Against Feasibility Analysis

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Feasibility analysis, a method of evaluating government regulations, has emerged as the major alternative to cost-benefit analysis. Although regulatory agencies have used feasibility analysis (in some contexts called "technology-based" analysis) longer than cost-benefit analysis, feasibility analysis has received far less attention in the scholarly literature. In recent years, however, critics of cost-benefit analysis have offered feasibility analysis as a superior alternative. We advance the debate by uncovering the analytic structure of feasibility analysis and its normative premises, and then criticizing them. Our account builds on two examples of feasibility analysis, one conducted by OSHA and the other by EPA. We find that feasibility analysis leads to both under- and overregulation, and we conclude that it lacks a normative justification and should have no place in government regulation.

INTRODUCTION

Feasibility analysis, a method of evaluating government regulations, has emerged as the major alternative to cost-benefit analysis (CBA). A regulation satisfies feasibility analysis if it reduces a risk of harm to the maximum extent possible without having a major negative impact on the economy such as "widespread plant closings."[1] By contrast, a regulation satisfies CBA if it produces benefits (in terms of deaths, injuries, and other losses avoided) greater than the cost of compliance. Although agencies have used feasibility analysis (in some contexts, called "technology-based" analysis[2]) longer than CBA, feasibility analysis has received far less attention in the scholarly literature. In recent years, however, critics of CBA have offered feasibility analysis as a superior alternative. The dispute over these standards will car-

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1 David M. Driesen, *Distributing the Costs of Environmental, Health, and Safety Protection: The Feasibility Principle, Cost-Benefit Analysis, and Regulatory Reform*, 32 BC Envir Aff L Rev 1, 9 n 44 (2005), quoting Daniel A. Farber, *Taking Slippage Seriously*, 23 Harv Envir L Rev 297, 306 (1999).

2 See, for example, Christopher H. Schroeder, *Clear Consensus, Ambiguous Commitment*, 98 Mich L Rev 1876, 1883 (2000) (describing different types of feasibility-based analysis used in environmental law).

ry over into the Obama administration,[3] and for that reason a critical assessment of the feasibility standard is long overdue.

When Congress authorizes agencies to regulate, it occasionally provides detailed instructions but more typically issues vague standards. These standards appear in numerous different formulations, but most statutes fall into two groups. In the first, Congress directs the agency to reduce a risk to the extent "feasible," or to the "maximum" extent, with no mention of costs. For example, the Occupational Safety and Health Act requires the Occupational Safety and Health Administration (OSHA) secretary to ensure, "to the extent feasible," that exposure to hazards in the workplace does not harm workers' health.[4] In the second, Congress directs the agency to consider the costs as well as the benefits of risk reduction. For example, the Toxic Substances Control Act directs the Environmental Protection Agency (EPA) to consider "all relevant aspects of the risk . . . [and] a comparison of the estimated costs of complying with actions taken under this chapter."[5] Agencies tend to use feasibility analysis for the first category of statutes and CBA for the second category of statutes, though it is by no means clear that they are legally obligated to do so, and there are some exceptions and mixed cases. Courts have afforded agencies significant latitude under the *Chevron* doctrine.[6]

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3 See, for example, Cass Sunstein, *Risk and Reason* 5–9 (Cambridge 2004) (arguing that a cost-benefit model of regulation can protect health and extend lives by identifying means that simple intuition might neglect). President Barack Obama has nominated (and the Senate has confirmed) Cass Sunstein, a prominent defender of CBA, to head the Office of Information and Regulatory Affairs (OIRA). See Bernie Becker, *Senate Confirms Regulatory Chief*, NY Times (Sept 10, 2009), online at http://thecaucus.blogs.nytimes.com/2009/09/10/senate-confirms-regulatory-chief (visited Nov 15, 2009) (noting that Sunstein was approved by a vote of 57-40 on September 10, 2009). Two prominent critics, Lisa Heinzerling and Chris Schroeder, have been appointed to positions in EPA and the Justice Department, respectively. Both Heinzerling and Schroeder have endorsed feasibility analysis. See Lisa Heinzerling, *Statutory Interpretation in the Era of OIRA*, 33 Fordham Urban L J 1097, 1097 (2006) (arguing that regulation under the Clean Water Act must be subjected to "technology-based" analysis rather than CBA); Sidney A. Shapiro and Christopher H. Schroeder, *Beyond Cost-Benefit Analysis: A Pragmatic Reorientation*, 32 Harv Envir L Rev 433, 479–80 (2008) (arguing that a pragmatic approach to regulatory analysis is more consistent with technology-based regulation than a "CBA-centered" approach, as the regulation requires "the most protection achievable by current technologies unless 'costs are disruptive or extraordinary'").

4 Occupational Safety and Health Act of 1970 § 6, Pub L No 91-596, 84 Stat 1590, 1593, codified at 29 USC § 655(b)(5).

5 Toxic Substances Control Act § 6, Pub L No 94-469, 90 Stat 2003, 2020 (1976), codified at 15 USC § 2605(c)(1).

6 See *Chevron U.S.A. Inc v NRDC*, 467 US 837, 865–66 (1984) (allowing agencies discretion in their construction of regulations when Congress, "inadvertently" or "intentionally," has left left some matters of interpretation unresolved). For an example of the Court affording an agency considerable latitude, see generally, for example, *Entergy Corp v Riverkeeper, Inc*, 129 S

In 1981, President Ronald Reagan issued an executive order requiring agencies to use CBA for major regulations.[7] His successors through President George W. Bush have issued similar orders;[8] President Barack Obama has not yet acted. The executive orders do not require agencies to use CBA in violation of statutory mandates, so their effect has been to more sharply bifurcate agency practice. Agencies applying statutes that permit them to consider costs have, since 1981, applied CBA more rigorously and systematically. Agencies applying statutes that do not permit them to compare costs and benefits, or that permit them to do so in a fashion that falls short of CBA, now report cost-benefit analyses of their regulations, but they do not follow these analyses and instead continue to use feasibility analysis to guide regulatory decisionmaking.

President Reagan's executive order unleashed an enormous literature on CBA. The debate continues to this day. Defenders argue that CBA produces better regulations, enhances transparency, and brings rigor to the regulatory process.[9] Critics argue that CBA has weak normative foundations and, in practice, forces agencies to ignore real but difficult-to-monetize regulatory benefits, resulting in underregulation of the environment, the workplace, and other domains.[10] Until

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Ct 1498 (2009) (allowing EPA to use CBA under a section of the Clean Water Act requiring the use of the "best technology available").

7 Executive Order 12291, 46 Fed Reg 13193 (1981).

8 Executive Order 12866, 58 Fed Reg 51735 (1993).

9 Richard L. Revesz and Michael A. Livermore, *Retaking Rationality: How Cost-Benefit Analysis Can Better Protect the Environment and Our Health* 12–13 (Oxford 2008) (arguing that CBA makes decisionmakers more accountable for their decisions, gives taxpayers a more accurate sense of the costs of regulation, and imposes structure on an otherwise discretionary process); Matthew D. Adler and Eric A. Posner, *New Foundations of Cost-Benefit Analysis* 100 (Harvard 2006) (comparing CBA's expected impact on overall welfare with the expected impact of other decision procedures); Robert W. Hahn, *The Economic Analysis of Regulation: A Response to the Critics*, 71 U Chi L Rev 1021, 1041–47 (2004) (arguing that CBA has advanced the "overall understanding of social policies and regulations" by providing a systematic way to compare different types of regulations and by making the process more transparent); Cass R. Sunstein, *The Cost-Benefit State: The Future of Regulatory Protection* 6–10 (ABA 2002) (arguing that CBA results in more targeted regulations, more government resistance to demands for regulation that have their foundations in emotional reactions, and more exposure of the consequences of regulation to public view); Kenneth J. Arrow, et al, *Benefit-Cost Analysis in Environmental, Health, and Safety Regulation: A Statement of Principles* 1–2 (AEI 1996), online at http://www.aei-brookings.org/admin/authorpdfs/page.php?id=203 (visited Nov 15, 2009) (encouraging the use of CBA when making major regulatory decisions or setting regulatory priorities, and arguing against statutory restrictions on its use, such as those found in the Clean Air Act).

10 David M. Driesen, Douglas A. Kysar, and Amy Sinden, *Cost-Benefit Analysis: New Foundations on Shifting Sand*, 3 Reg & Governance 48, 55–56 (2009) (criticizing the application of CBA to regulations involving the value of human life or the benefit of environmental protection rules); Frank Ackerman and Lisa Heinzerling, *Priceless: On Knowing the Price of Everything*

recently, the critics have never been very clear about what decision procedure they prefer to CBA. But feasibility analysis has become their white knight. They argue that feasibility analysis rests on a stronger normative foundation than CBA does, and is just as rigorous and transparent.[11]

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and the Value of Nothing 7–12 (New Press 2004); Frank Ackerman and Lisa Heinzerling, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 U Pa L Rev 1553, 1578–81 (2002) (arguing that CBA neglects unquantifiable health and environmental benefits of regulation and tends to overstate the costs of implementation); Steven Kelman, *Cost-Benefit Analysis: An Ethical Critique*, 5 Reg 33, 35–38 (Jan/Feb 1981) (arguing as an ethical matter that a regulation may be advisable even where its benefits do not outweigh its costs and that certain nonmarketed goods, such as human life and fresh-smelling air, should not be priced in dollar terms). A recent white paper signed by several law professors expressed concern about Cass Sunstein's appointment to OIRA because of his support for CBA and regulatory centralization. See John S. Applegate, et al, *Reinvigorating Protection of Health, Safety, and the Environment: The Choices Facing Cass Sunstein* 1 (white paper, Jan 2009), online at http://www.progressivereform.org/articles/SunsteinOIRA901.pdf (visited Nov 15, 2009) (arguing that CBA is "neither sound in theory nor useful in practice" and advocating that OIRA stop conducting centralized review of regulations).

[11] Driesen, Kysar, and Sinden, 3 Reg & Governance at 63–66 (cited in note 10) (arguing that feasibility analysis should be regarded as a welfarist procedure on par with or superior to CBA because, in addition to weighing costs, it "more comprehensively considers aspects of welfare that are central to environmental regulation" but not as amenable to quantification); Driesen, 32 BC Envir Aff L Rev at 1–3 (cited in note 1) (arguing that feasibility analysis reflects an accounting for costs and comports better with democratic theory by shifting responsibility from agencies to Congress); Ackerman and Heinzerling, *Priceless* at 205–07 (cited in note 10) (defending technology-based standards of the Clean Air Act); Lisa Heinzerling and Rena I. Steinzor, *A Perfect Storm: Mercury and the Bush Administration, Part II*, 34 Envir L Rep 10485, 10486 (2004) (arguing that EPA must employ feasibility analysis); Sidney A. Shapiro and Robert L. Glicksman, *Risk Regulation at Risk: Restoring a Pragmatic Approach* 61–65 (Stanford 2003) (arguing that the current system of regulation is more effective than CBA at "accommodating important noneconomic social values with the goal of economic efficiency"); Wendy E. Wagner, *The Triumph of Technology-Based Standards*, 2000 U Ill L Rev 83, 92–107 (arguing that feasibility analysis, in the form of technology-based standards, satisfies a "moral imperative" of environmental law and makes regulations more expeditious to promulgate, and more enforceable, predictable, even-handed, and adaptable); Thomas O. McGarity, *Reinventing Rationality: The Role of Regulatory Analysis in the Federal Bureaucracy* 142–59, 305 (Cambridge 1991) (arguing that CBA presents intractable valuation problems that may conceal biases and concluding that CBA alone cannot resolve policy questions in most regulatory contexts); Sidney A. Shapiro and Thomas O. McGarity, *Not So Paradoxical: The Rationale For Technology-Based Regulation*, 1991 Duke L J 729, 739–44 (criticizing the distributional consequences of implementing cost-benefit standards, and noting that "the cost-benefit approach creates too many uncompensated losers when compared with technology-based approaches"); Frank B. Cross, *Environmentally Induced Cancer and the Law* 90–92 (Quorum 1989) (arguing that feasibility analysis is more certain than CBA, since it does not rely so heavily on risk assessment, and less morally problematic, because it does not attempt to place a value on human life). See also Shapiro and Schroeder, 32 Harv Envir L Rev at 483–84 (cited in note 3) (proposing a type of "pragmatic" risk analysis largely consistent with feasibility analysis); Daniel A. Farber, *Eco-Pragmatism: Making Sensible Environmental Decisions in an Uncertain World* 116 (Chicago 1999) (proposing a reconciliation of CBA and feasibility analysis that combines elements of each).

There is an earlier literature from the 1980s and 1990s that criticized environmental regulation that relied on technology-based standards—a quasi-synonym for feasibility analysis. However, this literature had a different focus from the current debate.[12] Then, critics argued that EPA's regulations were costly and inefficient because command-and-control regulation fails to exploit market incentives.[13] The criticism led to proposals that cap-and-trade systems and similar market-based mechanisms be used,[14] and to endorsement in some quarters of CBA.[15] But the critics never addressed feasibility analysis on its own terms. It may well have been that EPA never applied the test appropriately rather than that the test was flawed.

Part of the problem was no doubt that the feasibility test had never been given a clear account. What does it mean to say that an agency must reduce a risk to the point at which "widespread plant closings" occur? Can this term be given a precise definition? And why exactly are widespread plant closings to be avoided? These questions have not received clear answers, with the result that the debate has proceeded in a cloud of ambiguity. We try to advance the debate by uncovering the analytic structure of feasibility analysis and its normative premises, and then criticizing them.[16] Our account builds on two examples of feasibility analysis, one conducted by OSHA and the other by EPA.[17] We con-

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12 See, for example, Bruce A. Ackerman and Richard B. Stewart, *Reforming Environmental Law*, 37 Stan L Rev 1333, 1335–37, 1341–47 (1985) (criticizing "best available technology" standards, but focusing on the transaction costs involved in their administration rather than addressing flaws inherent to feasibility anaylsis).

13 Id.

14 See, for example, id at 1341–47.

15 See, for example, Stephen Breyer, *Regulation and Its Reform* 271–84 (Harvard 1982) (defending the use of CBA in regulation).

16 Others have criticized feasibility analysis, usually on the grounds that it is vague. See, for example, Sunstein, *The Cost-Benefit State* at 73–75 (cited in note 9). But as defenders have pointed out, all decision procedures, including CBA, have this problem, at least to some extent. Other critics have addressed the record of the use of feasibility analysis by agencies. See, for example, Ackerman and Stewart, 37 Stan L Rev at 1334–35 (cited in note 12) (noting that the regulation systems in place have resulted in the waste of billions of dollars each year). We focus instead on its analytic and normative foundations. Although a number of sources have touched on this issue, none has been comprehensive. We cite them as appropriate below.

17 These examples are only two of many that have been issued over the years. We have not tried to do a survey, but we chose these two because they seem representative and are relatively clear. After the EPA regulation we discuss was issued, EPA issued guidelines on its regulatory approach, including its use of feasibility analysis. These guidelines are consistent with the approach that it used in the regulation that we examine, and subsequent regulations seem largely consistent with it as well. See generally EPA, *Guidelines for Preparing Economic Analyses* (Sept 2000), online at http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html/$file/Guidelines.pdf (visited Nov 15, 2009).

clude that feasibility analysis lacks a normative justification and should have no place in government regulation.

I. LEGAL BACKGROUND

Feasibility analysis is not a single statutory standard, nor is it a single, consistent methodology. Rather, feasibility analysis is a term that encompasses a spectrum of agency practices taken under the ambit of a wide variety of statutory mandates. All of these statutes by their plain terms appear to demand some type of stringent health or safety regulation that does not rely on calculations of costs and benefits. In the Parts that follow, we describe the legal apparatus surrounding feasibility analysis in some detail.

A. Statutory Framework

When Congress regulates an environmental or workplace hazard, it frequently does so on a technological or results-oriented basis. That is, Congress often mandates the installation of a particular level of pollution-controlling technology, or more generally it requires that an agency achieve a particular level of safety with respect to some hazard. The level of technology or the result sought is frequently described in vague terms by Congress, leaving the agency with ample interpretive authority. Nonetheless, many of these statutory mandates share a common feature: they require the most protective or restrictive level of pollution or hazard control possible, subject only to modest limitations. For instance, one section of the Clean Air Act requires that polluters install the "best available control technology" with the goal of achieving the "maximum degree of reduction" of regulated air pollutants.[18] At the same time, these statutes do not explicitly require a comparison of costs and benefits. Rather, regulated industries are directed to install a type of technology or achieve a level of safety whose benefits are left unspecified. The limitations placed on the technology are occasionally couched in terms of costs,[19] but are more frequently left in more demanding (if vaguer) terms—for instance, "best *available* technology."[20]

Scholars have argued that these statutes call for "feasibility analysis," a term borrowed from the Occupational Safety and Health Act,

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18 42 USC § 7475(a)(4). See also 42 USC § 7479(3).

19 See, for example, 42 USC § 7412(d)(2) (mandating the "maximum degree of reduction . . . achievable . . . taking into consideration the cost of achieving such emission reduction . . . .").

