Formality and Informality in Cost-Benefit Analysis

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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 make 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.
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> Letter from Benjamin Franklin to Joseph Priestly (Sept. 19, 1772)

A debate has been raging for decades over whether to use cost-benefit analysis (CBA) in evaluating environmental, health, and safety regulation.[1] In our federal environmental statutes, 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.[2] But beginning with

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[1] For some early arguments in favor of CBA, see, e.g., E.J. MISHAN, COST-BENEFIT ANALYSIS 390 (1976); A. R. Prest & R. Turvey, *Cost-Benefit Analysis: A Survey*, 75 ECON. J. 683 (1965). For some early critiques, see, e.g., Lawrence H. Tribe, *Ways Not to Think About Plastic Trees: New Foundations for Environmental Law*, 83 YALE L.J. 1315 (1974); ARTHUR SMITHIES, THE BUDGETARY PROCESS IN THE UNITED STATES 344-46 (1955).

[2] 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).

Ronald Reagan, every president has imposed, through Executive Order, a requirement on federal agencies to conduct CBA on all major rules, even when the statute does not allow the agency to make its decision on that basis.[3] As a result, agency use of CBA has increased over the past three decades. Nonetheless, debate continues over whether CBA makes regulation more rational,[4] or simply provides increased leverage for powerful industry stakeholders to downplay the benefits of regulation and manipulate agency decisionmaking toward less stringency.[5]

The participants in this debate have 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, identifies the economically efficient level of regulation.

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

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[3] Exec. Order No. 12,291, 3 C.F.R. § 128 (1982), *reprinted in* 5 U.S.C. § 601 (Supp. V 1981); Exec. Order No. 12,866, 3 C.F.R. § 638 (1994), *reprinted in* 5 U.S.C. § 601 (Supp. V 1993); Exec. Order 13,563.

[4] RICHARD L. REVESZ & MICHAEL A. LIVERMORE, RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH (2008); CASS R. SUNSTEIN, THE COST-BENEFIT STATE: THE FUTURE OF REGULATORY PROTECTION 19–20 (2002); CASS R. SUNSTEIN, RISK & REASON: SAFETY, LAW, AND THE ENVIRONMENT 99 (2002); John D. Graham, *Saving Lives through Administrative Law and Economics*, 157 U. PA L. REV. 395, 432–38 (2008).

[5] Sinden, *In Defense of Absolutes: Combating the Politics of Power in Environmental Law*, 90 IOWA L. REV. 1405 (2005).

relies on qualitative descriptions intuitively compared and purports to give 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 a standard-setting tool for identifying the optimal choice from among a whole range of regulatory alternatives. And between these two extremes lie yet more varieties of CBA.

Despite this broad range of meanings, scholars and policymakers often use the term "cost-benefit analysis" (or "benefit-cost analysis"),[6] without adjectives or qualifiers, as though it were a monolithic concept. This failure to distinguish 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 make 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

[6] The term "benefit-cost analysis" means exactly the same thing 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 (1996).

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.

But this pattern also suggests that there is far more potential for broad consensus to support less formal than more formal versions of CBA. We might, then, expect to see agencies—which tend to be averse to controversy—gravitating toward the less formal 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, the executive branch appears to be moving in the direction of increased formality in CBA. Executive Orders and guidance documents direct agencies to conduct a highly formal mode of CBA. And anecdotal evidence, at least, 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. Indeed, this is happening even in the face of a recent Supreme Court case, *Entergy v. Riverkeeper*, in which the Court expressed a clear preference for informal over formal modes of CBA.[7] In my view, this move toward formality is a bad development, in part because it can, and often does, lead to what I call "failed formalism"—a corruption of CBA that can occur when agencies fail to clearly define where on the formality-informality spectrum a particular CBA falls.

[7] 556 U.S. 208 (2009).

This article proceeds in five parts. Part I 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 II then reviews the academic debate over CBA and traces the role that conceptions of formality and informality have played in the arguments put forth by proponents and skeptics. Part III examines how CBA has been defined in the context of environmental regulation and the extent to which Congress and the federal courts have made distinctions and choices between formal and informal versions. Part IV then describes how the executive branch appears to be moving in the opposite direction. Executive Orders and guidance documents appear to envision formal economic CBA, and anecdotal evidence suggests that the Environmental Protection Agency (EPA), at least, is moving increasingly in that direction. The rulemaking leading up to the Supreme Court's decision in *Riverkeeper* provides an example of how this move toward formality can lead to failed formalism. Finally, Part V describes the lessons this analysis suggests for the broader debate about CBA in environmental rulemaking.

I. The Multiple Forms of Cost-Benefit Analysis

Broadly speaking, cost-benefit analysis is a decisionmaking technique that weighs and compares the costs and the benefits of a course of action.[8] Within those

[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*, REGULATION 33, 33 (Jan/Feb. 1981) ("At the broadest and vaguest level, cost-benefit analysis may be regarded simply as systematic thinking about decision-making.").

broad outlines, however, it can refer to a wide and divergent array of procedures and practices. At one end of the spectrum is the "prudential algebra" Ben Franklin described in his letter to his friend, Joseph Priestly. 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."[9] 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 using highly formal techniques, including discounting future costs and benefits to present net

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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," and describing it as "requir[ing] 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 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 of the . . . 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.

[9] Letter from Benjamin Franklin to Joseph Priestly (Sept. 19, 1772), in EDWARD M. GRAMLICH, BENEFIT-COST ANALYSIS 1 (2d ed. 1990).

value, and then attempts to pinpoint the course of action for which marginal benefits are just equal to marginal costs.[10]

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 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.[11] Measuring aggregate "welfare" has always been problematic, however. The early welfare economists rejected the notion that welfare or levels of happiness could be

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[10] *See* Merrill, *supra* note 8, at 996 (describing this kind of formal CBA as CBA "in 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 all the 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.g.*, E. J. MISHAN & EUSTON QUAH, COST-BENEFIT ANALYSIS 8 (5th ed. 2007); EPA, GUIDELINES FOR PREPARING ECONOMIC ANALYSES XI (Dec. 2010). Thus, cost-effectiveness analysis does not purport to measure the total 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.

[11] *See* Amartya Sen, *The Possibility of Social Choice*, 89 AM. ECON. REV. 349, 351–52 (1999); Kelman, *supra* note -, at 33; *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).

compared across individuals.[12] Nineteenth century social scientist, Vilfredo Pareto, found a way around this problem by constructing a definition of efficiency that avoids trading one person's welfare gain or loss off against another's.[13] 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.[14] A situation is "Pareto optimal" or "Pareto efficient," therefore, if there is no alternative state of affairs that would be a Pareto improvement.[15]

Under the laws of welfare economics, Pareto efficiency will be achieved by a perfectly functioning market[16]—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).[17] 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 improvement. Since the transaction is voluntary, both buyer and seller enjoy an increase in welfare.[18] Moreover, since in a perfect market there are no

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[12] *See* Sen, *supra* note 11, at 352; Oscar Lange, *The Foundations of Welfare Economics*, 10 ECONOMETRICA 215, 215 (1942); *but see* Sen, *supra* note 11, at 356–60 (arguing that interpersonal welfare comparisons are possible).

[13] *See* GRAMLICH, *supra* note 9, at 31.

[14] *See id.*

[15] *See id.*; Gerard Debreu, *Valuation Equilibrium and Pareto Optimum*, 40 Proc. Nat'l Academy of Sciences 588 (1954). *But see* Amartya Sen, *Unanimity and Rights*, 43 ECONOMICA 217, 235 (1976) (arguing that Pareto principle is inconsistent with basic liberal rights); Matthew D. Adler & Eric A. Posner, *Rethinking Cost-Benefit Analysis*, 109 YALE L. J. 165, 188 (1999) (describing objections to Pareto standard).

[16] *See* ROGER PERMAN ET AL., NATURAL RESOURCE AND ENVIRONMENTAL ECONOMICS 90 (1996).

[17] *See id.* at 90; ANTHONY E. BOARDMAN ET AL., COST-BENEFIT ANALYSIS: CONCEPTS AND PRACTICE 53 (4th ed. 2011).

[18] *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 11 (2d ed. 1977).

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.[19]

Where the market is imperfect, however—where, for example, manufacturing some market good produces externalities in the form of pollution that makes people sick or harms ecosystems—then 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.[20] First, it is very difficult 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, economists turn to a slightly different definition of efficiency with "somewhat less conceptual appeal but much

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[19] *See* RICHARD CORNES & TODD SANDLER, THE THEORY OF EXTERNALITIES, PUBLIC GOODS, AND CLUB GOODS 23 (2d ed. 1996); PAUL A. SAMUELSON & WILLIAM D. NORDHAUS, ECONOMICS 158 (17th ed. 2001).

[20] *See* GRAMLICH, *supra* note - , at 31-32.

greater feasibility": "potential Pareto" or "Kaldor-Hicks" efficiency.[21] 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.[22] Notice that a regulation meets this test whether or not the hypothetical wealth transfer occurs (and it virtually never does).[23]

Thus, economists use the concept of Kaldor-Hicks efficiency rather than Pareto efficiency as the basis for evaluating regulations under CBA.[24] In this way, welfare economists defend cost-benefit analysis 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 side-steps.[25]

Accordingly, any regulation for which total social benefits exceed social costs (in comparison to the status quo) constitutes a Kaldor-Hicks improvement. And an economist could, in theory at least, identify a close approximation of the level of

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[21] *See* BOARDMAN, *supra* note -, at 32; RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 17-20 (8th ed. 2011).

[22] *See* E.J. MISHAN, COST-BENEFIT ANALYSIS 390 (1971); BOARDMAN, *supra* note 20 at 32.

[23] *See* GRAMLICH, *supra* note - , at 32.

[24] *See id.*, at 32-33.

[25] *See* MISHAN, *supra* note, 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).

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.[26] On the graph in Figure 1, for example, the third alternative ("even more stringent regulation") would be the most efficient in terms of economic theory because it provides the highest *net* social benefit, even though the fourth alternative ("most stringent") provides higher benefits in absolute terms.

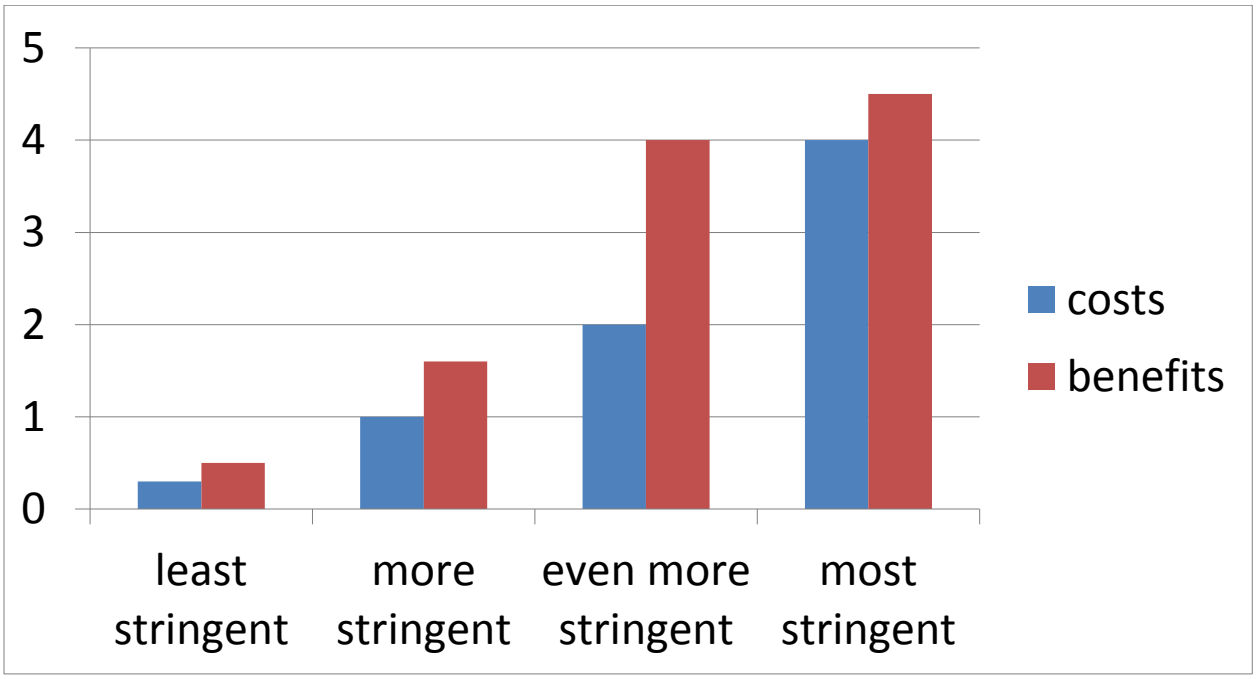

Figure 1: Total costs and benefits of varying levels of regulation

[26] *See* BOARDMAN, *supra* note - , at 33; OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, OMB CIRCULAR A-4 at 10 (2003).

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.") Assuming (as is usually the case) that at low levels of stringency the marginal benefits of regulation outweigh the costs but that as the stringency of regulation increases the marginal costs gradually increase while the marginal benefits gradually decrease, then the level of regulation at which net benefits are maximized—the point of efficiency—is the level at which the two curves cross, i.e. where marginal costs are just equal to marginal benefits.[27] Figure 2 illustrates this idea. Thus, assuming (1) sufficient data, (2) 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.

[27] *See* GRAMLICH, *supra* note -, at 33-36; TOM TIETENBERG, ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS 25, 66 (1984); Richard D. Morgenstern, *Conducting an Economic Analysis: Rationale, Issues, and Requirements*, *in* ECONOMIC ANALYSIS AT EPA: ASSESSING REGULATORY IMPACT 25, 40 (Morgenstern ed.,. 1997); Arrow, et al., *supra* note -, at 221.

