

FORMALITY AND INFORMALITY IN COST-BENEFIT ANALYSIS

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Abstract

Cost-benefit analysis (CBA) is usually treated as a monolith. In fact, the term can refer to a broad variety of decisionmaking practices, ranging from a qualitative comparison of pros and cons to a highly formalized and technical method grounded in economic theory that monetizes both costs and benefits, discounts to present net value, and locates the point at which the marginal benefits curve crosses the marginal costs curve. This article develops a typology that helps to conceptualize the multiple varieties of CBA along a formality-informality spectrum. It then uses this typology to analyze the treatment of CBA by the academic community and the three branches of the federal government. In academic and policy circles, the formal end of this spectrum generates far more controversy than the informal end. Additionally, the law (federal environmental statutes and case law) seems to favor informal over formal varieties of CBA. Nonetheless, the executive branch appears to be moving toward the formal end of the spectrum. Executive Orders and guidance documents direct agencies to conduct a highly formal mode of CBA. And anecdotal evidence suggests that agencies often go out of their way to give their CBAs the trappings of formality, sometimes in ways that lead to irrational results. I argue that 1) failing to distinguish between formal and informal CBA, and the many varieties in between, has led to muddled thinking and to misuses of CBA; and 2) the trend toward formality in the executive branch is out of step with Congress and the courts and may be counterproductive, where, for example, it leads to what I call “false formality”—a corruption of CBA that can occur when agencies fail to clearly and consistently define where on the formality-informality spectrum a particular CBA falls.

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[M]y way is to divide half a sheet of paper by a line into two columns; writing over the one Pro, and over the other Con. Then, during three or four days consideration, I put down under the different heads short hints of the different motives, that at different times occur to me, for or against the measure. When I have thus got them all together in one view, I endeavor to estimate their respective weights And, though the weight of reasons cannot be taken with the precision of algebraic quantities, yet when each is thus considered, separately and comparatively, and the whole lies before me, I think I can judge better, and am less liable to take a rash step, and in fact I have found great advantage from this kind of equation, in what may be called moral or prudential algebra.

Letter from Benjamin
Franklin to Joseph
Priestley (Sept. 19,
1772)¹

I. INTRODUCTION

A debate has been raging for decades over whether to use cost-benefit analysis (CBA) in evaluating government regulation.² But the participants in this debate have

¹ EDWARD M. GRAMLICH, *A GUIDE TO BENEFIT-COST ANALYSIS I* (2d ed. 1990).

² For some early arguments in favor of CBA, see, for example, E. J. MISHAN, *COST-BENEFIT ANALYSIS* 390 (1976); A. R. Prest & R. Turvey, *Cost-Benefit Analysis: A Survey*, 75 *ECON. J.* 683, 683–85 (1965). For some early critiques, see, for example, ARTHUR SMITHIES, *THE BUDGETARY PROCESS IN THE UNITED STATES* 344–46 (1955); Robert Dorfman, *Forty Years of Cost-Benefit Analysis*, in *ECONOMETRIC CONTRIBUTIONS TO PUBLIC POLICY* 268 (Richard Stone & William Peterson eds. 1978).

At least in the environmental arena, Congress has largely rejected CBA as a decisionmaking tool, instead directing the agencies to set standards using other criteria, like feasibility or the protection of public health. See Sidney A. Shapiro & Christopher H. Schroeder, *Beyond Cost-Benefit Analysis: A Pragmatic Reorientation*, 32 *HARV. ENVTL. L. REV.* 433 (2008); Amy Sinden, *The Economics of Endangered Species: Why Less Is More in the Economic Analysis of Critical Habitat Designations*, 28 *HARV. ENVTL. L. REV.* 129 (2004) [hereinafter Sinden, *Endangered Species*]. But beginning with President Ronald Reagan, every president has imposed, through executive order, a requirement on federal

not always been careful about defining terms. What, after all, do we mean by “cost-benefit analysis”? The term can be used to describe a broad range of practices. On one end of the spectrum is a Ben Franklin-style listing of qualitatively described pros and cons. On the other end is a highly technical and formal analytic method grounded in economic theory that attempts to fully quantify and monetize all of the social costs and benefits of a whole range of regulatory options and then, by calculating the point at which the marginal benefits curve intersects the marginal costs curve, identify the economically efficient level of regulation. And between these two extremes lie yet more varieties of CBA.

The two ends of this spectrum actually have very little in common, other than the general approach of juxtaposing positive and negative impacts. Informal CBA relies on qualitative descriptions intuitively compared and gives no more than general guidance. The most formal varieties of CBA, on the other hand, rely on numbers and mathematics and purport, at least, to provide precise answers. Moreover, the two techniques play entirely different roles in the decisionmaking process. Informal CBA provides no more than a secondary check on a decision that has been made by other means, while formal CBA provides, at least in theory, a standard-setting tool for identifying the optimal choice from among a whole range of regulatory alternatives.

Despite this broad range of meanings, scholars and policymakers often use the term “cost-benefit analysis” (or “benefit-cost analysis”),³ without adjectives or qualifiers, as though it were a monolithic concept. This failure to distinguish

agencies to conduct CBA on all major rules, even when the statute does not allow the agency to make its decision on that basis. Exec. Order No. 12,291, 3 C.F.R. 127 (1982); Exec. Order No. 12,866, 3 C.F.R. 638 (1994), *reprinted as amended in* 5 U.S.C. § 601 app. at 88–92 (2012); Exec. Order No. 13,563, 3 C.F.R. 215 (2012), *reprinted in* 5 U.S.C. § 601 app. at 102–03 (2012); *see infra* notes 215 to 217 and accompanying text. As a result, agency use of CBA has increased over the past three decades. Nonetheless, debate continues over whether CBA makes regulation more rational or simply provides increased leverage for powerful industry stakeholders to downplay the benefits of regulation and manipulate agency decision making toward less stringency. Compare RICHARD L. REVESZ & MICHAEL A. LIVERMORE, *RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH* 13–16 (2008) and CASS R. SUNSTEIN, *THE COST-BENEFIT STATE: THE FUTURE OF REGULATORY PROTECTION* 19–20 (2002) [hereinafter SUNSTEIN, *COST-BENEFIT STATE*] and CASS R. SUNSTEIN, *RISK AND REASON: SAFETY, LAW, AND THE ENVIRONMENT* 99, 120–23 (2002) [hereinafter SUNSTEIN, *RISK & REASON*] and John D. Graham, *Saving Lives Through Administrative Law and Economics*, 157 U. PA. L. REV. 395, 429, 432–38 (2008) with FRANK ACKERMAN & LISA HEINZERLING, *PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING* (2004) and Amy Sinden, *In Defense of Absolutes: Combating the Politics of Power in Environmental Law*, 90 IOWA L. REV. 1405, 1410, 1452–60 (2005) [hereinafter Sinden, *Defense of Absolutes*].

³ The term “benefit-cost analysis” means exactly the same thing as “cost-benefit analysis” and is preferred by a number of proponents of CBA. *See, e.g.*, Kenneth J. Arrow et al., *Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?*, 272 SCIENCE 221, 221–22 (1996).

between the many varieties of CBA muddies the debate and can lead to irrational results that are, ironically, completely at odds with the common sense and reasonableness we ascribe to Ben Franklin.

Once we approach the debate with an ear tuned to this divergent range of meanings, a peculiar pattern emerges. Scholars and commentators largely ignore these distinctions, but to the extent they do take note of CBA's formal or informal characteristics, CBA skeptics tend to portray it as highly formalized, rigid, and technical. Indeed, their objections relate almost exclusively to problems specific to the formal versions of CBA: the conceptual difficulties that arise from trying to measure things like human lives and ecosystems in monetary terms, the controversies surrounding discount rates, the problem of wealth effects, the lack of scientific data precise enough to allow for meaningful quantification, and so on. Meanwhile, proponents of CBA are far more likely to paint it in Ben Franklin terms: as a simple, commonsense, rational weighing of pros and cons. Indeed, from this vantage point, it can often seem as though the two sides are talking past each other.

Still, this pattern suggests that there is far more potential for broad consensus to support less formal versions of CBA. We might, then, expect to see agencies—which tend to be averse to controversy—gravitating toward the informal end of the spectrum, at least to the extent that the law permits them to do so. But the actual trend appears to be in precisely the opposite direction. Despite the fact that both the federal courts and Congress seem to favor less formality in CBA,⁴ the executive branch appears to pull in the direction of increased formality. Executive orders and guidance documents direct agencies to conduct a fairly formal brand of CBA.⁵ And anecdotal evidence suggests that agencies sometimes go to great lengths to give their CBAs the trappings of formality in efforts that ultimately prove futile, or even irrational. Indeed, this is happening even in the face of a recent Supreme Court case, *Entergy Corp. v. Riverkeeper, Inc.*,⁶ in which the Court expressed a clear preference for informal over formal modes of CBA.⁷

Thus, this pull toward formality in the executive branch sparks controversy in policy and academic circles and is out of step with Congress and the courts. Moreover, it may be counterproductive, where, for example, it leads to what I call “false formality.” This is a corruption of CBA that can occur when agencies fail to clearly define where on the formality-informality spectrum a particular CBA falls, and is one example of the kind of analytic sloppiness and muddled thinking that results from a failure to clearly distinguish among different forms of CBA.

This Article proceeds in five parts. Part II describes in more detail the distinctions between formal and informal CBA and presents a typology that helps to conceptualize and analyze the multiple varieties of CBA. Part III then reviews the academic debate over CBA and traces the role that conceptions of formality and

⁴ See discussion *infra* Part IV.

⁵ See discussion *infra* Part V.

⁶ 556 U.S. 208 (2009).

⁷ *Id.* at 226–27.

informality have played in the arguments put forth by proponents and skeptics. Part IV examines how Congress and the federal courts have made distinctions and choices between formal and informal versions of CBA in the context of environmental health and safety laws. Part V then analyzes the executive orders and guidance documents that govern the use of CBA by federal agencies and describes the rulemakings leading up to and following the Supreme Court's decision in *Riverkeeper*, in which the pull toward formality led the Environmental Protection Agency (EPA) first to irrationality and then to futility. Parts IV and V focus primarily on the use of CBA in the context of environmental, health, and safety regulation because this is the area in which CBA has been most extensively used and in which agency sophistication is probably highest. Many aspects of the analysis, however, may well be more broadly applicable. Finally, Part VI describes the lessons this analysis suggests for the broader debate about CBA.

II. THE MULTIPLE FORMS OF COST-BENEFIT ANALYSIS

Broadly speaking, CBA is a decisionmaking technique that weighs and compares the costs and benefits of a course of action.⁸ Within those broad outlines,

⁸ Richard A. Merrill, *Risk-Benefit Decisionmaking by the Food and Drug Administration*, 45 GEO. WASH. L. REV. 994, 996 (1977) (“‘Risk-benefit analysis’ . . . includes any technique for making choices that explicitly or implicitly attempts to measure the potential adverse consequences of an activity and to predict its benefits.”); cf. Steven Kelman, *Cost-Benefit Analysis: An Ethical Critique*, 5 REG. 33, Jan./Feb. 1981, at 33 (“At the broadest and vaguest level, cost-benefit analysis may be regarded simply as systematic thinking about decision-making.”).

In theory, a CBA could consist of just the tasks of toting up total costs and total benefits without actually comparing them. See RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 510 (8th ed. 2011) (“[C]ost-benefit analysis can refer to a method of pure evaluation, conducted without regard to the possible use of its results in a decision . . .”). Such an analysis would provide information only, with no explicit guidance on whether the analyzed regulation is a good or bad idea. Some authors sometimes appear to define CBA in this way. See, e.g., Robert W. Hahn & Cass R. Sunstein, *A New Executive Order for Improving Federal Regulation? Deeper and Wider Cost-Benefit Analysis*, 150 U. PA. L. REV. 1489, 1498 (2002) (describing CBA “as a tool and a procedure, rather than as a rigid formula to govern outcomes” that “requires a full accounting of the consequences of an action, in both quantitative and qualitative terms [that] [o]fficials should have . . . before them when they make decisions”); David M. Driesen, *Is Cost-Benefit Analysis Neutral?*, 77 U. COLO. L. REV. 335, 339 (2006) (“CBA of a proposed regulation consists of estimates of the regulation’s costs and . . . benefits.”). But it strains credibility to imagine that CBA is ever really treated that way in practice. Once costs and benefits are both toted up, it is hard to imagine the analyst not, at least implicitly, comparing them. Because I view some comparison of the costs to the benefits as integral to the enterprise of CBA, I have defined it to explicitly include that comparison. As discussed below, the manner in which the comparison is performed (i.e., the balancing formula used) can vary considerably.

however, it can refer to a wide and divergent array of procedures and practices.⁹ At one end of the spectrum is the “prudential algebra” Ben Franklin described in his letter to his friend, Joseph Priestley.¹⁰ This involves identifying benefits and costs (pros and cons) in purely qualitative terms, listing them in two columns on a sheet of paper, and then making a judgment about their relative weights. This is all done without actually attempting to convert them into numeric or monetized terms—that is, heeding Ben Franklin’s advice that “the weight of reasons cannot be taken with the precision of algebraic quantities”¹¹ At the other end of the spectrum is a highly technical and theorized branch of welfare economics that attempts to quantify and monetize all social costs and benefits for a whole range of alternatives using formal techniques—including discounting future costs and benefits to present net value—and then attempts to pinpoint the course of action for which marginal benefits are just equal to marginal costs.¹²

Informal, Ben-Franklin-style CBA is intuitive—almost a matter of common sense. Many of us perform some version of it as a matter of course when making major life decisions. Understanding the most formal version of CBA, on the other

⁹ Several others have also distinguished between different forms of CBA. See John C. Coates IV, *Cost-Benefit Analysis of Financial Regulation: Case Studies and Implications* 124 YALE L.J. (forthcoming 2015) (distinguishing between “quantified CBA,” “guesstimated CBA,” and “conceptual CBA”); Jonathan Cannon, *The Sounds of Silence: Cost-Benefit Canons in Entergy Corp. v. Riverkeeper, Inc.*, 34 HARV. ENVTL. L. REV. 425, 428–29 (2010) (distinguishing between strong vs. weak forms of CBA); Graham, *supra* note 2, at 432–38 (distinguishing between soft vs. hard forms of CBA); DANIEL A. FARBER, *ECO-PRAGMATISM: MAKING SENSIBLE ENVIRONMENTAL DECISIONS IN AN UNCERTAIN WORLD* 39 (1999) (distinguishing between CBA aimed at economic efficiency versus “soft” CBA, “which would compare costs and benefits without attempting to quantify every factor”).

¹⁰ GRAMLICH, *supra* note 1, at 1 (quoting Letter from Benjamin Franklin to Joseph Priestley (Sept. 19, 1772)).

¹¹ *Id.*

¹² See Merrill, *supra* note 8, at 996 (describing this kind of formal CBA as CBA “[i]n its most refined form”). Note that cost-effectiveness analysis—a form of analysis that often accompanies CBA—does not appear anywhere on this spectrum. Cost-effectiveness analysis is a distinct form of analysis with a fundamentally different analytic structure. While CBA measures all the social costs and social benefits of a given course of action and compares them, cost-effectiveness analysis takes a single regulatory goal or endpoint (e.g., saving one human life) and compares the costs of reaching that goal under various regulatory alternatives. See E. J. MISHAN & EUSTON QUAH, *COST-BENEFIT ANALYSIS* 8 (5th ed. 2007); NAT’L CTR. FOR ENVTL. ECON., EPA, *GUIDELINES FOR PREPARING ECONOMIC ANALYSES* xi (2014) [hereinafter *GUIDELINES*], available at [http://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0568-50.pdf/\\$file/EE-0568-50.pdf](http://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0568-50.pdf/$file/EE-0568-50.pdf), archived at <http://perma.cc/GA38-AUXP>. Thus, cost-effectiveness analysis does not purport to measure the total net social benefits of a course of action as CBA does, and, rather than comparing overall social costs directly to overall social benefits, cost-effectiveness analysis compares the costs of various alternative methods for achieving a single regulatory benefit.

hand, requires some grounding in the basics of welfare economics, which the following section provides.

A. *Welfare Economics and CBA*

Welfare economics is the normative branch of economics. It traces its roots to utilitarianism and is built around the normative principle of “efficiency”—that is, the maximization of the overall welfare of members of society in the aggregate.¹³ Measuring aggregate “welfare” has always been problematic, however. The early welfare economists rejected the notion that welfare or levels of happiness could be compared across individuals.¹⁴ Nineteenth century social scientist, Vilfredo Pareto, found a way around this problem by constructing a definition of efficiency that avoids trading off one person’s welfare gain or loss against another’s.¹⁵ Under what is now known as the Pareto Principle, one state of affairs is a “Pareto improvement” over another if it would result in at least one person being better off and no one being worse off.¹⁶ A situation is “Pareto optimum” or “Pareto efficient,” therefore, if there is no alternative state of affairs that would be a Pareto improvement.¹⁷

Under the laws of welfare economics, Pareto efficiency will be achieved by a perfectly functioning market¹⁸—one in which participants act rationally (consumers maximize “utility,” or preference satisfaction, and producers maximize profits), there are no transaction costs, information is perfect, and all social costs and benefits are accounted for in private costs and benefits (i.e., there are no externalities).¹⁹ To get an intuitive sense of why this is so, consider that in a perfect market, every transaction between a willing seller and a willing buyer produces a Pareto

¹³ See Amartya Sen, *The Possibility of Social Choice*, 89 AM. ECON. REV. 349, 351–52 (1999). *But see* Richard A. Posner, *Utilitarianism, Economics, and Legal Theory*, 8 J. LEGAL STUD. 103, 129–30 (1979) (explaining distinctions between welfare economics and utilitarianism).

¹⁴ See Sen, *supra* note 13, at 352 (“Every mind is inscrutable to every other mind and no common denominator of feelings is possible.” (citation omitted)); Oscar Lange, *The Foundations of Welfare Economics*, 10 ECONOMETRICA 215, 215 (1942) (stating that interpersonal comparisons have a “lack of operational significance”). *But see* Sen, *supra* note 13, at 356–60 (arguing that interpersonal welfare comparisons are possible).

¹⁵ See GRAMLICH, *supra* note 1, at 31.

¹⁶ *Id.*

¹⁷ See Gerard Debreu, *Valuation Equilibrium and Pareto Optimum*, 40 PROC. NAT’L ACAD. SCI. 588, 588 (1954); Morey W. McDaniel, *Stockholders and Stakeholders*, 21 STETSON L. REV. 121, 127 (1991). *But see* Amartya Sen, *Liberty, Unanimity and Rights*, 43 ECONOMETRICA 217, 235 (1976) (arguing that Pareto principle is inconsistent with basic liberal rights); MATTHEW D. ADLER & ERIC A. POSNER, *NEW FOUNDATIONS OF COST-BENEFIT ANALYSIS* 19–21 (2006) (describing objections to the Pareto standard).

¹⁸ See ROGER PERMAN ET AL., *NATURAL RESOURCE AND ENVIRONMENTAL ECONOMICS* 90–93 (1996).

¹⁹ See *id.*; ANTHONY E. BOARDMAN ET AL., *COST-BENEFIT ANALYSIS: CONCEPTS AND PRACTICE* 53 (4th ed. 2011).

improvement. Since the transaction is voluntary, both buyer and seller enjoy an increase in welfare.²⁰ Moreover, since in a perfect market there are no externalities, all of the costs and benefits associated with the transaction accrue to the two parties, and no one else is made worse off. Thus, under perfect conditions, the market will reach an equilibrium point of Pareto efficiency—that is, a point at which there is no alternative state of affairs that would be a Pareto improvement.²¹

Where the market is imperfect, however—where, for example, manufacturing some market good produces an externality like pollution that makes people sick or harms ecosystems—it will fail to achieve Pareto efficiency. In such circumstances it is appropriate, according to economic theory, for government to intervene with regulation to try to correct the market failure. But, economists argue, when government does step in, it should calibrate its regulation to mimic the economically efficient outcome that a perfectly functioning market would have produced.

This is where CBA comes in. Economists use CBA to try to identify the perfectly efficient level of regulation. The problem is that any attempt to use Pareto efficiency as the standard for judging the efficiency of government intervention is impractical.²² First, it is probably impossible to find a government action that does not cause harm to at least one person. Thus, virtually all government intervention would fail a Pareto-efficiency test. Second, the informational burden of trying to break down aggregate costs and benefits into individual costs and benefits is insurmountable. Accordingly, for these purposes, many economists turn to a slightly different definition of efficiency with “somewhat less conceptual appeal, but much greater feasibility” known as “potential Pareto” or “Kaldor-Hicks” efficiency.²³ Under this definition, a government regulation is more efficient than the status quo if those who stand to benefit from the regulation could fully compensate those who stand to lose from it and still be better off. Or, put another way, a regulation is more efficient in the Kaldor-Hicks sense if, following a hypothetical transfer of wealth from the winners to the losers, the resulting state of affairs would be a Pareto improvement.²⁴ Notice that a regulation meets this test whether or not the hypothetical wealth transfer occurs (and it virtually never does).²⁵

Thus, many economists use the concept of Kaldor-Hicks efficiency rather than Pareto efficiency as the basis for evaluating regulations and other public projects

²⁰ See POSNER, *supra* note 8, at 20.

²¹ RICHARD CORNES & TODD SANDLER, *THE THEORY OF EXTERNALITIES, PUBLIC GOODS, AND CLUB GOODS* 23 (2d ed. 1996); see also PAUL A. SAMUELSON & WILLIAM D. NORDHAUS, *ECONOMICS* 158 (17th ed. 2001) (explaining that perfectly competitive markets create a state of “allocative efficiency,” meaning that “no possible reorganization of production can make anyone better off without making someone else worse off”).

²² See GRAMLICH, *supra* note 1, at 31–32.

²³ BOARDMAN ET AL., *supra* note 19, at 32; POSNER, *supra* note 8, at 17–20.

²⁴ BOARDMAN ET AL., *supra* note 19, at 32; MISHAN, *supra* note 2, at 390–91.

²⁵ See GRAMLICH, *supra* note 1, at 32.

and policies under CBA.²⁶ In this way, they defend CBA as a normative standard for judging government intervention, while recognizing that it performs an imperfect imitation of the Pareto efficiency produced by a perfect market and no longer avoids the philosophical conundrums associated with interpersonal welfare comparisons that Pareto efficiency so effectively sidesteps.²⁷

Accordingly, any regulation for which total social benefits exceed total social costs (in comparison to the status quo) constitutes a Kaldor-Hicks improvement. And an economist could, in theory at least, identify the level of regulation that is optimally efficient in the Kaldor-Hicks sense by measuring all of the social costs and benefits of a whole range of regulatory alternatives and then locating the alternative that provides the highest level of net social benefit.²⁸ On the graph in Figure 1, for example, the third alternative (“even more stringent regulation”) would be the “efficient” one in the language of economic theory because it provides the highest *net* social benefit, even though the fourth alternative (“most stringent”) provides higher benefits in absolute terms.

²⁶ *Id.* This might be considered the mainstream view, at least in this country, but the discipline of economics is hardly a monolith and there are plenty of economists who reject this approach. See, e.g., David Ellerman, *On a Fallacy in the Kaldor-Hicks Efficiency-Equity Analysis*, 25 CONST. POL. ECON. 125, 127–28 (2014); see also ADLER & POSNER, *supra* note 27, at 21–24 (rejecting Kaldor-Hicks defense of CBA). In the United Kingdom and Europe, the dominant approach to CBA grounds it in the idea of a social welfare function rather than Kaldor-Hicks efficiency. See Matthew D. Adler et al., *The Social Value of Mortality Risk Reduction: VSL Versus the Social Welfare Function Approach*, 35 J. HEALTH ECON. 82, 82 (2014) (comparing the differing approaches of the United States and United Kingdom to cost-benefit analysis). For an explanation of social welfare functions, see PERMAN ET AL., *supra* note 18, at 27–37, 85–86.

²⁷ See MISHAN, *supra* note 2, at 382–96; Matthew D. Adler & Eric A. Posner, *Rethinking Cost-Benefit Analysis*, 109 YALE L.J. 165, 190 (1999) (noting that “[m]ost economists appear to concede that the Kaldor-Hicks standard is not, by itself, normatively desirable” but defend it nonetheless on the grounds that benefits to winners and costs to losers will wash out in the end).

²⁸ EDITH STOKEY & RICHARD ZECKHAUSER, A PRIMER FOR POLICY ANALYSIS 137 (1978); see BOARDMAN ET AL., *supra* note 19, at 13, 33; see also OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, at 9–10 (2003).

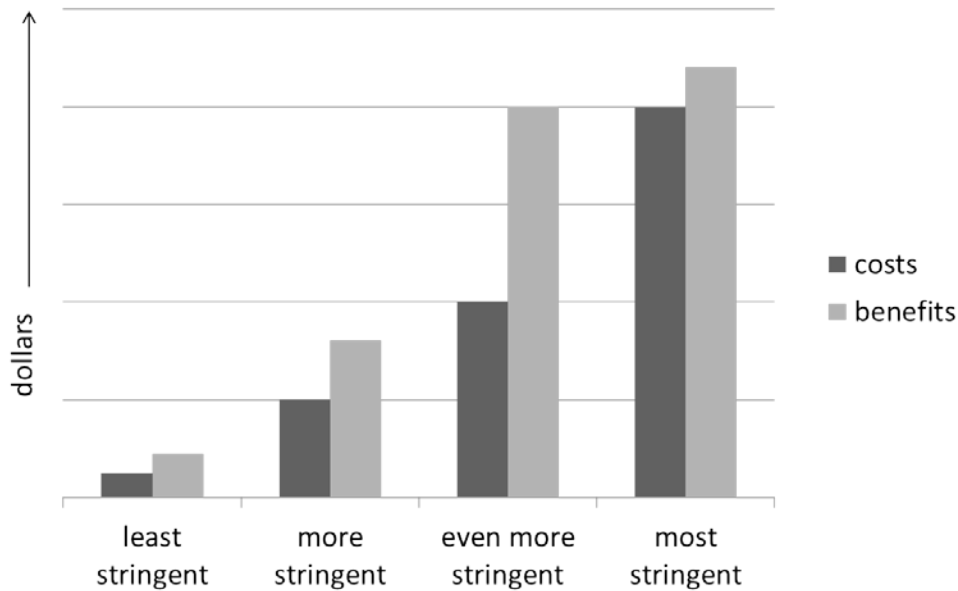


FIGURE 1. Total costs and benefits of varying levels of regulation.

Ideally, the economist would have enough data on the costs and benefits of incrementally more and less stringent regulatory alternatives to plot on a graph the marginal benefits and marginal costs of regulation at each possible level of stringency. (The change in the level of costs or benefits produced by each incremental change in the stringency of the regulation is called a “marginal cost” or a “marginal benefit.”) In many instances, the relationship between costs and benefits is something like that shown in Figure 2. That is, marginal benefits exceed costs at low levels of stringency, but as the stringency of regulation increases the marginal costs gradually increase while the marginal benefits gradually decrease until the two lines cross, and at higher levels of stringency, marginal costs exceed marginal benefits. In such a case, the level of regulation at which net benefits are maximized—the point of optimal Kaldor-Hicks efficiency²⁹—is the level at which the two curves cross, that is, where marginal costs are just equal to marginal benefits.³⁰ Figure 2 illustrates this idea. Thus, assuming (1) sufficient data, (2)

²⁹ Notice that I use the term “efficiency” interchangeably with “optimal efficiency” to refer to a state of net benefits maximization. Some authors use the term “efficiency” in the context of welfare economics more loosely, to refer to any state of affairs that increases net benefits over the status quo, even if it does not achieve net benefits maximization.

³⁰ See GRAMLICH, *supra* note 1, at 33–36; TOM TIETENBERG, ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS 25, 66 (5th ed. 2000); Richard D. Morgenstern, *Conducting an Economic Analysis: Rationale, Issues, and Requirements*, in ECONOMIC ANALYSES AT EPA: ASSESSING REGULATORY IMPACT 25, 40 (Richard D. Morgenstern ed., 1997); Arrow et al., *supra* note 3, at 221.

relevant values that can all be meaningfully monetized, and (3) technologies that allow for incrementally varying levels of control (three big assumptions), an economist would be able to identify the point of economic efficiency.

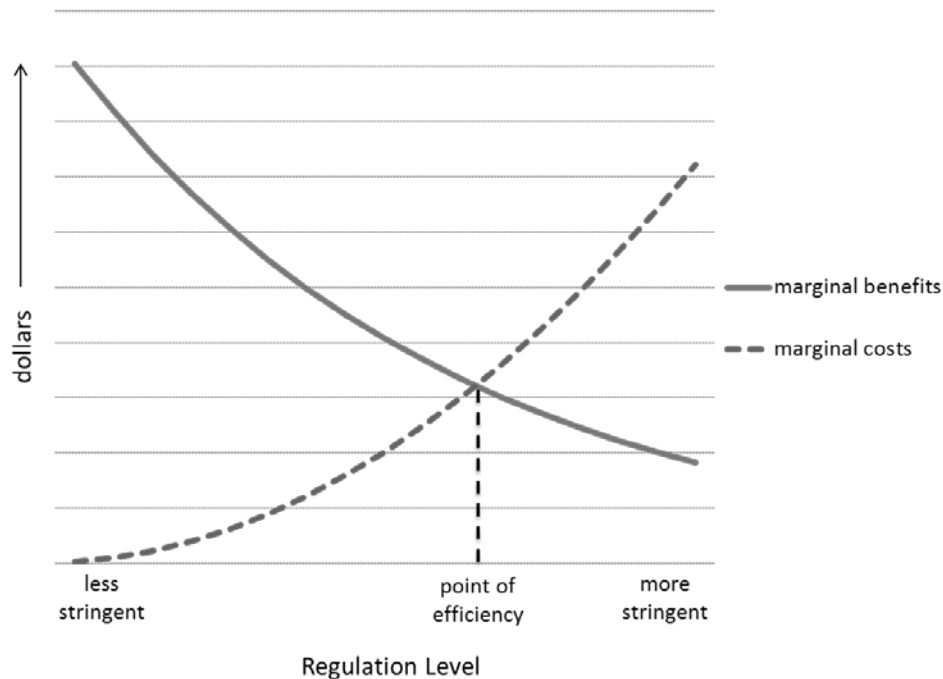


FIGURE 2. Marginal costs and benefits of incrementally varying levels of regulation.