20 See, for example, 42 USC § 4916(a)(1) (mandating that noise emission standards for railroads be based on the application of the "best available technology" for reducing noise emission).

which protects workplace safety "to the extent feasible."[21] According to these scholars, an agency regulating under one of these statutory provisions should not engage in CBA. Rather, it should examine only whether a particular level of regulation is technologically and economically feasible: whether the technological means exist to implement the regulation, and whether the regulation will cause significant economic harm to the regulated industry, to the point of triggering "widespread plant shutdowns."[22] Only regulations that would threaten to bankrupt a *large segment* of the affected industry are barred under feasibility analysis.[23] According to this conception of feasibility analysis, an agency cannot select a less stringent regulatory standard (among several options) when the more stringent option would not lead to plant shutdowns.[24] It is thus unsurprising that feasibility analysis has generally been regarded as favoring strong regulation, in comparison to CBA.

At the same time, the general heading of "feasibility analysis" masks wide variation among both statutory mandates and actual agency practices. In later Parts we examine the ways in which OSHA and EPA actually perform feasibility analysis. Here, we canvass several of the most important statutory phrases that are understood to trigger some version of feasibility analysis. In order to provide a standard for comparison, we also highlight several statutes that appear to call for something closer to CBA.

1. Workplace safety.

The term "feasibility analysis" derives from the Occupational Safety and Health Act, which instructs OSHA to set the standard "which most adequately assures, to the extent feasible . . . that no employee will suffer material impairment of health or functional capaci-

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21 29 USC § 655(b)(5).

22 Driesen, 32 BC Envir Aff L Rev at 2–3 (cited in note 1). See also Shapiro and Schroeder, 32 Harv Envir L Rev at 483–84 (cited in note 3); Heinzerling, 33 Fordham Urban L J at 1102 n 37 (cited in note 3).

23 *United Steelworkers of America v Marshall*, 647 F2d 1189, 1272 (DC Cir 1980) ("[A]s for economic feasibility, OSHA must construct a reasonable estimate of compliance costs and demonstrate a reasonable likelihood that these costs will not threaten the existence or competitive structure of an industry, even if it does portend disaster for some marginal firms.").

24 *Public Citizen Health Research Group v Tyson*, 796 F2d 1479, 1505–06 (DC Cir 1986) (holding that OSHA's guiding statute compels it to act if a regulation would reduce a significant health risk and would be feasible to implement and finding that OSHA had failed to support its decision not to issue a regulatory limitation on that basis); Driesen, 32 BC Envir Aff L Rev at 17 (cited in note 1) (noting that an agency cannot "forego an environmental improvement with costs too insignificant to produce closures").

ty."[25] That standard must be "reasonably necessary or appropriate to provide safe or healthful employment and places of employment."[26] On its face, "most adequately assures, to the extent feasible" reads as though the full extent of costs and benefits are largely irrelevant. The regulator is to require a safety measure, as long as the measure is "feasible." "[R]easonably necessary … to provide safe or healthful employment" appears to incorporate some measure of the benefits provided, but without any directive to balance them against costs.

Similarly, the Mine Act instructs the Secretary of Labor to "set standards which most adequately assure on the basis of the best available evidence that no miner will suffer material impairment of health or functional capacity."[27] That section notes that "[i]n addition to the attainment of the highest degree of health and safety protection for the miner, other considerations shall be … the feasibility of the standards."[28] This statute, like the safety and health statute, makes no mention of compliance costs.

2. Environmental protection.

Environmental statutes involve an extensive array of verbal formulations, some of which appear to trigger feasibility analysis and others of which call for an approach more akin to CBA.

a) Best available technology. The Clean Air Act's National Ambient Air Quality Standards and Prevention of Significant Deterioration programs instruct EPA to require that each new pollution-emitting facility employ "the best available control technology for each pollutant."[29] The Clean Air Act elsewhere defines "best available control technology" to mean a technology that will provide "the maximum degree of reduction of each pollutant … which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility."[30] Similarly, the New Source provisions of the Clean Air Act set as EPA's regulatory goal "the degree of emission

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25 29 USC § 655(b)(5) (requiring "the highest degree of health and safety protection for the employee," taking into account "available scientific data," "the feasibility of the standards," and "experience gained" under existing health and safety laws).

26 29 USC § 652(8).

27 Federal Mine Safety and Health Act of 1977 § 201, Pub L No 95-164, 91 Stat 1290, 1291, codified at 30 USC § 811(a)(6)(A).

28 Id.

29 42 USC § 7475(a)(4) (putting forward requirements for the construction of new major emitting facilities).

30 42 USC § 7479(3).

limitation achievable through the application of the best system of emission reduction . . . (taking into account the cost of achieving such reduction . . .)."[31] Here, as with OSHA, the objective is stated in categorical terms ("maximum degree of reduction"), and while the statute references economic costs, regulation is subject only to the limitation that those reductions be "achievable." As proponents of feasibility analysis have noted, the most straightforward way of achieving the maximum degree of reduction of a particular pollutant is to simply close down every factory that creates it.[32] In that sense, proponents of feasibility analysis view the principle that regulation must not trigger widespread bankruptcies as a concession to practical economic realities.[33]

Similarly, portions of the Clean Water Act require the use of "the best technology available for minimizing adverse environmental impact,"[34] while others "require application of the best available technology economically achievable for [each applicable] category or class"[35] or the "greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology."[36] Like the Clean Air Act, however, these statutory provisions are not silent on matters of costs. When regulating pursuant to these statutes, EPA must "take into consideration the cost of achieving" reductions in water pollution.[37] At the same time, categorical insistence upon the "best available technology," subject only to the consideration that it be "economically achievable" (or that the agency merely "consider" costs), has led sympathetic observers to conclude that the statute demands feasibility analysis, rather than CBA.[38]

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31 42 USC § 7411(a)(1).

32 *Union Electric Co v EPA*, 427 US 246, 265 & n 14 (1976) (remarking that "[i]n a literal sense, of course, no plan is infeasible since offending sources always have the option of shutting down" if the proposed regulation is too stringent); *AFL-CIO v Brennan*, 530 F2d 109, 118 n 26, 121 (3d Cir 1975) (discussing the prohibitive costs of the "no hands in dies" standard for mechanical power presses, and stating that while "[u]ndoubtably the most certain way to eliminate industrial hazards is to eliminate industry," the Occupational Safety and Health Act was intended to improve working conditions, not eliminate them altogether); Driesen, 32 BC Envir Aff L Rev at 10 (cited in note 1).

33 See, for example, Driesen, 32 BC Envir Aff L Rev at 10 (cited in note 1).

34 Federal Water Pollution Control Act Amendments of 1972 ("Clean Water Act"), Pub L No 92-500, 86 Stat 816, 876, codified at 33 USC § 1326(b).

35 33 USC § 1311(b)(2)(A)(i).

36 33 USC § 1316(a)(1).

37 33 USC § 1316(b)(1)(B).

38 See, for example, Heinzerling, 33 Fordham Urban L J at 1106–13 (cited in note 3) (arguing that the plain meaning of the Clean Water Act unambiguously requires the application of feasibility analysis).

These formulations are of course not identical; it may be that in differentiating between the "best available control technology" and the "best available *demonstrated* control technology" Congress meant to define some important difference in treatment. However, despite these variations, EPA has largely behaved as if these statutory standards called for similar types and levels of regulation.[39]

b) "Reasonably available" and "best practicable" technology. Not all environmental statutes are so strict. Several provisions of the Clean Air Act and Clean Water Act call for a type of review similar to CBA or set a more lenient regulatory standard than those listed above. For instance, the section of the Clean Air Act governing "non-attainment areas"—those parts of the country that have not met EPA's ambient air quality standards—calls for "the implementation of all *reasonably available* control measures," including "*reasonably available* control technology."[40] Similarly, a general provision of the Clean Water Act governing pollutant discharges calls for "the application of the *best practicable* control technology currently available."[41] In determining what technology to classify as the "best practicable," EPA is expected to consider "the total cost of application of technology *in relation to* the effluent reduction benefits to be achieved from such application."[42] Another section of the Clean Water Act directs EPA to "require application of the *best conventional* pollutant control technology,"[43] and in so doing to "include consideration of the reasonableness of the relationship between the costs of attaining a reduction in effluents and the effluent reduction benefits derived."[44]

The Clean Water Act's admonition to consider the reasonableness of the relationship between costs and benefits in the course of choosing the "best practicable" technology is best understood as calling for CBA. Other readings of the statute are certainly conceivable, but even opponents of CBA have admitted that this is the best interpretation of that provision.[45] The Clean Air Act, for its part, stops short

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39 See *Entergy Corp v Riverkeeper, Inc*, 129 S Ct 1498, 1505–09 (2009).

40 42 USC § 7502(c)(1) (emphasis added).

41 33 USC § 1311(b)(1)(A)(i) (emphasis added).

42 33 USC § 1314(b)(1)(B) (emphasis added).

43 33 USC § 1311(b)(2)(E) (emphasis added) (regulating the emission of pollutants classified as biological oxygen demanding, suspended solids, fecal coliform, and pH).

44 33 USC § 1314(b)(4)(B) (detailing factors to consider when establishing the "best conventional pollutant control technology measures and practices").

45 Driesen, 32 BC Envir Aff L Rev at 22–25 (cited in note 1) (conceding that the Clean Water Act imports CBA but arguing that its construction does not reflect such analysis "as conventionally understood" because it refuses to quantify the benefit to society from effluent limitations).

of explicitly requiring CBA. Nonetheless, the use of "reasonableness" as a touchstone seems to beg for a comparison of costs and benefits, just as it does in other areas of law.[46]

We summarize the most important of these statutes in Table A1 in the Appendix.

B. OIRA, Executive Order 12866, and CBA

The statutes described above are not the only legal constraint imposed upon OSHA and EPA. Under Executive Order 12866, each federal agency must conduct a cost-benefit analysis of any proposed regulation with an expected economic impact greater than $100 million.[47] These cost-benefit analyses are reviewed by the Office of Information and Regulatory Affairs (OIRA), which has the authority to reject the regulation or return it to the agency for further consideration.[48] However, this constraint is entirely internal to the administration: no outside group can sue an agency for failing to comply with an executive order, and of course no executive order can override a statutory mandate.[49]

Agencies thus find themselves whipsawed. In a variety of cases, EPA must regulate under the terms of a statute that appears to call for feasibility analysis and an executive order that demands CBA. If EPA opts for a stringent regulation that may produce more costs than benefits, it risks having the regulation rejected by OIRA; if EPA chooses a

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46 See, for example, *United States v Carroll Towing Co*, 159 F2d 169, 173–74 (2d Cir 1949) (analyzing the "reasonable person" standard in tort law by cost-benefit balancing); *People v Hall*, 999 P2d 207, 217–20 (Colo 2000) (analyzing the "reasonable person" standard in criminal law by cost-benefit balancing).

47 Executive Order 12866 § 6(a)(3)(C), 58 Fed Reg 51735, 51741 (1993) (describing the required CBA); Executive Order 12866 § 3(f)(1), 58 Fed Reg 51735, 51738 (1993) (specifying the categories of regulations for which analyses must be conducted).

48 Executive Order 12866 § 6(b), 58 Fed Reg 51735, 51742–43 (1993). See also Heinzerling, 33 Fordham Urban L J at 1100 & nn 16–17 (cited in note 3) (discussing OIRA's increasing use of its oversight authority under Executive Order 12866).

49 The executive orders state as much themselves. Executive Order 12866 § 1(a), 58 Fed Reg 51735, 51735 (1993) ("[I]n choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits . . . unless a statute requires another regulatory approach."); Executive Order 12866 § 9, 58 Fed Reg 51735, 51743 (1993) ("Nothing in this order shall be construed as displacing the agencies' authority or responsibilities, as authorized by law."); Executive Order 12866 § 10, 58 Fed Reg 51735, 51743 (1993):

> Nothing in this Executive order shall affect any otherwise available judicial review of agency action. This Executive order is intended only to improve the internal management of the Federal Government and does not create any right or benefit, substantive or procedural, enforceable at law or equity by a party against the United States, its agencies or instrumentalities, its officers or employees, or any other person.

different regulation that maximizes net benefits, it risks having that regulation challenged (by outside groups) as incompatible with the agency's statutory mandate. In theory, of course, OIRA's preference for CBA should give way when an alternate approach is mandated by statute. In reality, however, OIRA and EPA may have different interpretations of what, precisely, a statute demands. In addition, EPA may have some amount of interpretive freedom under the familiar *Chevron* deference standard,[50] which may lead OIRA to push the EPA to exercise that interpretive authority by regulating pursuant to CBA. Tension between Executive Order 12866 and the plain language of many statutes is unavoidable.

C. Judicial Interpretations

OSHA and the EPA have promulgated hundreds of regulations under the feasibility-based statutes described above, and challenges to those regulations have reached the appellate courts on dozens of occasions. Nearly every case involves either a claim by an environmental or labor group that the agency has not regulated strictly enough, or a claim by a private firm or industry group that it has regulated too strictly. The latter is frequently accompanied by an argument that the agency improperly failed to employ CBA; the former often involves a claim that the agency illegally employed CBA. From this voluminous record of judicial review, two important conclusions emerge.[51]

First, the federal courts—led by the Supreme Court—will not force agencies to use CBA in regulating when the governing statute appears to trigger feasibility analysis. For instance, in *American Textile Manufacturers Institute, Inc v Donovan*,[52] the Court held that "to the extent feasible" language in the Occupational Safety and Health Act did not require OSHA to conduct a cost-benefit analysis, validating a regulation that would not have led to widespread financial problems but might also not have passed a cost-benefit test.[53] In similar fashion,

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50 See *Chevron U.S.A. Inc v NRDC*, 467 US 837, 865–66 (1984).

51 Many of these cases take the form of "arbitrary and capricious" challenges to the rationality behind the agency's decision. See *Motor Vehicle Manufacturers Association of the United States, Inc v State Farm Mutual Insurance Co*, 463 US 29, 42–43 (1983) (announcing the standard for "arbitrary and capricious" review). These types of challenges are necessarily highly fact-specific, and we do not dwell on their minutiae here. Rather, we are concerned with how the courts have treated arguments that agencies should or should not be using CBA in the presence of statutes that appear to call for feasibility analysis.

52 452 US 490 (1981).

53 Id at 509.

courts of appeals have repeatedly upheld OSHA[54] and EPA[55] regulations governed by "feasibility" or "best available technology" statutory language against arguments by industry groups that those regulations are not cost-benefit justified. Courts have stated repeatedly that those statutes do not obligate OSHA and EPA to conduct cost-benefit analyses, and that a failure to perform such analysis does not render the resulting regulations legally infirm.

Second, EPA—and likely OSHA as well—is permitted to employ CBA in lieu of feasibility analysis as an exercise of its discretion under *Chevron*. This appears to be the case even for the most stringent of statutory standards. In *Entergy Corp v Riverkeeper, Inc*,[56] decided in April 2009, the Supreme Court announced that EPA could use CBA when regulating under a section of the Clean Water Act that mandates use of the "*best technology available* for minimizing adverse environmental impact."[57] The Court held that the agency's decision was reasonable under *Chevron*,[58] despite classifying the "best technology available" provision as the most stringent statutory standard con-

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54 *Public Citizen Health Research Group v Department of Labor*, 557 F3d 165, 186 (3d Cir 2009) (upholding a hexavalent chromium exposure standard against a challenge that the agency should have performed a type of CBA); *Kennecott Greens Creek Mining Co v Mine Safety and Health Administration*, 476 F3d 946, 960 (DC Cir 2007) (upholding a diesel particulate matter exposure limit against a challenge that an agency should have performed a type of CBA); *American Iron and Steel Institute v OSHA*, 939 F2d 975, 986, 992, 999, 1007 (DC Cir 1991) (upholding an airborne lead standard as economically and technologically feasible against challenges that the agency failed to properly account for industry compliance costs).

55 *Alaska Department of Environmental Conservation v EPA*, 540 US 461, 497–500 (2004) (upholding the applicability of an EPA nitrous oxide regulation under a "best available control technology" standard); *Texas Oil & Gas Association v EPA*, 161 F3d 923, 936 (5th Cir 1998) ("In applying the BAT standard, the EPA is not obligated to evaluate the reasonableness of the relationship between costs and benefits."); *American Paper Institute v Train*, 543 F2d 328, 354 (DC Cir 1976) (holding that there was no requirement that EPA balance costs and benefits under a "best available demonstrated control technology" standard); Heinzerling, 33 Fordham Urban L J at 1102 n 32 (cited in note 3) (collecting cases addressing the argument that technology-based regulations must be subjected to CBA).

56 129 S Ct 1498 (2009).