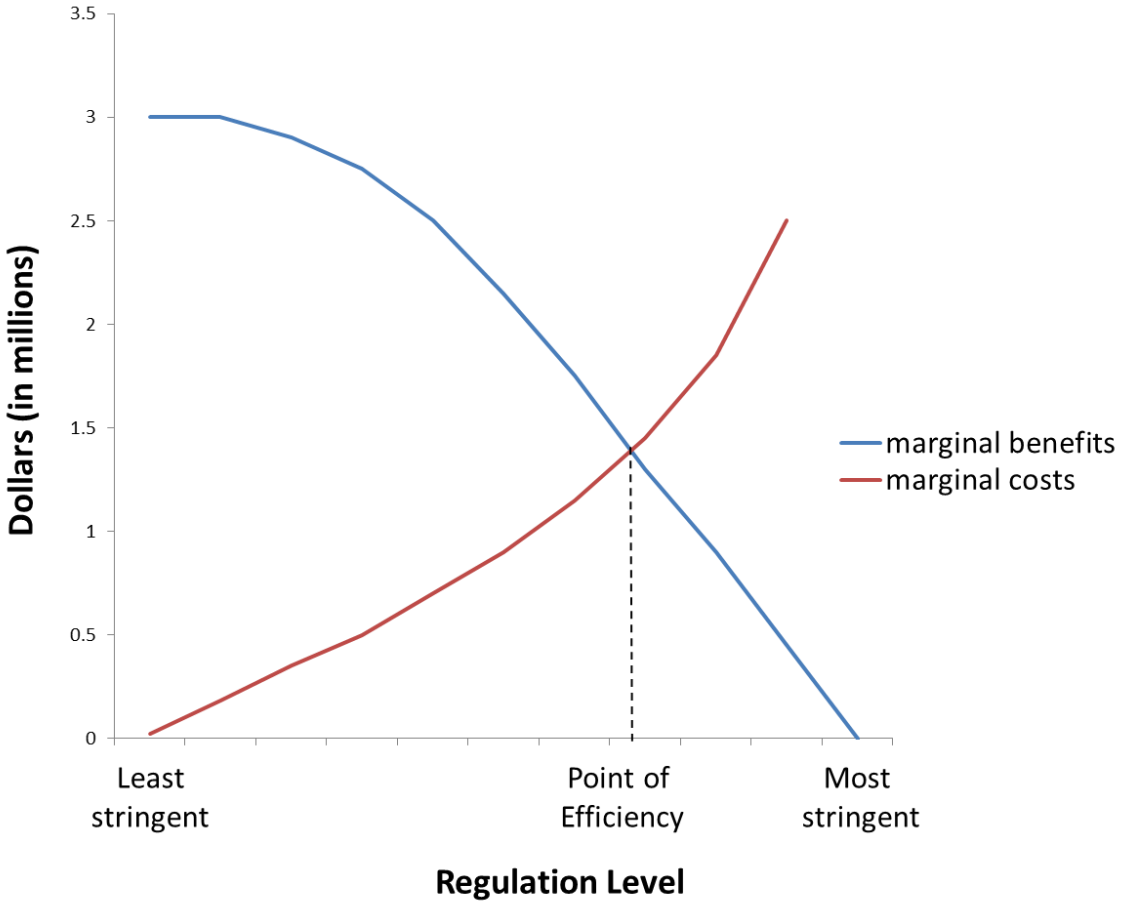

Figure 2: Marginal costs and benefits of incrementally varying levels of regulation

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 of each regulatory alternative and convert all of those quantities into a common metric (usually dollars) so that all of the costs and benefits can be aggregated and compared.

B. Complications and Critiques

This quantification and monetization raises a host of complications. First, in order to aggregate and compare costs and benefits that will not accrue until a future date, along with those accrued in the present, future costs and benefits must be discounted to present value. Determining the appropriate discount rate is a complex and highly controversial task.[28] And, even after decades of trying, economists have been unable to agree on a single method for doing so.[29]

Second, not all of the costs or benefits of environmental regulation are easily quantified or expressed in monetary terms (or any other single metric).[30] But in order for a cost-benefit analysis to actually locate the point of efficiency, it must account for all social costs and benefits, including things like life and death or clean air over the Grand Canyon.[31] Economists have developed a number of clever techniques for trying to divine the monetary value of things not traded in markets, but all are controversial and produce highly contestable results.[32]

Hedonic surveys are an example of a "revealed preference" technique. These surveys attempt to infer a dollar value for non-market goods by observing things that *are* traded in markets and are thought to reflect (or "reveal") the unpriced

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[28] Richard 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).

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

[30] *See* Leonard Shabman & Kurt Stephenson, *Environmental Valuation and Its Economic Critics*, 126 J. WATER RESOURCES PLANNING & MGMT 382 (2000).

[31] MISHAN, *supra* note -, at 180–81.

[32] *See* I. PEARCE & R. TURNER, ECONOMICS OF NATURAL RESOURCES AND THE ENVIRONMENT 141–58 (1990).

value.[33] 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.[34] 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.[35]

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 non-market goods by simply asking them.[36] 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 American household is willing to pay $257 to prevent the extinction of bald eagles.[37] Another

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[33] *See generally* David S. Brookshire et al., *Valuing Public Goods: A Comparison Survey and Hedonic Approaches*, 72 AM. ECON. REV. 165, (1982); BOARDMAN, *supra* note -, at 318–24; Philip E. Graves, *Benefit-Cost Analysis of Environmental Projects: A Plethora of Biases Understating Net Benefits*, 3 J. BENEFIT-COST ANALYSIS 12–18 (2012).

[34] *See, e.g.*, Richard Ready & Charles Abdalla, *The Impact of Open Space and Potential for Local Disamenities on Residential Property Values in Berks County, Pennsylvania* (The Pennsylvania State University, Dep't of Agricultural Economics & Rural Sociology, Staff Paper no. 363, June 2003) *available at* http://landuse.aers.psu.edu.

[35] *See* Shi-Ling Hsu & John Loomis, *A Defense of Cost-Benefit Analysis for Natural Resources Policy*, 32 ENVTL. L. REP. 10,239, 10,242 (2002); *but see* BOARDMAN ET AL., *supra* note -, at 52 (admission fee to national park not set by market and thus unlikely to reflect value visitors actually place on park).

[36] *See* Hsu & Loomis, *supra* note -, at 10,242; Thomas H. Stevens, Jaime Echeverria, Ronald J. Glass, Tim Hager, & Thomas A. More, *Measuring the Existence Value of Wildlife: What Do CVM Estimates Really Show?* 67 LAND ECON. 390, (1991); D.W. PEARCE & A. MARKANDYA, ENVIRONMENTAL POLICY BENEFITS: MONETARY VALUATION (1989). For a critique, see generally John Heyde, *Is Contingent Valuation Worth the Trouble?*, 62 U. CHI. L. REV. 331, (1995).

[37] John B. Loomis & Douglas S. White, *Economic Benefits of Rare and Endangered Species: Summary and Meta-analysis*, 18 ECOLOGICAL ECON. 197, 199 table 1 (1996).

concludes that the average person is willing to pay $457,000 to avoid contracting chronic bronchitis.[38]

Finally, using dollars to measure non-market goods, like preventing people from dying of cancer or an endangered species from extinction raises a host of intractable theoretical problems. Some argue that such values simply can't be measured in monetary terms—that they are incommensurable with money. 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.[39]

A phenomenon known as "the endowment effect" presents a related problem. Experiments consistently 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.[40] Accordingly, measuring willingness-to-pay (to buy) versus willingness-to-accept (to sell) yields different values for the exact same good. And despite decades of study and debate, economists have yet to come up with any principled basis for choosing between these two measures of value. This then

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[38] *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. 41, 47, 50 (1991).

[39] Some argue that CBA can be designed to incorporate distributional weightings in order to correct for the problem of wealth effects, *see, e.g.*, 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 (2013), but this is an underdeveloped and highly controversial technique, *see*. *See* Susan Rose-Ackerman, *Putting Cost-Benefit Analysis in Its Place: Rethinking Regulatory Review*, 65 U. MIAMI L. REV. 335, 339 (2010); Matthew D. Adler, *Cost-Benefit Analysis and Distributional Weights: An Overview* (2013).

[40] J.K. Horowitz & K.E., McConnell, *A Review of WTA/WTP Studies*. 44 J. OF ENVTL. ECON. & MGMT. 426–447 (2002); J.L.. Knetsch, *Environmental Policy Implications of Disparities between Willingness to Pay and Compensation Demanded Measures of Values*, 18. J. OF ENVTL. ECON. & MGMT. 227–237 (1990).

provides another point of contention in the design of stated preference surveys: they are usually designed to measure willingness-to-pay, but such a study can be criticized for containing a downward bias, since asking about respondents' willingness-to-accept will consistently yield higher values.

Thus, 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. These two forms of CBA, which I will refer to as "Ben Franklin CBA" and "Economic CBA," define two extremes on a spectrum from informality to formality. Many forms of CBA fall somewhere in between.

C. Formality and Informality in CBA: A Typology

By defining the two extremes, we can see that different forms of CBA have characteristics that vary along three distinct but related Axes. Axis #1 describes the level of quantification and monetization involved. Axis #2 describes the degree of precision with which to the two sides of the equation (costs and benefits) are compared.[41] And Axis #3 describes the number of regulatory alternatives for which cost/benefit estimates are generated. These three Axes are related in that where a particular CBA falls along one may affect where it can logically fall along the other two.

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[41] 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"). *See* David M. Driesen, *Two Cheers for Feasible Regulation*, 35 HARV. ENVTL. L. REV. 313, 318-19 (2011); Driesen, *supra* note -, at 387-394 (2006).

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 theoretically 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 full monetization, leaving costs and benefits expressed in different metrics.

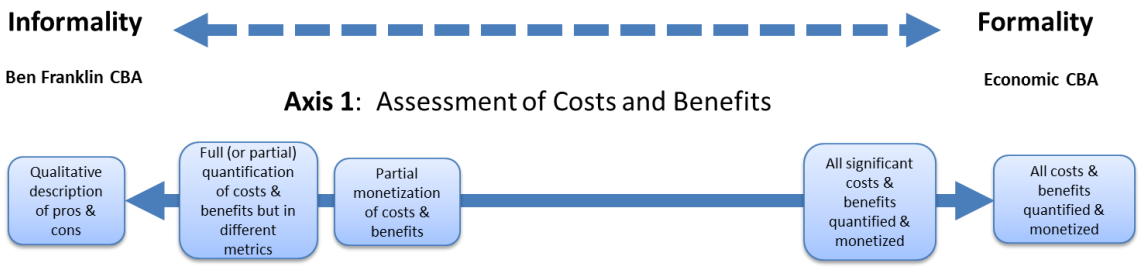

Figure 3

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. Even the next box to the left ("All significant costs & benefits quantified and monetized") is probably impossible to achieve in practice most of the time, although this is a more controversial statement. Indeed, much of the 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 balancing test that is applied to compare costs to benefits once the assessment/evaluation of costs and benefits is completed. 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 of the level of regulatory stringency at which marginal benefits and marginal costs are just equal, which is necessary 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. These intermediate balancing tests are discussed more fully below.

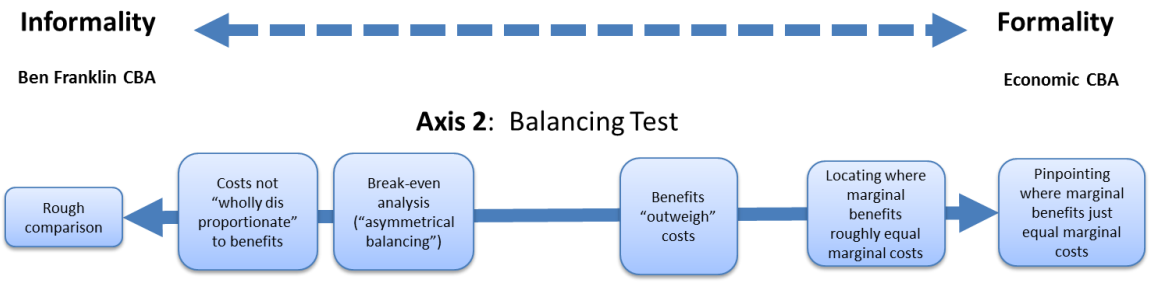

Figure 4

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 on the most informal end of the axis, to the full spectrum of incrementally varying alternatives on the right end of the axis that would be necessary in order to graph the marginal cost and marginal benefit curves under an

Economic CBA. Here too, there are of course, many possible points in between—as many as there are incrementally varying alternatives.

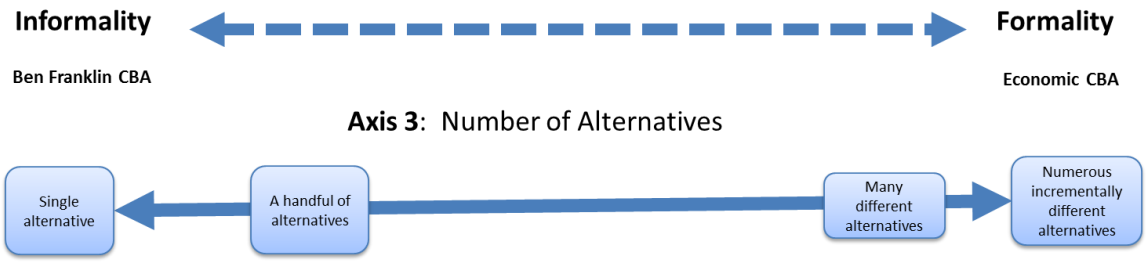

Figure 5

Axis #3 is over-idealized and misleading to the extent that it suggests that alternatives can always be neatly ranked in linear fashion along an ordinal scale.[42] 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.

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, which are depicted in Figure 6 below. Moving toward a more precise and formal balancing test along Axis #2, for example, requires a

[42] 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).

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 ("benefits outweigh costs") will likely pose difficulties for a CBA not occupying one of the two right-most boxes on Axis #1, because without fully monetizing both costs and benefits, it may be hard say for sure whether costs outweigh benefits or benefits outweigh costs.

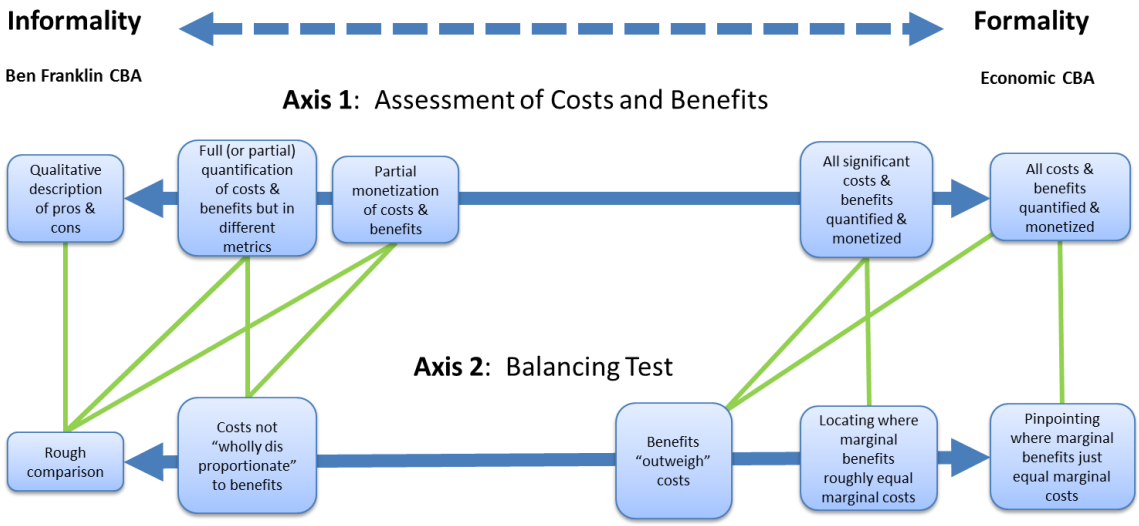

Figure 6

Imagine, for example, a CBA, which—as is often the case—provides a relatively complete estimate of monetized costs but only a partial monetization of benefits. If the (partial) benefits outweigh the (full) costs, one can comfortably

conclude that the true benefits also exceed the true costs.[43] If, on the other hand, the (full) costs outweigh the (partial) benefits, it is much harder to reach any conclusion at all. Unless there is some good reason to believe that the unmonetized benefits are trivial, one cannot reach any conclusion about whether the true costs exceed the true benefits, since the unmonetized benefits might or might not be big enough to make up the difference.[44] Thus, partial monetization on Axis #1 requires an "asymmetrical balancing test" on Axis #2. This test asks: Do benefits outweigh costs? I call this test "asymmetrical" because an affirmative answer provides a definitive result, but a negative answer provides inconclusive results.