Welfare economics, then, presumes a kind of cost-benefit analysis that measures the social costs and benefits of many alternative regulations at incrementally varying levels of stringency. Moreover, because the purpose is to identify the precise point at which marginal costs just equal marginal benefits, this form of CBA must quantify all of the social costs and all of the social benefits for each regulatory alternative and convert all of those quantities into a common metric (usually dollars) so that, for each alternative, all costs and benefits can be aggregated and compared.³¹

B. Complications and Critiques

This quantification and monetization raises a host of complications. In many instances, we simply lack good information and data on how much a regulation will

³¹ See MISHAN, *supra* note 2, at 180–81.

cost or on the benefits it might provide to human or ecological health.³² But more fundamentally, using dollars to measure nonmarket goods—like saving people from dying of cancer or an endangered species from extinction—raises a host of intractable theoretical problems. Some take the position that converting such values to a monetary (or any other common) metric confronts incommensurability problems that are simply insurmountable.³³ And there are other, more subtle problems as well.

First, in order to aggregate and compare costs and benefits that will not accrue until a future date alongside those accrued in the present, cost-benefit analysis typically applies a discount rate to future costs and benefits. While such discounting makes sense when comparing purely monetary sums, when applied to natural resources, human lives, and future generations, it confronts deep theoretical difficulties.³⁴ Even those who view discounting of such values as appropriate are far from consensus on the proper method for setting the rate.³⁵ As a result, the discount rates applied in practice vary widely and yield wildly differing outcomes when applied to time periods of a decade or more.³⁶

Additionally, dollars do not provide a consistent measure of value across rich and poor people because of the declining marginal value of money (the fact that a dollar is worth more to a poor person than to a rich person) and the fact that willingness to pay is constrained by ability to pay.³⁷ A phenomenon known as “the

³² See THOMAS O. MCGARITY, *REINVENTING RATIONALITY: THE ROLE OF REGULATORY ANALYSIS IN THE FEDERAL BUREAUCRACY* 134 (1991); Ronnie Levin, *Lead in Drinking Water*, in *ECONOMIC ANALYSES AT EPA*, *supra* note 30, at 205, 230; Amy Sinden, *The Problem of Unquantified Benefits* at 21–27 (March 16, 2015) (unpublished manuscript) (on file with Utah Law Review).

³³ ELIZABETH ANDERSON, *VALUE IN ETHICS AND ECONOMICS* 55–59 (1993); MARK SAGOFF, *THE ECONOMY OF THE EARTH: PHILOSOPHY, LAW, AND THE ENVIRONMENT* 1–7 (1988); Cass R. Sunstein, *Incommensurability and Valuation in Law*, 92 *MICH. L. REV.* 779, 841–42 (1994); see also Lisa Heinzerling, *Quality Control: A Reply to Professor Sunstein*, 102 *CALIF. L. REV.* 1457, 1465–66 (2014) (critiquing the Department of Justice’s attempts to quantify the costs of prison rape) (“To ask how much victims of sexual assault would be willing to accept assault is . . . to misunderstand the very nature of the crime . . .”).

³⁴ Douglas A. Kysar, *Discounting . . . on Stilts*, 74 *U. CHI. L. REV.* 119, 119–20 (2007); Richard L. Revesz, *Environmental Regulation, Cost-Benefit Analysis, and the Discounting of Human Lives*, 99 *COLUM. L. REV.* 941, 955–86 (1999); Lisa Heinzerling, *Discounting Our Future*, 34 *LAND & WATER L. REV.* 39, 40–41 (1999).

³⁵ Daniel H. Cole, *Law, Politics, and Cost-Benefit Analysis*, 64 *ALA. L. REV.* 55, 57 (2012) (“In the literature, one finds a large range of acceptable values for discount rates . . . large enough to permit the strategic manipulation of outcomes . . .”).

³⁶ *Id.* at 57–62.

³⁷ Some argue that CBA can be designed to incorporate distributional weightings in order to correct for the problem of wealth effects. See, e.g., Matthew D. Adler, *Cost-Benefit Analysis and Distributional Weights: An Overview* (Duke Envtl. & Energy Econ. Working Paper Series, Working Paper No. EE 13-04, 2013), available at http://scholarship.law.duke.edu/faculty_scholarship/3110, archived at <http://perma.cc/5M>

endowment effect” presents a related problem. Experiments show that people demand significantly more to give up a good that they already have than they are willing to pay to obtain the same good if they do not have it yet.³⁸ Any attempt to measure values in dollar terms is accordingly indeterminate.

Despite these problems, economists have developed a number of clever techniques for trying to divine the monetary value of things not traded in markets.³⁹ Hedonic surveys are an example of a “revealed preference” technique. These surveys attempt to infer a dollar value for nonmarket goods by observing things that *are* traded in markets and are thought to reflect (or “reveal”) the unpriced value.⁴⁰ Thus, an economist might attempt to measure the value people attach to unspoiled open space by comparing the prices of otherwise comparable properties located adjacent to spoiled and unspoiled areas.⁴¹ Or an economist might measure the recreational “use value” attached to natural resources by measuring the admission fees and travel costs hikers pay to visit a national park.⁴²

99-EHFV; Gregory Scott Crespi, *Correcting for the Wealth Bias of Cost-Benefit Analysis Through Use of “Percentage of Wealth”-based Valuations*, 46 CREIGHTON L. REV. 149, 149–56 (2013). But this is an underdeveloped and controversial technique. See Susan Rose-Ackerman, *Putting Cost-Benefit Analysis in Its Place: Rethinking Regulatory Review*, 65 U. MIAMI L. REV. 335, 339 (2011).

³⁸ See John K. Horowitz & Kenneth E. McConnell, *A Review of WTA/WTP Studies*, 44 J. ENVTL. ECON. & MGMT. 426, 426–47 (2002); Jack L. Knetsch, *Environmental Policy Implications of Disparities Between Willingness to Pay and Compensation Demanded Measures of Values*, 18 J. ENVTL. ECON. & MGMT. 227, 227–37 (1990); but see generally Charles R. Plott & Kathryn Zeiler, *The Willingness to Pay—Willingness to Accept Gap, the “Endowment Effect,” Subject Misconceptions, and Experimental Procedures for Eliciting Valuations*, 95 AM. ECON. REV. 530 (2005) (arguing that previous experiments demonstrating a gap between willingness to pay and willingness to accept were skewed by subject misconceptions, and reporting results of experiment controlling for all previously identified sources of subject misconception that found no such gap).

³⁹ See generally DAVID W. PEARCE & ANIL MARKANDYA, ENVIRONMENTAL POLICY BENEFITS: MONETARY VALUATION (1989) (discussing various direct and indirect benefit valuation techniques, including hedonic and contingent valuation methods).

⁴⁰ See generally David S. Brookshire et al., *Valuing Public Goods: A Comparison of Survey and Hedonic Approaches*, 72 AM. ECON. REV. 165 (1982); see also BOARDMAN ET AL., *supra* note 19, at 353–57; Philip E. Graves, *Benefit-Cost Analysis of Environmental Projects: A Plethora of Biases Understating Net Benefits*, 3 J. BENEFIT-COST ANALYSIS 1, 12–19 (2012).

⁴¹ E.g., Richard Ready & Charles Abdalla, *The Impact of Open Space and Potential Local Disamenities on Residential Property Values in Berks County, Pennsylvania* (Pa. State Univ. Dep’t Agric. Econ. & Rural Sociology, Staff Paper No. 363, 2003), available at <http://aese.psu.edu/directory/aic/the-impact-of-open-space-and-potential-local-disamenities-on-residential-property-values-in-berks-county-pennsylvania>, archived at <http://perma.cc/2W4Z-JZ6V>.

⁴² See Shi-Ling Hsu & John Loomis, *A Defense of Cost-Benefit Analysis for Natural Resource Policy*, [2002] 32 Env’tl. L. Rep. (Env’tl. Law Inst.) 10,239, 10,242 (Feb. 2002); BOARDMAN ET AL., *supra* note 19, at 358–65.

Alternatively, where values can't be "revealed" through actual market transactions, economists turn to "stated preference" methods. "Contingent valuation" surveys—also called "stated-preference surveys"—attempt to determine people's willingness to pay for nonmarket goods by simply asking them.⁴³ In what is essentially a sophisticated public-opinion poll, respondents are given information about a particular natural resource or medical condition and then asked how much they would be willing to pay to preserve the resource or avoid the disease. One such stated-preference survey, for example, concludes that the average California household is willing to pay \$18.14 per year to increase gray whale populations by 100 percent.⁴⁴ Another concludes that the average person is willing to pay \$457,000 to avoid contracting chronic bronchitis.⁴⁵

All of these methods are controversial and produce highly contestable results.⁴⁶ One problem, for example, is the endowment effect, discussed above. Even though measuring willingness to pay (to buy) versus willingness to accept (to sell) yields different values for the same good, economists have yet to come up with any principled basis for choosing between these two measures of value. This makes stated-preference surveys, which are almost always designed to measure willingness to pay, vulnerable to criticism that they underestimate the values they try to measure.

In sum, the kind of CBA that emerges out of the theory of welfare economics is highly formal, complex, and technical—a far cry from Ben Franklin's prudential algebra. Using these two extremes as a starting point, the next section develops a typology of formality and informality in CBA.

C. *Formality and Informality in CBA: A Typology*

The two forms of CBA described in the previous section, which I will refer to as "Ben Franklin CBA" and "Economic CBA," define two ends of a spectrum from informality to formality. Many forms of CBA fall somewhere in between. By defining the two extremes, however, we can see that these different forms of CBA have characteristics that vary along three distinct but related axes.

⁴³ See BOARDMAN ET AL., *supra* note 19, at 372–405; Hsu & Loomis, *supra* note 42, at 10,242; Thomas H. Stevens et al., *Measuring the Existence Value of Wildlife: What Do CVM Estimates Really Show?*, 67 LAND ECON. 390, 392–97 (1991). For a critique, see generally John M. Heyde, *Is Contingent Valuation Worth the Trouble?*, 62 U. CHI. L. REV. 331 (1995).

⁴⁴ John B. Loomis & Douglas M. Larson, *Total Economic Values of Increasing Gray Whale Populations: Results from a Contingent Valuation Survey of Visitors and Households*, 9 MARINE RES. ECON. 275, 282 tbl.1 (1994).

⁴⁵ See W. Kip Viscusi et al., *Pricing Environmental Health Risks: Survey Assessments of Risk-Risk and Risk-Dollar Trade-Offs for Chronic Bronchitis*, 21 J. ENVTL. ECON. & MGMT. 32, 47, 50 (1991).

⁴⁶ See DAVID W. PEARCE & R. KERRY TURNER, *ECONOMICS OF NATURAL RESOURCES AND THE ENVIRONMENT* 141–58 (1990); Leonard Shabman & Kurt Stephenson, *Environmental Valuation and Its Economic Critics*, 126 J. WATER RES. PLAN. & MGMT. 382, 382–84 (2000).

Axis 1 describes the level of quantification and monetization involved in the assessment of costs and benefits. Axis 2 describes the degree of precision with which the comparison is made.⁴⁷ And Axis 3 describes the number of regulatory alternatives for which cost/benefit estimates are generated. As discussed below, these three axes are related in that where a particular CBA falls along one axis may affect where it can logically fall along the other two.

1. The Three Axes

Axis 1, as illustrated in Figure 3, extends from the purely qualitative description of pros and cons involved in a Ben Franklin CBA on the left, to the full quantification and monetization of all aspects of social costs and benefits that is required for an Economic CBA on the right. There are obviously an infinite variety of possibilities between these two extremes, only a few of which are described in the boxes on the diagram. Costs and/or benefits may be partially quantified to varying degrees. And even where there is quantification, there may not be monetization, leaving costs and benefits expressed in different metrics.

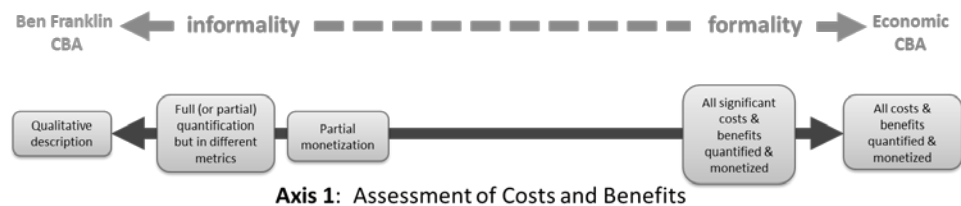


FIGURE 3. Axis 1.

It is also worth pointing out that an analysis that falls all the way to the right on Axis 1—that is, that fully monetizes absolutely all costs and benefits—is undoubtedly impossible to achieve in practice.⁴⁸ Even the next box to the left (“All significant costs & benefits quantified and monetized”) is probably impossible to achieve in practice much of the time, at least with respect to environmental regulation, although this is a more controversial statement.⁴⁹ Indeed, much

⁴⁷ Professor David Driesen has previously identified some of the points along this axis, calling them the “efficiency criterion,” the “no excess cost criterion,” and the “proportionality criterion” (“costs should not grossly exceed benefits”). David M. Driesen, *Two Cheers for Feasible Regulation: A Modest Response to Masur and Posner*, 35 HARV. ENVTL. L. REV. 313, 318–19 (2011); Driesen, *supra* note 8, at 387–94.

⁴⁸ See, e.g., MICHAEL FAURE & GÖRAN SKOGH, *THE ECONOMIC ANALYSIS OF ENVIRONMENTAL POLICY AND LAW: AN INTRODUCTION* 166 (2003) (“All costs and benefits are, in reality, of course, not measurable.”); BOARDMAN ET AL., *supra* note 19, at 10–12 (discussing various impediments to full quantification and monetization).

⁴⁹ See BOARDMAN ET AL., *supra* note 19, at 11 (noting that quantifying and monetizing environmental values is “especially contentious”).

disagreement between the supporters and skeptics of CBA probably boils down to differing beliefs about the feasibility of getting somewhere close to the right end of Axis 1 in practice.

Axis 2, illustrated in Figure 4, describes the precision of the balancing test used to compare costs and benefits. This axis extends from the rough, apples-to-oranges comparison that occurs under Ben Franklin CBA on the left, to, on the other end, pinpointing the level of regulatory stringency at which marginal benefits and marginal costs are just equal in order to identify the point of Kaldor-Hicks efficiency under Economic CBA. Here there are also a variety of possibilities in between the two extremes, the most prominent of which are identified in the boxes in Figure 4.

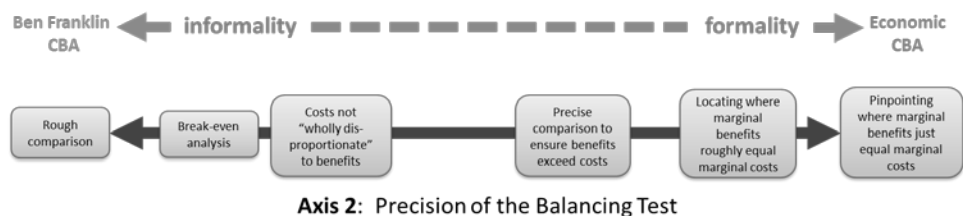


FIGURE 4. Axis 2.

The balancing tests along Axis 2 actually vary along two separate dimensions. First, they vary with respect to the precision with which costs and benefits must be compared. Locating the point at which marginal costs and benefits are equal requires more precision than a rough comparison. Second, some of the tests vary with respect to the proportion of benefits to costs that triggers the tipping point—in other words, where the fulcrum is placed on the scales. Thus, the third box from the right (“precise comparison to ensure benefits exceed costs”) probably requires at least a 1.1 to 1 ratio of benefits to costs, while the “costs not wholly disproportionate to benefits” test might put the tipping point at 1 to 5 or even 1 to 25.⁵⁰ On the other end of the spectrum, Economic CBA requires total benefits to exceed total costs *as much as possible* (maximization of net benefits).

In principle, the placement of the fulcrum doesn’t necessarily have any connection to formality or informality. It could simply reflect a judgment by, say, Congress about where it wants the risk of error to fall. (A wholly disproportionate test allows more regulation through than a benefits-exceed-costs test.) Notice in this regard that the tests are not arrayed in order on Axis 2 with respect to fulcrum placement: the left-most box (“rough comparison”) probably puts the fulcrum in

⁵⁰ Note that under Economic CBA, comparing costs and benefits through the ratio of the two is inappropriate because it is the absolute amount of net benefits to society that is important. See GRAMLICH, *supra* note 1, at 42; OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, at 10 (2003).

about the same place as the third box from the right (“precise comparison to ensure benefits exceed costs”).⁵¹

In practice, however, the position of the fulcrum ends up also having implications for the level of precision used in the balance. Thus, the balancing test for Economic CBA in the rightmost position on Axis 2 requires a fulcrum shift—benefits must exceed costs as much as possible. But that fulcrum shift also implies a precise balance, because finding the point of net benefits maximization requires locating the point where marginal costs and benefits are *just equal*. The wholly disproportionate test probably operates similarly. One could in principle interpret this test to impose a precise tipping point; for example, benefits that are 10% of costs are okay, but benefits at 9% of costs are not. In practice, however, it seems likely that the real significance of the fulcrum shifting accomplished by the wholly disproportionate standard is that it allows for a rougher comparison. One can tell from a distance whether two elements are wholly disproportionate, even if the picture is fuzzy. Discerning whether one element just exceeds another, however, may require a sharper, more precise image.⁵² Accordingly, with the caveats stated above, I have chosen to arrange these balancing tests on a single axis, placing the emphasis on the precision of the balance (an aspect of formality) rather than the placement of the fulcrum.

Axis 3, illustrated in Figure 5, describes the number of alternatives for which costs and benefits are evaluated and compared. This can obviously range from a single alternative to the full spectrum of incrementally varying alternatives that would be necessary in order to graph the marginal cost and marginal benefit curves for an Economic CBA. Here, too, there are of course many possible points in between—as many as there are incrementally varying alternatives.

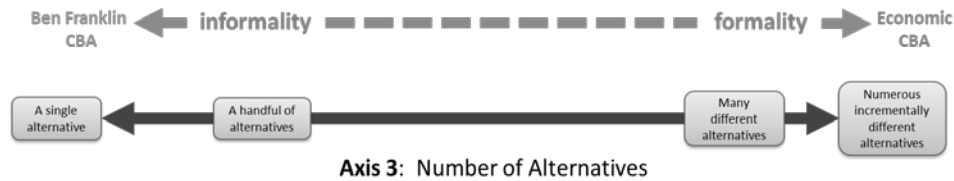


FIGURE 5. Axis 3.

⁵¹ A break-even analysis, which is essentially a way of trying to get a handle on whether benefits exceed costs when benefits are only partially monetized, also puts the fulcrum in the same place. *See infra* notes 60–63 and accompanying text.

⁵² The EPA, at least, appears to treat the standard this way. *See infra* notes 299–300 and accompanying text (describing the EPA’s stated justification for using a wholly disproportionate test in the cooling water intake rule under the Clean Water Act: “important benefit effect categories will very likely not be able to be quantified and monetized”).

Axis 3 is overidealized and potentially misleading to the extent it suggests that alternatives can always be neatly ranked in linear fashion along an ordinal scale.⁵³ Sometimes—where, for example, the relevant technologies allow for incrementally varying levels of pollution control—such a linear ranking will be possible. But in other instances (e.g., where the question is whether to build a shopping mall or a housing development on endangered species habitat) a linear ranking may not be possible.⁵⁴ Nonetheless, with these caveats, this admittedly over-simplified depiction is useful for purposes of this typology.

2. *The Relationship Between Axes 1 and 2*

Once we have mapped out these three axes, we can begin to see the relationships between them. The relationships between Axes 1 and 2 are depicted in Figure 6 below. Moving toward a more precise and formal balancing test along Axis 2, for example, probably requires a parallel move toward formality (and increased quantification and monetization) along Axis 1. A CBA cannot, for example, pinpoint the level at which marginal costs just equal marginal benefits (the right-most position on Axis 2) without fully quantifying and monetizing all costs and benefits (the right-most position on Axis 1). Even moving to the third box from the right on Axis 2 (“precise comparison to ensure benefits exceed costs”) will likely pose difficulties for a CBA not occupying one of the two right-most boxes on Axis 1.

⁵³ It is also impossible in practice, of course, to take all conceivable alternatives into account. And the decision about which alternatives to include can make formal CBA highly vulnerable to manipulation. See Catherine A. O’Neill, *The Mathematics of Mercury*, in REFORMING REGULATORY IMPACT ANALYSIS 108, 113 (Winston Harrington et al. eds., 2009).

⁵⁴ In such an instance, the analyst could still, theoretically, identify the alternative that maximized net benefits, though constructing meaningful marginal cost/benefit curves likely would be difficult or impossible. Such an inquiry is largely, if not wholly, academic, however, since any such example must almost by definition present significant quantification/monetization problems under Axis 1 as well. Cf. James Salzman & J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 STAN. L. REV. 607, 609 (2000).

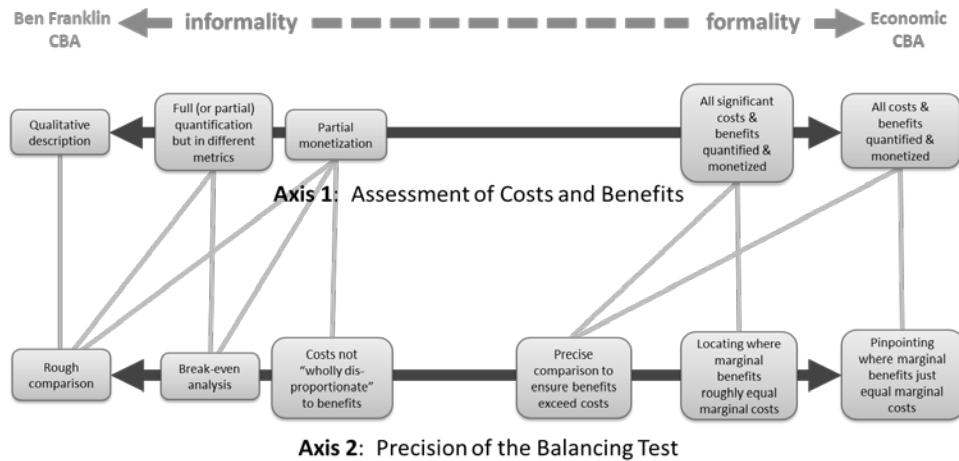


FIGURE 6. The relationship between Axes 1 and 2.

Imagine, for example, a CBA, which—as is often the case—provides a relatively complete monetization of costs but only a partial monetization of benefits. If the (partial) benefits are greater than the (full) costs, one can comfortably⁵⁵ conclude that the true benefits also exceed the true costs, even under the “precise comparison” test.⁵⁶ If, on the other hand, the (full) costs are greater than the (partial) benefits, it is arguably much harder to reach a conclusion. Unless there is some good reason to believe that the unmonetized benefits are trivial, some would argue that one cannot reach any conclusion at all about whether the true costs exceed the true benefits.⁵⁷ Others might say that a determination about whether benefits “justify” or “outweigh” costs can still be made in such circumstances by considering qualitative and quantitative descriptions of the nonmonetized benefits.⁵⁸ But all would probably agree that a precise comparison is impossible. Thus, if a complete-costs-partial-

⁵⁵ This, of course, assumes that one is comfortable with the monetized values assigned to begin with.

⁵⁶ There are certainly real-world examples of exactly this scenario, especially involving Clean Air Act rules affecting particulate matter emissions, a pollutant for which data showing adverse human health effects is plentiful. *See, e.g., Cole, supra* note 35, at 73 (discussing the EPA’s CBA for its 1999 revised particulate matter NAAQS, showing benefits of \$58 to \$110 billion and costs of \$6 billion).

⁵⁷ *See Driesen, supra* note 8, at 401; Levin, *supra* note 32, at 230. *But see* Arden Rowell, *Partial Valuation in Cost-Benefit Analysis*, 64 ADMIN. L. REV. 723, 741 (2012) (arguing that where benefits are unquantifiable due to incommensurability, they should simply be excluded and CBA conducted using only monetizable costs and benefits: “[T]here is no room to allow non-monetizable benefits to affect the outcome of a monetary cost-benefit analysis.”).

⁵⁸ *See infra* notes 60–63 and accompanying text. These are the tests contained in the Clinton and Reagan executive orders (respectively) that require(d) agencies to conduct CBA of major federal regulations. *See infra* notes 219–220 and accompanying text.

benefits CBA is subjected to a precise comparison, it produces an asymmetry: if the monetized benefits exceed the monetized costs, the result is definitive, but if benefits fall short of costs, the result is inconclusive.⁵⁹ This point is illustrated in Figure 7, below, by the dotted line labeled “potential failure.”

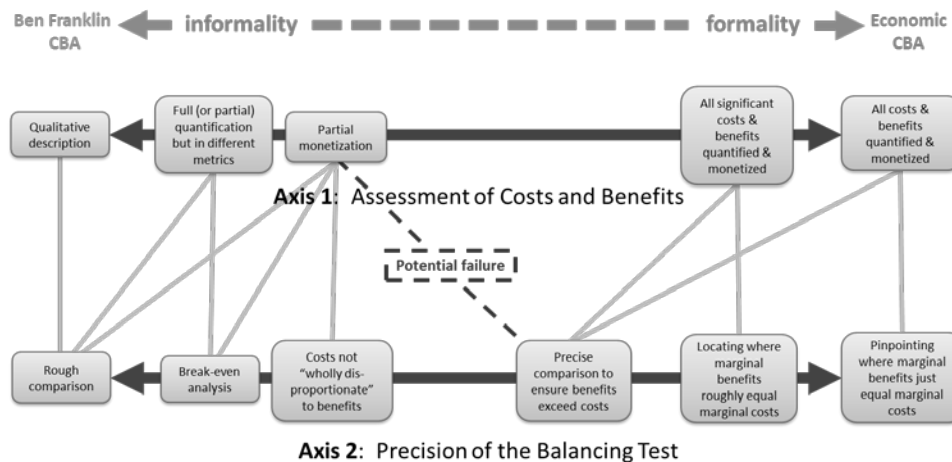


FIGURE 7. Asymmetry resulting when monetized benefits fail to exceed monetized costs.

In such instances, the Office of Information and Regulatory Affairs (OIRA)⁶⁰ encourages agencies to conduct what they call a “break-even” or “threshold” analysis.⁶¹ This kind of analysis subtracts the partial benefits estimate from the (full) costs estimate and then asks the analyst to make an intuitive judgment whether the remaining unquantifiable benefits are likely large enough to make up the difference.⁶² This is essentially a less precise apples-to-oranges balancing standard, which I have located further to the left on Axis 2.⁶³

⁵⁹ OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, at 10 (2003) (“When important benefits and costs cannot be expressed in monetary units, BCA is less useful, and it can even be misleading, because the calculation of net benefits in such cases does not provide a full evaluation of all relevant benefits and costs.”).

⁶⁰ OIRA is a White House office within the Office of Management and Budget that is specifically tasked with administering the requirement in Executive Order 12,866 that agencies conduct CBA of major rules. See Exec. Order No. 12,866, 3 C.F.R. 638 (1994), reprinted as amended in 5 U.S.C. § 601 app. at 88–92 (2012).

⁶¹ OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, at 2 (2003).

⁶² *Id.*

⁶³ Cass Sunstein might dispute this characterization. In a recent article, he argues that, at least in some circumstances, break-even analysis can be conducted in a more systematic and analytically rigorous way. See Cass R. Sunstein, *The Limits of Quantification*, 102 CALIF. L. REV. (forthcoming 2014); Cf. Richard L. Revesz, *Quantifying Regulatory Benefits*, 102 CALIF. L. REV. (forthcoming 2014) (critiquing Professor Sunstein’s position); Daniel A.

Alternatively, for a CBA that does some amount of quantification or monetization of costs and benefits but does not fully monetize (either the second or third box from the left on Axis 1), it might be possible to occupy the third box from the left on Axis 2—that is, to say whether costs are “wholly disproportionate to benefits.”⁶⁴ A version of CBA commonly used by the EPA under the Clean Water Act takes this form. Expressing costs in dollars and benefits in pounds of pollutant removed from a factory’s effluent, it asks whether, for example, \$100 in costs is “wholly disproportionate” to the benefit of removing fifty pounds of phosphorous pollution.⁶⁵

Where only partial monetization is achieved on Axis 1, any of the less precise balancing formulas on the left of Axis 2 (rough balancing, break-even, or wholly disproportionate) essentially engage the analyst in an intuitive, apples-to-oranges comparison. Even though the EPA and OIRA take the position that this kind of balancing can be meaningfully accomplished and courts arguably engage in a similar analytic exercise every time they apply the myriad balancing tests that are commonplace in the common law, it is not necessarily an uncontroversial concept. Some would undoubtedly argue that this kind of apples-to-oranges comparison is irrational. How can we know how fifty pounds of phosphorous pollution compares to \$100? But others would argue that such comparisons can be meaningfully made.⁶⁶ Certainly, we would at least want to know a little more about the kind of harm fifty pounds of phosphorous might cause, but in many instances the agency probably does know more. Let’s say we know that fifty pounds of phosphorous per year will cause significant eutrophication of the waterway, thus starving fish and other aquatic organisms of oxygen and causing substantial disruption to the existing aquatic ecosystem. With enough specificity in the qualitative description of benefits, a

Farber, *Breaking Bad? The Uneasy Case for Regulatory Breakeven Analysis*, 102 CALIF. L. REV. (forthcoming 2014) (same); Heinzerling, *supra* note 33 (same).