57 Id at 1505, 1510 (interpreting 33 USC § 1326(b)).

58 Id at 1508–10. It is worth noting that this portion of the Court's opinion garnered six votes, with Justice Stephen Breyer concurring. Id at 1512 (Breyer concurring) (agreeing that the relevant statutory language authorizes EPA to conduct CBA). The Court specifically approved of EPA's decision to "avoid extreme disparities between costs and benefits," and it left open the possibility that "[o]ther arguments may be available to preclude such a rigorous form of cost-benefit analysis as that . . . which required weighing the total cost of application of technology against the . . . benefits to be achieved." Id at 1508–09 (majority) (quotation marks omitted). Nonetheless, the Court stopped short of suggesting that it believes such arguments exist. It seems reasonable to assume that the Court would not have disapproved straightforward CBA, much less CBA with a multiplier. See note 211 and accompanying text.

tained within the Clean Water Act.[59] And perhaps not surprisingly, the Court also suggested that (less stringent) statutory sections requiring EPA to select the "best available technology economically achievable" and "best available demonstrated control technology" might similarly allow for regulation based on CBA.[60]

In fact, so far as we are aware, only one court of appeals has ever rejected an agency decision to employ CBA as exceeding that agency's interpretive authority under *Chevron*—the Second Circuit in *Entergy*, which was promptly reversed by the Supreme Court. Courts of appeals have occasionally used strong language rejecting CBA as "incompatible" with feasibility-based statutory provisions,[61] but those statements always came in the context of an agency decision not to perform CBA. Given the deference to agency interpretation shown by the Court in *Entergy*, it is difficult to believe that many "feasibility"-based statutory sections will prohibit agencies from regulating on the basis of CBA. Going forward, agencies may simply have the option of selecting between CBA and feasibility analysis, with courts willing to approve either methodology.[62]

II. FEASIBILITY ANALYSIS IN PRACTICE

A. OSHA's Chromium Regulation

1. Background and health effects.

Hexavalent chromium, Cr(VI), is a predominantly manmade compound[63] used in approximately thirty major industries.[64] It is used to produce alloys, such as stainless steel, which are then often employed in welding or to form surface protection layers for plate metal and plastic substrates.[65] Cr(VI) compounds are also used as "ingre-

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59 Id at 1507.

60 *Entergy*, 129 S Ct at 1507 ("It is not obvious to us that [the proposition that CBA is precluded under the Best Available Technology Economically Achievable and Best Available Demonstrated Control Technology tests] is correct, but we need not pursue that point.").

61 See, for example, *Public Citizen*, 557 F3d at 177 ("We note that the Supreme Court has conclusively ruled that economic feasibility does not involve a cost-benefit analysis.").

62 But see *Entergy*, 129 S Ct at 1518 (Stevens dissenting). It is beyond the scope of this Article to determine whether this statutory interpretation is correct in each and every instance; our argument is principally that, if given the option, agencies should prefer CBA.

63 Office of Safety and Health Administration, Occupational Exposure to Hexavalent Chromium, 71 Fed Reg 10100, 10104 (2006), codified at 29 CFR §§ 1910, 1915, 1917, 1918, 1929.

64 Id at 10108. OSHA estimated that Cr(VI) is used by approximately 52,000 individual businesses and facilities. Id at 10227.

65 Id at 10108.

dients and catalysts" in the production of pigments and chemicals.[66] However, Cr(VI) is known to cause lung cancer in addition to lesser ailments such as asthma, dermatitis, nasal irritation, and gastrointestinal ulcers.[67]

As of 2004, OSHA regulations set a maximum personal exposure level (PEL) for workers dealing with Cr(VI) of 52 $\mu g/m^3$.[68] This meant that workers could be exposed to a concentration of chromium in the air they were breathing equal to 52 micrograms per cubic meter. OSHA determined that lowering the allowable level of chromium exposure could prevent as many as 300 deaths per year.[69] This triggered OSHA's statutory obligation to "assure[], to the extent feasible . . . that no employee will suffer material impairment of health or functional capacity."[70] Accordingly, OSHA initiated rulemaking proceedings and set out to amend the existing standard.[71]

2. Cost-benefit analysis.

As part of the regulatory process (and to comply with Executive Order 12866), OSHA undertook a cost-benefit analysis in which it examined a variety of possible regulatory standards ranging from 0.25 $\mu g/m^3$ to 20 $\mu g/m^3$.[72] OSHA estimated the number of fatal and nonfatal cancers that could be prevented by imposing each of these exposure limits. (Other than a small additive factor for cases of dermatitis,[73] OSHA did not include any other non-cancer illnesses due to a lack of data on the likelihood of those conditions and their costs.[74]) OSHA

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66 Id.

67 71 Fed Reg at 10108, 10166, 10174 (cited in note 63). Studies show that in addition to inhalation, "direct hand-to-nose contact" can also result in these symptoms. Id at 10170. In the course of examining the threat to worker health posed by Cr(VI), OSHA determined that a "linear relative risk model"—according to which the health risk posed by Cr(VI) exposure scales linearly with the amount to which a worker is exposed—best fit the available data. Id at 10220 (rejecting simultaneously a threshold dose-response approach to estimating cancer risk).

68 Office of Safety and Health Administration, Occupational Exposure to Hexavalent Chromium, 69 Fed Reg 59306, 59448–49 (2004) (proposed rule) (noting this to be the prevailing standard).

69 71 Fed Reg at 10224 (cited in note 63).

70 29 USC § 655(b)(5).

71 The rule is set out in 71 Fed Reg at 10100 (cited in note 63) (reducing the exposure limit from 52 $\mu g/m^3$ of Cr(VI) to 5 $\mu g/m^3$), and was upheld by the Third Circuit, see *Public Citizen Health Research Group v Department of Labor*, 557 F3d 165, 180–82 (3d Cir 2009).

72 71 Fed Reg at 10307 (cited in note 63).

73 Id at 10305, 10307 (relying on data from the National Institute for Occupational Safety and Health). Medical costs per case were estimated to be $119 and secondary costs $1,239. Id at 10307. Based on an incidence of 0.2 percent to 1 percent, OSHA estimated 418 to 2,089 cases of dermatitis annually and presumed a 50 percent reduction to 209 to 1,045 cases. Id.

74 Id at 10307.

then monetized the benefits of avoiding these cancers using the EPA standard valuation of $6.8 million per life saved and a range of values for nonfatal cancers extending from $188,502 per cancer avoided (the medical cost of treating such an illness) to $4 million (the best estimate of individuals' willingness to pay to avoid a nonfatal case).[75] OSHA then discounted the projected annual monetized benefits to present value, performing one calculation using a rate of 3 percent and another calculation with a 7 percent discount rate.[76] Table 1 displays the results of OSHA's cost-benefit analysis.

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75 Id at 10305.

76 71 Fed Reg at 10306 table VIII-11 (cited in note 63). The Office of Management and Budget (OMB) currently recommends that agencies perform CBA using discount rates of both 3 percent and 7 percent. See Office of Management and Budget, Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* 8 (Oct 29, 1992), available at 57 Fed Reg 53519, 53523–24 (1992); Office of Management and Budget, Circular A-4, *Regulatory Analysis* 33–34 (Sept 17, 2003), online at http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf (visited Nov 15, 2009).

TABLE 1: OSHA CR(VI) COST-BENEFIT ANALYSIS

Exposure Limit	0.25 μg/m^3	0.5 μg/m^3	1 μg/m^3	5 μg/m^3	10 μg/m^3	20 μg/m^3
Fatal Cancers Avoided	66–258	62–243	58–224	40–145	27–95	15–47
Nonfatal Cancers Avoided	9–35	8–33	8–31	5–20	4–13	2–6
Monetized Benefits (7 percent discount rate)	$60–891	$57–841	$53–776	$36–504	$25–328	$13–162
Monetized Benefits (3 percent discount rate)	$189–1,587	$176–1,496	$164–1,382	$112–896	$77–584	$41–288
Total Costs (3 percent discount rate)	$1,762	$996	$552	$273	$165	$109
Total Costs (7 percent discount rate)	$1,815	$1,033	$570	$282	$170	$112
Median Net Benefit (7 percent discount rate)	–$1,340	–$584	–$156	–$12	$6	–$24
Median Net Benefit (3 percent discount rate)	–$874	–$160	$221	$231	$165	$56

Source: 71 Fed Reg at 10304 table VIII-10, 10306 table VIII-11, 10308 table VIII-12 (cited in note 63).
Note: Dollar figures refer to millions of 2003 dollars.

As Table 1 shows, there is a great deal of uncertainty surrounding the potential costs and benefits of chromium regulation. Many of the high and low estimates of benefits are more than an order of magnitude apart, and the choice of discount rate affected the calculations of benefits by approximately a factor of two. (This is in addition to the fact that the cost-benefit analysis incorporates only cancers and dermatitis and excludes other illnesses.) The cost-benefit analysis nevertheless provides a significant amount of information. While the health consequences of chromium exposure scale approximately linearly, the costs of complying with increasingly stringent standards clearly do not. Rather, they increase exponentially as the regulatory standard becomes stricter. For instance, the cost to industry of complying with a 5 $\mu g/m^3$ exposure limit is $112 million greater than the cost of complying with a 10 $\mu g/m^3$ exposure limit, while the cost of complying with a 0.25 $\mu g/m^3$ limit is nearly $800 million greater than the cost of complying with a 0.5 $\mu g/m^3$ standard.

Accordingly, the 0.25 $\mu g/m^3$ standard is not cost-benefit justified under any set of assumptions, while the 0.5 $\mu g/m^3$ standard is not cost-benefit justified under any but the most optimistic assumptions. On the other hand, both the 5 $\mu g/m^3$ and 10 $\mu g/m^3$ standards would produce greater net benefits than the 20 $\mu g/m^3$ standard under nearly any set of assumptions. OSHA's cost-benefit analysis is thus helpful in narrowing the range of useful possibilities, even taking into account the high degree of uncertainty involved. The socially optimal exposure limit for Cr(VI) likely lies somewhere within the range of 1 $\mu g/m^3$ to 10 $\mu g/m^3$.

In its original notice of proposed rulemaking, OSHA suggested an exposure limit of 1 $\mu g/m^3$.[77] When OSHA eventually published the final rule, the agency had revised its regulatory goals and settled on an exposure limit of 5 $\mu g/m^3$.[78] OSHA never fully explained the reasons for this change, and the ultimate rationale behind it remains unclear. However, OSHA may have been under pressure from several fronts: it received a number of negative comments from potentially regulated parties about the proposed 1 $\mu g/m^3$ standard;[79] a preliminary feasibility analysis showed that such a stringent limitation might put several industries under significant pressure (more on this later);[80] and, in addition, OSHA may have been influenced by the cost-benefit analysis outlined above.

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77 69 Fed Reg at 59448–49 (cited in note 68).

78 71 Fed Reg at 10378 (cited in note 63) (amending 29 CFR § 1910.1026).

79 See id at 10333–34.

80 See id at 10301–02.

3. Feasibility analysis.

Before promulgating a regulation setting a new exposure limit of 5 μg/m^3, OSHA was of course required to conduct a feasibility analysis. The Occupational Safety and Health Act does not define "feasibility"—the specifics are left to the agency. Here, OSHA attached a particular set of numerical values to that statutory standard. OSHA policy required that in order for a regulation to be considered economically feasible—in the sense of avoiding widespread plant closings—it must not cause revenue within an industry to decline by more than 1 percent or profits to decline by more than 10 percent.[81] (We refer to this as OSHA's "1 percent/10 percent rule.") However, OSHA reserved the right to except industries from this standard under certain circumstances—to impose regulations even though projected revenue or profit declines would exceed the 1 percent/10 percent thresholds.

In order to conduct its feasibility analysis, OSHA surveyed 250 potentially affected industries.[82] The surveys asked businesses whether they used Cr(VI) as part of normal business operations and, if so, what proportion of those operations involved potential chromium exposure. Pursuant to these surveys, OSHA identified nine industries where the costs of complying with the proposed 5 μg/m^3 standard were expected to exceed 1 percent of revenues, and an additional twenty-two where costs were expected to exceed 10 percent of profits (but revenue loss would be less than 1 percent).[83] We list these industries and their projected profit and revenue losses in Table A2 in the Appendix. However, OSHA ascertained that nineteen of the thirty-one substantially affected industries were "plating or welding application groups in which actual plating or welding are exceedingly rare."[84] As a result, OSHA concluded that it would be improper to extrapolate from the responses of one or a few businesses to the entire industry, as it typically does in the course of a feasibility analysis.[85] Either those businesses were outliers, and the chromium regulation would not significantly harm the industry, or the business may have checked

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81 Id at 10299–300.

82 The federal government classifies industries according to the North American Industry Classification System (NAICS), created by OMB to standardize the collection and analysis of industry-wide data. See 71 Fed Reg at 10271–79 table VIII-7 (cited in note 63). For details on the NAICS, see US Census Bureau, *North American Industry Classification System*, online at http://www.census.gov/eos/www/naics (visited Nov 15, 2009).

83 71 Fed Reg at 10300 (cited in note 63).

84 Id.

85 Id at 10300–01. See also id at 10281.

an incorrect box on OSHA's survey.[86] OSHA disregarded the effects of chromium regulation in those cases.[87]

That left twelve industries that OSHA conceded would be affected beyond the 1 percent/10 percent threshold.[88] Even in the face of these twelve violations of its 1 percent/10 percent rule, OSHA elected to proceed with the regulation. The agency justified its waiver of the 1 percent/10 percent standard with respect to these industries according to a variety of arguments:

- In several cases, OSHA decided that demand for the chromium-related product was highly inelastic and concluded that affected firms would be able to pass compliance costs directly along to consumers, saving the firms from closing.[89] The fact that consumers would then bear these costs was not part of the analysis.[90] OSHA also did not address foreign competition;[91] if foreign firms do not bear the cost of regulation, then domestic firms cannot pass on compliance costs to consumers.
- OSHA classified other industries—typically welding industries geared around machinery repair—as primarily "service" industries.[92] It concluded that overseas competition was not a real concern for these industries, and thus that demand was relatively inelastic.[93] This is a non sequitur; demand could certainly be elastic even without direct foreign competition.
- In other cases, OSHA concluded similarly that the products and services being produced were in high demand within the American market or constituted an irreplaceable link in a larger market chain.[94] OSHA's unstated view must have been that demand would be relatively inelastic, though here again the possibility of foreign competitors went unmentioned.
- OSHA excepted several industries on the ground that they had recently absorbed profit fluctuations or price increases greater than those expected from the new regulation.[95] The agency did

86 Id.
87 71 Fed Reg at 10300–01 (cited in note 63).
88 Id at 10301–02.
89 Id.
90 Id.
91 71 Fed Reg at 10302 (cited in note 63).
92 Id at 10301–02.
93 Id at 10302.
94 Id at 10301–02.
95 71 Fed Reg at 10300–01 (cited in note 63).

not account for the fact that fluctuations in profits are not the same as guaranteed declines in profits.

- Finally, OSHA excepted several other industries because alternatives to Cr(VI) or cheaper emission control technologies existed and could be easily substituted.[96] This rationale amounts to a claim that costs were simply not as high as OSHA had estimated in its own feasibility analysis.

We summarize these explanations, as applied to the relevant industries, in Table A2 of the Appendix, and we provide a sampling of them here.

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96 Id at 10302.

TABLE 2: SELECTED RESULTS OF OSHA'S FEASIBILITY ANALYSIS

Industry	Compliance Costs as a Percentage of Revenue	Compliance Costs as a Percentage of Profits	Explanation of Deviation from Screening
Electroplating—General Industry			
Electroplating, Plating, Polishing Anodizing, and Coloring Services (NAICS 332813)	1.24%	30.15%	Industry sells service not product, so overseas competition should not be strong. Electroplating is "essential to the manufacture of most plated products," implying that demand is unlikely to decrease. Industry experienced and survived profit variation of up to 49 percent in single year. The 1.24 percent price increase is "significantly less than the average annual increase in price." Demand is inelastic because plating is just a component of product's total cost (less than 0.5 percent).
Welding—Construction Industry (Stainless Steel)			
Building, Developing, and General Contracting; Heavy Construction; Special Trade Contractors (NAICS 233, 234, 235)	0.92%	22.33%	Passing costs on would only increase price 0.92 percent and steel prices have varied more than 10 percent a year without affecting the industry.
Painting—General Industry			
Used Car Dealers (NAICS 441120)	0.41%	33.66%	Cr(VI) alternatives already exist, the use of Cr(VI) is only a small portion of the actual business, and demand is probably fairly inelastic.
Automotive Body, Paint, and Interior Repair and Maintenance (NAICS 811121)	1.50%	39.16%	Cr(VI) alternatives are already developed, the use of Cr(VI) is only a small portion of the actual business, and demand is probably fairly inelastic.
Chromium Catalyst Producers			
All Other Basic Inorganic Chemical Manufacturers (NAICS 325188)	0.80%	27.14%	Short-term demand is relatively inelastic since most companies would need major new investments to shift away from CR(VI) catalysts.

Source: 71 Fed Reg at 10272–80 table VII-7 (cited in note 63) (data); 71 Fed Reg at 10301–02 (cited in note 63) (explanation).

