GREATER THAN THE SUM OF ITS PARTS: THE INTEGRATION OF ENVIRONMENTAL JUSTICE ADVOCACY AND ECONOMIC POLICY ANALYSIS

STEPHANIE H. JONES*

* Managing Editor, New York University Environmental Law Journal 2016–2017; J.D. 2017, New York University School of Law. I am grateful to Katrina Wyman and Richard Revesz for their thoughtful feedback, the New York University Environmental Law Journal staff for their excellent work, and the Institute for Policy Integrity staff and Rebecca Judge for teaching me that environmental and humanitarian issues deserve rigorous analysis.

INTRODUCTION

Integrating environmental justice values into economic policy analysis—that is, giving greater consideration to the impacts that environmental regulation (or lack thereof) has on poor or otherwise disadvantaged people—is both pragmatic and conceptually coherent. While there are historical, substantive, and procedural tensions between the environmental justice movement and the economic perspective on environmental policymaking, this Note argues that it is possible to reconcile at least some of the major tensions, and that this is a goal worth pursuing—for people who care about environmental justice concerns, as well as for people who care about maximizing utility in policymaking.

In Part I, I explain how the use of cost-benefit analysis in environmental policymaking in the United States has developed over time. I first describe what cost-benefit analysis entails methodologically. I then explain the history of its use in domestic regulatory policymaking generally, and environmental policymaking more specifically. Initially embraced by antiregulatory interests and opposed by progressive interests, like the environmental movement, cost-benefit analysis has been increasingly championed—and shaped—by some factions of the environmental movement in more recent years.

In Part II, I discuss the apparent tension between two factions of the environmental movement, which I will refer to as environmental justice advocates and economic policy technocrats. These factions differ in terms of their goals, norms, and methods. Environmental justice advocates prioritize the concerns of poor and otherwise disadvantaged groups of people, who disproportionately suffer from environmental harms while benefitting little from environmental goods. Thus, these advocates focus on advocacy strategies rooted in enforcing the constitutional and statutory rights of individuals to enjoy certain freedoms and to not suffer certain forms of discrimination. Economic policy technocrats, on the other hand, prioritize the efficiency of regulations, measured by the maximization of overall social welfare. This goal has led to a focus on methods of regulatory analysis and decision-making that allow a central decision maker to take a comprehensive view of monetized regulatory impacts. The technocrat faction of the environmental movement has overcome its initial opposition to cost-benefit analysis and now makes the continued reform of cost-benefit analysis a central part

of its advocacy work; the environmental justice faction remains in large part opposed to cost-benefit analysis, for reasons that I argue are fully understandable, but are due for reconsideration.

In Part III, I set forth ways that the current schism with regard to cost-benefit analysis between these two factions can be overcome. I explore opportunities for better quantifying and monetizing impacts of concern to environmental justice advocates so that they can be counted in cost-benefit analysis, for reforming cost-benefit analysis by incorporating adjustments that better represent the true utility of regulatory impacts (namely, equity-weighting), and for including demands for agencies to justify their regulatory decisions with reference to cost-benefit analysis as a prong of environmental justice advocacy. I argue that these approaches are consistent with the values of both environmental justice advocates and economic policy technocrats, because they generate stronger consideration of environmental justice concerns in regulatory policymaking in a manner that is economically principled and rigorous.

In Part IV, I apply the ideas discussed in Part III to two different areas of environmental policymaking that are of particular concern for certain environmental justice advocates: climate change and pesticides. Climate change is of particular concern for large, national, mainstream environmental organizations, some of which also consider environmental justice issues to be a part of their missions.[1] Pesticides are of particular concern for organizations focusing on environmental justice issues that largely poor, primarily Latino farmworker communities face.[2] Policies regarding climate change, as a general matter, involve imposing costs in the present or near future in order to mitigate potentially massive costs in the more distant future. Climate change presents environmental justice concerns, as problems ranging from heat-related health effects to forced migration will be felt by poorer people worst and first. These disparities are expected to play out on a domestic level (between poorer and richer

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1 *See, e.g.*, Phil McKenna, *Environmental Justice Grabs a Megaphone in the Climate Movement*, INSIDE CLIMATE NEWS (Jan. 5, 2018), https://insideclimatenews.org/news/04012018/environmental-justice-climate-activism-standing-rock-black-lives-matter (quoting Patrice Simms, vice president of litigation for Earthjustice, saying "[W]e [cannot] return to a period where environmental justice is not a part of the conversation [about climate change].").

2 *See, e.g.*, *Pesticide & Worker Safety*, CAL. RURAL LEGAL ASSISTANCE FOUND., https://www.crlaf.org/pesticide-worker-safety (last visited June 3, 2018).

individuals living in the United States), as well as an international level (between poorer and richer countries or regions). Policies regarding pesticide use, as a general matter, involve imposing costs on the businesses that produce and use pesticides in order to mitigate harms to human health and the environment. Since the costs of restricting pesticide use are largely incurred by businesses and the benefits are largely incurred by poor and otherwise disadvantaged individuals, at least under a narrow, direct scope of analysis, pesticide regulation has clear environmental justice implications. The expanded application of cost-benefit analysis to these issues presents different advantages, as well as different sets of substantive or pragmatic challenges.

I conclude by briefly discussing whether focusing on cost-benefit analysis is worthwhile for environmental justice advocates, even when that methodology might not always yield the results that the advocates are seeking for their clients—who are by definition disadvantaged in some way, and not in a comfortable position to lose some battles in the interest of tinkering with a new advocacy strategy. In spite of this challenge, I maintain that cost-benefit analysis is a worthwhile tool for environmental justice advocates, and that in turn, the distributional perspective environmental justice advocates offer can improve cost-benefit analysis as well.

I. DEVELOPMENT OF THE ROLE OF COST-BENEFIT ANALYSIS IN ENVIRONMENTAL POLICYMAKING

A. *Overview of Cost-Benefit Analysis Methodology*

Cost-benefit analysis is a tool for evaluating regulatory options. The sum of a regulation's varied costs, "such as compliance costs, job loss, and the reduced consumer well-being resulting from price increases," is subtracted from the sum of its varied benefits, "such as lives saved or protected from disease and disability, wilderness preservation, and the creation of jobs or recreational opportunities," ultimately yielding an appraisal of the regulation's net social benefits.[3] There are three main steps in undertaking a cost-benefit analysis: (1) identification and quantification of regulatory impacts; (2) monetization of regulatory impacts; and (3) adjustment and summation of

[3] RICHARD L. REVESZ & MICHAEL A. LIVERMORE, RETAKING RATIONALITY 10 (2008).

regulatory impacts.

Consider a stylized example: a proposed regulation would restrict the emissions of a carcinogenic pollutant primarily released during the manufacturing of widgets. In the first step, policymakers would identify the expected impacts: the regulation would likely increase compliance costs for widget manufacturers and prices for widget consumers, but would likely reduce cancer-related medical expenses and deaths. Once identified, the scale of each impact would be quantified: fifty widget factories would each have to purchase a scrubber to be replaced every twenty years; the reduction in emissions would avoid fifty incidences of cancer and five cancer-related deaths over the course of twenty years. At this step, the agency must make principled determinations as to what counts as an impact fairly attributable to the rule. Some impacts are intended; others are incidental. Some impacts are direct; others result from an indirect causal chain. These questions of scope will not be covered in this Note. Nevertheless, this line-drawing is a step in the cost-benefit analysis process that should be transparent and rational.

In the second step, policymakers would monetize these impacts, assigning a dollar value to each of them: each scrubber is estimated to cost $1 million; the average treatment costs for this form of cancer are $500 thousand per patient; the value of each avoided death is $9 million. For some impacts, monetization is simple: for example, a scrubber is a market good, so determining its cost could be as simple as determining what companies have paid for recently installed, similar scrubbers (perhaps with the addition of installation costs, or the subtraction of expected price decreases due to technology forcing).[4] For other impacts, like incidences of cancer, monetization requires more complicated judgments: some aspects of the impact, like medical treatment expenses or lost work hours, are readily monetized market goods; others, like diminished quality of life from living with a disease or premature death, are clearly significant but require more sophisticated (and controversial) methods in order to monetize. In the case of deaths, the current accepted methodology is to use the Value of a Statistical Life, which extrapolates the monetary value of an avoided death from how much people are willing to pay to

4 *See* OFFICE OF MGMT. & BUDGET, CIRCULAR A-4 37 (2003) [hereinafter CIRCULAR A-4].

avoid risks.[5] This willingness to pay can be ascertained from contingent valuation (surveying people directly about their willingness to pay) or from observed behavior (determining the difference in pay for jobs that have similar qualifications but different levels of safety or health risks, for example). The Value of a Statistical Life that the Environmental Protection Agency (EPA) uses is $7.4 million in 2006 dollars,[6] approximately $9 million in 2017 dollars.[7]

In the third step, policymakers adjust the values of the impacts before adding them. The most ubiquitous adjustment is discounting: "it is incorrect simply to add all of the expected net benefits or costs without taking account of when the [sic] actually occur" because "[b]enefits or costs that occur sooner are generally more valuable."[8] This claim is grounded in three rationales: (1) investments usually generate positive returns (making current costs more expensive than future ones); (2) people exhibit a pure rate of time preference (making current benefits more valuable than future ones); and (3) the economy is generally expected to grow, which, coupled with diminishing marginal utility of wealth, makes future benefits less valuable than current ones.[9] Thus, a discount rate is applied to future costs and benefits to represent them in terms of present value, so that regulatory impacts occurring at different times can be weighed against each other. For example, at a discount rate of 7 percent,[10] a regulation costing $1,000 at the time of implementation for expected benefits of $1,100 one year after implementation ($1,100 / 1.07 = $1,028 present value) would be considered to have net social benefits (benefits minus costs = $1,028 - $1,000 = $28), while a regulation costing $1,000 at the time of implementation for expected benefits of $1,100 two years after implementation ($1,100 / 1.07^2 = $961 present value) would be considered to have net social costs (benefits minus costs = $961 - $1,000 = -$39). The wide acceptance of the use of a discount rate shows that economists and regulators recognize that the raw,

5 *See Mortality Risk Valuation*, EPA, https://www.epa.gov/environmental-economics/mortality-risk-valuation (last visited June 3, 2018).