⁶⁴ Particularly if we view the “wholly disproportionate” test as aimed at eliminating only the most extreme cases—where a rule seems to eliminate only a de minimis amount of pollution but at great cost—then the idea that an apples-to-oranges comparison can be meaningfully made under such a test seems plausible.

⁶⁵ See *infra* notes 142 to 143 and accompanying text.

⁶⁶ See, e.g., Frank Ackerman, *What Should OIRA Do? Comments on the Role of Cost-Benefit Analysis in Regulatory Review*, OFFICE OF INFO. & REGULATORY AFFAIRS (Feb. 24, 2009), <http://www.reginfo.gov/public/jsp/EO/fedRegReview/D>, archived at <http://perma.cc/9H6H-AEZ6> (“Costs, typically expressed in dollars, can be directly compared to benefits expressed in natural, typically non-monetary units such as lives saved, illnesses avoided, and environmental resources protected. The comparison is inevitably deliberative—and it is far more transparent and comprehensible than a fully monetized cost-benefit calculation.”); ANDERSON, *supra* note 33, at 215 (arguing for qualitative balancing); Rachel Bayefsky, *Dignity as a Value in Agency Cost-Benefit Analysis*, 123 YALE L.J. 1732, 1735–37 (2014) (arguing for an informal variety of CBA that describes certain values that resist monetization, like dignity, in purely quantitative terms, but with specificity).

meaningful apples-to-oranges comparison may well be possible.⁶⁷ But it is undoubtedly a point on which there is room for debate.

This example assumes that both costs and benefits are fully described—if not in quantitative terms, then in qualitative ones. But what if some (or all) of the benefits are simply unknown? What if we know that removing a certain amount of dioxin from factory effluents will provide human health benefits in the form of a certain number of avoided cancers, but we also suspect that dioxin is an endocrine disruptor causing additional health impacts that researchers don't understand well enough to come up with even a ballpark estimate of magnitude? And what if researchers simply have not studied the impacts of dioxin on species and ecosystems and consequently understand those impacts only dimly, if at all? If some of the benefits are unquantifiable because they are unknown, the challenges to conducting a meaningful balance are of an entirely different order. Under these conditions, even a rough comparison, “wholly disproportionate” test, or break-even analysis may become impossible to apply in a meaningful way, although the extent of the problem will depend on the specific numbers.⁶⁸

⁶⁷ See Bayefsky, *supra* note 66, at 1750, 1771–81.

⁶⁸ Imagine, for example, a CBA in which the costs are fully monetized at \$200 million, the benefits are only partially monetized at \$250 million, and there are additional unknown benefits that cannot be described in either quantitative or qualitative terms. Since even the partially monetized benefits are bigger than the costs, the analyst could find that this regulation passes muster under either an “exceeds” test or a “wholly disproportionate” test. If we change the scenario only slightly, so that fully monetized costs are still \$200 million, but the partial benefits are only \$150 million, then the analyst would probably be able to conclude that the wholly disproportionate test is met (i.e., that costs are not wholly disproportionate to benefits), but would not be able to reach a conclusion under the “exceeds” test. If the fully monetized costs are \$200 million, but the partially monetized benefits are only \$500,000, however, it might well be impossible to reach a conclusion under either test.

These scenarios, involving costs that are fully (or nearly fully) monetized and benefits that are only partially monetized, are fairly common (one might even say ubiquitous) in environmental law, where benefits relating to human health and species and ecosystems are notoriously difficult to quantify and monetize. Clean Air Act regulations frequently fall into the first category—with partially monetized benefits significantly outweighing fully monetized costs—because a number of health impacts associated with particulate matter pollution are relatively well understood and have generated substantial, reliable data. *See, e.g.*, Richard D. Morgenstern, *The Clean Air Interstate Rule*, in REFORMING REGULATORY IMPACT ANALYSIS, *supra* note 53, at 20, 25–28. Regulation of most other kinds of environmental harm and pollution, on the other hand, often falls into the second or third categories—with partially monetized benefits lower than costs. *See, e.g.*, SUNSTEIN, RISK & REASON, *supra* note 2, at 166 (the EPA's CBA of its 2001 regulation of arsenic in drinking water pegged costs at \$210 million and benefits at \$140 million to \$198 million). Regulation of ecological harms in particular is likely to fall in the third category. The EPA's efforts to conduct CBA of its regulation of cooling water intake structures at power plants and other industrial facilities, for example, which I discuss in Part V.B, is an example of the third category, in which partially monetized benefits fall far short of fully monetized costs, making a meaningful conclusion under any test impossible. *See generally* Sinden, *supra* note 32

In fact, significant levels of *unknown*—as opposed to unquantifiable or unmonetizable—benefits arguably take the analysis off the diagram altogether. Even the most informal version of CBA depicted in the diagram—the Ben Franklin style—assumes that all costs and benefits are *known*, at least enough to be qualitatively described. Franklin envisioned that all of the “pros and cons” could be put down in one column or the other on a sheet of paper, such that “the whole lies before me.”⁶⁹ If there are big blank spaces in one or both columns—representing unknown costs or benefits of unknown magnitude—then even the kind of rough, intuitive comparison that Franklin envisioned becomes very problematic and probably impossible.

Attempting to depict this on the diagram requires extending Axes 1 and 2 even further to the left, beyond Ben Franklin CBA:

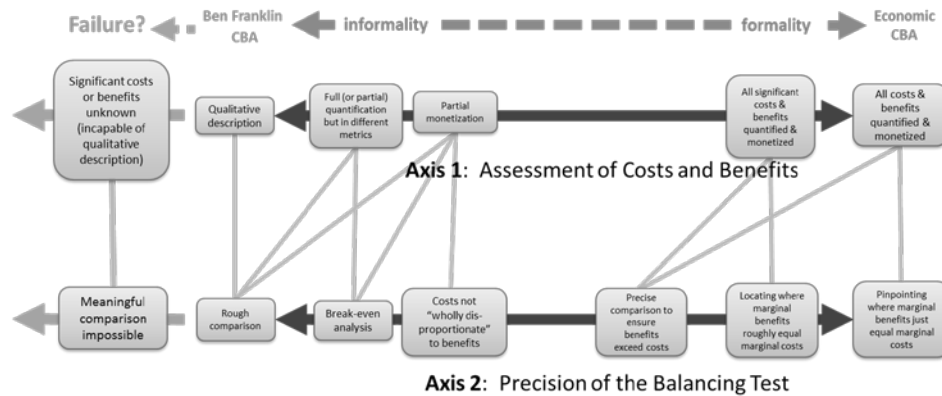


FIGURE 8. Unknown benefits.

Thus, where benefits (or costs) become not just unquantifiable, but unknown (incapable of even qualitative description), CBA may fail altogether, which is to say, meaningful comparison of costs and benefits becomes impossible.⁷⁰

To generalize, then, a move toward informality on Axis 1 (less quantification and monetization) will generally require a parallel move toward informality on Axis 2 (less precision in balancing). The converse is usually true, though not always. A move toward informality on Axis 2 is likely to be accompanied by a parallel move on Axis 1, though need not be in every case. Moving all the way to the left on Axis 2 requires some move toward informality on Axis 1 because the left-most positions

(analyzing how often and to what extent the problem of unquantified benefits arise in agency CBAs).

⁶⁹ GRAMLICH, *supra* note 1, at 1 (quoting Letter from Benjamin Franklin to Joseph Priestley (Sept. 19, 1772)).

⁷⁰ See Arrow, et al., *supra* note 3, at 221 (“In some cases . . . benefit-cost analysis cannot be used to conclude that the economic benefits of a decision will exceed or fall short of its costs, because there is simply too much uncertainty.”).

on Axis 2 are simply incompatible with the right-most positions on Axis 1. (How can one conduct a rough comparison or break-even analysis of fully monetized values?) A move from the right-most end of Axis 2 to the “wholly disproportionate” test, on the other hand, would probably allow for a parallel move toward less quantification on Axis 1, but would not require it.

3. The Relationship Between Axes 2 and 3

The second and third axes are also closely related. Figure 9 adds these relationships to the diagram.

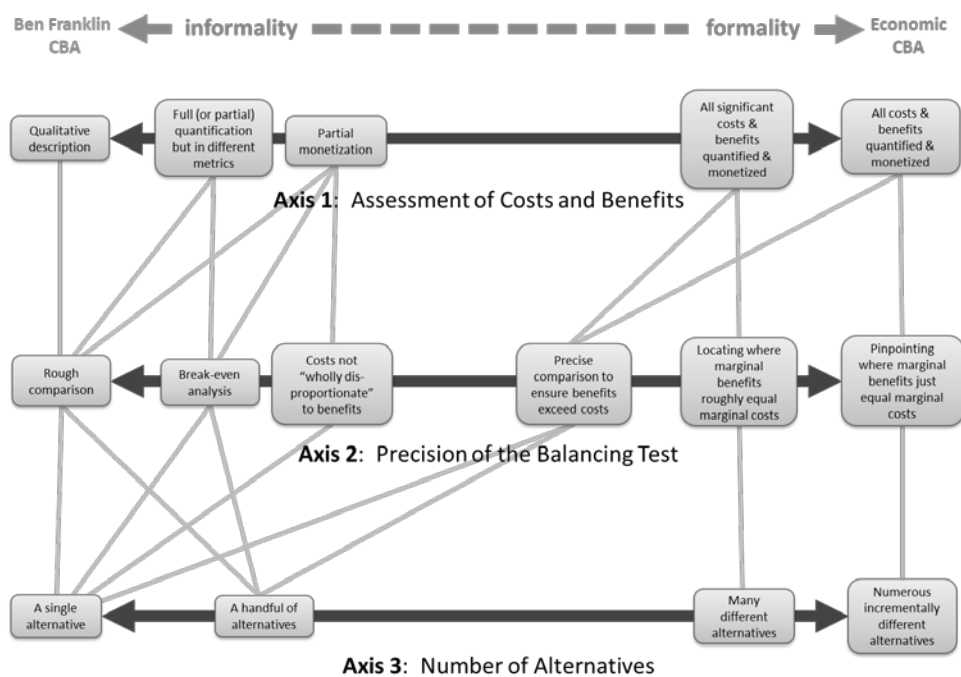


FIGURE 9. The relationship between Axes 2 and 3.

Certainly, if a CBA falls all the way to the left on Axis 3 (costs and benefits are measured only for a single alternative), then it is impossible to move all the way to the right on Axis 2, that is, to pinpoint the level of regulation at which marginal costs are just equal to marginal benefits. Indeed, a CBA in the right-most position on Axis 2 must also occupy the right-most positions on Axes 1 and 3. It is impossible to pinpoint the regulation for which marginal benefits equal marginal costs without fully quantifying and expressing in a single metric both costs and benefits (Axis 1) and without measuring costs and benefits for a large number of alternatives (Axis 3).

Alternatively, a CBA can take a diagonal trajectory starting at the formal end of Axis 1, fully quantifying and monetizing all costs and benefits, and ending on the informal end of Axis 3 because it only estimates the costs and benefits of a single

alternative. Such a CBA would also fall near the middle of Axis 2 (in the third box from the right) because it would be able to precisely compare the single alternative's total costs to its total benefits.⁷¹

4. *The Different Roles of Formal and Informal CBA*

Figure 9 also helps to make salient another important insight about the distinction between formal and informal CBA. Economic CBA—by measuring the costs and benefits of numerous incrementally different alternatives (Axis 3)—chooses one perfect option from a whole range of alternatives. Theoretically at least, it has the capacity to tell the agency at precisely which level of stringency it should set the regulation—that is, to choose the optimally “efficient” level of regulation from a whole range of all possible alternatives. On the other hand, any analysis located all the way to the left on Axis 3—measuring the costs and benefits of only a single alternative—merely provides a binary go-or-no-go answer for a single option.

Thus, formal and informal CBA perform fundamentally different functions in the decisionmaking process. At the formal end of the spectrum, an Economic CBA acts as a standard setting tool, telling the agency exactly where to set the regulatory standard among a whole range of options.⁷² A more informal CBA, on the other hand (at the middle or left end of the spectrum), acts as a sort of secondary check or litmus test on a standard setting decision that has been made by other means.⁷³ Once the agency has decided on the basis of some other decisionmaking criterion where to set the standard, it can then subject that single option to an informal CBA in order to decide whether or not to proceed.⁷⁴

This analysis reveals another important insight. While an informal or middle-of-the-spectrum CBA gives policymakers a vague idea about whether a regulation is desirable in comparison to the status quo or moves in the direction of efficiency, it has no capacity to tell them—even with perfect information—whether a regulation

⁷¹ See, e.g., Jonathan S. Masur & Eric A. Posner, *Against Feasibility Analysis*, 77 U. CHI. L. REV. 657, 657 (2010) (defining CBA as a test that is satisfied if the regulation at issue “produces benefits (in terms of deaths, injuries, and other losses avoided) greater than the cost of compliance”).

⁷² See Nathaniel O. Keohane, *The Technocratic and Democratic Functions of the CAIR Regulatory Analysis*, in REFORMING REGULATORY IMPACT ANALYSIS, *supra* note 53, at 33, 47 (noting that a CBA evaluating only one option “fails to meet the most basic requirement of sound economic policy analysis: namely, the consideration of multiple alternatives”).

⁷³ See Cannon, *supra* note 9, at 454 (describing informal CBA, what he calls “the weak form of CBA,” as a tool for “screen[ing] for irrational outcomes”); Cole, *supra* note 35, at 57 (“[CBA] is viewed as a kind of filter designed to capture welfare-reducing proposals, while allowing welfare-enhancing proposals to pass through.”).

⁷⁴ Keohane, *supra* note 72, at 47 (“A document that considers the costs and benefits of the proposed policy only relative to the status quo cannot possibly have been used to design that policy.”). See also Driesen, *supra* note 47, at 320 (criticizing Professors Jonathan S. Masur and Eric A. Posner for confusing these two different functions of CBA).

is “efficient” in the welfare economics sense, that is, whether it maximizes overall social welfare.⁷⁵ While it is probably true that a regulation that produces more total costs than total benefits is inefficient, the converse is not true. Just because a single regulation passes a benefits-exceed-costs test does not necessarily mean that it is efficient.⁷⁶ Indeed, it may fall far short of efficiency.

Imagine, for example, that the efficient level of regulation (that would be identified by a perfect Economic CBA) would reduce national emissions of some air pollutant from forty-eight to fifteen tons per year, would cost society \$5 billion per year, and would produce \$25 billion per year in social benefits, thus producing \$20 billion in net benefits. While this is the only level of regulation that would satisfy a formal Economic CBA, many other alternatives could meet the simple benefits-exceed-costs criterion for a litmus-test CBA. A regulation that reduced emissions by just one ton—from forty-eight to forty-seven tons per year—might still produce total benefits that significantly outweighed total costs. It might cost \$1 billion and produce \$5 billion in benefits, for example. In that case, it would pass the simple benefits-exceed-costs test with flying colors, but it would not be efficient because it would not maximize net benefits. It would produce only \$4 billion in net benefits, compared with the \$20 billion produced by the more stringent regulation.⁷⁷ Thus, a

⁷⁵ See. BOARDMAN ET AL., *supra* note 19, at 13 (distinguishing between the decision rule for CBA of a single alternative—go forward if net social benefits are positive—and CBA of multiple alternatives, which chooses the alternative with the highest net social benefit); RICHARD E. JUST ET AL., *THE WELFARE ECONOMICS OF PUBLIC POLICY: A PRACTICAL APPROACH TO PROJECT AND POLICY EVALUATION* 642 (2004) (arguing for welfare maximization approach to CBA).

⁷⁶ TOM TIETENBERG, *ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS* 66 (1984) (observing, with respect to a benefits-exceed-costs test: while this test “guarantee[s] that no activity which confers more costs on society than benefits will be undertaken, [it] do[es] not guarantee efficiency. . . . [E]fficiency is attained when the *marginal* value of benefits equals the *marginal* value of costs.”); Keohane, *supra* note 72, at 49 (“Simply calculating total benefits and costs does not shed light on marginal benefits and costs, which—as any economics student knows—must be equated to satisfy efficiency.”) An informal litmus-test CBA does, by definition, move closer toward the goal of efficiency (assuming some accuracy in cost/benefit estimation), but does not necessarily achieve net benefits maximization. See *supra* note 29.

⁷⁷ Because of this asymmetry, a simple total-benefits-exceed-total-costs CBA may—on a fairly reasonable set of assumptions about the shapes of the marginal cost and benefit curves—produce what Professor Driesen has called a “one-way ratchet,” tending always to push regulation toward less stringency but not in the opposite direction. See Driesen, *supra* note 8, at 380. This is because a regulation that fails a simple litmus-test CBA is usually one that is too stringent. A regulation that errs in the other direction, on the other hand—one that is too lenient—will likely produce positive net benefits, just less of them than an efficient regulation would have produced. Accordingly, a too-lenient regulation will often pass a litmus-test CBA, while a too-stringent regulation will fail. See Sinden, *supra* note 32, at 15 n.28.

CBA that falls on the informal end of Axis 3 (measures only a single alternative) provides a very poor proxy for efficiency.

* * *

In sum, we can envision different forms of CBA as falling along a spectrum from an informal Ben Franklin CBA to a highly formal Economic CBA. We can arrange the various characteristics of formal and informal CBA along three axes that describe the level of quantification and monetization, the precision with which costs and benefits are compared, and the number of alternatives considered. This typology reveals three important insights. First, the three axes are not entirely independent. Rather, a move along one axis will often require a parallel move along neighboring axes. Second, where some benefits (or costs) are not only unquantifiable but also unknown (i.e., cannot be described in even qualitative terms), CBA may fail altogether. That is to say, no meaningful comparison under even a rough, imprecise Axis 2 formula will be possible. Third, formal and informal CBAs perform significantly different functions in decisionmaking. Economic CBA serves as a standard setting tool, choosing the efficient level of regulation from all possible alternatives. Ben Franklin CBA and other informal varieties, in contrast, act only as a litmus test or secondary check on standard setting decisions that have been made by other means.

It is important to be clear about the distinctions and relationships between different forms of CBA and about the roles and capacities of each. Unfortunately, this kind of clarity has been largely missing from the debate. Instead, scholars and policymakers have tended to treat CBA as a monolithic concept. And, as the next section shows, to the extent they have made note of these distinctions, they have tended to follow an odd pattern: CBA skeptics stress CBA's formality while proponents stress its informality.

III. FORMALITY AND INFORMALITY IN THE ACADEMIC DEBATE

The debate over the role of CBA in evaluating regulation has raged for decades. Proponents of CBA promote it as a means of rationalizing agency decisionmaking, counteracting the influence of special interests, and increasing transparency.⁷⁸ Opponents charge that it fails to adequately account for transcendent and intangible values, that it suffers from hopeless limitations on data and scientific understandings, and that it obfuscates and obscures relevant issues rather than promoting transparency.⁷⁹

Often, this debate proceeds in reference simply to "cost-benefit analysis" as a generic and undefined, or perhaps presumed-to-be-self-evident, concept. But if we

⁷⁸ See, e.g., SUNSTEIN, COST-BENEFIT STATE, *supra* note 2, at 27.

⁷⁹ See FRANK ACKERMAN & LISA HEINZERLING, PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING 8–9 (2004).

examine the literature with an ear tuned specifically to the variety of forms that CBA can take, a peculiar pattern emerges. When proponents do take the time to describe or define CBA, they often emphasize its informality. Conversely, when skeptics do so, they stress its formality.

A. CBA Proponents

Professor Cass Sunstein, for example, in the academic writings he published before being appointed as President Barack Obama's "regulatory czar" in charge of OIRA, described what he was advocating for as a "modest" form of CBA.⁸⁰ This "modest CBA" probably falls somewhere in the middle of the formality spectrum.⁸¹ With respect to Axis 1, he urged that costs and benefits "should be translated into monetary equivalents" wherever possible,⁸² but he also acknowledged that "[q]uantification will be difficult or even impossible in some cases," and that in such cases, effects should be described in qualitative terms.⁸³ With respect to Axis 2, his balancing formula is also in the middle of the spectrum: "[A]n agency should be required to conclude, in ordinary circumstances, that the benefits [of a regulation] justify the costs."⁸⁴ For him, the "justify" formulation "ordinarily" requires a showing that the monetized benefits exceed the monetized costs, but exceptions are allowed where the agency can "explain" that it is an "unusual" case involving, for

⁸⁰ Cass R. Sunstein, *Legislative Foreword: Congress, Constitutional Moments, and the Cost-Benefit State*, 48 STAN. L. REV. 247, 253 (1996).

⁸¹ Indeed, Sunstein's form of CBA is apparently hard to pigeonhole. Commenters seem to disagree about whether his preferred variety of CBA is "softer" or "stronger." Compare Thomas O. McGarity, *A Cost-Benefit State*, 50 ADMIN. L. REV. 7, 10–11 (1998) (calling what Sunstein promoted a "'soft' version" of CBA), and FARBER, *supra* note 9, at 93 (same), with Cannon, *supra* note 9, at 429 (identifying Sunstein as a proponent of what he calls the "strong" (i.e., more formal) form of CBA). This difference in view may perhaps simply reflect the fact that Sunstein's views have changed over time. See *infra* note 87.

⁸² SUNSTEIN, COST-BENEFIT STATE, *supra* note 2, at 20.

⁸³ *Id.* at 21; see also SUNSTEIN, RISK & REASON, *supra* note 2, at 111 ("The quantitative description should supplement rather than displace a qualitative description of relevant effects.").

⁸⁴ SUNSTEIN, COST-BENEFIT STATE, *supra* note 2, at 21. The "justify" formulation for balancing costs and benefits is the one that appears in the current executive orders requiring agencies to conduct CBA of major federal regulations, though an earlier executive order put in place by President Reagan in 1981 originally required benefits to "outweigh" costs. See *infra* notes 219–220 and accompanying text.

example, risks to young children.⁸⁵ With respect to Axis 3, he was not explicit, but appeared to envision evaluation of a single alternative.⁸⁶

The important point here is that in describing his “modest” brand of CBA, Professor Sunstein went to great pains to emphasize its *informality* and *flexibility*:

None of this suggests that the government should be rigidly bound by the “bottom line.” Cost-benefit analysis ought not to place agencies in an arithmetic straightjacket. The benefits should ordinarily be required to exceed the costs, but regulators might reasonably decide that the numbers are not decisive if, for example, children are mostly at risk, or if the relevant hazard is faced mostly by poor people, or if the hazard at issue is involuntarily incurred or extremely difficult to control.⁸⁷

Similarly, John Graham, former administrator of OIRA under President George W. Bush, has distinguished between “soft” and “hard” CBA in his academic writings, advocating for use of the “soft” version.⁸⁸ Like Professor Sunstein’s “modest” CBA, Graham’s “soft” CBA does not require full quantification or monetization and does not require a precise balancing of costs and benefits: “[A] nonefficiency claim (e.g., a fairness concern or equity consideration) can contribute to a determination that the benefits of a rule do, or do not, justify the costs.”⁸⁹ Thus,

⁸⁵ *Id.* Professor Sunstein also suggested that, at least when courts review whether a regulation meets a cost-benefit test, the balancing formula should be relatively imprecise and informal: “[C]osts [should] not be grossly disproportionate to benefits,” a balancing standard well toward the informal end of Axis 2. SUNSTEIN, RISK & REASON, *supra* note 2, at 120.

⁸⁶ *See, e.g.*, SUNSTEIN, COST-BENEFIT STATE, *supra* note 2, at 21 (“If, for example, a regulation is expected to save 80 lives, each valued at \$6 million, and if it would cost \$200 million, it is fully justified.”).

⁸⁷ *Id.* at 22; *accord* SUNSTEIN, RISK & REASON, *supra* note 2, at 106–07; *see also* Jonathan B. Wiener, *Best Case Scenario*, 43 TULSA L. REV. 933, 934 n.13 (2008) (“Sunstein’s cognitive approach to cost-benefit analysis . . . harkens back to Benjamin Franklin’s ‘prudential algebra’ for making considered decisions that weigh the pros and cons . . .”). *But see* Michael Abramowicz, *Toward a Jurisprudence of Cost-Benefit Analysis*, 100 MICH. L. REV. 1708, 1726–28 (2002) (criticizing Professor Sunstein for allowing regulators to allow nonquantified factors to sometimes trump the numerical results of CBA and for allowing rights and irreversibility to trump). In his recent writings since stepping down as OIRA director, Professor Sunstein appears to have backed away some from this embrace of informality, stressing instead the importance of quantification and monetization and maximizing net benefits. *See infra* notes 310–313 and accompanying text.

⁸⁸ Graham, *supra* note 2, at 432–38. Even Graham’s “hard” CBA does not meet all the requirements for Economic CBA, because it imposes only a litmus-test CBA, rather than identifying the point at which marginal costs equal marginal benefits.

⁸⁹ *Id.* at 433; *see also* Antonin Scalia, *Responsibilities of Regulatory Agencies under Environmental Laws*, 24 HOUS. L. REV. 97, 101 (1987) (distinguishing between CBA in the “narrow sense” and a broader form and endorsing the broader form: “What I mean by cost-benefit analysis is simply a weighing of all the desirable effects of a proposed action against

both Professor Sunstein and Professor Graham recognize that there may be multiple forms of CBA but explicitly endorse a more informal variety.

Alternatively, some proponents of CBA blur the line between formal and informal CBA and thus appropriate some of the universal appeal of Ben Franklin to the project of advocating for more formal CBA. Judge Stephen Williams of the D.C. Circuit, for example, long a proponent of formal CBA in agency decisionmaking,⁹⁰ has, in both his opinions and his academic writings, argued for CBA's rationality by equating it with Ben Franklin's prudential algebra.⁹¹ Many others have done the same. Here's one example:

An analytical technique explicitly relied upon by Benjamin Franklin and Oliver Wendell Holmes, cost-benefit analysis is as old as rational thought. All deliberative decisions involve a weighing of the advantages (benefits) and disadvantages (costs) of a contemplated course of action.⁹²

And here's another:

While the Constitution does not mandate cost-benefit analysis, such a mode of thinking was not unknown to the Framers. Benjamin Franklin recommended that individuals consider courses of action by writing down all their advantages and disadvantages⁹³

By invoking Ben Franklin, either explicitly or implicitly, these authors present CBA as "the soul of rationality" and common sense.⁹⁴ Kip Viscusi, an economist and prominent proponent of formal CBA, calls CBA "straightforward" and "intuitively appealing" and suggests that the only alternative is for regulators to

all the undesirable effects, whether or not they are susceptible of being expressed in economic terms.").

⁹⁰ See, e.g., *Int'l Union, UAW v. OSHA*, 938 F.2d 1310 (D.C. Cir. 1991). For a discussion of this case, see *infra* notes 201–208 and accompanying text.

⁹¹ Stephen F. Williams, *Cost-Benefit Analysis Colloquy: Squaring the Vicious Circle*, 53 ADMIN. L. REV. 257, 270 (2001) ("[I]f you accept the basic Ben Franklin preference for net benefit, then you must in some way consider costs and compare them with benefits; that's the *only* way you can get to *net* benefit."); *Int'l Union*, 938 F.2d at 1319–21 (invoking Ben Franklin: "'Reasonableness' has long been associated with the balancing of costs and benefits. . . . [C]ost-benefit analysis entails only a systematic weighing of pros and cons, or what Benjamin Franklin referred to as a 'moral or prudential algebra.'").

⁹² David G. Owen, *Design Defects*, 73 MO. L. REV. 291, 310 (2008) (citations omitted).

⁹³ John O. McGinnis, *Presidential Review as Constitutional Restoration*, 51 DUKE L.J. 901, 940 n.177 (2001) (defending CBA of federal regulations as required in Executive Order 12,866); see also Jonathan B. Wiener, *The Diffusion of Regulatory Oversight*, in *THE GLOBALIZATION OF COST-BENEFIT ANALYSIS IN ENVIRONMENTAL POLICY* 123, 123–24 (Michael A. Livermore & Richard L. Revesz eds., 2013) (equating CBA with Ben Franklin's "prudential algebra").

⁹⁴ ACKERMAN & HEINZERLING, *supra* note 79, at 35.

“abandon rational thought about policy impacts and rely on their instincts.”⁹⁵ Professors Richard L. Revesz and Michael A. Livermore claim that “the use of cost-benefit analysis is a requirement of basic rationality”⁹⁶ and warn that the only other choice is to “abandon reasoned analysis” and descend into “gut-level decisionmaking.”⁹⁷ Professor Sunstein uses similar terms in arguing for his more “modest” form of CBA, telling us “the antonym to regulation guided by cost-benefit analysis is . . . regulation that amounts to a stab in the dark.”⁹⁸

This kind of rhetoric was particularly evident in the briefing before the U.S. Supreme Court in *Riverkeeper*, a case that brought the issue of CBA in environmental rulemaking before the Court in 2009.⁹⁹ Industry associations, the federal government, and their supporting amici, argued in favor of the EPA’s use of CBA and portrayed CBA as informal and casual. In some instances they avoided the term “cost-benefit analysis” altogether, referring instead to “a comparison of costs and benefits” or a consideration of the relationship “between costs and benefits.”¹⁰⁰

⁹⁵ W. Kip Viscusi, *Regulating the Regulators*, 63 U. CHI. L. REV. 1423, 1436, 1439 (1996).

