EQUITY AND FEASIBILITY REGULATION

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INTRODUCTION

Two major approaches to regulating industrial health risks have emerged over the past fifty or so years.[1] Feasibility analysis—the approach required by parts of the Clean Air Act of 1970 ("Clean Air Act"),[2] the Clean Water Act of 1972 ("Clean Water Act"),[3] and the Occupational Safety and Health Act of 1970[4] ("OSH Act")—says to reduce risks to the maximum extent possible without threatening the existence or competitive stability of the regulated industries.[5] By contrast, cost-benefit analysis ("CBA")—the approach that has dominated regulatory policy since the Reagan administration[6]—says to reduce risks to the point at which net social benefits would be maximized,[7] that is, to

1. A third and somewhat less prevalent approach to risk regulation is the "health-based" or "safety-based" approach, which requires risks to be eliminated or reduced to a specified level, regardless of cost or impact on industry. *See* Michael A. Livermore & Richard L. Revesz, *Rethinking Health-Based Environmental Standards*, 89 N.Y.U. L. REV. 1184, 1193–94 (2014) (describing health-based standards as "the third principal approach to determining the stringency of environmental regulation," after designating cost-benefit analysis and feasibility analysis as the other two major approaches).

2. *See* Clean Air Act Amendments of 1977, 42 U.S.C. §§ 7475(a)(4), 7479(3) (2012).

3. *See* Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. §§ 1311(b)(2)(A)(i), 1316(a)(1), 1316(b)(1)(B) (2012).

4. *See* Occupational Safety & Health Act of 1970, 29 U.S.C. § 655(b)(5) (2012).

5. *See, e.g.*, United Steelworkers of Am. v. Marshall, 647 F.2d 1189, 1272 (D.C. Cir. 1980) (explaining economic feasibility for purposes of the OSH Act).

6. *See, e.g.*, Exec. Order No. 12,866, 3 C.F.R. 638, 639 (1993) (ordering regulatory agencies to conduct CBA for all significant regulations); Exec. Order No. 12,291, 3 C.F.R. 127, 128 (1981).

7. *See* Livermore & Revesz, *supra* note 1, at 1190 ("Cost-benefit analysis, in its most

invest in risk reduction up to (but not beyond) the point at which further investment would cost more than it would save in accident costs.[8]

Although the normative basis of CBA is generally agreed to be some form of welfarism,[9] consensus over the normative basis of feasibility analysis has been more elusive. The feasibility approach has alternately been defended on the basis of fairness,[10] Rawlsian social contract theory,[11] and, most recently, welfarism informed by a "concentration principle."[12]

The absence of consensus as to the normative basis of feasibility analysis has left it vulnerable to attack. Most prominently, Jonathan Masur and Eric Posner have charged that the feasibility approach is normatively indefensible and has no place in risk regulation.[13] Masur and Posner contend that feasibility regulation

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general form, places both costs and benefits along a common metric and supports the standard that maximizes net benefits (the difference between benefits and costs).").

8. *See* Jonathan S. Masur & Eric A. Posner, *Against Feasibility Analysis*, 77 U. CHI. L. REV. 657, 697 (2010) ("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.").

9. The term welfarism, term in this article, see *infra* text accompanying note 116, is the view that the normatively appropriate action or policy is that which maximizes social welfare (overall well-being). *See* Matthew D. Adler & Eric A. Posner, *Implementing Cost-Benefit Analysis When Preferences Are Distorted*, *in* COST-BENEFIT ANALYSIS: LEGAL, ECONOMIC, AND PHILOSOPHICAL PERSPECTIVES 269, 274 (Matthew D. Adler & Eric A. Posner eds., 2001) ("[T]here is a genuine normative criterion that does plausibly justify the use of CBA, and that is the criterion of overall well-being.").

10. *See* ROBERT E. KEETON ET AL., TORT AND ACCIDENT LAW: CASES AND MATERIALS 1255–57 (4th ed. 2004) [hereinafter KEETON ET AL., TORT AND ACCIDENT LAW]; ROBERT E. KEETON, LEWIS D. SARGENTICH, & GREGORY C. KEATING, TEACHER'S MANUAL TO ACCOMPANY TORT AND ACCIDENT LAW: CASES AND MATERIALS 20-6–20-12 (3d ed. 1998).

11. *See* Gregory C. Keating, *A Social Contract Conception of the Tort Law of Accidents*, *in* PHILOSOPHY AND THE LAW OF TORTS 22, 23 (Gerald J. Postema ed., 2001) [hereinafter Keating, *Social Contract*] (using social contract theory to analyze accident law); Gregory C. Keating, *Pressing Precaution Beyond the Point of Cost-Justification*, 56 VAND. L. REV. 653, 681 (2003) [hereinafter Keating, *Pressing Precaution*] (discussing social contract theory and interpersonal comparison to assess how to measure risk imposition and comparable harm).

12. *See* David M. Driesen, *Distributing the Costs of Environmental, Health, and Safety Protection: The Feasibility Principle, Cost-Benefit Analysis, and Regulatory Reform*, 32 B.C. ENVTL. AFF. L. REV. 1, 35 (2005) [hereinafter Driesen, *Feasibility Principle*] (noting that the concentration principle is useful in determining the significance of cost distribution); David M. Driesen, *Two Cheers for Feasible Regulation: A Modest Response to Masur and Posner*, 35 HARV. ENVTL. L. REV. 313, 319, 339 (2011) [hereinafter Driesen, *Two Cheers*] (explaining that concentrated costs have harmful impacts).

13. *See* Masur & Posner, *supra* note 8, at 661–62; *see also* Livermore & Revesz, *supra* note 1, at 1193 (endorsing Masur and Posner's normative critique of feasibility-based reg-

promotes overall well-being less effectively than CBA does,[14] and has no clearly identifiable nonwelfarist rationale.[15] Feasibility regulation has also been attacked on the grounds that it delivers indefensible results. A number of scholars have charged that feasibility analysis results both in "overregulation" that requires unjustifiably large investments in risk reduction[16] and in "underregulation" that tolerates unjustifiably dangerous industrial practices.[17]

If this line of criticism were correct, there would be cause for serious concern. Important parts of the Clean Air Act, Clean Water Act, and OSH Act—statutes which together comprise the foundation of environmental and workplace safety legislation in the United States—would lack a normative basis, and that would be deeply troubling. The stakes are high when it comes to the regulation of the risks industrial activity poses to human health. Not only do people's lives hang in the balance, but so does the long-term vitality of the nation's economy. For federal law to be getting risk regulation fundamentally wrong by taking a feasibility approach would be an intolerable state of affairs.

Thankfully, the feasibility approach is normatively sound. This article offers a novel account of its normative basis. The norm underlying feasibility regulation is *equity*. Closely related to the notion of fairness, equity is specifically concerned with equalizing

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ulation).

14.   *See* Masur & Posner, *supra* note 8, at 699–707.

15.   *See id.* at 707–09, 707 n.224. Masur and Posner summarily dismiss the possibility that the feasibility principle rests on deontological considerations, and fail to consider the possibility of it resting on social contract theory. *See id.* at 707.

16.   *See, e.g.*, MATTHEW D. ADLER & ERIC A. POSNER, NEW FOUNDATIONS OF COST-BENEFIT ANALYSIS 110 (2006) (noting that "a regulation that does not bankrupt an industry may nonetheless lower overall welfare"); DOUGLAS A. KYSAR, REGULATING FROM NOWHERE: ENVIRONMENTAL LAW AND THE SEARCH FOR OBJECTIVITY 7 (2010) (noting that economic reformers object to feasibility analysis on the grounds that "[i]t is simply not the case . . . that more protection is always better"); Livermore & Revesz, *supra* note 1, at 1193 (stating the over-regulation objection); Masur & Posner, *supra* note 8, at 702 ("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."); *id.* at 704 ("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.").

17.   *See, e.g.*, Adler & Posner, *supra* note 9, at 110 (observing that "a sufficiently harmful industry should be bankrupted"); Livermore & Revesz, *supra* note 1, at 1193 (stating the underregulation objection); Masur & Posner, *supra* note 8, at 704 ("Underregulation occurs because feasibility analysis tolerates dangerous industrial practices if regulation would shut down plants.").

the burdens borne and benefits enjoyed by differently situated individuals as the result of some collectively beneficial activity or policy. It is precisely this concern that underlies feasibility regulation.

CBA, at least in its most traditional form, is driven by a concern for maximizing social welfare. CBA is commonly defended on the grounds that it results in the greatest increase in the welfare of society as a whole.[18] The argument for feasibility regulation is that, although it may sometimes lead to a somewhat lower level of overall well-being, it typically results in a more equitable distribution of the burdens and benefits of risky industrial activities.

Quite often, the health risks posed by a toxic substance or emission are concentrated on a relatively small group of workers or plant neighbors, while the costs of mitigating those risks are distributed among a vast number of consumers or shareholders.[19] In this common scenario, a substantial reduction in each risk-bearer's risk of suffering death or serious bodily harm can typically be achieved at a cost that, while perhaps significant in the aggregate, is trivial for each person responsible for bearing such costs. Equity requires that such regulatory investments be made, even if they are excessive from the perspective of CBA.

The Occupational Safety and Health Administration ("OSHA") provides an illustrative example in its recent regulation of occupational exposure to hexavalent chromium, a carcinogenic substance used in a number of industries. In 2006, following its statutory mandate, OSHA fixed the new permissible exposure limit ("PEL") for chromium at what it determined to be the lowest feasible level of 5 micrograms per cubic meter ("$\mu g/m^3$"), despite that the cost-justified PEL was, on a plausible set of assumptions, determined to be 10 $\mu g/m^3$.[20] In other words, OSHA determined that setting the chromium PEL at the lowest feasible level of 5 $\mu g/m^3$ would result in a net loss to social welfare compared to the cost-justified level of 10 $\mu g/m^3$. What, then, could possibly have been the rationale for doing so?

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18. *See, e.g.*, Livermore & Revesz, *supra* note 1, at 1190.

19. *See infra* Part IV.A.3.

20. *See infra* Table 1 and sources cited therein.

The answer lies in a consideration of the costs and benefits of chromium regulation for each affected individual. While each worker's annual risk of developing fatal lung cancer was 1 in 769 at the 10 µg/m³ level, the risk fell to 1 in 1521 if the chromium PEL was reduced to 5 µg/m³.[21] While a rational worker would be willing to pay more than $4000 for this reduction,[22] the $112 million total cost of accomplishing that reduction for all workers was likely to be distributed among millions of consumers, making the cost less than (and probably *much* less than) $100 per consumer.[23] Thus, a safety benefit worth more than $4000 to each worker could be provided at a cost of less than $100 for each consumer. Considerations of equity therefore weighed strongly in favor of reducing the chromium PEL to 5 µg/m³, notwithstanding that social welfare would have been maximized at the more lenient PEL of 10 µg/m³.[24] This line of reasoning generally justifies the feasibility point as a floor for risk regulation and responds to the objection that feasibility analysis unjustifiably overregulates relative to CBA.

There is also a sound normative basis for imposing the feasibility point as a ceiling for risk regulation.[25] Capping regulatory investments at the feasibility point makes sense provided that, at that point, the industry remains socially beneficial in a pluralistic, "all things considered" sense to be specified in Part IV. In such circumstances, requiring investment beyond the feasibility point is tantamount to requiring the disruption of an industrial activity that, from a moral point of view, improves the state of the world on net and ought to be pursued. This point generally justifies the feasibility point as a ceiling for risk regulation and responds to the objection that feasibility analysis unjustifiably underregulates relative to CBA.

This article has four parts. Parts I through III set the stage. Part IV contains the heart of the argument. Part I generally describes feasibility-based regulation, with an emphasis on how it has been implemented by OSHA. Part II describes and critiques

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21. *See infra* Table 1 and sources cited therein.
22. This follows from OSHA's use of a $6.8 million value of a statistical life. *See infra* p. 1308.
23. *See infra* notes 189–93 and accompanying text.
24. *See infra* pp. 1309, 1311.
25. *See infra* Part IV.B.

the existing justifications that have been offered for the feasibility approach, focusing on those proposed by David Driesen and Gregory Keating. Part III describes the most promising normative basis for the feasibility approach: the norm of equity, as that norm is interpreted by a strand of social contract theory known as contractualism. Part III also introduces normative pluralism—the view that moral judgment should embrace considerations of both equity and overall well-being—which constitutes the "master theory" on which this article's defense of feasibility regulation rests. Part IV explains how normative pluralism generally and contractualism specifically can justify the feasibility point as both a floor and a ceiling for risk regulation.

I. WHAT IS FEASIBILITY REGULATION?

The use of the term "feasible" in the regulatory context appears to have originated with the OSH Act.[26] The OSH Act provides that, in promulgating regulatory standards for toxic materials or other hazardous substances, OSHA

> shall set the standard which most adequately assures, *to the extent feasible*, on the basis of the best available evidence, that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to the hazard dealt with by such standard for the period of his working life.[27]

The Supreme Court has defined the term "feasible" in this context to mean "capable of being done," and on that basis held that the OSH Act's use of that term precluded consideration of cost in setting regulatory standards.[28] In a seminal case relating to this statute, the D.C. Circuit Court of Appeals interpreted the feasibility standard to impose two distinct sub-requirements—technological feasibility and economic feasibility[29]—each of which is discussed in detail below.

In this article, the term "feasibility-based regulation" refers not only to workplace safety regulations enacted under the authority

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26. *See* Masur & Posner, *supra* note 8, at 663 ("The term 'feasibility analysis' derives from the Occupational Safety and Health Act . . . .").

27. Occupational Safety and Health Act of 1970, 29 U.S.C. § 655(b)(5) (2012) (emphasis added).

28. *See* Am. Textile Mfrs. Inst., Inc. v. Donovan, 452 U.S. 490, 509 (1981).

29. *See* United Steelworkers of Am. v. Marshall, 647 F.2d 1189, 1264 (D.C. Cir. 1980); Am. Iron & Steel Inst. v. OSHA, 577 F.2d 825, 832 (3d Cir. 1978).

of the OSH Act, but also to environmental regulations enacted under the authority of the Clean Air Act[30] and Clean Water Act.[31] Though the term "feasible" may not appear in these statutes, the "best available technology" and "best practicable technology" standards the statutes impose have commonly been interpreted to contemplate the same sort of feasibility analysis used in the OSH Act context.[32]

A. *Technological Feasibility*

To establish that a proposed regulatory standard is technologically feasible, it must be shown by "the best available evidence" that there is a "reasonable possibility that the typical firm will be able to develop and install engineering and work practice controls that can meet the [proposed standard] in most of its operations."[33] This showing can be made by "pointing to technology that is either already in use or has been conceived and is reasonably capable of experimental refinement and distribution within the standard's deadlines."[34]

The technological feasibility requirement is commonly associated with the judicial observation that the feasibility standard is intended to be "technology-forcing."[35] This means, at a minimum, that a standard that "only the most technologically advanced plants in an industry have been able to achieve . . . in some of their operations some of the time" may be considered technologi-

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30. *See* 42 U.S.C. § 7475(a)(4) (2012) (requiring new facilities to employ "the best available control technology for each pollutant"); 42 U.S.C. § 7479(3) (defining "best available control technology" as a technology providing "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 . . .").

31. *See* 33 U.S.C. § 1326(b) (requiring "the best technology available for minimizing adverse environmental impact"); 33 U.S.C. § 1311(b)(2)(A)(i) (requiring "application of the best available technology economically achievable").

32. *See* Lisa Heinzerling, *Statutory Interpretation in the Era of OIRA*, 33 FORDHAM URB. L.J. 1097, 1101–02 (2006) (arguing the Clean Water Act's "technology-based requirements are not . . . based on cost-benefit analysis"); Masur & Posner, *supra* note 8, at 664 ("Environmental statutes involve an extensive array of verbal formulations, some of which appear to trigger feasibility analysis.").

33. *See United Steelworkers of Am.*, 647 F.2d at 1272.

34. *Id*.

35. *See id.* at 1264 (citing AFL-CIO v. Brennan, 530 F.2d 109, 121 (3d Cir. 1975)). *But see* Masur & Posner, *supra* note 8, at 691–92 (claiming that agencies "rarely issue technology-forcing regulations").

cally feasible for the entire industry to adopt.[36] The technological feasibility requirement may even permit the imposition of a standard that could only be met if firms within an industry developed and employed an entirely new technology.[37] As the D.C. Circuit observed, OSHA is not required "to prove with any certainty that industry will be able to develop the necessary technology, or even to identify the single technological means by which it expects industry to meet the [permissible exposure limit]."[38] OSHA need only "show that modern technology has at least conceived some industrial strategies or devices which are likely to be capable of meeting the PEL and which the industries are generally capable of adopting."[39]

B. *Economic Feasibility*

A regulatory standard is economically feasible if the costs of implementing it "will not threaten the existence or competitive structure of an industry, even if it does portend disaster for some marginal firms."[40] In other words, the economic feasibility principle says to reduce a given risk to the maximum extent possible without threatening the long-term viability of the industrial activity giving rise to the risk.[41] As one oft-quoted opinion explains,

> A standard is feasible if it does not threaten 'massive dislocation' to, or imperil the existence of, the industry. No matter how initially frightening the projected total or annual costs of compliance appear, a court must examine those costs in relation to the financial health and profitability of the industry and the likely effect of such costs on unit consumer prices. . . . [T]he practical question is whether the standard threatens the competitive stability of an industry, or

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36. *United Steelworkers of Am.*, 647 F.2d at 1264.

37. *See id.* at 1264–65 ("So long as it presents substantial evidence that companies acting vigorously and in good faith can develop the technology, OSHA can require industry to meet PEL's never attained anywhere.").

38. *Id.* at 1266.

39. *Id.*

40. *Id.* at 1272; *see also* Am. Textile Mfrs. Inst., Inc. v. Donovan, 452 U.S. 490, 530 n.55 (1981) (holding cotton dust standard economically feasible because "the industry will maintain long-term profitability and competitiveness").

41. It seems clear that the economically feasible level of precaution must necessarily be technologically feasible, i.e., must be achievable within the limits of available technology. Obviously, requiring a degree of safety that is technologically unattainable is inconsistent with the survival of the activity at issue.