6 *See id*.

7 *See CPI Inflation Calculator*, U.S. DEP'T OF LABOR, BD. OF LABOR STATISTICS, https://data.bls.gov/cgi-bin/cpicalc.pl (last visited June 3, 2018).

8 CIRCULAR A-4, *supra* note 4, at 31–32.

9 *See id*. at 32.

10 Cost-benefit analysis of regulations generally makes assessments of net social benefits using a 7 percent discount rate and a 3 percent discount rate. *See supra* note 4, at 33–34.

monetized value of a benefit or cost should be adjusted to better reflect its actual utility. Thus, the discount rate lays the groundwork for equity adjustments.

As other commentators have noted, however, the adjustment step of cost-benefit analysis is the most fraught with academic and political controversy. The tallying and monetizing of impacts can at least have the appearance of a neutral, scientific exercise. The judgment, after dollar-values have been assigned, that one $10 impact is worth more than another $10 impact, however, seems much more manipulative—especially when that judgment is made on the basis of the identity of the person or group who incurs the impact, as a distributional adjustment would dictate. Michael Livermore compellingly describes the difficulty:

> Well-structured, rigorous, and consistent distributional analysis continues to elude even the most sophisticated government practitioners of cost-benefit analysis . . . . This situation likely arises because distributional analysis . . . must . . . provide an evaluation of the relative importance of shifts in wealth from one group to another. In part because of the strongly normative and political connotations of such an evaluation, distributional analysis has remained a controversial subject that has not made its way into the mainstream practice of cost-benefit analysis.[11]

Therefore, cost-benefit analysis generally takes monetized impacts at face value and does not make further adjustments, with the exception of the discount rate applied to future impacts.

B. *Development of the Role of Cost-Benefit Analysis in U.S. Regulatory Policymaking*

The potential value of using cost-benefit analysis in regulatory policymaking is clear. Because it first monetizes the diverse regulatory impacts, translating them from proverbial apples and oranges into the fungible form of dollars, cost-benefit analysis offers a theoretically rational and objective method of evaluating a regulation. Rather than allowing an agency to potentially overemphasize benefits and costs of concern to well-organized interest groups,[12] cost-benefit analysis forces the agency to present

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11 Michael A. Livermore & Jennifer S. Rosenberg, *The Shape of Distributional Analysis*, *in* THE GLOBALIZATION OF COST-BENEFIT ANALYSIS IN ENVIRONMENTAL POLICY 69, 69 (Richard Revesz & Michael A. Livermore eds., 2013).

12 *See* Richard L. Revesz, *Federalism and Environmental Regulation: A Public Choice Analysis*, 115 HARVARD L. REV. 553, 559 (2001) ("*Articulation of*

a relatively comprehensive picture of the regulation's expected impact on overall social welfare. While implementation of cost-benefit analysis in United States policymaking has departed from this objective ideal at times,[13] the value of the technique supports a call for continued reform rather than elimination.[14]

Cost-benefit analysis attained its central role in domestic regulatory policymaking in 1981, when President Reagan issued Executive Order 12291,[15] which "required [the Office of Management and Budget (OMB)] to review significant new regulatory actions to ensure that the potential benefits to society outweigh the potential costs . . . ."[16] This requirement created both a procedural and a substantive change from the former requirements for regulatory action. Procedurally, Executive Order 12291 systematized central review of regulatory action, conferring responsibility for this central review upon an entirely economics-focused entity in OMB. Before Executive Order 12291, OMB's "principal function . . . was to manage the federal budget."[17] Substantively, Executive Order 12291 "imposed the cost-benefit criterion as a prerequisite to promulgation of federal regulations," limiting agency rulemaking to circumstances where the agency could establish that the action's monetized benefits would exceed its monetized costs. Prior to Executive Order 12291, agencies were

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the Public Choice Claim . . . . [S]tates adopt suboptimally lax environmental standards because industry groups that favor less stringent regulation are small and cohesive, whereas individuals who support more stringent regulation are a larger and more diffuse group.").

13 *See, e.g.*, Philip Shabecoff, *Budget Office Attacked Over Rules for Asbestos*, N.Y. TIMES (Oct. 4, 1985), http://www.nytimes.com/1985/10/04/us/budget-office-attacked-over-rules-for-asbestos.html (discussing a Congressional report that accused the federal overseer of regulatory cost-benefit analysis, the Office of Management and Budget (OMB), of "unlawful abuse of power").

14 *See* R. Shep Melnick, *The Politics of Benefit-Cost Analysis*, *in* VALUING HEALTH RISKS, COSTS, AND BENEFITS FOR ENVIRONMENTAL DECISION MAKING: REPORT OF A CONFERENCE 23, 51 (P. Brett Hammond & Rob Coppock eds., 1990) (asserting that "hostility to . . . benefit-cost analysis" may actually inhibit consideration of regulatory benefits, because "[a]s former EPA official Albert Nichols pointed out . . . '[i]f you don't have that kind of discipline in the system, there is a tendency to just make qualitative statements which don't allow you to set priorities . . . .'").

15 Exec. Order No. 12,291, 46 Fed. Reg. 13,193 (Feb. 17, 1981).

16 NICHOLAS A. ASHFORD & CHARLES C. CALDART, ENVIRONMENTAL LAW, POLICY, AND ECONOMICS 270 (2008).

17 William B. Schultz & David C. Vladeck, *An Obstacle to Public Safety*, WASH. POST, May 10, 1988, at 20 (reprinted in ASHFORD & CALDART, *supra* note 16, at 268).

required to produce an "inflationary impact statement" assessing whether the costs of a rule might exceed its benefits, but there was no linked substantive requirement.[18]

In the decades since, Presidents Bill Clinton, George W. Bush and Barack Obama have each issued an executive order updating the cost-benefit analysis requirements for agency rulemaking.[19] Additionally, in 2003, OMB published a synthesized guide for agency cost-benefit analysis called Circular A-4. At the time of this writing, President Trump has not yet issued guidelines on the required methodology of cost-benefit analysis, per se. He has issued executive orders related to economic analysis of regulations, such as one that discusses regulatory costs (seemingly without regard for regulatory benefits),[20] and an executive order that, in the context of environmental policy, expresses support for the guidance set forth in Circular A-4, stating that it "was issued after peer review and public comment and has been widely accepted for more than a decade as embodying the best practices for conducting regulatory cost-benefit analysis."[21]

C. *Development of Cost-Benefit Analysis with Respect to Environmental Policy Specifically*

The idea that cost-benefit analysis could support, rather than hinder, the promulgation of environmental protection policies has only recently achieved wide acceptance. Historically, cost-benefit analysis was considered inherently anti-regulatory and anti-progressive. [22] For environmental benefits to be rigorously incorporated into cost-benefit analysis, they need to be quantified and monetized, allowing them to act as a direct counterweight to other costs and benefits that have a readily apparent dollar value. Over the years, environmental benefits and environmentally-related public health benefits (like human health and life, avoided

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18 *See* ASHFORD & CALDART, *supra* note 16, at 270.

19 *See* Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Oct. 4, 1993); Exec. Order No. 13,422, 72 Fed. Reg. 2763 (Jan. 23, 2007); Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 21, 2011).

20 *See generally* Exec. Order No. 13,771, 82 Fed. Reg. 9339 (Feb. 3, 2017) (Regarding "Reducing Regulation and Controlling Regulatory Costs").

21 Exec. Order No. 16,093, 82 Fed. Reg. 16,093, 16,096 (Mar. 31, 2017) (Regarding "Promoting Energy Independence and Economic Growth").