⁹⁶ REVEZ & LIVERMORE, *supra* note 2, at 12; *see also* Shi-Ling Hsu, *On the Role of Cost-Benefit Analysis in Environmental Law: A Book Review of Frank Ackerman & Lisa Heinzerling’s Priceless: On Knowing the Price of Everything & the Value of Nothing*, 35 ENVTL. L. 135, 137–38 (2005) (“[A]ll would agree that [CBA] is a way of introducing some rationality into [the] legislative and regulatory process”); *Int’l Union*, 938 F.2d at 1319–21 (“‘Reasonableness’ has long been associated with the balancing of costs and benefits.”); Shabman & Stephenson, *supra* note 46, at 382 (“Benefit-cost analysis has been defended as a universal stance of rationality”).

⁹⁷ REVEZ & LIVERMORE, *supra* note 2, at 3; *see also id.* at 4 (stating that rejecting CBA is equivalent to “rejecting reason”); *id.* at 16 (stating CBA brings “increased rationality to federal regulation”). Indeed, the title of Professors Revesz’s and Livermore’s book, *Retaking Rationality*, which argues that progressives should embrace CBA, essentially equates CBA with rationality.

⁹⁸ SUNSTEIN, *RISK & REASON*, *supra* note 2, at 107; *see also* THEODORE M. PORTER, *TRUST IN NUMBERS: THE PURSUIT OF OBJECTIVITY IN SCIENCE AND PUBLIC LIFE* 119 (1995) (“A favorite rhetoric surrounding the measurement of benefits and costs naturalizes it as the form of analysis spontaneously used by rational economic actors.”). *But see* GRAMLICH, *supra* note 1, at 5 (stating that the idea “that [CBA] is a mechanical substitute for common sense” is a “common misconception[]” and that “[n]othing could be further from the truth”).

A number of CBA supporters also try to soften its edges by presenting it as a decision “procedure” that provides information to decision makers, but does not necessarily dictate outcomes. *See, e.g.*, Hahn & Sunstein, *supra* note 8, at 1498; *see also* ADLER & POSNER, *supra* note 17, at 62–100; CASS R. SUNSTEIN, *FREE MARKETS AND SOCIAL JUSTICE* 138 (1997); REVEZ & LIVERMORE, *supra* note 2, at 15 (CBA should be only one of several inputs into public policy); Arrow et al., *supra* note 3, at 221–22; *see also* Rowell, *supra* note 57, at 741 (“It is by no means obvious that cost-benefit analysis should be the sole determinant of legal policy. . . .”).

⁹⁹ *Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208 (2009).

¹⁰⁰ *See* Brief for Petitioners Entergy Corp. at 39, 55, *Riverkeeper*, 556 U.S. 208 (Nos. 07-588, 07-589, 07-597), 2008 WL 2753247, at *39, *55; Brief for the AEI Center for

The Justice Department's brief equated the EPA's use of CBA with common sense, rationality,¹⁰¹ and reasonableness,¹⁰² calling what agencies do "conceptually similar" to the common sense weighing of costs and benefits that individuals do,¹⁰³ which is common "in human experience generally."¹⁰⁴ Entergy Corporation's brief called CBA "nothing more than common sense—the imperative of basic rationality to ensure that actions do more good than harm."¹⁰⁵

And, of course, there was the inevitable appeal to Ben Franklin. The amicus brief filed by the American Enterprise Institute on behalf of a group of economists supporting the EPA's use of CBA opened its argument section this way: "The general concept of comparing benefits and costs is familiar and long standing. Indeed, in 1772, Benjamin Franklin wrote in a letter about a method for making private decisions . . . that illustrates the basic features of benefit-cost assessments."¹⁰⁶ That brief never used the term "cost-benefit analysis" at all—preferring the more innocuous term "benefit-cost comparisons."¹⁰⁷ Additionally, it emphasized the fact that "[n]ot all impacts of a decision can be quantified or expressed in dollar terms" and that CBA should "give due consideration to factors that defy quantification but are thought to be important."¹⁰⁸

There are also plenty of counterexamples—proponents of CBA who advocate a highly formal brand of CBA.¹⁰⁹ Many of these counterexamples come from the

Regulatory and Market Studies et al. as Amici Curiae Supporting Petitioners *passim*, *Riverkeeper*, 556 U.S. 208 (Nos. 07-588, 07-589, 07-597), 2008 WL 2817679 [hereinafter Brief for the AEI Center].

¹⁰¹ Brief for Petitioners Entergy Corp., *supra* note 100, at 4 (describing CBA as "further[ing] rational decisionmaking"); Brief for the AEI Center, *supra* note 100, at 6.

¹⁰² Brief for Petitioners Entergy Corp., *supra* note 100, at 30 ("[A]ny reasonable judgment will ordinarily be based on some kind of weighing of costs and benefits . . .") (quoting Cass R. Sunstein, *Cost-Benefit Default Principles*, 99 MICH. L. REV. 1651, 1694 (2001)).

¹⁰³ Brief for the Federal Parties as Respondents Supporting Petitioners at 14, *Riverkeeper*, 556 U.S. 208 (Nos. 07-588, 07-589, 07-597), 2008 WL 2753248 at *14.

¹⁰⁴ *Id.* at 13–14 ("In everyday life, people routinely weigh costs against benefits in deciding whether to do something.").

¹⁰⁵ Brief for Petitioner Entergy Corp., *supra* note 100, at 29. Indeed, Entergy argued that "cost-benefit analysis is *always* reasonable. Cost-benefit analysis (and particularly the modest form employed by EPA here) is essentially just another way of describing common sense or basic rationality." *Id.* at 56; see Amy Sinden, *Cost-Benefit Analysis, Ben Franklin, and the Supreme Court*, 4 U.C. IRVINE L. REV. 1175, 1185 (2014).

¹⁰⁶ Brief for the AEI Center, *supra* note 100, at 6.

¹⁰⁷ See *id. passim*.

¹⁰⁸ *Id.* at 12–13.

¹⁰⁹ See, e.g., Michael A. Livermore & Richard L. Revesz, *Environmental Law and Economics*, in OXFORD HANDBOOK OF LAW AND ECONOMICS (forthcoming 2014) (manuscript at 3), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=23888 83, archived at <http://perma.cc/QD47-3S27> ("Kaldor-Hicks efficiency is the basis for formal cost-benefit analysis."); Matthew Adler, *Incommensurability and Cost-Benefit Analysis*, 146

economics literature.¹¹⁰ For example, there have been a number of studies in recent years by economists purporting to measure the quality of agency CBAs. These studies employ criteria that essentially assume a good CBA equals a formal CBA.¹¹¹ Nonetheless, it is worth noting the significant strand of pro-CBA scholarship—much of it from some of CBA’s most prominent advocates—that emphasizes instead the informality of CBA.

B. CBA Skeptics

On the other hand, those who attack CBA, to the extent they define it at all, tend to stress its formality. Professors Frank Ackerman and Lisa Heinzerling criticize what they refer to as “formal cost-benefit analysis”¹¹² and “narrow

U. PA. L. REV. 1371, 1378–79 (1998) (defining the procedure of CBA in terms that put it at the most formal end of the spectrum—requiring full quantification in a common metric of costs and benefits of multiple options in order to identify the point of net benefits maximization—though arguing against a normative grounding in Kaldor-Hicks efficiency); Rowell, *supra* note 57, at 723 (arguing that CBA should not include nonmonetized benefits); Cole, *supra* note 35, at 59 (defining CBA in terms of net benefit maximization).

¹¹⁰ See, e.g., Arrow et al., *supra* note 3, at 221–22 (arguing that CBA should identify the point at which “the incremental benefits from regulation are just offset by the incremental costs,” that “[b]enefits and costs . . . should be quantified wherever possible . . . [and] [i]n most instances, it should be possible to describe the effects of proposed policy changes in quantitative terms,” and that “[f]ormal benefit-cost analysis . . . can greatly improve the process and, hence, the outcome of policy analysis”).

¹¹¹ See, e.g., Stuart Shapiro & John F. Morrall III, *The Triumph of Regulatory Politics: Benefit-Cost Analysis and Political Salience*, 6 REG. & GOVERNANCE 189, 197 (2012) (using a set of indicators developed by OIRA as criteria for good CBA, including quantification/monetization of costs and benefits, analysis of alternatives, and discounting); Jerry Ellig & Patrick A. McLaughlin, *The Quality and Use of Regulatory Analysis in 2008*, 32 RISK ANALYSIS 855, 856, 859 (2012) (evaluating quality of CBAs of “economically significant” rules reviewed by OIRA in 2008 using “evaluation criteria . . . drawn from Executive Order 12866 and [OMB] Circular A-4,” including “[d]id the agency maximize net benefits?”); Robert W. Hahn & Paul C. Tetlock, *Has Economic Analysis Improved Regulatory Decisions?*, 22 J. ECON. PERSPECTIVES 67, 72 (2008) (using OMB guidelines and Arrow et al., *supra* note 3, as a benchmark for good CBA); Robert W. Hahn & Patrick M. Dudley, *How Well Does the U.S. Government Do Benefit-Cost Analysis?*, 1 REV. ENVTL. ECON. & POL’Y 192, 197 (2007) (using Executive Order 12,866 and OMB guidance as a benchmark, including requirements of quantification “to the fullest extent possible,” assessment of “all costs and benefits of available regulatory alternatives,” and “selecting the regulatory approach that maximizes net benefits” (citations omitted)). Similarly, in the political realm, formality in CBA is sometimes equated with “rigor.” See Robert P. Bartlett, III, *The Institutional Framework for Cost Benefit Analysis in Financial Regulation: A Tale of Four Paradigms* 9 (Univ. of Cal., Berkeley Ctr. for Law, Bus., and Econ., 2013), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2488077, archived at <http://perma.cc/55LJ-G3H5>.

¹¹² ACKERMAN AND HEINZERLING, *supra* note 79, at 9.

economic analysis,”¹¹³ decrying CBA’s “atomistic and reductionist approach.”¹¹⁴ Professor Doug Kysar describes CBA as grounded in the economic concept of Kaldor-Hicks efficiency and “select[ing] the point of marginal equivalence between social costs and benefits.”¹¹⁵ Professor David Driesen describes CBA as fully quantified and monetized—it “consists of estimates of the regulation’s costs and of the monetary value economists associate with the harms the regulation will avoid.”¹¹⁶

Indeed, much of opponents’ criticism of CBA centers on the quantification and monetization of costs and benefits. They argue that certain values, like human lives or endangered species, are simply incommensurable with money and therefore simply cannot—or should not—be shoehorned into a monetary metric.¹¹⁷ They argue that quantification is simply impossible as a practical matter because of gross inadequacies in data and scientific understandings of things like the health effects of toxic chemicals or the impacts of rising temperatures on ecosystems. They argue that expressing everything in dollar terms devalues the preferences of the poor because each dollar is worth more to a poor person than a rich person.¹¹⁸ They argue that using a discount rate to convert monetary values representing future benefits into present net values devalues the lives of future generations in ways that breach fundamental ethical norms.¹¹⁹ All of these problems only arise when the analyst tries to quantify costs and benefits and translate them into a monetary metric—one of the hallmarks of formal CBA.

Indeed, many of CBA’s harshest critics don’t object to informal Ben Franklin CBA at all. Professors Sidney Shapiro and Christopher Schroeder, longtime opponents of CBA, actually invoke Ben Franklin’s prudential algebra themselves as a model for their proposed alternative to (formal) CBA.¹²⁰ Professors Ackerman and

¹¹³ *Id.* at 8.

¹¹⁴ *Id.* at 211.

¹¹⁵ DOUGLAS A. KYSAR, *REGULATING FROM NOWHERE: ENVIRONMENTAL LAW AND THE SEARCH FOR OBJECTIVITY* 104 (2010); *see also* Sinden, *Defense of Absolutes*, *supra* note 2, at 1413–23 (tracing the development of CBA over the course of the twentieth century, from limited pragmatic method used by the Army Corps of Engineers, to analyzing the construction costs and electricity production benefits of dams, to the highly theorized, extensively elaborated branch of welfare economics that attempts to quantify and monetize all social values related to policies).

¹¹⁶ Driesen, *supra* note 8, at 339.

¹¹⁷ *See* ACKERMAN & HEINZERLING, *supra* note 79, at 7–9, 211–12.

¹¹⁸ Duncan Kennedy, *Cost-Benefit Analysis of Entitlement Problems: A Critique*, 33 *STAN. L. REV.* 387, 401–07 (1981).

¹¹⁹ Douglas A. Kysar, *Climate Change, Cultural Transformation, and Comprehensive Rationality*, 31 *B.C. ENVTL. AFF. L. REV.* 555, 580 (2004); *see* Revesz, *supra* note 34, at 988–1006; Heinzerling, *supra* note 34, at 40–41.

¹²⁰ Shapiro & Schroeder, *supra* note 2, at 497 (stating that their alternative “more closely resembles Ben Franklin’s prudential algebra than the reductive rationality attempted by CBA”).

Heinzerling similarly endorse an informal balancing of costs and benefits and distinguish it from the formal CBA that they criticize:

[A]nalysis of costs and benefits, in lowercase letters, is an essential part of any systematic thought about public policy, and has always been involved in government decision making. Our criticism concerns the much narrower doctrine of Cost-Benefit Analysis, which calls for a specific, controversial way of expressing and thinking about costs and benefits.¹²¹

I have also previously argued in favor of “limited cost-benefit analysis”—a rough apples-to-oranges balancing that is one of a series of “short-cut standards” that Congress adopted in the environmental legislation of the 1970s in order to avoid the problems and pitfalls associated with formal CBA.¹²² Professor Alexander Volokh, who criticizes CBA from a libertarian perspective, takes a similar view, noting that “[f]ormal cost-benefit analysis—which is just one of many possible implementations of cost-benefit analysis—is much more controversial, and its theoretical basis is much less defensible than the intuitive kind we do all the time.”¹²³

* * *

Two things seem to be going on here. First, a number of prominent authors and policymakers who advocate CBA promote a more informal version—or at least a middle-of-the-spectrum CBA—while a number of the most prominent skeptics do not object to the most informal forms of CBA. This suggests that, if there is any room for agreement, it is more likely to be found at the informal end of the spectrum, while formal versions of CBA remain highly controversial.¹²⁴ To the extent this is

¹²¹ ACKERMAN & HEINZERLING, *supra* note 79, at 211 (citations omitted).

¹²² Sinden, *Endangered Species*, *supra* note 2, at 184–192; *see also* Wendy E. Wagner, *The CAIR RIA: Advocacy Dressed up as Policy Analysis*, in REFORMING REGULATORY IMPACT ANALYSIS, *supra* note 53, at 56, 76–77 (arguing, in the context of the EPA’s 2005 Clean Air Interstate Rule, for an informal CBA—or “mixed quantitative-qualitative” CBA—that would have “list[ed] the aggregated costs . . . on one side compared against the significant quantified and unquantified (but not monetized) benefits, presented on the other side”).

¹²³ Alexander Volokh, *Rationality or Rationalism? The Positive and Normative Flaws of Cost-Benefit Analysis*, 48 HOUS. L. REV. 79, 82 (2011); *see also* FARBER, *supra* note 9, at 93, 114–23 (advocating a hybrid scheme that uses a “soft CBA” as a kind of backstop to a feasibility analysis); ANDERSON, *supra* note 33, at 215 (acknowledging that “any rational evaluation of policies must take account of their costs and benefits,” but arguing that “these facts are best presented qualitatively” and “in disaggregated form,” and that “[t]he willingness-to-pay measure of value must be rejected”).

¹²⁴ *See* Cannon, *supra* note 9, at 455 (noting that informal CBA—what he calls “the weak form of CBA”—has “broad intuitive appeal” and “does not provoke the level of resistance or skepticism that currently attaches to the strong form of CBA”).

true, one might expect to see agencies inclined to move toward less formal versions of CBA in order to avoid controversy—at least to the extent allowed by Congress and the courts.

Second, some CBA proponents appear to invoke Ben Franklin and his mantle of rationality and common sense in arguing for more formal modes of CBA. The analysis in Part II pointing out the important distinctions between formal and informal CBA suggests that this kind of argument is inappropriate and serves to muddy the debate. I will examine this point more closely in Part VI.

Having examined the academic debate through the lens of formality and informality, the next order of business is to look at the law through the same lens. To what extent have Congress and federal courts cabined agency discretion with respect to where along the formality-informality spectrum their CBAs lie?

IV. CONGRESS AND THE COURTS: THE TREND TOWARD INFORMALITY

Congress has in most instances actually rejected CBA as a decisionmaking rubric for environmental health and safety regulation, directing agencies to instead use feasibility or health-based standards. And the courts have largely upheld that approach, in some instances going so far as to adopt a default rule disfavoring the use of CBA. In those instances where Congress and the courts have endorsed or allowed agency use of CBA, however, it has usually been of a fairly informal variety. There have been a few notable departures from this pattern in some circuit courts starting in the early 1990s, which, several years ago, might have been read to signal an incipient trend toward formality in the courts. But the U.S. Supreme Court's 2009 decision in *Riverkeeper*, endorsing informality and expressing considerable skepticism about more formal varieties of CBA, certainly bucked, and perhaps weakened, any such trend.

A. Congress

In the 1970s, when most of our federal environmental laws were passed, Congress was highly skeptical of CBA.¹²⁵ Members of Congress worried that pervasive scientific uncertainties and the difficulties inherent in attempting to monetize intangible values would make any meaningful quantification and comparison of costs and benefits impossible.¹²⁶ They worried that agencies would spin their wheels and spend vast resources chasing the holy grail of the accurate, uncontestable, and determinate CBA, and produce instead only regulatory

¹²⁵ See ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 363–64 (4th ed. 2003); SUBCOMM. ON OVERSIGHT & INVESTIGATIONS OF THE COMM. ON INTERSTATE & FOREIGN COMMERCE, 94TH CONG., FEDERAL REGULATION AND REGULATORY REFORM 510–15 (Comm. Print 1976).

¹²⁶ See Sinden, *Endangered Species*, *supra* note 2, at 184–85.

paralysis.¹²⁷ Accordingly, in crafting our major environmental statutes, Congress in almost every instance¹²⁸ rejected CBA.¹²⁹ Instead, Congress directed agencies to set standards via either feasibility criteria,¹³⁰ which limit environmental degradation to

¹²⁷ See Howard Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and “Fine-Tuning” Regulatory Reforms*, 37 STAN. L. REV. 1267, 1283–84 (1985).

¹²⁸ The Federal Insecticide, Fungicide and Rodenticide Act Amendments of 1972 (FIFRA), 7 U.S.C. §§ 136–136y (2012), the Toxic Substances Control Act of 1976 (TSCA), 15 U.S.C. §§ 2601–97 (2012), and the Safe Drinking Water Act Amendments of 1996 (SDWA), 42 U.S.C. § 300g-1(b)(3) (2012), are the only prominent exceptions. FIFRA and the TSCA have been called “two of the least successful statutes of the environmental decade.” Thomas O. McGarity, *Professor Sunstein’s Fuzzy Math*, 90 GEO. L.J. 2341, 2343 (2002). The cost-benefit criterion has arguably made them unwieldy and difficult to administer, producing exactly the kind of regulatory paralysis that Congress worried about in other contexts. *Id.* Indeed, since the Fifth Circuit’s 1991 decision overturning the EPA’s asbestos ban on the ground that its CBA was inadequate, *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201, 1222–23 (5th Cir. 1991), discussed *infra* notes 183 to 192 and accompanying text, TSCA has come to a grinding halt. The EPA has yet to ban a single chemical under TSCA. 3 LAW OF ENVIRONMENTAL PROTECTION §§ 16:3–16:4 (Sheldon M. Novick et al. eds., 2011).

¹²⁹ See SIDNEY A. SHAPIRO & ROBERT L. GLICKSMAN, RISK REGULATION AT RISK: RESTORING A PRAGMATIC APPROACH 32 (2003); Thomas O. McGarity, *Media-Quality, Technology, and Cost-Benefit Balancing Strategies for Health and Environmental Regulation*, 46 LAW & CONTEMP. PROBS. 159, 160–61 (1983); Sinden, *Endangered Species*, *supra* note 2, at 184–92, 197–210; Lynn E. Blais, *Beyond Cost/Benefit: The Maturation of Economic Analysis of the Law and Its Consequences for Environmental Policymaking*, 2000 U. ILL. L. REV. 237, 238–40.

¹³⁰ Feasibility standards—also known as technology-based standards—are common in American environmental law. See generally David M. Driesen, *Distributing the Costs of Environmental, Health, and Safety Protection: The Feasibility Principle, Cost-Benefit Analysis, and Regulatory Reform*, 32 B.C. ENVTL. AFF. L. REV. 1 (2005) (arguing that the feasibility principle offers a rational alternative to CBA); Wendy E. Wagner, *The Triumph of Technology-Based Standards*, 2000 U. ILL. L. REV. 83, 86 (defending technology-based standards as “one of the most important innovations in U.S. environmental law”); Sidney A. Shapiro & Thomas O. McGarity, *Not So Paradoxical: The Rationale for Technology-Based Regulation*, 1991 DUKE L.J. 729 (critiquing Professor Sunstein’s arguments for the use of CBA instead of technology-based standards).

Feasibility criteria are distinct from cost-benefit analysis because they do not require a comparison of costs to benefits. See Winston Harrington, *The Cooling Water Intake Structures Rule*, in REFORMING REGULATORY IMPACT ANALYSIS, *supra* note 53, at 160, 161. Once an agency (or Congress) determines that the benefits of regulation exceed some threshold, the feasibility principle directs the agency to make the standard as stringent as technologically possible without imposing costs that cannot be reasonably borne by the industry.

the lowest level economically and technically feasible, or health-based criteria,¹³¹ which look only at impacts on human or ecological health and prohibit any consideration of costs.¹³²

In the few instances in which Congress has authorized agency use of CBA in setting environmental standards, it has not been particularly clear about the level of formality it intends the agencies to use. The Toxic Substances Control Act (TSCA) and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), for example, are both frequently cited as the classic cost-benefit balancing statutes.¹³³ Yet neither one ever uses the term “cost-benefit analysis,” or even “cost-benefit balancing.” Instead, they simply direct the EPA to apply a “reasonableness” criterion in setting standards.¹³⁴ The courts have inferred that determining whether a standard is “reasonable” requires some comparison of costs and benefits.¹³⁵ But Congress has certainly not made clear how formal that analysis needs to be.

Some pieces of the legislative history of TSCA indicate that Congress intended only a relatively informal analysis and was somewhat wary of formal CBA. The House committee report expressed Axis I reservations, noting that a “formal benefit-cost analysis . . . would not be very useful” given the difficulties of assigning monetary values to the costs and benefits of chemical regulation.¹³⁶ The Senate

¹³¹ Two prominent examples are the Endangered Species Act, 16 U.S.C. §§1531–44 (2012), and the provision for the establishment of National Ambient Air Quality Standards under the Clean Air Act, 42 U.S.C. § 7409 (2012).

¹³² See Michael A. Livermore & Richard L. Revesz, *Rethinking Health-Based Environmental Standards*, 89 N.Y.U. L. REV. 1184, 1190 (2014) (identifying CBA, health-based standards, and feasibility standards as the “three principal approaches for determining the stringency of environmental protection”).

¹³³ See PERCIVAL ET AL., *supra* note 125, at 455–59.

¹³⁴ See 15 U.S.C. § 2605(a) (2012) (authorizing the EPA to regulate toxic chemicals that “present an unreasonable risk of injury to health or the environment”); *id.* § 2605(c)(1)(D) (directing the EPA to assess the economic benefits of the chemical to society and the “economic consequences” of the regulation in order to evaluate the unreasonableness of a risk); 7 U.S.C. § 136(bb) (2012) (directing the EPA to deny registration to any pesticide that poses an “unreasonable risk to man or the environment”).

The Consumer Product Safety Act (CPSA), 15 U.S.C. §§ 2051–2089 (2012), uses similar language, authorizing the Consumer Product Safety Commission to promulgate rules “reasonably necessary to eliminate or reduce an unreasonable risk of injury.” *Id.* § 2058(f)(3)(A). The CPSA also requires the Commission to publish a “description of the potential benefits and potential costs of the proposed rule, including any benefits or costs that cannot be quantified in monetary terms,” *id.* § 2058(c)(1), and the costs and benefits of “any reasonable alternatives,” *id.* § 2058(c)(4), and to make a finding that “the benefits expected from the rule bear a reasonable relationship to its costs,” *id.* § 2058(f)(3)(E). As discussed in more detail below, courts have interpreted this language to require only informal CBA. See *infra* notes 178–180 and accompanying text.

¹³⁵ See *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201, 1222–23 (5th Cir. 1991).

¹³⁶ COMM. ON INTERSTATE & FOREIGN COMMERCE, TOXIC SUBSTANCES CONTROL ACT, H.R. REP. NO. 94-1341, at 14 (1976).

committee report expressed concerns about Axis 2 as well, stating “[i]n comparing risks, costs, and benefits, . . . it is important to recognize that one is weighing noncommensurates, and it is not feasible to reach a decision just on the basis of quantitative comparisons.”¹³⁷ Despite these statements, a landmark Fifth Circuit opinion—discussed more fully in the next section—took a very different view, striking down the EPA’s asbestos ban under TSCA for employing an insufficiently formal version of CBA.¹³⁸

The legislative history of FIFRA contains evidence that Congress may have had in mind a less formal CBA under that statute as well. FIFRA requires the EPA to deny registration to any pesticide that will cause “any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide.”¹³⁹ The Senate Commerce Committee created this standard and stated that it thereby “intended that any adverse effect ought not to be tolerated unless there are overriding benefits from the use of a pesticide.”¹⁴⁰ This language could be construed to suggest a version of the “wholly disproportionate” test and, thus, a CBA situated well toward the informal end of Axis 2.¹⁴¹

Similarly, in directing the EPA to set the first interim set of standards for pollution discharges under the Clean Water Act, Congress called for CBA but seemed to contemplate a relatively informal version. The statute directed the EPA to consider “the total cost [imposed on industry by the standards] . . . in relation to the effluent reduction benefits to be achieved.”¹⁴² Senator Edmund Muskie, the principal sponsor of the Act in the Senate, described this as a “limited balancing

¹³⁷ S. COMM. ON COMMERCE, TOXIC SUBSTANCES CONTROL ACT, S. REP. NO. 94-698, at 13 (1976), *reprinted in* 1976 U.S.C.C.A.N. 4491, 4503 (indicating an expectation that the EPA give “full consideration” to the “burdens of human suffering and premature death”); *see also id.* at 8, 10, 20, 1976 U.S.C.C.A.N. at 4498, 4500, 4510 (emphasizing statutory language at 15 U.S.C. § 2605(c)(1)(D) that limits the EPA’s consideration to those “economic consequences” that are “reasonably ascertainable”); *id.* at 82, 1976 U.S.C.C.A.N. at 4532 (noting that language in TSCA requiring consideration of economic impacts was included “in lieu of proposals [that would have provided for] the mandatory preparation of detailed economic impact statements”).

¹³⁸ *Corrosion Proof Fittings*, 947 F.2d at 1229–30.

¹³⁹ 7 U.S.C. § 136(bb).

¹⁴⁰ S. COMM. ON COMMERCE, FEDERAL ENVIRONMENTAL PESTICIDE CONTROL ACT OF 1972, S. REP. NO. 92-970, at 11 (1972); *see* WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW 451 (2d ed. 1994) (noting that the Senate Commerce Committee was “environmentally inclined” and that this “language was perceived as tightening criteria for registration” above the looser language that had been adopted in the House bill).

¹⁴¹ *See* Mary Jane Angelo, *Embracing Uncertainty, Complexity, and Change: An Eco-pragmatic Reinvention of a First-Generation Environmental Law*, 33 *ECOLOGY L.Q.* 105, 177 (2006); *see also* SHAPIRO & GLICKSMAN, *supra* note 129, at 39 (characterizing FIFRA as containing an “open-ended balancing standard”).

¹⁴² 33 U.S.C. § 1314(b)(1)(B) (2012); *see also* § 1311(b)(1)(A) (requiring adoption of the “best practicable control technology currently available”).

test” that was only intended to affect the standard “where the additional degree of effluent reduction is wholly out of proportion to the costs.”¹⁴³ This is the standard used as an example in Part II above. It is situated well toward the informality end of the spectrum along all three axes. And, as the next section explains, the case law has read this provision consistently with this legislative history as requiring only an informal CBA.

The only exception is the Safe Drinking Water Act (SDWA), as amended in 1996, but even there Congress did not appear to contemplate the most formal version of CBA. In setting maximum contaminant levels for sources of drinking water, the SDWA requires the EPA to assess the “[q]uantifiable and nonquantifiable” costs and benefits associated with each alternative being considered.¹⁴⁴ Here, then, unlike the other statutes, Congress made specific reference to costs, benefits, and quantification. The statute also uses language that appears to reference economic theory, specifically giving the EPA authority to “identify valid approaches for the measurement and valuation of benefits . . . including . . . consumer willingness to pay for reductions in health risks from drinking water contaminants.”¹⁴⁵ But the statute stops short of actually requiring the EPA to base its decision on CBA. Indeed, the statute actually directs the EPA to set the maximum contaminant level in the first instance on the basis of a feasibility standard.¹⁴⁶ It then gives the EPA the discretion, *if it so chooses*, to override the results of the feasibility analysis and adjust the level on the basis that “the benefits of a maximum contaminant level . . . would not justify the costs . . .”¹⁴⁷ Thus, while the SDWA arguably authorizes a more formal variety of CBA, it does not require the EPA to actually base its decision on that CBA.