> whether any intra-industry or inter-industry discrimination in the standard might wreck such stability or lead to undue concentration.[42]

Because economic feasibility is determined on an industry-wide basis, it does not "necessarily guarantee the continued existence of individual employers."[43] Thus, "[a] standard is not infeasible simply because it is financially burdensome . . . or even because it threatens the survival of some companies within an industry."[44]

In a given case, how do regulators determine whether the imposition of a particular standard threatens the existence or competitive stability of an industry? OSHA approaches this question in the first instance by conducting an industry-by-industry analysis. For each industry, OSHA determines the percentage of the industry's revenues and profits that the costs of complying with the standard represent.[45] On this point, one OSHA report offers the following guidance:

> [W]hile there is no hard and fast rule, in the absence of evidence to the contrary OSHA generally considers a standard economically feasible when the costs of compliance are *less than one percent of revenues*. Common-sense considerations indicate that potential impacts of such a small magnitude are unlikely to eliminate an industry or significantly alter its competitive structure particularly since most industries have at least some ability to raise prices to reflect increased costs. . . . There is an enormous variety of year-to-year events that could cause a one percent increase in a business's costs, *e.g.*, increasing fuel costs, an unusual one-time expense, changes in costs of materials, increased rents, increased taxes, etc.[46]

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42. *United Steelworkers of Am.*, 647 F.2d at 1265 (discussing Indust. Union Dep't, AFL-CIO v. Hodgson, 499 F.2d 467, 478 (D.C. Cir. 1974)) (internal citations omitted); *see also Am. Textile Mfrs. Inst., Inc.*, 452 U.S. at 531 (describing OSHA's determination that proposed standard for workplace cotton dust exposure was economically feasible because, "although some marginal employers may shut down rather than comply, the industry as a whole will not be threatened by the capital requirements of the regulation") (internal citations omitted).

43. *United Steelworkers of Am.*, 647 F.2d at 1265 (quoting *Indus. Union Dep't, AFL-CIO*, 499 F.2d at 478).

44. *Id.*

45. *See, e.g.*, Occupational Exposure to Hexavalent Chromium, 71 Fed. Reg. 10,100, 10,271–82 tbl.VIII-7 (Feb. 28, 2006) (to be codified at 29 C.F.R. pt. 1910) (describing results of industry-by-industry analysis of economic impact of proposed permissible exposure limit for hexavalent chromium).

46. *Id.* at 10,299–300 (emphasis added). The sort of "standard" at issue in OSHA health regulations is one that identifies a PEL for a particular toxic substance.

In at least one instance, OSHA concluded that where the costs of complying with a particular standard come to less than both 1% of an industry's revenues and 10% of its profits, implementation of the standard would not threaten the existence or competitive stability of the industry.[47] The reasoning here seems to be that if an industry is routinely able to absorb revenue and profit fluctuations within certain limits without seeing its existence or competitive stability undermined, then a regulatory standard whose implementation would cause a revenue or profit fluctuation within those same limits would not threaten the industry's existence or competitive stability.

Where a particular industry's compliance costs significantly exceed the threshold levels designated by OSHA (which are typically stated as a percentage of the industry's revenues and profits), OSHA determines whether complying with a particular standard will threaten the industry's existence or competitive stability. For example, in analyzing the economic feasibility of PELs for hexavalent chromium, OSHA expressed concern about how a PEL of 1 $\mu g/m^3$ would affect the electroplating industry:

> OSHA is concerned about the economic feasibility of the standard for electroplating at a PEL of 1 [$\mu g/m^3$]. At this lower PEL, costs of the standard represent 2.7 percent of revenues and 65 percent of profits. . . . It seems unlikely that a price increase of 2.7 percent . . . would eliminate the industry entirely. OSHA has concluded, however, that the costs associated with such a PEL could alter the competitive structure of the industry. OSHA has concluded this because these costs substantially exceed the average nominal price increases in the industry, and the reasons for these nominal price increases—increases in the cost of labor and energy, for example—will continue. Thus a price increase that would assure continued profitability for the entire industry would require almost tripling the annual nominal price increase. . . . That would represent a significant real price increase that might not be passed forward, particularly by older and less profitable segments of the industry.[48]

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47. *See id.* at 10,300 ("The record does not contain evidence that any of the affected industries for which OSHA found that the costs of complying with the standard will be less than both one percent of prior revenue and ten percent of prior profits will in fact be threatened by the standard. . . . [C]ost changes of less than one percent are routinely passed on and impacts that are less than 10 percent of profits have not been shown to be likely to affect the viability or competitive structure of any of the industries affected by this standard.").

48. *See id.* at 10,301–02.

The touchstone of OSHA's analysis here seems to be ensuring continued profitability,[49] which leads naturally to a focus on demand elasticity, i.e., the extent to which demand for the industry's product or service will be affected by fluctuations in price.[50] The less elastic the demand, the more an industry can pass on compliance costs to consumers without suffering a reduction in demand and a consequent reduction in profitability. Though, in the above case, OSHA concluded that "demand for electroplating services is relatively inelastic," making possible some degree of cost pass-through, it also concluded that the costs of compliance with the proposed standard (2.7% of revenues) were too large to be entirely passed on to consumers in the form of real price increases.[51] The implication seems to be that compliance with the proposed standard would mean diminishing electroplating firms' profits so much as to effectively make electroplating an unprofitable enterprise for at least some segments of the industry in question. That, OSHA implies, is at least part of what is meant by threatening the "competitive stability" or altering the "competitive structure" of an industry.[52]

C. *Is Feasibility Regulation Feasible?*

This article's primary concern is to articulate and defend a novel normative basis for the feasibility approach to risk regulation. The important practical question of implementation—how exactly a regulatory agency ought to determine how much regulation an industry can tolerate without seeing its existence threatened or its competitive stability undermined[53]—is largely outside the scope of discussion here. However, it will be helpful to briefly explain why the practical challenges presented by feasibility analysis are not insurmountable.

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49.   *See* Am. Textile Mfrs. Inst., Inc. v. Donovan, 452 U.S. 490, 530 n.55 (1981) (holding cotton dust standard economically feasible because "the industry will maintain long-term profitability and competitiveness").

50.   *See id.* at 533 n.61, 534.

51.   *See* Occupational Exposure to Hexavalent Chromium, 71 Fed. Reg. at 10,301.

52.   *See id.* at 10,102, 10,211.

53.   *See* Masur & Posner, *supra* note 8, at 702 & n.188 (charging that feasibility-based regulation "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?").

Regulatory agencies, with OSHA as the leading example, have developed a sensible general approach to implementing feasibility regulation. For example, with respect to economic feasibility,[54] OSHA's general approach is to calculate regulatory costs as a percentage of total industry revenues, and total industry profits and determine whether the industry has previously absorbed losses of similar magnitude without serious disruption.[55] Masur and Posner's critique of this approach is *not* that it fails as a reliable indicator of whether the existence or competitive stability of the regulated industries will be threatened. Instead, Masur and Posner contend only that, relative to CBA,[56] this approach results in underregulation in some circumstances (e.g., where industry profits or revenues are low), and overregulation in others (e.g., where industry profits or revenues are high).[57] Even if Masur and Posner are right about this, they will have shown only that feasibility analysis must be defended on the basis of a norm other than overall well-being. This article agrees with that proposition and argues that equity is the alternative norm that supports feasibility-based regulation.

Although there is undoubtedly room for improvement in some of the more specific aspects of agencies' implementation of the feasibility approach,[58] that is no reason to believe that it is incoherent or impractical to key risk regulation to the long-term survival of the regulated industries. Nor is it reason to question OSHA's basic practice of using an industry's revenues and profits to gauge the likely effect of regulatory costs on the industry's survival and competitive stability.

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54. On the distinction between economic feasibility and technological feasibility, see *infra* Part I.

55. *See infra* Part I.B.

56. *See* Masur & Posner, *supra* note 8, at 697 ("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.") (emphasis added).

57. *See id.* at 697–98.

58. For example, Masur and Posner may be correct that OSHA's use of a 10%-of-industry-revenues and 1%-of-industry-profits threshold for determining economic feasibility is somewhat arbitrary. *See id.* at 679; *infra* Part I.B. Masur and Posner may also be correct that regulatory agencies have inappropriately deviated from courts' directives, see *infra* Part I.A and judicial opinions cited therein, that the technological feasibility requirement be "technology-forcing." *See* Masur & Posner, *supra* note 8, at 692 (claiming that agencies "rarely issue technology-forcing regulations").

II. Existing Justifications for Feasibility-Based Regulation

This part describes and critiques the two most prominent justifications for feasibility-based regulation that have been offered to date, those provided by David Driesen and Gregory Keating. For reasons described below, neither account provides an entirely satisfying response to the criticism that feasibility analysis indefensibly results in overregulation and underregulation relative to CBA.

A. *Overall Well-Being and the "Concentration Principle": Driesen*

David Driesen is perhaps the most prominent defender of feasibility-based regulation.[59] Driesen defines the feasibility approach as one which "authorizes government agencies to forego physically impossible environmental improvements [and] forego constraints so costly that they cause widespread plant shutdowns."[60] Focusing on the distribution of the costs and benefits of regulation, Driesen defends feasibility-based regulation on the basis of what he calls the "concentration principle":

> When economic losses become concentrated in ways that devastate individuals, they can have drastic effects, even if the total amount of cost is low. Conversely, widely distributed costs can have minor effects, even if total aggregate costs are high. This "concentration" principle suggests that the distribution of costs can tell us a lot about their significance.[61]

How, in Driesen's view, does the concentration principle support feasibility-based regulation? The concentration principle states that regulatory standards should be made sensitive to concen-

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59. Driesen has authored no less than three published papers defending the feasibility approach (one of which is co-authored). *See generally* Driesen, *Feasibility Principle*, *supra* note 12; Driesen, *Two Cheers*, *supra* note 12; Amy Sinden et al., *Cost-Benefit Analysis: New Foundations on Shifting Sand*, 3 REG. & GOVERNANCE 48, 63–66 (making clear Driesen was the author of the subsection on feasibility analysis). Masur and Posner focus almost exclusively on Driesen's work in their critique of feasibility-based regulation. *See* Masur & Posner, *supra* note 8, at 700 (identifying Driesen as the "leading defender of feasibility analysis").

60. Driesen, *Feasibility Principle*, *supra* note 12, at 9.

61. *Id.* at 35; *see also* Driesen, *Two Cheers*, *supra* note 12, at 319 ("In *Feasibility* [*Principle*], I developed a concentration principle: widely distributed costs almost always have minor effects, while concentrated costs (or harms, if you'd prefer) can have devastating impacts.").

trated harms such as death, devastating injury, or job loss, but not to *de minimis* costs like modest increases in the price of consumer products.[62] To the extent the costs of safety regulations can be spread among a very large group of people—for example, by incrementally raising the price of a particular good—the regulation at issue becomes effectively costless according to Driesen's concentration principle.[63] It follows that, so long as the costs of regulation can be widely distributed among consumers or another large group of persons, regulation that reduces risks of death and devastating injury should continue. Regulation should cease only when further risk reduction would be expected to result in a concentrated harm. The concentrated harm Driesen focuses on is job loss, specifically the job losses resulting from a widespread closure of plants.[64] For Driesen, the feasibility principle reflects these judgments by requiring the reduction of risks of death and devastating injury up to the point at which widespread plant closures, and the job losses they cause, would occur.[65]

Driesen characterizes this justification of feasibility regulation as welfarist in nature. "Feasibility analysis," he claims, "more comprehensively considers aspects of welfare that are central to environmental regulation, and *should therefore be considered a procedure focused on welfare*."[66] Thus, for Driesen, the feasibility approach and the concentration principle on which it is founded are justified because they promote overall well-being more effectively than CBA does.[67]

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62. *See* Driesen, *Feasibility Principle*, *supra* note 12, at 35–41.

63. *See* Driesen, *Two Cheers*, *supra* note 12, at 324 ("Even if some consequences exist, when costs are widely distributed, *they simply deserve no weight* compared to the concentrated harms that individual victims of pollution experience, such as hospitalization for asthma or death from cancer.") (emphasis added).

64. *See* Driesen, *Feasibility Principle*, *supra* note 12, at 37; Driesen, *Two Cheers*, *supra* note 12, at 321–22; Sinden et al., *supra* note 59, at 65.

65. *See* Driesen, *Feasibility Principle*, *supra* note 12, at 3; Driesen, *Two Cheers*, *supra* note 12, at 323.

66. Sinden et al., *supra* note 59, at 64 (emphasis added); *see also* Driesen, *Feasibility Principle*, *supra* note 12, at 70; Driesen, *Two Cheers*, *supra* note 12, at 322–26; Sinden et al., *supra* note 59, at 65 ("[B]oth CBA and feasibility analysis, however, are more accurately viewed as narrow welfarist procedures, albeit with differing foci."); *id.* ("Feasibility analysis, however, is more likely [than CBA] to track overall wellbeing, as it focuses on factors that are important and survive idealization.").

67. Masur and Posner reach the same conclusion about the welfarist nature of Driesen's account. *See* Masur & Posner, *supra* note 8, at 700.

Driesen's defense of feasibility regulation has not been terribly convincing to defenders of CBA. For example, Masur and Posner have charged that Driesen's concentration principle cannot adequately justify the feasibility point as either a floor or a ceiling for risk regulation.[68]

The central virtue of Driesen's account is that it correctly rests the case for feasibility-based regulation on a comparison of the harms and costs experienced by differently situated individuals, as opposed to harms and costs considered in the aggregate. Driesen is on the right track in focusing his defense of the feasibility approach on the distribution of costs, harms, and risks.

There is, however, reason to question whether Driesen has provided a *welfarist* justification for feasibility-based regulation. Driesen's insistence that widely-distributed monetary costs "simply deserve no weight"[69] and ought to be ignored is, as Masur and Posner note, "deeply puzzling from a welfarist perspective."[70] Welfarism would deny, for example, that the imposition of a $1 cost on each of 100,000 people deserves no weight. The impact might be trivial for each affected person, but standard welfarism's commitment to the interpersonal aggregation of costs and benefits might well lead to the conclusion that the impact on overall well-being is significant when summed across all 100,000 affected individuals.

By contrast, Driesen's claim that widely distributed costs "simply deserve no weight *compared to the concentrated harms that individual victims of pollution experience*"[71] seems to involve an implicit appeal to considerations of fairness or equity. Once a normative judgment is based on a comparison between the loss suffered by one person and the loss suffered by another, the realm of fairness and equity has been entered and the realm of welfarism left behind.[72] Thus, even if one were to accept Driesen's defense of feasibility regulation on the basis of the concentration

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68. *See id.* at 703.

69. *See* Driesen, *Two Cheers*, *supra* note 12, at 324.

70. Masur & Posner, *supra* note 8, at 703.

71. *See* Driesen, *Two Cheers*, *supra* note 12, at 324 (emphasis added).

72. *See* John Broome, *Fairness*, *in* 91 PROCEEDINGS OF THE ARISTOTELIAN SOCIETY 87, 95 (1990–91) ("[F]airness is concerned only with how well each person's claim is satisfied *compared with* how well other people's are satisfied. It is concerned only with relative satisfaction, not absolute satisfaction.").

principle, there is good reason to question Driesen's claim that this defense is ultimately welfarist in nature.

To the extent Driesen's defense actually sounds in equity, rather than welfarism, the defense is theoretically underdeveloped. As discussed in Part III, the notion of equity is rather abstract and, to be deployed successfully in a normative defense of feasibility regulation, requires elaboration of a kind that Driesen has not offered. This is my primary motivation for relying on contractualist moral theory as a sensible specification of what equity requires in particular circumstances. Further, the particular variant of contractualism I rely on—*ex ante contractualism*—provides a useful framework for determining what equity requires in circumstances where the act or policy under consideration involves imposing *risks* of death, illness, or job loss. My goal in this article is to provide a theoretically robust and more elaborate version of the sort of equity-based justification that Driesen seems to have in mind with his concentration principle, thereby providing a defense of feasibility regulation that is less vulnerable to the objections that have been lodged by advocates of CBA.

B. *Rawlsian Social Contract Theory: Keating*

Gregory Keating correctly locates the normative basis of the feasibility principle in social contract theory, rather than in welfarism.[73] For this reason, Keating's work is foundational for the argument in this article and indeed for any attempt to defend feasibility regulation on the basis of social contract theory.[74] However, there is a significant lacuna in Keating's account that leaves it susceptible to one of the chief objections lodged by advocates of CBA.

Keating's case for the feasibility regulation rests on "a particular conception of fairness," one that emerges from "the social con-

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73. *See* Gregory C. Keating, *Irreparable Injury and Extraordinary Precaution: The Safety and Feasibility Norms in American Accident Law*, 4 THEORETICAL INQUIRIES L. 1, 22, 25–26 (2003); Keating, *Pressing Precaution*, *supra* note 11, at 681, 684–85; Gregory C. Keating, *Pricelessness and Life: An Essay for Guido Calbresi*, 64 MD. L. REV. 159, 180–81, 183–84 (2005); Keating, *Social Contract*, *supra* note 11, at 46–51.

74. Interestingly, Masur and Posner appear to have overlooked Keating's work in their discussion of the normative basis of feasibility regulation. *See* Masur & Posner, *supra* note 8, at 699–709 (failing to discuss or mention Keating's work in their discussion of the normative basis of the feasibility approach).

tract tradition in political philosophy, broadly conceived."[75] For Keating, the fundamental question accident law poses is how to reconcile potential injurers' interest in liberty with potential victims' interest in bodily security.[76] The social contract conception of fairness on which Keating relies holds that "[f]air terms reconcile the competing claims of liberty and security in ways that advantage even those they most disadvantage."[77] Keating observes,

> It is reasonable to expose other people to risks of serious injury and even death when it is fair to do so; and it is fair to do so when they also stand to gain, ex ante and over time, from the imposition of [those] risks . . . .[78]

Keating considers two types of risk impositions. The first involves what he calls a "community of risk." This is a case in which (i) those exposed to the risk at issue also benefit from being able to impose the identical risk on others and (ii) all persons affected by the risky practice face roughly the same level of risk and derive roughly the same level of benefit from being able to impose that risk on others.[79] The paradigmatic example of a community of risk is the activity of driving automobiles on shared public roads. Keating asserts, "The right to impose risks *on* others can justify the imposition of equal risks on us *by* others, because, for example, we may each gain more than we lose from having to bear the risks created by the presence of other cars on the road."[80] When a community of risk is present,

> practices of risk imposition are fair if and when they are to the advantage of a representative member of the community. They are to the advantage of a representative member of the community when the liberty that she gains from the right to impose the relevant risks is more valuable to her than the security she loses from having to bear exposure to equivalent risk impositions at the hands of others.[81]

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75.   Keating, *Pressing Precaution*, *supra* note 11, at 674.