As an initial matter, it is possible to draw several conclusions from the manner in which OSHA conducted this feasibility analysis. First, OSHA's stated 1 percent/10 percent rule operated as only a weak constraint. OSHA overrode its general rule in a dozen instances, including several cases in which industries were expected to suffer profit losses greater than 20 percent. These deviations would seem a great deal more arbitrary were it not for the arbitrariness of the 1 percent/10 percent rule itself. OSHA made no serious attempt to justify that standard, nor—more importantly—did it tie it to the DC Circuit's standard for feasibility: that the regulation not threaten "the existence or competitive structure of an industry."[97] The ease with which OSHA accepted multiple deviations from its 1 percent/10 percent rule seems to imply that the agency did not view its own standard as a constraint.

Second, OSHA's exceptions to the 1 percent/10 percent rule are neither well reasoned nor well documented. OSHA provides little explanation for its broad conclusions about major industries, and (as noted above[98]) at certain points its claims seem to skip over important logical links. This is in addition to the fact that many of OSHA's rationales—perhaps all of them—actually amounted to claims that profits in an industry *would not* decrease by the proportion OSHA expected. OSHA's claim that it had *excepted* industries from the 1 percent/10 percent rule is not precisely correct; in fact, OSHA simply contravened its own findings. In many cases OSHA may well be correct to adjust its own results, but the ease with which standard assessments of lost profits and lost revenues were discarded speaks poorly of the reliability of those numbers in the first place. On the whole, OSHA's exceptions have the air of post hoc rationalizations: having decided to regulate, OSHA appears to have simply done the paperwork necessary to clear a few formal obstacles.

Finally, it is entirely conceivable that OSHA's feasibility analysis led the agency to select a suboptimal level of regulation—though not for the reasons that feasibility analysis is typically criticized. Industry groups frequently attack feasibility analysis for enabling more stringent regulation than they deem appropriate.[99] Here, however, feasibility analysis may well have led OSHA to opt for too weak a regulatory standard, from a social welfare perspective. On a plausible set of as-

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97 *United Steelworkers of America v Marshall,* 647 F2d 1189, 1272 (DC Cir 1980) (requiring that EPA "construct a reasonable estimate of compliance costs" in order to demonstrate a "reasonable likelihood" that the industry's existence or structure is not put in danger).

98 See notes 89–96 and accompanying text.

99 This is in many cases a valid criticism, and one we take up in Part III.A.5.

sumptions,[100] a 1 μg/m^3 exposure limit actually produces greater net benefits than a 5 μg/m^3 exposure limit. Recall that OSHA initially considered setting the exposure limit at 1 μg/m^3 only to discard it in favor of a more relaxed standard, in part because a preliminary feasibility analysis indicated that at least one industry might suffer losses great enough to threaten its survival.[101] It is difficult to understand why one or two industries ought to hold effective veto rights over a regulation that might substantially benefit workers in numerous other segments of the economy, but feasibility analysis—at least as performed by OSHA—invites precisely this result.

B. EPA's Paper Mill Regulation

1. Background.

Pulp, paper, and paperboard mills discharge hazardous chemicals into the water and hazardous pollutants into the air. The discharges into the water sicken and kill fish and may cause harm, including cancer, to humans who eat those fish. The emissions into the air cause cancer, other diseases (such as respiratory disease), unwanted symptoms (such as headaches), and bad smells.[102] In 1998, EPA issued a new rule that revised and updated earlier rules regulating this industry pursuant to its authority under the Clean Air Act and the Clean Water Act.[103] To keep our exposition as simple as possible, we focus on the effluent limitations—the regulations governing the discharge of waste into bodies of water. These limitations were applied to mills that used a particular wood pulp production process in which wood chips are dissolved in caustic soda or sodium sulfide (the bleached papergrade kraft and soda category), and to mills that used related sulfite-based processes (the papergrade sulfite category).[104] Ninety-six such mills were in operation in the United States at the time of the regulation.[105]

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100 Those assumptions are a 3 percent discount rate and benefits near the higher end of the possible range. See Table 1.

101 See notes 77–80 and accompanying text.

102 EPA, *National Emission Standards for Hazardous Air Pollutants for Source Category: Pulp and Paper Production; Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards: Pulp, Paper, and Paperboard Category*, 63 Fed Reg 18504, 18585–87 (1998).

103 See id at 18504. The regulation was upheld by the DC Circuit. See *National Wildlife Federation v EPA*, 286 F3d 554, 557 (DC Cir 2002).

104 See Forestry Insights, *Pulp and Paper*, online at http://www.insights.co.nz/products_processes_pp.aspx (visited Nov 15, 2009).

105 63 Fed Reg at 18505 (cited in note 102).

Under the Clean Water Act, different standards apply to different types of regulated activity, depending (for example) on whether a facility existed prior to regulation or not,[106] whether discharges are direct or indirect,[107] and the nature and toxicity of the pollutant.[108] In the context of paper mill regulation, all of these possibilities arise, and hence EPA in principle was required to regulate under multiple standards—best practicable control technology currently available, best conventional pollutant control technology, best available technology economically achievable, among others—with presumably the strictest prevailing.[109] EPA considered three regulatory options under the best available technology standard, with the aim of limiting or removing chlorine from the production process, of which cancer-causing dioxin and furan are byproducts.[110] "Option A" required the mills to substitute chlorine dioxide for elemental chlorine in the production process, which reduces but does not eliminate the discharge of dioxin and furan.[111] "Option B" was a stricter rule, involving the Option A limits plus delignification (the removal of lignin, a material in wood pulp) and other restrictions on the manufacturing process.[112] The effect would be to reduce the discharge of dioxin and furan still further but not eliminate it. "Option TCF" ("totally chlorine free"), stricter still, required the complete elimination of all chlorine from the production process, which would eliminate discharge of furan and dioxin.[113]

2. Cost-benefit analysis.

Pulp mills rarely discharge waste into commercial fisheries.[114] Commercially distributed fish caught where waste is discharged are

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106 Compare, for example, 33 USC § 1311(b)(2)(A) (requiring standards for existing facilities which "require application of the best available technology economically achievable for such category or class") with 33 USC § 1316(a)(1) (requiring standards for new facilities which "reflect[ ] the greatest degree of effluent reduction . . . achievable through application of the best available demonstrated control technology").

107 See, for example, 33 USC § 1311(b)(2)(A); 33 USC § 1313(d)(1); 33 USC § 1362(14); 33 USC § 1313(d)(1).

108 See, for example, 33 USC § 1311(b)(2)(C)–(D).

109 See 63 Fed Reg at 18513–14 (cited in note 102).

110 Id at 18541–43.

111 Id at 18542 (noting that, in mills used to provide data for Option A, "kappa factors for softwood furnish averaged .17 and all were less than .2").

112 Id at 18541–42.

113 63 Fed Reg at 18542 (cited in note 102).

114 EPA, *Economic Analysis for the National Emission Standards for Hazardous Air Pollutants for Source Category: Pulp and Paper Production; Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards: Pulp, Paper, and Paperboard Catego-*

not numerous and are distributed widely, and so constitute an insignificant portion of the average consumer's diet.[115] Accordingly, EPA considered only the health effects for recreational and subsistence anglers.[116] Before regulation, between 0.83 and 2.76 statistical lives were lost per year as a result of the paper mill discharges.[117] Option A would reduce annual statistical deaths by between 0.73 and 2.41, and Option B would reduce annual statistical deaths by between 0.75 and 2.50.[118] To monetize these figures, EPA used a very broad range for the value of a statistical life (between $2.5 and $9 million).[119] The highest possible benefit was accordingly $21.7 million per year under Option A and $22.5 million per year under Option B.[120] In a separate "sensitivity analysis," EPA estimated that Option TCF would reduce statistical cancer deaths by between 0.83 and 2.76 per year—thus eliminating the entire pre-regulation risk of death—providing a potential benefit of up to $25.2 million.[121]

EPA also stated that the regulations would reduce risk of noncancer illnesses but (like OSHA) did not report monetary estimates because of inadequate data.[122] Further, by reducing the amount of dioxin in fisheries, the regulations would reduce the number of dioxin-related fish advisories and hence would increase the number of anglers who would be able to use those fisheries.[123] EPA valued this benefit at $2 to $20 million per year for both Option A and Option B.[124] Increased participation of anglers would add another $4.7 to $15.5 million per year, but because of uncertainties EPA did not end up including these figures in its benefit estimate.[125] Finally, the ability to

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ry—Phase 1 ch 8, 8 (Oct 27, 1997), online at http://www.epa.gov/ost/pulppaper/jd/pulp.pdf (visited Nov 15, 2009).

115 Id.

116 Id. See also 63 Fed Reg at 18587 (cited in note 102).

117 63 Fed Reg at 18588 (cited in note 102).

118 Id at 18588, 18591.

119 *Economic Analysis* at ch 8, 12 table 8-6 (cited in note 114) (calculating the annual monetized benefits from reduction in cancer cases).

120 Id. The normal value of a life is $6 million. Eric Posner, *Dollars and Death*, 72 U Chi L Rev 537, 549 & table 2 (2005) (noting that "most regulatory agencies have now converged on a fairly narrow range for the valuation of life: $5 million to $6.5 million," and listing the values used by various agencies). EPA also calculated the effect of the options on the Native American angler population, but because the numbers are so small and uncertain, EPA omitted them from its analysis. See *Economic Analysis* at ch 8, 9–14 (cited in note 114); 63 Fed Reg at 18589 (cited in note 102).

121 *Economic Analysis* at ch 8, 45 (cited in note 114).

122 Id at ch 8, 14.

123 Id at ch 8, 23.

124 Id at ch 8, 23, 26 table 8-12.

125 *Economic Analysis* at ch 8, 23–24, 26 table 8-12 (cited in note 114).

use cheaper sludge disposal methods would save another $8 to $16 million per year.[126] Option TCF would have the same effect.[127] Aggregate benefits were $11.9 to $57.1 million for Option A,[128] $12 to $57.9 million for Option B,[129] and $12.1 to $60.6 million for Option TCF.[130]

EPA estimated compliance costs of approximately $262 million per year for Option A,[131] $324 million for Option B,[132] and $1.1 billion for Option TCF.[133] It did not calculate aggregate present values for the benefits and costs for each option,[134] but quite clearly they were negative, especially because capital costs would occur in the near term and many of the benefits, such as avoided cancer deaths, would be enjoyed only in the long term. Of the three options, Option A is the least bad, reducing social wealth by, on average, only about $200 million per year (assuming benefits at the maximum of the range).

The effluent regulation is not the whole story, however. As noted earlier, the rule combined both effluent and emission regulations under the Clean Water Act and Clean Air Act, and the EPA integrated the cost-benefit analyses of both sets of regulations.[135] The reason for this is that Options B and TCF would produce hazardous emissions that would require further controls under the Clean Air Act.[136] The combined annual benefits for Option A ranged between –$727 million[137] and $1.5 billion,[138] while the combined annual costs were $420 million[139]—more or less a wash if we take the midpoint of the benefits. Table 3 provides a summary of the analysis.

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126 Id at ch 8, 25.

127 Id at ch 8, 45.

128 Id at ch 8, 26 table 8-12.

129 *Economic Analysis* at ch 8, 26 table 8-12 (cited in note 114).

130 Id at ch 8, 46 table 8-21.

131 Id at ch 5, 25 table 5-16.

132 Id at ch 5, 25 table 5-16.

133 *Economic Analysis* at ch 5, 28 table 5-18 (cited in note 114).

134 EPA does report present values for the integrated rules, including emissions limitations. See id at ch 10, 4 table 10-2.

135 See text accompanying note 103.

136 See 63 Fed Reg at 18552 (cited in note 102) (noting that EPA combined the Clean Air Act and Clean Water Act reviews "expressly to address these cross-media issues").

137 Negative benefits are possible because the emissions regulation replaces some hazardous emissions with other hazardous emissions; under certain conditions, the latter emissions could cause more harm. See, for example, *Economic Analysis* at ch 4, 7 (cited in note 114).

138 Id at ch 10, 1, 2 table 10-1 (providing a breakdown of water- and air-related benefits).

139 Id.

TABLE 3: PULP AND PAPER REGULATION:
COSTS AND BENEFITS OF OPTIONS

	Rules					
	Option A *Final Rule*		**Option B** *Alternate Rule #1*		**Option TCF** *Alternate Rule #2*	
	Individually	**CAA Rule**	**Individually**	**CAA Rule**	**Individually**	**CAA Rule**
Capital Costs	$1,039	$1,394	$2,203	$2,694	$3,159	$3,650
Operation and Management Costs	$158	$211	$94	$163	$790	$859
Pre-Tax Annualized Costs	$262.8	$351.1	$324.0	$442.4	$1,096.5	$1,214.8
Total Annual Monetized Benefits	$11.9–$57.1	($738.5)–$1,496	$12.0–$57.9	($738.4)–$1,496	$12.1–$60.6	($738.3)–$1,497
Net Benefits	($250.9)–($205.7)	($1,089.6)–$1,144.9	($312.0)–($266.1)	($1,180.8)–$1,053.6	($1,084.4)–($1,035.9)	($1,953.1)–$282.2

Source: *Economic Analysis* at ch 3 at 2, ch 4 at 23, ch 5 at 25 table 5-16, ch 5 at 28 table 5-18, ch 8 at 26 table 8-12, ch 8 at 27 table 8-13, ch 8 at 46 table 8-21 (cited in note 114).

Note: All dollar amounts are in millions of 1995 dollars. Amounts that are surrounded by parentheses are negative. EPA used a 7 percent discount rate in all of its calculations. Costs were apparently annualized over a thirty-year period, with capital costs being double counted in both the first and twenty-first years, and annual operation and management costs counted every year after the first. *Economic Analysis* at ch 4, 23 (cited in note 114).

3. Feasibility analysis.

EPA did not explicitly refer to feasibility analysis, but it conducted what it called an analysis of "economic impact" that resembles OSHA's feasibility analysis for the chromium rule, albeit without the compliance thresholds.[140]

First, EPA examined mill closures. Ninety-six mills would be affected by the regulation.[141] Of these, one would be closed under Option A, two under Option B, and seven under Option TCF.[142] EPA made these estimates on the basis of accounting data reported by the firms.[143] If the cost of compliance would be greater than the profits generated by a particular mill, then that mill would close. OSHA, by contrast, looked directly at the impact on profits.[144]

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140 See *Economic Analysis* at ch 3, 1–28 (cited in note 114).

141 Id at ch 6, 16.

142 Id at ch 6, 15 table 6-4, 44 table 6-19.

143 See id at ch 3, 4.

144 See text accompanying note 81.

Second, EPA examined job loss. The industry employed 90,840 workers.[145] EPA estimated that 400 jobs would be lost under Option A,[146] 900 under Option B,[147] and 7,100 under Option TCF.[148] These jobs refer to those of workers in firms that would be shut down.[149] EPA also noted that 5,700 jobs would be lost in aggregate under Option A—including job losses in mills that are not shut down but suffer a loss in demand—and between 9,900 and 27,700 jobs would be lost under Option B, but did not provide comparable figures for TCF.[150]

Third, EPA considered bankruptcies of firms. Thirty-six firms would be affected by the regulation.[151] EPA estimated that no publicly owned firms would be bankrupted under Option A, and more than one would be bankrupted under Option B.[152] The estimate was based on an algorithm that uses accounting data as inputs and generates a probability that the firm will enter bankruptcy.[153] EPA did not perform this analysis for Option TCF but reasoned that it would bankrupt at least as many firms as Option B.[154]

As noted, EPA, unlike OSHA, did not set a compliance threshold for revenue or profit loss, or plant closings in general. It simply reported this information without comment.[155] Table 4 provides a summary. Table 4 also includes the feasibility analysis for the integrated regulation that includes emissions standards. These standards applied to a greater number of mills, jobs, and firms, and those figures are included in Table 4.[156]

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145 *Economic Analysis* at ch 6, 44 table 6-19 (cited in note 114) (showing that, without price increase, the industry was expected to continue employing 90,840 workers).

146 Id at ch 6, 15 table 6-4 (comparing jobs lost under Option A and Option B).

147 Id.

148 Id at ch 6, 44 table 6-19 (comparing jobs lost under Option B and Option TCF).

149 See *Economic Analysis* at ch 6, 15 table 6-4, 44 table 6-19 (cited in note 114); id at ch 6, 12, 16 (noting that the closure of one firm under Option A would result in the loss of about 400 jobs, whereas, under Option B, about 900 jobs would be lost between the two firm closures).

150 Id at ch 6, 35 table 6-15.

151 Id at ch 6, 4.

152 Id at ch 6, 6.

153 See *Economic Analysis* at ch 6, 4 (cited in note 114) (noting the use of the Altman's Z score for each company, a "weighted average of financial ratios" used to predict company distress and failure).

154 63 Fed Reg at 18584 (cited in note 102) (noting that job losses and closures were high enough under TCF that the additional firm failure analysis was unnecessary).