¹⁴³ ENVTL. POL’Y DIV., CONG. RESEARCH SERV., 93RD CONG., A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972, at 170, 1466 (Comm. Print 1973) [hereinafter WATER POLLUTION CONTROL ACT LEGISLATIVE HISTORY] (“The Committee recognizes that no mathematical balance can be achieved in considering relative costs and benefits nor would any precise formula be desirable . . .”).

¹⁴⁴ 42 U.S.C. § 300g-1(b)(3)(C)(i) (2012).

¹⁴⁵ *Id.* § 300g-1(b)(3)(C)(iii); *see also id.* § 300g-1(b)(3)(C)(i)(IV) (requiring the EPA to publish an analysis of “[t]he incremental costs and benefits associated with each alternative maximum contaminant level considered”).

¹⁴⁶ The statute first directs the EPA to set something called a “maximum contaminant level goal.” *Id.* § 300g-1(b)(1)(A). This goal is to be set according to a very stringent health based standard—that is, “at the level at which no known or anticipated adverse effects on the health of persons occur and which allows an adequate margin of safety.” *Id.* § 300g-1(b)(4)(A). It then directs the EPA to set the “maximum contaminant level,” which is the limit that drinking water supplies are actually required to meet, “as close to the maximum contaminant level goal as is feasible.” *Id.* § 300g-1(b)(4)(B).

¹⁴⁷ *Id.* § 300g-1(b)(6)(A). This provision goes on to say that where the costs of the chosen maximum contaminant level do not justify the benefits, the EPA “may . . . promulgate a maximum contaminant level . . . that maximizes health risk reduction benefits at a cost that is justified by the benefits.” *Id.* While this language might appear at first glance to be a reference to net benefits maximization (economic efficiency), it actually calls for something quite different and represents a departure from economic theory. It directs the EPA to set the

In sum, Congress has for the most part eschewed CBA in crafting our federal environmental statutes. In those few instances when it has directed agencies to use CBA, it has—with limited exceptions—directed them to use only informal varieties of CBA.¹⁴⁸

B. *The Courts*

In interpreting the federal environmental statutes, a number of federal court decisions have largely confirmed Congress's antipathy toward CBA.¹⁴⁹

standard at the level at which overall benefits are as high as they can possibly be, as long as they are cost justified. This could well be a point more stringent than the point of net benefits maximization. In Figure 2, for example, this would be the point furthest to the right (“most stringent” regulation). *See supra* fig. 2.

The D.C. Circuit also noted in *City of Portland v. EPA*, 507 F.3d 706, 710–11 (D.C. Cir. 2007), that while the SDWA requires the EPA to perform a CBA, the use of that CBA to set the maximum contaminant level is discretionary. That case actually involved an exception the statute carves out for cryptosporidium, which prohibits the EPA from using the CBA override to set the maximum contaminant level for this contaminant. 42 U.S.C. § 300g-1(b)(6)(C). Congress was particularly concerned about cryptosporidium at the time, due to a high profile and disastrous outbreak in Milwaukee three years earlier. *City of Portland*, 507 F.3d at 710–11.

¹⁴⁸ The Unfunded Mandates Reform Act (UMRA)—not itself an environmental statute, but one that applies to rulemaking under the environmental statutes—conforms with this trend. 2 U.S.C. §§ 658–658g, 1501–71 (2012). The UMRA, passed in 1994 as part of the 104th Congress's “contract with America,” requires agencies to prepare CBAs of major rules. *See* Victor B. Flatt, *Environmental “Contraction” for America? (or How I Stopped Worrying and Learned to Love the EPA)*, 29 LOY. L.A. L. REV. 585, 588 n.7 (1996). But nothing in the statutory text indicates that the CBA must be particularly formal. It simply requires a “written statement containing . . . a qualitative and quantitative assessment of the anticipated costs and benefits.” 2 U.S.C. §1532(a).

In the National Environmental Policy Act, Congress also expressed concern with the potential shortcomings of formal modes of analysis. In the same section of the statute that requires federal agencies to conduct environmental impact statements where their actions involve significant environmental effects, Congress directed all federal agencies to “identify and develop methods and procedures . . . which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations.” 42 U.S.C. § 4332(2)(B) (2012). The regulations interpreting that provision explicitly discourage formal CBA: “[T]he weighing of the merits and drawbacks of various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations. . . .” 40 C.F.R. § 1502.23 (2014).

¹⁴⁹ In his 2002 book, *The Cost-Benefit State*, Professor Sunstein attempted to make the opposite argument, contending that the federal courts were moving toward adopting a default rule in favor of cost-benefit analysis. *See* SUNSTEIN, *COST-BENEFIT STATE*, *supra* note 2, at 19–20. *But see* Amy Sinden, *Cass Sunstein's Cost-Benefit Lite: Economics for Liberals*, 29 COLUM. J. ENVTL. L. 191 (2004).

The U.S. Supreme Court has on three occasions held particular provisions of environmental statutes to preclude CBA, and on two of those occasions has done so on the basis of an anti-CBA presumption, stating that unless the statute is clear, it should be presumed to preclude CBA.¹⁵⁰ More recently, in *Riverkeeper*, the Court

¹⁵⁰ In *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457, 470–71 (2001), the Court held that the text of the Clean Air Act “unambiguously bars” the EPA from using CBA to set the National Ambient Air Quality Standards. In so doing, the Court applied an anti-CBA presumption, holding that in the absence of a “clear” “textual commitment” to CBA, the statute must be read as precluding CBA. *See id.* at 490 (Breyer, J. concurring) (reading majority opinion as applying a “presumption that any authority . . . to consider costs must flow from a ‘textual commitment’ that is ‘clear’” (quoting *id.* at 468 (majority opinion))). In *Am. Textile Mfrs. Inst., Inc. v. Donovan*, 452 U.S. 490, 510 (1981), the Court held that the Occupational Safety and Health Act directs OSHA to set workplace health standards for toxics on the basis of a feasibility test rather than CBA and indicated that this was based on a general presumption against CBA: “When Congress has intended that an agency engage in cost-benefit analysis, it has clearly indicated such intent on the face of the statute.” Finally, in *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 184–88 (1978), the Court held that the Endangered Species Act imposes absolute requirements on federal agencies and precludes cost-benefit balancing: “The plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction, whatever the cost.” *Id.* at 184. This meant that “in this case [the fact that] the burden on the public through the loss of millions of unrecoverable dollars would greatly outweigh the loss of the snail darter” was not a reason to relieve the Tennessee Valley Authority from its obligation under the Act to halt completion of a \$100 million dam in order to preserve the species. *Id.* at 187.

Similarly, a line of cases in the federal courts of appeals has held that CBA is not required in setting most of the feasibility standards under the Clean Water Act. *See, e.g.*, *Texas Oil & Gas Ass'n v. EPA*, 161 F.3d 923, 936 (5th Cir. 1998) (“In applying the BAT standard, the EPA is not obligated to evaluate the reasonableness of the relationship between costs and benefits. . . . Indeed, the EPA may prescribe [effluent limitations guidelines] whose costs are significantly disproportionate to their benefits, just as long as the BAT determination remains economically feasible for the industry as a whole.” (citations omitted)); *Am. Petroleum Inst. v. EPA*, 858 F.2d 261, 265 (5th Cir. 1988) (“[A] direct cost/benefit correlation is not required [for BAT], so even minimal environmental impact can be regulated, so long as the prescribed alternative is technologically and economically achievable.” (citations omitted)); *Reynolds Metals Co. v. EPA*, 760 F.2d 549, 565 (4th Cir. 1985) (holding that CBA is not required for setting BAT, NSPS, PSES and PSNS standards); *Nat'l Ass'n of Metal Finishers v. EPA*, 719 F.2d 624, 662 n.64 (3rd Cir. 1983) (“[Under BAT], cost is no longer considered *in comparison to* effluent reduction benefits. Instead, the Administrator looks only at the cost of achieving the requisite effluent reduction.” (citations omitted)); *Weyerhaeuser Co. v. Costle*, 590 F.2d 1011, 1046–47 (D.C. Cir. 1978) (distinguishing BAT from BPT standard stating that a limited cost-benefit balancing is required under the latter but not under the former); *CPC Int'l, Inc. v. Train*, 540 F.2d 1329, 1341–42 (8th Cir. 1976) (holding that CBA is not required in setting NSPS); *Am. Paper Inst. v. Train*, 543 F.2d 328, 338 (D.C. Cir. 1976) (holding CBA not required in setting BAT); *see also EPA v. Nat'l Crushed Stone Ass'n*, 449 U.S. 64, 70–71 & n.10 (1980) (noting in dicta that the Clean Water Act directs the EPA not to consider costs in relation to benefits in setting effluent limits under the Best Available Technology (BAT) standard). *But see Masur &*

upheld the EPA's discretion to use CBA if it so chooses where the statute was ambiguous, suggesting that any apparent anti-CBA presumption arising out of the earlier cases is not necessarily strong enough to prevent an agency that wants to from pursuing CBA.¹⁵¹

More importantly for present purposes, in those instances where courts have upheld agency use of CBA, they have generally sanctioned an informal type. Thus, in *Riverkeeper*, the Supreme Court endorsed only a fairly informal variety of CBA and suggested that more "rigorous form[s]" of CBA might be "preclude[d]."¹⁵² This approach is consistent with numerous lines of earlier circuit court cases that have rejected calls for formal CBA and encouraged agencies to use informal CBA. There have been a few isolated exceptions to this trend, but only one case, the Fifth Circuit's famous decision in *Corrosion Proof Fittings v. EPA*,¹⁵³ actually invalidated an agency rule for its failure to use a more formal CBA.¹⁵⁴

1. Favoring Informality

The issue of CBA in environmental rulemaking came before the Supreme Court in 2009, in *Riverkeeper*. This time, unlike the three prior occasions in which the Court had addressed this issue,¹⁵⁵ the case involved an agency decision to adopt CBA, rather than to reject it. Although the provision at issue—Section 316(b) of the Clean Water Act, which regulates the intake of cooling water by power plants and other large industrial facilities—appears to set out a standard feasibility criterion, the EPA set the standard based on CBA instead. In a six-to-three opinion, the Court upheld the Agency's use of CBA. Justice Scalia, writing for the majority, went to some pains, however, to make clear that the kind of CBA he was endorsing was far toward the informal end of the spectrum:

Posner, *supra* note 71, at 670 (noting that only one court of appeals—the Second Circuit—has ever rejected an agency decision to employ CBA as exceeding the agency's authority, and that case was *Riverkeeper*, subsequently overturned by the Supreme Court, *Riverkeeper, Inc. v. EPA*, 475 F.3d 83 (2d Cir. 2007), *rev'd*, *Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208, 223 (2009)).

¹⁵¹ See Masur & Posner, *supra* note 71, at 669–70. In another recent case, *EPA v. EME Homer City Generation*, 134 S. Ct. 1584, 1603–04 (2014), the Supreme Court upheld the EPA's decision to read cost considerations into the Clean Air Act's Good Neighbor Provision in designing the Cross-State Air Pollution Rule. But this case—despite Justice Scalia's erroneous suggestion to the contrary, *id.* at 1610 (Scalia J., dissenting)—did not involve actual cost-benefit analysis. It involved something closer to cost-effectiveness or feasibility analysis.

¹⁵² *Riverkeeper*, 556 U.S. at 223.

¹⁵³ 947 F.2d 1201 (5th Cir. 1991).

¹⁵⁴ See *id.* at 1222–23.

¹⁵⁵ See cases cited *supra* note 150.

Other arguments may be available *to preclude such a rigorous form of cost-benefit analysis* as that which was prescribed under the statute's former BPT standard, which required weighing "the total cost of application of technology" against "the . . . benefits to be achieved." But that question is not before us.

In the Phase II requirements challenged here the EPA sought only to avoid extreme disparities between costs and benefits.¹⁵⁶

Thus, the majority opinion did not specify exactly what a permissible CBA looks like, but it offered enough clues to make clear that the CBA it was endorsing fell pretty far toward the informal end of the spectrum along all three axes. First, Justice Scalia wrote, "[T]he EPA sought only to avoid extreme disparities between costs and benefits"¹⁵⁷ This indicates informality along both Axis #2 and Axis #3. Second, Justice Scalia said that the form of CBA he was endorsing was less "rigorous" than that performed under the Best Practicable Control Technology (BPT) standard,¹⁵⁸ which has typically not monetized benefits.¹⁵⁹ This puts Justice Scalia's CBA near the informal end of Axis 1, consistent with Justice Breyer's view that the EPA should describe benefits in "non-monetized terms."¹⁶⁰

In his concurring opinion, Justice Breyer emphasized the distinction between formal and informal CBA, clearly endorsing the latter, and highlighted the dangers of formal CBA:

The EPA's reading of the statute would seem to permit it to describe environmental benefits in non-monetized terms and to evaluate both costs and benefits in accordance with its expert judgment and scientific knowledge. *The Agency can thereby avoid lengthy formal cost-benefit proceedings and futile attempts at comprehensive monetization; take account of Congress' technology-forcing objectives; and still prevent results that are absurd or unreasonable in light of extreme disparities between costs and benefits.*¹⁶¹

Thus, the CBA Justice Breyer envisioned was clearly well toward the informal end of the spectrum along Axis 1 (describing benefits in nonmonetized terms) and Axis 2 (avoiding extreme disparities between costs and benefits).¹⁶²

¹⁵⁶ *Riverkeeper*, 556 U.S. at 223–24 (emphasis added) (quoting 33 U.S.C. § 1314(b)(1)(B)).

¹⁵⁷ *Id.* at 224.

¹⁵⁸ *Id.* at 223.

¹⁵⁹ See *infra* notes 163–175 and accompanying text.

¹⁶⁰ *Riverkeeper*, 556 U.S. at 235 (Breyer, J., concurring in part and dissenting in part).

¹⁶¹ *Id.* (emphasis added) (citations omitted).

¹⁶² Justice Breyer's reading conforms with early agency interpretations of section 316(b) of the Clean Water Act. See Best Technology Available for the Location, Design, Construction, and Capacity of Cooling Water Intake Structures, 41 Fed. Reg. 17,387, 17,388

The Supreme Court's expressed preference for informality in the *Riverkeeper* case is consistent with the general trend in the circuits. In multiple lines of cases the federal appeals courts have repeatedly and in many contexts endorsed informal over formal versions of CBA.

One example is the line of cases (referenced above) interpreting the interim BPT standard that the Clean Water Act required industrial point sources to meet by 1977. Unlike the other feasibility standards in the Act, this standard directed the EPA to consider costs "in relation to" benefits.¹⁶³ But in interpreting it, the courts have emphasized that the agency is to engage in only "a 'limited' balancing test," and that "cost need not be balanced against benefits with pinpoint precision."¹⁶⁴ Indeed, the circuit courts have routinely upheld CBAs under this provision that simply made an apples-to-oranges comparison of costs measured in dollars against benefits measured in pounds of pollution removed from a factory's effluent.¹⁶⁵ In so doing, they have recognized the Axis 1 limitations inherent in the measurement of water pollution—that "many of the benefits resulting from the effluent reduction are incapable of precise quantification"¹⁶⁶ and "often cannot be reduced to dollars and

(Apr. 26, 1976) (codified at 40 C.F.R. pt. 402) ("No comparison of monetary costs with the social benefits of minimizing adverse environmental impacts, much less a formal, quantified 'cost/benefit' assessment is required by the terms of the Act."). For a more detailed analysis of the Court's opinion along these lines, see Sinden, *supra* note 105, at 1189–91.

¹⁶³ 33 U.S.C. §§ 1311(b)(1)(A), 1314(b)(1)(B) (2012) (requiring adoption of the "best practicable control technology currently available" that is to be determined in part by consideration of "the total cost [imposed on industry by the standards] . . . in relation to the effluent reduction benefits to be achieved").

¹⁶⁴ *Weyerhaeuser Co. v. Costle*, 590 F.2d 1011, 1048 (D.C. Cir. 1978) (quoting statement of Senator Muskie in legislative history); *see also* *EPA v. Nat'l Crushed Stone Ass'n*, 449 U.S. 64, 71 n.10 (1980) (quoting same language); *Ass'n of Pac. Fisheries v. EPA*, 615 F.2d 794, 809 (9th Cir. 1980) (citing same language); *Chem. Mfrs. Ass'n v. EPA*, 870 F.2d 177, 204 (5th Cir. 1989) (quoting same language).

¹⁶⁵ *See, e.g., Weyerhaeuser*, 590 F.2d at 1047 (estimating costs to industry as a whole at \$1.6 billion and benefits of "5,000 fewer tons per day of BOD discharged into the nation's waters"); *Ass'n of Pac. Fisheries*, 615 F.2d at 808–09 (noting that agency should weigh dollar costs against amount of effluent reduction achieved); *Nat'l Ass'n of Metal Finishers v. EPA*, 719 F.2d 624, 663 (3d Cir. 1983) (approving EPA's CBA "calculat[ing] that the benefits would be an effluent reduction of 140 million pounds of toxic pollutants per year, and that the total costs would be \$1.34 billion plus \$425 million annually."), *rev'd on other grounds*, *Chem. Mfrs. Ass'n v. Natural Res. Def. Council, Inc.*, 470 U.S. 116 (1985).

¹⁶⁶ *Ass'n of Pac. Fisheries*, 615 F.2d at 809; *see also id.* at 805 ("Congress was aware that prior enforcement efforts based on water quality standards had not been successful. It determined, accordingly, that the Agency should have the authority to require effluent reduction benefits as defined by the amount or degree of reduction achieved by a level of technology applied to discharge, without the necessity of demonstrating the incremental effect of that technology on the quality of the receiving water.").

cents”¹⁶⁷—and thus have endorsed a “wholly disproportionate” balancing test, well toward the informal end of Axis 2.¹⁶⁸

Several of these courts specifically rejected arguments by various industries that the EPA should perform an Economic CBA under this provision.¹⁶⁹ In one case, members of the American pulp and paper industry pointed to a statement in the legislative history from the bill’s sponsor, Senator Muskie, which the EPA had also cited in support of its contention that the statute required only a rough, unquantified balancing of costs and benefits.¹⁷⁰ Senator Muskie had said, “The balancing test between total cost and effluent reduction benefits is intended to limit the application of technology only where the *additional degree* of effluent reduction is *wholly out of proportion* to the costs of achieving such *marginal level of reduction*”¹⁷¹ The EPA emphasized the phrase “wholly out of proportion,” while the industry petitioners pointed to the phrases “additional degree” and “marginal level.”¹⁷²

The court, however, was unwilling to impose such a formal and precise balancing formula on the EPA and rejected the argument that the use of the word “marginal” signaled an intent for the agencies to use an Economic CBA.¹⁷³ The D.C. Circuit worried “[a] requirement that EPA perform the elaborate task of calculating incremental balances would bog the Agency down in burdensome proceedings on a relatively subsidiary task.”¹⁷⁴

¹⁶⁷ *Appalachian Power Co. v. Train*, 545 F.2d 1351, 1361 (4th Cir. 1976); *see also* *Am. Iron & Steel Inst. v. EPA*, 568 F.2d 284, 296–97 (3d Cir. 1977) (suggesting Congress did not require quantification of benefits); *Appalachian Power Co. v. EPA*, 671 F.2d 801, 809 n.3 (4th Cir. 1982) (“The power companies simply misread this language when they argue that as a matter of statutory interpretation the ‘benefits’ referred to in ‘effluent reduction benefits’ necessarily relate to improved receiving water quality.”).

¹⁶⁸ *See, e.g., Ass’n of Pac. Fisheries*, 615 F.2d at 805; *Weyerhaeuser*, 590 F.2d at 1045 n.52. During this time, the EPA applied the same brand of CBA in its guidelines for site-specific permitting for cooling water intake structures under Section 316(b): directing state permit writers to simply ensure that costs were not “wholly disproportionate” to benefits. *See Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208, 225 (2009); *Seacoast Anti-Pollution League v. Costle*, 597 F.2d 306, 311 (1st Cir. 1979).

¹⁶⁹ *See, e.g., Weyerhaeuser*, 590 F.2d at 1041 n.41 (rejecting argument that BPT required a CBA based on economic theory); *Am. Petroleum Inst. v. EPA*, 540 F.2d 1023, 1037–38 (10th Cir. 1976) (rejecting industry’s argument that the EPA should have done incremental CBA); *BASF Wyandotte Corp. v. Costle*, 598 F.2d 637, 656–57 (1st Cir. 1979) (same).

¹⁷⁰ *See Weyerhaeuser*, 590 F.2d at 1047.

¹⁷¹ *Id.* at 1045 n.52 (quoting WATER POLLUTION CONTROL ACT LEGISLATIVE HISTORY, *supra* note 143, at 170).

¹⁷² *Id.* at 1045 n.52, 1047.

¹⁷³ *Id.* at 1048.

¹⁷⁴ *Id.*; *see also* 2 WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW: AIR AND WATER 432 (1986) (explaining that “cost-sensitive” standards such as BPT or BAT are far different than standards justified by formal, monetized cost-benefit analyses, where “every dollar spent on technology must return at least a dollar in enhanced water quality”).

Indeed, in *Weyerhaeuser*, the D.C. Circuit explicitly rejected the idea that regulations should be subject to a formal CBA under the tenets of economic theory:

Apart from this simple “common sense” version of the argument, there is a more sophisticated economic version called the “optimal pollution” theory. This economic theory contends that there is a level or type of pollution that, while technologically capable of being controlled, is uneconomic to treat because the benefit from treatment is small and the cost of treatment is large. These economic theories are premised on a view that we have both adequate information about the effects of pollution to set an optimal test, and adequate political and administrative flexibility to keep polluters at that level once we allow any pollution to go untreated. As discussed in this section, it appears that Congress doubted these premises.¹⁷⁵

Similarly, a line of cases has upheld the use of CBA by the Occupational Safety and Health Administration (OSHA) in promulgating safety standards under the Occupational Safety and Health Act for workplace hazards other than toxic chemicals. OSHA issues these standards pursuant to the Act’s requirement that they be “reasonably necessary.”¹⁷⁶ But here, again, the CBA sanctioned by the courts has been of a relatively informal variety. The courts have declined to “prescribe any rigid formula” for CBA and have repeatedly upheld agency analyses that failed to monetize benefits.¹⁷⁷

Another line of cases has interpreted the authority of the Consumer Products Safety Commission to regulate hazards that create an “unreasonable risk” of injury

¹⁷⁵ *Weyerhaeuser*, 590 F.2d at 1041 n.41 (citations omitted).

¹⁷⁶ 29 U.S.C. § 652(8) (2012).

¹⁷⁷ *RMI Co. v. Sec’y of Labor*, 594 F.2d 566, 573 (6th Cir. 1979). *See also* *Nat’l Grain & Feed Ass’n v. OSHA*, 866 F.2d 717, 733 (5th Cir. 1989) (“The test under section 3(8) is an intermediate one between the feasibility mandate of section 6(b)(5) and a strict cost-benefit analysis that requires a more formal, specific weighing of quantified benefits against costs.”); *Asbestos Info. Ass’n v. OSHA*, 727 F.2d 415, 423 n.18 (5th Cir. 1984) (“[W]e do not imply that the Occupational Safety and Health Act requires the agency to [conduct a formal cost-benefit analysis].”); *Donovan v. Castle & Cooke Foods*, 692 F.2d 641, 649 (9th Cir. 1982); *Tex. Indep. Ginners Ass’n v. Marshall*, 630 F.2d 398, 411 n.44 (5th Cir. 1980) (“A requirement for formal cost-benefit analysis demands that regulatory benefits exceed their costs. The reasonably necessary requirement in the Act only demands that the expected costs of OSHA regulations be reasonably related to the expected benefits, leaving considerable discretion for the agency as long as it is exercised on substantial evidence and with an adequate statement of reasons.”); *Int’l Harvester Co. v. OSHRC*, 628 F.2d 982, 989–90 (7th Cir. 1980) (upholding agency’s analysis that described benefits to employees of reduced noise exposure in completely non-monetized terms and costs in partially non-monetized terms); *Turner Co. v. Sec’y of Labor*, 561 F.2d 82, 86 (7th Cir. 1977) (describing benefits in non-monetized terms).

to authorize the use of CBA.¹⁷⁸ Here also the courts have eschewed formal CBA, observing that the CBA conducted by the commission need not be “elaborate,”¹⁷⁹ and comparing it to the kind of balancing “familiar in tort law.”¹⁸⁰ And yet another line of cases under the Magnuson-Stevens Fisheries Conservation Management Act have similarly rejected formal CBA, holding that it is “not realistic to expect [Fisheries Management Councils] to quantify” economic impacts of fisheries regulation on fishing communities or to “undertake a rigorous exercise in microeconomic analysis.”¹⁸¹ Again, the analyses upheld by the courts in these cases have involved no more than an apples-to-oranges balancing of primarily qualitative costs and benefits.¹⁸²

Thus, while the courts have interpreted some statutes as forbidding agency use of CBA altogether, in those cases in which the courts have authorized agency use of CBA, they have generally called for a CBA that falls on the informal end of the spectrum. There have been a few exceptions to this general trend, however.

2. *Exceptions*

The most prominent exception is the Fifth Circuit’s opinion in *Corrosion Proof Fittings v. EPA*, in which the court considered an industry challenge to the EPA’s ban on asbestos under the Toxic Substances Control Act (TSCA).¹⁸³ As noted above, there was considerable reason to conclude based on the statutory language and

¹⁷⁸ 15 U.S.C. § 1261(s) (2012); *see also id.* § 2058(f)(2) (2012) (barring the Commission from issuing a new rule “unless it has prepared . . . a final regulatory analysis of the rule containing . . . [a] description of the potential benefits and potential costs of the rule”).

¹⁷⁹ *Aqua Slide ‘N’ Dive Corp. v. Consumer Prod. Safety Comm’n*, 569 F.2d 831, 840 (5th Cir. 1978).

¹⁸⁰ *Forester v. Consumer Prod. Safety Comm’n*, 559 F.2d 774, 789 (D.C. Cir. 1977).

¹⁸¹ *Pac. Coast Fed’n of Fishermen’s Ass’n v. Sec’y of Commerce*, 494 F. Supp. 626, 631 (N.D. Cal. 1980) (“It is simply not realistic to expect the Council to quantify foreclosures, bankruptcies, fishing accidents, and unemployment rates[, or to] . . . foresee[] the wild gyrations in interest rates that have recently occurred. . . . [This is] an agency whose job is to weigh broad environmental and economic elements.”); *see also Alaska Factory Trawler Ass’n v. Baldrige*, 831 F.2d 1456, 1460 (9th Cir. 1987) (stating that in reviewing a fisheries management plan for conformance with the national standards set forth in the Act, “[t]he Secretary [of Commerce] does not have to conduct a formal cost/benefit analysis” of the measure).

¹⁸² At least one similar decision rejecting formal CBA has come down in the context of a Federal Energy Regulatory Commission (FERC) dam relicensing decision. *See Conservation Law Found. v. FERC*, 216 F.3d 41, 46–47 (D.C. Cir. 2000) (upholding FERC’s decision to reject a proposal to restore in-stream flows to a dammed channel based in part on an assessment of the costs of the proposal in monetized terms juxtaposed against a nonquantified assessment of the benefits: “Certainly, nothing in the [Federal Power Act] requires the Commission to place a dollar value on nonpower benefits”).

¹⁸³ 947 F.2d 1201 (5th Cir. 1991).

legislative history that Congress intended the EPA to undertake only a very informal version of CBA in setting standards under the Act.¹⁸⁴ Nonetheless, in a long and detailed opinion, the Fifth Circuit struck down the EPA's rule on the ground that its CBA was inadequate.¹⁸⁵ And the opinion made clear that the CBA was inadequate precisely because it fell too far toward the informality end of each of the three axes identified in Part II.

The court's first set of criticisms related to Axis 1. It faulted the Agency for failing to more fully quantify and monetize the benefits of the regulation and for failing to apply a discount rate to benefits, which, of course, would have required full monetization.¹⁸⁶ Next, the court criticized the Agency on Axis 2 grounds for using insufficient precision in its balancing of costs against benefits, criticizing the Agency for essentially using a break-even analysis to conclude that unquantified benefits were large enough to justify a finding that benefits outweighed costs, even though monetized benefits fell significantly short of monetized costs.¹⁸⁷ The court found this approach unacceptable, saying, "Unquantified benefits can, at times, permissibly tip the balance in close cases. They cannot, however, be used to effect a wholesale shift on the balance beam."¹⁸⁸ Finally, the court specifically demanded a move toward formality on Axis 3 as well, faulting the Agency for evaluating only a single regulatory alternative rather than estimating costs and benefits for a whole range of alternatives in order to maximize net benefits.¹⁸⁹

Consistent with the tendency in the academic debate for CBA proponents to disavow any insistence on formality, the court stressed that the EPA need not "engage in an exhaustive, full-scale cost-benefit analysis"¹⁹⁰ and asserted that "[a]n agency may exercise its judgment without strictly relying upon quantifiable risks, costs, and benefits . . ."¹⁹¹ But these protestations had little impact in the face of the court's substantive analysis. After the court remanded the case, the EPA, which had already spent ten years preparing the first CBA, gave up entirely. The Agency never tried to promulgate the ban on asbestos again, nor, indeed, to take any significant regulatory action under TSCA.¹⁹²

Another U.S. Court of Appeals decision permits but does not require agency reliance on a formal version of CBA. In *Center for Biological Diversity v. National*

¹⁸⁴ See *supra* note 133 and accompanying text.

¹⁸⁵ *Corrosion Proof Fittings*, 947 F.2d at 1229–30.