76.   *See id.* at 675–78.

77.   *Id.* at 677. Keating refers to this as a "general Rawlsian idea of fairness." *Id.* at 679 n.61; *see also id.* at 676 n.57 (observing that his "conception of the problem of accidental harm has its roots in the social contract tradition in political theory, especially as articulated by John Rawls"). *See generally* JOHN RAWLS, A THEORY OF JUSTICE (1971) (offering a theory of distributive justice based on social contract principles).

78.   Keating, *Pressing Precaution*, *supra* note 11, at 678.

79.   *See id.*

80.   *Id.*

81.   *Id.*

From a social contract standpoint, the practice of driving on shared roads is fair because the practice is to the *ex ante* advantage of those exposed to its risks. That is, we each stand to gain more from the practice of driving on shared roads than we stand to lose. Crucially, this can be true from an ex ante perspective even though those unlucky enough to be injured or killed in car accidents may, from an ex post perspective, ultimately have lost more from the practice than they have gained.

The second type of risk imposition Keating considers does not involve a community of risk. In this sort of risk imposition, some asymmetry is present, typically one involving the imposition of the activity's risks on a particular subset of the activity's beneficiaries, rather than on all of the activity's beneficiaries.[82] The paradigmatic example would be a health risk borne by workers in a particular industry—say, due to a toxic substance used in the industry's production processes. Although the industry may confer significant benefits on its consumers, workers, and shareholders, the industry's health risks are borne solely—or at least disproportionately—by the workers. Because of this asymmetry between the class of the industry's beneficiaries and the class of those exposed to its health risks, a community of risk would not be present.

In such a situation, Keating describes the requirements of fairness as follows:

> When risks are not imposed within a community of risk—when a discernible group bears more of the burden or garners less of the benefit of some practice of risk imposition—practices of risk imposition are fair when they work to the greatest long-run advantage of a representative member of the class of those most disadvantaged by the practice of risk imposition.[83]
>
> . . .
>
> In the case of a practice which puts some in particular peril, we can say that there was no reconciliation of these two essential conditions of rational agency [liberty and security] that would have improved the prospects of those most disadvantaged by the reconciliation at issue, *without imposing a greater disadvantage on a comparable class of those affected by the practice.*[84]

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82. *See id*. at 679–80.

83. *Id.* at 679.

84. *Id.* at 680 (emphasis added); *see also id.* ("There was no alternate way of reconcil-

Although Keating does not say so explicitly, the so-called "maximin" criterion is plainly at work here.[85] The maximin criterion ranks alternative policies or actions according to the situation of the worst off group or individual.[86] Under maximin, the right policy or course of action is that under which the situation of the worst-off group or individual is better than it is under any alternative policy or course of action.[87] For Keating, when a community of risk is not present, a fair practice of risk imposition is one that, among a set of alternative practices, maximizes the position of those most disadvantaged by the practice, the practice that maximizes the minimum.[88] To return to the example of a workplace health risk, the practice of imposing such risk would satisfy the maximin criterion if the risk were regulated in such a way that the risk-bearing workers could not be made safer without imposing a greater burden on another class of persons.

For Keating, the case for feasibility regulation involves the second type of risk imposition he considers, one not involving a community of risk.[89] This makes sense because the health risks posed by industrial activity tend to be asymmetric in that they usually fall on a *subset* of the activity's beneficiaries—e.g., workers or residents of communities' neighboring plants—rather than on *all* of the activity's beneficiaries.

The requirement that such risks be reduced to the feasibility point emerges straightforwardly from an application of the maximin criterion. Because the monetary costs of risk reduction are generally dispersed among a large number of consumers or shareholders, significant reductions in each risk-bearer's chance

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ing liberty and security which would have improved their life prospects, and perhaps have avoided their devastation, without working a greater hardship on another class of persons.").

85.   This is evident, in particular, in the clause that is italicized in the foregoing quotation. The maximin criterion figures prominently in the work of John Rawls, on which Keating's own social contract conception of fairness is based. *See* RAWLS, *supra* note 77, at 133–38 (discussing maximin criterion).

86.   *See id.* at 133.

87.   *See* DEREK PARFIT, REASONS AND PERSONS 490 (1984) ("According to Maximin, the best outcome is the one in which the worst-off people are best off."); RAWLS, *supra* note 77, at 33 ("The maximin rule tells us to rank alternatives by their worst possible outcomes: we are to adopt the alternative the worst outcomes of which is superior to the worst outcomes of the others.").

88.   *See* Keating, *Pressing Precaution*, *supra* note 11, at 680.

89.   *Id.* at 679.

of suffering death or serious injury can be achieved at a cost that, while perhaps significant in total, is trivial for each consumer or shareholder who will absorb the cost.[90] So long as the increases in the safety of each risk-bearer can be achieved at a minimal monetary cost to each cost-bearer, the maximin criterion requires that regulation continue, even if this results in more stringent regulation than CBA would have.[91] In such circumstances, the position of those most disadvantaged by the risky activity—the workers or plant neighbors whose life and limb it imperils—is being improved without imposing a comparably severe burden on those consumers or shareholders who must bear the cost of the improvement.[92]

However, there will come a point at which further reduction in each risk-bearer's risk of death or serious bodily harm can be achieved only by imposing costs that would threaten the existence of the risky activity itself. For Keating, it is at this point— the feasibility point—that fairness forbids further risk reduction.[93] If the activity is an important one, then its cessation would necessarily deprive its would-be beneficiaries of important life-improving (and perhaps life-preserving) benefits. Further, the burden imposed by such a deprivation might well be *worse* than the burden imposed on those risk-bearing workers or neighbors whose life and limb the activity imperils.[94] If that is the case, the maximin criterion requires regulation up to the feasibility point, but no further. This line of reasoning represents the core of Keating's social contract case for feasibility regulation.

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90. *See id.* at 698 ("It is unfair to inflict even one death for the sake of trivial gains to others, no matter how numerous those others may be, and it is equally unfair to devastate even one person so that many people may reap trivial benefits.").

91. *See id.* at 674 ("When pressing precaution beyond the point of cost-justification confers great benefits on some at the cost of only trivial losses to others, doing so is not only fair, it is also desirable insofar as well-being itself is of primary concern.").

92. *See id.* at 702 ("[W]hen trivial gains to a large number of persons stand on the credit side of the balance sheet and devastating harms to a few stand on the debit side, the imposition of the risks in question should be forbidden. No number of trivial gains to some can ever compare to a single devastating injury to another.").

93. *See id.* at 684–85.

94. *See id.* at 722 ("The judgment of comparability at work here is a simple one: The risky activity being regulated is sufficiently valuable that shutting the activity down would work a greater hardship to those who benefit from it than would asking those workers endangered by the activity to bear significant risks of devastating injury.").

There is, however, a significant lacuna in Keating's account that leaves it still vulnerable to objection. Keating does not provide an entirely satisfying response to the criticism that the feasibility approach is capable of overregulation. If Keating is correct that only the cessation of a major productive activity is a harm comparable to the imposition of a significant risk of death or devastating injury,[95] then *any* reduction in such a risk—no matter how tiny—would seem to be required no matter how great the monetary cost, so long as the imposition of the cost does not threaten the existence of the underlying industry. The implicit suggestion is that one individual's certain monetary loss (or gain) is fundamentally incomparable to—and cannot fairly be traded against—an increase (or reduction) in the low but significant risk of death or serious bodily harm borne by another individual. In an important sense, this leaves Keating's account unresponsive to Masur and Posner's overregulation objection. "Overregulation occurs," according to Masur and Posner, "because feasibility analysis ignores the cost of regulations to consumers—the costs they incur because prices rise or products disappear from the market."[96] By suggesting that the burden imposed by an increase in per-unit prices is categorically incomparable to the burden imposed by an increased risk of death or devastating injury (no matter how slight the increase in risk), Keating's account seems to give inadequate weight to the monetary burden that regulation places on consumers.

The discussion in Part IV will make clear a disagreement with Keating's view that monetary losses and reductions in risks of death or serious injury are fundamentally incomparable. Incremental changes in the monetary costs borne by each individual who subsidizes safety precaution *can* meaningfully be traded against incremental changes in the risks of serious bodily harm borne by each individual risk-bearer. If a given reduction in risk is sufficiently costly for each cost-bearer and sufficiently small for each risk-bearer, it is inequitable to require the reduction, even if

95. *See* Keating, *Social Contract*, *supra* note 11, at 46 ("Only the cessation of an activity threatens to impair anyone's pursuit of a conception of the good as gravely as premature death and permanent disability do, and then only if the activity is an important and hard to replace one.").

96. Masur & Posner, *supra* note 8, at 704; *see also id.* at 702 ("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.").

doing so would not threaten the survival of the underlying activity. This article therefore departs from Keating's stated view in conceding that feasibility-based regulation would *not* be justified in circumstances where the marginal cost to each cost-bearer would exceed the amount each risk-bearer would rationally be willing to pay for the resulting marginal reduction in his or her own risk.[97] To adequately justify feasibility as a floor for regulation, an empirical corollary is needed: that, in the common regulatory scenario involving health risks posed by toxic substances used in or emitted by industrial activity, such circumstances will rarely occur.[98]

III. EQUITY AND CONTRACTUALISM

This part describes the notions of equity, contractualism, and normative pluralism. These are the normative principles upon which this article's defense of feasibility-based regulation rests.

A. *Contractualism as an Interpretation of Equity*

The term "equity" is defined in Webster's Third New International Dictionary as "a free and reasonable conformity to accepted standards of natural right, law, and justice without prejudice, favoritism, or fraud and without rigor entailing undue hardship."[99] Although often taken to be synonymous with fairness,[100] equity, as its etymology suggests,[101] specifically connotes the aspect of fairness that has to do with equality. "[T]he essence of Justice or Equity," observed the utilitarian moral philosopher Henry Sidgwick, "is that different individuals are not to be treated differently, except on grounds of universal application."[102] Equity is therefore a somewhat narrower concept than fairness, as it is

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97. *See generally infra* Part IV.A.

98. *See infra* at Part IV.A.3–4.

99. *Equity*, WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY (7th ed. 2002). This article will use the term in this more popular sense, rather than in the technical legal sense that refers to the legal system and body of principles originating in the English Court of Chancery.

100. *See Equity*, BLACK'S LAW DICTIONARY (10th ed. 2014) (defining equity as "[f]airness; impartiality; evenhanded dealing").

101. The term derives from the Latin words *aequitas* ("equality") and *aequus* ("equal"). *Equity*, WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY (7th ed. 2002).

102. HENRY SIDGWICK, THE METHODS OF ETHICS 496 (1981).

specifically concerned with achieving fairness in the distribution of burdens and benefits.[103] It is for this reason that equity—rather than the broader notion of fairness—is the concept that best captures the gist of this article's defense of feasibility regulation. Equity, as understood here, is broadly concerned with equalizing the burdens borne by differently situated individuals as the result of some socially desirable act, practice, or policy. As discussed in Part IV, underlying feasibility regulation is precisely the concern for achieving parity among the respective burdens borne by the risk-bearers, cost-bearers, and potential beneficiaries of a risky industrial activity.

Like the norm of fairness, the norm of equity presupposes evaluation of an action or policy from the point of view of each affected individual, rather than an impersonal evaluation from a "view from nowhere" or "God's eye" perspective.[104] When determining whether an action or policy is equitable, one is implicitly and necessarily asking whether it is equitable *to* a particular affected party or to each and every affected party.[105] It is impossible to determine whether an action, policy, or rule is equitable in a general sense without assessing and comparing its impact on each affected individual. By contrast, norms like overall well-being or efficiency do not require that the perspective of each affected individual be consulted and considered.[106] It would not make sense, for example, to ask whether an action or policy maximizes social welfare *to* or from the standpoint of a particular party.

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103. By contrast, one can intelligibly speak of fairness in a non-distributive sense. For example, consider the notions of "fair play," see Int'l Shoe Co. v. Washington, 326 U.S. 310, 316 (1945) (observing that an assertion of personal jurisdiction must not offend "traditional notions of fair play and substantial justice") (quoting Milliken v. Meyer, 311 U.S. 457, 463 (1940)), and "unfair surprise," see 8 SAMUEL WILLISTON, A TREATISE ON THE LAW OF CONTRACTS § 18:7 (4th ed. 2010) (discussing notion of "unfair surprise" in the context of the unconscionability doctrine in contract law).

104. *See, e.g.*, Broome, *supra* note 72, at 95 ("[F]airness is concerned only with how well each person's claim is satisfied *compared with* how well other people's are satisfied. It is concerned only with relative satisfaction, not absolute satisfaction.").

105. This is reflected in the famous definition of justice offered by the Roman jurist Ulpian: "Justice is a steady and enduring will to render unto everyone his right." Dig. 1.1.10 (Ulpian, Rules 1) (Alan Watson ed., 1985).

106. *See* Johann Frick, *Contractualism and Social Risk*, 43 PHIL. & PUB. AFF. 175, 221 (2015) ("[E]quity is an 'individualistic' moral notion. Being equitable is a property that attaches to actions, not in virtue of their overall or aggregate effects, but in virtue of how they treat each person individually.").

However, what exactly equity requires in a particular case may not be deducible from these rather abstract observations. For purposes of analysis, this article adopts a particular interpretation of the notion of equity. Specifically, this article will hold an action, practice, policy, or rule to be equitable if and only if it would be permitted by contractualism.[107] Contractualism is a relatively new theory of normative ethics, introduced by the philosopher T.M. Scanlon in 1982,[108] and founded on the social contract tradition in political philosophy (embodied in the work of Locke,[109] Rousseau,[110] and Rawls[111]) and on the Kantian tradition in moral philosophy.[112]

Contractualism is not a general theory of morality, but rather a theory of interpersonal morality or, to use Scanlon's famous phrase, "what we owe to each other."[113] From its inception, contractualism has purported to represent an alternative to utilitarianism and, in particular, to embody an argument against the core utilitarian tenet that all moral questions reduce to questions about the consequences of acts (or rules) for the aggregate well-being of all affected individuals.[114]

Contractualism offers the following criterion for determining the rightness or wrongness of an action: "[A]n act is wrong if its performance under the circumstances would be disallowed by any set of principles for the general regulation of behavior that no one could reasonably reject as a basis for informed, unforced general agreement."[115]

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107. *See id.* at 220–21 (arguing that the notion of equity best captures the wrong-making property that contractualism specifies).

108. *See generally* T.M. Scanlon, *Contractualism and Utilitarianism*, *in* UTILITARIANISM AND BEYOND (1982) [hereinafter Scanlon, *Contractualism*]; T.M. SCANLON, WHAT WE OWE TO EACH OTHER (1998) (especially Chapter 5, pp. 189–247) [hereinafter SCANLON, WHAT WE OWE].

109. *See* JOHN LOCKE, SECOND TREATISE OF GOVERNMENT (C.B. Macpherson ed., Hackett Pub'g Co. 1980) (1690).

110. *See* Jean-Jacques Rousseau, *On the Social Contract*, *in* THE BASIC POLITICAL WRITINGS 153–252 (1778) (Donald A. Cress ed., trans., 2d ed., 2011).

111. *See* JOHN RAWLS, A THEORY OF JUSTICE (1971).

112. *See* IMMANUEL KANT, GROUNDWORK OF THE METAPHYSICS OF MORALS 1–5 (Mary Gregor ed., trans., 1997).

113. SCANLON, WHAT WE OWE, *supra* note 108, at 7, 110. Thus, contractualism does not directly address questions of *political* morality, the moral strictures applicable to the actions and policies of coercive institutions, nor does it address our moral obligations to animals or future persons.

114. Scanlon, *Contractualism*, *supra* note 108 at 120.

115. SCANLON, WHAT WE OWE, *supra* note 108, at 153.

What exactly does that mean? And in what sense is this formula supposed to represent an alternative to utilitarianism? Consider the following example.

Policy Choice

Suppose the government is deciding between two different policies with which to accomplish a particular goal, Policy One and Policy Two. Both policies will affect Group A, composed of one million people, and Group B, composed of 100 people. At the time of the government's decision, all members of both groups enjoy roughly equal levels of well-being, and a decent, intermediate standard of living. Policy One would leave members of Group A much better off by increasing their standard of living from decent to high, but would leave members of Group B much worse off by lowering their standard of living from decent to low. Policy Two would leave members of Group A slightly better off by making a very small improvement in their standard of living, but would leave members of Group B slightly worse off by making a very small reduction in their standard of living. From a normative point of view, which policy should the government adopt?

A view referred to as welfarism provides a normative basis for choosing Policy One. Welfarism, as the term is understood in this article, is the view that the morally right action or policy is that which maximizes social welfare, that action or policy under which the aggregate (overall) well-being of all affected persons is greater than it would be under any alternative action or policy.[116] In the above example, welfarism would direct the government to calculate the net aggregate gain (or loss) in welfare associated with each policy, and to choose the policy that delivers the greater net gain (or smaller net loss) to aggregate welfare. It seems clear that both policies would increase aggregate welfare on net. This follows from the fact that, while each policy would result in a reduction in the well-being of 100 people (Group B), each policy

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116. Welfarism, as is understood here, is essentially equivalent to classical utilitarianism, except that it holds the goodness of the outcome of an action or policy is to be evaluated on the basis of how it affects the well-being of individuals, rather than on how much pleasure or pain it produces. *See Consequentialism*, STAN. ENCYCLOPEDIA PHIL. (2015), http://plato.stanford.edu/entries/consequentialism/#toc ("When a welfarist theory of value is combined with the other elements of classic utilitarianism, the resulting theory can be called *welfarist consequentialism*.").

would also deliver an equally sized increase to the well-being of *one million* people (Group A). For this reason, both policies would, from a welfarist point of view, plausibly result in a net improvement over the status quo.[117] For a welfarist, the question is which policy delivers the bigger improvement, i.e., the greater increase to overall well-being. On that question, it seems clear that Policy One wins out. While Policy One would make each Group A member *much* better off, Policy Two would make each Group A member only *slightly* better off. Were Group A the only group of people affected, it is clear Policy One would result in a significantly greater increase in aggregate well-being than Policy Two would. Does this change when the policies' respective effects on Group B are taken into consideration? Almost certainly not. Although Policy One would leave members of Group B worse off than Policy Two would, Group B is only a tiny fraction (1/10,000) of the size of Group A. The policies' respective effects on 100-person Group B therefore play a negligible role in determining how they would each affect the aggregate well-being of all 1,000,100 affected persons. For these reasons, it is assumed Policy One would deliver a greater net increase to aggregate well-being than Policy Two would. Welfarism therefore favors Policy One.