22 *See* REVESZ & LIVERMORE, *supra* note 3, at 29 (explaining that, under Reagan, the inaccessibility of OMB "and an antiregulatory administrative bias indicated to environmentalist and other proregulatory groups that cost-benefit analysis was a pretext for deregulation, rather than a legitimate analytic tool.").

pollution clean-up and compliance costs, ecosystem services like water filtration, and use or non-use values of natural areas) have been quantified and monetized, allowing them to provide a robust counterbalance to already-monetized market goods.[23] Now, the major players in the mainstream environmental movement have embraced cost-benefit analysis, seeking to encourage its use and to further refine it.[24]

II. THE APPARENT CONFLICT BETWEEN ENVIRONMENTAL JUSTICE ADVOCATES AND ECONOMIC POLICY TECHNOCRATS

A. *Environmental Justice Advocates Are Skeptical That Economic Policy Analysis Can Address Their Concerns Effectively*

In contrast with much of the environmental movement, the environmental justice wing has resisted the expanded role of cost-benefit analysis. Environmental justice is the principle that environmental hazards and benefits should be distributed among societal groups in a manner that is substantively and procedurally equitable.[25] While the roots of the inequities that motivate the environmental justice movement run deep, the movement did not coalesce into its modern form until the late twentieth century.[26] The uniting principle of the environmental justice movement is that environmental hazards and benefits are distributed unequally among different social groups, and that this inequitable distribution should be remedied.

Different environmental justice advocates and advocacy groups are concerned with different distributive inequities and use

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23 *See, e.g.*, *Natural Capital Project*, UNIV. OF MINN., http://environment.umn.edu/discovery/natcap/ (last visited June 3, 2018).

24 *See, e.g.*, *About the Project*, THE COST OF CARBON POLLUTION, http://costofcarbon.org/about (last visited June 3, 2018) (joint project of the Natural Resources Defense Council, Environmental Defense Fund, and the Institute for Policy Integrity).

25 *See* THE LAW OF ENVIRONMENTAL JUSTICE, at xxxiii (Michael B. Gerrard & Sheila R. Foster eds., 2008) [hereinafter THE LAW OF ENVIRONMENTAL JUSTICE] (Preface to the First Edition) ("There is no universally accepted definition of environmental justice. I define it as the idea that minority and low-income individuals, communities, and populations should not be disproportionately exposed to environmental hazards, and that they should share fully in making the decisions that affect their environment.").

26 *See id.* ("The suggestion that . . . pollution was distributed in a systematically unfair manner was not widely discussed . . . until the landmark 1987 report, *Toxic Wastes and Race in the United States*, from the Commission on Racial Justice of the United Church of Christ.").

different advocacy methods. The umbrella of environmental justice concerns includes health risks related to pesticide exposure in Latino farmworker communities in California's Central Valley,[27] health risks related to smog exposure for communities of color near Los Angeles ports,[28] and climate change-induced destruction of a Native Alaskan village,[29] to name a few. Advocacy methods include litigation, policy advocacy (including legislative lobbying and participation in regulatory public input processes), community organizing, research documenting and analyzing environmental hazards, and direct action (such as protests).[30] Many environmental justice advocates regard involvement of the affected community to be a central responsibility of the environmental justice movement.[31] Environmental justice advocates should determine their priorities through consultation with the affected community about its concerns and preferences.[32] Furthermore, they should provide for long-term protection of these concerns and preferences by carrying out the advocacy in a manner that builds capacity in the community to advocate on its own behalf, making the legal and regulatory system more receptive to environmental justice concerns.[33]

The first type of tension preventing environmental justice advocates from embracing cost-benefit analysis is procedural. The environmental justice movement seeks to strengthen the ability of disadvantaged "individuals, communities, and populations" to "share fully in making the decisions that affect their environment."[34] Because of this core aim, the environmental justice movement has norms of respecting and empowering

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27 *See Pesticides*, CENTER ON RACE, POVERTY, & THE ENV'T, http://www.crpe-ej.org/our-work/sustainable-agriculture/pesticides/ (last visited June 3, 2018).

28 *See Decrease Port, Train, and Truck Pollution*, NAT. RES. DEF. COUNCIL, https://www.nrdc.org/issues/decrease-port-train-and-truck-pollution (last visited June 3, 2018).

29 *See* Native Vill. of Kivalina v. ExxonMobil Corp., 696 F.3d 849 (9th Cir. 2012), *cert. denied*, 133 S. Ct. 2390.

30 *See* LUKE COLE & SHEILA FOSTER, FROM THE GROUND UP 19 (2000).

31 *See* THE LAW OF ENVIRONMENTAL JUSTICE, *supra* note 25, at xxxiii ("[M]inority and low-income individuals, communities, and populations . . . should share fully in making the decisions that affect their environment.").

32 *See id*.

33 *See Movement Building*, CENTER ON RACE, POVERTY, & THE ENV'T, http://www.crpe-ej.org/our-work/movement-building/ (last visited June 3, 2018).

34 *See* THE LAW OF ENVIRONMENTAL JUSTICE, *supra* note 25, at xxxiii.

grassroots, community-based expertise and decisionmaking.[35] Cost-benefit analysis appears at odds with these closely-guarded norms in layered, interrelated ways. First, while conceptually straightforward, cost-benefit analysis is methodologically complex, requiring large amounts of data for inputs (much of which may not be readily available to the public) and technical competence (economic, mathematic, and sometimes scientific) for analysis.[36] These characteristics act as barriers to entry, limiting participation in cost-benefit analysis to those who have the resources and expertise to gather and process the necessary data. Second, mainstream environmental groups tend to focus their cost-benefit analysis work on federal agency decision-making; environmental justice groups tend to place a strategic focus on state- and local-level decisionmakers, who may be more politically accountable and logistically accessible.[37] Finally, even environmental justice groups that do have the resources to engage in cost-benefit analysis may choose not to focus on it because they do not want to detract from the legitimacy of other ways of examining the impacts of environmental hazards. Communities with visceral, traumatic experiences from environmental hazards may be resistant to representing those experiences in a manner that dehumanizes them to "just a number;" beyond strategic considerations, there is the dignitary consideration of being heard.[38]

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35 *See* COLE & FOSTER, *supra* note 30, at 105.

36 *See Cost Benefit Analysis*, ENVTL. LITERACY COUNCIL, https://enviroliteracy.org/environment-society/economics/cost-benefit-analysis/ (last visited June 3, 2018).

37 *Compare* Center on Race, Poverty, & the Environment, Report on Audit of Financial Statements for the Year Ended December 31, 2015, at 3, 6 (May 24, 2016), http://www.crpe-ej.org/wp-content/uploads/2016/12/CRPE-2015-Financial-Statement-1.pdf (showing annual operating expenditures of approximately $1 million and net assets of approximately $2 million, for an environmental justice organization founded in 1989); *with* Consolidated Financial Statements, Nat. Res. Def. Council, at 3, 4 (Nov. 23, 2016), https://www.nrdc.org/sites/default/files/nrdc_finanical_fy16.pdf (showing annual operating expenditures of approximately $140 million and net assets of approximately $300 million, for a mainstream environmental organization founded in 1970).

38 *See, e.g.*, COLE & FOSTER, *supra* note 30, at 80–84 (telling the story of a Latino farmworker community experiencing a high rate of severe birth defects and organizing to seek justice from the polluter suspected of causing the defects) ("[I]n one meeting, when the council did not want to listen, when they did not want to translate . . . [t]he entire audience, 90 percent of whom spoke only Spanish . . . got up and left the meeting.") (internal quotation marks omitted); Bruce Barcott, *Who Wants the Nuclear Waste?*, PACIFIC STANDARD (Mar. 11, 2013), https://psmag.com/environment/nuclear-waste-carlsbad-fukushima-yucca-53628 ("Even the most down-on-its-luck burg has its dignity, and balks when

Even if these procedural tensions could be resolved, there are substantive tensions between cost-benefit analysis and environmental justice advocacy. One of the most useful and appealing features of cost-benefit analysis is that it converts all of the heterogeneous impacts of a policy decision into a single dollar value, allowing for a more objective evaluation of whether the policy is socially desirable. For decisionmakers who seek a rational way to reconcile the competing demands of a multitude of constituencies, cost-benefit analysis is a sensible tool. Cost-benefit analysis is inherently well-suited to assessing the efficiency of a policy: it aims to state how much bang (benefits) a policy will get for its buck (costs). For environmental justice groups that form in a grassroots fashion in response to hazards facing particular communities, such an approach would be incongruous. Unlike a government accountable to a vast range of constituents, environmental justice advocates are accountable to the communities to which they belong or whose interests they have committed to protecting—their role is to seek the best possible results for these communities, not the most efficient result overall.

An example serves to illustrate the possibility for tension between efficiency-based concerns and equity-based concerns in environmental policy decisionmaking.[39] In the summer of 2015, the California state legislature considered a bill, AB-590, that sought to make biomass-fueled power generation facilities eligible for expenditures from California's Greenhouse Gas Reduction Fund.[40] At a committee hearing, representatives of general environmental protection advocacy groups and environmental justice groups made appearances to voice their support or disapproval for the measure. Most of the general environmental protection groups expressed support, mainly because biomass-fueled power generation has the potential to reduce greenhouse gas

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that dignity is affronted.").