In such instances, OIRA encourages agencies to conduct what they call a "break-even analysis."[45] 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.[46] This is essentially a less precise balancing standard, which I have located further to the left on Axis #2.

Alternatively, for a CBA that does some amount of quantification or monetization of costs and benefits but does not fully monetize (located in either the

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[43] 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 - , at 73 (discussing EPA's CBA for its 1999 revised particulate matter NAAQS, showing benefits of $58-110 billion and costs of $6 billion).

[44] *See* Driesen, *supra* note - , at 401; Ronnie Levin, *Lead in Drinking Water*, in ECONOMIC ANALYSIS AT EPA: ASSESSING REGULATORY IMPACT 205, 230 (Richard D. Morgenstern, ed. 1997). *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: "there is no room to allow non-monetizable benefits to affect the outcome of a monetary cost-benefit analysis.").

[45] OMB Circular A-4 at 2; *see also* Cass R. Sunstein, Quantifiable at 17.

[46] OMB Circular A-4 at 2.

box second from or third from the left on Axis #1), it might be possible to occupy the second box from the left on Axis #2—that is, to, to say whether costs are "wholly disproportionate to benefits." A version of CBA commonly used by EPA under the Clean Water Act, for example, takes this form. Expressing costs in dollars and benefits in pounds of pollutant removed from a factory's effluent, it asks whether $100 in costs is "wholly disproportionate" to the benefit of removing 50 pounds of phosphorous pollution.[47]

Where only partial monetization is achieved on Axis #1, any of the less precise balancing formulas on the left of Axis #2 (rough balancing, wholly disproportionate or break-even analysis) essentially engage the analyst in an intuitive, apples-to-oranges comparison. Even though 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 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 50 pounds of phosphorous pollution compares to $100? Certainly, we would at least want to know a little more about the kind of harm 50 pounds of phosphorous might cause in a waterway, though, to be fair, the agency could probably be expected to have that information in most instances. If we take seriously the idea that the "wholly disproportionate" test is aimed at eliminating only the most extreme cases—cases where a rule seems to eliminate only a de minimus amount of pollution but at great cost—then perhaps

[47] *See infra* notes – to – and accompanying text.

the idea becomes more plausible, at least with respect to that test. But it is undoubtedly a point on which there is room for debate.

This example also assumes that both costs and benefits are fully quantified, just in different metrics. What if some benefits cannot be quantified at all? If they can be qualitatively described, just not quantified, that's one thing. Then the problem of balancing those benefits against dollar costs is not particularly different from that described above. It's debatable, but a plausible case can be made that meaningful conclusions are at least possible under a "wholly disproportionate" test.

But what if some (or all) of the benefits can't be quantified because they 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 that has additional health impacts and researchers don't understand those impacts well enough to even come up with a ballpark estimate of their magnitude? And what if researchers simply have not studied the impacts of dioxin on species and ecosystems and so 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.

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 enough to outweigh the costs, the analyst could find that this regulation passes muster under either an "outweighs" test or a "wholly disproportionate" test. If we change the scenario only slightly, however, 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 "outweighs" test. If, on the other hand, the fully monetized costs are $200 million, but the partially monetized benefits are only $500 thousand, it might well be impossible to reach a conclusion under either test.[48]

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

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[48] These scenarios, involving fully (or nearly fully) quantified costs and partially quantified benefits are fairly common (one might even say ubiquitous) in environmental law, where benefits relating to human health and species and ecosystems are notorious 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.*, Harrington chapter on CAIR. Regulation of most other kinds of environmental harm and pollution, on the other hand, more often falls into the second or third categories—with partially monetized benefits lower than costs. *See, e.g.,* SUNSTEIN, Risk & Reason, *supra* note – , at 166 (EPA's CBA of its 2001 regulation of arsenic in drinking water pegged costs at $210 million and benefits at %140-198 million). Regulation of ecological harms in particular is likely to fall in the third category. 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 IV, is an example of the third category, in which partially monetized benefits fall far short of fully monetized costs, making a conclusion under any test impossible. *See infra* notes 198 to 224 and accompanying text.

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." 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:

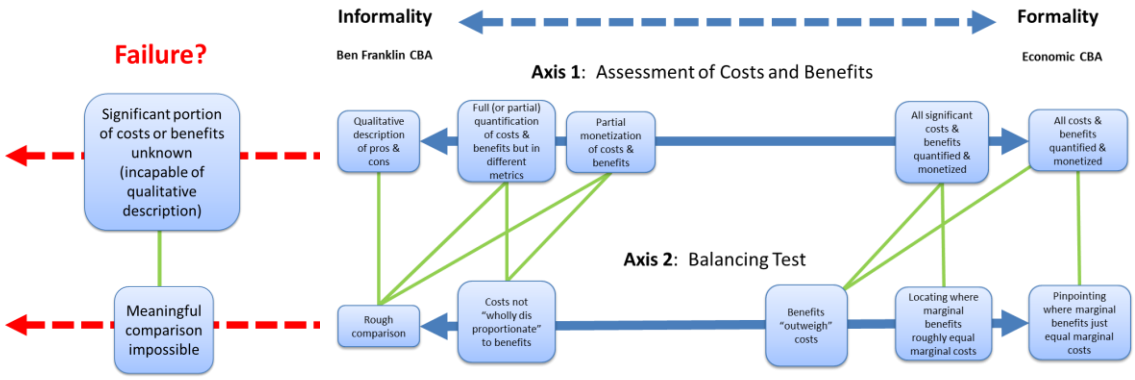

Figure 7

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.[49]

[49] *See* OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4 at 10 ("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."); Arrow, et al., *supra* note -, at 221 ("In some cases . . .

To generalize, then, a move toward informality on Axis #1 (quantification and monetization), will generally require a parallel move toward informality on Axis #2 (precision). The converse is usually true, though not necessarily so. A move toward informality on Axis #2 is likely to be accompanied by a simultaneous move toward informality on Axis #1, since if a CBA employs a balancing test that only asks whether costs are "wholly disproportionate" to benefits, it probably does not require that costs and benefits be fully monetized. But application of an informal "wholly disproportionate" test is still technically feasible with fully monetized costs and benefits. (Whether a rough comparison is possible with fully monetized values is perhaps debatable.)

3. The Relationship between Axes #2 and #3

The second and third axes are also closely related. These relationships are added to the diagram in Figure 8.

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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.").

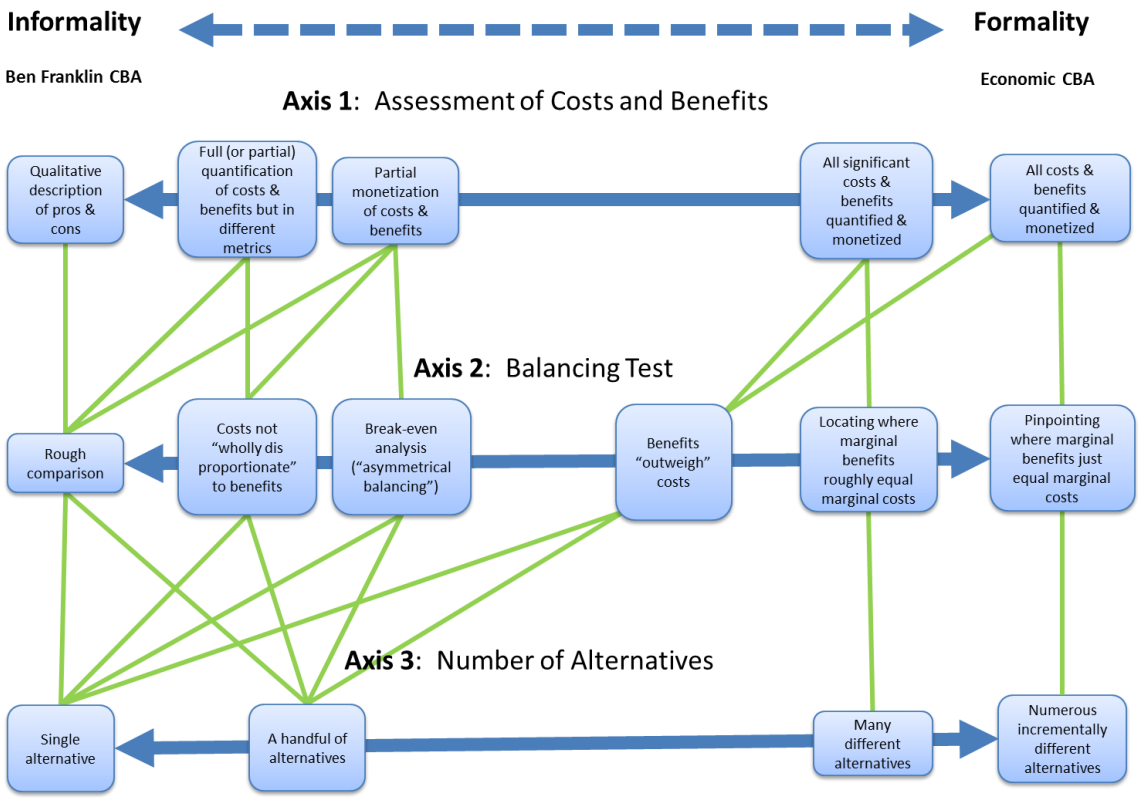

Figure 8

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. Again, the Clean Water Act standard described above, is an example of this form of CBA. Conversely, 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 total costs and benefits, but only for a single alternative.[50]

4. The Different Roles of Formal and Informal CBA

Figure 8 also helps to make salient another important insight about the distinction between formal and informal CBA. Analyses located on the informal end of Axis #3 perform a fundamentally different function in the decision making process than those at the formal end. Formal Economic CBA—by measuring 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, to choose the optimal (or "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 to a single option.[51]

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[50] *See, e.g.*, Jonathan Masur & Eric 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").

[51] *See* Jonathan Cannon, *The Sounds of Silence: Cost-Benefit Canons in* Entergy Corp. v. Riverkeeper, Inc., 34 HARV. ENVTL. L. REV. 425, 454 (2010) (describing informal CBA, what he calls "the weak form of CBA," as a tool for "screen[ing] for irrational outcomes"); *see also* BOARDMAN, supra note - , at 13 (distinguishing between the decision rule for CBA of a single alternative—go forward if net

Thus, formal and informal CBA play very different roles in decisionmaking. 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.[52] An informal CBA, on the other hand, acts as a sort of secondary check or litmus test on a standard setting decision that has been made by other means.[53] Once the agency has decided on the basis of some other decisionmaking standard where to set the regulation, it can then subject that single option to an informal CBA in order to decide whether or not to proceed.[54]

This analysis reveals another important insight. While an informal CBA gives policy makers a vague idea about whether a regulation is desirable in comparison to the status quo or moves in the direction of more efficiency, it has no capacity tell them—even with perfect information —whether a regulation is "efficient" in the welfare economics sense, that is, whether it maximizes overall social welfare.[55]

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social benefits are positive—and CBA of multiple alternatives, which chooses the alternative with the highest net social benefit); RICHARD 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).

[52] *See, e.g.,* Nathaniel O. Keohane, *The Technocratic and Democratic Functions of the CAIR Regulatory Analysis*, *in* REFORMING REGULATORY IMPACT ANALYSIS 47 (Winston Harrington et al. eds., 2009) (noting that a CBA that considers only one option "fails to meet the most basic requirement of sound economic policy analysis: namely, the consideration of multiple alternatives.")

[53] Daniel H. Cole, *Toward a Political Economy of Cost-Benefit Analysis*, draft at 3 (2011) (noting CBA "is viewed as a kind of filter designed to capture welfare-reducing proposals, while allowing welfare-enhancing proposals to pass through.").

[54] Keohane, *supra* note - , 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, *Two Cheers, supra* note - , at 320 (criticizing Jonathan Masur and Eric Posner for confusing these two different forms of CBA).

[55] *See* TIETENBERG, *supra* note -, at 66 (observing with respect to a benefits-exceed-costs test that "[w]hile [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 -, 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.").

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.

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 48 to 15 tons per year and would cost society $5 billion per year and 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. A regulation that reduced emissions by just one ton—from 48 to 47 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 million produced by the more stringent regulation.[56] Thus, a CBA that falls on the informality end of Axis #3 (measures only a single alternative) doesn't tell us whether a regulation is efficient in the welfare economics sense—that is, whether it maximizes overall social welfare.

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[56] Because of this asymmetry, a simple total-benefits-exceed-total-costs CBA produces what David Driesen has called a "one-way ratchet"—tending always to push regulation toward less stringency, but not in the opposite direction. This is because a regulation that fails the simple total CBA (for which total costs exceed total benefits) 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 lenient regulation will be upheld under the simple benefits-exceed-costs test, even when under an efficiency test, it ought to be made more stringent. *See* Driesen, *Neutral*, *supra* note - , at 380.

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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 varieties of 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 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 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 forms, in contrast, act only as a secondary check on standard setting decisions that have been made initially 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 academic 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 the characteristics of

formal or informal CBA, they have tended to follow an odd pattern: CBA skeptics stress CBA's formality while proponents stress its informality.

II. Formality and Informality in the Academic Debate

The debate over the role of CBA in environmental law has raged for decades. Proponents of CBA promote it as a means of rationalizing agency decision making, counter-acting the influence of special interests, and increasing transparency. Opponents charge that it fails to adequately account for transcendent and intangible values connected to human life and health or irreplaceable aspects of our natural heritage, that it suffers from hopeless limitations on data and scientific understandings, and that it obfuscates and obscures relevant issues rather than promoting transparency.[57]

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 examine the debate 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 specify the type of CBA they're talking about, they often emphasize its informality. Conversely, when skeptics describe the kind of CBA they're talking about, they stress its formality.

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[57] *See* FRANK ACKERMAN & LISA HEINZERLING, PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING (2004).

A. **CBA Proponents**

Cass Sunstein, for example, in the academic writings he published before being appointed President Obama's "regulatory czar" in charge of the Office of Information and Regulatory Affairs (OIRA), described what he was advocating for as a "modest" form of CBA.[58] This "modest CBA" probably falls somewhere in the middle of the formality spectrum.[59] With respect to Axis #1, he urged that costs and benefits "should be translated into monetary equivalents wherever possible,"[60] but also acknowledged that "[q]uantification will be difficult or impossible in some cases," and that in such cases, effects should be described in qualitative terms.[61] 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."[62] 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 example, risks to young children.[63] With respect to

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[58] Cass R. Sunstein, *Congress, Constitutional Moments and Cost-Benefit State*, 48 STAN. L. REV. 247, 253 (1996).