Contractualism provides a normative basis for choosing Policy Two. Contractualists believe the normatively appropriate policy is the one that could be justified not to the entire group of affected persons considered as a whole, but to *each* affected person in light of how the policy, and the available alternatives, would affect him or her.[118] To use contractualist language, the morally permissible policy is the one permitted by a principle that no person could reasonably reject.[119] Policy One is not justifiable to members of Group B because there is an alternative policy—Policy Two—under which no person is left as bad off as members of Group B would be under Policy One. A contractualist would maintain that members of Group B could, on that basis, reasonably reject a principle permitting Policy One, making Policy One

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117. In welfare economics terms: although neither policy would represent a "Pareto" improvement over the status quo, both policies would result in a "Kaldor-Hicks" improvement. *See* NICHOLAS BARR, ECONOMICS OF THE WELFARE STATE 46 (5th ed. 2002) (defining "Pareto" efficiency); *Kaldor-Hicks Efficiency*, OXFORD DICTIONARY BUS. & MGMT. 344 (6th ed. 2016).

118. *See* SCALON, WHAT WE OWE, *supra* note 108, at 229.

119. *See id*. at 153.

morally impermissible. Members of Group A might wish to reject Policy Two in favor of Policy One, but they could not reasonably do so, as they would implicitly be asking each member of Group B to put up with being left substantially worse off (rather than only slightly worse off) so that each member of Group A could avoid being left only slightly better off (rather than substantially better off).

The contractualist criterion of moral rightness involves three core ideas: (i) that interpersonal morality presupposes the requirement of justifiability to *each* affected person considered as an individual, rather than the requirement of justifiability to *all* affected persons considered in the aggregate;[120] (ii) that the moral status of a particular act (its rightness or wrongness) is a function of the moral validity of the general principle licensing the act;[121] and (iii) tying together the first two tenets, that a principle is justifiable to each person if and only if it would command the free assent of all persons, i.e., no person could *reasonably reject* it as a principle for the general regulation of behavior.[122] Thus, under contractualism, an act is morally right if and only if no one could reasonably reject the general principle permitting the act.

When, according to contractualism, can a principle be reasonably rejected? The concept underlying the notion of reasonable rejectability is the minimax criterion.[123] Among a set of candidate principles, the nonrejectable principle, P, is the one of which the following is true: the strongest complaint any person could make against P, were P generally accepted, is weaker than the strongest complaint that could be made against every other alternative principle. As Scanlon puts it, "[S]omeone can reasonably reject a principle if there is some alternative to which no other person has a complaint that is as strong."[124] The principle no one could rea-

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120.   *Id.* at 153, 390 n.8 ("What is basic to contractualism as I understand it is the idea of justifiability to each person (on grounds that he or she could not reasonably reject).").

121.   *Id.* at 197 ("To justify an action to others is to offer reasons supporting it and to claim that they are sufficient to defeat any objections that others may have. To do this, however, is also to defend a principle, namely one claiming that such reasons are sufficient grounds for so acting under the prevailing conditions.").

122.   *Id*. at 153.

123.   This article follows Sophia Reibetanz in using the minimax criterion to explain the notion of reasonable rejectability. *See* Sophia Reibetanz, *Contractualism and Aggregation,* 108 ETHICS 296, 300 (1998) (describing "minimax complaint model" of reasonably rejectability).

124.   SCANLON, WHAT WE OWE, *supra* note 108, at 229.

sonably reject is the principle that, among a set of candidate principles, *minimizes* the strength of the complaint that could be lodged by the *maximally* burdened person.[125] The person who would be most burdened by the general acceptance of a particular principle still cannot reasonably reject that principle if every alternative principle would, if generally accepted, impose a greater burden on someone else.

Contractualism thus contemplates a rejectability inquiry, the goal of which is to identify the principle or policy satisfying the minimax criterion. This is a fundamentally comparative inquiry that takes into account not just the extent to which general acceptance of each candidate principle burdens each affected person in an absolute sense, but also the differential each person experiences in the burdens they would bear under the respective principles.[126] That is, supposing A is the most burdened party under Principle P-1 and B the most burdened party under Principle P-2, we ask not only if A's burden under Principle P-1 is weightier than B's burden under Principle P-2, but also if A's gain in moving from P-1 to P-2 is more significant than B's gain in moving from P-2 to P-1. In other words, would it be unreasonable for A to refuse to accept the loss she would experience in moving from P-2 to P-1 in order for B to avoid the loss she would experience in moving from P-1 to P-2?[127]

A critically important feature of contractualism—one that makes it particularly appropriate as an interpretation of the notion of equity—is what has been termed its individualist restriction, i.e., "its insistence that the justifiability of a moral principle depends only on various *individuals'* reasons for objecting to that principle and alternatives to it."[128] In other words, according

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125. Applying the minimax rule to complaints or burdens is roughly (though not perfectly) equivalent to applying the more familiar "maximin" rule to outcomes for individual well-being. *See* Reibetanz, *supra* note 123, at 299.

126. *See id.*; Scanlon, *Contractualism*, *supra* note 108, at 113.

127. *See* Scanlon, *Contractualism*, *supra* note 108, at 123. For example, suppose that under P-1, A's well-being is 102 and B's is 103 and under P-2, A's well-being is 150 and B's is 101. The mere fact that the loser under P-1 (A) is slightly better off than the loser under P-2 (B) does not necessarily mean that P-1 is the nonrejectable principle satisfying the minimax criterion. This is because A might plausibly be taken to have a stronger complaint with P-1 being chosen over P-2 than B would have with P-2 being chosen over P-1. Why? Because it would arguably be unreasonable for B to refuse to accept a 2-unit (roughly 2%) reduction in well-being so that A can avoid a 48-unit (roughly 32%) reduction in well-being. Thus, B could not reasonably reject P-2.

128. *See* SCANLON, WHAT WE OWE, *supra* note 108, at 229 (emphasis in original).

to the individualist restriction, the strength of a complaint lodged against a particular principle can never be a function of the sum of different individuals' gain (or loss) in well-being as compared with some alternative principle. Thus, contractualism does not allow for the interpersonal aggregation of complaints. It instead contemplates "a series of pairwise comparisons"[129] in which one representative individual's burden under a particular principle is compared to another representative individual's burden under an alternative principle. To return to the example discussed above, the fact that there are many more people in Group A than in Group B plays no role in determining which policy is justifiable to each person. That determination is made entirely on the basis of a pairwise comparison between representative members of each group.

B. *Contractualism and Risk: Ex Ante or Ex Post?*

In cases involving the imposition of a risk of harm, as opposed to the imposition of certain harm, contractualism requires a further specification. Are the possible principles, policies, or courses of action to be evaluated on the basis of the risks of harm they pose to each person they *might* impact, or on the basis of the actual harm they cause to the person or persons they *do* impact?

Under ex ante contractualism, candidate principles are evaluated based on risk, i.e., on their *expected* outcomes for the well-being of each individual who stands a chance of being affected (positively or negatively) by the principles' respective adoption.[130] This means the rejectability inquiry would be based on probabilistic data about each individual's expected fate under each principle—the likelihood of suffering death, serious injury, or some other loss from the risks the principle tolerates. Thus, under ex ante contractualism, in determining the magnitude of the burdens that a given policy would impose on differently-situated individuals, it is the policy's probabilistically defined expected impact on each affected individual's well-being that is relevant (e.g.,

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129. *See* Reibetanz, *supra* note 123, at 300.

130. *See* Aaron James, *Contractualism's (Not So) Slippery Slope*, 18 LEGAL THEORY 263, 266–67 (2012) ("Let us call *ex ante contractualism* the . . . view that only *expected* outcomes count as grounds for complaint or objection (including expected outcomes of a principle's general adoption) mounted on behalf of each potentially affected party from some specified epistemic position.").

the risk of death or devastating injury borne by *each and every worker* in a particular industry), rather than the policy's actual outcomes for individuals' well-being (e.g., the death or devastating injury expected to be suffered by an unlucky subset of the workers in that industry).[131]

Under ex post contractualism, on the other hand, candidate principles are evaluated based on their outcomes for the well-being of each individual who is actually affected by adoption of the principle at issue.[132] This means the rejectability inquiry would be based on data concerning the actual fate that some ex ante unidentifiable individual is expected to suffer under each principle, such as death, serious injury, or some other type of loss.

For example, suppose a government policy imposes a one-in one million risk of death on a group of one million individuals. Under ex ante contractualism, each of the million risk-bearers would have a complaint valued at one millionth of the strength of a complaint based on death. Under ex post contractualism, on the other hand, where the principle is expected to result in exactly one death, each of the million risk-bearers would have a complaint based on death.

The idea underlying ex ante contractualism is that there is a moral difference between, for example, imposing a one-in-one million risk of death on one million people and a 50% risk of death on two people, even though both impositions will have the identical expected outcome: one death. According to ex ante contractualism, each of the one million risk-bearers has a weaker complaint against imposition of the risk they are subject to than do each of the two persons subject to the 50% risk, notwithstanding that both risk impositions are expected to result in the death of a single person. Ex post contractualism, however, considers the two situations to be morally identical.

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131. *See* Frick, *supra* note 106, at 118 ("According to *ex ante contractualism*, the strength of someone's personal reasons for rejecting a principle licensing a risky action depends on the quality of the prospect that the action gave her *ex ante*. A person's harm-based complaint against a loss she suffers must, therefore, be *discounted* by her ex ante unlikelihood of suffering a loss and by her ex ante likelihood of benefiting from the risky action.").

132. *See id.* at 185 (describing ex post contractualism as the view that "the relative strength of an individual's harm-based complaint turns not on the ex ante prospect it offered her individually, but on the foreseeable distribution of outcomes across individuals that the action will produce ex post."); James, *supra* note 130, at 266 ("Let us call *ex post contractualism* the view that we should evaluate what decision is reasonably acceptable only in light of its *actual outcomes* as they actually unfold over time.").

Ex ante contractualism is the more defensible form of contractualism because it seems clear that the magnitude of the risk faced by each risk-bearer is a factor relevant to moral judgments in cases of risk imposition. To begin, compare the effect that *awareness* of the risk imposition would have on risk-bearers in the two-person case with the effect it would have in the million-person case. Knowing that one is going to be exposed to a 50% risk of death would strike terror in most people; knowing that one is going to be exposed to a one in one million risk of death would not. Consider, for example, that the lifetime risk of being killed in a lightning strike in the United States is roughly 1 in 164,968.[133] The imposition of risk can, in and of itself, have a negative impact on the well-being of those exposed, provided they are aware of the imposition and know something about its magnitude and probability. And even if the person exposed to a 50% risk of death were not aware of the imposition at the time it occurred, she would still plausibly have a strong moral objection to the imposition based purely on the fact that it dramatically raised the likelihood she would be killed.[134]

Another way of getting at the same idea is to imagine what each of the two risk-bearers would plausibly be willing to sacrifice to eliminate the 50% risk of death to which they are subject (All their wealth? A limb? Two limbs?). Now compare that with the sacrifice each of the million risk-bearers would plausibly be willing to make to eliminate the .0001% risk of death to which *they* are subject. This is probably very little, if anything at all.

In both cases, one person is expected to die. In the two-person case, however, two people will also be placed at significant risk of death. In the million person case, no one—not even the unlucky person killed when the risk materializes—is placed at *significant* risk of death. To the extent risk imposition alone can negatively impact the well-being of a risk-bearer aware of the imposition and can ground a moral objection to the imposition even in a case where the risk-bearer is ignorant of the risk at the time it is im-

133. *See* NATIONAL SAFETY COUNCIL, INJURY FACTS 43 (2015), http://www.nsc.org/Membership%20Site%20Document%20Library/2015%20Injury%20Facts/NSC_InjuryFacts2015Ed.pdf.

134. *See* Aaron James, The Distinctive Significance of Systemic Risk 17 (unpublished manuscript), https://webfiles.uci.edu/ajjames/Distinctive%20Significance%20of%20Systemic%20Risk.docx (last visited Apr. 15, 2016) ("The interest we have in our exposure to risk is an objective interest in its own right, which is not to be confused with or reduced to our separate interests in not suffering the *experience* of risk exposure.").

posed, the two-person imposition seems morally worse. Ex ante contractualism registers this difference. Ex post contractualism effaces it.

In a 2001 essay, Judge Richard Posner implicitly recognized this point in the context of discussing the notion of placing a monetary value on a statistical human life. Posner discussed two hypothetical projects, the first imposing a one-in-one million risk of death on one million people and the second imposing a one in 1000 risk of death on 1000 people.[135] Posner observed,

> The cost [of the projects] is the same in an ex post sense, but evaluating the projects ex ante requires consideration of the ex ante costs, and they are not the same. The second project is more costly ex ante, because people are much more reluctant (plausibly more than a thousand times as reluctant) to be subjected to the higher risk. If the 1 million would pay less in the aggregate to avert the risk to them than the 1 thousand would pay to avert the respective risk to them, the second project is more costly.[136]

Posner's point that cost-benefit analysis ought to register differences in the level of individual risk faced by each risk-bearer, even when there are no differences in the ultimate outcome ex post, provides support for the analogous proposition that our moral judgments ought to register such differences as well, particularly when trying to determine how much money ought to be invested in risk-reducing precautions.[137] This militates in favor of contractualism taking an ex ante, rather than ex post, form.

A final reason for preferring ex ante contractualism relates to cases of the sort considered in this article: ones where activities providing substantial social benefits also pose significant risks of death or serious injury. If possible regulatory standards are evaluated from an ex post point of view, contractualism would implausibly deem impermissible most forms of socially beneficial, though significantly risky, conduct. If a precautionary standard tolerates a risk that is expected to result in the death of even a single person, that standard could, it seems, be reasonably reject-

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135. Richard A. Posner, *Cost-Benefit Analysis: Definition, Justification, and Comment on Conference Papers*, *in* COST-BENEFIT ANALYSIS: LEGAL, ECONOMIC, AND PHILOSOPHICAL PERSPECTIVES 324 (Matthew D. Adler & Eric A. Posner eds., 2001).

136. *Id.* at 324–25.

137. *But see* Matthew D. Adler, *Against "Individual Risk": A Sympathetic Critique of Risk Assessment*, 153 U. PA. L. REV. 1121, 1130 (2005) (arguing individual risk, as opposed to population risk, is irrelevant from a normative point of view).

ed, since no person will have a stronger complaint than one based on the loss of life.[138] As the philosopher Aaron James has put it, "Complaints of death will always carry the day."[139] Thus, if the ex post point of view governs, any risky activity that would be expected to result in the death of at least one person will be impermissible according to contractualism, since there will be at least one person who could reasonably reject the principle that allows the activity to go forward. But this would bar all sorts of risky activities—large-scale construction projects, etc.—that, assuming reasonable precautions are taken, seem intuitively acceptable, notwithstanding that they are certain to result in the accidental loss of life and limb.[140]

Thus, because ex post contractualism ignores factors that seem morally relevant and leads to results that seem morally implausible, contractualism should take an ex ante form when applied to cases involving the imposition of risks of harm.[141]

C. *Normative Pluralism*

Hard-core contractualists would insist that contractualist considerations exhaust the content of morality, and that morality always requires choosing the act or policy that is most equitable. Hard-core welfarists, on the other hand, would insist that considerations of overall well-being exhaust the content of morality, that morality always requires choosing the act or policy that maximizes overall well-being. Thus, in the Policy Choice hypothetical discussed above, a hard-core welfarist would maintain that the

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138. *See* Barbara H. Fried, *Can Contractualism Save Us from Aggregation?*, 16 J. ETHICS 39, 440 (2012) (noting that under ex post contractualism, "any principle that authorizes actions that risk gravely harming at least one person will be rejected by the hypothetical representative person who, by happenstance or by being permitted to peek ahead, learns she will be the unlucky one").

139. James, *supra* note 130, at 272.

140. *See* Frick, *supra* note 106, at 185 (arguing that "ex post contractualism is hard to accept" because it "would dramatically contradict many of our ordinary moral convictions" about the permissibility of risky activities); James, *supra* note 130, at 269 (arguing that ex post contractualism results in "moral gridlock," i.e., a ban on virtually all socially beneficial but risky activities).

141. A number of commentators have reached a similar conclusion. *See, e.g.*, Frick, *supra* note 106, at 180, 219; James, *supra* note 130, at 274, 292; Rahul Kumar, *Risking and Wronging*, 43 PHIL. & PUB. AFF. 27, 48 (2015). Ex ante contractualism is not without its critics, however, and may face certain problems of its own. *See* Reibetanz, *supra* note 123, at 302–04, 311 (arguing that ex ante contractualism can lead to counterintuitive results).

government should opt for Policy One, notwithstanding its arguably inequitable impact on members of Group B.

Normative pluralists reject both hard-core welfarism and hardcore contractualism. Pluralists believe that normative judgments should be informed both by considerations of equity and by considerations of overall well-being (and perhaps by other sorts as well), making room for the possibility that welfarism should prevail in some situations and contractualism in others.[142]

For example, a pluralist might hold that contractualist considerations should prevail over welfarist considerations when an act or policy will deliver tiny benefits to a vast number of people, but inflict devastating losses on a very small number of people. Such a policy could be rejected on contractualist grounds notwithstanding that it might increase aggregate well-being significantly on net. On the other hand, a pluralist might hold that welfarist considerations should prevail over contractualist considerations when, for example, choosing between a policy that poses a 1 in 1000 risk of death to one million people (1000 expected deaths) and a policy that poses a one in ten risk of death to 100 people (ten expected deaths). The latter policy could be justified on welfarist grounds notwithstanding that it runs afoul of ex ante contractualism's minimax criterion, i.e., it imposes a far greater expected burden on each of the 100 persons it would affect than the alternative policy would impose on each of the one million persons it would affect.

When contractualist and welfarist considerations conflict, a normative pluralist would reach a considered judgment about the morally correct course of action by gauging the strength of those competing considerations. If, for example, contractualist considerations weigh strongly in favor of a particular course of action and welfarist considerations weigh only weakly against it, the normative pluralist could sensibly hold the course of action to be

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142. I owe to Johann Frick the notion of a normative pluralism specifically encompassing considerations of both equity and overall well-being. *See* Frick, *supra* note 106, at 219, 221–22 (proposing a "pluralist account of moral rightness" that embraces considerations of both equity and well-being); *cf.* Adler & Posner, *supra* note 9, at 275 ("Thus we disagree with classical utilitarianism, which is the view that overall well-being is the sole criterion bearing on governmental choice. Our view is that the government should choose a welfare-improving project unless other considerations, such as deontological or egalitarian considerations, justify rejecting the welfare-improving project and choosing the status quo instead.").

morally permissible. The more difficult cases are those in which the conflicting normative considerations are of relatively equal strength.