¹⁸⁶ *Id.* at 1218.

¹⁸⁷ *Id.* at 1218–19.

¹⁸⁸ *Id.* at 1219. Even though, for the rule as a whole, benefits outweighed costs, certain aspects of the rule, when viewed in isolation, appeared to have large costs in relation to benefits. The EPA's calculations showed, for example, that the ban on asbestos pipe would cost well over a hundred million dollars but save only three lives. *Id.*

¹⁸⁹ *Id.* at 1217.

¹⁹⁰ *Id.* at 1222.

¹⁹¹ *Id.* at 1214.

¹⁹² See McGarity, *supra* note 128, at 2343.

Highway Traffic Safety Administration,¹⁹³ environmentalists challenged the National Highway Traffic Safety Administration's (NHTSA) rule setting Corporate Average Fuel Efficiency Standards (CAFE) for light trucks in model years 2008–2011.¹⁹⁴ In arriving at the fuel efficiency standard, the Agency had performed a highly formal CBA. Indeed, it had actually conducted an Economic CBA, measuring costs and benefits for a whole range of efficiency levels and setting the standard “at the point where marginal costs equaled marginal benefits.”¹⁹⁵ The environmentalists argued that in conducting the CBA, the Agency had erred in failing to account for the climate change benefits of increased fuel efficiency.¹⁹⁶ The Ninth Circuit agreed, faulting the Agency for its failure to include a monetized value for the benefit of reducing carbon emissions, especially given that the Agency had “monetized other uncertain benefits.”¹⁹⁷

This case then is very different from *Corrosion Proof Fittings*, where the court faulted the Agency for not using formal CBA.¹⁹⁸ *Center for Biological Diversity*, in contrast, simply stands for the proposition that where an agency elects on its own to employ a highly formal variety of CBA it must be consistent by quantifying and monetizing all relevant benefits.¹⁹⁹ Thus, while *permitting* agency use of formal CBA, this case certainly does not require it. Rather, it seems aimed at avoiding the kind of false formality that I discuss in more detail in Part V—where an agency inappropriately combines formal and informal elements of CBA in a single analysis.²⁰⁰

¹⁹³ 538 F.3d 1172 (9th Cir. 2008).

¹⁹⁴ *Id.* at 1180.

¹⁹⁵ *Id.* at 1191. The statute itself did not explicitly call for formal CBA, or necessarily for CBA at all. It simply directed NHTSA to set fuel economy standards at “the maximum feasible . . . level,” and to take into account in that determination “technological feasibility, economic practicability, the effect of other motor vehicle standards . . . on fuel economy, and the need of the United States to conserve energy.” Energy Policy and Conservation Act of 1975, 49 U.S.C. § 32902(a), (f) (2012).

¹⁹⁶ *Ctr. for Biological Diversity*, 538 F.3d at 1187–89.

¹⁹⁷ *Id.* at 1202.

¹⁹⁸ 947 F.2d 1201, 1230 (5th Cir. 1991).

¹⁹⁹ *Ctr. for Biological Diversity*, 538 F.3d at 1187–89. A recent district court case involving a challenge to an environmental impact statement issued in connection with coal leasing on federal lands reached a similar conclusion. *High Country Conservation Advocates v. U.S. Forest Service*, No. 13-CV-01723-RBJ, 2014 WL 2922751 at *10 (D. Colo. July 27, 2014) (“Even though NEPA does not require a cost-benefit analysis, it was nonetheless arbitrary and capricious to quantify the *benefits* of the lease modifications and then explain that a similar analysis of the *costs* was impossible when such an analysis was in fact possible [by use of the social cost of carbon].”). For more on NEPA (the National Environmental Policy Act), *see supra* note 148.

²⁰⁰ Professor Revesz cites *Center for Biological Diversity*, along with another case, *Public Citizen v. Federal Motor Carrier Safety Administration*, 374 F.3d 1209 (D.C. Cir. 2004), as examples of courts pushing agencies to quantify benefits in their CBAs. Revesz, *supra* note 63. *Public Citizen* involved a rule issued by the Federal Motor Carrier Safety

A third case that is often cited as an example of a federal court endorsing CBA is a D.C. Circuit opinion on OSHA's "lock out/tag out rule" in which prominent CBA proponent Judge Stephen Williams urged OSHA to adopt formal CBA.²⁰¹ The views on CBA expressed by Judge Williams in that case, however, ultimately had little effect since on remand OSHA pointedly declined his invitation to use formal CBA.

As noted above, in the case law interpreting the Occupational Safety and Health Act the Fifth, Sixth, Seventh, and Ninth Circuits had already endorsed a relatively informal version of CBA for workplace safety standards outside the context of toxic chemicals. But in the lock out/tag out case, Judge Williams parted company with those courts, specifically urging OSHA to instead adopt a highly formal type of CBA. He explicitly linked the CBA he was envisioning to economic theory: "[P]roperly conducted cost-benefit analysis should yield a solution approximating that of a market undistorted by market failures."²⁰² He also indicated that OSHA should monetize the benefits of human lives and human health.²⁰³ On remand,

Administration to limit the hours of truck drivers and other commercial vehicle drivers. *Pub. Citizen*, 374 F.3d at 1216. The D.C. Circuit struck down the rule but not on the basis of the Agency's CBA. *Id.* In dicta, however, the court did criticize the Agency for its failure to require electric onboard recorders (EOBRs) that would monitor compliance with the rules, expressing skepticism, in particular, at the Agency's proffered justification—"that the costs and benefits of EOBRs are unknown." *Id.* at 1221. This apparently prompted the Agency to look more carefully at the CBA, and, on remand, it actually quantified both the costs and benefits of requiring EOBRs, finding annual net benefits in the hundreds of millions of dollars annually. *Electronic On-Board Recorders and Hours of Service Supporting Documents*, 76 Fed. Reg. 5,537, 5,547–48 (Feb. 1, 2011) (to be codified at 49 C.F.R. pts. 385, 390, 395).

Though aptly cited by Professor Revesz in the context of his argument, whether this is an example of a court actually requiring formal CBA is less clear. Even putting aside the fact that the CBA discussion was dicta, it is not entirely clear that the court necessarily had in mind full quantification and/or monetization in suggesting that the Agency should "estimat[e] the costs," and "at least . . . attempt to analyze [the] benefits" of the rule. *Pub. Citizen*, 374 F.3d at 1221–22. The court did say that the statute (which contained a directive to "consider" costs and benefits) required the Agency "to collect and analyze data on the costs and benefits," and "to estimate [the] benefits on imperfect empirical assumptions." *Id.* The court also acknowledged, however, that the Agency's estimates might be "imprecise," and suggested that at least one factor to be weighed in the balance was the (presumably unquantifiable) possibility that the devices "might be unduly intrusive." *Id.*

²⁰¹ *Int'l Union, UAW v. OSHA*, 938 F.2d 1310, 1319 (D.C. Cir. 1991).

²⁰² *Id.* at 1319.

²⁰³ *See id.* at 1320–21. Judge Williams also authored another opinion in 1991 interpreting an open-ended provision of the Clean Air Act to give the EPA discretion to use CBA in deciding whether to exclude surface coal mines' fugitive emissions from the threshold for PSD permitting. *See Natural Res. Def. Council, Inc. v. EPA*, 937 F.2d 641 (D.C. Cir. 1991). In that opinion, however, Judge Williams did not make any specific comment as to the level of formality the EPA should employ in such CBAs. *See id.*

however, in a rebuke to Judge Williams, the Agency explicitly rejected what it called the “formal cost-benefit analysis” that his opinion had urged on it.²⁰⁴ OSHA argued

that problems associated with formal cost-benefit analysis militate against its use in safety rulemaking. The formal cost-benefit analysis discussed by the court is generally understood to require that all the costs and benefits of a particular action be identified, monetized and compared. Each stage of this analysis—selection of relevant costs and benefits, assignment of monetary values, and judgment of relative worth—presents complex policy and factual issues, the resolution of which is not necessarily more precise or rational than resolution of the issues OSHA currently addresses and which could result in significantly protracted agency rulemaking.²⁰⁵

The ultimate legal question for the court was whether the Agency was interpreting the statute in a way that provided sufficient guidance to withstand a constitutional challenge under the nondelegation doctrine.²⁰⁶ Thus, Judge Williams’s opinion had not required the Agency to use formal CBA; it had merely suggested it as “at least one interpretation” of the statute that would survive constitutional attack.²⁰⁷ When the case subsequently went back to the D.C. Circuit, Judge Williams and the rest of the panel deferred (though somewhat grudgingly) to the Agency, holding that its alternative interpretation did “guide[] its choice of safety standards enough to satisfy the demands of the nondelegation doctrine.”²⁰⁸

In sum, while these three cases appear to superficially endorse a more formal version of CBA, only one actually invalidated a rule for an agency’s decision to use informal CBA. And in the face of these few exceptions stand the numerous federal court decisions discussed above that have eschewed formal CBA and encouraged agencies to instead use a highly informal style of CBA much closer to the Ben Franklin end of the spectrum.²⁰⁹

²⁰⁴ Control of Hazardous Energy Sources (Lockout/Tagout), 58 Fed. Reg. 16,612, 16,622 (Mar. 30, 1993) (codified at 29 C.F.R. pt. 1910).

²⁰⁵ *Id.*

²⁰⁶ *Int’l Union*, 938 F.2d at 1321.

²⁰⁷ *Id.* at 1313.

²⁰⁸ *Int’l Union, UAW v. OSHA*, 37 F.3d 665, 669 (D.C. Cir. 1994); *see also id.* at 670 (“In any event, the current case does not require us to decide whether the statute requires a reasonable relationship between a rule’s costs and its benefits.”).

²⁰⁹ Professor Sunstein’s theory that the federal courts have adopted a set of “cost-benefit default rules”—explicated in his 2002 book, *The Cost-Benefit State*, *supra* note 2—is largely consistent with this view. In making this argument, he did not distinguish between formal and informal CBA, but a careful look at the cases behind his “default rules” shows that, in fact, the vast majority of them endorse informal rather than formal varieties of CBA. Indeed, many of the “cost-benefit default rules” that Professor Sunstein found in various court opinions, in his words, “fall far short of calling for full-fledged cost-benefit analysis.” SUNSTEIN, *COST-BENEFIT STATE*, *supra* note 2, at 33. Instead, they involve principles that

While the weight of the case law certainly favors informality, some might still argue that the trend is in the opposite direction. It is true that many of the cases endorsing informal CBA were issued in the 1970s and 1980s, while those cases that arguably endorse a more formal brand of CBA have occurred in the 1990s and onward. It is possible then—though certainly far from clear—that we are seeing an incipient trend in the federal courts toward formality in CBA. A recent D.C. Circuit case outside the environmental arena, *Business Roundtable v. SEC*,²¹⁰ which has received a lot of attention for requiring CBA of securities regulations and faulting the Agency for not quantifying certain costs and benefits, could also be read to augur such a trend.²¹¹ But that opinion is not a model of clarity, and it is not at all clear whether the court was actually demanding the kind of comprehensive monetization that would put a CBA on the formal end of the spectrum.²¹² Moreover, since

Professor Sunstein viewed as related to CBA or evidencing a CBA sensibility. Thus, he pointed to cases authorizing agencies to make “de minimis” exceptions to regulatory requirements, *id.* at 33–37, to cases requiring agencies to also consider potential countervailing adverse health impacts when considering the health benefits of a rule, *id.* at 37–40, and to cases allowing agencies to consider costs without actually balancing them against benefits, *see, e.g.*, *Michigan v. EPA*, 213 F.3d 663 (D.C. Cir. 2000).

Only five of the cases Professor Sunstein cited could be said to involve actual CBA. Of these, two involved an informal Ben Franklin balancing of qualitative pros and cons. *See Grand Canyon Air Tour Coal. v. FAA*, 154 F.3d 455 (D.C. Cir. 1998); *George E. Warren Corp. v. EPA*, 159 F.3d 616 (D.C. Cir. 1998). One approved a CBA prepared by the EPA that contained some indicia of formality (some monetization of costs and benefits for four different regulatory alternatives), but left significant benefits unquantified. *See Natural Res. Def. Council, Inc. v. EPA*, 937 F.2d 641, 646–47 (D.C. Cir. 1991); Requirements for Implementation Plans, 54 Fed. Reg. 48,870, 48,873 (Nov. 28, 1989) (codified at 40 C.F.R. pts. 51, 52). The other two cases were Judge Williams’s decision on OSHA’s lockout/tagout rule and the Fifth Circuit’s *Corrosion Proof Fittings* decision, both discussed above. For an argument that Professor Sunstein’s “cost-benefit default rules” are largely imaginary, see Sinden, *supra* note 149.

²¹⁰ 647 F.3d 1144 (D.C. Cir. 2011).

²¹¹ *See id.* at 1150.

²¹² The case involved an SEC rule requiring corporate boards to include in their proxy voting materials candidates to board vacancies nominated by shareholders. *Id.* at 1147. The rule was aimed at improving shareholder democracy—a social value that, like environmental quality and public health, is in some sense intangible. *See id.* at 1149. But while the court faulted the Agency for failing to consider certain particular costs and benefits, it was not clear that in every instance the court expected quantification. For example, one aspect of the benefits analysis that the court found wanting was the Agency’s conclusion that the rule would “improve board performance and increase shareholder value by facilitating the election of dissident shareholder nominees.” *Id.* at 1150. This was a benefit that the Agency had described in purely qualitative terms, but the court did not suggest that the Agency should try to quantify it. *See id.* Rather, the court objected to the fact that the SEC had “relied exclusively and heavily” on two particular studies that the court found “unpersuasive.” *Id.* at 1151. *See Coates IV, supra* note 9, at 29 (criticizing the D.C. Circuit for “characteriz[ing] (without explanation) a peer-reviewed article published in the *Journal of Financial*

Business Roundtable, the D.C. Circuit has handed down two cases about financial regulation that have been quite explicit in their rejection of formal CBA.²¹³ In the words of the court, “An agency is not required ‘to measure the immeasurable,’ and need not conduct a ‘rigorous, quantitative economic analysis’ unless the statute explicitly directs it to do so.”²¹⁴ Finally, back in the environmental arena, any notion that the handful of cases from the last two decades endorsing more formality in CBA constitute an incipient trend is far harder to defend in the wake of the Supreme Court’s decision in *Riverkeeper*, which cuts pretty clearly in the opposite direction.

In sum, courts have in a number of instances rejected agency use of CBA altogether in setting environmental health and safety standards. And in those instances in which courts have endorsed agency use of CBA, they have typically sanctioned only an informal version of CBA that does not require full quantification or monetization of costs and benefits (Axis 1), requires only a rough balancing (Axis 2), and requires analysis of only a single option in relation to the status quo (Axis 3).

V. THE EXECUTIVE BRANCH: BUCKING THE TREND

The law, then, does not generally push agencies in the direction of formality and, indeed, often seems to push in the opposite direction. In light of this tendency toward informality in Congress and the courts, along with the observations above

Economics as ‘relatively unpersuasive’”). Thus, it is not at all clear that the court was demanding anything more than a partial quantification of costs and benefits.

The two earlier cases relied on by the court in *Business Roundtable* similarly did not require full quantification of costs and benefits. *See* *Am. Equity Inv. Life Ins. Co. v. SEC*, 613 F.3d 166, 177 (D.C. Cir. 2010) (striking down an SEC rule that narrowed a pre-existing exception so as to subject certain annuity contracts to the securities laws for an agency’s failure to correctly define the baseline status quo against which the “efficiency” of the new rule would be assessed); *Chamber of Commerce v. SEC*, 412 F.3d 133, 142 (D.C. Cir. 2005) (striking down SEC rule requiring certain mutual funds to have boards made up of 75% independent directors and an independent chair for agency’s failure to adequately quantify costs of the rule, but rejecting industry’s claim that its assessment of the benefits was inadequate: “[W]e are acutely aware that an agency need not—indeed cannot—base its every action upon empirical data; depending upon the nature of the problem, an agency may be ‘entitled to conduct . . . a general analysis based on informed conjecture.’” (quoting *Melcher v. FCC*, 134 F.3d 1143, 1158 (D.C. Cir. 1998))).

²¹³ *See* *Nat’l Ass’n of Mfrs. v. SEC*, 748 F.3d 359, 369 (D.C. Cir. 2014) (rejecting industry claim that SEC performed an inadequate CBA in connection with its rule imposing disclosure requirements on companies using minerals obtained in and around the Democratic Republic of Congo where trade in such minerals helps to fuel armed conflict); *Inv. Co. Inst. v. Commodity Futures Trading Comm’n*, 720 F.3d 370, 370–78 (D.C. Cir. 2013) (upholding against a CBA challenge a rule issued by the CFTC narrowing an exception that had previously allowed certain kinds of derivatives to escape regulation under the Commodity Exchange Act).

²¹⁴ *Nat’l Ass’n of Mfrs.*, 748 F.3d at 369 (quoting *Inv. Co. Inst.*, 720 F.3d at 379).

about the academic debate, we might expect to see the agencies and the White House moving toward informality as well. That does, after all, appear to be the path of least resistance. Surprisingly, a close look at the executive orders and guidance documents that govern agency use of CBA, as well as anecdotal evidence of agency practice, suggests a marked pull in the opposite direction. The executive branch, particularly the White House, appears to push toward more formality in CBA.

A. *Executive Orders and Guidance*

There is a strange disconnect in environmental law between what statutes tell the agencies to do and what executive orders tell them to do.²¹⁵ As detailed above, the vast majority of this country's environmental statutes direct the agencies to set regulatory standards using some criterion other than CBA, and some even outright prohibit the use of CBA.²¹⁶ Yet, at the same time, in a kind of parallel universe, a series of executive orders, dating back to President Reagan, direct executive branch agencies to perform CBA on all "major" regulations—that is, those costing \$100 million or more per year. Since an executive order obviously cannot trump a statutory command, this can put the agencies in the anomalous position of having to prepare a CBA that they cannot actually use in making their decision.²¹⁷ A similar disconnect exists with respect to the formality of CBA, with statutes and court decisions endorsing primarily informal CBA while the executive orders and guidance documents prescribe a form of CBA that falls well toward the formal end of the spectrum.²¹⁸

The CBA executive order that President Bill Clinton issued in 1993 is still in effect and requires agencies to propose or adopt regulations "only upon a reasoned

²¹⁵ See Masur & Posner, *supra* note 71, at 667 (noting that as a result of this disconnect "[a]gencies thus find themselves whipsawed").

²¹⁶ See *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457, 471 (2001) (determining that EPA may not use CBA in setting Clean Air Act's air quality standards); *Am. Textile Mfrs. Inst., Inc. v. Donovan*, 452 U.S. 490, 512–13 (1981) (holding that Occupational Safety and Health Act directs OSHA to set workplace health standards for toxics on the basis of a feasibility test, which the Court viewed as inconsistent with CBA); *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 184 (1978) (holding that Endangered Species Act imposes absolute duties on federal agencies "to halt and reverse the trend toward species extinction, whatever the cost" that preclude CBA).

²¹⁷ The requirement that agencies conduct CBAs of major rules also appears in the UMRA. 2 U.S.C. §§ 658–658g, 1501–71 (2012). See *supra* note 148. The UMRA requires agencies to prepare a CBA of major rules, *id.* § 1532(a), and to use the CBA to choose the "least burdensome" alternative, *id.* § 1535(a), but provides an exception to that requirement where it is "inconsistent with law," *id.* § 1535(b)(2). Accordingly, like the executive orders, the UMRA does not trump other statutes.

²¹⁸ See Cannon, *supra* note 9, at 455 ("[A]rguably the strong form of CBA is codified for significant rulemaking in federal administrative practice . . .").

determination that the benefits of the intended regulation justify its costs.”²¹⁹ While it is not entirely clear where along Axis 2 this “justify” formulation falls, most observers assume that it represents a slight shift toward informality in comparison to President Reagan’s Executive Order, which required benefits to “outweigh” costs.²²⁰ President Clinton’s Order also makes a few nods toward informality along Axis 1, making several references to the difficulties inherent in attempting to quantify certain values and directing that costs and benefits “be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify but nevertheless essential to consider.”²²¹ On the other hand, President Clinton’s Order also contains language very similar to President Reagan’s Order that seems to tilt decidedly toward formality, requiring agencies to choose “among alternative regulatory approaches” so as to “select those approaches that maximize net

²¹⁹ Exec. Order No. 12,866 § 1(b)(6), 3 C.F.R. 638, 639 (1994), *reprinted as amended in* 5 U.S.C. § 601 app. at 88–92 (2012). In 2007, President George W. Bush supplemented Executive Order 12,866 with Executive Order 13,422, which, in addition to CBA of major rules, required a finding that the rule aimed at curing some “specific market failure.” Exec. Order No. 13,422, 3 C.F.R. 191 (2008). It also expanded the power of OIRA over rulemaking by applying the CBA mandate to guidance documents as well as rules and by requiring a presidential appointee to serve as Regulatory Policy Officer within each agency. *Id.* President Obama revoked this executive order, however, soon after taking office. Exec. Order No. 13,497, 3 C.F.R. 218 (2010), *reprinted as amended in* 5 U.S.C. § 601 app. at 102.

²²⁰ Exec. Order No. 12,291 § 2(b), 3 C.F.R. 127, 128 (1982) (“Regulatory action shall not be undertaken unless the potential benefits to society for the regulation outweigh the potential costs to society.”). *See, e.g.,* Graham, *supra* note 2, at 433 (describing the “justify” formulation as the “‘soft’ benefit-cost test”). This view is strengthened by the fact that the “justify” language in the Clinton Executive Order is preceded by another reference to the difficulty of quantifying benefits: “Each agency shall . . . [.] recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only upon a reasoned determination that the benefits . . . justify its costs.” Exec. Order No. 12,866, § 1(b)(6), 3 C.F.R. 638, 639 (1994) (emphasis added).

The antiregulatory mission of the Reagan Executive Order was made clear in its preamble, which stated that the purpose of the executive order was, *inter alia*, “to reduce the burdens of existing and future regulations.” *Id.* pmb1., 3 C.F.R. at 127. (That language was omitted from the subsequent Clinton Order, *see* Exec. Order No. 12,866, 3 C.F.R. 638 (1994).) For an historical account of how CBA has been pushed by political conservatives and industry over the years, see REVESZ & LIVERMORE, *supra* note 2, at 21–30.

²²¹ Exec. Order No. 12,866 § 1(a), 3 C.F.R. at 638–39. President Reagan’s Order contained similar language about nonquantifiable costs and benefits, but stopped short of calling them “essential to consider.” *See* Exec. Order No. 12,291 §3(d), 3 C.F.R. at 129 (requiring the description of benefits, costs, and net benefits to each include “any . . . effects that cannot be quantified in monetary terms”).

benefits.”²²² This directive for net benefits maximization requires a CBA near the formal end of the spectrum along all three axes.²²³

Soon after President Obama came into office in 2009, he considered revoking Executive Order 12,866, and, in fact, solicited public comment on that idea.²²⁴ Ultimately, however, he left the prior order in place and instead simply issued Executive Order 13,563, “Improving Regulation and Regulatory Review,” which “supplement[s] . . . and reaffirms” the Clinton Order.²²⁵ This new order reiterates some of the key language of Executive Order 12,866, including the requirement that agencies show that a regulation’s “benefits justify its costs”; the requirement that they “select, in choosing among alternative regulatory approaches, those approaches that maximize net benefits”; and the recognition “that some benefits and costs are difficult to quantify.”²²⁶ In language that arguably shifts even further toward formality and has no analogue in the Clinton Order, however, it also unambiguously sets out full quantification as the goal, stating that “each agency is directed to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible.”²²⁷ It follows this statement with an acknowledgment of the difficulties that arise in attempting to quantify some values, but makes the directive that agencies discuss unquantifiable values permissive rather than mandatory: “Where appropriate and permitted by law, each agency *may* consider (and discuss qualitatively) values that are difficult or impossible to quantify, including equity, human dignity, fairness, and distributive impacts.”²²⁸

The executive orders’ CBA directive was further refined and clarified in OMB Circular A-4, which was issued by OIRA in 2003.²²⁹ This document is also clear in setting up Economic CBA as the goal, stating that CBA “provide[s] a systematic framework for identifying and evaluating the likely outcomes of alternative

²²² Exec. Order No. 12,866 § 1(a), 3 C.F.R. at 638–39. A subsequent section of the executive order also requires the agency to submit to OIRA “[a]n assessment, including the underlying analysis, of costs and benefits of potentially effective and reasonably feasible alternatives to the planned regulation.” *Id.* § 6(a)(3)(C)(iii), 3 C.F.R. at 646. President Reagan’s Order similarly stated, “Regulatory objectives shall be chosen to maximize the net benefits to society” and “[a]mong alternative approaches to any given regulatory objective, the alternative involving the least net cost to society shall be chosen.” Exec. Order No. 12,291 §2(c)–(d), 3 C.F.R. at 128.

²²³ *See supra* Part II.C.3.

²²⁴ *See* Memorandum: Regulatory Review, 74 Fed. Reg. 5977 (Jan. 30, 2009) (directing OMB to produce recommendations for a new executive order on regulatory review); Federal Regulatory Review, Request for Comments, 74 Fed. Reg. 8819 (Feb. 26, 2009) (OMB requesting public comment on those recommendations).

²²⁵ Exec. Order No. 13,563 § 1(b), 3 C.F.R. 215, 215 (2012), *reprinted in* 5 U.S.C. § 601 app. at 102–03 (2012).

²²⁶ *Id.*

²²⁷ *Id.* § 1(c), 3 C.F.R. at 216.

²²⁸ *Id.* (emphasis added).

²²⁹ OFFICE OF MGMT. & BUDGET, CIRCULAR A-4, at 1 (2003).

regulatory choices,”²³⁰ and that “[w]here all benefits and costs can be quantified and expressed in monetary units, benefit-cost analysis [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).”²³¹ Later it reiterates the same point, saying, “By measuring incremental benefits and costs of successively more stringent regulatory alternatives, you can identify the alternative that maximizes net benefits.”²³² The Circular is clearly grounded in economic theory and uses the language of that discipline, directing agencies to measure costs and benefits in terms of “opportunity costs” and “willingness-to-pay.”²³³

While acknowledging that “[i]t will not always be possible to express in monetary units all of the important benefits and costs,”²³⁴ the OMB Circular clearly contemplates complete monetization as the goal and the norm: “A distinctive feature of BCA is that both benefits and costs are expressed in monetary units, which allows you to evaluate different regulatory options with a variety of attributes using a common measure.”²³⁵

The EPA’s *Guidelines for Preparing Economic Analyses* are similarly geared toward a highly formal CBA.²³⁶ The introduction frames the CBA endeavor from the outset in the language of economic theory: “[The Potential Pareto] criterion is the foundation of BCA, requiring that a policy’s net benefits to society be positive. . . . The policy that maximizes net benefits is considered the most efficient.”²³⁷ And the guidelines contain a detailed appendix that provides a textbook introduction to

²³⁰ *Id.* at 9.

²³¹ *Id.* at 2.

²³² *Id.* at 10. Later, the Circular reiterates the importance of measuring the costs and benefits of a whole range of incrementally varying alternatives (formality on Axis 3), directing agencies to “present both total and incremental benefits and costs” of successive alternatives. *Id.* at 16.

²³³ *Id.* at 18. The Circular also makes repeated reference to the importance of ensuring that the methods used by agencies in preparing CBAs are “consistent with economic theory.” *Id.* at 21, 23.

²³⁴ *Id.* at 2.

²³⁵ *Id.* at 10. (“BCA” or “benefit-cost analysis” is a synonym for CBA. *See supra* note 3.) Similarly, by requiring all costs and benefits to be discounted at both 3 and 7 percent, the OMB Circular clearly assumes full monetization, or at least quantification. *See id.* at 31–37; *see also id.* at 36 (assuming that non-monetized benefits are at least quantified: “[E]ven for benefits and costs that are not expressed in monetary units . . . [t]he timing differences can be handled through discounting.”).

²³⁶ GUIDELINES, *supra* note 12.

²³⁷ *Id.* at 1-4. Starting in 1983, the EPA issued a series of guidelines for preparing CBAs. The Agency released its most recent version in December 2010 (with some discrete updates relating to environmental justice added in May 2014). *See id.* at 1-1. This document was prepared by economists at the EPA and subsequently peer reviewed by the EPA’s Science Advisory Board.

the fundamentals of economic theory.²³⁸ Thus, like the OMB Circular, the EPA's guidelines require that "[b]enefits and costs should be reported in monetary terms whenever possible" and that "[b]enefits and costs that cannot be monetized should, if possible, be quantified," while also acknowledging that "[i]n reality . . . there are often effects that cannot be monetized, and the analysis needs to communicate the full richness of benefit and cost information beyond what can be put in dollar terms."²³⁹ Nonetheless, despite these caveats, the guidelines require a strict numerical comparison of costs against benefits in order "to determine a regulation's net benefits, *even if important benefits or costs cannot be monetized.*"²⁴⁰ This language pulls strongly in the direction of formality, and arguably encourages false formality, by directing the Agency to combine inconsistent positions on Axes 1 and 2.²⁴¹

Thus, the language in the executive orders providing that benefits need only "justify" costs and acknowledging that some costs and benefits will be unquantifiable gives a nod to informality on Axes 2 and 1 (respectively) and suggests that informality may, at times, be tolerated. But, at the same time, the repeated references in the executive orders and the guidance documents to maximizing net benefits and quantifying costs and benefits "as accurately as possible" clearly set up Economic CBA as the goal.²⁴²

B. Agency Practice

Anecdotal evidence also indicates a tilt toward formality in agency practice, at least at the EPA.²⁴³ Two examples can be found in the EPA rulemakings on cooling water intake structures—first, in the rulemaking the Court ultimately reviewed in *Riverkeeper*, and, second, in the rulemaking that followed the Supreme Court's remand in that case. The basic outlines of these two examples are described below. More detail can be found in my article, *Cost Benefit Analysis, Ben Franklin, and the Supreme Court.*²⁴⁴

²³⁸ *Id.* app. A.