155 See text accompanying note 140.

156 See 63 Fed Reg at 18573 (cite in note 102).

TABLE 4: PULP AND PAPER REGULATION: ECONOMIC IMPACTS OF OPTIONS

	Rules					
	Option A ***Final Rule***		**Option B** ***Alternate Rule #1***		**Option TCF** ***Alternate Rule #2***	
	Individually	**CAA Rule**	**Individually**	**CAA Rule**	**Individually**	**CAA Rule**
Mill Closures / Regulated Mills	1/96	2/158	2/96	4/158	7/96	9/158
Job Losses from Mill Closures *Baseline: 90,840*	400	900	900	4,800	7,100	10,200
Firm Failures / Regulated Firms	0/37	0/52	>1/37	>1/52	>1/37	>1/52

Source: *Economic Analysis* at ch 2 at 3, 29, ch 6 at 4–6, 15 table 6-4, 17 table 6-5, 44 table 6-19 (cited in note 114).

EPA concluded on the basis of this analysis that Option A was "economically achievable," and that Option B and Option TCF were not.[157]

The question, then, is why Option A satisfied the feasibility test. Is it because a regulation that causes the closure of only one of 96 mills is "feasible"? Or is the relevant issue job loss or bankruptcy? And where is the line to be drawn? EPA said that seven mill closures and 7,100 job losses made Option TCF infeasible without considering firm failures.[158] What if these numbers were incrementally lower? More puzzles arise when one considers the integrated regulation options. Now Option A shuts down two mills and eliminates 900 jobs. How does one determine whether these extra harms are justified by the additional benefits from the emissions limits? In addition, mill closures (2) and job losses (900) are the same under the unachievable Option B by itself and the integrated Option A. The only difference is the lack of firm failure. EPA said that failures are "particularly problematic,"[159] but did not elaborate. In addition, EPA has issued other

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157 63 Fed Reg at 18550, 18584 (cited in note 102). However, Option B was chosen for new sources. Id at 18553.

158 Id at 18584 (explaining that, because of the significant number of closures and job losses, there was no need to conduct a firm failure analysis or determine combined direct and indirect impacts).

159 Id at 18550 (noting that increased closures and job losses were considered to be "strong indicators of economic unachievability," but focusing more heavily on potential firm failures).

rules despite the fact that they caused firm failures.[160] Does it matter what size the firm is? Should it not matter? Since mills employ different numbers of workers (400 at the most vulnerable mill, 500 at the second most, and 3,900 at the third and fourth most vulnerable mills combined, or 1,950 at each on average),[161] a larger mill could easily employ more workers and produce more paper than a smaller firm.

Whatever feasibility analysis's ambiguities, it is clear about one thing: losses to consumer welfare do not play a role in the test. Because EPA nonetheless performed an analysis of the effect of the rules, we can see the consequence of this approach. EPA estimated that Option A would increase the cost of paper products for people with incomes under $10,000 from 2.09 to 2.13 percent of pre-tax income, in aggregate $26.1 million.[162] The losses to the general public would be much higher, of course, as reflected in the cost-benefit analysis—although, ideally, a cost-benefit analysis would also monetize the benefits that EPA omitted.

III. THE PROBLEMS WITH FEASIBILITY ANALYSIS

A. The Economic Consequences of Feasibility Analysis

1. A framework.

As we have noted, feasibility analysis comes in different formulations. We focus on OSHA's because of its precision, but our analysis applies to others as well, and we briefly address EPA's approach. OSHA's feasibility analysis proceeds as follows:

1. Identify a workplace that is unsafe.[163]
2. Define the relevant industry or industries.[164]
3. Determine the technologically feasible (that is, available) measures that can reduce or eliminate the risk.[165]

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160 See, for example, EPA, *Pharmaceutical Manufacturing Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards*, 63 Fed Reg 50388, 50406 (1998) (conceding that several facilities were likely to close due to the cost of complying with the regulation under consideration).

161 See Table 4 (aggregating the loss of jobs from each new closure).

162 *Economic Analysis* at ch 8, 43 (cited in note 114).

163 *Industrial Union Department, AFL-CIO v American Petroleum Institute*, 448 US 607, 642 (1980) ("Benzene Case") ("[OSHA] is required to make a threshold finding that a place of employment is unsafe—in the sense that significant risks are present and can be eliminated or lessened by a change in practices.").

164 See, for example, text accompanying notes 82–83.

4. Require firms in the industry to adopt these measures unless the cost of doing so would cause widespread plant closings or (in OSHA's formulation):
    a. Reduce industry profits by more than 10 percent; or
    b. Reduce industry revenues by more than 1 percent.[166]

Analysts refer to step three as the technological feasibility requirement and step four as the economic feasibility requirement. Step one is straightforward; we evaluate steps two through four below.

2. Industry.

Feasibility analysis requires some definition of industry because the technological feasibility requirement typically refers to technologies used in the industry being regulated,[167] and the economic feasibility requirement refers to plant closings within that industry.[168] To understand the importance of this requirement, imagine that Substance X causes harm to workers who are exposed to it. Industry 1 uses Substance X to paint cars. Industry 2 uses Substance X to paint aircraft. A technologically feasible regulation would require employers to supply workers with respirators at the cost of (say) $500 per worker.

It is easy to see that this identical regulation might cause widespread plant closings in one industry but not another. Industry 1 (let us suppose) faces elastic demand. If firms supply respirators and raise prices, they lose customers. Plants that had been justified by economies of scale are shut down and workers lose jobs. Industry 2 faces inelastic demand. Firms pass on the costs to consumers and demand remains constant. No plants close.

If Industries 1 and 2 are treated separately for the purpose of feasibility analysis, then regulations will mandate respirators only in Industry 2, not in Industry 1. If Industries 1 and 2 are treated as the same industry—the industrial consumer-products painting industry—then the agency would need to determine whether the respirator rule would cause widespread plant closures in the whole industry that combines 1 and 2. Using OSHA's chromium approach, this would in-

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165 See, for example, text accompanying notes 72–78.

166 See text accompanying note 81.

167 See, for example, 71 Fed Reg at 10337 (cited in note 63) ("To find the proposed PEL technologically feasible *for an industry*, OSHA must prove a reasonable possibility that *the typical firm* can meet it with engineering and work practice controls in most operations.") (quotation marks omitted) (emphasis added).

168 See *Benzene Case*, 448 US at 671 (Rehnquist concurring in the judgment).

volve determining whether the regulation reduces revenues by 1 percent and profits by 10 percent for the joint industry. If so, the respirator rule is imposed, and car-painting plants are shut down. If not, the respirator rule is not imposed. It is clear that whether respirators are used thus depends on a rather arbitrary notion of how broadly the industry is defined.

Industries do not come in natural kinds. Any industry can be subdivided indefinitely. In our Industry 1, closer examination might reveal that some firms paint cars and boats, while other firms paint only cars. The firms in each subindustry could have different cost structures, so that if we applied the feasibility test to each subindustry, one subindustry would pass the test and the other would not. Then it could turn out that, among firms that paint cars and boats, some provide high-end work, while others provide low-end work; some do custom work, while others do mass-produced work; some serve a particular region; some export and others do not; and so on, until each firm belongs to its own "industry." Feasibility analysis would then simply require firms that are large (their revenues are high) and profitable to adopt the safety precautions, but not smaller and poorer firms.

One might try to define industry in light of the purpose of feasibility analysis. But it is not clear what the purpose of that test is. If the purpose is to permit regulation up to the point of significant job loss, then one should not use an industry definition at all. The relevant consideration would be the total number of lost jobs, regardless of the industry from which they disappear. Another possible purpose is to protect workers with industry-specific skills—skills that can be applied to one type of production process and not others. Workers with such skills who lose their jobs may not be able to find jobs in another industry. On this theory, plant shutdowns scattered across industries are less troublesome than those concentrated in a single industry, even if the total number of jobs lost is the same.[169] If this is the purpose of feasibility analysis, then industries should be defined with reference to the transferability of skills. Another possible purpose is to avoid substantial job losses in a single region, on the theory that workers are not highly geographically mobile. If this is the purpose of feasibility analysis, then industries should be defined with reference to geography.

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[169] See, for example, Derek Neal, *Industry-Specific Human Capital: Evidence from Displaced Workers*, 13 J Labor Econ 653, 669–70 (1995) (discussing the wage cost of switching industries and the loss of human capital).

That is not how agencies define industries. Instead, they use the North American Industry Classification System (NAICS).[170] The Office of Management and Budget (OMB) developed NAICS in order to regularize statistical reporting by government agencies. NAICS divides industries into more than a thousand six-digit codes. Classification is allegedly based on the similarity of production processes.[171] Consider the following example:[172]

> 333311 Automatic Vending Machine Manufacturing
>
> 333312 Commercial Laundry, Drycleaning, and Pressing Machine Manufacturing
>
> 333313 Office Machinery Manufacturing
>
> 333314 Optical Instrument and Lens Manufacturing
>
> 333315 Photographic and Photocopying Equipment Manufacturing
>
> 333319 Other Commercial and Service Industry Machinery Manufacturing

A firm that manufactures vending machines and a firm that manufactures pressing machines belong to different industries because the production processes are different. A firm that manufactures hole punchers and a firm that manufactures calculators belong to the same industry—Office Machine Manufacturing—because their production processes are ostensibly similar.[173] But the similarity or difference of production processes is not the same thing as the substitutability of jobs. An assembly-line worker, or custodian, or security guard could probably work in any of these firms. And of course these classifications say essentially nothing about geography. Another government classification system divides up occupations according to their similarity, but agencies do not use that system.[174]

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170 See, for example, 71 Fed Reg at 10337 (cited in note 63) (OSHA); EPA, *Coal Mining Point Source Category; Amendments to Effluent Limitations Guidelines and New Source Performance Standards*, 67 Fed Reg 3370, 3370 (2002) (EPA).

171 See US Census Bureau, *NAICS—Frequently Asked Questions, What Is NAICS and How Is It Used?*, online at http://www.census.gov/eos/www/naics/faqs/faqs.html#q1 (visited Nov 15, 2009).

172 See US Census Bureau, *2007 NAICS Definition*, online at http://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart_code=31&search=2007%20NAICS%20Search (visited Nov 15, 2009).

173 We are hardly experts, but we have our doubts.

174 US Census Bureau, *NAICS—Frequently Asked Questions, How Can I Find an Occupational NAICS Code?*, online at http://www.census.gov/eos/www/naics/faqs/faqs.html#q19 (visited Nov 15, 2009). An occupation-based classification system, the Standard Occupational Classification (SOC) system, has been developed by the Bureau of Labor Standards, but the two systems are separate entities. See Bureau of Labor Standards, *Standard Occupational Classification*

This is a problem if the purpose of economic feasibility is to prevent regulations from harming workers by eliminating their jobs. A regulation that completely eliminated office machinery manufacturing would have little impact on employment if workers can easily find jobs in other commercial and service industry machinery manufacturing. Accordingly, the fact of widespread plant closures in an industry reveals little about the regulation's impact on workers.

Agencies appear to be aware of this problem, which they address by tinkering with industry classifications on an ad hoc basis.[175] This means that whether a regulation turns out to be economically feasible or not is essentially a discretionary judgment by the agency.

It is worth noting that agencies may elect to alter (or scrap) a regulation entirely rather than exempt certain industries from otherwise general rules. For instance, if a regulation as applied to some industry would be infeasible per OSHA's 1 percent/10 percent rule, OSHA may elect to either except that industry from the 1 percent/10 percent rule and apply the regulation anyway or scrap the regulation. This is effectively what happened in the chromium case: the one microgram standard looked as though it would do too much damage to one industry, so OSHA scrapped it in favor of a five microgram standard and then applied that standard to all industries despite the fact that some of them almost certainly would not suffer substantial revenue or profit loss under the one microgram standard. Infeasibility in one industry may act as an effective veto of regulation of other industries.

3. Technological feasibility.

Technological feasibility generally means technological availability. For example, suppose that industrial practices cause certain inhalable toxins to enter the air. The agency may consider ordering firms to adopt measures that are already technologically possible—for example, ventilation fans or respirators that are already used by firms (though not necessarily those in the industry).[176] Although some com-

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(SOC) System, online at http://www.bls.gov/soc/home.htm (visited Nov 15, 2009) (explaining that the SOC divides workers into over 820 occupations "for the purpose of collecting, calculating, or disseminating data").

175 See 71 Fed Reg at 10226 (cited in note 63) (using "application groups" to group "firms where employees are exposed . . . when performing a particular function" since similar control technologies would be appropriate within the group); 63 Fed Reg at 18504 (cited in note 102) (revising the subcategorization scheme to better reflect the actual processes used).

176 The literature has dwelt on the ambiguity of this term. A safety measure that is cheap in one type of plant may be a little or a great deal more expensive in another type of plant because

mentators believe that agencies may issue "technology-forcing" regulations[177]—regulations that oblige firms to develop new, more effective technologies—in practice courts have placed a heavy burden on agencies to prove that such technologies can indeed be developed, and as a result agencies rarely issue technology-forcing regulations.[178]

Thus, the relevant "cost" for purposes of determining economic feasibility is the cost of adopting available technology for the purpose of reducing or eliminating a risk. Presumably, the most restrictive technology must be used, consistent only with economic feasibility. An agency can also reduce the risk to zero simply by banning the production process that causes the risk. For example, if a toxin is used in painting cars, the agency could order the firm not to use the toxin—again subject to the economic feasibility rule. Option TCF for the paper mill regulation did just this.

The consequence is that the agency must choose between mandating safety precautions that already exist and banning the substance altogether. But banning the substance altogether would always be worse than demanding technological innovation that renders it harmless, given that firms would always retain the option of discontinuing use of the substance if such innovation would be too expensive.

The effect of the technological feasibility condition is not only to protect firms from regulations that might drive them out of business (because they cannot develop a new technology in cost-justified fashion), but also to entrench old technologies.[179] Although feasibility analysis does not eliminate firms' existing incentives to develop safety

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of differences in the physical configurations of the plants. As others have discussed this issue in detail, we ignore it. See, for example, Bruce A. Ackerman and Richard B. Stewart, *Reforming Environmental Law: The Democratic Case for Market Incentives*, 13 Colum J Envir L 171, 173 (1988) ("Uniform [ ] requirements waste many billions of dollars annually by ignoring variations among plants and industries in the costs of reducing pollution and by ignoring geographic variations in pollution effects.").

177 See, for example, Note, *Forcing Technology: The Clean Air Act Experience*, 88 Yale L J 1713, 1718–19 (1979).

178 Driesen, 32 BC Envir Aff L Rev at 13–15 (cited in note 1). Many feasibility-triggering statutes explicitly require "available" or "demonstrated" technology, see, for example, 42 USC § 7475(a)(4) (requiring limitations based on the "best available control technology for each pollutant"), and courts have interpreted this language to mean that it has already been tested and approved for use.

179 Sometimes agencies will accompany feasibility-based regulations with other regulations that provide incentives for innovation. See, for example, 63 Fed Reg at 18593–608 (cited in note 102) (introducing the Voluntary Advanced Technology Incentives Program in paper mills). In addition, there are some recent examples of courts supporting agencies' selection of control technolgies that have only been adopted in a few facilities. See, for example, *American Iron & Steel Institute v OSHA*, 939 F2d 975, 983–84 (DC Cir 1991) (approving OSHA's feasibility determination based on evidence that a single company was able to meet the standard).

precautions that are cheaper than, but just as effective as, existing safety precautions, it does not enhance these incentives. The reason is that feasibility analysis gives firms no incentive to take into account the costs they impose on third parties. In fact, firms have incentives to avoid developing new technologies. Newer, more effective technologies might make otherwise infeasible regulations feasible, allowing agencies to impose additional regulation.

4. Economic feasibility.

In OSHA's formulation, economic feasibility exists when two conditions are satisfied: the cost of the safety technology is less than 10 percent of profits, and the cost is less than 1 percent of revenues. Commentators have generally interpreted feasibility in terms of plant closures, which were also the focus of EPA's paper mill regulation.[180] We address each of these approaches.

a) Revenues. It is straightforward that the revenue component of the feasibility rule introduces a market distortion in favor of small firms, that is, firms with low revenues, compared to large firms.[181] To see why, suppose that the technologically feasible safety precaution in the car-painting industry is the installation of a ventilation system. Suppose that one firm does high-end work, with high revenues and high costs, and another firm does low-end work, with low revenues and low costs—but are otherwise identical. Suppose that the first firm has revenues of $10 million and the second firm has revenues of $1 million, and that the ventilation system costs $50,000. If the firms are defined as belonging to different industries, then only the first firm must install the ventilation system. If the firms are defined as belonging to the same industry, then both firms must either install the system or not install the system, depending on the overall cost structure of the industry. Yet there is no reason to make the ventilation system depend on the size of the firm.

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[180] See Driesen, 32 BC Envir Aff L Rev at 3 (cited in note 1). See also notes 141–43 and accompanying text.

[181] Note also that "under the Regulatory Flexibility Act (RFA), 5 U.S.C. § 601 et seq., as amended by [the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub L No 104-121, 110 Stat 847], EPA generally is required to conduct a regulatory flexibility analysis describing the impact of the rule on small entities." 63 Fed Reg at 18611 (cited in note 102). In other words RFA requires a separate analysis of small businesses. In some OSHA regulations, it has used a 1 percent/5 percent limit for small businesses instead of the 1 percent/10 percent threshold. Occupational Safety and Health Administration, *Assigned Protection Factors*, 71 Fed Reg 50122, 50157 (2006); OSHA, *Fire Protection in Shipyard Employment*, 69 Fed Reg 55668, 55701 (2004).