As a normative pluralist, it is tempting to look for a decision rule or algorithm with which to resolve such cases. That temptation should be resisted. The task of moral theory is to identify the relevant normative factors that should inform our moral judgments and to explain why those factors matter,[143] not to provide a quasi-mathematical rule for making all moral judgments. Moral judgment in particular cases is inherently multifactorial and deeply fact-dependent, making a rigid algorithm an inappropriate substitute for considered reflection and deliberation when the normative factors one has identified stand in equipoise.[144]

A normative pluralism embracing both welfarism and contractualism constitutes the theoretical foundation of the argument in this article. However, contractualist considerations receive greater emphasis in the analysis because, as will be demonstrated in the following Part, they do the lion's share of work in providing a normative basis for feasibility-based regulation.

IV. A CONTRACTUALIST DEFENSE OF FEASIBILITY-BASED REGULATION

The normative justification for CBA is broadly welfarist. It proceeds from a "God's eye" perspective that evaluates regulatory policies on the basis of their aggregate costs and benefits for human well-being, summed across all affected persons. By contrast, the normative justification for feasibility regulation is broadly equity-based and specifically contractualist. It is rooted in comparative consideration of the perspective of each individual likely to be affected by a particular regulatory policy or action.

This part draws on contractualism and normative pluralism to defend the feasibility approach to risk regulation against two prominent objections raised by its critics: (i) the feasibility ap-

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143. *See* SHELLY KAGAN, NORMATIVE ETHICS 17–22 (1998) (distinguishing between "factoral" views that identify which normative factors or properties make acts wrong and "foundational" views that explain why the identified normative factors are wrong-making).

144. *See* Frick, *supra* note 106, at 223 ("The aim and ambition of moral philosophy should be to inform our judgment, by making us alive to the relevant ethical considerations, not to abolish the need for judgment.").

proach prescribes more stringent risk regulation than is norma-
tively appropriate in some cases (the "overregulation objection")
and (ii) the feasibility approach permits more lax regulation than
is normatively appropriate in other cases (the "underregulation
objection"). The overregulation objection charges that the feasibil-
ity principle requires investments in risk reduction that are not
justifiable in light of their costs. Masur and Posner argue, for ex-
ample, "[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."[145] The underregulation objection,
on the other hand, charges that the feasibility principle unjustifi-
ably allows an industry to engage in dangerous practices merely
for the sake of ensuring its survival. In the words of Masur and
Posner, "[a] regulation that substantially reduces risks of harm
should be issued even if it closes many plants."[146] This article con-
siders each objection in turn.

A. *Justifying Feasibility as a Floor for Risk Regulation*

A prominent and familiar criticism of feasibility-based regula-
tion is that it results in more stringent regulation than is norma-
tively desirable, that it "overregulates."[147] When this criticism is
leveled, the underlying assumption is usually that the feasibility
approach is normatively indefensible to the extent that it results
in more stringent regulation than would be optimal from the
point of view of CBA.[148] This section defends feasibility regulation
from this objection by making two basic points. First, when the
feasibility approach results in more stringent regulation than
CBA would have, such "CBA-relative overregulation" is typically
justifiable on the basis of equity, interpreted as ex ante contrac-

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145. Masur & Posner, *supra* note 8, at 702.

146. *Id*.

147. *See, e.g.*, CASS R. SUNSTEIN, THE COST-BENEFIT STATE: THE FUTURE OF
REGULATORY PROTECTION 73–74 (2002); Masur & Posner, *supra* note 8, at 679 & n.99
("Industry groups frequently attack feasibility analysis for enabling more stringent regu-
lation than they deem appropriate" and "[t]his is in many cases a valid criticism.").

148. *See* DANIEL A. FARBER, ECO-PRAGMATISM: MAKING SENSIBLE ENVIRONMENTAL
DECISIONS IN AN UNCERTAIN WORLD 78 (1999); Masur & Posner, *supra* note 8, at 697 ("Ac-
cording 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. 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.") (emphasis added).

tualism. Second, although it is theoretically possible for feasibility analysis to overregulate even relative to ex ante contractualism, this theoretical possibility will rarely occur where, as is commonly the case, the monetary costs of significantly reducing the health risks posed by toxic substances or emissions are spread among millions of consumers or shareholders.

1. Valuing Life v. Valuing Risks to Life

Suppose a given regulation is expected to save 100 lives at a cost of $1 billion. Do the life-saving benefits of the regulation justify its monetary cost? At least since President Reagan's 1981 Executive Order directing federal regulatory agencies to engage in cost-benefit analysis of all major regulations,[149] regulators have been faced with the difficult task of answering these questions.

The approach regulatory agencies have taken is to convert the health benefits of such a regulation—primarily, deaths avoided—into the same currency as the regulation's cost—dollars. In the early 1980s, the notion of a "value of statistical life" ("VSL") was born, and has since been used pervasively by federal agencies charged with regulating risks of death or serious bodily harm.[150]

How exactly do regulatory agencies calculate the VSL? This question presents a dilemma. On one hand, the view that a statistical death should be prevented at *any* monetary cost strikes many as implausible.[151] On the other hand, using willingness-to-pay or willingness-to-accept as a method for attaching a monetary value to life itself is problematic, since, except in very unusual circumstances, no sane person would be willing to forfeit his or her life in exchange for any amount of money.[152] How have economists resolved this dilemma? Cass Sunstein and Eric Pos-

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149. *See* Exec. Order No. 12,291, 3 C.F.R. § 2 (1981).

150. *See* Eric A. Posner & Cass R. Sunstein, *Dollars and Death*, 72 U. CHI. L. REV. 537, 538, 549 (2005). Most federal regulatory agencies have converged on a VSL figure somewhere between $5 million and $6.5 million. *Id.* at 549; *infra*, Part IV.A.3 (discussing case study of workplace risk regulation in which OSHA used a VSL of $6.8 million).

151. *See, e.g.*, STEPHEN BREYER, BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION 16 (1993) ("[E]very day, each of us implicitly evaluates risks to life. We begin to run risks to achieve our daily objectives the instant we get out of bed. . . . We believe it worth installing guard rails on bridges, but not worth coating the Grand Canyon in soft plastic to catch those who might fall over the edge.").

152. *See, e.g.*, Driesen, *Two Cheers*, *supra* note 12, at 340.

ner explain that the answer involves "real-world behavior, in which workers and consumers receive compensation when they are subject to risks of death."[153] Sunstein and Posner continue,

> In the workplace and for consumer goods, additional safety has a "price"; market evidence, involving the compensation people actually receive, is investigated to identify that price. Agency valuations are largely a product of studies of workplace risks, attempting to determine how much workers are paid to assume mortality hazards. The relevant risks usually are in the general range of 1/10,000 to 1/100,000. The calculation of the value of a statistical life (VSL) is a product of simple arithmetic. Suppose . . . that workers must be paid $600, on average, to eliminate a risk of 1/10,000. If so, the value of a statistical life would be said to be $6 million.[154]

It is important to bear in mind that this method of attaching a monetary value to human life is, in one very clear sense, based on a fiction. There is a huge inferential leap from the empirical proposition that an average worker would require a $600 payment to be exposed to a 1 in 10,000 risk of death to the proposition that a statistical worker's life has a value of $6 million. Obviously, it cannot be inferred that an average worker would forfeit their life in exchange for a monetary payment of *any* amount of money, much less a payment of $6 million.[155] To generalize this point, it cannot be inferred that the amount a worker would be willing to pay to eliminate a risk of death would increase in a linear fashion as the risk itself increases. Although a worker might be willing to pay only $600 for the elimination of a 1 in 10,000 risk of death, she might well be willing to pay more than ten times as much to eliminate a risk ten times as great. Judge Richard Posner has put this point as follows: "[C]ost-benefit analysis values risks, and the so-called value of life that cost-benefit analysts refer to is just a mathematical transformation."[156]

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153. *See* Posner & Sunstein, *supra* note 150, at 551.

154. *Id*. Professor W. Kip Viscusi is generally credited with introducing the practice of calculating VSL based on willingness-to-pay figures derived from actual labor market behavior. *See* W. Kip Viscusi, *Risk Equity*, *in* COST-BENEFIT ANALYSIS: LEGAL, ECONOMIC, AND PHILOSOPHICAL PERSPECTIVES 19 (Matthew D. Adler & Eric A. Posner eds., 2001).

155. *See, e.g.*, Driesen, *Two Cheers*, *supra* note 12, at 340.

156. Richard A. Posner, *Cost-Benefit Analysis: Definition, Justification, and Comment on Conference Papers*, 29 J. LEGAL STUD. 1153, 1160 (2000) [hereinafter Posner, *Cost-Benefit Analysis*]; *see also supra* Part III.B (discussing Posner's point).

This point has a critically important implication for the normative evaluation of risk regulation. Suppose an average person would be willing to pay no more than $600 to eliminate a 1 in 10,000 risk of death. In welfarist terms, this would mean that imposing a cost of more than $600 on a person would leave that person worse off than imposing a 1 in 10,000 risk of death on them would. This implies that if a government agency can accomplish a particular goal either by imposing a cost of, say, $2000 on Person A or imposing a 1 in 10,000 risk of death on Person B, the right thing to do (from the standpoint of both overall well-being and equity) is to impose the risk on Person B. Further, it implies that if a government agency can accomplish a goal either by imposing a cost of $50 on Person A or imposing a 1 in 10,000 risk of death on Person B, the right thing to do is to impose the monetary cost on Person A.[157]

However, if Posner is right that CBA should be understood to value risks to life rather than life itself, then it is problematic to think the sorts of trade-offs described in the previous paragraph straightforwardly entail the moral propriety of trade-offs of the type often made when CBA is applied to government regulations affecting large numbers of people. For example, suppose a regulation will impose a cost of $8 million on an industry and save one life. Taking $6 million as the value of a statistical life, the regulation is not cost justified and so would be prohibited by standard CBA. Posner's point suggests that, to be consistent with the manner in which VSL is actually determined, CBA would need to take into account not only the ex post life-saving impact of the regulation (one life saved), but also the regulation's ex ante impact on the risk to which each risk-bearer is exposed. For example, if the regulation eliminates a 1 in 10,000 risk of death to 10,000 workers, the risk-exposed workers would be expected to each pay $600 for that reduction in risk, a total of $6 million. Using willingness to pay as a measure of well-being implies that the $8 million cost of the regulation exceeds its risk-reducing benefit. However, if the regulation eliminates a 1 in 1000 risk of death to 1000 workers, it is quite possible that each worker would be will-

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157.   The point made in this sentence and the previous one assumes both persons would experience the identical setback to their well-being as a result of the imposition of the specified monetary cost. The same assumption is made with respect to the imposition of the specified risk.

ing to pay more than $8000 to eliminate that risk. If true, the regulation becomes a cost effective one. Because, as Posner observes, the VSL is actually derived from workers' ex ante willingness to take on risks of varying magnitudes, this suggests that regulatory agencies need to move away from using a single VSL figure to analyze the cost-effectiveness of risk regulations based on ex post life-saving benefits or costs.[158] CBA instead needs to be calibrated to risk-bearers ex ante willingness to pay to avoid the risks they are faced with.

Judge Posner's point might be stated as follows: when the costs of reducing deaths and serious injuries caused by toxic substances primarily take the form of monetary losses, the way to achieve an appropriate regulatory balance is to monetize the *risks* posed to life and limb, rather than monetizing life and limb themselves. Although Posner made this point in the context of discussing how CBA ought to deal with cases in which life and limb are pitted against monetary losses, the point has an important implication for contractualist analysis as well. As will be seen in the following section, a contractualist analysis of such cases will focus on a comparison between the safety benefit a given regulation will provide for each person exposed to the toxic substance at issue and the corresponding monetary burden it will impose on each person who will bear a share of the regulation's cost. In making this comparison, we will need to convert the safety benefit into the same currency as the regulatory cost. That is, it is necessary to monetize the safety benefit to each risk-bearer. Judge Posner's point suggests that the way to do so is via ex ante contractualism: the regulatory benefit should be expressed as the amount of money each risk-bearer would be willing to pay ex ante for a specified reduction in their risk of death or devastating injury. The contractualist analysis will center on a comparison between this figure and the amount of money each cost-bearer will be required to pay to achieve the specified reduction in each risk-bearer's risk.

2. Equity, Individual Risk, and Individual Cost

Feasibility-based regulation typically (though not necessarily) dictates more stringent regulation than cost-benefit analysis

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158. *See* Posner, *Cost-Benefit Analysis*, *supra* note 156, at 1155.

does.[159] When that is the case, what is the normative basis for pressing regulation beyond the point of cost-justification to the point of maximum economic feasibility? The norm for providing a basis for feasibility-based regulation in such circumstances is that of equity, interpreted as ex ante contractualism.

As discussed in Part III, the norm of equity can provide a defensible basis for choosing a policy or course of action that is suboptimal from the perspective of overall well-being. If, for example, the policy that is preferable from the standpoint of overall well-being disproportionately disadvantages a particular person or group of persons, it may be inequitable to pursue that policy, notwithstanding its welfarist merits. Normative pluralism holds that, depending on just how inequitable the policy would be to the disadvantaged group, the all-things-considered morally proper course of action may be to act equitably rather than according to the dictates of welfarism.[160] Normative pluralists believe welfarist considerations have an important role to play in evaluating regulatory policy. However, the argument in this article is premised on the notion that, in common regulatory circumstances, equitable considerations may tend to prevail over welfarist considerations. In particular, the case for pressing regulation beyond the point dictated by CBA and up to the feasibility point rests squarely on considerations of equity.

The case for regulating past the point dictated by CBA and up to the feasibility point can be stated straightforwardly using a simple example. Suppose the 100,000 workers in a particular industry face a 1 in 10,000 annual risk of death from exposure to a toxic chemical used in the industry's production process. Suppose the risk can be eliminated at a total annual cost of $100 million, which will be entirely passed on to the industry's five million annual consumers in the form of a $20-per-unit price increase. As a matter of morality, should the industry be required to make the $100 million regulatory investment?

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159. *See* KEETON ET AL., TORT AND ACCIDENT LAW, *supra* note 10, at 1237–41 (discussing a continuum of precautionary standards in which the feasibility standard is considered less tolerant of risk than the cost-benefit balancing standard); Keating, *Pressing Precaution*, *supra* note 11, at 684–85 (observing that feasibility regulation generally tolerates less risk than the cost-justification standard); Masur & Posner, *supra* note 8, at 679 & n.99 ("Industry groups frequently attack feasibility analysis for enabling more stringent regulation than they deem appropriate. . . . This is in many cases a valid criticism.").

160. *See supra* Part III.C.

Under standard welfarism, the answer is no. Assuming, as above,[161] that each worker would be willing to pay $600 to eliminate the risk to him or her, the risk imposes a total cost of $60 million on the workers ($600 x 100,000 workers).[162] Because this is substantially less than the $100 million cost of eliminating the risk, the regulation is not cost-justified. Using willingness-to-pay as a measure of well-being,[163] the regulation would reduce overall well-being on net, and so is indefensible from the standpoint of welfarism.

Analyzing the regulation from the standpoint of equity, one needs to consider the costs and benefits it would impose on each affected individual, rather than costs and benefits considered in the aggregate. For each risk-bearing worker, the regulation confers the benefit of eliminating a 1 in 10,000 risk of death. By hypothesis, each worker would be willing to pay $600 for that benefit. On the cost side, the regulation imposes a cost (in the form of a price increase) of $20 on each of the five million consumers.

When adopting ex ante contractualism as an interpretation of equity, the question is whether a consumer could reasonably reject the imposition of a $20 cost so that each worker can avoid the imposition of a 1 in 10,000 risk of death. Since each worker would plausibly be willing to pay $600 to avoid a risk of that magnitude,

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161. *See supra* notes 156–57 and accompanying text.

162. This calculation follows Judge Posner's recommendation that CBA be based on the ex ante valuation of risks to life, rather than on the ex post valuation of lives lost. *See* Posner, *Cost-Benefit Analysis*, *supra* note 156, at 1160–61. Had the ten lives expected to be saved by the regulation resulted from the elimination of a 1 in 1000 risk of death to 10,000 workers—rather than the elimination of a 1 in 10,000 risk of death to 100,000 workers— the regulation's aggregate benefit would plausibly be significantly more than $60 million. As Judge Posner's discussion suggests, a worker would plausibly be willing to pay more than ten times as much money to eliminate a 1 in 1000 risk of death than she would be willing to pay to eliminate a 1 in 10,000 risk of death.

163. For purposes of simplifying my analysis here, I assume that all individuals potentially affected by a particular risk imposition have the identical level of pre-existing wealth and identical degree of aversion to risk. With these assumptions in place, (i) each affected individual will experience the identical loss (or gain) in well-being as the result of the imposition of a given monetary cost (or credit) or as the result of a given increase (or reduction) in their risk of death or serious injury, and (ii) each risk-bearer will be willing to pay the identical amount of money for a specified reduction in their risk of death or serious injury. Of course, CBA must confront the same difficulty. *See* Matthew D. Adler, Cost-Benefit Analysis and Distributional Weights: An Overview 10–15 (Aug. 20, 2013) (unpublished manuscript), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2313388 (explaining how distributionally weighted cost-benefit analysis can take account of varying levels of individual wealth and the diminishing marginal utility of money).

the choice is between imposing a $20 cost on each cost-bearing consumer (if the regulation is adopted) or imposing what is effectively a $600 cost on each risk-bearing worker (if the regulation is not adopted). Intuitively, it seems clear that no consumer could reasonably reject having to pay an extra $20 so that each worker can avoid a cost that is thirty times as great. A consumer might wish to reject the risk-reducing price increase, but they could not *reasonably* do so, as that would effectively mean asking each worker to shoulder an additional cost of $600 so each consumer could avoid an additional cost of $20.[164]

Just as considerations of equity militated in favor of Policy Two in the Policy Choice hypothetical,[165] so do they militate in favor of adopting the $100 million regulation here. Although the regulation is not cost-justified in the aggregate, it provides each risk-bearing worker with a risk reduction benefit worth $600 while imposing a cost of $20 on each cost-bearing consumer. A consumer could not reasonably refuse to accept the regulation's $20 per capita monetary cost so that each worker can enjoy the $600 per capita safety benefit she would miss out on, were the regulation not adopted.