39 This example is drawn from the author's experience attending committee hearings regarding AB-590.

40 *See* A.B. 590, 2015–16 Reg. Sess. (Cal. 2015). The California State Assembly passed AB-590, but it died without State Senate approval. *See* A.B.590 (Cal. 2015), https://leginfo.legislature.ca.gov/faces/billStatusClient.xhtml?bill_id=201520160AB590 (last updated Nov. 30, 2016). The California legislature passed a different bill supporting biomass-fueled power generation in the context of greenhouse gas reduction spending in 2016. *See* S.B. 859, 2015–16 Reg. Sess. (Cal. 2016); S.B.859 (Cal. 2015), https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB859 (last updated Sept. 14, 2016).

emissions relative to fossil-fueled power generation. Burning recently-grown organic matter, as opposed to organic matter that decomposed millions of years ago, has the theoretical potential to be carbon neutral. Thus, green groups supported biomass-fueled power generation because of its globally dispersed benefits in terms of decreased carbon pollution.

Environmental justice groups, on the other hand, opposed the bill because of concerns over the unfair distribution of increased conventional pollution: "Opponents state that AB-590 will hurt disadvantaged communities already overly burdened by pollution; it will further degrade air quality in the Central Valley and around the state from emissions of high levels of criteria air pollutants due to biomass incineration . . . ."[41] While these groups were not phrasing their arguments in explicitly economic terms, the situation illustrates this truism: a policy may be both socially beneficial on the whole and harmful to a particular set of people. Cost-benefit analysis, a tool designed for assessing and recommending policies on the basis of their cumulative effects, is not necessarily suitable to assess how the effects are distributed among different groups and individuals.

Furthermore, there is reason to believe that policies that prioritize efficiency without regard for distributive impacts will not only fail to alleviate inequity, but exacerbate it. For example, environmental economists often favor cap-and-trade pollution reduction policies because they allow a central decision-maker to determine the desired level of pollution reduction; market mechanisms then apportion the responsibility for achieving those units of reduction to the polluter(s) that can reduce their emissions most cheaply.[42] The environmental justice perspective is often resistant to cap-and-trade programs, because unlike command-and-control programs that require all polluters to reduce emissions, cap-and-trade programs by design allow certain polluters the ability to keep polluting in exchange for paying for reductions elsewhere.[43] Environmental justice advocates cite research

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41 *See Greenhouse Gas Reduction Fund: Hearing on Assemb. B. 590 Before the S. Comm. On Envtl. Quality*, 2015–16 Reg. Sess., (Cal. 2015) (statement of Rebecca Newhouse, Consultant).

42 *See, e.g.*, Nathaniel Keohane & Dan J. Dudek, *How Cap and Trade Works*, ENVTL. DEF. FUND, https://www.edf.org/climate/how-cap-and-trade-works (last visited Mar. 2, 2018).

43 *See, e.g.*, *Cap and Trade*, CENTER ON RACE, POVERTY, & THE ENV'T, http://www.crpe-ej.org/resources/policy/cap-and-trade/ (last visited Mar. 2,

showing that polluters near poor and otherwise disadvantaged communities tend not to reduce their emissions (and indeed, may even increase their emissions) under cap-and-trade programs.[44]

Finally, the idea that it would be better to regulate in an efficient but inequitable manner and then compensate the policy's "losers" later assumes that the harms the "losers" suffer are compensable. But communities sometimes consider cash compensation inadequate. A scene from *A Civil Action*, a non-fiction account of a lawyer attempting to sue companies for disposing hazardous waste that community members believe has caused the deaths of several children, illustrates this dynamic. "Plaintiffs always want to settle in a reasonable and fair manner,"[45] asserts the plaintiffs' lawyer, predicting that his clients will accept a large cash settlement instead of going to trial. The judge, however, tells him it may not be that simple:

> The main fuel, I think, in lawsuits for the death of children is an overwhelming sense of personal guilt. Mostly, I don't think parents really want money. They may indeed be offended that money is an equivalent for life. What they do want is to have it said clearly that this wasn't their fault.[46]

Monetizing the expected avoided deaths of a proposed regulation according to the Value of a Statistical Life, as is routine in cost-benefit analysis, is another way of implying that "money is an equivalent for life." A *statistical* life (the extrapolation of the values people place on avoided risks of varying magnitudes) is

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2018).

44 *See, e.g.*, Lara J. Cushing et al., *A Preliminary Environmental Equity Assessment of California's Cap-and-Trade Program*, Research Brief, USC DORNSIFE PROGRAM FOR ENVTL. AND REG'L EQUITY, at 1 (Sept. 2016) ("We found that regulated GHG-emitting facilities are located in neighborhoods with higher proportions of residents of color and residents living in poverty. In addition, facilities that emit the highest levels of both GHGs and PM_{10} are also more likely to be located in communities with higher proportions of residents of color and residents living in poverty. . . . In terms of GHG emission trends, in-state emissions have increased on average for several industry sectors since the advent of the cap-and-trade program, with many high emitting companies using offset projects located outside of California to meet their compliance obligations."). *But see generally* TODD SCHATZKI & ROBERT N. STAVINS, ADDRESSING ENVIRONMENTAL JUSTICE CONCERNS IN THE DESIGN OF CALIFORNIA'S CLIMATE POLICY (2009) (noting that the correlation varies between greenhouse gas emissions, which do not have local effects, and co-pollutants that do have local effects, so concerns about co-pollutants could be better addressed directly rather than through greenhouse gas regulation).

45 *See* JONATHAN HARR, A CIVIL ACTION 272 (1995).

46 *See id.* at 273.

distinct from an *actual* life,[47] and monetizing the benefit of avoided deaths allows them to be included in the cost-benefit analysis (and thus, to rigorously counterbalance the costs of the regulation). But some advocates find this a distinction without a difference and argue that we should not make decisions about the most precious things—human health, human life, and the environment—through an artificially dispassionate process.[48]

B. *Skepticism of Technocrats Regarding Incorporation of Environmental Justice Concerns into Cost-Benefit Analysis*

Economic policy technocrats have likewise tended to view cost-benefit analysis as being at odds with the substantive and procedural characteristics of environmental justice advocacy. Scholars and practitioners in this area tend to express respect or sympathy for the aims of the environmental justice movement, but do not see the pursuit of these aims as being compatible with cost-benefit analysis-based decisionmaking.[49] Other economists and economics-minded policy analysts have seen the potential applicability of cost-benefit analysis to environmental justice advocacy.

Among the range of skeptics, there is a range of tolerance for consideration of distributional concerns in environmental policymaking. At best, distributional concerns are seen as something to be considered in a separate analysis in parallel with efficiency concerns—from this perspective, distributional concerns should be considered in environmental policymaking, but through an analysis separate from the efficiency-focused cost-benefit

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47 *See Mortality Risk Valuation*, EPA, https://www.epa.gov/environmental-economics/mortality-risk-valuation (last visited Mar. 2, 2018).

48 *See* FRANK ACKERMAN & LISA HEINZERLING, PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING 8–9 (2004) ("The basic problem with narrow economic analysis of health and environmental protection is that human life, health, and nature cannot be described meaningfully in monetary terms; they are priceless. . . . By proceeding as if its assumptions are scientific and by speaking a language all its own, economic analysis too easily conceals the basic human questions that lie at its heart and excludes the voices of people untrained in the field.").

49 *See* RICHARD L. REVESZ, ENVIRONMENTAL LAW AND POLICY 131 (3d. ed. 2015) ("*Economic Perspective's Response to Disparities in Risk* . . . . [T]he economic perspective should not be considered insensitive to the concerns of the environmental justice movement. However, rather than allowing distributional consequences to inhibit the efficient allocation of resources, advocates of the economic perspective would argue that discrepancies in risk should be addressed by way of wealth redistribution in the form of a progressive taxation regime.").

analysis. For example, Richard Revesz and Michael Livermore call distributional analysis "a necessary corollary to cost-benefit analysis."[50] They continue: "Critics of cost-benefit analysis are indeed correct that without efforts to distribute the burdens and benefits of regulations fairly, cost-benefit analysis loses much of its normative allure."[51] Revesz and Livermore recommend that distributional analysis be promoted through new Office of Information and Regulatory Affairs (OIRA) guidelines requiring agencies to conduct distributional analysis, and subsequent OIRA compilation of the resulting distributional data.[52] More recently, Revesz has re-emphasized that the current regulatory process does not adequately account for distributional effects.[53] Revesz recommends that this inadequacy be addressed through the following mechanism: agencies would present distributional analysis alongside cost-benefit analysis for their rules, OIRA would flag significant rules with "serious negative distributional consequences," and an interagency working group would determine the proper response.[54] In recommending a parallel process for distributional analysis, Revesz and Livermore underscore that they believe distributional analysis is important, but should be conducted separately from a purely efficiency-oriented cost-benefit analysis.

At worst (from the standpoint of seeking to unify these views), technocrats see distributional concerns as muddling an efficiency-oriented process and leading to suboptimal environmental policy decisions. From this perspective, to the extent that distributional concerns are seen as worth addressing, the proper route for doing so is taxation and redistribution, not environmental policy. Indeed, this position appears to be the prevailing one among law and economics scholars.[55] Essentially, such scholars believe that cost-

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50 *See* REVESZ & LIVERMORE, *supra* note 3, at 182.