²³⁹ *Id.* at 11-2.

²⁴⁰ *Id.* at 11-3 (emphasis added).

²⁴¹ *See supra* Figure 7.

²⁴² *See e.g.*, Exec. Order No. 13,563 § 1(c), 3 C.F.R. 215, 216 (2012), *reprinted in* 5 U.S.C. § 601 app. at 102-03 (2012).

²⁴³ Christopher Carrigan & Stuart Shapiro, *What's Wrong with the Back of the Envelope? A Call for Simple (and Timely) Benefit-Cost Analysis* 5 (Geo. Wash. U. Reg. Studies Ctr., Working Paper Oct. 2014), *available at* http://regulatorystudies.columbian.gwu.edu/sites/regulatorystudies.columbian.gwu.edu/files/downloads/Carrigan_Shapiro-Back-of-the-Envelope.pdf, *archived at* <http://perma.cc/XNM5-9R2Z> (arguing that "[Regulatory Impact Analyses (RIAs)] appear to be becoming more complex" based on an analysis of data showing that RIAs prepared between 2009 and 2012 were over four times longer on average than RIAs prepared in 2000).

²⁴⁴ *See generally* Sinden, *supra* note 105.

I. EPA's CBA on Cooling Water Intakes: Round I

Section 316(b) of the Clean Water Act directs the EPA to regulate cooling water intake structures at power plants and other large industrial facilities.²⁴⁵ These structures withdraw billions of gallons of water a day from rivers, lakes, and estuaries, and, in so doing, kill billions of fish and aquatic organisms, squashing them against intake screens and sucking them up into the internal workings of the plant. The EPA issued Phase I of these regulations, governing new facilities, in 2001. In so doing, the EPA interpreted the statutory language requiring “the best technology available for minimizing adverse environmental impact” as a straightforward feasibility standard,²⁴⁶ comparing facilities’ projected compliance costs for various technologies to their projected revenues.²⁴⁷ On this basis, the EPA concluded that closed cycle cooling—a method that minimizes the amount of water used by recirculating it—was the “best technology available” (BTA) with costs of less than 1% of revenues for all but nine of the affected facilities.²⁴⁸ When it came time to submit a CBA to OIRA under Executive Order 12,866,²⁴⁹ the EPA left it informal, making no effort to quantify or monetize the environmental benefits of the rule, or to compare them to costs.²⁵⁰

Phase II governed existing plants. Because retrofitting an existing plant to incorporate closed cycle cooling costs more than incorporating it into a new plant’s design, in the draft proposed rule it sent to OIRA, the EPA proposed to only require closed cycle cooling for the fifty-nine largest and most damaging plants.²⁵¹ The others would be allowed to use the older “once-through” technology and make

²⁴⁵ 33 U.S.C. § 1326(b) (2012).

²⁴⁶ *Id.*; National Pollutant Discharge Elimination System—Regulations Addressing Cooling Water Intake Structures for New Facilities, 65 Fed. Reg. 49,060, 49,065 (proposed Aug. 10, 2000) (codified at 40 C.F.R. pts. 9, 122–25) [hereinafter Proposed Phase I New Facilities Rule].

²⁴⁷ Proposed Phase I New Facilities Rule, 65 Fed. Reg. at 49,095.

²⁴⁸ National Pollutant Discharge Elimination System—Regulations Addressing Cooling Water Intake Structures for New Facilities, 66 Fed. Reg. 65,256, 65,324 (Dec. 18, 2001) (codified at 40 C.F.R. pts. 9, 122–25) [hereinafter Final Phase I New Facilities Rule].

²⁴⁹ Exec. Order No. 12,866, 3 C.F.R. 638 (1994), *reprinted as amended in* 5 U.S.C. § 601 app. at 88–92 (2012).

²⁵⁰ Final Phase I New Facilities Rule, 66 Fed. Reg. at 65,312 (“[I]t is neither required nor prudent for EPA to develop empirical estimates of benefits where data limitations or other critical constraints preclude doing so in a credible and reliable manner.”). OIRA sometimes pushes back in such situations, sending rules back to the EPA with demands for more quantification. But this time it accepted the CBA as is. *See id.* at 65,327 (stating that the final rule was reviewed by OIRA); *id.* at 65,312 (stating that the CBA associated with the final rule did not quantify the rule’s benefits).

²⁵¹ EPA, OMB Review Draft for the Proposed Section 316(b) Rule for Large Cooling Water Intake Structures at Existing Power Generating Facilities, Docket W-00-32, DCN # 4-4005, at 72 (Dec. 28, 2001) [hereinafter OMB Review Draft—Proposed Phase II Rule].

relatively modest changes to their intake structures—new types of screens and filters that are less effective at saving fish, but also less expensive.²⁵² As it had done for the new plants, the EPA assessed the “economic practicability” of this proposal by comparing compliance costs to annual revenues.²⁵³ Its conclusion was that compliance costs would be “low.” Indeed, 82% of firms would incur compliance costs of less than 0.5% of revenues, and 91% would incur costs of less than 1%.²⁵⁴

This time, however, the EPA took a very different approach to the CBA. Rather than declining to attempt any quantification of benefits, as it had done with the Phase I rule, the Agency spent enormous amounts of time and resources attempting to devise a fully quantified and monetized CBA.²⁵⁵ The problem was that the data available on the ecological and other benefits of reducing harms to fish and other aquatic organisms were vastly incomplete, and the methods for converting such data into monetary equivalents were highly controversial.

Accordingly, the EPA left out whole categories of aquatic organisms for which it simply had no data.²⁵⁶ And of those it did include, the Agency counted less than 2% of the individuals in each species.²⁵⁷ This represented the fraction of the total population that could actually be expected to be caught by commercial or recreational fisherman once they escaped the cooling water intake structures.²⁵⁸ The

²⁵² *Id.* at 75.

²⁵³ Compare National Pollutant Discharge Elimination System—Proposed Regulations To Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities, 67 Fed. Reg. 17,122, 17,158 (proposed Apr. 9, 2002) [hereinafter Proposed Phase II Existing Facilities Rule], with *supra* notes 246–248 and accompanying text.

²⁵⁴ Proposed Phase II Existing Facilities Rule, 67 Fed. Reg. at 17,158 ex.5.

²⁵⁵ The EPA recognized that the task would be “challenging,” National Pollutant Discharge Elimination System—Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities, 69 Fed. Reg. 41,576, 41,613 (July 9, 2004) [hereinafter Final Phase II Existing Facilities Rule], and expressed concern from the outset that formal CBAs under the CWA have generally “been limited in the range of benefits addressed,” thus “hinder[ing] EPA’s ability to compare . . . benefits and costs . . . comprehensively,” Proposed Phase II Existing Facilities Rule, 67 Fed. Reg. at 17,191.

²⁵⁶ These included phytoplankton, zooplankton, endangered sea turtles, shrimp, crabs, and lobsters, among others. See Final Phase II Existing Facilities Rule, 69 Fed. Reg. at 41,586; OFFICE OF WATER, EPA, REGIONAL ANALYSIS DOCUMENT FOR THE FINAL SECTION 316(B) PHASE II EXISTING FACILITIES RULE, EPA-821-R-02-003, at A9-1 (2004) [hereinafter REGIONAL ANALYSIS DOCUMENT—FINAL PHASE II RULE], available at http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/upload/Cooling-Water_Phase-2_Regional-benefits_2004.pdf, archived at <http://perma.cc/6ZYS-RHH8>; OFFICE OF WATER, EPA, ECONOMIC AND BENEFITS ANALYSIS FOR THE PROPOSED SECTION 316(B) PHASE II EXISTING FACILITIES RULE, EPA-821-R-02-001, at C1-7 (2002) [hereinafter ECONOMIC AND BENEFITS ANALYSIS—FINAL PHASE II RULE], available at http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/upload/Cooling-Water_Phase-2_Economics_2004.pdf, archived at <http://perma.cc/XYL5-9WKJ>.

²⁵⁷ Final Phase II Existing Facilities Rule, 69 Fed. Reg. at 41,660–61.

²⁵⁸ *Id.*

EPA candidly admitted that it had vastly undercounted the fish that would be protected by the rule, stating that its estimate “does not account for the benefits from the remaining 98.2% of the . . . aquatic organisms estimated to be protected nationally under today’s rule.”²⁵⁹ Nonetheless, the Agency continued to doggedly pursue a formal CBA.

Next, the Agency had to tackle the difficult task of assigning monetary values to the fish. With respect to the fish that would be commercially caught, the EPA simply used the market price.²⁶⁰ But assigning a monetary value to recreational fishing and ecological benefits posed more of a challenge.²⁶¹ Several monetization methods the EPA used initially proved controversial.²⁶² Ultimately, after receiving considerable criticism in the comments to the proposed rule, the EPA threw up its hands and attached no dollar value at all to the vast majority of the ecological values, effectively zeroing them out.²⁶³

In the end, the EPA flatly acknowledged that the exercise had been a failure. Its benefits estimate was grossly incomplete, making a meaningful comparison with costs impossible: “EPA notes that these analyses are based on a comparison of a partial measure of benefits with a complete measure of costs; therefore, the results must be interpreted with caution.”²⁶⁴

Nonetheless, it appears that the EPA (presumably under pressure from OIRA) used this flawed CBA as the basis for significantly weakening the rule. When the rule emerged from OIRA review, the closed cycle cooling requirement for the fifty-nine most damaging plants had been removed, making those plants subject to the

²⁵⁹ *Id.* at 41,661.

²⁶⁰ *Id.* at 41,659–60.

²⁶¹ For recreational fishing, the EPA used the travel cost method, which generated considerable controversy. *Id.* at 41,657–58; REGIONAL ANALYSIS DOCUMENT—FINAL PHASE II RULE, *supra* note 256, at A11-1 to A11-13.

²⁶² See Proposed Phase II Existing Facilities Rule, 67 Fed. Reg. 17,122, 17,191–93 (proposed April 9, 2002) (using “trophic transfer method” and the Habitat Replacement Cost method).

²⁶³ In the final rule, the EPA abandoned altogether the Habitat Replacement Cost analysis—criticized by Harvard economist Robert Stavins as “empirically invalid” and “fundamentally flawed,” Comments of Robert N. Stavins on EPA’s Notice of Data Availability for the Proposed 316(b) Phase II Rule (June 2, 2003) (submitted to EPA, Docket ID No. EPA-HQ-OW-2002-0049-0363)—using instead the far lower (and less complete) numbers generated by the trophic transfer model. Final Phase II Existing Facilities Rule, 69 Fed. Reg. at 41,657.

²⁶⁴ Final Phase II Existing Facilities Rule, 69 Fed. Reg. at 41,666; see also ECONOMIC AND BENEFITS ANALYSIS—FINAL PHASE II RULE, *supra* note 256, at D1-5 (“A comparison of complete costs and incomplete benefits does not provide an accurate picture of net benefits to society.”); OMB Review Draft—Proposed Phase II Rule, *supra* note 251, at 211 (“EPA cannot perform a complete benefit-cost comparison because not all of the benefits resulting from the proposed regulatory alternative can be valued in dollar terms.”).

same weak standards that applied to everyone else.²⁶⁵ And the only reason the EPA cited for the change was the numeric result of its CBA: the dollar costs of the rule—\$413 million—outweighed the dollar benefits of the rule—\$146 million.²⁶⁶ Despite the Agency’s earlier repeated protestations that the benefits estimate was incomplete and the directive of its own guidance document to “communicate the full richness” of unquantifiable values,²⁶⁷ the EPA made no mention of the numerous nonquantified and underquantified benefits.²⁶⁸ We can only assume that OIRA ignored the EPA’s admonition to interpret the results of its CBA “with caution” and pressured the EPA to do the same.²⁶⁹

The result was a perfect poster child for what I’m calling false formality. This is a corruption of CBA that occurs when the analyst inappropriately combines inconsistent positions on two or more of the formality-informality Axes. Here, EPA did exactly that. The monetized benefits estimate was, by the Agency’s own admission, vastly incomplete, thus placing the analysis well toward the *informal* end of the spectrum on Axis 1. But even so, the Agency applied a balancing test on the *formal* end of Axis 2 that precisely compared the bare numbers, and left out the many unquantifiable benefits. The result was a logically incoherent analysis that inappropriately combined two inconsistent positions on Axes 1 and 2,²⁷⁰ purporting to balance with precision a grossly incomplete estimate of benefits against a relatively complete estimate of costs.²⁷¹ As Professor Doug Kysar put it, “Unable to

²⁶⁵ See Harrington, *supra* note 130, at 162; EPA, Summary of Major Changes During Interagency Review, Docket W-00-3, DCN # 4-4019, at 1 (Feb. 28, 2002). Another change was the addition of the site-specific compliance alternative, allowing facilities to escape the national performance standards based on a site specific CBA. *Id.*

²⁶⁶ Proposed Phase II Existing Facilities Rule, 67 Fed. Reg. at 17,158; Sinden, *supra* note 105, at 1199–1200. The EPA used the term “significantly outweigh,” but given how vastly incomplete the benefits estimate was, this was clearly a nonsensical conclusion. One need only imagine that the monetized portion of the benefits represented a third or less of the benefits’ full value to see that the balance could easily have tipped the other way—benefits outweighing costs. Indeed, natural resources economist Frank Ackerman, Ph.D., in comments submitted on the proposed rule, suggested that even just correcting for a few of the many inaccuracies in the EPA’s benefits estimate would yield an estimate four to six times as high. Comments from Frank Ackerman, Professor, Tufts Univ., on EPA’s Section 316(b) Stated Preference Survey (July 10, 2012) (on file with the Utah Law Review). This would yield benefits significantly higher than costs, in the range of \$584 to \$876 million.

²⁶⁷ GUIDELINES, *supra* note 12, at 11-2; see Sinden, *supra* note 105, at 1200.

²⁶⁸ See *supra* notes 256–263 and accompanying text.

²⁶⁹ Final Phase II Existing Facilities Rule, 69 Fed. Reg. at 41,666.

²⁷⁰ See *supra* fig. 7.

²⁷¹ This kind of false formality is arguably encouraged by the directive in the EPA’s guidelines to calculate a number for net benefits “*even if important benefits or costs cannot be monetized.*” GUIDELINES, *supra* note 12, at 11-3 (emphasis added). To be fair, however, those guidelines also require the agency “to communicate the full richness of benefit and cost information beyond what can be put in dollar terms,” *id.* at 11-2, something the EPA failed to do in this instance.

measure what was important, EPA instead chose to make important what it could measure.”²⁷² The result was patently irrational—180 degrees from Ben Franklin’s reasonableness and common sense.

Two relevant points emerge from this example. First, the Agency went out of its way to do formal CBA when it didn’t have to (and when doing so arguably made no sense). Second, the formal CBA the Agency did perform provides a perfect example of what I’m calling false formality. Another example of an agency moving toward the formal end of the CBA spectrum occurred in connection with the EPA’s second round of rulemaking on cooling water intake structures, which the next section describes.

2. EPA’s CBA of Cooling Water Intakes: Round II

Perhaps even more surprising than the EPA’s move toward formality in the rulemaking leading up to the Supreme Court’s opinion in *Riverkeeper* is the Agency’s dramatic move even further along the formality spectrum in the rulemaking that followed.²⁷³ Despite the Supreme Court’s expressions of skepticism about more formal or “rigorous” varieties of CBA, in drafting the new cooling water rule on remand, the EPA moved further toward formality in two ways. First, in order to conduct a nationwide CBA of the rule as a whole, the EPA expended substantial time and energy conducting a stated-preference survey in what ultimately proved to be a “futile” attempt to quantify and monetize the ecological and existence-value benefits that it had been unable to quantify the first time around.²⁷⁴ Second, in crafting the rules for case-by-case CBA, the EPA—at the behest of OIRA—replaced the relatively informal balancing formulas (“wholly disproportionate” and then “significantly greater than”), which it had used previously and which had been specifically endorsed by the Supreme Court, with the more formal requirement that the benefits must “justify” the costs.²⁷⁵

The story begins in July 2010, a year after the remand, when the EPA announced that it would conduct a stated-preference survey in connection with its

²⁷² Douglas A. Kysar, *Fish Tales*, in REFORMING REGULATORY IMPACT ANALYSIS, *supra* note 53, at 199.

²⁷³ Following the Supreme Court’s decision in *Riverkeeper*, the rule was remanded to the EPA because the Second Circuit had also invalidated the rule on other grounds not raised in the Supreme Court. *See* Entergy Corp. v. Riverkeeper, Inc., 556 U.S. 208, 226 (2009) (“We of course express no view on the remaining bases for the Second Circuit’s remand which did not depend on the permissibility of cost-benefit analysis.”).

²⁷⁴ *See id.* at 235 (Breyer, J., concurring in part and dissenting in part).

²⁷⁵ Interestingly, in developing the new facilities portion of the Phase III rule, a process that started years before the Supreme Court’s opinion in *Riverkeeper* came down, the EPA declined to use CBA, citing its inability to reliably quantify the benefits, a decision that the Fifth Circuit upheld a year after *Riverkeeper* in *ConocoPhillips Co. v. EPA*, 612 F.3d 822, 826–27 (5th Cir. 2010).

new version of the cooling water rule.²⁷⁶ The announcement immediately unleashed a firestorm of criticism from both industry and environmentalists. Industry advocates maintained that the method was inherently unreliable and would vastly overstate the benefits of the rule.²⁷⁷ They pointed to the well-known problem of “hypothetical bias”—the fact that when asked in a survey what they would hypothetically pay for some good, people tend to overestimate what they would be willing to pay if they were actually required to take money out of their wallets.²⁷⁸ Environmental groups, meanwhile, warned that the stated-preference survey would understate the rule’s benefits because it framed the question in terms of people’s willingness to pay to obtain environmental values rather than their willingness to accept payment to give up environmental values—here fish and aquatic ecosystems that, “[l]ike the air and water themselves . . . are public trust resources belonging to the public at large.”²⁷⁹

Preliminary results published in June 2012 suggested dramatic results.²⁸⁰ The EPA provided figures on households’ willingness to pay for a one percentage point improvement in fish mortality levels²⁸¹ but didn’t tally up its numbers to provide final dollar values for total national willingness to pay for each proposed option. Professor Frank Ackerman, an economist hired by a set of environmental groups commenting on the rule, did the missing arithmetic and concluded that the survey

²⁷⁶ Willingness To Pay Survey for Section 316(b) Existing Facilities Cooling Water Intake Structures (New), 75 Fed. Reg. 42,438 (July 21, 2010).

²⁷⁷ Am. Chem. Council et al., Comments on ICR for Willingness to Pay Survey for Section 316(B) Existing Facilities Cooling Water Intake Structures, at 17 (2010) (submitted to EPA, Docket ID No. EPA-HQ-OW-2010-0595) [hereinafter ACC Comments (2010)]. Indeed, the controversy reached the House of Representatives, where Republican members questioned the EPA Administrator Gina McCarthy about the Agency’s use of these surveys at a congressional hearing. See Lee Logan, *McCarthy Sidesteps GOP Concern about Non-Use Benefits in Future Rules*, INSIDE EPA, Dec. 6, 2013, at 34.

²⁷⁸ See ACC Comments (2010), *supra* note 277, at 27. The EPA responded to this concern by simply asking survey respondents if they were biased and taking their answers at face value. See EPA, SUPPORTING STATEMENT FOR INFORMATION COLLECTION REQUEST FOR WILLINGNESS TO PAY SURVEY FOR § 316(B) EXISTING FACILITIES COOLING WATER INTAKE STRUCTURES: INSTRUMENT, PRE-TEST, AND IMPLEMENTATION 9 (2014), available at <http://water.epa.gov/lawsregs/lawguidance/cwa/316b/upload/316bsupport.pdf>, archived at <http://perma.cc/4MX8-9VR2>.

²⁷⁹ See Comments from Reed W. Super, Founder, Super Law Grp., LLC, to EPA, on Proposed ICR for Stated Preference Survey for Section 316(b) Rulemaking 6 (Sept. 20, 2010) (submitted to EPA, Docket ID No. EPA-HQ-OW-2010-0595). This was a reference to the endowment effect, discussed above. See *supra* notes 37–38 and accompanying text.

²⁸⁰ National Pollutant Discharge Elimination System—Proposed Regulations To Establish Requirements for Cooling Water Intake Structures at Existing Facilities; Notice of Data Availability Related to EPA’s Stated Preference Survey, 77 Fed. Reg. 34,927, 34,929 (June 12, 2012).

²⁸¹ EPA, SURVEY SUPPORT DOCUMENT: IN SUPPORT OF SECTION 316(b) STATED PREFERENCE SURVEY NOTICE OF DATA AVAILABILITY 32–36 (2012).

would result in huge numbers for the benefits of the rule as a whole, ranging from \$1.3 to \$7 billion per year. These numbers produced total benefits for all four options that would either substantially exceed costs or—using a high 7% discount rate—be below costs by such a slight amount as to be within the margin of error.²⁸² Industry economists appeared to agree with this assessment and, hence, industry commenters urged the EPA to “abandon” its stated-preference survey altogether,²⁸³ calling it “ill-conceived from the outset”²⁸⁴ and “deeply flawed,”²⁸⁵ and complaining that the “benefit-cost calculations resulting from the survey are so far out of line with EPA’s prior economic estimates as to be totally implausible.”²⁸⁶ Environmentalists, on the other hand, identified errors in the EPA’s analysis that they argued skewed the results significantly downward. If those errors were corrected, they argued, the benefits of the EPA’s most stringent closed cycle cooling option would have outweighed the costs by three to one.²⁸⁷

The EPA finally issued its final rule on May 19, 2014,²⁸⁸ adopting a somewhat watered-down version of the rule it had proposed three years earlier.²⁸⁹ But after intensive lobbying by industry, the long-anticipated results of the stated-preference survey had been axed from the CBA. The preamble gave little in the way of explanation for this omission, stating simply, “EPA decided not to employ the survey results for purposes of decision-making, and EPA has not accounted for values estimated from the survey in the quantitative comparison of costs and benefits.”²⁹⁰

²⁸² Comments from Frank Ackerman, *supra* note 266, at 11.

²⁸³ Util. Water Act Grp. & Edison Elec. Inst., Comments on the Notice of Data Availability Related to EPA’s Stated Preference Survey 6 (2012) (submitted to EPA, Docket ID No. EPA-HQ-OW-2008-0667).

²⁸⁴ *Id.* at 2.

²⁸⁵ *Id.* at 3.

²⁸⁶ *Id.* at 4.

²⁸⁷ Riverkeeper, Inc. et al., Comments on National Pollutant Discharge Elimination System—Proposed Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities 5 (2012) (submitted to EPA, Docket ID No. EPA-HQ-OW-2008-0667).

²⁸⁸ National Pollutant Discharge Elimination System—Final Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities, 79 Fed. Reg. 48,300, 48,321–22 (Aug. 15, 2014) (to be codified at 40 C.F.R. pts. 122, 125) [hereinafter Final Existing Facilities Rule Post-Remand].

²⁸⁹ National Pollutant Discharge Elimination System—Cooling Water Intake Structures at Existing Facilities and Phase I Facilities, 76 Fed. Reg. 22,174, 22,204–05 (proposed Apr. 20, 2011) (to be codified at 40 C.F.R. pts. 122, 125) [hereinafter Proposed Existing Facilities Rule Post-Remand].

²⁹⁰ Final Existing Facilities Rule Post-Remand, 79 Fed. Reg. at 48,350; *see also id.* at 48,324–25. At one point, buried deep in the preamble, the EPA suggested obliquely that the stated preference survey might have played a role in informing their qualitative estimate of the magnitude of the benefits: “While preliminary, and not yet reviewed by EPA’s Science Advisory Board, the preliminary results of EPA’s stated preference survey . . . suggest that

Thus, the EPA ended up, as it had in the original rule a decade earlier, with a monetized estimate of benefits (\$33 million annually) that was vastly incomplete and far below the annual cost estimate of \$275 million.²⁹¹ Once again, the EPA was upfront about the inadequacy of its monetary benefits estimate, noting that “[m]any of the benefits that will result from the rule are not monetized or quantified, and as a result the Agency’s monetized benefits analysis underestimates the totality of the rule’s benefits.”²⁹² But this time, to its credit, the Agency did not, explicitly at least, use the fact that the monetized benefits fell short of the costs as a justification for weakening the rule. In balancing the costs and benefits, the EPA gave significant weight to the unquantified benefits, concluding that the “benefits . . . justify the costs of the rule,” even though the monetized benefits fell far short.²⁹³

Thus, while the EPA appears to have avoided engaging in the kind of false formality that characterized its first version of the rule, what is notable here is the *kind* of CBA the Agency pursued in response to the Supreme Court’s decision. The Agency’s first step after remand was to devote countless hours and resources to conducting a stated-preference survey. This represented a dramatic shift in the direction of formality, even in the face of a Supreme Court decision clearly encouraging the EPA to move in the opposite direction and suggesting that a move toward formality might be out of bounds. And, one might say the EPA’s eventual abandonment of the survey in connection with the final rule makes Justice Breyer’s warning that “attempts at comprehensive monetization” will ultimately prove “futile” seem prescient.²⁹⁴

The EPA also moved toward formality with respect to the other way CBA figures in this rulemaking—site-specific CBAs. The Obama EPA’s new rule is far more lenient than the original, Bush-era rule that was approved by the Supreme Court. The old rule included a variance procedure under which individual plants

[the unquantified benefits] have the potential to be significantly different from zero.” *Id.* at 48,415 (citations omitted). But the Agency subsequently hurried to reassure its audience that “EPA did not rely on the results of its stated preference survey in estimating the benefits of today’s rule.” *Id.* at 48,401.

²⁹¹ *Id.* at 48,350.

²⁹² *Id.* at 48,349.

²⁹³ *Id.* While this was exactly the kind of situation in which OIRA advises use of a break-even analysis, the EPA did not use that term.

²⁹⁴ *Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208, 235 (2009) (Breyer, J., concurring in part and dissenting in part). While the EPA gave little explanation in the preamble for its decision to abandon the stated-preference survey, at certain points it seemed to suggest that the stated-preference survey might be an ongoing effort that could conceivably benefit future rulemakings. *See* Final Existing Facilities Rule Post-Remand, 79 Fed. Reg. at 48,406 (“EPA presents preliminary benefits estimates based on the stated preference survey in the [Benefits Assessment] to demonstrate progress on this effort.”). But the EPA’s experience so far with the stated-preference survey simply illustrates the degree to which efforts to use highly controversial, contestable, and manipulable methods to monetize nonmarket goods ultimately shift agency decision making into a highly politicized realm. *See* Sinden, *Defense of Absolutes*, *supra* note 2, at 1452–59.

could in specific circumstances escape from the national standards by conducting a site-specific CBA showing that their compliance costs would be “significantly greater than” the benefits.²⁹⁵ But the new rule subjects all facilities to a case-by-case BTA determination by state permit writers, based in part on a site-specific CBA.²⁹⁶

This time the EPA initially used a “wholly disproportionate” standard for these site-specific CBAs rather than the “significantly greater than” formulation from the Bush-era rule. This may have been in response to Justice Breyer’s concurrence in *Riverkeeper*, in which he questioned the EPA’s use of the “significantly greater than” formulation. In the first few decades after passage of the Clean Water Act, before it got around to issuing national standards for cooling water intakes, the EPA had directed state agencies to do all BTA determinations on a site-specific basis (a system not unlike that created by the new rule).²⁹⁷ Under that program, however, the EPA had used a “wholly disproportionate” test. Justice Breyer, accordingly, objected to the Agency’s failure to explain its departure from that balancing test in the Bush-era rule.²⁹⁸ It may be, then, that in drafting the proposed version of the new Obama rule, the EPA initially used the original “wholly disproportionate” test in the hopes of avoiding having to provide Justice Breyer with an explanation should the rule return to the Supreme Court.

Thus, in the draft proposed rule it submitted to OIRA for review, the EPA prohibited state permit writers from rejecting an otherwise available technology “unless the social costs of compliance are wholly disproportionate to the social benefits.”²⁹⁹ In explaining the use of this informal Axis 2 standard, the EPA stressed that the challenges posed by site-specific CBA would necessitate a relatively informal position along Axis 1, noting that “when dealing with only a single site assessment the quantified and monetized estimates of benefits are more uncertain and less comprehensive than the estimates of costs” and that “[i]mportant benefit effect categories will very likely not be able to be quantified and monetized.”³⁰⁰

OIRA, however, pushed the EPA back toward the formal end of the spectrum—and not just to the “significantly greater” formulation upheld by the Supreme Court in the original rule. When the rule emerged from review, OIRA had deleted the EPA’s reference to the difficulties of quantification and monetization and replaced the “wholly disproportionate” balancing formula with language allowing standards

²⁹⁵ Final Phase II Existing Facilities Rule, 69 Fed. Reg. 41,576, 41,686 (July 9, 2004).

²⁹⁶ Final Existing Facilities Rule Post-Remand, 79 Fed. Reg. 48,300.

²⁹⁷ See OFFICE OF WATER ENFORCEMENT PERMITS DIV., EPA, DRAFT GUIDANCE FOR EVALUATING THE ADVERSE IMPACT OF COOLING WATER INTAKE STRUCTURES ON THE AQUATIC ENVIRONMENT: SECTION 316(b) P.L. 92-500 (1977).