This example is an interesting one because considerations of equity and overall well-being point in opposite directions. Normative pluralists believe such cases require a considered judgment about which of the norms should prevail. In some cases, considerations of overall well-being will prevail over considerations of equity; in others, the opposite will be true.

Contractualist considerations appear to trump welfarist considerations in the above example in virtue of two facts. First, taken in the aggregate, the monetary costs of the regulation exceed its monetized safety benefits, but not *dramatically* so. The $100 million cost of the regulation is not even twice the amount of the $60 million safety benefit. In other words, welfarist considera-

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164. More technically, recall that contractualism holds that the right course of action is one that satisfies the "minimax" criterion, i.e., the course of action under which the burden borne by the most-burdened individual is less weighty than the burden borne by the most-burdened individual under any alternative course of action. *See supra* Part III.A. Implementing the regulation is the course of action that satisfies the minimax criterion since it imposes a far less weighty burden on the consumer (a $20 monetary cost) than the alternative course of action—not implementing the regulation—imposes on the worker (an increased risk equivalent to a monetary cost of $600).

165. *See infra* Part III.A.

tions weigh against the regulation, but relatively weakly. Second, equitable considerations weigh *strongly* in favor of the regulation. When the regulation's costs and benefits are viewed from the perspective of each affected individual, it becomes clear that the cost to each worker of not implementing the regulation is thirty times as great as the cost to each consumer of implementing it. Equitable considerations prevail over considerations of overall well-being here because they dramatically favor implementing the regulation, whereas welfarist considerations weigh only weakly in the opposite direction. Consider the following real-world example of the same phenomenon.

3. Case Study: Hexavalent Chromium

Hexavalent chromium (Cr(VI)) is a toxic substance used in a number of industries.[166] Compounds containing chromium are used for metal electroplating and to produce "chemical catalysts and pigments for textile dyes, paints, inks, glass, and plastics."[167] Chromium "compounds are also [formed] incidentally . . . as a by-product of certain welding processes, and as an impurity found in portland cement."[168] "According to OSHA, there are over 30 industry sectors in which workers may be exposed to" chromium.[169]

"Compounds containing [chromium] can exist in mist, dust, or fume form, and have long been known to [pose health risks to workers] when inhaled, or upon contact with skin."[170] Most significantly, exposure to chromium can cause lung cancer, which is often fatal.[171] Chromium exposure can also cause nonfatal ailments such as asthma, dermatitis, nasal irritation, and gastrointestinal ulcers.[172]

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166. *See* Pub. Citizen Health Research Grp. v. U.S. Dep't of Labor, 557 F.3d 165, 168–69 (3d Cir. 2009) (denying petition challenging OSHA's regulation of hexavalent chromium except with respect to the employee notification aspects of the standard).

167. *Id.* at 169.

168. *Id*.

169. *Id*.

170. *Id*.

171. *Id*. at 169–70; *see also* Occupational Exposure to Hexavalent Chromium, 71 Fed. Reg. 10,100, 10,224 (Feb. 28, 2006).

172. Occupational Exposure to Hexavalent Chromium, 71 Fed. Reg. at 10,108, 10,166, 10,174.

In 1971, OSHA set a PEL for chromium of 52 micrograms per cubic meter ($\mu g/m^3$).[173] By 2004, chromium's carcinogenic properties had become clear, and OSHA consequently proposed reducing the chromium exposure standard to 1 $\mu g/m^3$.[174] In 2006, after extensive comments and hearings, OSHA issued its final rule, which set a somewhat higher chromium PEL of 5 $\mu g/m^3$.[175]

OSHA calculated that, at the then-existing PEL of 52 $\mu g/m^3$, exposure to chromium over a forty-five-year, full-time working life would cause between 101 and 351 deaths for every 1000 workers,[176] translating into a lifetime risk of death between 10.1% and 35.1% for each worker. OSHA then computed the risks of lung cancer deaths at six lower PELs (20, 10, 5, 1, 0.5, and 0.25 $\mu g/m^3$), with the following results:

Table 1

Percentage Chance of Lung Cancer Death from
Exposure to Hexavalent Chromium[177]

Cr(VI) Concentration ($\mu g/m^3$)	20-Year Exposure	45-Year Exposure	20-Year Exposure Median	One-Year Exposure[178]
52	4.3–19.8	10.1–35.1	12.05	0.603 (1 in 166)
20	1.7–8.3	4.1–16.4	5.0	0.25 (1 in 400)
10	0.9–4.3	2.1–8.6	2.6	0.13 (1 in 769)
5	0.43–2.2	1.0–4.5	1.315	0.06575 (1 in 1,521)
1	0.085–0.44	0.21–0.91	0.263	0.0131 (1 in 7,619)
0.5	0.043–0.22	0.11–0.46	0.132	0.0066 (1 in 15,152)
0.25	0.021–0.11	0.053–0.23	0.0033	0.00314 (1 in 30,303)

173. *Pub. Citizen Health Research Grp.*, 557 F.3d at 169.

174. *Id*.

175. *Id*.

176. Occupational Exposure to Hexavalent Chromium, 71 Fed. Reg. at 10,224 tbl.VII-1.

177. *See id*.; *id*. at 10,195 tbl.VI-7.

178. The occupational risk of lung cancer death from one year of exposure to hexavalent chromium has been computed by dividing the median risk for twenty-year exposure by twenty. Although OSHA did not provide one-year risk figures in its report on hexavalent chromium, OSHA stated that its "risk estimates are roughly proportional to duration for any given exposure concentration." *See id*. at 10,224.

In addition to computing individual risk for varying levels and durations of exposure to chromium, OSHA also calculated the annual costs and monetized benefits of setting the chromium PEL at the various alternative levels it was considering.[179] The benefits included the prevention of both fatal and nonfatal cancers.[180] To monetize the avoidance of fatal cancers, OSHA adopted EPA's then-prevailing $6.8 million VSL; to monetize the avoidance of nonfatal cancers, OSHA employed an analysis based on both the VSL and a cost-of-illness approach.[181] The following table summarizes the results of OSHA's cost-benefit analysis.

Table 2

Annual Monetized Net Benefits From A Reduction in Exposure to Hexavalent Chromium
(dollar figures refer to millions of 2003 dollars)[182]

PEL (µg/m³)	.25	.5	1	5	10	20
Monetized Benefits (Discounted at 7%)[183]	$475	$449	$414	$270	$176	$88
Monetized Benefits (Discounted at 3%)[184]	$888	$836	$773	$504	$331	$165
Costs (Discounted at 7%)	$1,815	$1,033	$570	$282	$170	$112
Costs (Discounted at 3%)	$1,762	$996	$552	$273	$165	$109
Net Benefit (7% Discount Rate)	−$1,340	−$584	−$156	−$12	**$6**	−$24
Net Benefit (3% Discount Rate)	−$874	−$160	$221	**$231**	$165	$56

179. *See id.* at 10,305, 10,307.

180. *See id.* Based on various scientific studies, OSHA estimated ranges of the annual cancer-prevention benefits of setting the chromium PEL at the various alternative levels it was considering. For annual avoided lung cancer deaths, the reported ranges for each PEL were as follows: .25: 66-258; .5: 62-243; 1: 58-224; 5: 40-145; 10: 27-95; 20: 15-47. *Id.* at 10,304 tbl.VIII-10. For annual avoided non-fatal cancers, the reported ranges for each PEL were as follows: .25: 9-35; .5: 8-33; 1: 8-31; 5: 5-20; 10: 4-13: 20: 2-6. *Id.*

181. *See id.* at 10,305.

182. *See id.* at 10,306 tbl.VIII-11, 10,308 tbl.VIII-12.

183. The figures in this row represent the median values of the monetized benefit ranges in the OSHA report using a 7% discount rate. The range of monetized benefits reported for each PEL were as follows (in millions of 2003 dollars): .25: $60–$891; .5: $57–$841; 1: $53–$776; 5: $36–$504; 10: $25–$328; 20: $13–$162. *See id.* at 10,306 tbl.VIII-11.

184. The figures in this row represent the median values of the monetized benefit ranges in the OSHA report using a 3% discount rate. The range of monetized benefits reported for each PEL were as follows (in millions of 2003 dollars): .25: $189–$1587; .5: $176–$1496; 1: $164–$1382; 5: $112–$896; 10: $77–$584; 20: $41–$288. *See id.*

In Table 2 above, the 5 µg/m^3 PEL column is shaded to indicate the exposure level OSHA ultimately found to satisfy the economic feasibility standard and the level at which the new chromium PEL was fixed.[185] In the bottom two rows showing net benefits for the two discount rates OSHA considered, the bolded figures represent the largest net benefit capable of being realized among the alternative PELs being considered by OSHA. Discounting costs and median monetized benefits by 7%,[186] the greatest net benefit ($6 million) would be realized at a PEL of 10 µg/m^3. Discounting costs and median monetized benefits by 3%, the greatest net benefit ($231 million) would be realized at a PEL of 5 µg/m^3.

Under the assumption of a 7% discount rate,[187] the feasible level of regulation (a PEL of 5 µg/m^3) is more stringent than the level of regulation that maximizes net social benefits (a PEL of 10 µg/m^3). In such circumstances, the feasible level of regulation is suboptimal from the point of view of overall well-being. As Table 2 indicates, compared with the welfare-maximizing 10 µg/m^3 PEL, requiring firms within the regulated industries to adhere to a more stringent PEL of 5 µg/m^3 would impose marginal costs of $112 million, while resulting in marginal monetized benefits of only $94 million. What, then, is the case for lowering the PEL to that more stringent level?

The case rests on considerations of equity, interpreted as ex ante contractualism. Contractualism directs our attention away

185. *See* Pub. Citizen Health Research Grp. v. U.S. Dep't of Labor, 557 F.3d 165, 169 (3d Cir. 2009).

186. OSHA relied on an assumption of a 7% discount rate in its analysis of costs, adding an alternative 3% discount rate calculation as part of what it called a "sensitivity analysis" when calculating net monetized benefits. *See* Occupational Exposure to Hexavalent Chromium, 71 Fed. Reg. at 10,263 ("[A]ll costs are annualized at a discount rate of 7 percent. (A sensitivity analysis using a discount rate of 3 percent is presented in the discussion of net benefits.)").

187. The analysis here assumes a 7% discount rate because, under that assumption, feasibility regulation "overregulates" relative to CBA, i.e., feasibility analysis dictates a more stringent chromium PEL than cost-benefit analysis would. As the bottom row of Table 2 indicates, if a 3% discount rate is assumed, then the 5 µg/m^3 PEL is both the economically feasible *and* cost-justified (welfare-maximizing) level of regulation, based on the median values in the ranges of monetized benefits provided in OSHA's report for each PEL. *See supra* Part IV.A.3 tbl.2. As Masur and Posner point out, it is only if both a higher-than-median value for monetized benefits is used *and* a 3% discount rate is assumed that a more stringent 1 µg/m^3 PEL is cost-justified and feasibility regulation consequently underregulates relative to CBA. *See* Masur & Posner, *supra* note 8, at 673, 679–80. For discussion of cases in which the feasible level of regulation is less stringent than the cost-justified level, see *infra* Part IV.B.

from aggregate costs and benefits and toward the monetary costs imposed on each individual cost-bearer and the safety benefits realized by each individual risk-bearing worker. Here, as Table 1 indicates, a worker's annual risk of lung cancer death from exposure to 10 µg/m^3 of hexavalent chromium is .13%, or roughly 1 in 769.[188] Lowering a worker's exposure to 5 µg/m^3 reduces her annual risk of death to .06575%, or roughly 1 in 1521. Reducing the PEL from the cost-justified level of 10 µg/m^3 to the feasible level of 5 µg/m^3 therefore reduces each worker's annual risk of death by roughly half in relative terms, and by .06425% in absolute terms. What would an average, rational worker be willing to pay for such a reduction in her risk of death? Using OSHA's $6.8 million figure as the value of a statistical life, a worker would be willing to pay $4369 for this risk reduction.

The marginal cost of accomplishing this reduction in each worker's annual risk of death was estimated by OSHA to be $112 million in total.[189] A contractualist analysis requires determining how this cost was distributed among the individuals responsible for bearing it. Since considerations of equity relate to the costs and benefits experienced by each affected individual—rather than costs and benefits considered in the aggregate—the relevant comparison is one between each risk-bearer's reduction in risk and each cost-bearer's share of the cost of accomplishing that reduction. As seen above, reducing the chromium PEL from 10 to 5 µg/m^3 would result in a reduction of each worker's annual risk of lung cancer death from 1 in 769 to 1 in 1521. What would each cost-bearer's per capita share of the $112 million total cost be?

This question is impossible to answer with precision and difficult to estimate. Costs will generally either be passed on to consumers in the form of price increases or absorbed by firms in the form of reductions to profits.[190] From OSHA's chromium report, it

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188. OSHA indicated in its report that, as of 2006, 40,536 U.S. workers were exposed to chromium levels of 10 µg/m^3 or greater, and 68,295 U.S. workers were exposed to chromium levels of 5 µg/m^3 or greater. *See* Occupational Exposure to Hexavalent Chromium, 71 Fed. Reg. at 10,253–55 tbl.VII-2.

189. This figure represents the difference between the $170 million cost of achieving the 10 µg/m^3 PEL and the $282 million cost of achieving the 5 µg/m^3 PEL. *See supra* Table 2.

190. *See* Occupational Exposure to Hexavalent Chromium, 71 Fed. Reg. at 10,280. ("Price elasticity refers to the relationship between the price charged for a service and the demand for that service; that is, the more elastic the relationship, the less able is an establishment to pass the costs of compliance through to its customers in the form of a price

is difficult to determine either the proportion of regulatory costs that would be passed to consumers or the amount of any per-unit price increases by which such pass-throughs would be accomplished. The OSHA report does provide some helpful information, however. OSHA determined that firms in over thirty different industry sectors would be affected by the new chromium regulation.[191] Many of the firms in these industry sectors—those in the welding and construction sectors—may primarily serve other businesses rather than individual consumers, so multiple cost pass-throughs may occur before a regulatory cost reaches an individual "end user."

If the $112 million marginal cost of lowering the chromium PEL from 10 µg/m^3 to 5 µg/m^3 were distributed among ten million consumers, each consumer's per capita share would be $11.20; if distributed among one million consumers, each consumer's share would be $112; and if distributed among 100,000 consumers, each consumer's share would be $1120. Only if the total regulatory cost of moving from a 10 µg/m^3 to 5 µg/m^3 PEL were equally distributed among less than 30,000 consumers would each consumer's per capita share of that cost begin to approach the $4352 per-worker effective cost of opting for a 10 µg/m^3 PEL instead of a 5 µg/m^3 PEL.

Other commentators analyzing feasibility-based regulation have assumed that regulatory costs would be primarily passed on to consumers in the form of price increases of less than $100 per unit.[192] Therefore, for purposes of this analysis, it seems reasonable to assume the $112 million cost of lowering the chromium PEL from 10 µg/m^3 to 5 µg/m^3 would, if entirely passed through,

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increase and the more it will have to absorb the costs of compliance from its profits.").

191. *See id.* at 10,271–79 tbl.VIII-7.

192. *See, e.g.*, Driesen, *Two Cheers*, *supra* note 12, at 314 (offering example of feasibility regulation involving a $10 million regulatory cost passed through to consumers in the form of a $10-per-unit price increase on television sets); *id.* at 323 ("Proposed environmental regulations not producing widespread plant closures generally lead to agency predictions of modest price increases."); Keating, *Pressing Precaution*, *supra* note 11, at 674 ("Pressing precaution beyond the point of cost-justification will confer great benefits on some at the cost of trivial losses to others."); Masur & Posner, *supra* note 8, at 707–08 (discussing the possibility that feasibility analysis is based on a version of welfarism holding that "it is wrong for an agency to hold off regulating a substance that damages workers' lungs so that consumer products will be a few dollars cheaper"); *id.* at 703–04 (referring to the per-consumer costs imposed by feasibility regulation as "small costs" that consumers incur "because prices rise").

be distributed among at least 1 million consumers for a per-capita cost of $112. With this conservative assumption in place, it is clear that considerations of equity would weigh strongly in favor of feasibility regulation in the case of occupational exposure to chromium. A reduction in each worker's risk of lung cancer death worth $4369 can be achieved at a cost of $112 to each cost-bearer. Per contractualism, it would clearly be unreasonable for a consumer to reject a $112 price increase so that a worker can avoid an increased risk of death equivalent to a $4369 cost (nearly forty times as great as the price increase). Further, considerations of overall well-being weigh only weakly against feasibility regulation. Lowering the chromium PEL from 10 µg/m^3 to 5 µg/m^3 reduces the net benefit of regulation from $6 million to –$12 million, a difference of $18 million. This is a rather modest reduction in (monetized) overall well-being considering the scale of the total costs—between $170 and $282 million—and total monetized benefits—between $176 and $270 million—involved. The $112 million marginal cost of reducing the chromium PEL from 10 µg/m^3 to 5 µg/m^3 is just 120% of the size of the corresponding marginal monetized safety benefit. By contrast, each worker's marginal safety benefit is roughly 4000% the size of each consumer's marginal monetary burden. Thus, the feasibility-based regulation of chromium can be strongly defended on the basis of a normative pluralism encompassing considerations of equity and overall well-being.

4. Response to Objections

This equity-based defense of feasibility regulation as a floor is not vulnerable to the chief objections made by advocates of CBA. The defense offered here does not hold that *any* amount of money ought to be spent to prevent even a single death, so long as the existence or stability of the regulated industries is not threatened. If equity is interpreted as ex ante contractualism, then considerations of equity would weigh against a regulatory expenditure that would impose a monetary burden on each cost-bearer that exceeds the monetized risk-reduction benefit it would provide to each risk-bearer. For example, suppose a one in one million risk of death for one million workers could be eliminated at a regulatory cost of $1 billion distributed equally among one million consumers (a per capita cost of $1000 per consumer). Suppose

further that this cost could be borne without threatening the existence or competitive stability of the regulated industries. Since it is feasible to prevent a death, is there a normative basis for not doing so? Ex ante contractualism would hold that there is. Because no risk-bearing worker would rationally be willing to pay $1000 to eliminate a one in one million risk of death to herself, it would be inequitable to ask a consumer to make that investment on each worker's behalf. From the standpoint of ex ante contractualism, equity requires that consumers not be required to bear this monetary burden.