51 *See id*.

52 *See id*.

53 *See* Richard L. Revesz, *Regulation and Distribution*, 93 N.Y.U. L. REV. (forthcoming 2018).

54 *See id*. at 62–66.

55 *See* Kyle Logue & Ronen Avraham, *Redistributing Optimally: Of Tax Rules, Legal Rules, and Insurance*, 56 TAX L. REV. 157, 158 (2003) ("Many economists and most law and economics scholars, however, are far from neutral with regard to how to accomplish redistribution. To the contrary, although (as far as we know) no polls have been conducted on this question, we believe it is a safe bet that a majority of legal economists hold the following view: *Whatever amount of redistribution is deemed appropriate or desirable, the exclusive policy*

benefit analysis should be used to identify the most efficient regulatory means to reach the prescribed policy target. Further, some of these scholars even believe that cost-benefit analysis should be used in setting the target itself. Their ideal policy satisfies the Kaldor-Hicks criterion: "If the net effects of a government policy are positive, then those who gain as a result of the policy *could, in theory*, pay off those who lose and still have some benefits left over for themselves. *Potentially*, no one loses and at least some gain."[56] Under this theoretical framework, if policymakers choose a level of regulation, as well as a means with which to regulate, that maximize efficiency, with a subsequent step of taxation and redistribution, every member of society can be made better off by the policy.[57]

However, there are major reasons to question the adequacy of tax-and-transfer for addressing inequity. First, while the form of inequity most readily accessible to economic analysts is income inequality, other forms also require policy attention. Distributive justice advocates, including environmental justice advocates, are concerned with not only income disparities, but also class (a combination of income, family wealth, political access, and other factors), race, immigration status, education, and age. As one analysis found, the suitability of tax-and-transfer versus legal rules for addressing an inequity varies:

> [W]ith respect to dealing with income inequality, we generally side with those who believe that the lion's share of income redistribution should be done through the tax-and-transfer system, although there may be some relatively small, supplementary role for the legal system in redistributing income. . . . [W]ith respect to non-income sources of inequality (or nonincome proxies for well-being) . . . the tax-and-transfer system no longer has the clear comparative advantage. Indeed, we identify some examples in which the legal system arguably has an advantage over the tax system as a means of redistribution.[58]

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tool for redistributing to reduce income or wealth inequality should always be the tax-and-transfer system.") (emphasis added).

56 ASHFORD & CALDART, *supra* note 16, at 162 (emphasis in original).

57 *See* Louis Kaplow & Steven Shavell, *Why the Legal System is Less Efficient than the Income Tax in Redistributing Income*, 23 J. LEGAL STUD. 667, 669 (1994) ("[A]ny regime with an inefficient legal rule can be replaced by a regime with an efficient legal rule and a modified income tax system designed so that every person is made better off.").

58 Logue & Avraham, *supra* note 55, at 166–67.

Furthermore, an income-based tax-and-transfer system is inadequate not only for identifying other relevant characteristics at the time of regulation, but also for identifying and compensating environmental and health-related harms that will arise in the future.[59]

Other scholars identify significant shortcomings of tax-and-transfer even where the desired redistribution is income-related. These shortcomings range from legislative inertia, meaning the inability to respond immediately to legal and regulatory distributional effects, to fairness preferences, meaning that people prefer policies that assign costs and benefits according to who "deserves" them.[60]

Even if we were convinced that a progressive taxation and redistribution scheme would be the ideal policy structure for addressing distributional issues in theory, such a mechanism is unlikely to be implemented in the United States. Thus, a purely efficiency-oriented cost-benefit analysis that premises its exclusion of distributive considerations on a tenuous assumption that the tax system will take care of reallocating benefits is unsound:

> [A] *potential* Pareto improvement . . . is not the same as an actual Pareto improvement *unless* the redistribution of benefits to the losers actually takes place. The fact that such redistribution normally does not occur in response to an environmental policy tends to undercut the value of cost-benefit analysis as a means of measuring the policy's effects on social welfare.[61]

Just as cost-benefit analysis of a proposed regulation takes the current legal and regulatory landscape as a baseline, so too should it take the current taxation and redistribution landscape as a baseline. There is little reason to believe that explicit redistribution in the form of tax-and-transfer will encounter less political friction than implicit redistribution in the form of laws and regulations.[62]

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59 *See* Revesz, *supra* note 53, at 19–21 (noting that the tax-and-transfer system is ill suited for addressing probabilistic harms *ex ante*).

60 *See generally* Lee Anne Fennell & Richard H. McAdams, *The Distributive Deficit in Law and Economics*, 100 MINN. L. REV. 1085–1105 (2016).

61 ASHFORD & CALDART, *supra* note 16, at 162 (emphasis in original).

62 *See* Fennell & McAdams, *supra* note 60, at 1051, 1081–82, 1099.

III. OVERCOMING THE CURRENT STANDOFF: APPROACHES TO INTEGRATING ENVIRONMENTAL JUSTICE VALUES INTO ECONOMIC POLICY ANALYSIS

Environmental justice concerns could be better addressed by cost-benefit analysis as it is currently structured, by better quantifying and monetizing relevant inputs. One may pragmatically assume that cost-benefit analysis is entrenched in policymaking, and that continuing to resist or ignore its use will be ineffective. Even without reform to the structure of cost-benefit analysis, research and analysis that quantifies impacts of concern to environmental justice advocates will afford these impacts greater weight in cost-benefit analysis.

In addition, environmental justice concerns could be better addressed by structural reforms to cost-benefit analysis. This suggestion is based on the optimistic assumption that rational policymakers will seriously consider such reforms when they are rigorously defensible based on the core norms of cost-benefit analysis. This paper primarily focuses on explaining and enhancing the substantive applicability of cost-benefit analysis to environmental justice issues. It leaves the resolution of the valid, difficult, process-related concerns for another time.[63]

Equity weighting is perhaps the most theoretically coherent, yet also the most methodologically challenging, way to account for distributive issues in cost-benefit analysis. It adjusts cost-benefit analysis by assigning each cost or benefit a weight that reflects the change in utility experienced by the person to whom it accrued.[64] The theoretical coherence of equity weighting derives from the combination of two foundational principles of the economic perspective: the positive claim that there is declining marginal utility of wealth (an extra $1 is worth more to you when you have $100 than when you have $1,000, for example) and the normative claim that regulations should seek to maximize welfare.[65] Having accepted the theoretical coherence of equity weighting in general,

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63 *See supra* text accompanying notes 33–38.

64 For a literature review of equity weighting in utilitarian social welfare, see David Anthoff, Cameron Hepburn, & Richard S.J. Tol, *Equity Weighting and the Marginal Damage Costs of Climate Change*, 68 ECOLOGICAL ECON. 836, 837 (2009).

65 For a non-technical outline of these core principles, see Kentaro Toyama, *The Case for Happiness-Based Economics*, THE ATLANTIC (Mar. 21, 2011), https://www.theatlantic.com/business/archive/2011/03/the-case-for-happiness-based-economics/72764/.

the thorny methodological question of how to calculate and apply equity weights remains:

> One obvious problem with equity weighting is that any number of social-welfare functions (SWFs) can be postulated, each producing different weightings and hence different overall climate-damage figures and different marginal social-cost estimates. However, just like 'not discounting', 'not equity weighting' implies a value of an equity weight equal to unity, i.e. $1 of damage to a poor person is treated as if it is the same as $1 of loss to a rich person. Hence, there is no procedure that avoids explicit or implicit equity weighting and it seems better to consider 'reasonable' SWFs and see what they imply for climate damage.[66]

Given that methodological technicalities are at the forefront of concerns regarding equity weighting, this Note will explore them in some depth.

The following pages will illustrate in detail how the impacts of policies are evaluated without equity weighting, with utilitarian equity weighting, and with Rawlsian equity weighting. These approaches assume that the trait used for equity weighting is income; this is reasonable in that increases in income are inversely correlated with declining marginal utility of wealth. However, it is important to note that building an equity weighting structure on income will neglect other factors that could influence an individual's marginal utility of wealth (including wealth acquired through means other than income, like family inheritance). Furthermore, though income is correlated with other traits that are relevant to environmental justice advocates, like education and race,[67] it does not directly account for these traits. Finally, as one of the practical drawbacks to equity weighting is its methodological complexity,[68] the following illustrations are meant to make the concepts more understandable, not to model equity weighting in a realistic regulatory decision.

Without equity weighting, costs (or damage) of a course of

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66 David W. Pearce, *The Social Cost of Carbon and Its Policy Implications*, 19 OXFORD REV. OF ECON. POL'Y 362, 372 (2003).

67 *See* Robert Bullard, *Anatomy of Environmental Racism and the Environmental Justice Movement*, *in* RICHARD L. REVESZ, ENVIRONMENTAL LAW AND POLICY 127 (3d. ed. 2015) ("Racism provides whites of all class levels with an 'edge' in gaining access to a healthy physical environment. This has been documented again and again.").