[59] Indeed, Sunstein's form of CBA is apparently hard to pigeonhole. Commenters seem to disagree about whether he is a proponent of a "softer" or "weaker" form of CBA, or a "harder" or "stronger form. *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); DANIEL A. FARBER, ECO-PRAGMATISM: MAKING SENSIBLE ENVIRONMENTAL DECISIONS IN AN UNCERTAIN WORLD 93 (1999) (identifying Sunstein as a proponent of a "soft" form of CBA), *with* Cannon, *supra* note - , at 429 (identifying Sunstein as a proponent of what he calls the "strong" [i.e., more formal] form of CBA).

[60] SUNSTEIN, COST-BENEFIT STATE, *supra* note - , at 20.

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

[62] SUNSTEIN, CB State, *supra* note -, at 21.

[63] *Id*. Sunstein also suggested that, at least when courts review whether a regulation meets a cost-benefit test, the balancing formula should be the relatively imprecise and informal: "costs

Axis #3, he is not explicit, but appears to envision an informal evaluation of a single alternative.[64]

The important point here is that in describing his "modest" brand of CBA, 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 number 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.[65]

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 the use of the "soft" version.[66] Like 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

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[should] not be grossly disproportionate to benefits," a balancing standard well toward the informal end of Axis #2. SUNSTEIN, Risk and Reason, *supra* note -, at 120.

[64] *See, e.g.,* SUNSTEIN, CB State, *supra* note - , 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.").

[65] *Id.* at 21-22; *accord* SUNSTEIN, Risk and Reason, *supra* note - , at 106-07. *See also* Jonathan Wiener, *Best Cass 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 (2002) (criticizing Sunstein for allowing regulators to allow non-quantified factors to sometimes trump the numerical results of CBA; 1728: and for allowing rights and irreversibility to trump). In his recent writings since stepping down as IORA director, 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 x to y and accompanying text.

[66] Graham, *supra* note -, at 432-438. Even Graham's "hard" CBA does not meet all the requirements for economic CBA, because it imposes only a total-benefits-exceed-total-costs test, rather than identifying the point at which marginal costs equal marginal benefits.

consideration) can contribute to a determination that the benefits of a rule do, or do not, justify the costs."[67]

Thus, both Sunstein and 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,[68] has, in both his opinions and his academic writings, argued for CBA's rationality by equating it with Ben Franklin's prudential algebra.[69] Many others have done the same:

> 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.[70]

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[67] Graham, *supra* note - , 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 all the undesirable effects, whether or not they are susceptible of being expressed in economic terms."); *but see* Arden Rowell, *Partial Valuation in Cost-Benefit Analysis*, 64 ADMIN. L. REV. 723 (2012) (arguing that CBA should not include non-monetized benefits); REVESZ & LIVERMORE, *supra* note -, at 10 (defining CBA in terms that at least imply formal economic CBA: as a tool "to maximize the net benefits of regulation").

[68] *See, e.g.,* International Union UAW v. OSHA, 938 F.2d 1310 (D.C. Cir. 1991), discussed *infra* notes 159 to 160 and accompanying text.

[69] Stephen F. Williams, *Squaring the Vicious Circle*, 53 ADMIN. L. REV. 257, 270 (2001) ("If you accept the Ben Franklin's 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 (Williams, J.) (suggesting that there exists a continuity between Benjamin Franklin's thought and cost-benefit analysis; "'Reasonableness' has long been associated with the balancing of costs and benefits;" "cost-benefit analysis entails only a systematic weighing of pros and cons, or what Benjamin Franklin referred to as a 'moral or prudential algebra.'").

[70] David G. Owen, *Design Defects*, 73 MO. L. REV. 291, n.82 (2008).

> 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 disadvantages.[71]

By invoking Ben Franklin, either explicitly or implicitly, these authors present CBA as "the soul of rationality"[72] and common sense. 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 "abandon rational thought about policy impacts and rely on their instincts."[73] Revesz and Livermore claim that "the use of cost-benefit analysis is a requirement of basic rationality,"[74] and warn that the only other choice is to "abandon reasoned analysis" and descend into "gut level decision making."[75] Cass Sunstein uses similar terms in arguing for his more "modest" form of CBA, telling us that "the antonym to

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[71] John O McGuinnis, *Presidential Review as Constitutional Restoration*, 51 DUKE L.J. 901 (2001) (defending CBA of federal regs as required in EO 12866); *see also* Jonathan Wiener, *The Diffusion of Regulatory Oversight* (equating CBA with Ben Franklin's "prudential algebra"); Jonathan B. Wiener, *Better Regulation in Europe*, *in* CURRENT LEGAL PROBLEMS 447, 483-89 (Jane Holder & Colm O'Cinneide eds, 2007).

[72] ACKERMAN & HEINZERLING, *supra* note - , at 35.

[73] Kip Viscusi, *Regulating the Regulators*, 63 U. CHI. L. REV. 1423, 1436, 1439 (1996).

[74] REVESZ & LIVERMORE, *supra* note - , at12; *See also* Shi-Ling Hsu, On the Role of Cost-Benefit Analysis in Environmental Law, 35 Envtl. L. 135, 137 (2005) ("A]ll would agree that [CBA] is a way of introducing some rationality into [the] regulatory process."); Int'l Union, UAW v. OSHA, 938 F.2d 1310, 1319–21 (D.C. Cir. 1991) (Williams, J.) ("Reasonableness" has long been associated with the balancing of costs and benefits"); Shabman & Stephenson, *supra* note -, at 382 ("Benefit-cost analysis has been defended as a universal stance of rationality," citing THEODORE PORTER, TRUST IN NUMBERS: THE PURSUIT OF OBJECTIVITY IN SCIENCE AND PUBLIC LIFE (1995)).

[75] REVESZ & LIVERMORE, *supra* note 74, at 3. *See also id*. at 4 (rejecting CBA equivalent to "rejecting reason"); *id*. at 16 (CBA brings "increased rationality" to regulation) Indeed, the title of their book, *Retaking Rationality*, which argues that progressives should embrace CBA, essentially equates CBA with rationality.

regulation guided by cost-benefit analysis is . . . regulation that amounts to a stab in the dark."[76]

This kind of rhetoric was particularly evident in the briefing before the U.S. Supreme Court in *Riverkeeper v. Entergy Corp.*, a case that brought the issue of CBA in environmental rulemaking before the high court in 2009. Industry, the federal government and their supporting amici, arguing in favor of EPA's use of CBA, portrayed CBA as informal and casual. In many 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." The Justice Department's brief equated EPA's use of CBA with common sense, rationality[77] and reasonableness,[78] calling what agencies do "conceptually similar . . . to the common sense weighing of costs and benefits that individuals do,"[79] and which is common "in human experience generally."[80] Entergy' Corporation's brief

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[76] SUNSTEIN, Risk and Reason, *supra* note - , at 107. 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 doesn't necessarily dictate outcomes. *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); CASS R. SUNSTEIN, FREE MARKETS AND SOCIAL JUSTICE 138 (1997); Arrow, et al., *supra* note - , at 221-22; Adler & Posner, *supra* note - , at 195; REVESZ & LIVERMORE, *supra* note - , at 15.

[77] Brief for Petitioner Entergy Corp. at 4, Entergy v. Riverkeeper, 556 U.S. 208 (2009) (Nos. 07-588, 07-589, 07-597), 2008 WL 2753247 (describing CBA as "further[ing] rational decisionmaking"); Brief for AEI Center for Regulatory and Market Studies et al. as Amici Curiae Supporting Petitioners at 6, Entergy Corp. v. Riverkeeper, Inc., 556 U.S. 208 (2009) (Nos. 07-588, 07-589, 07-597), 2008 WL 2817679 ("Benefit-cost comparisons . . . foster rational decision making").

[78] Brief for Petitioner Entergy Corp. 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)).

[79] Brief for the Federal Parties as Respondents Supporting Petitioners at 14, Entergy Corp. v. Riverkeeper, Inc., 556 U.S. 208 (2009) (Nos. 07-588, 07-589, 07-597), 2008 WL 2753248.

[80] *Id.* at 13; *see also id.* at 13–14 ("In everyday life, people routinely weigh costs against benefits in deciding whether to do something.").

called CBA "nothing more than common sense—the imperative of basic rationality to ensure that actions do more good than harm."[81]

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 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."[82] That brief never used the term "cost-benefit analysis" at all—preferring the more innocuous term: "benefit-cost comparisons."[83] 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."[84]

There are also plenty of counterexamples—proponents of CBA who advocate a highly formal brand of CBA.[85] Many of these counterexamples come from

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[81] Brief for Petitioner Entergy Corp. 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 generally* Amy Sinden, *Cost-Benefit Analysis, Ben Franklin, and the Supreme Court*, -- U.C. IRVINE L. REV. – (2014).

[82] Brief for AEI Center for Regulatory and Market Studies et al. as Amici Curiae Supporting Petitioners at 6, Entergy Corp. v. Riverkeeper, Inc., 556 U.S. 208 (2009) (Nos. 07-588, 07-589, 07-597), 2008 WL 2817679.

[83] *Id.* at *passim*.

[84] *Id.* at 12–13

[85] *See, e.g.,* Richard L. Revesz & Michael A. Livermore, *Environmental Law and Economics* (draft at 3), in OXFORD HANDBOOK OF LAW AND ECONOMICS (forthcoming 2014) ("Kaldor-Hicks efficiency is the basis for formal cost-benefit analysis.").

economists.[86] For example, there have been a number of studies in recent years by economists purporting to measure the quality of agency CBAs that employ criteria that essentially assume a good CBA equals a formal CBA.[87] 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, tend to stress its formality. Ackerman and Heinzerling criticize what they refer to as "formal cost-benefit analysis"[88] and "narrow economic analysis,"[89] decrying CBA's "atomistic and reductionist approach."[90] 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."[91] David Driesen describes

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[86] *See, e.g.,* Arrow, et al., *supra* note - , at 221 (arguing that CBA should identifying 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.").

[87] *See, e.g.*, Robert W. Hahn & Paul C. Tetlock, *Has Economic Analysis Improved Regulatory Decisions?*, 22 J. ECON. PERSPECTIVES 67, 72 (2008) (Using OMB Guidelines (1992 Circular A-94) and Arrow et al., *supra* note - , as benchmark for good CBA); Robert Hahn & Patrick M. Dudley, *How Well Does the U.S. Government Do Benefit-Cost Analysis?*, 1 REV. OF ENVTL. ECON. & POL'Y 192, 197 (2007) (using E.O. 12866 and OMB guidance as 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."). and see others cited at S.Shapiro & J.F.Morrall III, The triumph of regulatory politics at 7. *See also* Cole, *supra* note -, at 59 (defining CBA as formal economic CBA); REVESZ & LIVERMORE, *supra* note -, at 10 (same); 2008 OMB Report to Congress – discussion of possible "scorecards" for measuring quality of CBAs.

[88] ACKERMAN AND HEINZERLING, *supra* note - , at 9.

[89] *Id.* at 8.

[90] *Id.* at 211.

[91] DOUGLAS A. KYSAR, REGULATING FROM NOWHERE: ENVIRONMENTAL LAW AND THE SEARCH FOR OBJECTIVITY 104 (2010); *see also* Sinden, *In Defense, supra* note -, at 1413–23 (tracing the development

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."[92]

Indeed, much of opponents' criticism of CBA centers around 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 can't—or shouldn't—be shoe-horned into a monetary metric.[93] 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.[94] They argue that using a discount rate to convert monetary values representing future costs and benefits into present net value devalues the lives of future generations.[95] 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.

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of CBA over course of 20th century, from limited pragmatic method used by the Army Corps of Engineers to analyze construction costs and electricity production benefits of dams to highly theorized extensively elaborated branch of welfare economics that attempts to quantify and monetize all social values related to policies).

[92] Driesen, *Neutral, supra* note - , at 339.

[93] ACKERMAN & HEINZERLING, *supra* note - .

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

[95] Douglas A. Kysar, *Climate Change, Cultural Transformation, And Comprehensive Rationality*, 31 B.C. ENVTL. AFFAIRS L. REV. 555, 580 (2004); Revesz, *Discounting, supra* note - , at 988-1006; Lisa Heinzerling, *Discounting Our Future*, 34 LAND & WATER L. REV. 39, 40-41 (1999).

Indeed, many of CBA's harshest critics don't object to informal Ben Franklin CBA at all. Shapiro and Schroeder, longtime opponents of CBA, actually invoke Ben Franklin's prudential algebra themselves as a model for their proposed alternative to (formal) CBA.[96] Ackerman and 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.[97]

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.[98] 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

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[96] Sidney A. Shapiro & Christopher H. Schroeder, *Beyond Cost-Benefit Analysis: A Pragmatic Reorientation*, 32 HARV. ENVTL. L. REV. 433, 497 (2008) (stating that their alternative "more closely resembles Ben Franklin's prudential algebra than the reductive rationality attempted by CBA.").

[97] ACKERMAN & HEINZERLING, *supra* note - , at 211.

[98] Sinden, *Endangered Species*, *supra* note - , at 184-192; *see also* Wendy Wagner, *The CAIR RIA: Advocacy Dressed up as Policy Analysis*, *in* REFORMING REGULATORY IMPACT ANALYSIS 56, 76–77 (Winston Harrington et al. eds., 2009) (Arguing in the context of 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").

more controversial, and its theoretical basis is much less defensible than the intuitive kind we do all the time."[99]

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Two things seem to be going on here. First, a number of prominent authors who advocate CBA, advocate for a more informal version—or at least a middle-of-the-spectrum CBA—while a number of the most prominent skeptics have said that they 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.[100] To the extent this is true, one would 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 I pointing out the important distinctions between formal and informal CBA suggest that this kind of argument is inappropriate and serves to muddy the debate. I will examine this point more closely in Part IV.

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.

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[99] Alexander Volokh, *Rationality or Rationalism: The Positive and Normative Flaws of Cost-Benefit Analysis*, 48 Houston L. Rev. 79, 82 (2011). *See also* Kelman, *supra* note -, at 33 ("At the broadest and vaguest level, cost-benefit analysis may be regarded simply as systematic thinking about decision-making.").

[100] *See* Cannon, *supra* note -, 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."); FARBER, *supra* note -, at 114-123 (advocating a hybrid scheme that uses a "soft CBA" as a kind of backstop to a feasibility analysis).

To what extent have Congress and the federal courts cabined agency discretion with respect to where along the formality-informality spectrum their CBAs lie?

III. Congress and the Courts: The Trend Toward Informality

Congress has in most instances actually rejected CBA as a decision making 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, even 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 1990's, 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 v. Entergy*, pretty clearly 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.[101] Members of Congress worried that

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[101] *See* ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE AND POLICY 363–64 (4th ed. 2003); *Federal Regulation and Regulatory Reform: Report of the Subcommittee on Oversight and Investigations of the Committee on Interstate and Foreign Commerce, House of Representatives,* H. Rep 75-931, 94th Cong. 2d Sess. 510-11, 515 (1976).