Firms become large to exploit economies of scale. A rule that systematically disfavors large firms discourages firms from becoming large in the first place. The loss of economies of scale will drive up costs, hurting consumers and shareholders, without producing any offsetting benefits.

It is possible that, in some industries, the revenue rule is harmless because the costs of safety precautions increase with revenue. Suppose, for example, that the technologically feasible precaution is for workers to use respirators, and that higher revenue firms have more workers. In this case, the revenue rule does not create inefficiency because larger firms do not suffer relative to small firms. However, there is no reason to believe this relationship holds in all cases.

b) Profits. The profit component of the economic feasibility rule protects low-profit industries from regulation. To understand the economic effect of such a rule, we need to understand why some industries enjoy higher profits than others. There are a few possibilities. First, the higher-profit industry might face a higher level of risk, and investors demand the higher profits to compensate them for taking on this extra level of risk.[182] If this is the case, then regulations that disfavor higher-profit firms will simply reduce their profits and cause investors to flee. Despite the apparent small impact of the regulation on profits (that is, less than 10 percent), firms will close or otherwise reduce their risk-taking activity. The effect will be felt as lower returns for shareholders in the short run, but as higher costs for consumers or the elimination of desirable goods in the long run.

Second, some firms enjoy short-term profits because their managers spot market opportunities that competitors miss. The short-term profits thus serve as a signal of unexploited demand, attracting capital and eventually driving down prices, to the benefit of consumers.[183] The profit rule is simply a tax on such profits, which will reduce incentives to exploit these opportunities. Consumers lose as a result.

Third, the higher-profit industry may benefit from natural or artificial market restrictions, such as economies of scale, regulations, or illegal anticompetitive behavior. In the last case, the profit rule will reduce the profits of firms without having any negative effect, assuming that the rents enjoyed by investors are greater than 1 percent of the total return. At the same time, the profit rule may interact in undesirable ways with other areas of the law. Intellectual property law

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182 See William F. Sharpe, *Portfolio Theory and Capital Markets* 84–85 (McGraw-Hill 1970).

183 See Arthur L. Faubel, *Principles of Economics: An Elementary Textbook* 73–80 (Harcourt, Brace 1932).

grants firms limited monopolies in order to encourage innovation, yet these firms become vulnerable under the feasibility test. Antitrust law is the proper method for policing anticompetitive behavior; a rule that generally penalizes high-profit firms would be in tension with antitrust law's more nuanced approach.

c) Plants, jobs, and firms. Why does OSHA consider revenues and profits? An alternative approach, illustrated by EPA's paper mill regulation, is to determine whether a regulation closes plants, destroys jobs, or bankrupts firms.[184] Scholarly defenders of feasibility analysis also focus on plant closures, job losses, and bankruptcies.[185] Which is the right standard for feasibility?

These standards are obviously not the same. A regulation that reduces the revenues of an industry does not necessarily reduce its profits. The regulation could cause some firms to shut down, resulting in greater business for other firms and generating rents for them in the short run. A regulation could also reduce profits without reducing revenues just by increasing costs. OSHA requires both conditions to be satisfied, but why exactly? What is so important about revenues and profits? One might think that OSHA seeks to protect the capitalists, not the workers.

Revenues and profits could be proxies for plant shutdowns. If revenues and profits decline, then plants may be shut down and jobs lost. But revenues and profits could decline without any plants being shut down: the regulation could just cause firms to fire workers while keeping plants open with smaller staffs. In any event, why use proxies if the real concern is plant closings or job losses? Agencies can estimate these outcomes directly—EPA did just this in the paper mill regulation—and can evaluate regulations' feasibility on the basis of them.

But plant closures and job losses are not the same thing, either. A regulation that causes plant closures could have no effect on job losses if firms just reassign workers to plants that remain open. Or consider a regulation that shuts one out of fifty plants, with the result that one hundred jobs are lost, and a regulation that shuts zero plants but causes ten job losses in all fifty plants, for a total of five hundred job losses. Should the agency focus on plant closings (perhaps because of the effect on the community) or job losses (because in the end this is what matters)? Workers are harmed when they lose jobs, and people in the

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184 See text accompanying notes 140–62.

185 See, for example, Driesen, 32 BC Envir Aff L Rev at 3 (cited in note 1) (arguing that avoiding plant closures and unemployment should be the only countervailing consideration to health and safety under feasibility analysis).

surrounding community could be hurt if job losses are concentrated in one plant. Plant closings might be thought of as a proxy for job losses, but agencies are capable of estimating job losses directly; EPA did this as well. There is no need to employ any sort of proxy.

Finally, should agencies instead interpret feasibility to refer to bankruptcies? Consider an industry with fifty plants. One firm owns forty-nine plants and another firm owns one plant. If a regulation bankrupts the first firm, the consequences might seem more serious than if it bankrupts the second firm, because the first firm owns more plants. On the other hand, bankruptcy does not force firms to shut down plants they own. If the plants remain profitable, the firms will just sell them, and no one will lose a job. If that is the case, why restrict regulation to avoid bankruptcy?

These different rules would cause firms to act in different ways, none good. If firms anticipate that agencies will spare them from regulation when necessary to minimize plant shutdowns, then they will invest in larger numbers of smaller plants. If agencies spare firms when necessary to minimize bankruptcy, then firms will maintain thin capitalizations by distributing dividends to a greater extent than they would otherwise. If agencies spare firms when necessary to minimize job loss, then firms will overhire. Of course, if the regulations have only limited effect, then these distortions will be only marginal, but by the same token the regulations will do little good.

d) Path dependency and time inconsistency. Suppose that an industry produces hazardous emissions that kill ten people per year. The industry has revenues of $1 million, costs of $900,000, and profits of $100,000. Under some versions of the feasibility approach, EPA should choose a level of regulation that reduces emissions to the maximum extent consistent with avoiding widespread plant shutdowns or bankruptcies. Let us stipulate that a Regulation X that costs $90,000 would save nine lives and avoid shutdowns and bankruptcies, leaving the industry as a whole with profits of $10,000.

Next year, scientists discover that this same industry emits another hazardous substance. This substance kills one hundred people per year. A Regulation Y that costs $50,000 would save ninety-nine of these people but would also bankrupt the industry, which now has profits of only $10,000. Accordingly, feasibility analysis would forbid the agency from promulgating this regulation.

If scientists had discovered the second substance first, EPA could have issued Regulation Y, which saves more people at lower cost than Regulation X does. This path dependence reflects another form of arbitrariness that feasibility analysis produces. By contrast, CBA

would require either or both regulations to be issued, regardless of the order in which they are introduced, as long as they are cost-justified (and regardless of whether they bankrupt the industry).[186]

Agencies can reduce the risk of path dependency by refusing to issue regulations that consume a large portion of an industry's profits. As we have seen, OSHA will not issue regulations that reduce profits by more than 10 percent. In this case, path dependence will result only if OSHA issues at least nine regulations that amount to more than 90 percent of profits. But the price of avoiding the risk of path dependence is high. OSHA must refrain from issuing cost-justified regulations that produce high costs but even higher benefits.

5. Summary.

We can put the pieces of our analysis together. According to economic analysis, a firm should engage in a precaution when the marginal benefits (in terms of reduced risk of harm to workers and others) exceed the marginal costs.[187] Feasibility analysis deviates from this approach. We can divide the deviations into two categories—cases where feasibility analysis results in underregulation (relative to economic optimality) and cases where it results in overregulation.[188] As before, we focus on OSHA's approach.

Feasibility analysis results in underregulation of industrial sectors where:

- A low-cost precaution technology can be cheaply developed but does not currently exist;
- The industry has low revenues or precaution costs do not increase with revenue; or
- The industry has low profits.

Feasibility analysis results in overregulation of industrial sectors where:

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186 Path dependency could be introduced if the CBA takes into account the hardship from job loss; however, as noted earlier, these costs are generally ignored for largely sensible reasons. See text accompanying notes 170–75.

187 See, for example, Richard J. Butler, *The Economics of Social Insurance and Employee Benefits* 125 (Springer 1999).

188 Others have noted that feasibility analysis leads to under- and overregulation relative to CBA. See, for example, Farber, *Eco-Pragmatism* at 78 (cited in note 11); Lester B. Lave, *The Strategy of Social Regulation: Decision Frameworks for Policy* 14–15 (Brookings 1981).

- The technologically feasible regulation creates costs greater than the benefits from risk reduction; and
- The industry has high revenues, precaution costs increase with revenue, or the industry has high profits.

Further, the constraint that requires agencies to choose between banning a substance or activity, or imposing a technologically feasible precaution, prevents agencies from requiring optimal technological innovation. And the industry-level analysis creates further distortions. If the technologically feasible regulation is also economically optimal, then a narrow definition of industry (down to the firm level) inefficiently spares low-revenue and low-profit firms, while a broad definition inefficiently spares all firms in low-revenue and low-profit "industries." Finally, feasibility analysis is path dependent and can result in underregulation if more hazardous activities are discovered after regulations addressing less hazardous activities are issued.

Under EPA's approach, other distortions occur. A cost-justified regulation that shuts down plants, causes job loss, or sends firms into bankruptcy is barred, and a regulation that excessively reduces risks and hence harms consumers but does not have these other effects is permitted.

We should immediately note that one might defend feasibility analysis on grounds other than those of welfare economics. It might seem too obvious to state that any decision procedure other than CBA will promote social welfare less well than CBA does. But matters are considerably more complicated than this.

Initially, it is important to be clear about how feasibility analysis deviates from CBA. If these differences seem intuitively appropriate, then we might believe that these deviations are justified. As we see, defenders of feasibility analysis believe that one advantage is that it focuses on plant closures—which can cause concentrated hardship—whereas CBA ignores them.

Further, we might agree that social welfare maximization is the appropriate normative goal, and argue about whether CBA or feasibility analysis is the better decision procedure for obtaining that goal. CBA is an imperfect decision procedure;[189] feasibility analysis might be better. Indeed, defenders of feasibility analysis make this argument.[190]

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189 Hahn, 71 U Chi L Rev at 1048 (cited in note 9) (conceding that CBA provides only an "imperfect" account of "net benefits," but maintaining that it is nonetheless superior to any other alternative).

190 See text accompanying notes 199–201.

Finally, we might instead reject social welfare maximization as the goal and argue that agencies should pursue some other normative goal that feasibility analysis happens to promote. Defenders of feasibility analysis make this argument as well.[191]

We turn to these arguments in the next Parts.

B. Feasibility Analysis as a Welfarist Decision Procedure

Feasibility analysis is a decision procedure—that is, an instrument or means that agencies use for the purpose of achieving a normative goal.[192] The normative goal itself might be reflected in the statute or, if the statute is ambiguous, in the policy of the agency or the executive branch. Let us first suppose that the relevant statute or policy sets the goal of advancing social welfare.

A decision procedure is just a type of rule. Rules (compared to standards) reduce decision costs but raise error costs.[193] The choice between rules and standards depends on the tradeoff between these costs. In the current setting, agencies could be asked to apply a standard—maximize social welfare—but most people agree that such a standard provides inadequate guidance, thus generating high decision costs. The literature discusses various rule-like procedures that reduce decision costs, including CBA, quality-adjusted life-year analysis, risk-risk analysis, and feasibility analysis.[194] CBA is a "wide" rule that allows the analyst to take into account a range of costs that regulations impose on people.[195] Risk-risk analysis, by contrast, is narrower: it considers only the effects on lives.[196] Social welfare maximization favors wider approaches, to the extent that decision costs can be minimized, be-

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191 See note 224.

192 For a discussion of decision procedures in this context, see Adler and Posner, *New Foundations of Cost-Benefit Analysis* at 63–68 (cited in note 9) (distinguishing decision procedures, such as CBA, from moral criteria or normative goals, such as welfare maximization).

193 Fredrick E. Schauer, *Playing by the Rules: A Philosophical Examination of Rule-Based Decisionmaking in Law and in Life* 148–49 (Oxford 1991) (noting that rules, while sometimes more efficient, "commit a decision-making process to some number of errors"). See also generally Louis Kaplow, *Rules versus Standards*, 42 Duke L J 557 (1992) (describing a general theory of rules and standards).

194 Adler and Posner, *New Foundations of Cost-Benefit Analysis* at 73–76 (cited in note 9).

195 We refer to CBA as ordinarily practiced, which assumes the standard economic welfarist approach—subjective preference satisfaction—but in practice ignores certain other-regarding preferences. For a discussion, see id.

196 Id at 76 (explaining that the purpose of "risk-risk" analysis is to "minimize the total number of premature deaths," taking into consideration both the risks associated with the "targeted hazard" and risks associated with the "effort to mitigate"). See also W. Kip Viscusi, *Regulating the Regulators*, 63 U Chi L Rev 1423, 1436–55 (1996).

cause people's welfare depends on a range of activities and conditions, not just (for example) the bare fact of being alive. At the same time, CBA minimizes decision costs through the magic of quantification. Once valuations are obtained from the marketplace and surveys—fixed costs that can be spread across multiple regulations—decisions are relatively automatic. Judgment must be used, but standard procedures have developed,[197] which improves monitoring and thus limits bias.[198]

The idea that feasibility analysis is a welfarist decision procedure—that it is justified because it promotes well-being more effectively than CBA or any other decision procedure does—is not fanciful. David Driesen, the leading defender of feasibility analysis, appears to take this view, or at least certain elements of his defense are consistent with this view. In particular, he stresses three welfarist virtues of feasibility analysis: that it ensures that agencies regulate industrial processes that create harms that are difficult to monetize;[199] that it ensures that regulation does not impose concentrated harms on workers and spreads the costs of regulation among consumers;[200] and that it provides clear guidance for agencies, thus avoiding arbitrary and inconsistent regulatory outcomes.[201] Let us consider these arguments in turn.

1. Difficulties with monetization.

Various substances used in industrial processes cause harm to humans. Unfortunately, it is often difficult to quantify and monetize those harms. Regulators may suspect that a substance harms humans because it causes cancer in animals but lack epidemiological proof that the substance also causes cancer in humans.[202] Regulators might have evidence that the substance harms some people (for example, cigarette smokers) and might believe, based on experience, that such a

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197 See, for example, Christopher Fuller, Note, *Congressional Pre-commitment to Curb Discretionary Spending: A Proposal to Apply Executive Cost-Benefit Principles to Legislative Appropriations in Order to Discipline Discretionary Spending*, 33 Seton Hall Leg J 499, 516–18 (2009) (discussing the use of "scorecards" to quantify costs and benefits, which make it possible to track agency decisions and performance).

198 We discuss bias in Part III.D.

199 Driesen, 32 BC Envir Aff L Rev at 37–38 (cited in note 1).

200 Id at 38.

201 Id at 41–48.

202 See, for example, EPA, *Oxygenates in Water: Critical Information and Research Needs* 1–3 (1998), online at http://www.epa.gov/ncea/pdfs/oxy_h2o.pdf (visited Nov 15, 2009); EPA, *Methyl Tertiary Butyl Ether (MTBE); Advance Notice of Intent to Initiate Rulemaking under the Toxic Substances Control Act to Eliminate or Limit the Use of MTBE as a Fuel Additive in Gasoline*, 65 Fed Reg 16094, 16094 (2000) (issuing an advance notice of proposed rulemaking regarding regulation of the use of MTBE).

substance will be generally harmful, but lack evidence that it causes harm to other people.[203] And even when it is clear that substances cause harms, many harms are difficult to monetize. Some substances might cause bad odors or unsightly air pollution that does not cause harm to health but bothers people;[204] it is not easy to monetize these harms. Medical costs can be used when the condition is curable, but many conditions are chronic and bothersome but not deadly; how does one attach a money value to these experiences? And what if rich people and poor people are affected by the same hazard: should the well-being of the rich count more because they are willing to pay a higher amount (by virtue of their wealth alone) to avoid it? Finally, there is the vexed question of valuing avoided deaths.[205]

Cost-benefit analysts have struggled with these problems and proposed a range of imaginative methods for estimating and monetizing harms.[206] But many critics of CBA believe that these estimates are arbitrary or too low, and that the burden of collecting and analyzing data builds in an unjustified anti-regulatory bias.[207] The chromium and paper mill regulations were typical in this regard. OSHA believed that exposure to chromium causes asthma, nasal irritation, and gastrointestinal ulcers but did not include these harms in its cost-benefit analysis because of data limitations.[208] EPA believed that paper mill discharges cause various non-cancer illnesses but did not include these harms for the same reason.[209] Feasibility analysis avoids this problem by starting with the assumption that known risks of harm should be reduced as far as possible, consistent with technological and economic feasibility. Although one must identify harmful substances—so, again, lack of available data could still hinder regulations—once one has done this, it is not necessary to calculate precise risks and to monetize harms.

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203 See, for example, Ronald J. Rychlak, *Cards and Dice in Smoky Rooms: Tobacco Bans and Modern Casinos*, 57 Drake L Rev 467, 482–90 (2009).