68 *See* Michael A. Livermore, *Can Cost-Benefit Analysis of Environmental Policy Go Global?*, 19 N.Y.U. ENVTL. L.J. 146, 184–87 (2011–12).

action would be calculated as: $D_{WORLD} = sum_{i \to n}(D_i)$. In plain English, this equation means: "The total damage is equal to the sum of the damage to each individual in the world."

With equity weighting, costs (or damage) of a course of action could be calculated as: $D_{WORLD} = sum_{i \to n}(D_i * [Y_{average}/Y_i]^E)$. In plain English, this equation means:

> The total damage is equal to the sum of the damage to each individual in the world, with each individual's damage adjusted by multiplying it by an equity weight. The equity weight is calculated by taking the ratio of the average income to the individual's income and compounding that ratio by an "inequality aversion factor."

This equity weighting approach is a utilitarian approach because it aims to have the monetary evaluation of a policy's total damages reflect the sum of the loss of utility experienced by each individual affected.

A different approach to equity weighting, the Rawlsian approach, calculates the costs (or damage) of a course of action solely with regard to the poorest members of society: $D_{WORLD} = D_P * [Y_{average}/Y_P]^E$. In plain English, this means:

> The damage of a policy is considered to be equal to the damage to the poorest members of society, adjusted by multiplying by an equity weight. The equity weight is calculated by taking the ratio of the average income to the income level of the poorest members of society and compounding that ratio by an "inequality aversion factor."

This approach derives its rationale from the political philosophy of John Rawls, whose famous concept of the "veil of ignorance" hypothesizes that if the members of a society had to devise the society's structure without any knowledge of which roles they would play in it (that is, without knowing their own gender, race, age, skills, family, or geographic residence), they would want the society to guarantee equal liberties to all members, with any subtractions from these liberties made only to benefit the poorest members of society.[69] This is a philosophical iteration of the "maximin"[70] (maximizing the minimum) decision method: select the option that yields the least-bad worst-case scenario.

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69 *See generally* JOHN RAWLS, A THEORY OF JUSTICE 136–142 (1971).

70 *Maximin*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/maximin (last visited June 3, 2018) ("Definition of MAXIMIN: the maximum of a set of minima").

To illustrate how these approaches work in practice, consider a simplified world with three individuals: Arthur, Betsy, and Charles. Arthur is a pesticide company executive, Betsy is a farm manager, and Charles is a farm field worker. Arthur has an income of $500, Betsy has an income of $200, and Charles has an income of $50. Therefore, the average income of this society is $250.

The government is considering two possible courses of action. To color the example a bit, assume that the problem the government aims to address is a pesticide that is the cheapest way for farmers to rid their crops of pests, but that can cause respiratory problems upon exposure. The government is considering Policy 1, under which the application of the pesticide would be limited to certain hours of the day, and Policy 2, under which the pesticide would be banned entirely. Policy 1 would result in $10 worth of damage for Arthur, $20 worth of damage for Betsy, and $30 worth of damage for Charles. Policy 2 would result in $30 worth of damage for Arthur, $20 worth of damage for Betsy, and $10 worth of damage for Charles.

Evaluating the damage of each policy without equity weights, the costs of the policies are deemed equivalent.

Policy 1:

$D_{WORLD} = sum_{i \to n}(D_i)$
$= D_A + D_B + D_C$
$= \$10 + \$20 + \$30$
$= \underline{\$60}.$

Policy 2:

$D_{WORLD} = sum_{i \to n}(D_i)$
$= D_A + D_B + D_C$
$= \$30 + \$20 + \$10$
$= \underline{\$60}$

Without equity weights, the evaluation of the damage does not give any consideration to which members of society the policy harms and how much it harms them. Two policies with the same overall amount of monetized damage are deemed equivalent, though one harms the least advantaged member of society the most and the other harms the most advantaged member of society the most.

Evaluating the damage of each policy with utilitarian equity weights, however, deems their costs to be quite different. Assume for the moment that E, the "inequality aversion factor," equals 1.[71]

Policy 1:

$D_{WORLD} = sum_{i \to n}(D_i * [Y_{average}/Y_i]^E)$
$= D_A * [Y_{average}/Y_A]^E + D_B * [Y_{average}/Y_B]^E + D_C * [Y_{average}/Y_C]^E$
$= \$10 * [\$250/\$500]^1 + \$20 * [\$250/\$200]^1 + \$30 * [\$250/\$50]^1$
$= \$10 * .50 + \$20 * 1.25 + \$30 * 5.00$
$= \$5 + \$25 + \$150$
$= \underline{\$180}.$

Policy 2:

$D_{WORLD} = sum_{i \to n}(D_i * [Y_{average}/Y_i]^E)$
$= D_A * [Y_{average}/Y_A]^E + D_B * [Y_{average}/Y_B]^E + D_C * [Y_{average}/Y_C]^E$
$= \$30 * [\$250/\$500]^1 + \$20 * [\$250/\$200]^1 + \$10 * [\$250/\$50]^1$
$= \$30 * .50 + \$20 * 1.25 + \$10 * 5.00$
$= \$15 + \$25 + \$50$
$= \underline{\$90}.$

Because Policy 1 causes more dollars worth of damage to

71 For a deeper discussion of ways the value of the inequality aversion factor E is actually determined, and how different values of E could affect policy analysis, see Pearce, *supra* note 66, at 372–73 (defining E as "the elasticity of the marginal utility of income schedule, a measure of 'inequality aversion'" and concluding that "values of E in the range 0.5–1.2 seem reasonable").

individuals who derive greater utility from each dollar than Policy 2, its utilitarian equity weighted costs are substantially higher.

For the sake of completeness, the damage of each policy calculated with Rawlsian equity weighting is as follows:

Policy 1:

$D_{WORLD} = D_P * [Y_{average}/Y_P]^E$
$= \$30 * [\$250/\$50]^1$
$= \$30 * 5$
$= \underline{\$150}$

Policy 2:

$D_{WORLD} = D_P * [Y_{average}/Y_P]^E$
$= \$10 * [\$250/\$50]^1$
$= \$10 * 5$
$= \underline{\$50}$

As these calculations illustrate, Rawlsian equity weighting can result in evaluating the *total* damages of a course of action as being *lower* than they would be with no equity weighting. The possibility of this outcome is clear from the underlying principle: policies are evaluated only with regard to their costs to the poorest members of society, which are by definition a subset of the total set of costs. The Rawlsian damage analysis may therefore have the unintended antiregulatory consequence of justifying *less* overall government intervention than a standard, unweighted analysis.[72] Thus, Rawlsian analysis may be useful as one of many methods of evaluating a policy's impacts, but it is likely undesirable (not to mention politically unrealistic) to advocate for its use as the core metric for governmental decisionmaking.

IV. CASE STUDIES: APPLICATIONS OF THE APPROACHES TO TWO CURRENT ENVIRONMENTAL JUSTICE ISSUES

In this section, I consider how cost-benefit analysis, with equity weighting or other distribution-minded adjustments, could support certain environmental justice struggles. I discuss two very different case studies: climate change policy, which presents global environmental justice issues, and pesticide policy, which presents local environmental justice issues.

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72 *See id*. at 372 ("One paradox in using a Rawls-type welfare function is that global damages are less than if no weights are used at all, implying a lower marginal social cost of carbon and less global action.") (citing Samuel Fankhauser et al., *Extensions and Alternatives to Climate Change Impact Valuation: On the Critique of IPCC Working Group III's Impact Estimates*, ENV'T AND DEV. ECON. (1997); Samuel Fankhauser et al., *The Aggregation of Climate Change Damages: A Welfare Theoretic Approach*, ENV'T AND RES. ECON. (1997); and Richard Tol et al., *Distributional Aspects of Climate Change Impacts*, GLOB. ENVTL. CHANGE (2003)).

A. *Climate Change Regulation (domestic and international environmental justice issue)*

It is vital that policymakers address climate change. However, efforts in this area have been stymied by many challenges, several of which are relevant to the prospects of better incorporating environmental justice concerns into decisionmaking. Climate change is an issue that is caused by innumerable actors and actions, some of which can be regulated and some of which cannot; its effects will be universally yet unequally felt; and it will unfold in drastically evolving ways over the course of decades and centuries to come. Regulatory cost-benefit analysis depends heavily on one metric, the social cost of carbon, to aggregate, quantify, and monetize the sprawling impacts of this phenomenon.[73] Thus, if climate change policy analysis is to incorporate equity weighting, it makes sense to focus on how equity weighting could be integrated into the computation of the social cost of carbon, and how this integration would alter the resulting social cost of carbon value.

Unfortunately, but expectedly, this is not an easy determination to make. Different studies have come to different conclusions about the implications of equity weighting for the social cost of carbon. At least one study calculated that equity weighting would produce higher costs for climate change impacts—that is, equity weighting would justify more expensive mitigation measures than standard cost-benefit analysis does.[74] But other research has concluded that equity weighting would produce lower costs for climate change impacts—that is, equity weighting would justify less expensive mitigation measures than standard cost-benefit analysis.[75] Upon examining the methodology of these studies, it becomes clear that in order to preserve the coherence of equity weighting and avoid counterintuitive outcomes, its application must be carefully considered.