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.[102] 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 paralysis.[103] Accordingly, in crafting our major environmental statutes, Congress in almost every instance[104] rejected cost-benefit analysis.[105] Instead, Congress directed agencies to set standards via either feasibility criteria, [106] which limit

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[102] *See* Sinden, endangered species, *supra* note - , at 184–85.

[103] *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).

[104] The Federal Insecticide, Fungicide and Rodenticide Act Amendments of 1972 (FIFRA), 7 U.S.C. §§ 136-136y (2003), the 1976 Toxic Substances Control Act (TSCA), 15 U.S.C. §§ 2601-92 (2003), and the Safe Drinking Water Amendments of 1996 (SDWA), 42 U.S.C. § 300g-1(b)(3) (2003), are the only prominent exceptions. FIFRA and 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 overturned EPA's asbestos ban on the basis that its CBA was inadequate in *Corrosion Proof Fittings v. EPA*, 947 F.2d 1201, 1222-23 (5th Cir. 1991), TSCA has come to a grinding halt. EPA has yet to ban a single chemical under TSCA. *See* 3 Law of Environmental Protection § 16.3-.4 (Sheldon M. Novick, et al. eds. 2003). *See also* Jason Scott Johnston, *A Game Theoretic Analysis of Alternative Institutions for Regulatory Cost-Benefit Analysis,* 150 U. PA. L. REV. 1343, 1390-95 (2002) (citing FIFRA and SDWA as examples of a cost-benefit statutes producing particularly intense lobbying of the agency by regulated industries).

[105] *See* Shapiro & Schroeder, *supra* note - , at - (2008); 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 - , at 184-92, 197-210; 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.

[106] Feasibility standards are common in American environmental law. *See generally* Driesen, *Two Cheers supra* note - ; 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 (2004); Wendy A. Wagner, *Innovations in Environmental Policies: The Triumph of Technology-Based Standards,* 2000 U.ILL. L. REV. 83; Sidney A. Shapiro & Thomas O. McGarity, *Not So Paradoxical: The Rationale for Technology-Based Regulation,* 1991 DUKE L. J. 729.

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 160, 161 (Winston Harrington, et al., eds. 2009). Once an agency (or Congress) determines that the benefits of regulation exceed some threshold, the

environmental degradation to the lowest level economically and technically feasible, or health-based criteria,[107] which look only at impacts on human or ecological health and prohibit any consideration of costs.[108]

In the few instances in which Congress has authorized agency use of CBA in setting environmental standards, it hasn't been particularly clear about the level of formality it intends the agencies to use. The Toxic Substances Control Act (TSCA),[109] and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), for example, are both frequently cited as the classic cost-benefit balancing statutes.[110] Yet neither one ever uses the term "cost-benefit analysis," or even "cost-benefit balancing." Instead, they simply direct EPA to use a "reasonableness" standard in setting standards.[111] The courts have inferred that determining whether a standard is "reasonable" requires some comparison of costs and benefits.[112] But Congress has certainly not made clear how formal that analysis needs to be.

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feasibility principle directs the agency to make the standard as stringent as technologically possible without imposing costs that can't be reasonably borne by the industry.

[107] Two prominent examples are the Endangered Species Act, 16 U.S.C. §§1531–44 (2003), and the provision for the establishment of National Ambient Air Quality Standards under the Clean Air Act, 42 U.S.C. § 7409 (2003).

[108] *See* Michael A. Livermore & Richard L. Revesz, *Rethinking Health-Based Environmental Standards*, -- N.Y.U. L. Rev. – (2014) at 6 (identifying CBA, health-based standards, and feasibility standards as the "three principal approaches for determining the stringency of environmental protection").

[109] 15 U.S.C. §§ 2601-2692.

[110] *See* PERCIVAL, *supra* note – at 456.

[111] *See* TSCA, 15 U.S.C. § 2605(a) (authorizing EPA to regulate toxic chemicals that "present[] . . . an unreasonable risk of injury to health or the environment") and 15 U.S.C. § 2605(c)(1) (directing EPA to assess the economic benefits of the chemical to society and the "economic consequences of regulation" in order to evaluate the "unreasonableness" of a risk).

[112] Corrosion Proof Fittings v. EPA, 947 F.2d 1201 (5th Cir. 1991).

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 #1 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.[113] The Senate 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."[114] Despite these statements, a landmark Fifth Circuit opinion—discussed more fully in the next section—took a very different view, striking down EPA's asbestos ban under TSCA for employing an insufficiently formal version of CBA.[115]

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 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

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[113] TOXIC SUBSTANCES CONTROL ACT, H. COMM. ON INTERSTATE AND FOREIGN COMMERCE, H.R. REP. NO. 94-1341, at 14 (1976).

[114] TOXIC SUBSTANCES CONTROL ACT, S. COMM. ON COMMERCE, S. REP. NO. 94-698, at 13 (1976) (indicating and expectation that EPA give "full consideration" to the "burdens of human suffering and premature death."). *See also id.* at 8, 10, 20 (emphasizing statutory language at 15 U.S.C. § 2605(c)(1)(D) that limits EPA's consideration to those "economic consequences" that are "reasonably ascertainable"); *id.* at 75 (noting that language in TSCA requiring consideration of economic impacts included "in lieu of other proposals [that would have provided for] the mandatory preparation of detailed economic impact statements").

[115] Corrosion Proof Fittings v. EPA, 947 F.2d 1201 (5th Cir. 1991).

and benefits of the use of any pesticide."[116] 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."[117] 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.[118]

Similarly, in directing 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 EPA to consider "the total cost [imposed on industry by the standards] . . . in relation to the effluent reduction benefits to be achieved."[119] Senator Muskie, the principal sponsor of the Act in the Senate, described this as a "limited balancing test" that was only intended to affect the standard "where the additional degree of effluent reduction is wholly out of proportion to the costs."[120] This is the standard used as an example in Part I above. It is situated well toward the informality end of the spectrum along all three

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[116] 7 U.S.C. § 136(bb).

[117] S.Rep. 92-970, P.L. 92-516, at 4095. *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).

[118] *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).

[119] Clean Water Act, 33 U.S.C. §§ 1311(b)(1)(A), 1314(b)(1)(B) (2000) (requiring adoption of the "best practicable control technology currently available").

[120] CONGRESSIONAL RESEARCH SERVICE, A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972 at 170 (1973); *see also* ENVTL. POL'Y DIV. OF THE LIBRARY OF CONGRESS, A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972, at 1466 (1973) ("The Committee recognizes that no mathematical balance can be achieved in considering relative costs and benefits nor would any precise formula be desirable.").

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, as amended in 1996, in which Congress specifically directed the agency to conduct a formal CBA. In setting maximum contaminant levels for sources of drinking water, the SDWA requires EPA to assess the "quantifiable and nonquantifiable . . . benefits . . . and . . . costs" associated with each alternative being considered[121] and to use those assessments to conduct an Economic CBA.[122] This then, appears to contemplate formality along all three axes. But the statute stops short of actually requiring EPA to base its decision on that CBA. Indeed, the statute actually directs EPA to set the maximum contaminant level in the first instance on the basis of a feasibility standard.[123] It then gives EPA the discretion, *if it so chooses*, to override the results of the feasibility analysis and set the level on the basis of the CBA instead.[124] The SDWA, then, authorizes a relatively formal variety of CBA, but does not require EPA to actually base its decision on that CBA.

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[121] 33 U.S.C. § 300g-1(b)(3)(C)(i).

[122] *See* 33 U.S.C. § 300g-1(b)(3)(C)(i)(IV) (requiring EPA to publish an analysis of "[t]he incremental costs and benefits associated with each alternative maximum contaminant level considered."); *see also* 33 U.S.C. § 300g-1(b)(6)(A) (indicating that the mandated CBA will identify the point at which net benefits are maximized).

[123] The statute first directs EPA to set something called a "maximum contaminant level goal." 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." 33 U.S.C. § 300g-1(b)(4)(A). It then directs 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." 33 U.S.C. § 300g-1(b)(4)(B).

[124] 33 U.S.C. § 300g-1(b)(6)(A). *See also* City of Portland v. EPA, 507 F.3d 706, 710-11 (D.C. Cir. 2007) (noting that while SDWA requires EPA to perform a CBA, the use of that CBA to set the maximum contaminant level is discretionary). The statute carves out an exception for cryptosporidium, prohibiting EPA from using the CBA override to set the maximum contaminant level for this contaminant. Congress was particularly concerned about cryptosporidium at the time, due to a high profile and disastrous outbreak in Milwaukee three years earlier. 33 U.S.C. § 300g-1(b)(6)(C); City of Portland v. EPA, 507 F.3d 706, 710-11 (D.C. Cir. 2007).

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.

B. **The Courts**

In interpreting the federal environmental statutes, a number of federal court decisions have largely confirmed Congress' apparent antipathy toward CBA.[125] The U.S. Supreme Court has on three occasions declined industry invitations to read a CBA requirement into an environmental statute, suggesting that unless a statute is crystal clear, the Court will not overturn an agency's decision to reject CBA.[126] More

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[125] In his 2001 book, *The Cost-Benefit State*, Cass 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. SUNSTEIN, COST-BENEFIT STATE, *supra* note - . *But see* Amy Sinden, *Cass Sunstein's Cost-Benefit Lite: Economics for Liberals*, 29 COLUM. J. ENVTL. L. (2004).

[126] Am. Textile Mfrs. Inst. v. Donovan, 452 U.S. 490, 510 (1981) ("When Congress has intended that an agency engage in cost-benefit analysis, it has clearly indicated such intent on the face of the statute."); Whitman v. American Trucking, 531 U.S. 457, 471 (2001) (declining to read a CBA requirement into the standard for setting air quality standards under the Clean Air Act where statute is silent on costs); *See also* 531 U.S. 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 majority opinion, 531 U.S. at 468); Tennessee Valley Authority v. Hill, 437 U.S. 153 (1978)(rejecting argument that Endangered Species Act should be read against a background presumption in favor of CBA).

A line of cases has reached similar conclusions with respect to some of the feasibility standards under the Clean Water Act. *See, e.g.*, EPA v. Nat'l Crushed Stone Ass'n, 449 U.S. 64, 71 (1980) (Clean Water Act directs EPA not to consider costs in relation to benefits in setting effluent limits under the Best Available Technology (BAT) standard); Tex. Oil & Gas Ass'n v. EPA, 161 F.3d 923, 936 n.9 (5th Cir. 1998) ("In applying the BAT standard, EPA is not obligated to evaluate the reasonableness of the relationship between costs and benefits . . . Indeed, 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.")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.'"); Reynold Metals v. EPA, 760 F.2d 549, 565 (5th Cir. 1985) (no CBA required for setting BAT, NSPS, PSES and PSNS standards); National Ass'n Metal Finishers v. EPA, 719 F.2d 624, 662–63 (3rd Cir.1983) (under BAT, "'cost is no

recently, in *Riverkeeper v. Entergy*, the high court heard a case that came to it in a different posture. Here, the agency chose to use CBA where the statute was ambiguous and the Supreme Court upheld that decision. While *Riverkeeper* did not actually overturn those earlier decisions rejecting CBA, it did make clear that any apparent anti-CBA presumption arising out of those cases is not actually strong enough to prevent an agency that wants to from pursuing CBA where there is at least a little ambiguity in the statute.[127]

More importantly for present purposes, in those instances where courts have upheld agency use of CBA, they have generally sanctioned a decidedly informal type of CBA. 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]." This approach is consistent with numerous lines of earlier circuit court cases that have rejected calls for formal CBA and encouraged agencies to use more informal varieties of 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*, that actually invalidated an agency rule for its failure to use a more formal CBA.

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longer considered *in comparison to* effluent reduction benefits.' . . . Instead, the Administrator looks only at the cost of achieving the requisite effluent reduction."); Weyerhaeuser v. Costle, 590 F.2d 1011, 1046 (D.C. Cir. 1978) (distinguishing BAT from BPT standard in that a limited cost-benefit balancing required under the latter, but not under the former); CPC Int'l Inc. v. Train, 540 F.2d 1329, 1341–42 (8th Cir.1976) (CBA not required in setting NSPS), *cert. denied*, 430 U.S. 966, (1977); Am. Paper Inst., 543 F.2d at 338 [need more info on this source] (same); *but see* Masur & Posner, *supra* note -, at 670 (noting that only one court of appeals has ever rejected an agency decision to employ CBA as exceeding the agency's authority—that was the Second Circuit, in *Riverkeeper*—which was overturned).

[127] *See* Masur & Posner, *supra* note - , at 669.

1. **Favoring Informality**

The issue of CBA in environmental rulemaking came before the high court in 2009, in *Entergy v. Riverkeeper*. This time, unlike the three prior occasions on which the Supreme Court had addressed this issue, 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 regulating the intake of cooling water by power plants and other large industrial facilities—appears to set out a standard feasibility criterion, EPA set the standard based on CBA instead. In a 6-3 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:

> 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.[128]

The majority opinion doesn't specify exactly what the CBA they are endorsing looks like, but it offers enough clues to make clear that it falls pretty far toward the informal end of the spectrum along all three axes. First, Justice Scalia tells us "EPA sought only to avoid extreme disparities between

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[128] *Id.*. at 223–24 (emphasis added) (citation omitted).

costs and benefits."[129] This indicates informality along both Axis #2 and Axis #3. Second, Justice Scalia tells us that the form of CBA he's endorsing is less "rigorous" than that performed under the BPT standard,[130] which has typically not monetized benefits.[131] This puts it near the informal end of Axis #1 as well, and is consistent with Justice Breyer's view that EPA should describe benefits in "non-monetized terms."[132]

In a concurring opinion, Justice Breyer further 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.[133]

Thus, the CBA that Justice Breyer was envisioning was clearly well toward the informal end of the spectrum along Axis #1 (describe benefits in non-monetized terms) and Axis #2 (avoid extreme disparities between costs and benefits).[134]

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[129] 129 S.Ct. at 1509.
[130] 129 S.Ct. at 1508.
[131] *See supra* notes 135 to 144 and accompanying text.
[132] 129 S.Ct. at 1515.
[133] *Id.* at 235 (emphasis added).
[134] For a more detailed analysis of the Court's opinion along these lines, *see* Sinden, *Ben Franklin, supra* note -.

The Supreme Court's expressed preference for informality in the *Riverkeeper* case is consistent with the general trend in the circuits, where the courts have repeatedly and in many contexts endorsed informal versions of CBA. Several lines of cases in the federal appeals courts exhibit a similar preference for informality. In a line of cases interpreting the interim Best Practicable Control Technology (BPT) standard, which the Clean Water Act required industrial point sources to meet by 1977, and which—unlike the other feasibility standards in the Act—directed EPA to consider costs "in relation to" benefits,[135] the courts have emphasized that "cost need not be balanced against benefits with pinpoint precision."[136] Indeed, the circuit courts 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,[137] recognizing that "many of the benefits resulting from the effluent reduction are incapable of precise quantification"[138] and "often cannot be reduced to dollars and cents."[139] And

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[135] 33 U.S.C. §§ 1311(b)(1)(A), 1314(b)(1)(B) (2000) (requiring adoption of the "best practicable control technology currently available" which 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").