204 See, for example, 40 CFR § 81.403 (establishing, among other places, Grand Canyon National Park as a location where visibility is an important value).

205 Many of these criticisms originated in Kelman, *Cost-Benefit Analysis* at 36–40 (cited in note 10) (discussing the difficulty of assigning a value to nonmarket things, and criticizing the notion that, by observing risk-taking behavior, we can place a value on avoided deaths). For a recent compilation, see Ackerman and Heinzerling, 150 U Pa L Rev at 1567–68, 1574–75 (cited in note 10).

206 See, for example, W. Kip Viscusi, *Fatal Tradeoffs: Public and Private Responsibilities for Risk* 34–50 (Oxford 1992). For a compilation of academic efforts aimed at addressing this problem, see generally W. Kip Viscusi and Joseph E. Aldy, *The Value of Statistical Life: A Critical Review of Market Estimates throughout the World*, 27 J Risk & Uncertainty 5 (2003); Jerry A. Hausman, ed, *Contingent Valuation: A Critical Assessment* (Elsevier 1993).

207 See, for example, Driesen, 32 BC Envir Aff L Rev at 4 (cited in note 1).

208 See Part II.A.

209 See Part II.B.

This advantage of feasibility analysis, however, comes at a significant cost. If there were no technological and economic feasibility constraint, feasibility analysis would require agencies to reduce all risks of harm to zero. Virtually all industrial practices create risks of harm for workers and for other people exposed to a firm's pollution. Any serious effort to reduce risks to zero would require shutting down the economy (in the process no doubt making life less healthy and more dangerous).[210] Feasibility analysis avoids this outcome by stipulating that the economy should not be shut down. But it does not explain how far regulation should go: at what point should we regard suppression of economic activity as too great to justify a regulation that reduces risk?

As we have seen, the agencies have failed to answer this question. OSHA's approach in the chromium regulation is clearly arbitrary, but that is only because it is so specific; any similar approach that refers more vaguely to avoiding plant closings is equally arbitrary. A regulation that substantially reduces risks of harm should be issued even if it closes many plants. A regulation that reduces risks of harm very little, while imposing very high costs on consumers, should not be issued even if it does not close any plants.

A further point is that if the problem with CBA is that it ignores real harms (as opposed to harms for which there is no evidence because they do not exist), then multipliers and other simple devices can be used to improve analysis. The government could conduct periodic retrospective studies of regulations to see whether the cost-benefit analyses that justified them turned out to be accurate.[211] If these retrospective studies reveal that CBA systematically underestimates the benefits of regulation by (say) a factor of two, then agencies should be directed to multiply their estimates of benefits by two whenever they conduct CBA for new regulations.

2. Plant closings.

Driesen argues that feasibility analysis ensures that regulations do not impose excessively concentrated hardships on workers and communities that depend on the employment opportunities offered

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[210] Feasibility analysis emerged in part because an earlier effort to reduce risks to zero was abandoned. See Ackerman and Stewart, 13 Colum J Envir L at 175 (cited in note 176).

[211] In fact, scholars do this routinely. See generally Winston Harrington, Richard D. Morgenstern, and Peter Nelson, *On the Accuracy of Regulatory Cost Estimates*, 19 J Pol Analysis & Mgmt 297 (2000) (performing a study comparing the direct costs of regulations to the original cost estimates).

by industrial plants.[212] His argument centers on the distributional consequences of regulation.[213] Concentrated economic costs are more likely to diminish welfare because of the diminishing marginal value of money; it is more harmful (in welfare terms) for one person to lose $10,000 than for 10,000 people each to lose $1. Driesen favors environmental regulation in general because the types of harms caused by pollution—lung cancer, for instance—are borne by a few individuals, rather than spread across many.[214] He supports feasibility analysis in particular because it largely ignores widespread costs borne by consumers (more on this later) and concentrates only on avoiding unemployment—a harm borne by comparatively few individuals.[215]

As an initial matter, the focus on avoiding concentrated harms does not justify feasibility analysis in a broad range of cases. For instance, suppose that feasibility analysis prevents OSHA from lowering the Cr(VI) exposure limit to 1 $\mu g/m^3$ because of the threat of plant closings. The cost of implementing a weaker exposure limit, rather than this stricter limit, will fall on the workers who are stricken with lung cancer as a result. The same is true for environmental regulations: feasibility analysis may force regulators to trade the health (and lives) of a few individuals for the jobs of a greater number of workers. If the goal of feasibility analysis is to avoid concentrated harms, preventing job loss at the expense of allowing a greater number of serious illnesses makes little sense. And this is not even to mention the fact that regulations that do not cause "widespread plant closings" could nonetheless lead to widespread layoffs—that is, layoffs from plants that are not entirely shut down.

In addition, in an effort to emphasize larger concentrated costs over smaller dispersed ones, feasibility analysis errs by valuing those small costs at zero. The complete disregard of costs other than those related to job loss is deeply puzzling from a welfarist perspective.[216] Consider an average person, P. P has a job, breathes the air, eats food, drives a car, raises a family, purchases entertainment, pays for medical

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212 Driesen, 32 BC Envir Aff L Rev at 37 (cited in note 1) (tying the plant closing standard to a fear of excessive, concentrated layoffs).

213 See id at 38.

214 See id.

215 See id at 36–38.

216 See John D. Graham, *Saving Lives through Administrative Law and Economics*, 157 U Pa L Rev 395, 445 (2008); Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 Colum L Rev 1613, 1694 (1995) (observing that technology-based standards both under- and overregulate, leaving some communities relatively unprotected from toxic materials while imposing tremendous cost inefficiencies upon others).

insurance, and so forth. The feasibility test ensures that a regulation takes account of P's interest in keeping her job, in having a safe job, and in breathing the air, but ignores her interests in having cheap and healthy food, maintaining her car, buying goods for her family, and having access to inexpensive entertainment. Why should regulations take account of health, safety, and job loss, but nothing else? This same worker is also a consumer; regulations that raise costs for consumers hurt this worker just as polluted air does. Indeed, the regulation could lower P's medical insurance premium by reducing risks that she faces, but at the same time, by raising the cost of goods, leave her with less disposable income for purchasing medical insurance in the first place. These effects cannot be evaluated if the effect of a regulation on the cost of goods is ignored. But that is exactly what the feasibility test does.

The approach of feasibility analysis thus creates significant problems of over- and underregulation. Overregulation occurs because feasibility analysis ignores the cost of regulations to consumers—the costs they incur because prices rise or products disappear from the market. Underregulation occurs because feasibility analysis tolerates dangerous industrial practices if regulation would shut down plants. As we have seen, OSHA's approach to Cr(VI) creates other perverse incentives: to reduce the size of firms, to avoid taking entrepreneurial risks, and so forth.[217] EPA's approach would also cause distortions—larger plants, thinner capitalization, and so on.[218] CBA, by contrast, takes into account all the costs that regulations impose on consumers, as well as the benefits.

It is true that CBA has traditionally ignored the effect of regulation on employment. The reason is that economists tend to assume that labor markets will adjust in response to changes in the cost of inputs. Regulations raise the cost of inputs, but these costs can increase for exogenous reasons; these are simply the facts of life for any employer. In classical labor market models, firms will enter and exit the market in response to these shocks, and workers will lose their jobs and obtain jobs at other firms.[219] The cost to workers, if there is one, is transitional only, and most cost-benefit analysts probably regard them as small relative to the regulatory benefits and costs to con-

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217 See Part III.A.4.

218 See Part II.B.

219 Rajshree Agarwal and Michael Gort, *The Evolution of Markets and Entry, Exit, and Survival of Firms*, 78 Rev Econ & Stat 489, 489 (1996); Daniel S. Hamermesh, Wolter H. J. Hassink, and Jan C. van Ours, *Job Turnover and Labor Turnover: A Taxonomy of Employment Dynamics*, 41/42 Annales d'Economie et de Statistique 21, 37–38 (1996) (discussing the flow of workers between firms).

sumers. In addition, workers can self-insure against job loss, and governments often provide training and other assistance, which reduces the transition costs. But if all of this is a mistake—if it is appropriate to take into account the hardship costs to workers who lose their jobs—then CBA can easily accommodate these costs. Analysts would simply estimate the effect of a regulation on employment, and multiply that number by the estimated costs of transition or unemployment for the workers in question. In doing so, analysts would take account of macroeconomic and other conditions that affect the ability of workers to find new jobs.

If CBA errs when translating dollars into welfare, this problem can be cured much more accurately and intelligently within the framework of CBA. Regulators could simply apply multipliers to highly concentrated benefits in accordance with economists' best estimates of individuals' welfare functions. The right approach cannot be to simply reduce some values in the equation to zero.

3. Clarity.

We have mentioned the many vague concepts used in feasibility analysis.[220] Neither technological nor economic feasibility are well-defined concepts; the definition of industry is also largely arbitrary. Technological feasibility could mean technology that exists or technology that could be cheaply developed. Given problems of proof, agencies opted for the first definition, but even then faced challenges from industries that pointed out that technology that might work in some types of plants does not work in other types—or works only if it is modified, which requires further costs. We have discussed the problems of economic feasibility: the OSHA approach in the chromium rule is arbitrary; the EPA approach is indefinite.

The real problem is not the vagueness of words—words are always vague—but the absence of a theoretically coherent normative basis for feasibility analysis, a theory the analyst can draw upon in order to flesh out these terms in specific regulatory contexts. CBA also uses vague terms, and requires some choices that are relatively arbitrary. But if the analyst keeps the overall goal of CBA in mind—the promotion of public well-being—then the ambiguities can be resolved. Feasibility analysis's notion of balancing employment with health and

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[220] See, for example, text accompanying notes 167–75. Other critics of feasibility analysis have also taken issue with the method's essential vagueness. See, for example, Sunstein, *Risk and Reason* at 216–18 (cited in note 3).

safety provides no similar guidance because it offers no theoretical way to determine the correct balance.

Driesen argues that feasibility analysis provides clear guidance, pointing out that in practice regulations tend to avoid plant closings or revenue losses of more than 0.01 to 2 percent,[221] and that agencies usually do not require firms to develop new technologies.[222] But this argument confuses the supposed analytic benefits of feasibility analysis and the ways in which agencies actually use it. If Driesen's account is correct, it appears that agencies use the test in the most conservative way possible in order to avoid litigation or minimize the risk of harm. But that only suggests that agencies are massively underregulating when they employ feasibility analysis.

Our own survey of feasibility analyses by agencies provides little evidence that this test guides or constrains agencies. As the chromium and paper mill regulations illustrate, the agencies' use of the test seems to be ad hoc. The explanations are unpersuasive, the presumptions or rules they use arbitrary, and the recourse to exceptions frequent and inadequately justified. Agencies' record with CBA is not perfect, either,[223] and perhaps agencies could improve their feasibility analysis with practice and guidance from OMB. But on the evidence so far, the claim that feasibility analysis provides meaningful guidance is unsupported.

To be sure, feasibility analysis can be made arbitrarily specific, thus driving decision costs down. The OSHA chromium rule reflects such an attempt. But the error costs become huge. A regulation that could save many lives at relatively low cost becomes impossible because the industry is small or poor. Alternatively, feasibility analysis can remain vague, more of a standard, as in the EPA paper mill approach. Now, however, it becomes difficult to understand why EPA drew the line it did—one mill shutdown rather than two. At the same time, EPA continues to ignore costs that matter to people, such as the

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221 Driesen, 32 BC Envir Aff L Rev at 17 n 85 (cited in note 1).

222 Id at 16.

223 See Robert W. Hahn and Patrick M. Dudley, *How Well Does the Government Do Cost-Benefit Analysis?* *23 (AEI-Brookings Institution Working Paper No 04-01, Jan 2004), online at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=495462 (visited May 5, 2010); Robert W. Hahn, et al, *Assessing Regulatory Impact Analyses: The Failure of Agencies to Comply with Executive Order 12,866*, 23 Harv J L & Pub Pol 859, 877 (2000). See also generally Richard D. Morgenstern, ed, *Economic Analysis at EPA: Assessing Regulatory Impact* (Resources for the Future 1997). Other sources are listed in Adler and Posner, *New Foundations of Cost-Benefit Analysis* at 214–15 n 35 (cited in note 9).

increase in the price of paper. So even with high decision costs, error costs remain high as well.

C. Does Feasibility Analysis Have an Alternative Normative Basis?

Let us return to the idea that feasibility analysis has an alternative normative basis.[224] If it is not welfarist, what would that basis be? Philosophers distinguish consequentialist and deontological approaches to ethics. The consequentialist believes that acts should be evaluated on the basis of the goodness of their consequences; the deontologist believes that acts should be evaluated on the basis of their own quality—for example, one should not (presumptively) lie even when lying has good consequences. Within consequentialism, welfarism is only one version: one could care about consequences for people's welfare, but one could also care about consequences in other ways—for people's virtue, for example. And then welfarism can be defined in various ways. Welfare might refer to positive subjective experience or mental states; the satisfaction of desires (or of certain desires); or objective goods (such as education).[225]

Feasibility analysis clearly does not reflect deontological thinking; we have argued that it also does not reflect welfarism in any straightforward sense.[226] Welfarism normally suggests that all aspects of a person's well-being be taken into account, not just aspects of well-being related to employment, health, and safety.[227] Perhaps, though, feasibility analysis can be based on a version of welfarism that stresses these conditions over all others. This could be attached to incommensurability worries—that certain values should not be traded off each other, that it is wrong for an agency to hold off regulating a substance

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224 This was suggested by Shapiro and Schroeder, 32 Harv Envir L Rev at 459–62 (cited in note 3); Driesen, 32 BC Envir Aff L Rev at 49 (cited in note 1), albeit without any clear indication of what that theory would be.

225 See Amartya Sen, *On Ethics & Economics* 40–51 (Basil Blackwell 1987) (considering and analyzing these possibilities); James Griffin, *Well-Being: Its Meaning, Measurement, and Moral Importance* 1–20 (Oxford 1986) (same); L.W. Sumner, *Welfare, Happiness, and Ethics* 1–20 (Clarendon 1996) (same); Adler and Posner, *New Foundations of Cost-Benefit Analysis* at 28–39 (cited in note 9) (discussing existing accounts of welfare, such as mental-state and objective good accounts, and proposing a "restricted, preference-based account of well-being"); John Bronsteen, Christopher Buccafusco, and Jonathan S. Masur, *Welfare as Happiness*, 98 Georgetown L J *1–2 (forthcoming 2010), online at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1397843 (visited Nov 15, 2009) (arguing that "well-being is neither preference-satisfaction nor nature-fulfillment but rather happiness or positive effect—*feeling good*").

226 See Part III.B.

227 See Martha C. Nussbaum, *Women and Human Development: The Capabilities Approach* 116–17 (Cambridge 1993).

that damages workers' lungs so that consumer products will be a few dollars cheaper.[228]

Most economists reject this argument but philosophers have taken it seriously.[229] One school of thought holds that goods contribute to well-being only if the agent would rationally prefer those goods under full information; others argue that well-being is objective, in the sense that people's well-being depends on their ability to engage in certain activities regardless of whether they actually desire to engage in these activities.[230] Martha Nussbaum, for example, suggests the following objective list of qualities that comprise welfare: life; bodily health; bodily integrity; senses, imagination, and thought; emotions; practical reason; affiliation (including the goods of both friendship and self-respect); play; other species; and control over one's environment (including both political rights and property rights).[231] Other accounts emphasize different goods but are largely consistent with Nussbaum's objectivist approach.[232]

Feasibility analysis advances bodily health and bodily integrity but it does not take into account the other goods, with the result that regulations will favor only two of the eight items on Nussbaum's list and, similarly, a small portion of the goods on other philosophers' lists. Affiliation requires access to transportation so that one can visit friends, attend political meetings, and the like. Control over one's environment presupposes the affordability of goods that one needs in order to manipulate the environment. Tradeoffs must be made. Sometimes these tradeoffs are tragic—people are forced to choose between goods about which they have fundamental entitlements.[233] Sometimes they are not. If a person chooses to move from a very clean rural area to a very slightly polluted city in order to take advantage of cultural opportunities, but in doing so takes a miniscule risk of early death, this

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228 See, for example, Elizabeth Anderson, *Value in Ethics and Economics* 44–64 (Harvard 1993).

229 See Griffin, *Well-Being* at 75–92 (cited in note 225); Sumner, *Welfare, Happiness, and Ethics* at 200–17 (cited in note 225).

230 See Sumner, *Welfare, Happiness, and Ethics* at 27–34 (cited in note 225). See, for example, Henry Sidgwick, *The Methods of Ethics* 111–12 (Cambridge 1901); Sen, *On Ethics and Economics* at 60 (cited in note 225).

231 Nussbaum, *Women and Human Development* at 78–80 (cited in note 227). Nussbaum does not advance her view as a comprehensive account of welfare but as a list of central political goods that people with different views of welfare should endorse for political purposes. We use her list for illustration only.

232 Adler and Posner, *New Foundations of Cost-Benefit Analysis* at 31–32 (cited in note 9) (describing other objective conceptions of welfare).