Thus, this article's defense of feasibility as a "floor" for risk regulation is, in this respect and from a purely theoretical standpoint, a qualified one—it does not hold that regulation up to the point of economic feasibility is normatively defensible in every conceivable instance. Its claim is that in the typical regulatory scenario, the point of economic feasibility will be reached *before* the point at which the marginal per capita cost of regulation would exceed the marginal per capita monetized risk reduction benefit. For example, at the chromium PEL found by OSHA to be feasible (5 µg/m^3), each worker's marginal monetized risk reduction benefit ($4369 compared with a PEL of 10 µg/m^3) far exceeded each consumer's share of the corresponding marginal cost ($112, assuming the costs were distributed among one million consumers).[193] This tends to be the case because regulatory costs are frequently distributed among a vast number of consumers or shareholders—making each cost-bearer's share of such costs relatively trivial—while, as Table 1 demonstrates in the case of chromium,[194] the risk reduction benefits of significantly lowering levels of exposure to toxic substances are often substantial for each risk-bearer.

It follows that a defense of feasibility regulation based on ex ante contractualism is not vulnerable to the charge that, as Masur and Posner put it, "[o]verregulation occurs because feasibility analysis ignores the cost of regulations to consumers—the costs they incur because prices rise or products disappear from the market."[195] Unlike Driesen's "concentration principle," which ac-

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193.   *See supra* Part IV.A.3.
194.   *See supra* Table 1.
195.   Masur & Posner, *supra* note 8, at 704.

cords no weight to widely distributed regulatory costs,[196] ex ante contractualism does give such costs weight. Ex ante contractualism holds that even a relatively modest per-capita cost cannot justifiably be placed on consumers if the resulting reduction in risk for each risk-bearer is negligible or sufficiently tiny.[197] As noted above, the crucial empirical corollary to the equity-based defense offered in this article is that, as a matter of actual fact, this will rarely be the case when it comes to the regulation of toxic substances or emissions. If that is true, then in the vast majority of cases pressing regulation beyond the cost-justified point to the point of economic feasibility, will be defensible.

5. The Role of Job Loss

This defense of the feasibility point as a floor for risk regulation has so far focused on situations in which the costs of regulation would be passed on to consumers in the form of price increases. What, though, about a situation in which firms within an industry are not able to pass on all of the regulatory costs to consumers and choose instead to meet those costs by laying off workers? Even if firms are able to pass regulatory costs on to consumers, what if price increases result in a reduction in consumer demand that, in turn, leads to worker layoffs? In such circumstances—where job losses are among the costs of pressing regulation up to (though not beyond) the feasibility point—can such regulation be defended on the basis of ex ante contractualism?

Under ex ante contractualism, the relevant comparison in such circumstances would be between the increased risk of job loss imposed on each worker within an industry as the result of the regulation and the decreased risk of death or serious injury the regulation yields for each risk-bearing individual. In cases where the industry's health risks fall primarily on its workers, the question

196. *See* Driesen, *Two Cheers*, *supra* note 12, at 319. *See supra* Part II.A. Keating's defense of feasibility-regulation is vulnerable to roughly the same objection. By holding that the only burden comparable in strength to the imposition of a significant risk of death or devastating injury is the cessation of a major productive activity, Keating seems to imply that pressing precaution to the feasibility point would be justified even when the marginal costs of doing so for each cost-bearer exceeded the marginal benefit for each risk-bearer. *See supra* Part II.B.

197. Dov Waisman, *Reasonable Precaution for the Individual*, 88 ST. JOHN'S L. REV. 653, 672 n.69, 690–91 (2014).

is whether pressing regulation to the feasibility point provides a safety benefit to each worker that outweighs the increased risk of job loss imposed on each worker. If it does, then regulation to the feasibility point is to the ex ante advantage of each worker and, for that reason, is defensible on the basis of ex ante contractualism, assuming the risk of job loss is the greatest ex ante burden imposed on any individual by the regulation.

For example, suppose reducing the chromium PEL from 10 $\mu g/m^3$ to 5 $\mu g/m^3$ were associated with a 10% risk of job loss[198] for each worker within the regulated industries. If a worker would, as noted above, be willing to pay $4369 per year for the associated reduction in their annual risk of lung cancer death,[199] the question is whether this benefit outweighs the welfare setback associated with a 10% risk of job loss.

Answering that question involves determining what a worker would be willing to pay to avoid a job loss risk of that magnitude. In a recent paper, Jonathan Masur and Eric Posner concluded that the monetized lifetime cost of a job loss—taking into account both lifetime earnings losses and nonpecuniary losses such as increased mortality risk and unhappiness—is well over $100,000, and perhaps even as high as $260,000.[200] If that is true, a rational, fully informed worker might be willing to pay as much as $26,000 to avoid a 10% risk of job loss. However, this figure must be compared with the $4369 *per year* that a rational worker would be willing to pay for the reduction in their risk of lung can-

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198.   OSHA's feasibility analysis did not specifically analyze the employment impacts of its regulation of chromium, so I use a 10% risk of job loss simply for the sake of illustration. There is reason to doubt whether regulating up to the feasibility point would normally pose a risk of job loss that is as high as 10%. If feasibility regulation tolerates the bankruptcy of marginal firms—but not massive disruption or widespread plant closings—the increased job loss risk associated with pressing regulation up to the feasibility point seems unlikely to be quite that high in most cases. *See, e.g.*, EPA, ECONOMIC ANALYSIS FOR THE NATIONAL EMISSIONS 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 PAPER BOARD CATEGORY–PHASE I, at 6-15 tbl.6-4, 6-35 tbl.6-15 (Oct. 27, 1997) (estimating that feasibility-based regulation of chemical runoff from pulp and paper mills under the Clean Water Act and Clean Air Act would result in the loss of 5711 of the 90,840 jobs in the regulated industries, thereby posing a job loss risk of 6.3% to each worker in those industries).

199.   *See supra* text accompanying notes 176–77.

200.   *See* Jonathan S. Masur & Eric A. Posner, *Regulation, Unemployment, and Cost-Benefit Analysis*, 98 VA. L. REV. 579, 618 (2012).

cer death. Over the course of a full working lifetime of forty years, the monetized benefit associated with the reduction in the worker's annual risk of death from lung cancer—$174,760—dwarfs the $26,000 benefit associated with avoiding a 10% risk of job loss. On these assumptions, regulating up to the feasibility point would be in the worker's ex ante interest, notwithstanding the nontrivial risk of job loss such regulation might pose.

Of course, this is just one particular example, one in which the feasibility regulation resulted in both a significant decrease in each risk-bearer's risk of death and, I have assumed for the sake of argument, a substantial increase in each worker's risk of job loss. A regulation that yielded a smaller reduction in each risk-bearer's risk of death might not be justifiable on ex ante contractualist grounds if the resulting increase in job loss risk were sufficiently large. Had the chromium regulation reduced each worker's annual risk of death by just 1 in *10,000* (rather than, as was actually the case, closer to 1 in 1000), the regulation would still have narrowly worked to each worker's ex ante advantage over the course of a forty-year working lifetime, even if it posed a job loss risk of 10% to each worker. However, once the annual reduction in death risk accomplished by a regulation falls much below 1 in 10,000, the regulation might not be justifiable under ex ante contractualism if it posed a 10% risk of job loss to each affected worker.[201] And this would be true whether the risk at issue fell on workers or on some other groups of persons, such as those living in proximity to industry plants.

B. *Justifying Feasibility as a Ceiling for Risk Regulation*

Another prominent criticism of feasibility regulation is that it "underregulates" relative to CBA—that it may unjustifiably dictate a lower level of precaution than is optimal from a welfarist point of view. According to Masur and Posner, "[u]nderregulation

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201. For a worker exposed to a risk of death over the course of a forty-year working lifetime, the regulation would have to provide the worker with a safety benefit equivalent to $650 per year to justify a 10% risk of job loss, assuming a job loss imposes a monetized loss of $260,000. Assuming a $6.8 million VSL, this would mean the regulation would have to reduce the worker's annual risk of death by roughly 1 in 10,000 annually to be justifiable. While I have not collected data across all OSHA regulations, the chromium regulation suggests that workplace health regulations can and do yield much larger reductions in each worker's annual risk of death than 1 in 10,000.

occurs because feasibility analysis tolerates dangerous industrial practices if regulation would shut down plants."[202]

What, then, is the justification for capping safety expenditures at the point of maximum economic feasibility? Should an industry be allowed to cease investing in measures that lower the risks it generates on the basis that further investment would threaten the industry's survival or result in widespread plant shutdowns? Under what circumstances, if any, should increased risks to human life be tolerated merely for the sake of preserving an industry or avoiding mass job losses? Should it depend on whether the industry at issue delivers major, life-improving benefits—say, the pharmaceutical industry—as opposed to luxuries or conveniences? Answering these questions requires consideration of a more basic question: if an activity poses a significant and ineliminable risk of death or serious injury to a large number of people, on what grounds is it morally permissible to engage in the activity at all?

1. If an Industrial Activity Carries a Significant Risk of Death or Serious Injury, Why Do It at All?

If we know for certain that a number of workers will suffer accidental death in building a large suspension bridge, why allow the bridge to be built? If we know for certain that dust emitted by cement factories will cause a number of persons in surrounding communities to develop cancer or lung disease, why allow the manufacture of cement?

The welfarist answer to such questions would center on a comparison between the total costs of the activity (including its monetized life-and-limb accident costs) and the total benefits. A welfarist would maintain it is permissible to engage in the risky activity notwithstanding its expected costs if it increases overall well-being on net, i.e., if the total benefits delivered outweigh the total costs imposed. If the activity is such that, no matter how great the investment in safety precautions and other risk-reducing measures, the total costs it imposes exceed the total

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202. Masur & Posner, *supra* note 8, at 704; *see also id.* at 702 ("A regulation that substantially reduces risks of harm should be issued even if it closes many plants.").

benefits it delivers, welfarism would conclude it is morally impermissible to engage in the activity.[203]

A contractualist answer to these questions would also center on a comparison between benefits and burdens, though a nonaggregative one. An ex ante contractualist would maintain it is permissible to engage in a risky activity only if there exists some level of safety precaution at which the benefit the activity delivers to the person it most benefits exceeds the expected burden the activity places on the person to whom it poses the gravest risk. In other words, if the burden the activity places on the person to whom it poses the greatest risk is greater than the burden the activity's discontinuation (or absence) would place on its greatest would-be beneficiary, ex ante contractualism would not allow the activity to go forward.[204]

Whether one approaches the question from a welfarist or contractualist perspective, the normative case for engaging in risky activities rests on the life-improving, life-extending, liberty-enhancing benefits such activities provide. Such benefits can come in the form of consumption (of the good or service the activity provides), employment (in the activity's production processes), or additions to wealth (as a share of profits from the activity). A normative pluralist would evaluate any risky activity through both a welfarist and a contractualist lens, making a considered judgment about whether it is morally permissible to engage in the activity when welfarism and contractualism disagree about whether, at a given level of regulation, the activity is beneficial on net.[205] Taking both welfarist and contractualist considerations into account, a normative pluralist would determine whether a

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203. *See* Fried, *supra* note 138, at 60 ("If, however much we spend on safety, the sum of lives lost plus safety costs will be greater than the social benefits, it does not make sense to go ahead with the project at all.").

204. *See* Keating, *Pressing Precaution*, *supra* note 11, at 735–36, 736 n.187 ("It is important to recall that matters are more complex when terminating an activity would be to the advantage of those most endangered by it in the sense we have defined, but would impose a comparable burden on others who benefit from the activity. Then we must decide if the benefit to those others is greater than the burden of significant risk to the most endangered. In the kind of case we are considering, this would happen when the burden to shareholders and consumers of shutting down a major productive activity is greater than the burden to workers of bearing a significant risk of injury.").

205. See *supra* Part III.C for a more complete discussion of normative pluralism. *See also* Frick, *supra* note 106, at 219–23 (discussing a pluralist account of moral rightness embracing considerations of both equity and overall well-being).

particular activity is all-things-considered beneficial at a speci-fied level of regulation. If it is not, then normative pluralism would deem it morally impermissible to engage in the activity at that level of regulation.[206]

All-things-considered beneficialness should operate as a nor-mative side constraint on risk regulation. The justification for en-gaging in risky activities at all is that, notwithstanding their risks, many such activities deliver profound social benefits, in-cluding the reduction of natural and manmade threats to bodily integrity. If an activity is so dangerous that, no matter a regula-tion's stringency, it will result in so many deaths or devastating injuries as to prevent it from being all-things-considered benefi-cial, then it should be impermissible to engage in the activity un-der any circumstances. If the activity would be all-things-considered beneficial at a specified level of regulation, but not at any lower level, then it should be impermissible to engage in the activity unless the specified level of regulation (or a greater level) is observed. And more controversially, if the activity would be all-things-considered beneficial at a specified level of regulation but not viable for technological or economic reasons at a more strin-gent level of regulation, then it should be permissible to engage in the activity at the less stringent level, assuming there is no al-ternative way of providing the same benefits without imposing the same risks.

This line of reasoning has rather radical implications for the regulation of industrial and environmental risks in the developed world. Commercial profitability is a poor proxy for all-things-considered beneficialness due, in large part, to the phenomenon of negative externalities.[207] Many of the health costs imposed on society by industry are externalized to such an extent that were those costs to be internalized, the industry might no longer be ca-pable of maintaining profitability. Imposing all-things-considered

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206. I set to the side the argument that it should be morally permissible to engage in industrial activities that are *not* all-things-considered beneficial on net if those subject to the activity's risks of harm knowingly and willingly assume such risks. For example, given the harmful effects of inhaling tobacco smoke, it is doubtful whether the production of cig-arettes is socially beneficial, all things considered. Yet that activity's existence might still be defended on assumption of risk grounds.

207. *See, e.g.*, Jonathan S. Masur & Eric A. Posner, *Toward a Pigouvian State*, 164 U. PA. L. REV. 93, 94–95 (2015) (discussing phenomenon of negative externalities generated by industry).

beneficialness as a constraint on commercial activity could mean the legitimacy of at least some of the industries whose existence we take for granted would be called into question, notwithstanding their long-term commercial profitability.[208]

As will be discussed in more detail, the normative defense presented for the feasibility principle acknowledges that ensuring the survival of an industry—the touchstone of feasibility-based regulation—may at times be a goal inconsistent with engaging in only those industrial activities whose benefits justify their costs, all things considered. There may be cases where an industry's viability can be ensured only at the price of regulation so lax that the industry's benefits cannot justify its life-and-limb accident costs. To be sure, in such circumstances, feasibility-based regulation lacking a side constraint of all-things-considered beneficialness would be indefensible.

2. All-Things-Considered Beneficialness and Underregulation

In defending the feasibility point as a ceiling for risk regulation, it is helpful to begin by asking: if one rejects a regulatory standard that caps regulation at the point of maximum economic feasibility, what is the alternative? The alternatives can be separated into two groups: regulatory standards that would *routinely* dictate a greater-than-feasible level of risk regulation and regulatory standards that would dictate a greater-than-feasible level of regulation only occasionally. The primary example of a regulatory standard that might routinely dictate a greater-than-feasible expenditure on precaution is a "safety" standard directing risks to be reduced to the point at which they are no longer significant regardless of cost or impact on the industry.[209] The primary example

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208. The tobacco industry is perhaps the best example of this.

209. *See* Keating, *Pressing Precaution*, *supra* note 11, at 685 ("Safety-based regulations require risk to be reduced to a point where no 'significant risk' of devastating injury remains. Applying the safe level standard therefore does not require any inquiry into the costs of risk reduction. All that it requires is a determination of the level at which the risk created by exposure to the regulated substance ceases to be 'significant.'"). For example, the Food Quality Protection Act of 1996 takes a safety approach with respect to regulating the level of pesticides present in food. *See* 21 U.S.C. § 346a(b)(2)(A)(ii) (requiring that pesticide levels in pure and processed food be reduced to a level at which "there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue, including all anticipated dietary exposures and all other exposures").

of a regulatory approach that might occasionally, though not routinely, require a greater-than-feasible level of regulation is CBA.

Obviously, any regulatory standard that routinely dictated a greater-than-feasible level of regulation would, if widely imposed, effectively grind the economy to a halt. Industries incapable of remaining economically viable if required to reduce their risks to insignificant levels[210] would cease to exist, depriving society of the benefits they provide. The range of industrial activities thriving in a modern, free market economy collectively provide immensely important life-preserving, life-extending, and life-improving social benefits.[211] Any regulatory standard that, if generally imposed, would bankrupt many or most of the industries within an economy should therefore be rejected in light of the profound social harm certain to follow.[212]

What about CBA? CBA is a regulatory standard that, presumably, would not routinely dictate a greater-than-feasible level of regulation. Indeed, there appears to be a general consensus among commentators that CBA will generally dictate a *less* stringent level of regulation than that dictated by the feasibility principle.[213] One cannot therefore reject CBA on grounds that, if generally adopted, it would largely eliminate the complex of life-improving, life-extending benefits provided by industrial activity. By hypothesis, general acceptance of CBA as a regulatory standard would not have that sort of stultifying effect on the economy. However, CBA may occasionally dictate a more stringent level of regulation than a feasibility standard would.[214] If a regulatory

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210. This is what a safety standard would require.

211. Just as one illustration, the world average life expectancy at birth in 1900 was thirty-one years and under fifty years in even the richest countries. *See* WORLD HEALTH ORG. HEALTH, HISTORY AND HARD CHOICES: FUNDING DILEMMAS IN A FAST-CHANGING WORLD (Aug. 2006), http://www.who.int/global_health_histories/seminars/presentation07.pdf. By the mid-20th century, the average rose to forty-eight years. By 2005, this figure had risen to 65.6 years, and over eighty years in some countries. *Id.*

212. *See* Masur & Posner, *supra* note 8, at 702 ("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).").

213. *See supra* note 159 and accompanying text; Keating, *Pressing Precaution*, *supra* note 11, at 671 n.45 ("In general, cost-justified precaution is less protective of safety than feasible precaution . . . but not always.").

214. *See* Masur & Posner, *supra* note 8, at 679 (arguing that this may have been the case with respect to OSHA's regulation of hexavalent chromium); *id.* at 697 (contending that the feasibility approach results in underregulation where "[a] low-cost precaution technology can be cheaply developed but does not currently exist; [t]he industry has low

standard is generally industry-preserving, what is the case for re-jecting the standard in the exceptional case in which its adoption would dictate a greater-than-feasible level of regulation, and thereby threaten the existence or competitive stability of some particular industry or group of industries? Put differently, where a particular industry poses a particular risk, why should a threat to the existence of the industry provide a basis for capping safety expenditures at a sub-optimal level, i.e., below the level dictated by CBA?