[136] Weyerhauser Co. v. Costle, 590 F.2d 1011, 1048 (D.C.Cir. 1978). *See also* Assn of Pacific fisheries 615 F. 2d 794, 808 (9th Cir. 1980)(quoting *Weyerhauser*); Chemical Mfrs. Ass'n v. EPA, 870 F.2d 177, 204 (5th Cir. 1989)

[137] *See, e.g.* Weyerhauser, 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 Pacific Fisheries 615 F. 2d 794, 808 (9th Cir. 1980)

[138] *Ass'n of Pacific Fisheries*, 615 F. 2d at 808.

[139] 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 (3d Cir. 1977) (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.").

they balanced those factors by using a loose test that simply asked whether the costs were "wholly disproportionate" to the benefits.[140]

Several of these courts specifically rejected arguments by industry that EPA should perform an Economic CBA under this provision.[141] In one case, industry pointed to a statement in the legislative history from the bill's sponsor, Senator Muskie, which EPA had also cited in support of its contention that the statute required only a rough, unquantified balancing of costs and benefits. 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*."[142] EPA emphasized the phrase "wholly out of proportion," but industry pointed to the phrases "additional degree" and "marginal level."

The courts, however, were unwilling to impose such a formal and precise balancing formula on EPA and rejected the argument that the use of the word "marginal" signaled an intent for the agencies to use an Economic CBA. The D.C. Circuit worried that "[a] requirement that EPA perform the elaborate task of

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[140] *See, e.g.*, *Ass'n of Pacific Fisheries*, 615 F. 2d at 805; *Weyerhauser*, 590 F.2d at 1045, n.52. During this time, 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* Riverkeeper v. Entergy Corp., 556 U.S. 208 (2009); Seacoast Anti-pollution League v. Costle, 597 F.2d 306, 311 (1st Cir. 1979).

[141] *See, e.g.*, *Weyerhauser*, 590 F.2d at 1048; Am. Petroleum Inst. v. EPA, 540 F.2d 1023, 1037–38 (10th Cir. 1976) (rejecting industry's argument that EPA should have done incremental CBA); BASF Wyandotte Corp. v. Costle, 598 F.2d 637 (1st Cir. 1979), *cert. denied,* 444 U.S. 1096 (1980)(same).

[142] CONGRESSIONAL RESEARCH SERVICE, A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972, [report number?] at 170 (1973) (emphasis added); *Weyerhauser*, 590 F.2d at 1047 (quoting Senator Muskie).

calculating incremental balances would bog the Agency down in burdensome proceedings on a relatively subsidiary task."[143]

Indeed, in the *Weyerhauser* case, 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. See generally W. Baxter, People or Penguins: The Case for Optimal Pollution (1974); B. Ackerman, S. Rose-Ackerman, J. Sawyer & D. Henderson, The Uncertain Search for Environmental Quality (1974). 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.[144]

Similarly, a line of cases has upheld the use of CBA by OSHA in promulgating safety standards under the Occupational Safety and Health Act for workplace hazards other than toxic chemicals pursuant to the Act's requirement that such standards be "reasonably necessary."[145] But here again, the CBA sanctioned by the courts has been of a relatively informal variety. The courts have declined "to

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[143] *Weyerhauser*, 590 F.2d at 1048; *see also* WILLIAM RODGERS, ENVIRONMENTAL LAW: AIR AND WATER 432 (2d ed. 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").

[144] *Weyerhauser*, 590 F.2d at 1041, n.41.

[145] 29 U.S.C. §652(8).

prescribe any rigid formula" for CBA,[146] and have repeatedly upheld agency analyses that failed to monetize benefits.[147]

Another line of cases has interpreted the authority of the Consumer Products Safety Commission to regulate hazards that create an "unreasonable risk" of injury to authorize the use of CBA.[148] Here also the courts eschewed formal CBA observing that the CBA conducted by the Commission need not be "elaborate"[149] and comparing it to the kind of balancing "familiar in tort law."[150] 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."[151] Again, the analyses upheld by the courts in these cases have involved

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[146] RMI Co. v. Sec'y of Labor, 594 F.2d 566, 573 (6th Cir. 1979).

[147] *See, e.g.*, *id.* at -; Turner Co. v. Sec'y of Labor, 561 F.2d 82, 86 (7th Cir. 1977); Int'l Harvester Co. v. OSHRC, 628 F.2d 982, 989 (7th Cir. 1980); Donavan v. Castle & Cooke Foods, 692 F.2d. 641 (9th Cir. 1982); 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.]"); Texas Independent 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.").

[148] 15 U.S.C. §1261(s); *see also* 15 U.S.C. § 2058(3) (barring CPSC 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."); *id*. at § 2058(c,f).

[149] Aqua Slide 'N' Dive Corp. v. Consumer Product Safety Comm'n, 569 F.2d 831, 839 (5th Cir. 1978).

[150] Forester v. Consumer Product Safety Comm'n, 569 F.2d 774, 789 (D.C. Cir. 1977).

[151] See, e.g., Alaska Factory Trawler Ass'n 831 F.2d 1456, 1460 (9th Cir. 1987)(In reviewing a fisheries management plan for conformance with the national standards set forth in the Act, "the Secretary [of Commerce] does not have to conduct a formal cost/benefit analysis of the measure."); Pacific Coast Fed'n of Fishermen's Ass'n, 494 F.Supp. 626, 631 (N.D. Cal. 1980)("It is simply not

no more than an apples-to-oranges balancing of primarily qualitative costs and benefits.

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*,[152] in which the Fifth Circuit considered an industry challenge to EPA's ban on asbestos under the Toxic Substances Control Act (TSCA). As noted above, there was considerable reason to conclude based on the statutory language and legislative history that Congress intended EPA to undertake only a very informal version of CBA in setting standards under the Act. Nonetheless, in a long and detailed opinion, the Fifth Circuit struck down EPA's rule on the ground that its CBA was inadequate. 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 I.

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, requires full

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realistic to expect the Council to quantify foreclosures, bankruptcies, fishing accidents, and unemployment rates[,] [n]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. It need not undertake a rigorous exercise in microeconomic analysis.").

[152] 947 F.2d 1201 (5th Cir. 1991).

monetization. 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. 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."[153] 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.

Consistent with the tendency in the academic debate for CBA proponents to disavow any insistence on formality, the court insisted that EPA need not "engage in an exhaustive, full-scale cost-benefit analysis" and asserted that "an agency may exercise its judgment without strictly relying upon quantifiable risks, costs, and benefits."[154] But these protestations had little impact in the face of the court's substantive analysis. After the court remanded the case, EPA, which had already spent ten years preparing the first CBA, gave up entirely. The agency never tried to

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[153] 947 F.2d at --. 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. 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. 947 F.2d at 1219.

[154] 947 F.2d at

promulgate the ban on asbestos—nor indeed to take any significant regulatory action under TSCA—again.[155]

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 Highway Traffic Safety Administration*,[156] environmentalists challenged NHTSA's rule setting Corporate Average Fuel Efficiency Standards (CAFÉ) for light trucks in model years 2008-2011. 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."[157] The environmentalists argued, that in conducting that CBA the agency erred in failing to account for the climate change benefits of increased fuel efficiency. The Ninth Circuit agreed, faulting the agency for its failure to include a monetized value for the benefit of carbon emissions, especially given that the agency had "monetized other uncertain benefits."[158]

This case then is very different from *Corrosion Proof Fittings*, where the court faulted the agency for not using a more formal CBA. *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. Thus, while permitting agency use of formal

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[155] *See* McGarity, *Fuzzy Math*, *supra* note - , at 2343.
[156] 508 F.3d 508 (9th Cir. 2007).
[157] *Id*. at 524.
[158] *Id*. at 535.

CBA, this case certainly does not require it. Rather, it seems aimed at avoiding the kind of "failed formalism" that I discuss in more detail in Part IV—where an agency inappropriately combines formal and informal elements of CBA in a single analysis.

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. The views on CBA expressed by Williams in that case, however, ultimately had little effect, since on remand OSHA pointedly declined his invitation to use formal CBA. As noted above, 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 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: "Properly conducted, cost-benefit analysis should yield a solution approximating that of a market undistorted by market failures."[159] He also indicated that OSHA should monetize the benefits of human lives and human health.[160] On remand, 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.[161] OSHA argued

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[159] International Union, UAW v. OSHA, 938 F.2d 1310, 1319 (D.C. Cir. 1991).

[160] *Id.* at 1321. Judge Williams also authored another opinion in 1991 interpreting an open-ended provision of the Clean Air Act to give discretion to EPA to use CBA in deciding to whether to exclude fugitive emissions from surface coal mines from the threshold for PSD permitting requirements. *See* NRDC 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 EPA should employ in such CBAs.

[161] 58 Fed. Reg. 16,612, 16,622 (Mar. 30, 1993).

> 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.[162]

The ultimate legal question for the court was whether the agency was interpreting the statute in a way so as to provide sufficient guidance to withstand a constitutional challenge under the non-delegation doctrine. Thus, Judge Williams' 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 the constitutional attack.[163] Accordingly, when the case subsequently went back to the D.C. Circuit, Judge William 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."[164]

While these three cases appear superficially to endorse a more formal version of CBA, only one actually invalidated an agency rule for its failure to use a more formal CBA. And in the face of these few exceptions stand the numerous federal court decisions discussed above that have eschewed formal CBA and

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[162] *Id*.

[163] *International Union*, 938 F.2d at 1313.

[164] International Union, 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.").

encouraged agencies to use instead a highly informal style of CBA much closer to the Ben Franklin end of the spectrum.

Cass Sunstein's theory that the federal courts have adopted a set of "cost-benefit default rules" is largely consistent with this view.[165] In making the argument that these "default rules" existed, Sunstein, like most academic commentators, did not distinguish between formal and informal CBA, even though he pointed to these "rules"—implicitly at least—to bolster the case for formal CBA.[166] 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.[167]

Nonetheless, it is true that many of the cases endorsing informal CBA were issued in the 1970s and 1980s and those cases that arguably endorse a more formal CBA have occurred in the 1990s and onward. It is possible then—though certainly

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[165] In my view, the existence of Sunstein's supposed "default rules" is highly contestable. *See supra* note 125. For my purposes here, however, the important point is that even his default rules endorse informality more often than formality.

[166] He defends, among other things, EPA's efforts to conduct a formal CBA of its rule regulating levels of arsenic in drinking water, which went to great lengths to quantify the costs and benefits of the rule, though, in the end, the estimates contained such enormous error margins that the analysis was indeterminate.

[167] *See* Sinden*, Cost-Benefit Lite*, *supra* note - , at 229. Many of the "cost-benefit default rules" that Sunstein finds in various court opinions, in his words, "fall far short of calling for full-fledged cost-benefit analysis." SUNSTEIN, *supra* note - , at 33. Instead, they involve principles that Sunstein views as related to CBA or evidencing a CBA sensibility. Thus, he points to cases authorizing agencies to make "de minimus" 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 (2000).

Only five of the cases he 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 Coalition v. FAA, 154 F.3d 455 (D.C.Cir. 1998); George E. Warren Corp. v. U.S. EPA, 159 F.3d 616 (D.C.Cir. 1998). One approved a CBA prepared by EPA that contained some indicia of formality (some monetization of costs and benefits for four different regulatory alternatives), but left significant benefits unquantified. NRDC v. EPA, 937 F.2d 641, 646-47 (D.C. Cir. 1991)(Stephen Williams, Judge); 54 Fed. Reg. at 48,873. The other two cases were Judge Williams' decision on OSHA's lockout/tag out rule and the Fifth Circuit's *Corrosion Proofs Fittings* decision, both discussed above.

far from clear—that we are seeing the beginnings of a trend in the federal courts toward formality in CBA. A recent D.C. Circuit case outside the environmental area, *Business Roundtable v. SEC*, which has received a lot of attention for requiring CBA of securities regulations and faulting the agency for not quantifying certain effects, could be read to augur such a trend.[168] But any notion that the handful of cases from the last two decades that have seemed to endorse 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 clearly cuts in the opposite direction.

In sum, the 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 they have endorsed agency use of CBA, they have in most cases endorsed 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 an analysis of a single option only in relation to the status quo (Axis #3).

IV. 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 other direction. In light of this trend in

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[168] 647 F.3d 1144 (D.C. Cir. 2011). The case involved an SEC rule requiring corporate boards to include candidates to board vacancies nominated by shareholders in their proxy voting materials. The rule was aimed at improving shareholder democracy – a social value that, like environmental quality and public health, is in some sense intangible. Nonetheless, despite the agency's protestations that certain costs and benefits of the rule were impossible to quantify, the court sent the rule back to the SEC, criticizing the agency for its failure to quantify certain costs and for its reliance on "insufficient empirical data." 647 F.3d at 1150.

Congress and the courts, in combination with the observations above about the academic debate and the expressed preferences of both sides toward more informal modes of CBA, 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 with respect to agency practice, suggests a marked trend in the opposite direction. The executive branch, particularly the White House, appears to be pushing toward more formality in CBA.

A. **Executive Orders and Guidance**

There is a strange disconnect in environmental law between what statutes and Executive Orders tell the agencies to do.[169] 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.[170] 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—i.e., those costing $100 million or more per year. Since an Executive Order obviously cannot trump a statutory command,

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

[170] *See* Am. Textile Mfrs. Inst. v. Donovan, 452 U.S. 490, 510 (1981) (Occupational Safety and Health Act); Whitman v. American Trucking, 531 U.S. 457, 471 (2001) (Clean Air Act's air quality standards); Tennessee Valley Authority v. Hill, 437 U.S. 153 (1978)(Endangered Species Act); EPA v. Nat'l Crushed Stone Ass'n, 449 U.S. 64, 71 (1980) (Clean Water Act's Best Available Technology (BAT) standard).

this can put the agencies in the anomalous position of having to prepare a CBA that they cannot actually use in making their decision. A similar disconnect exists with respect to the formality of CBA, with statutes and court decisions endorsing primarily informal CBA, while the Executive Orders prescribe a form of CBA that falls well toward the formal end of the spectrum.[171]

The CBA Executive Order that President Clinton issued in 1993 is still in effect and requires agencies to propose or adopt regulations "only upon a reasoned determination that the benefits of the intended regulation justify its costs."[172] 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 the Reagan Executive Order, which required benefits to "outweigh" costs.[173] The Clinton Order also makes a few nods toward informality along Axis #1, making several references to the difficulties inherent in attempting to quantify certain values, directing that costs and benefits "be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative

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[171] *See* Cannon, *supra* note -, at 455 ("arguably the strong form of CBA is codified for significant rulemakings in federal administrative practice").