Intuitively, it seems that equity weighting would increase the social cost of carbon (and thus justify more costly regulation) because nations, groups, and individuals who are poor or

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73 *See generally Social Costs of Greenhouse Gases*, INST. FOR POL'Y INTEGRITY, (Feb. 2017), http://policyintegrity.org/files/publications/Social_Cost_of_Greenhouse_Gases_Factsheet.pdf.

74 *See* Anthoff, Hepburn, & Tol, *supra* note 64, at 836.

75 *See* Chris Hope, *Discount Rates, Equity Weights and the Social Cost of Carbon*, 30 ENERGY ECON. 1011, 1011 (2008).

disadvantaged are most vulnerable to the various harms of climate change. Indeed, some studies confirm this intuition. One study of how various equity weights and discount rates affected the output of the Climate Framework for Uncertainty, Negotiation, and Distribution (FUND) model found that "equity-weighted estimates are substantially higher than estimates without equity-weights; equity-weights may even change the sign of the social cost estimates."[76] Equity weights were applied according to the utilitarian social welfare functions of the sixteen regions of the FUND model.[77] In other words, rather than equity weighting climate change impacts based on whether they are experienced by poor or rich individuals, this study weights climate change impacts based on whether they are experienced by poor or rich geographic regions.

Another study came to the opposite, counterintuitive conclusion: equity weighting climate change damages decreases the resulting value relative to an unweighted calculation.[78] This conclusion is explained by the fact that future generations are expected both to experience increasingly severe climate change impacts and to have increasingly higher incomes. Increasing wealth is one of the factors that justifies a non-zero discount rate in policymaking. Environmental groups often advocate for lower discount rates (that is, an equal or close-to-equal consideration of impacts that occur in the future) when determining climate change policy, because the nature of climate change is that costly policies must be implemented now to avoid harms that are decades away. With a high discount rate, fewer and less costly current actions are justified under cost-benefit analysis. However, the basis for

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76 Anthoff, Hepburn, & Tol, *supra* note 64, at 836. FUND is a model that calculates the Social Cost of Carbon based on estimated impacts to agriculture, forestry, water, energy, sea level rise, ecosystems, human health, and extreme weather. *See* INTERAGENCY WORKING GROUP ON SOCIAL COST OF CARBON, U.S. GOVERNMENT, TECHNICAL SUPPORT DOCUMENT: SOCIAL COST OF CARBON FOR REGULATORY IMPACT ANALYSIS UNDER EXECUTIVE ORDER 12866, at 7–8 (Feb. 2010).

77 *See* Anthoff, Hepburn, & Tol, *supra* note 64, at 842 (noting that the regions are: "the United States of America, Canada, Western Europe, Japan and South Korea, Australia and New Zealand, Central and Eastern Europe, the former Soviet Union, the Middle East, Central America, South America, South Asia, Southeast Asia, China, North Africa, Sub-Saharan Africa, and Small Island States."). The authors point out that while regional equity weighting is much more practical than individual-level, it is less substantively sound—it necessarily ignores intraregional inequality, which could be vast. *See id.* at 840–41.

78 *See* Hope, *supra* note 75, at 1011.

discount rates is conceptually akin to the decreasing marginal utility of wealth basis for equity weighting. A 2009 Anthoff, Hepburn, and Tol study recognized this connection,[79] but did not focus on it. A 2008 Hope study reasoned, essentially, that it would be inconsistent to treat wealth disparities between contemporaries differently than wealth disparities between current and future generations:

> Another way to understand this result is to realise that incomes per capita are expected to be much higher by the end of the century than they are now. If we give extra weight to impacts in poorer countries today, through the use of equity weights, we should also give extra weight to the impacts to today's poorer generations rather than the future's richer ones, through the use of higher discount rates.[80]

However, it is possible to draw a principled ethical distinction between intra and intergenerational equity weighting. Many scholars have noted the philosophical dubiousness of assigning lower weight to benefits to future generations in the context of the discount rate.[81] OMB Circular A-4 notes that "[s]pecial ethical considerations arise when comparing benefits and costs across generations," because future generations are not able to voice their policy preferences, and because there is increased "uncertainty about the appropriate value of the discount rate" the further into the future the policy analysis looks.[82] Circular A-4 notes that while an agency could choose to use a constant discount rate and "supplement the analysis with an explicit discussion of the intergenerational concerns," an agency would also be justified in using a lower discount rate (such as one to three percent) for future generations, or at least using these lower discount rates in conducting sensitivity analyses to see if they would meaningfully affect the outcome of the analysis.

Even if one were to disagree with the claim that intragenerational equity weighting necessitates intergenerational

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79 *See* Anthoff, Hepburn & Tol, *supra* note 64, at 838 ("The combination of discounting and equity weighting needs to be done with care, since the two concepts overlap in their theoretical justification.").

80 Hope, *supra* note 75, at 1017.

81 *See* John Broome, *Discounting the Future,* 23 PHIL. & PUB. AFF. 128, 128 (1994) ("In cost-benefit analysis . . . economists typically . . . count future goods for less than present goods. To many philosophers this seems a reprehensible . . . device for unjustly promoting our own interests at the expense of our descendants'.").

82 CIRCULAR A-4, *supra* note 4, at 35, 36.

equity weighting on a philosophical level, there are complications at a technical level. The fact that the calculations of the discount rate and the equity weight both use the "inequality aversion factor" noted above creates a conundrum.[83] If the magnitude of this variable is increased (that is, there is greater aversion to income inequality), the discount rate and the equity weight both increase, but "the drop in present values that results far outweighs the small increase in impacts that equity weights bring."[84] This means that—counterintuitively—the more importance we place on equity in this equation, the less action to fight climate change will be justified, because the benefits to future, presumably richer generations are discounted more heavily.

A large portion of the discussion of equity weighting with regard to environmental policy, and climate change policy more specifically, considers equity weighting in the international (United States policy regarding impacts on other countries) or foreign (within other countries, especially developing countries) context.[85] This makes sense, because in the international context, taxation is not an available policy mechanism. In certain subsets of the foreign context, the collection of taxes or the subsequent redistribution of revenues could be unreliable or administratively impractical.[86] These justifications for using equity weighting in policy analysis when tax-and-transfer is, practically speaking, unavailable could also be extended to the domestic context of the United States, where comprehensive tax-and-transfer is impractical.[87]

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83 Hope, *supra* note 75, at 1016 ("The elasticity used in the equity weighting formula is exactly the same parameter as is used in the derivation of the discount rate . . . . So it is not clear that we have the freedom to alter the elasticity value in the equity weighting formula while keeping a constant [discount rate].").

84 *id*. at 1017.

85 *See, e.g*., Michael A. Livermore, *Can Cost-Benefit Analysis of Environmental Policy Go Global?*, 19 N.Y.U. ENVTL. L.J. 146, 185 (2011).

86 *See* Michael A. Livermore, *The Shape of Distributional Analysis*, *in* THE GLOBALIZATION OF COST-BENEFIT ANALYSIS IN ENVIRONMENTAL POLICY 69, 70 (Richard Revesz & Michael A. Livermore eds., 2013) ("Real-world conditions in many developing countries, including the existence of a large informal economy or a lack of administrative capacity to effectually tax income and make transfers, however, can cut against the applicability of Kaplow and Shavell's argument. At least some of the time, therefore, regulation may be a superior redistributional tool.").

87 *See supra* text accompanying notes 58–62.

B. *Pesticide Regulation (domestic environmental justice issue)*

A critical concern of the environmental justice movement, particularly in California and other major agricultural areas, is the application of pesticides to crops.[88] Because pesticides are, by definition, toxic to insects, fungus, rodents, or other organisms that can harm crops, it is natural to suspect that they might also be toxic to other organisms in addition to their targets—like humans or organisms in the surrounding ecosystem. Indeed, the EPA's protocol of requiring that all pesticides undergo a registration process prior to introduction to the United States market, which includes evaluation of human health and ecological risks, implies a recognition that pesticides are presumptively potentially harmful.[89] However, the registration process also allows pesticides with known or suspected harmful consequences for human health or the environment, depending upon the comparison between the pesticide's harmfulness and its usefulness.[90]

Farm workers are exposed to pesticides on the job, and people in surrounding agricultural communities can be exposed to pesticides through the air, water, and soil.[91] Environmental justice advocates have pushed the EPA to ban or otherwise restrict the use of many pesticides on the basis of proven or suspected health-related harms from exposure.[92] The people with the highest

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88 *See Pesticides*, CENTER ON RACE, POVERTY, & THE ENV'T, http://www.crpe-ej.org/our-work/sustainable-agriculture/pesticides/ (last visited Mar. 11, 2018).