233 Martha C. Nussbaum, *The Costs of Tragedy: Some Moral Limits of Cost-Benefit Analysis*, 29 J Legal Stud 1005, 1007 (2000).

is hardly a tragedy. In either case, a regulatory decision procedure that requires agencies to focus on health and bodily integrity to the exclusion of all else would not advance people's well-being.

If standard economic accounts of well-being are to be rejected and replaced with philosophical accounts that distrust (some of) people's choices, that may be reasonable, but then the challenge is to invent a decision procedure that reflects the proper interpretation of well-being. An objective or limited desire-based approach will exclude certain goods and activities that people care about but not those that feasibility analysis ignores. CBA will continue to be appropriate as long as a sufficient portion of consumer choices continue to be respected under the alternative approach. If not, it can be modified so that people's preferences for objectively bad or rationally undesirable goods are ignored.[234]

But our goal is not to defend CBA. It is certainly possible that this decision procedure is not consistent with the correct theory of well-being. It is, however, consistent with a range of reasonable conceptions of well-being. Feasibility analysis is not. No attempt to reverse-engineer a theory of well-being that justifies feasibility analysis has been successful.

D. The Politics of Feasibility Analysis

If our analysis is correct so far, feasibility analysis does not necessarily have a pro- or anti-regulatory bias. In some sectors it results in overregulation; in others it results in underregulation. It is impossible to say anything more general. Yet in political debates, proregulatory groups generally favor feasibility analysis, while anti-regulatory groups favor CBA. What explains this pattern?

We do not know the answer but can speculate. CBA is associated with the administration of Ronald Reagan, who sought to deregulate entire sectors of the economy and curtail regulation in others.[235] Although CBA had been used in government before then, Reagan was the first to institutionalize it—to require agencies to use it as a matter of routine—and therefore CBA is associated with an anti-regulatory mentality. It may well have been introduced by Reagan's OMB because he and other political leaders believed that most regulations do not in fact pass the cost-benefit test or because CBA would introduce bureaucratic hurdles that would at least slow down regulation.[236]

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234 See Adler and Posner, *New Foundations of Cost-Benefit Analysis* at 124–53 (cited in note 9) (describing a process for laundering preferences).

235 See note 7 and accompanying text.

236 See Adler and Posner, *New Foundations of Cost-Benefit Analysis* at 3–4 (cited in note 9) (analyzing the political economy of CBA).

Whatever they might have thought, many regulations since then have passed the cost-benefit test.[237]

Feasibility analysis, by contrast, has been understood to apply when statutes forbid considerations of costs and benefits, and it would therefore often seem to support strict regulations that are not clearly cost-justified. As we have seen, however, the technological and economic feasibility conditions can be interpreted in quite a stringent way, so as to bar regulation that CBA would permit. In their anxiety to refute CBA, proponents of regulation have had to fall back on feasibility analysis as an alternative, but they have not realized that feasibility analysis might be no more favorable to regulation than CBA is.

Indeed, there is a possible public choice interpretation of feasibility analysis that is in tension with good-government premises: it may reflect a political deal between industry, on the one hand, and environmental or labor groups, on the other. Industry receives protection from regulations that greatly reduce profits; environmental and labor groups obtain reductions in workplace accidents and environmental pollution. The loser is the consumer, whose interests receive zero weight. This pattern is reproduced in the dispute over the meaning of feasibility itself. Most of the interpretations of this term—those emphasizing plant closures, lost revenues, lost profits, and firm bankruptcies—favor organized interests. Plant closures outrage communities and their political representatives. Lost revenues and profits, and bankruptcies, make businesses unhappy. Job loss that is spread across industries receives no attention, just like consumer welfare, because those affected are not politically organized.

Why then has industry shifted its support to CBA? One possibility is that feasibility analysis in the hands of agencies proved so easily manipulated that the deal came unstuck. Agencies, staffed with people deeply committed to their regulatory mission, went beyond the limits that feasibility analysis was supposed to impose—or so businesses might have believed.[238] Businesses threw their weight behind Ronald Reagan and supported CBA because at least that approach is more predictable. Or it may be that Presidents—including Reagan's successors—are not as vulnerable to interest group pressure as Congress is, and so insisted on CBA

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[237] For this reason, some liberal scholars support CBA. See, for example, Sunstein, *The Cost-Benefit State* at 6–10 (cited in note 9); Revesz and Livermore, *Retaking Rationality* at 9–12 (cited in note 9).

[238] See, for example, Ackerman and Stewart, 37 Stan L Rev at 1335–37 (cited in note 12); Hahn, 71 U Chi L Rev at 1028–29 (cited in note 9); Breyer, *Regulation and its Reform* at 32–42 (cited in note 15), and others who argue that much environmental regulation has been excessive or excessively costly.

because it would improve public welfare, possibly redounding to the electoral benefit of the President, rather than send rents to interest groups. This would explain why the executive branch has championed CBA across five administrations (both Democratic and Republican), while Congress has wavered between the standards,[239] influenced sometimes by businesses and at other times by pro-regulatory groups.

A final point: it is possible to imagine conditions under which feasibility is both pro-regulatory in impact and desirable from a broad social welfare standpoint, but these conditions are very unlikely to exist. Suppose that agencies have "ideal points"—in the language of political science—at the same place in the political spectrum that the public has.[240] Agencies, in other words, are good agents for the public interest. CBA, correctly performed, would put agencies in the same location on the ideological spectrum. However, CBA is expensive and crude[241] and accordingly would create a drag on otherwise optimal regulation. Perhaps in this case a weaker standard such as feasibility would be preferable. But this argument for feasibility analysis is very tricky. No standard at all would be better still if agencies act in the public interest when unconstrained; the feasibility standard would be desirable only if agencies tend to underestimate harm to workers and overestimate costs to consumers, so that a direction to pay attention to workers and ignore consumers would somehow balance out the agencies' natural inclinations and produce optimal incentives to regulate. If this is the case for feasibility analysis—and it is the only one we can think of—a great deal of empirical work would be necessary to prevail over one's natural skepticism about the accuracy of these premises.

One could put this argument differently. If agencies are inclined to underregulate, and CBA would only exacerbate this tendency because of the costs and hurdles it introduces, then it may well make sense to refrain from requiring agencies to conduct CBA. But some standard must be used. Feasibility analysis does not necessarily correct for the deficiencies of CBA because it invites agencies to stop regulat-

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239 See Sunstein, *The Cost-Benefit State* at 10–16 (cited in note 9) (discussing the use of cost-benefit balancing in both the executive branch and Congress since the 1980s, and noting that Congress has alternated between several types of standards, including flat bans on consideration of costs, feasibility requirements, and cost-benefit requirements).

240 See Adler and Posner, *New Foundations of Cost-Benefit Analysis* at 103–07 (cited in note 9) (discussing the relationship between agencies, the executive branch, Congress, and the courts, and the potential for principal-agent problems).

241 This is a frequent charge of critics. See, for example, Thomas O. McGarity, *A Cost-Benefit State*, 50 Admin L Rev 7, 13 (1998) (leveling this charge); Thomas O. McGarity, *Some Thoughts on "Deossifying" the Rulemaking Process*, 41 Duke L J 1385, 1413 (1992) (same).

ing in order to avoid negative economic impacts. At the same time, it encourages agencies to ignore other costs that matter. The most straightforward solution to the problem of underregulation—if it is a problem, which is far from clear—would be to fund and staff agencies more generously and to invest in improvements in the practice of CBA.

CONCLUSION

We have discovered no reason for agencies to use feasibility analysis, and, given its ambiguity and its unacceptable normative implications, we doubt that agencies actually allow it to guide their decisionmaking. Most likely, agencies engage in informal cost-benefit balancing while taking into account political constraints that exist because of public (or congressional) hostility to plant closings, or they simply strike a deal with employers and labor and environmental groups at the expense of consumers. Whether feasibility analysis actually constrains agencies or serves as a subterfuge for decisions arrived at on other grounds, it has no place in regulatory decisionmaking.

Remedies are straightforward. Where statutes delegate agencies policymaking authority, those agencies should exercise their power under the *Chevron* doctrine to replace feasibility analysis with CBA or another suitable decision procedure. OIRA should encourage agencies to take this step; it might reasonably go so far as to forbid agencies to use feasibility analysis to the extent permitted by law. Courts should adopt a presumption that regulatory statutes do not authorize feasibility analysis. Congress should refrain from incorporating the feasibility test in regulatory statutes, and should amend existing statutes so that they no longer do so.

APPENDIX

TABLE A1: SELECTED FEASIBILITY-TRIGGERING STATUTES

Statute	US Code	Language (Emphasis Added)
"Feasible" Statutes		
The Occupational Safety and Health Act of 1970	29 USC § 652(8)	". . . requires conditions . . . reasonably necessary or appropriate to provide . . . ."
	29 USC § 655(b)(5)	". . . the standard which most adequately assures, to the extent feasible, on the basis of the best available evidence . . . ."
Federal Mine Safety and Health Act of 1977	30 USC § 811(a)(6)(A)	"…standards which most adequately assure on the basis of the best available evidence that no miner will suffer material impairment . . . ." Additional considerations of "highest degree of health and safety" include "the latest available scientific data . . . the feasibility of the standards, and experience gained under this and other health and safety laws."
"Best Available" / "Maximum Available" Statutes		
Clean Air Act - Prevention of Significant Deterioration Program - National Ambient Air Quality Standards	42 USC § 7475(a)(4)	" . . . subject to the best available control technology for each pollutant . . . ."
	42 USC § 7479(3)	Defines BACT as " . . . maximum degree of reduction . . . taking into account energy, environmental, and economic impacts and other costs . . . ."
Clean Air Act - Emission Standards	42 USC § 7412(d)(2)	" . . . maximum degree of reduction [achievable] . . . taking into consideration the cost of achieving such emission reduction . . . ."
Clean Air Act - Standards of Performance for New Stationary Sources	42 USC § 7411(a)(1)	" . . . best system of emission reduction . . . taking into account the cost…and any nonair quality health and environmental impact and energy requirements . . . [that has been] adequately demonstrated."
Clean Water Act	33 USC § 1326(b)	" . . . reflect the best technology available for minimizing adverse environmental impact."
	33 USC § 1311(b)(2)(A)(i)	". . . best available technology economically achievable . . . which will result in reasonable further progress . . . ."
	33 USC § 1314(b)(2)(B)	Factors "shall" include "age of equipment and facilities involved, the process employed, the engineering aspects of the application . . . process changes, the cost of achieving such effluent reduction, non-water quality environment impact (including energy requirements), and such other factors as the Administrator deems appropriate."
	33 USC § 1311(b)(2)(E)	". . . best conventional pollutant control technology . . . ."
	33 USC § 1316(a)(1)	" . . . greatest degree of effluent reduction . . . achievable through . . . best available demonstrated control technology . . . ."
	33 USC § 1316(b)(1)(B)	"…take into consideration the cost of achieving such effluent reduction, and any non-water quality, environmental impact and energy requirements."
"Reasonably Available" / "Best Practicable" Statutes		
Clean Air Act	42 USC § 7502(c)(1) (formerly 42 USC § 7502(b)(3))	". . . through the adoption, at a minimum, of reasonably available control technology . . . ."
Clean Water Act	33 USC § 1311(b)(1)(A)(i)	" . . . best practicable control technology currently available . . . ."
	33 USC § 1314(b)(1)(B)	"Factors . . . include consideration of the total cost of application of technology in relation to the effluent reduction benefits to be achieved . . . ."

TABLE A2: OSHA'S ANALYSIS OF CHROMIUM HIGH-IMPACT INDUSTRIES

Industry	Compliance Costs as a Percentage of Revenue	Compliance Costs as a Percentage of Profits	Explanation of Deviation from Screening
Electroplating – General Industry			
Specialty Trade Contractors (NAICS 238)	0.43%	11.14%	Only a few establishments reported use.
Electroplating, Plating, Polishing, Anodizing, and Coloring Services (NAICS 332813)	1.24%	30.15%	Industry sells service not product, so overseas competition should not be strong. Electroplating is "essential to the manufacture of most plated products," implying that demand is unlikely to decrease. Industry experienced and survived profit variation of up to 49% in single year. The 1.24% price increase is "significantly less than the average annual increase in price." Demand is inelastic because plating is just a component of product's total cost (less than 0.5%).
Wholesale Trade, Durable Goods (NAICS 423)	0.28%	11.01%	Only a few establishments reported use.
Motor Vehicle and Parts Dealers (NAICS 441)	0.23%	16.27%	Only a few establishments reported use.
Furniture and Home Furnishing Stores (NAICS 442)	0.66%	17.59%	Only a few establishments reported use.
Electronics and Appliance Stores (NAICS 443)	0.50%	14.70%	Only a few establishments reported use.
Building Materials and Garden Equipment and Supplies Dealers (NAICS 444)	0.55%	11.18%	Only a few establishments reported use.
Health and Personal Care Stores (NAICS 446)	0.44%	17.46%	Only a few establishments reported use.
Miscellaneous Store Retailers (NAICS 453)	0.71%	22.73%	Only a few establishments reported use.
Nonstore Retailers (NAICS 454)	0.61%	16.01%	Only a few establishments reported use.
Information Services and Data Processing Service (NAICS 519)	3.12%	35.01%	Only a few establishments reported use.

Rental and Leasing Services (NAICS 532)	0.86%	34.20%	Only a few establishments reported use.
Professional, Scientific, and Technical Services (NAICS 541)	0.85%	13.52%	Only a few establishments reported use.
Administrative and Support Services (NAICES 561)	1.05%	27.60%	Not counted in the tally of thirty-one high impact industries and no explanation given. Likely only a few establishments reported use.
Performing Arts, Spectator Sports, and Related Industries (NAICS 711)	5.17%	54.93%	Only one establishment reported use; possible mistake.
Personal and Laundry Services (NAICS 812)	2.58%	49.92%	Only a few establishments reported use.
Welding - General Industry (Stainless Steel)			
Gasoline Stations (NAICS 447)	0.22%	29.52%	Only a few establishments reported use.
Nursing and Residential Care (NAICS 623)	1.56%	30.07%	Only a few establishments reported use.
Social Assistance (NAICS 624)	1.14%	22.34%	Only a few establishments reported use.
Food Services and Drinking Places (NAICS 722)	0.49%	11.93%	Only a few establishments reported use.
Repair and Maintenance (NAICS 811)	0.40%	10.49%	Given that it is a service industry, demand for repairs should remain relatively constant and foreign competition should not pose a problem.
Personal and Laundry Services (NAICS 812)	0.67%	13.02%	Given that it is a service industry, demand for repairs should remain relatively constant and foreign competition should not pose a problem.
Religious, Grantmaking, Civil, Professional and Similar Organizations (NAICS 813)	3.91%	158.08%	Only one establishment reported use; possible mistake.
Welding – Construction Industry (Stainless Steel)			
Building, Developing, and General Contracting; Heavy Construction; Special Trade Contractors (NAICS 233, 234, 235)	0.92%	22.33%	Passing costs on would only increase price 0.92% and steel prices have varied more than 10% a year without affecting the industry.

Welding - General Industry (Carbon Steel)			
Religious, Grantmaking, Civil, Professional and Similar Organizations (NAICS 813)	1.00%	40.34%	Only one establishment reported use; possible mistake.
Painting – General Industry			
Motor Vehicle Body and Trailer Manufacturing (NAICS 3362)	0.51%	20.44%	Merely part of manufacturing process, so the actual cost is insignificant in terms of the final product price and should be largely passed on.
Military Armored Vehicle, Tank, and Tank Component Manufacturers (NAICS 336992)	0.25%	10.14%	Merely part of manufacturing process, so the actual cost is insignificant in terms of the final product price and should be largely passed on.
Used Car Dealers (NAICS 44112)	0.41%	33.66%	Cr(VI) alternatives already exist, the use of Cr(VI) is only a small portion of the actual business, and demand is probably fairly inelastic.
Automotive Body, Paint, and Interior Repair and Maintenance (NAICS 811121)	1.50%	39.16%	Cr(VI) alternatives are already developed, the use of Cr(VI) is only a small portion of the actual business, and demand is probably fairly inelastic.
Chromium Catalyst Producers			
All Other Basic Inorganic Chemical Manufacturers (NAICS 325188)	0.80%	27.14%	Short-term demand is relatively inelastic since most companies would need major new investments to shift away from CR(VI) catalysts.
Iron and Steel Foundries			
Iron Foundries; Steel Investment Foundries; Steel Foundries (Except Investment) (NAICS 3315, 331512, 331513)	0.42%	15.30%	Monitoring costs make up 44% of estimated compliance costs, but such costs could be reduced to less than 10% of profits if performance-based monitoring is used instead of scheduled periodic monitoring. Industry has absorbed 32% increase in price of steel over past two years and survived.
Chromium Catalyst Users – Service Companies			
Other Services to Buildings and Dwellings, Including Catalyst Handling (NAICS 325110)	0.44%	11.59%	Demand should remain constant since companies are more likely to turn to service companies when regulation is increased.

Source: 71 Fed Reg at 10272–80 table VIII-7 (cited in note 63) (data); 71 Fed Reg at 10300–02 (cited in note 63) (explanation).