[172] Exec. Order No. 12,866 § 1(b)(6), 58 Fed. Reg. 51,735, 51,736 (1993). 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." 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. President Obama revoked this Executive Order, however, soon after taking office. Exec. Order No. 13,497 (Jan. 30, 2009).

[173] Exec. Order No. 12,291, § 2(b), 46 Fed. Reg. 13,193 (Feb. 17, 1981) ("Regulatory action shall not be undertaken unless the potential benefits to society for the regulation outweigh the potential costs to society."). The anti-regulatory mission of the 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.* at 13,193. For an historical account of how CBA has been pushed by political conservatives and industry over the years, see REVESZ & LIVERMORE, *supra* note - , at 21–30.

measures of costs and benefits that are difficult to quantify but nonetheless essential to consider."[174] On the other hand, the Clinton Order also contains language very similar to the Reagan 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 benefits."[175] Indeed, it is hard to interpret this language as referencing anything but the most formal end of the spectrum along all three axes—an Economic CBA.

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. Ultimately, however, he left the prior Order in place and instead simply issued Executive Order 13,563, "Improving Regulation and Regulatory Review," which "supplements and reaffirms" Executive Order 12,866.[176] 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

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[174] Exec. Order No. 12,866, § 1(a), 58 Fed. Reg. 51,735, (1993). The Reagan Order contained similar language about non-quantifiable costs and benefits, but stopped short of calling them "essential to consider." Exec. Order No. 12,291, §3(d), 46 Fed. Reg. 13,193, (Feb. 17, 1981) (requiring the description of benefits, costs, and net benefits to each include "any . . . effects that cannot be quantified in monetary terms").

[175] Exec. Order No. 12,866, § 1(a), 58 Fed. Reg. 51,735 (1993). 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.* at § 6(a)(3)(C)(iii). The Reagan Oder similarly stated "[r]egulatory 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), 46 Fed. Reg. 13,193 (Feb. 17, 1981).

[176] 76 Fed. Reg. 3821 (Jan. 21, 2011). President Obama "reaffirm[ed]" the principles of Executive Order 12,866 in Executive Order 13,563. 76 Fed. Reg. 3821.

costs are difficult to quantify."[177] In language that arguably shifts even further toward formality and contains no analogue in the Clinton Order, however, it also unambiguously sets out full quantification and monetization as the goal, stating "each agency is directed to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible."[178] 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."[179]

The Executive Orders' CBA directive has been further refined and clarified in OMB Circular A-4, issued by OIRA in 2003. 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 regulatory choices,"[180] and that "[w]here all benefits and costs can be quantified and expressed in monetary units, [CBA] 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)."[181] Later it reiterates the same point, saying, "[b]y measuring incremental benefits and costs of successively more stringent

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[177] Exec. Order No. 13,563 § 1(b).
[178] *Id.*
[179] *Id.*
[180] OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4 at 9.
[181] *Id.* at 2.

regulatory alternatives, you can identify the alternative that maximizes net benefits."[182]

While acknowledging that "[i]t will not always be possible to express in monetary units all of the important benefits and costs,"[183] 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."[184]

EPA's *Guidelines for Preparing Economic Analyses* are similarly geared toward a highly formal CBA.[185] 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."[186] And the *Guidelines* contain a detailed appendix that provides a textbook introduction to the fundamentals of economic theory.[187] Thus, like the OMB Circular, EPA *Guidelines* requires 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

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[182] *Id.* at 10.
[183] *Id.* at 2.
[184] *Id.* at 10.
[185] EPA, GUIDELINES FOR PREPARING ECONOMIC ANALYSES, 240-R010-001 (Dec. 2010), *available at* http://yosemite.epa.gov/ee/epa/eed.nsf/pages/guidelines.html.
[186] *Id.* at 1-4. Starting in 1983, EPA issued a series of Guidelines for preparing CBAs. The agency released its most recent version in December 2010. This document was prepared by economists at EPA and subsequently peer reviewed by EPA's Science Advisory Board.
[187] *Id.* at Appendix A.

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." [188]

Thus, while 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, the repeated references to maximizing net benefits and quantifying costs and benefits "as accurately as possible" clearly set up Economic CBA as the goal.[189]

B. **Agency Practice**

Anecdotal evidence also indicates a tilt toward formality, at least at EPA. Two examples can be found in EPA rulemakings on Cooling Water Intake Structures, first in the rulemaking the high 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*.[190]

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

Section 316(b) of the Clean Water Act directs EPA to regulate cooling water intake structures at power plants and other large industrial facilities. These structures withdraw billions of gallons of water a day from rivers, lakes and

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[188] *Id.* at 11-2 ("Quantifiable benefits and costs, properly discounted, should be compared to determine a regulation's net benefits, even if important benefits or costs cannot be monetized.").

[189] *Id.*

[190] Sinden, *Ben Franklin, supra* note -.

estuaries, and, in so doing, kill billions of fish and aquatic organism, squashing them against intake screens and sucking them up into the internal workings of the plant. EPA issued Phase I of these regulations, governing new facilities, in 2001. In so doing, EPA interpreted the statutory language, requiring "the best technology ["BTA"] available for minimizing adverse environmental impact" as a straightforward feasibility standard,[191] comparing facilities' projected compliance costs for various technologies to their projected revenues.[192] On this basis, EPA concluded that closed cycle cooling—a method that minimizes the amount of water used by recirculating it—was the "best technology available," with costs of less than one percent of revenues for all but nine of the affected facilities.[193] When it came time to submit a CBA to OIRA under Executive Order 12,866,[194] EPA left it informal, making no effort to quantify or monetize the environmental benefits of the rule, or to compare them to costs.[195]

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, EPA proposed to only require closed cycle cooling for the 59 largest and most damaging plants. The others would

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[191] 33 U.S.C. § 1326(b).

[192] Regulations Addressing Cooling Water Intake Structures for New Facilities, 65 Fed. Reg. at 49,095.

[193] 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).

[194] Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Sept. 30, 1993).

[195] 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."). While OIRA sometimes has been known to push back in such situations—sending rules back to EPA with demands for more quantification—this time it accepted the CBA as is. *See* 66 Fed. Reg. at 65,327 (final rule was reviewed by OIRA); *id*. at 65,312 (the CBA associated with the final rule did not quantify the rule's benefits).

be allowed to use the older "once-through" technology and make relatively modest changes to their intake structures—new types of screens and filters—that are less effective at saving fish, but also less expensive. As it had done for the new plants, EPA assessed the "economic practicability" of this proposal by comparing compliance costs to annual revenues.[196] Its conclusion was that compliance costs would be "low." Indeed, 82 percent of firms would incur compliance costs of less than 0.5 percent of revenues, and 91 percent would incur costs of less than 1 percent.[197]

This time, however, 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, EPA spent enormous time and resources attempting to devise a fully quantified and monetized CBA.[198] 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.

EPA left out whole categories of aquatic organisms for which it simply had no data.[199] Of those it did include, however, EPA counted less than two percent of the

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[196] *See supra* notes – to - and accompanying text.

[197] 67 Fed. Reg. 17,158.

[198] EPA recognized that the task would be "challenging," Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities, 69 Fed. Reg. 41,576, 41,655 (July 9, 2004), and expressed concern from the outset that formal CBAs under the CWA have generally "been limited in the range of benefits assessed," thus "hinder[ing] EPA's ability to compare . . . benefits and costs . . . comprehensively," Proposed Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities, 67 Fed. Reg. at 17,191.

[199] These included phytoplankton, zooplankton, endangered sea turtles, shrimp, crabs, and lobsters, among others. *See* Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities, 69 Fed. Reg. at 41,624; EPA, *Regional Analysis Document for the Final Section 316(b) Phase II Existing Facilities Rule* A9-1, EPA-821-R-02_003 (Feb. 12, 2004),

individuals in each fish species.[200] 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.[201] 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."[202]

Next, the agency then had to tackle the difficult task of assigning monetary values to the fish. With respect to the fish that would be commercially caught, EPA simply used the market price.[203] But assigning a monetary value to recreational fishing and ecological benefits posed more of a challenge.[204] Several monetization methods EPA used initially proved controversial.[205] Ultimately, after receiving considerable criticism in the comments to the proposed rule, EPA threw up its hands and attached no dollar value at all to the vast majority of these ecological values, effectively zeroing them out.[206]

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available at http://www.epa.gov/waterscience/316b/phase2/casestudy/final.htm; EPA, *Economic and Benefits Analysis for the Proposed Section 316(b) Phase II Existing Facilities Rule* C1-7, EPA-821-R-02-001 (Feb. 2002), *available at* http://www.epa.gov/waterscience/316b/phase2/econbenefits.

[200] Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facitilies, 69 Fed. Reg. at 41,660–61.

[201] *Id.* at 41,660-61.

[202] *Id.*

[203] *Id.* at 41,659–60.

[204] For recreational fishing, EPA used the travel cost method, which generated considerable controversy. *Id.* at 41,657–58; EPA, *Regional Analysis Document for the Final Section 316(b) Phase II Existing Facilities Rule*, *supra* note 104, at A11-1 to A11-13.

[205] *See* Proposed Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities, 67 Fed. Reg. 17,122, 17,191, 17,193 (Apr. 9, 2002) (using "trophic transfer method" and the Habitat Replacement Cost method).

[206] In the final rule, EPA abandoned altogether the Habitat Replacement Cost analysis (criticized by Harvard economist Robert Stavins as "completely illegitimate" and "fatally flawed"),

In the end, 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."[207]

Nonetheless, it appears that EPA (perhaps 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 same weak standards that applied to everyone else.[208] And the only reason EPA cited for the change was the numeric result of its cost-benefit analysis: The dollar costs of the rule—$413 million—outweighed the dollar benefits of the rule—$146 million.[209] Despite the agency's earlier repeated protestations that the benefits

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using instead the far lower (and less complete) numbers generated by the trophic transfer model. Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities, 69 Fed. Reg. at 41,657.

[207] 69 Fed. Reg. at 41,666; *see also* EPA, *Economic and Benefits Analysis (EBA) for the Final Section 316(b) Phase II Existing Facilities Rule*, *supra* note 104, 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,* 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.").

[208] *See* Harrington, *Cooling Water*, *supra* note - , at 162 (EPA submitted draft rule to OMB that identified closed cycle as BTA for 59 plants; OMB suggested lifting this requirement and adding site specific CBA). *See* EPA, *Summary of Major Changes During Interagency Review*, Docket W-00-32, DCN # 4-4005, at 1 (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*.

[209] 67 Fed. Reg. at 17158; Sinden, *Ben Franklin*, *supra* note -. EPA used the term "significantly outweigh," but given how vastly incomplete the benefits estimate was, this was clearly a nonsensical conclusion. Indeed, 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 EPA's benefits estimate would yield an estimate 4-6 times as high. J.A. 223. This would yield benefits significantly higher than costs, in the range of $584 – $876 million.

estimate was incomplete, EPA made no mention of the numerous non-quantifiable and under-quantified benefits.[210] We can only assume that OIRA ignored EPA's admonition to interpret the results of its CBA "with caution."[211]

The result was a perfect poster child for failed formalism. The agency purported to take a formal approach, expressing both costs and benefits in monetary terms (Axis #1) and applying a precise balancing formula (do costs outweigh benefits?). But because the monetized benefits estimate was, by the agency's own admission, vastly incomplete, the analysis was actually well toward the *informal* end of the spectrum on Axis #1, while falling well toward the *formal* end of Axis #2. The result was a logically incoherent analysis that inappropriately combined two inconsistent positions on Axes #1 and #2, purporting to balance with precision an incomplete estimate of benefits against a relatively complete estimate of costs. As Doug Kysar put it: "Unable to measure what was important, EPA instead chose to make important what it could measure."[212] The result was patently irrational—180 degrees from the reasonableness and common sense of Ben Franklin.

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 it arguably made no sense to). Second, the formal CBA the agency did perform provides a perfect example of what I'm calling "failed formalism."

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[210] *See supra* notes – to - and accompanying text.
[211] 69 Fed. Reg. at 41,666.
[212] KYSAR, NOWHERE, *supra* note -, at 199.

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

Perhaps even more surprising than EPA's move toward formality in this rulemaking is the agency's dramatic move toward even more formal CBA in the rulemaking that followed the Supreme Court's remand in *Riverkeeper*. Despite the Supreme Court's expressions of skepticism in that opinion about more formal or "rigorous" varieties of CBA, in drafting the new rule EPA has moved even further toward the formal end of the CBA spectrum.[213] The agency has done that in two ways: First, in order to conduct a nationwide CBA of the rule as a whole, EPA has expended substantial time and energy conducting a Stated Preference Survey in an attempt to quantify and monetize the ecological and existence-value benefits associated with the rule that it was unable to quantify the first time around. Second, in crafting the rules for case-by-case CBA, 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.

In July 2010, EPA's announced that it would conduct a stated preference survey in connection with its new version of the cooling water rule. The announcement immediately unleashed a firestorm of criticism from both industry and environmentalists. Industry maintained that the method was inherently

[213] EPA did not use CBA in in developing the new facility portion of the Phase III rule, citing its inability to reliably quantify the benefits, a decision that was upheld in ConocoPhillips Co. v. EPA, 612 F.3d 822 (5th Cir. 2010).

unreliable and would vastly overstate the benefits of the rule.[214] 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.[215] Environmental groups, meanwhile, warned that the SPS 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."[216]

Although the final results of the survey are still not out as of this writing, preliminary results published in June 2012 suggest dramatic results.[217] EPA provided figures on households' willingness to pay for a one percentage point improvement in fish mortality levels[218] but didn't tally up its numbers to provide final dollar values for total national willingness to pay for each proposed option. Frank Ackerman, an economist hired by a set of environmental groups commenting on the rule, did the missing arithmetic and concluded that the survey will result in huge numbers, ranging from $1.3 to $7 billion per year. These numbers produce

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[214] UWAG comments Sept. 2010, p. 17. Indeed, the controversy has reached the House of Representatives, where Republican members recently questioned EPA Administrator Gina McCarthy about the agency's use of these surveys at a congressional hearing. *See McCarthy Sidesteps GOP Concern about Non-Use Benefits in Future Rules*, 34 INSIDE EPA (Dec. 6, 2013).

[215] *See* UWAG comments 2010, p. 4. EPA responded to this concern by simply asking survey respondents if they were biased, and taking their answer at face value. *See* EPA, Supporting Statement for ICR 2010, at 9.

[216] *See* Reed Super comments Sept 2010, p. 1.

[217] 77 Fed. Reg. 34,929, col. 2 (June 12, 2012).