In answering this question, it is important to recall exactly what the economic feasibility point is supposed to represent: the point beyond which regulation would pose a threat to the exist-ence or competitive stability of an industry. As noted in Part I, this understanding is based directly on language in U.S. Supreme Court and federal circuit court opinions interpreting the notion of economic feasibility for purposes of the OSH Act.[215] This implies that regulation *beyond* the feasibility point poses a threat of mas-sively disrupting the regulated industry or eliminating it alto-gether,[216] thereby depriving society of the benefits the industry provides.

This understanding of what the feasibility point represents leads naturally to a particular way of making the normative case for capping regulation at that point. Specifically, the case for cap-ping regulation at the feasibility point rests on the goal of *pre-serving the social benefits that the regulated industry provides,* benefits that would be eliminated or sharply reduced were regu-lation pressed beyond the point of maximum economic feasibility.

To make this more concrete, consider an example offered by Cass Sunstein:

> [I]t would be wrong to think that CBA is more 'antiregulatory' than a feasibility constraint. We can easily imagine a regulation that might not be feasible, but that might satisfy a requirement of cost-benefit balancing. Suppose, for example, that a regulation would cost $2 billion, that industry could not bear that cost without many busi-

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revenues or precaution costs do not increase with revenue; or [t]he industry has low prof-its").

215.   *See supra* Part I.B.

216.   *See, e.g.,* United Steelworkers of Am. v. Marshall, 647 F.2d 1189, 1265 (D.C. Cir. 1980) ("A standard is feasible if it does not threaten 'massive dislocation' to, or imperil the existence of, the industry.") (internal citations omitted).

> ness failures, but that the regulation would save 5,000 lives. In some cases, the cost-benefit requirement is more protective, not less protective, of intended beneficiaries of regulatory programs.[217]

In this example, under what circumstances, if any, would capping regulatory expenditures at the feasibility point—which would mean *not* implementing the $2 billion regulation and allowing the 5000 lives to be lost—be defensible from a moral point of view? Suppose the industry at issue provides a product or service that prevents the loss of life on a mass scale, e.g., the production of vaccines against life-threatening disease or the operation of hospitals. In such a case, if it could be shown that the industry would result in the deaths of 5000 people through exposure to workplace or environmental hazards, but that the industry would also save, say, 10,000 lives that would otherwise be lost to disease, the tradeoff becomes straightforward. If implementing the $2 billion regulation means that so many firms go out of business as to effectively destroy the industry, the regulation saves 5,000 lives but also causes 10,000 lives to be lost that would otherwise have been saved by the industry. On that basis, it would arguably be morally improper to implement the $2 billion regulation, since the price of doing so is that the life-saving, all-things-considered beneficial industry ceases to exist. Note that this would be the case even though—considered in the abstract—a regulatory investment of $2 billion to save 5000 lives (at a cost of $400,000 per life saved) is obviously cost-justified under the prevailing VSL figure of roughly $6 million. There is, however, an important sense in which this regulatory investment would *not* be cost-justified, since one "cost" of making the $2 billion investment is losing the industry and the net social benefit it delivers.

This point can be generalized. If, when an industry is regulated to the point of maximum economic feasibility, the industry would still deliver a net social benefit in the all-things-considered sense specified above, then capping regulation at the feasibility point is morally defensible, assuming there is no alternative means of providing the same benefit without imposing the same level of risk. To require greater-than-feasible risk reduction in such a case is to deprive society of the benefits the industry delivers. Crucially, this would be the case even if the feasible level of regu-

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217. SUNSTEIN, *supra* note 147, at 74.

lation happened to be suboptimal from the point of view of CBA. If requiring a cost-justified regulatory investment means eliminating an industry that is all-things-considered beneficial, the cost-justified investment ought not to be made. Requiring the cost-justified investment in such a case is tantamount to requiring the disruption of an industrial activity that, from a moral point of view, improves the state of the world on net and ought to be pursued.[218]

How many industries, when regulated to the point of maximum feasibility, would pass the test of all-things-considered beneficialness described above? To consider a different variation of Sunstein's hypothetical, suppose the industry at issue were *not* one whose existence directly resulted in the prevention of premature death or serious illness. Suppose, for example, that the industry at issue involved production of a nonessential good like televisions.[219] Unlike ceasing the production of vaccines for a life-threatening disease, ceasing the manufacture of televisions would not be expected to directly result in the loss of lives that would otherwise have been saved. Many industries seem to be similar to television manufacturing in this regard. If the health risks posed by such an industry *do* routinely result in premature death or serious illness for at least some people, on what basis could the industry still be deemed beneficial on net in the all-things-considered sense specified above? Can the benefits associated with the production of a nonessential good like televisions justify the imposition of health risks that result in even a small number of premature deaths or serious illnesses?

To make this question more concrete, let's return to Sunstein's hypothetical, in which, when regulated to the point of maximum feasibility, the industry at issue—taking television manufacturing as our example—would generate health risks expected to result in the loss of 5000 lives. Assume these 5000 deaths would result from the imposition of a 1 in 1000 risk of death on 5 million people. As above, it is critical to bear in mind that, if the industry

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218. In correspondence concerning this issue, Professor Barbara Fried suggested to me the possibility of the government subsidizing regulation in such a case, so that the life-saving benefit can be realized without threatening the long-term viability of the regulated industries. E-mail from Barbara Fried to Dov Waisman (June 24, 2014) (on file with author).

219. I borrow the example of television manufacturing from David Driesen. *See* Driesen, *Two Cheers*, *supra* note 12, at 314.

truly has been regulated to the feasibility point, the only way to further reduce the remaining risk is to eliminate the industry altogether. That is just what it means to say that the industry's health risks have been reduced to the maximum extent feasible. Further risk reduction would necessitate the cessation of the industry.

A welfarist justification for the continued existence of the industry would begin by tallying the industry's benefits for the well-being of all affected individuals, including consumers, workers, and owners. The consumption-related benefits of television are significant. Televisions provide access to programming content on which many millions of people regularly rely for information and entertainment. Further, many workers earn their livelihoods by participating in the manufacture of televisions, and many more do so by participating in the production of programming content intended exclusively for television broadcast. A welfarist defense of the industry would have to contend that these consumption and employment benefits—summed over the millions of people in the world who enjoy them—outweigh the welfare costs associated with 5000 people losing their lives prematurely.

One might reasonably balk at such a claim, however. Five thousand premature deaths represent a huge social cost, one likely also to cause significant welfare losses for the surviving family and friends of the deceased. Are the employment and consumption benefits associated with the manufacture of televisions—even if enjoyed by millions—really sufficient to outweigh the welfare losses associated with the premature death of 5000 people? A welfarist might reasonably conclude that, under such facts, television manufacturing takes more well-being away from the world than it adds to it.

For a normative pluralist, a judgment that television manufacturing reduces overall well-being on net would not end the analysis, however. The activity would still have to be evaluated from a contractualist point of view. If television manufacturing is, when regulated to the point of maximum feasibility, defensible from a contractualist standpoint, it may still be beneficial *all things considered*.

As noted above, an ex ante contractualist would deem television production morally permissible if, when regulated to the point of maximum feasibility, the benefit television manufacturing stands to provide to the person it most benefits exceeds the burden it places on the person to whom it poses the gravest risk. The question, in other words, is: does the person who is placed at greatest risk of death by the activity of television manufacturing bear a greater burden than the discontinuation of television manufacturing would impose on the person who most benefits from that activity? Unless the answer to that question is "yes," no one could reasonably reject the continuation of television manufacturing

At this point, the contractualist analysis divides into consideration of two importantly different types of cases: cases in which those placed at risk benefit directly from the risky activity and cases in which risk-bearers derive no direct benefit from the activity. First, suppose that all five million of the people exposed to a 1 in 1000 risk of death from the activity of television manufacturing also directly benefit from that activity. If the risk of death or serious injury is sufficiently low, bearing that risk might well be desirable when the alternative is a world without television manufacturing and the benefit it provides. From an ex ante point of view, the continued existence of the industry—and the continued imposition of the risks it generates—could be justifiable to each risk-bearer on the grounds that the alternative would leave them worse off. For example, faced with a choice between being exposed to a 1 in 1000 risk of death and losing her job, a worker in a television factory might rationally prefer to be exposed to the risk. Keating has referred to this sort of situation as one in which bearing the risk works to the "ex ante advantage" of the risk-bearer.[220] In such a case, the risk-bearer could not *reasonably* reject the continuation of television manufacturing (and the consequent imposition of the risk on them) because she could not *rationally* do so. Although the risk, taken on its own, does impose a burden, that burden may be more than offset by a certain benefit. In other words, it may be that the risk-bearing beneficiary has no *net* ex ante burden on the basis of which to object to the risky activity, nor would it be in her interest to so object.

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220.   *See* Keating, *Pressing Precaution*, *supra* note 11, at 680.

This contractualist point could drive a judgment that the industry is all-things-considered beneficial when regulated to the point of maximum economic feasibility, even if welfarism were to deem the industry a net loser for the reasons discussed above. Although the manufacture of televisions might, on the assumptions stated above, result in a net reduction in overall well-being, it might still reasonably be considered socially beneficial all things considered on the grounds that, from an ex ante standpoint, those exposed to its risks could not rationally prefer its cessation, and so could not reasonably reject its continuation. In other words, the ex ante contractualist justification for a risky activity carries the day when everyone—even those to whom the activity poses the greatest risk of death—experiences a net ex ante benefit from the activity's existence.

The problem with this contractualist defense, however, is that it is limited to situations in which those placed at risk by an industrial activity also benefit from that activity. Many risky industrial activities impose their risks at least partly on individuals who cannot be said to benefit—whether as consumers, workers, or in some other way—from the activity's existence. Think, for example, of the subsistence fishermen who fish in a stream into which a nearby television factory deposits the runoff chemicals used in its production processes.[221] Assume that the fishermen derive no benefit from the activity of television production, as they do not own televisions, never watch television, are not employed in manufacturing televisions or producing television content, and do not own any shares of television-related companies. If the activity of television manufacturing results in premature deaths among fishermen as the result of their ingesting runoff chemicals, the sort of contractualist justification described above will not work. Unlike workers at television factories, subsistence fishermen would be left *better* off were television manufacturing to cease, since they would not lose out on any employment or consumption benefit and would be free of the risks that would oth-

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221. This example is inspired by a real-life case in which the chemical runoff from pulp and paper mills posed a risk of death to recreational and subsistence anglers who fished in the streams into which the mills deposited their chemicals. *See generally* 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. 18,504 (Apr. 15, 1998) (codified at 40 C.F.R. pt. 63, 261, 430).

erwise be imposed on them. The activity and its risks are therefore not justifiable to such a non-benefitting risk-bearer in the same way that they are justifiable to a risk-bearer who benefits from the activity.

Might they be justifiable in some other way? Recall that, under ex ante contractualism, each fisherman's burden is based not on the *actual* death that some unlucky fishermen are expected to suffer, but rather on the very small *risk* of death that each affected fisherman faces. The burden that the cessation of television manufacturing would place on a worker at a television factory (the certainty of at least temporary unemployment) plausibly outweighs the burden that a very small risk of death places on a fisherman. Indeed, it seems intuitively clear that if the choice is between imposing the burden of a 1 in 1000 risk of death on a *single* fisherman and imposing the burden of certain job loss on a *single* worker, equity might well require imposing the risk on the fisherman. It is plausibly the lesser burden. It would follow that no risk-bearing fisherman could reasonably reject a principle permitting television manufacturing. If that is so, then, when regulated to the point of maximum feasibility, television manufacturing would be defensible from the standpoint of ex ante contractualism even if its risks fell entirely on people who derive no benefit from the activity.

However, this type of ex ante contractualist justification—one *not* based on a claim that the risk imposition works to the ex ante advantage of everyone subject to the risk[222]—seems to carry significantly less weight in combatting a welfarist judgment that the risk imposition in question is morally impermissible. If those placed at risk do not benefit from the risk imposition, a risk of death is really being imposed on them for the benefit of someone else. The ex ante contractualist justification for a risk imposition of this type seems quite vulnerable to being overridden by considerations of overall well-being where the risk in question, though very small in magnitude, is imposed on a sufficiently large group of people to be expected to cause one or more deaths. In a case where risk-bearers benefit from the risk imposition, the force of the welfarist objection to the risk imposition is almost entirely

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222. Frick calls these sorts of risk impositions "competitive at the ex ante stage." *See* Frick, *supra* note 106, at 213. They are competitive in the sense that the risk imposition will necessarily work to the disadvantage of some person or persons ex ante.

blunted by the fact that the risk imposition is to each risk-bearer's advantage ex ante. To the family of the unlucky television factory worker killed when a very small workplace risk materializes, one can justify the risk imposition on the grounds that preventing the death would have required shutting down the activity that provided the worker with a livelihood. From an ex ante standpoint, the ill-fated worker could not rationally have wished for that to occur.

This sort of justification is not available in the case of the subsistence fishermen. To the family of the unlucky fisherman killed when a very small risk posed by chemical waste from the television factory materializes, all that can be said is that, from an ex ante perspective, the risk posed by the activity of television manufacturing burdened the fisherman to a lesser extent than the activity's discontinuation would have burdened *someone else* (say, a worker at a television factory). This justification seems to carry less force in counteracting a welfarist judgment that the fisherman's life—and the lives of similarly situated fishermen—were, in a net loss to overall well-being, impermissibly sacrificed in order to provide employment and nonessential consumption benefits to millions.

It seems, then, that risky industrial activities with two features may often turn out not to be socially beneficial in the pluralistic, all-things-considered sense specified above. The two features are: (i) the activity does not save lives or prevent serious illnesses; and (ii) the activity's risks fall, to a significant extent, on persons who derive no benefit from the activity. As noted above, if the activity is not all-things-considered beneficial when regulated to the point of maximum feasibility, then the activity is morally impermissible and should be shut down.[223]

3. Response to Objections

This line of reasoning forms the basis of a response to the objection that feasibility regulation unjustifiably underregulates

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   223.   This finding suggests that one way a risky activity might be *made* morally permissible in these circumstances would be for the industry engaging in the activity to offer to compensate all risk-bearers ex ante for the risk that is being imposed on them. If, for example, the television manufacturing company were to offer every affected fisherman an annual stipend roughly equivalent to the annual salary of a worker at the television factory, many fishermen might rationally choose to accept that offer rather than exercise their "moral veto" over the activity's continuation.

relative to CBA. The feasibility point is supposed to represent the maximum level of regulation an industry can tolerate without seeing its existence or competitive stability threatened. To require that an industry achieve a greater-than-feasible level of regulation is, therefore, to require that the industry effectively shut down, taking with it the social benefits it provides. The underregulation objection to feasibility regulation necessarily implies that if a cost-justified regulation would bankrupt an industry, then it should be allowed to fail. That may be a price worth paying when, at the feasible level of regulation, the industry is not all-things-considered beneficial. But it is not desirable when, at the feasible though suboptimal level of regulation, the industry *is* all-things-considered beneficial.

This defense of the feasibility ceiling is, of course, a qualified one in the sense that it holds the feasibility ceiling to be normatively defensible only if the industry in question, when regulated to the feasibility point, delivers an all-things-considered social benefit. On this view, an industry's preservation is not an independent good to be valued for its own sake. On the contrary, industries are worth preserving in virtue of the social benefits they provide. If a risky industrial activity cannot be made commercially viable without imposing social costs and risks that outweigh the activity's social benefits, there would seem to be no sound normative basis for engaging in the activity.[224] In other words, all-things-considered beneficialness should operate as a normative side constraint on risk regulation.

Undoubtedly, it may be difficult to determine whether an industrial activity considered as a whole delivers a net social benefit in a welfarist or contractualist sense.[225] All of the activity's benefits—including those associated with consumption, employment, and ownership—would need to be weighed against all of its

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224. *Cf.* CASS R. SUNSTEIN, RISK AND REASON: SAFETY, LAW, AND THE ENVIRONMENT 213 (2002) ("Might the FAA choose to interpret an ambiguous statute so as to impose an air quality regulation that would not be feasible for the air tour industry over the Grand Canyon, so that the relevant companies could not stay in business? . . . The agency might believe that it is more important to reduce noise levels than to allow the continued operation of the air tour industry.").

225. *Cf.* Keating, *Pressing Precaution*, *supra* note 11, at 741 ("Negligence has never been widely and effectively applied at what economists call the 'activity level.' Courts may sometimes be able to make well-founded judgments that an activity's benefits do not justify the harm that is its price, but it seems unlikely that they will be able to do so routinely.").

costs and risks—to human health, to human quality of life, and to the environment. This may involve difficult questions of measurability, quantification, and incommensurability. However, when evaluating risk regulation from a normative point of view, it is difficult to escape the necessity of answering activity-level questions of this type.

CONCLUSION

Though feasibility analysis originated nearly half a century ago during the heyday of environmental legislation in the United States, it stands today as the principal alternative to cost-benefit analysis. President Obama has recently relied on his authority under one of the chief statutory embodiments of the feasibility approach—the Clean Air Act of 1970—to issue a series of new regulations aimed at curbing fossil fuel emissions.[226] At the center of legal challenges to these recent regulations lies the same fundamental question at issue between CBA and feasibility analysis: how and to what extent regulators ought to consider economic costs when regulating hazardous substances and emissions that pose serious risks to human health.[227]

This article has articulated and defended a novel normative justification for feasibility-based regulation. Without denying the relevance of overall well-being to the normative analysis of risk regulation, it is ultimately the norm of equity that underlies and justifies the feasibility approach. Equity, interpreted as ex ante contractualism, provides a compelling basis for responding to the normative critique of feasibility regulation mounted by advocates of CBA. Though the feasibility approach may pose significant challenges of specification and implementation, it is normatively sound and deserves the prominent place it occupies in the federal regulation of risks to human health.

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226. President Obama has recently used the authority of the Clean Air Act to enact tougher regulations of hazardous substances like ozone, mercury, and methane. *See* Coral Davenport, *Obama Builds Environmental Legacy with 1970 Law*, N.Y. TIMES (Nov. 26, 2014), http://www.nytimes.com/2014/11/27/us/without-passing-a-single-law-obama-crafts-bold-enviornmental-policy.html?_r=0.

227. *See, e.g.*, Michigan v. EPA, 135 S. Ct. 2699, 2712 (2015) (holding EPA interpreted a section of the Clean Air Act unreasonably "when it deemed cost irrelevant to the decision to regulate power plants").