²⁹⁸ *Riverkeeper*, 556 U.S. at 235–36 (Breyer, J., concurring in part and dissenting in part).

²⁹⁹ EPA, National Pollutant Discharge Elimination System—Proposed Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities and Amend Requirements at Phase I Facilities 293, 381 (2011) (draft of proposed rule) (on file with the Utah Law Review).

³⁰⁰ *Id.* at 292.

to be loosened whenever costs are not “justified by” benefits.³⁰¹ While it is not entirely clear where exactly on Axis 2 this “justify” formulation falls, it seems safe to say that it falls well to the right of the “wholly disproportionate” test.³⁰² Moreover, since this formulation tracks the language of the Clinton Executive Order, it can be read to embody the same leaning toward formality contained in that document.³⁰³ Thus, in this instance, OIRA pushed the EPA to adopt a brand of CBA that is significantly more formal than what the Agency had first proposed or what the Supreme Court had endorsed in *Riverkeeper*.

In sum, there appears to be a discernable pull in the executive branch toward more formal modes of CBA. The executive orders requiring CBA of major agency rules and the guidance documents interpreting those orders all hold up formal Economic CBA as the goal. Additionally, in the two rulemakings preceding and following the *Riverkeeper* case, we see anecdotal evidence of the EPA leaning hard toward formality, even in the face of a U.S. Supreme Court opinion expressing substantial doubts about such an approach.

C. *Why the Move Toward Formality? Some Speculations*

Why does the executive branch seem to push for more formality in CBA despite the fact that more formal versions of CBA clearly spark more controversy in the academic community and also appear to be viewed with considerable skepticism by both Congress and the federal courts? While I have no definitive answer to this question, I offer some speculations below.

One obvious answer is to simply take the executive orders at their word: the executive branch values CBA’s standard setting function and wishes to use it to locate economically efficient levels of regulation. Putting aside the many arguments from the academic debate about why the notion of efficiency might itself be illusory

³⁰¹ See EPA, Redlined National Pollutant Discharge Elimination System—Proposed Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities and Amend Requirements at Phase I Facilities 308–09 (2011) [hereinafter EPA Redlined Proposed CWIS Rule] (redlined draft of proposed rule) (on file with the Utah Law Review) (deleting references to the difficulties and uncertainties associated with quantification and monetization quoted above and replacing the “wholly disproportionate” test with the “justify” test); see also Proposed Existing Facilities Rule Post-Remand, 76 Fed. Reg. 22,174, 22,288 (proposed Apr. 20, 2011) (to be codified at 40 C.F.R. pts. 122, 125). This language also appears in the final rule. Final Existing Facilities Rule Post-Remand, 79 Fed. Reg. 48,300, 48,352 (Aug. 15, 2014) (to be codified at 40 C.F.R. pts. 122, 125). In a nod toward informality, the rule does specify (not unlike the executive order) that the site-specific CBA should include consideration of “qualitative social benefits and costs.” *Id.* § 125.98(f)(2)(v).

³⁰² See *supra* notes 50–52, 219–220, and accompanying text.

³⁰³ Indeed, the proposed rule (as re-written by OIRA) indicated that the justify formulation was based on the executive orders and intended to have the same meaning. See EPA Redlined Proposed CWIS Rule, *supra* note 301, at 151.

or perhaps impossible to achieve in practice, another reason to at least perhaps hesitate in embracing this explanation emerges from the discussion above. Locating the economically efficient level of regulation requires formal Economic CBA, which requires measuring costs and benefits for a large number of alternatives. But CBA as actually practiced by agencies often evaluates only a single alternative and rarely evaluates more than a handful, putting those CBAs well toward the left end of Axis 3, far from formal Economic CBA.³⁰⁴ Indeed, the most such a litmus-test CBA can hope to achieve, assuming reasonably complete monetization, is an indication of whether a regulation moves in the general direction of efficiency. But even a regulation that passes that test may still be very far from the actual point of net benefits maximization. The kind of litmus-test CBA performed by most agencies is therefore a rather blunt instrument for achieving efficient regulation.³⁰⁵

Alternatively, it may be that a concern with transparency is driving the move toward formality. Transparency is, after all, one of the stated goals accompanying the CBA requirement in Executive Order 12,866—“to make the process more accessible and open to the public.”³⁰⁶ And President Obama has devoted considerable rhetorical energy to his administration’s commitment to increased transparency.

Some CBA proponents argue that formality increases transparency.³⁰⁷ Dan Cole, for example, argues that formal CBA forces the analyst to make methods and assumptions explicit, allowing “analysts, the media and interest groups [to] review[], challeng[e], replicat[e], or even simply understand[] why a particular decision was taken, rather than some other decision.”³⁰⁸ On this view, the more formal a CBA is—the more it makes use of data and numbers and mathematical formulas rather than gut feeling and instinct—the more its results have the capacity to be replicated and therefore checked by others, which creates transparency.

³⁰⁴ See Robert W. Hahn et al., *Assessing Regulatory Impact Analyses: The Failure of Agencies to Comply with Executive Order 12,866*, 23 HARV. J. L. & PUB. POL’Y 859, 869–70, 874 (2000) (finding that, in an empirical study of forty-eight federal agency CBAs, “the agencies generally did not provide a significant analysis of alternatives”); ECONOMIC ANALYSES AT EPA: ASSESSING REGULATORY IMPACT (Richard D. Morgenstern ed., 1997) (empirical evidence suggests that CBAs often fail to address a sufficient number of alternatives).

³⁰⁵ See Alan J. Krupnick, *The CAMR: An Economist’s Perspective*, in REFORMING REGULATORY IMPACT ANALYSIS, *supra* note 53, at 143 (noting that in practice, CBAs are not “sophisticated or comprehensive enough” to identify economically efficient policies).

³⁰⁶ Exec. Order No. 12,866, 3 C.F.R. 638, 638 (1994), *reprinted as amended* in 5 U.S.C. § 601 app. at 88–92 (2012); Exec. Order No. 13,563 § 2, 3 C.F.R. 215, 216 (2012), *reprinted* in 5 U.S.C. § 601 app. at 102–03 (2012).

³⁰⁷ See Sunstein, *supra* note 63 (stating “[q]uantification helps to promote accountability, transparency, and consistency”); see SUNSTEIN, COST-BENEFIT STATE, *supra* note 2, at 9, 27.

³⁰⁸ Cole, *supra* note 35, at 69–70.

But this is just one of the laundry list of arguments in favor of (formal) CBA that sparks heated debate in the academic community. Without delving too far into that debate, I will simply note here the argument frequently made by CBA skeptics that formal CBA actually inhibits rather than increases transparency. Skeptics (including myself in other work) contend that formal CBA obscures the value judgments that actually drive CBA behind a veil of seemingly objective and scientific numbers, that the numbers tend to eclipse important qualitative considerations, and that the technical methods of CBA—which employ sophisticated mathematics and abstruse concepts like discounting—are inaccessible to members of the general public and thus further tilt the playing field in favor of moneyed industrial interests who can afford to hire consultants over cash-strapped environmental groups who cannot.³⁰⁹ But this, of course, brings us back to the question of why the executive branch would purposely move toward controversy rather than away from it.

It may well be that the reason for the executive branch's apparent tilt toward formality lies primarily in the institutional dynamics relating to the interplay between the EPA and OIRA, the details of which are largely beyond the scope of this Article. I will nonetheless make a few brief observations in that direction based on the recent writings of Professors Cass Sunstein and Lisa Heinzerling. During President Obama's first term, Professor Sunstein was OIRA Director and Professor Heinzerling was Associate Administrator of the EPA's Office of Policy, where she interfaced regularly with Professor Sunstein's OIRA. Professors Sunstein's and Heinzerling's descriptions of their time in the executive branch both confirm that the embrace of formality apparent in the executive orders and guidance documents is also reflected in OIRA practice and that OIRA regularly exerts pressure on agencies to increase the formality of their CBAs.

Indeed, by Professor Sunstein's account, it appears that practices at OIRA have moved even more in the direction of formality than those documents themselves necessarily require. For example, Professor Sunstein characterizes the language of Executive Order 13,563 as "reflect[ing] an unprecedented emphasis on the importance of quantification" in the Obama administration.³¹⁰ In another article, he

³⁰⁹ Coates IV, *supra* note 9, at 71–79 (arguing formal CBA can be used as “camouflage” that can “as or more easily mislead as inform the public,” and CBA requirements may create incentives for agencies to make the analysis obscure and difficult to understand); Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, 107 YALE L.J. 1981, 2064–65, 2068 (1998); Sinden, *supra* note 149, at 219–22.

³¹⁰ Cass R. Sunstein, *The Real World of Cost-Benefit Analysis: Thirty-Six Questions (and Almost as Many Answers)*, 114 COLUM. L. REV. 167, 171 (2014) [hereinafter Sunstein, *Real World*]; see also Sunstein, *supra* note 307, at 7 (stating that Executive Order 13,563's requirement that agencies “quantify anticipated benefits and costs as accurately as possible” . . . attests to the importance of both quantification and monetization” (quoting Exec. Order No. 13,563 § 1(c), 3 C.F.R. 215, 216 (2012), reprinted in 5 U.S.C. § 601 app. at 102–03 (2012)); Cass R. Sunstein, *The Office of Information and Regulatory Affairs: Myths and Realities*, 126 HARV. L. REV. 1838, 1864 (2013) [hereinafter Sunstein, *Myths & Realities*]

boasts about the hard line that his OIRA took on CBA: “If the quantifiable benefits are lower than the quantifiable costs, agencies must explain why they seek to proceed In the Obama Administration, it has been very rare for a rule to have monetized costs in excess of monetized benefits.”³¹¹ And in his book he makes clear that, as OIRA director, he did not adopt the informal, kinder and gentler form of CBA he had endorsed in his earlier writings:

In fact, we should make a distinction here. On one view, analysis of costs and benefits really is just a nudge. Agencies have to produce such an analysis, but they do not need to be constrained by it. If the costs outweigh the benefits, they remain entitled to go forward. On another view, the analysis of costs and benefits is not merely a nudge; it is a rule of decision. On this view, agencies cannot proceed unless the benefits justify the costs. In the Obama Administration we took the stronger view: Agencies could not go forward if the benefits did not justify the costs, unless the law required them to do so.³¹²

And in another recent article, Professor Sunstein makes clear that where a regulation’s monetized benefits are less than monetized costs, it “will not be easy to establish” that the benefits justify the costs.³¹³

According to Professor Heinzerling, during her tenure at EPA, this meant not only that OIRA would prevent rules from going forward if their monetized benefits did not exceed their monetized costs, but that OIRA’s push for formality permeated the culture at the EPA. In Professor Heinzerling’s words, “OIRA’s fine cost-benefit sieve leads EPA personnel to be deeply wary of developing rules that have very high costs in relation to their quantified and monetized benefits.”³¹⁴

(calling executive order requirements that “benefits of rules justify the costs and that the agency has selected the approach that maximizes net benefits . . . exceedingly important” (citations omitted)).

³¹¹ Sunstein, *Myths & Realities*, *supra* note 310, at 1865–66; *see also* Sunstein, *Real World*, *supra* note 310, at 180–81 (noting that where a regulation’s monetized benefits are less than monetized costs, “the agency is unlikely to attempt to go forward with this regulation,” and if it does, it “will not be easy to establish” that the benefits justify the costs); *id.* at 188 (observing that if an agency were to express monetized benefits in wide ranges, “[a] great deal of work would be done to try to achieve greater precision and confidence in the numbers”).

³¹² CASS R. SUNSTEIN, *SIMPLER: THE FUTURE OF GOVERNMENT* 161 (2013). Compare this to Professor Sunstein’s description of the proper role of CBA in his 2002 book, *The Cost-Benefit State*, quoted in Part III.A above. *See supra* note 87 and accompanying text.

³¹³ Sunstein, *Real World*, *supra* note 310, at 180–81.

³¹⁴ Lisa Heinzerling, *Inside EPA: A Former Insider’s Reflections on the Relationship Between the Obama EPA and the Obama White House*, 31 *PACE ENVTL. L. REV.* 325, 352 (2014); *see also* Sunstein, *Real World*, *supra* note 310, at 180–81 (noting that where a regulation’s monetized benefits are less than monetized costs, “the agency is unlikely to attempt to go forward with this regulation”); Rena Steinzor, *The Case for Abolishing*

There is also, perhaps, a simple institutional dynamic that contributes to the executive branch's pull toward formality. OIRA's staff is made up primarily of economists, who by their training are probably more likely to favor formal CBA, with its explicit grounding in economic theory.³¹⁵ As noted in Part III.A, of the literature advocating for CBA, much of that urging a more formal view of CBA comes from formally trained economists.³¹⁶ Thus, OIRA's professional culture and institutional makeup may be one of the drivers of the push toward formality in the executive branch.

Alternatively, the EPA's move toward formality in this case may simply be the inevitable consequence of what Professor Doug Kysar has called the "cognitive lure" of CBA—the irresistible temptation that bureaucrats and policymakers feel to justify their decisions with numbers that project an aura of scientific objectivity and accuracy.³¹⁷ Or, as Kysar puts it, "the promise of an 'objective' quantitative analysis seem[s] difficult to resist in the face of a heavily politicized, deeply uncertain, and morally fraught decision."³¹⁸

Professor Wendy Wagner made a similar argument in her case study of the CBA accompanying the EPA's Clean Air Interstate Rule. Professor Wagner argued that in this rulemaking, CBA served not as a decisionmaking tool, but rather as a strategic advocacy document "to help insulate the agency from inevitable legal and political attack."³¹⁹ If, from the agency's perspective, defense and justification of their chosen rule is the goal, then it is easy to see how formality, or at least the appearance of formality, would appear to be the best strategy.³²⁰ Numbers convey

Centralized White House Regulatory Review, 1 MICH. J. ENVTL. & ADMIN. L. 209, 243–44 (2012) (discussing dynamic set up by centralized review of agency rules by OIRA, as giving OIRA significant power and sway over agency rule making).

³¹⁵ See Steinzor, *supra* note 314, at 276, 283.

³¹⁶ See *supra* notes 110–111 and accompanying text.

³¹⁷ Kysar, *Fish Tales*, *supra* note 272, at 190, 197.

³¹⁸ *Id.*; see also Cole, *supra* note 35, at 69 (observing that "government increasingly rel[ies] on [CBA] as a tool in policymaking" despite its "various subjective and manipulable elements" in part because it "appear[s] more scientific," and because it allows "decision makers . . . [to] boil down fundamental questions of regulatory policy to a single number (or a set of numbers . . .), which creates the impression (or misimpression) that the policy choice is . . . clear").

³¹⁹ Wagner, *supra* note 122, at 57; see also Coates IV, *supra* note 9, at 91–92 (stating agencies may use CBA strategically); Alan J. Krupnick, *The CAMR: An Economist's Perspective*, in REFORMING REGULATORY IMPACT ANALYSIS, *supra* note 53, at 142 ("When an RIA is issued contemporaneously with the rule itself, . . . the RIA becomes mere justification for the agency's choices rather than a means of informing and improving the ultimate choice."); THEODORE M. PORTER, TRUST IN NUMBERS: THE PURSUIT OF OBJECTIVITY IN SCIENCE AND PUBLIC LIFE 194 (1995).

³²⁰ See Coates IV, *supra* note 9, at 75 (noting that the SEC acted rationally in making CBA purposely opaque, using it to camouflage their real reasoning in order to defeat future court challenges); Livermore & Revesz, *supra* note 132, at 47–53 (demonstrating that when an agency has good quantifiable data on a rule's benefits—as the EPA does on the health

an aura of scientific accuracy and objectivity that qualitative descriptions cannot match.³²¹ Similarly, formality might serve to insulate the White House and OIRA from charges of political meddling in agency decisionmaking. If OIRA can point to the numbers in a formal CBA as a reason for pushing an agency to change a proposed rule, OIRA's role may appear less political and more scientific or technical.³²²

It may be that this “cognitive lure” is in part also fueled by the adversarial dynamics that inevitably play out between industry and environmentalists, especially with respect to high-profile rules like this one. In earlier work I have suggested that these dynamics take the form of “an ongoing tug-of-war between environmentalists and industry in which each side will progressively force [the agency] to spend more and more money seeking the holy grail of accuracy in the quantification of costs and benefits.”³²³ I argued that advocates on both sides would face incentives to push for increased formality in CBA:

Though [the agency] may start by performing rough apples-to-oranges comparisons in order to avoid quantifying benefits, a determination to [regulate more or less stringently] based on such an analysis will inevitably lead the disappointed constituency to sue claiming that benefits should have been quantified to ensure an objective and accurate cost-benefit analysis. Ultimately, unless [the agency] takes a stand in favor of [informality] . . . and . . . is backed up by the courts, this political dynamic will lead ineluctably to a more and more quantitative, complicated, and costly analysis.³²⁴

One might cite as a counterexample industry's recent arguments urging the EPA to drop the stated preference survey for its cooling water intake rule in the wake of results suggesting huge willingness-to-pay values for protecting aquatic life. But industry did not in that context urge the EPA to abandon formality per se. Rather, this argument represents a disagreement about which methods of formality to use, disagreements that are only likely to proliferate as formality increases and analysts turn with more frequency to controversial and contestable methods like contingent

effects of particulate matter pollution—it might view formal CBA as a way to defend a stringent rule: that certain air quality standards under the Clean Air Act would be more stringent if set by formal CBA rather than health-based criteria).

³²¹ See *supra* note 309 and accompanying text. *But see* Charles Gowan et al., *The Role of Ecosystem Valuation in Environmental Decision Making: Hydropower Relicensing and Dam Removal on the Elwha River*, 56 *ECOLOGICAL ECON.* 508 (2006) (providing an empirical study of a dam removal decision suggesting that decision makers and stakeholders prefer qualitative projections as the basis for negotiation and decision making and tend to ignore monetized valuations).

³²² See Daniel A. Farber & Anne Joseph O'Connell, *The Lost World of Administrative Law*, 92 *TEX. L. REV.* 1137, 1168–70 (2014).

³²³ Sinden, *Endangered Species*, *supra* note 2, at 183.

³²⁴ *Id.* (citations omitted).

valuation. Perhaps more interesting is the fact that the environmentalists, who generally oppose formality, found themselves in the position of arguing in favor of the EPA's stated-preference survey because it appeared likely to produce results that would support more stringent regulation.³²⁵ In this way, environmentalists' usual opposition to formal varieties of CBA may often be neutralized in specific cases.

A thorough understanding of the forces driving the executive branch's apparent tilt toward formality is largely beyond the scope of this Article. It may, however, reflect an attempt to achieve efficiency, a belief that formality will increase transparency, the institutional dynamics between the EPA and OIRA, the adversarial dynamics between industry and environmentalists, or perhaps simply the "cognitive lure" of formality.

VI. LESSONS FOR THE LARGER DEBATE

The foregoing analysis of the distinctions between formal and informal CBA provides some lessons for the larger debate over CBA. The first lesson is about doctrine: if we view CBA as a monolithic concept, then we risk misinterpreting those cases and statutes that do endorse agency use of CBA as ratifying all forms of CBA, no matter how formal. But that's a highly misleading reading of the law. The second lesson is about the broader debate: failing to carefully distinguish between formal and informal forms of CBA gives the proponents of CBA the ability to facilely use Ben Franklin as a shield in a way that muddies the debate and deflects attention from the pitfalls and dangers of formality. The third lesson is about function: different forms of CBA perform different functions in the decisionmaking process. Failing to differentiate among levels of formality in CBA leads to sloppiness and confusion about the function that CBA serves. The fourth lesson is about analytic integrity: carefully distinguishing among different forms of CBA helps to avoid the intellectual sloppiness and false formality that can occur when the CBA analyst tries to combine inconsistent positions along the three axes of formality. Each of these lessons is detailed in turn below.

A. *Doctrine*

If we're not careful to define terms and we lump all forms of CBA together into one category, then we risk misinterpreting the law. Viewing CBA as a monolith leads to a reading of *Riverkeeper* as endorsing agency use of all forms of CBA, including highly formalized versions. Indeed, that appears to be how the EPA is interpreting the case. But that's a highly inaccurate reading. As detailed above, the vast majority of circuit court opinions upholding agency uses of CBA prior to *Riverkeeper* also endorsed only relatively informal varieties of CBA, and a number

³²⁵ See Logan, *supra* note 277, at 34 (noting that "[e]nvironmentalists generally support [stated-preference] surveys, saying they account for benefits that are often ignored or 'zeroed out' in cost-benefit reviews").

of courts have expressed considerable skepticism about formal CBA, similar to that voiced by the Supreme Court in *Riverkeeper*. Accordingly, it is far more accurate to characterize the body of federal environmental statutory and case law as generally disfavoring CBA, but favoring decidedly informal varieties of CBA in those relatively rare instances when its use is sanctioned. With only a few exceptions, both Congress and the federal courts have adopted this view, expressing considerable skepticism about more formal versions of CBA.

B. Debate

Treating CBA as a monolith also allows proponents of CBA to use Ben Franklin as a shield—that is, to equate all forms of CBA with rationality, reasonableness, and common sense. Yet, as the above analysis has shown, informal, Ben Franklin-style CBA has very little in common with formal Economic CBA. For one thing, Ben Franklin CBA involves no conversion of nonmarket values into monetary terms, which is the source of most of the controversy that surrounds formal Economic CBA. Additionally, these two forms of CBA perform very different functions in decisionmaking. Informal Ben Franklin CBA is a secondary check or litmus test applied after a particular regulatory option has already been chosen by other means. Formal Economic CBA, on the other hand, is a decisionmaking standard that selects the efficient regulatory alternative from a whole range of options.

While there may be compelling arguments in favor of formal Economic CBA as a decisionmaking tool, they do not include appeals to Ben Franklin and simple homespun common sense. Rather, they require complex explications of economic theory (or broader theories of welfare and well-being).³²⁶ If participants on both sides of the debate are more careful about recognizing the distinctions between formal and informal varieties of CBA, then facile, but ultimately unhelpful, allusions to Ben Franklin can be taken off the table.

C. Function

As mentioned above, different kinds of CBA perform significantly different functions in the decisionmaking process. This aspect of the formality-informality spectrum arises out of Axis 3 (number of alternatives). As one moves to the right on Axis 3, CBA shifts from a secondary filter applied to a single alternative (or a small number of alternatives) chosen by other means to an actual standard setting tool that identifies the efficient (welfare maximizing) alternative. This is a crucial distinction, and failing to recognize it leads to muddled thinking.³²⁷ The most common error is

³²⁶ See ADLER & POSNER, *supra* note 17, at 1–25.

³²⁷ In its proposed cooling water intake structure rule on remand, the EPA appears to have treated CBA as a secondary check. Even though it purported to evaluate the costs and benefits of four different options, it only did a comprehensive balancing of costs against

assuming a regulation that passes a litmus-test CBA is therefore optimally efficient. This is not the case, as Part II explains.

D. Analytic Integrity

Breaking the CBA formality spectrum down into three axes, as the typology in Part II does, allows us to see the relationships between them. As a matter of simple logic, certain moves along one axis generally require corresponding moves along the other axes. Thus, if a CBA is at the informal end of Axis 1—describing costs and benefits in purely qualitative terms—it cannot possibly move even to the middle position on Axis 2. That is, it cannot balance costs and benefits with precision. Similarly, if a CBA is at the informal end of Axis 3—measuring the costs and benefits of only a single alternative—it cannot possibly move all the way to formality on Axis 2, identifying the point of equivalence between marginal benefits and costs.

Confusion or sloppiness about these relationships between axes leads to intellectual incoherence and sometimes to a particular brand of incoherence I have dubbed false formality. An example of this false formality can be found in the EPA's CBA of its cooling water intake rule in the lead up to the Supreme Court's opinion in *Riverkeeper*. This CBA was on the informal end of Axis 1, monetizing most costs but only a small portion of benefits, leaving most benefits unquantified and unmonetized. This, of course, necessitated staying toward the left side of Axis 2, performing only a rough apples-to-oranges balancing. Instead, though, when the time came for balancing, the EPA treated the analysis as though it were formal—performing a precise comparison of two single numbers, without mentioning the fact that the lower number was vastly incomplete.³²⁸ But this was, of course, nonsensical—the direct opposite of the rationality and common sense to which CBA's supporters lay claim. And it arose from a failure to pay close attention to where the CBA fell on the formality-informality spectrum and a failure to respect the relationships between the axes of formality.

There are other examples of this false formality in which the Agency, in Professor Wendy Wagner's words, exhibits an "obsession with the precise

benefits (quantified and unquantified) for the preferred option. *See* Proposed Existing Facilities Rule Post-Remand, 76 Fed. Reg. 22,174, 22,267–68 (proposed Apr. 20, 2011) (to be codified at 40 C.F.R. pts. 122, 125). This balancing yielded the conclusion that the benefits of the preferred option justified its costs. *Id.* But it could well be that benefits also justified costs for the other options as well. Indeed, after the preliminary results of the stated-preference survey came in, economist Frank Ackerman's calculations suggested that net benefits would actually be higher for the more stringent options. *See* Comments from Frank Ackerman, *supra* note 266, at 1, 11.

³²⁸ The EPA's guidelines facilitate this by requiring the analyst to calculate net benefits even where important benefits cannot be quantified. GUIDELINES, *supra* note 12, at 11-3; *see supra* notes 240–241 and accompanying text.

quantification of a subset of benefits.”³²⁹ Professor Wagner had this to say, for example, about the CBA that the EPA conducted in connection with its 2005 Clean Air Interstate Rule:

[I]f EPA cannot even be sure it has quantified the bulk of the benefits, subsequent monetization of the remaining quantified benefits becomes practically useless. If $(x + y) = \textit{social benefits}$, and y is unknown but is potentially large and perhaps even greater than x , then excessive efforts at monetization of x is not going to move the ball forward in finding the efficient balance point where marginal benefits meet marginal costs. This is not meant to suggest that the appropriate remedy is for EPA to simply put more resources into quantification of y , . . . however. EPA persuasively made a case that the ecological benefits were so difficult to predict, both qualitatively and quantitatively, that any estimation would amount to an unverifiable guess. The appropriate response to these quantitative problems is to acknowledge them and abort efforts to arrive at aggregate, monetized costs and benefits.

Indeed, to nevertheless persist with incomplete quantification in such circumstances is . . . analytically corrupt³³⁰

This kind of false formality, or analytic corruption, results in part from a lack of clarity about the distinctions between formal and informal varieties of CBA and the relationships between the three axes of the formality-informality spectrum. Clarity about where a particular CBA falls along each of the three axes and about the relationships between those axes would go a long way toward preventing the kind of false formality that occurred in the first iteration of the cooling water rule and that Professor Wagner identified in connection with the Clean Air Interstate Rule.

VII. CONCLUSION

In the now decades-long debate over the use of CBA in agency rulemaking, the participants have often failed to define the term. “Cost-benefit analysis” can refer to

³²⁹ Wagner, *supra* note 122, at 66; *see also* Coates IV, *supra* note 9, at 52–53 (criticizing the D.C. Circuit for insisting that the SEC quantify a small subset of costs where larger costs and all benefits cannot be quantified in any case); Keohane, *supra* note 72, at 47 (calling the EPA’s CBA for the Clean Air Interstate Rule “almost compulsive in its precision—as illustrated by its patient exploration of categories of impacts . . . that do not even amount to rounding error, being measured in the tens of millions relative to total benefits in the tens of billions”); O’Neill, *supra* note 53, at 119 (calling the CBA of the EPA’s 2005 Clean Air Mercury Rule “a complete cost-incomplete benefit analysis”).

³³⁰ Wagner, *supra* note 122, at 65; *see also* Keohane, *supra* note 72, at 49 (“In a sterling example of mistaking precision for accuracy, the CAIR RIA presents results to three significant digits without regard to the considerable error bounds surrounding its estimates.”).

a variety of different practices that span a large spectrum, from informal Ben Franklin CBA to formal Economic CBA. In the preceding pages I have constructed a typology of formality in CBA, which arranges the variety of forms of CBA along three axes in order to clarify the distinctions between and relationships among them. I hope that this typology helps to show why failing to distinguish between formal and informal CBA and the many varieties in between, leads to muddled thinking and to misuses of CBA.

I have also shown that when we examine the academic debate as well as the law concerning CBA with an ear tuned to these distinctions, several important points emerge. First, in the academic debate, those who oppose CBA tend to paint it in very formal terms, while those who support it are apt to paint it as less formal. This suggests that any room for consensus is far more likely to be found at the informal end of the spectrum. Second, the law largely seems to favor informal CBA as well. This is true both in the body of federal environmental statutes and in the federal case law. In light of these tendencies in the literature and the law, one might expect to see the executive branch moving as much as possible toward the informal end of the spectrum. Examination of executive orders, guidance documents, and a few anecdotal examples from the EPA, however, seems to suggest a pull in the opposite direction.

Skeptics, like myself, worry that this pull toward formality tends to diminish rather than enhance the quality of agency decisionmaking for all the reasons that have emerged over the years in the broader academic debate over the merits of CBA. But the analysis here suggests additional reasons for concern. The trend toward formality may also lead to more instances of false formality—a corruption of CBA that can occur when agencies fail to clearly define where on the formality-informality spectrum a particular CBA falls. Or it may lead to “futility”³³¹ of the type that occurred in connection with the EPA’s latest efforts on the cooling water rule, when their stated-preference survey provoked such controversy that, after an investment of considerable time and resources, the Agency dropped it altogether. Others may have different views on the desirability of formal versus informal modes of CBA, but before a discussion of these issues can occur, the first step is to simply recognize the existence and significance of these distinctions.

³³¹ *Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208, 235 (2009) (Breyer, J., concurring in part and dissenting in part).