[218] EPA, Survey Support Document at 33-34.

total benefits for all four options that either substantially exceed costs or—using a high 7% discount rate—are below costs by such a slight amount as to be within the margin of error.[219] Industry's economists appear to agree with this assessment and hence, industry commenters have urged EPA to "abandon" its Stated Preference Survey altogether,[220] calling it "ill-conceived from the outset,"[221] "deeply flawed,"[222] 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."[223] Environmentalists, on the other hand, identified errors in EPA's analysis that they argue skewed the results significantly downward. If those errors are corrected, they argue, the benefits of EPA's most stringent closed cycle cooling option outweigh the costs by 3 to 1.[224]

Whether EPA's move toward formality improves the analysis or simply provides more fodder for arguments on both sides remains to be seen. The point here is simply that EPA has chosen to shift its CBA evaluating the rule as a whole dramatically in the direction of formality, even in the face of a Supreme Court decision clearly encouraging EPA to move in the opposite direction and suggesting that such a move toward formality might even be out of bounds.

EPA has also moved toward formality with respect to the other way CBA enters this rulemaking—site-specific CBAs. The Obama EPA's new proposed rule is far more lenient than the original, Bush-era rule that was approved by the Supreme

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[219] Frank Ackerman comments, July 10, 2012 at 11.
[220] UWAG comments July 12, 2012 at 6.
[221] *Id.* at 2.
[222] *Id.* at 3.
[223] *Id.* at 4.
[224] Riverkeeper comments on NODA re SPS (July 12, 2012) at 5.

Court. The Bush-era rule included a variance procedure, under which individual plants could escape from the national standards by conducting a site-specific CBA showing that its compliance costs would be "significantly greater than" benefits. But the new Obama rule does away with national standards altogether, instead directing state permit writers to make the BTA determination for all existing facilities on a case-by-case basis, based in part on a site-specific CBA.[225]

This time, however, EPA initially used a "wholly disproportionate" standard for these site-specific CBAs rather than the "significantly greater than" formulation from the Bush rule. This may have been in response to Justice Breyer's concurrence in *Riverkeeper*, in which he questioned 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, 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).[226] Under that program, however, 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.[227] It may be, then, that in its draft proposed version of the new Obama rule, EPA 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 high court.

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[225] 76 Fed. Reg. 22,174.

[226] *See* EPA, OFFICE OF WATER ENFORCEMENT PERMITS DIV., {Draft} Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P.L. 92–500, (May 1, 1977), *available at* http://www.epa.gov/waterscience/316b/files/1977AEIguid.Pdf.

[227] 556 U.S. at 235-36.

Thus, in the draft proposed rule it submitted to OIRA for review, EPA directed state permit writers to only reject an otherwise available technology if "the social costs of compliance are wholly disproportionate to the social benefits."[228] In explaining the use of this informal Axis #2 standard, 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."[229]

OIRA, however, pushed 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 EPA's reference to the difficulties of quantification and monetization and replaced the "wholly disproportionate" balancing formula with language requiring benefits to "justify" costs.[230] This "justify" formulation tracks the language of the Clinton Executive Order and thus can be read to embody the same leaning toward formality contained in that document. OIRA has in this instance, then, pushed EPA to adopt a brand of CBA that is significantly more formal than what EPA first proposed or what the Supreme Court endorsed.

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[228] Draft Proposed Rule – Redlined Version, at 343-44.

[229] *Id.*

[230] 76 Fed. Reg. at 22288. In a nod toward informality, the proposed rule does (not unlike the Executive Order) specify that the site-specific CBA should include consideration of "qualitative social benefits and social costs." *Id.*

C. Why the Move Toward Formality? Some Speculations

Why does the executive branch seem to push for more and 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 might be that the executive branch values CBA's standard setting function and wishes to use it to locate the economically efficient level of regulation. As discussed above, this requires formal Economic CBA. This explanation, however, is hard to reconcile with the fact that agencies often evaluate only a single alternative and rarely evaluate more than a handful of alternatives in conducting CBAs, making identification of the efficient regulation impossible.[231]

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 12866—"to make the process more accessible and open to the public."[232] And President Obama has devoted considerable rhetorical energy to his administration's commitment to increased transparency. Some CBA proponents argue that formality increases transparency.[233] Dan Cole, for example, argues that formal CBA forces the analyst to

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[231] RICHARD D. MORGENSTERN, ECONOMIC ANALYSIS AT EPA: ASSESSING REGULATORY IMPACT (1997) (empirical evidence suggests that CBAs often fails to address a sufficient number of alternatives).

[232] 58 Fed. Reg. 51735. President Obama's E. O. 13563 also contained a section devoted to public participation. 76 Fed. Reg. 3821-22 (Sec. 2).

[233] *See* Cass R. Sunstein, *Nonquantifiable*, preliminary draft 6/13/13 at 6 ("Quantification helps to promote accountability, transparency, and consistency."); SUNSTEIN, Cost-Benefit State, *supra* note -, at 9, 27.

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."[234] 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.

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, which is beyond the scope of this paper, I will simply note here that CBA skeptics argue that formal CBA actually inhibits rather than increases transparency. Skeptics (including this author) 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 obscure concepts like discounting, are inaccessible to members of the general public and so further tilt the playing field in favor of moneyed industrial interests who can afford to hire consultants over cash-strapped environmental groups.[235] 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.

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[234] Cole, Law, Politics, *supra* note - , at 70.

[235] Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, 107 YALE L. J. 1981, 2064–65, 2068 (1998); Sinden, *Cost-Benefit Lite*, *supra* note -, at 219-222.

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 EPA and OIRA, the details of which are also largely beyond the scope of this article. I will nonetheless make a few brief observations in that direction based on the recent writings of Cass Sunstein describing and commenting on his experiences as OIRA Director during President Obama's first term, and Lisa Heinzerling, who in her position as Associate Administer of EPA's Office of Policy interfaced regularly with Sunstein's OIRA. Sunstein's and Hienzerling's descriptions of their time in the executive branch both confirm that the embrace of formality apparent in the E.O.s 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 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, Sunstein characterizes the language of E.O. 13563 as "reflect[ing] an unprecedented emphasis on the importance of quantification" in the Obama Administration.[236] In another article, he 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

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[236] Cass R. Sunstein, *The Real World of Cost-Benefit Analysis*, 114 COLUM. L. REV. 167, 171 (2014). *See also* Sunstein, Nonquantifiable, *supra* note - , at 7 (E.O. 13563's requirement that agencies "'quantify anticipated benefits and costs as accurately as possible' . . . "attests to the importance of both quantification and monetization."); Cass R. Sunstein, *The Office of Information and Regulatory Affairs: Myths and Realities*, 126 HARV. L. REV. 1838, 1864 (calling E.O.'s requirements that "benefits of rules justify the costs and that the agency has selected the approach that maximizes net benefits . . . exceedingly important").

monetized benefits."[237] And in his book he makes clear that, as OIRA director, he did not adopt the informal, kindler gentler form of CBA he 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 benefit 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.[238]

According to Heinzerling, 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 EPA. In Heinzerling's words, "OIRA's cost-benefit sieve leads EPA personnel to be deeply wary of

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[237] Sunstein, Myths & Realities, *supra* note -, at 1865-66; *see also* Sunstein, Real World, *supra* note -, at 180-81 (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 (where monetized benefits are expressed in wide ranges, "[a] great deal of work would be done to try to achieve greater precision and confidence in the numbers").

[238] CASS R. SUNSTEIN, SIMPLER: THE FUTURE OF GOVERNMENT 161 (2013). Compare this to Sustein's description of the proper role of CBA in his 2002 book, The Cost-Benefit State:

> [N]one 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 number 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.

SUNSTEIN, Cost-Benefit State, *supra* note -, at 22.

developing rules that have very high costs in relation to their quantified and monetized benefits." [239]

There is also, perhaps, a simple institutional dynamic that also contributes to the executive branch's trend 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.[240] As noted in Part IIA, of the literature advocating CBA, much of that urging a more formal view of CBA comes from formally trained economists.[241] Thus, OIRA's professional culture and institutional make-up may be one of the drivers of the push toward formality in the executive branch.

Alternatively, EPA's move toward formality in this case may simply be the inevitable consequence of what 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. 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."[242] Wendy Wagner has made a similar argument in her case study

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[239] Lisa Heinzerling, *Inside EPA: A Former Insider's Reflections on the Relationship between the Obama EPA and the Obama White House*, -- Pace Envtl. L. Rev. – (2014) [forthcoming] at 22; *see also* Rena Steinzor, *The Case for Abolishing Centralized White House Regulatory Review*, 1 MICH. J. ENVTL. & ADMIN. L. 209, 243 (2012) (discussing dynamic set up by centralized review of agency rules by OIRA, as giving OIRA significant power and sway over agency rule making).

[240] *See* Steinzor, *supra* note - , at 276, 283.

[241] *See supra* notes 86 to 87 and accompanying text.

[242] Douglas A. Kysar, Fish Tales, in REFORMING REGULATORY IMPACT ANALYSIS 197 (Winston Harrington et al. eds., 2009); *see also* Cole, *Law, Politics*, *supra* note - , at 69 (speculating 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

of the CBA accompanying EPA's Clean Air Interstate Rule. 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."[243] 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 route toward achieving that goal. Numbers convey an aura of scientific accuracy and objectivity that qualitative descriptions can't match.[244]

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."[245] I argued that advocates on both sides would face incentives to push for increased formality in CBA:

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a set of numbers . . .), which creates the impression (or misimpression) that the policy choice is . . . clear").

[243] Wagner, *The CAIR RIA*, at 57. See also Alan J. Krupnick, The CAMR: An Economist's Perspective, in REFORMING REGULATORY IMPACT ANALYSIS 142 (Winston Harrington et al. eds., 2009) ("When an RIA is issued contemporaneously with the rule itself . . . the RIA becomes mere justification for the agencie's choices rather than a means of informing and improving the ultimate choice."); PORTER, *supra* note - , at 189.

[244] *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 ECOL. ECON. 508 (2006) (empirical study of dam removal decision suggesting that decisionmakers and stakeholders prefer qualitative projections as the basis for negotiation and decisionmaking and tend to ignore monetized valuations).

[245] Sinden, *Endangered Species*, *supra* note -, at 183.

> 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.[246]

One might cite as a counterexample, industry's recent arguments urging EPA to drop the Stated Preference Survey in its efforts to quantify the benefits of its new cooling water intake rule in the wake of results suggesting huge willingness-to-pay values for protecting aquatic life. But industry is not in that context urging EPA to abandon formality per se. They still want to see EPA quantify and monetize benefits in order use formal CBA to make a decision. Rather, this argument represents a disagreement about which methods of formality to use, disagreements that are only likely to proliferate as formality increases. Perhaps more interesting is the fact that the environmentalists, who generally oppose formality, now find themselves in the position of arguing in favor of the Stated Preference Study because it appears to be producing results that support the use of the more environmentally protective closed cycle cooling technology.[247] In this way, environmentalists' usual opposition to formal varieties of CBA may often be neutralized in specific cases.

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[246] *Id*.

[247] *See McCarthy Sidesteps GOP Concern about Non-Use Benefits in Future Rules*, 34 INSIDE EPA (Dec. 6, 2013) ("Environmentalists generally support [Willingness to Pay] surveys, saying they account for benefits that are often ignored or 'zeroed out' in cost-benefit reviews.").

V. Lessons for the Larger Debate

The foregoing analysis of the distinctions between formal and informal CBA provides some lessons for the larger debate over the role that CBA should play in environmental rulemaking. 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 endorsing 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 muddles 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 failed formalism that can occur when the CBA analyst tries to combine inconsistent positions along the three axes of formality.

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 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 of courts have expressed considerable skepticism about formal CBA, similar to that voiced by the high 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 instances in which it does endorse it. With only a few exceptions, both Congress and the federal courts have adopted this view, expressing considerable skepticism about more formal versions of CBA.

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 and 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 non-market values into monetary terms, which is the source of the vast majority 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.)[248] 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.

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.[249] The most common error is assuming that a regulation that passes a secondary-filter CBA is therefore optimally efficient. This is not the case, as Part I explains.

Analytic Integrity. Breaking the CBA formality spectrum down into three axes, as the typology in Part I does, allows us to see the relationships between them. As a matter of simple logic, certain moves along one axis 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 with precision

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[248] *See* MATTHEW D. ADLER & ERIC A. POSNER, NEW FOUNDATIONS OF COST-BENEFIT ANALYSIS (2006).

[249] EPA's proposed Cooling Water Intake Structure rule on remand appears to treat CBA as a secondary check. Even though it purports to evaluate the costs and benefits of four different options, it only purports to balance costs against benefits (which yields the conclusion that benefits justify costs) for the preferred option. It could well be, however, that benefits also justify costs for the other options as well. Indeed Ackerman suggests that net benefits would actually be higher for the more stringent options.

costs and benefits that are described in qualitative terms. 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. An example of this failed formalism can be found in EPA's CBA of its Cooling Water Intake rule in the lead up to the Supreme Court's opinion in *Riverkeeper*. EPA's 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 as well, performing only a rough apples-to-oranges balancing. Instead, though, when the time came to balance the factors, 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.[250] But this was, of course, nonsensical—the direct opposite of the rationality and common sense that CBA's supporters point to. And it arose from a failure to pay close attention to where a 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 "failed formalism" in which the agency, in Wendy Wagner's words, exhibits an "obsession with a precise quantification of a

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[250] EPA's Guidelines facilitate this by requiring the analyst to calculate net benefits even where important benefits cannot be quantified. EPA, EPA GUIDELINES 11-2 ("Quantifiable benefits and costs, properly discounted, should be compared to determine a regulation's net benefits, even if important benefits or costs cannot be monetized.")

subset of benefits."[251] Wagner had this to say, for example, about the CBA that 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 ($x + y$) = *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.
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> Indeed, to nevertheless persist with incomplete quantification in such circumstances is . . . analytically corrupt.[252]

This kind of failed formalism, 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.

VI. Conclusion

In the now decades-long debate over the use of CBA in environmental rulemaking, the participants have often failed to define the term. "Cost-benefit analysis" can refer to a variety of different practices that span a large spectrum,

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[251] Wagner, *CAIR, supra* note - , at 67; *see also* Keohane, *supra* note - , at 47 (calling 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 250, at 108, 119 (calling the CBA of EPA's 2005 Clean Air Mercury Rule "a complete cost-incomplete benefit analysis.").

[252] Wagner, CAIR, *supra* note 253, at 56, 65; *see also* Keohane, *supra* note 253, at 47, 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.").

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 different varieties of CBA and their relationships to each other. I hope that this typology helps to show why failing to distinguish between formal and informal CBA, and the many varieties in between, has led 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 of CBA largely seems to favor informal CBA over formal CBA. This is true both in the body of federal environmental statutes and in the federal case law. In light of these trends, 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 EPA, however, seems to demonstrate a trend in the opposite direction. Skeptics, like myself, worry that this move toward formality will lead to poor agency decisionmaking for all the reasons that have emerged over the years in the broader academic debate over the merits of the CBA in general. But the analysis here suggests an additional reason for concern. The trend toward formality may also lead to more instances of "failed formalism"—

a corruption of CBA that can occur when agencies fail to clearly define where on the formality-informality spectrum a particular CBA falls.