89 *See Overview of Risk Assessment in the Pesticide Program*, EPA, https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/overview-risk-assessment-pesticide-program (last updated Aug. 21, 2017); *cf. Dietary Supplements*, NAT'L INST. OF HEALTH, https://ods.od.nih.gov/factsheets/DietarySupplements-HealthProfessional/ (noting that drugs are presumed unsafe and dietary supplements are presumed safe) ("Once a dietary supplement is marketed, FDA has to prove that the product is not safe in order to restrict its use or remove it from the market. In contrast, before being allowed to market a drug product, manufacturers must obtain FDA approval by providing convincing evidence that it is both safe and effective.").

90 *See* ENVIRONMENTAL LAW INSTITUTE, A TECHNICAL ANALYSIS OF ECONOMIC-BASED REGULATION IN ENVIRONMENTAL RULEMAKING, *Appendix D: FIFRA*, at 19 (2009) (on file with author) (funded by EPA) ("The legislative history of FIFRA conveys the theme that Congress recognized a certain level of risk to be inherent in pesticide use; the presence of risk alone would not support the cancellation or denial of a pesticide registration.").

91 *See* JILL LINDSEY HARRISON, PESTICIDE DRIFT AND THE PURSUIT OF ENVIRONMENTAL JUSTICE 37–40 (2011).

92 *See* Olivia Carter-Pokras et al., *The Environmental Health of Latino Children*, 21 J. OF PEDIATRIC HEALTH CARE 307, 309 ("Chronic pesticide

exposure to these pesticides—farm workers and the people who live, work, and attend school near the farms—are, in many parts of the country, predominantly poor and Latino.[93]

The EPA regulates the safety of pesticides under two main statutory schemes: the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)[94] and the Federal Food, Drug, and Cosmetic Act (FFDCA).[95] Essentially, FIFRA addresses the risks that a pesticide may pose to the environment, farm-workers, farm neighbors, and consumers; FFDCA addresses the risks that residues of the pesticide may pose to consumers.

For a pesticide to enter the domestic market, it must be granted a registration by the EPA. Under FIFRA, the EPA determines whether to allow a pesticide to be registered; registration would allow, under certain circumstances, its sale, distribution, and use.[96] The EPA can also cancel a pesticide's registration or choose not to reregister it at each fifteen-year registration renewal checkpoint[97] if it determines that dietary risks "exceed the 'reasonable certainty of no harm' standard" from the FFDCA, or that other types of risks "such as residential,

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exposure is associated with a wide range of adverse effects in children, including, but not limited to, neurologic and behavioral effects and endocrine disruption.").

93 *See id*. ("Latinos account for 90% of all seasonal agricultural and migrant farm workers. Migrant farm families are likely to have high pesticide exposures because of close proximity of housing to fields where spraying occurs, multiple family members working in the fields, poor quality of housing in which migrant families often live, and lack of adequate facilities to clean pesticide-contaminated work clothes.").

94 7 U.S.C. § 136 (2012).

95 21 U.S.C. §§ 301–399 (2012).

96 *See* ENVTL. LAW INST., A TECHNICAL ANALYSIS OF ECONOMIC-BASED REGULATION IN ENVIRONMENTAL RULEMAKING 16 (2009) (on file with author) (report funded by EPA). The report includes a helpful summary of cost-benefit analysis practice under FIFRA:

> Regulatory decisionmaking under FIFRA is guided by the term "unreasonable adverse effects on the environment." (Defined as "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide.") . . . The relative weight to be assigned by the Administrator to the risk and benefits of a pesticide varies according to the particular action taken. There is, however, an overriding concern expressed throughout the Act to prevent risks to public health.

Id.

97 *See Registration Review Process*, EPA, https://www.epa.gov/pesticide-reevaluation/registration-review-process (last updated Aug. 15, 2018), ("EPA will review each registered pesticide at least every 15 years to determine whether it continues to meet the FIFRA standard for registration.").

occupational or ecological risks . . . are unreasonable in light of the benefits associated with the pesticide use."[98] The first standard, the "reasonable certainty of no harm" for consumers standard, does not invite cost-benefit analysis. But even if a pesticide satisfies this standard, it could be banned or restricted under the other standard, if its "risks . . . are unreasonable in light of the benefits." This formulation implies that cost-benefit analysis is an appropriate method of evaluating whether a pesticide satisfies the standard for registration or reregistration.

If a pesticide's registration is approved, the EPA sets tolerances under the FFDCA. Tolerances are "the maximum amount of a pesticide allowed to remain in or on a food."[99] While the tolerance level governs the amount of pesticide on or in the food when it reaches consumers, the scope of analysis for determining what would be a safe level is broad, considering "[a]ll possible routes of exposure to that pesticide (residues on each crop use, as well as exposure from drinking water and residential exposure)."[100] Exceeding the tolerance amount makes products "subject to seizure by the government."[101] The EPA "must modify or revoke any tolerance [it] determine[s] is unsafe."[102]

The fight to protect communities from pesticide hazards recently commanded national attention when, on March 29, 2017, then-EPA Administrator Scott Pruitt abruptly ended a decade-long effort by environmental justice advocates to ban the pesticide chlorpyrifos.[103] The Natural Resources Defense Council (NRDC)

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98 *Pesticide Cancellation Under EPA's Own Initiative*, EPA, https://www.epa.gov/pesticide-tolerances/pesticide-cancellation-under-epas-own-initiative (last updated Nov. 16, 2016).

99 *Regulation of Pesticide Residues on Food*, EPA, https://www.epa.gov/pesticide-tolerances (last updated July 10, 2018).

100 *Setting Tolerances for Pesticide Residues on Food*, EPA, https://www.epa.gov/pesticide-tolerances/setting-tolerances-pesticide-residues-foods (last updated May 27, 2017).

101 *Id*.

102 *Revoking Pesticide Tolerances*, EPA, https://www.epa.gov/pesticide-tolerances/revoking-pesticide-tolerances (last updated Nov. 16, 2016).

103 *See* Eric Lipton, *E.P.A. Chief, Rejecting Agency's Science, Chooses Not to Ban Insecticide*, N.Y. TIMES (Mar. 29, 2017), https://www.nytimes.com/2017/03/29/us/politics/epa-insecticide-chlorpyrifos.html; Aseem Prakash & Nives Dolsak, *Why did Scott Pruitt refuse to ban a chemical that the EPA itself said is dangerous?*, WASH. POST (Apr. 12, 2017), https://www.washingtonpost.com/news/monkey-cage/wp/2017/04/12/why-did-scott-pruitt-refuse-to-ban-a-chemical-that-the-epa-itself-said-is-dangerous/. At the time of the writing of this paper, litigation continues before the 9th Circuit regarding the fate of chlorpyrifos regulation. *See* League of United Latin Am. Citizens v. Pruitt,

and Pesticide Action Network North America (PANNA) had initially filed a petition on September 12, 2007.[104] In the petition, NRDC and PANNA requested that the EPA "revoke all tolerances and cancel all registrations for the pesticide chlorpyrifos."[105] The petition was spurred by the EPA's 2006 finding that "chlorpyrifos uses would be eligible for reregistration and that the current pesticide tolerances met the legal safety standard."[106]

NRDC and PANNA objected to the EPA's continued registration of chlorpyrifos and setting of chlorpyrifos tolerances, on the basis that the EPA had failed to respond to NRDC's 2001 chlorpyrifos comments "identif[ying] evidence of harm" and highlighting the possibility of developmental harm to infants and children.[107] Furthermore, the petition alleged that the EPA had not revised its chlorpyrifos risk assessment between 2001 and 2006, despite "new, significant published studies that emerged during this time showing harm."[108] The petition mainly discussed scientific studies in light of the EPA's obligation to "focus explicitly on exposures and risks to children and infants" when setting tolerances;[109] NRDC and PANNA could have argued that "focusing explicitly" on these impacts should have compelled the EPA to assign a weight to these impacts in cost-benefit analysis. While there are certainly other manners for an agency to "consider" impacts in theory, when a cost-benefit analysis is present, its bottom-line determination is highly concrete and salient, and thus functionally carries great persuasive weight. While the petition quoted the "unreasonable adverse effects" standard that implies a cost-benefit analysis approach to the registration decision,[110]

Case No. 17-71636 (9th Cir. June 5, 2017). Regardless of litigation developments, the scientific, economic, and social dimensions of chlorpyrifos regulation have parallels in many other pesticides, so the analysis remains relevant.

104 *See* Natural Resources Defense Council & Pesticide Action Network North America, Petition to Revoke All Tolerances and Cancel All Registrations for the Pesticide Chlorpyrifos (Sept. 12, 2007), https://www.nrdc.org/sites/default/files/hea_10072201a.pdf [hereinafter "Chlorpyrifos Petition"].

105 *Id*. at 1.

106 *Id*. at 4; *see Reregistration Eligibility Decision for Chlorpyrifos*, EPA, OFF. OF PESTICIDE PROGRAMS (July 31, 2006), https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_PC-059101_1-Jul-06.pdf.

107 Chlorpyrifos Petition, *supra* note 104, at 3.

108 *Id*. at 4.

109 *Id*. at 3.

110 *See id*. at 2 ("EPA may not register a pesticide unless the chemical will

NRDC and PANNA did not situate any of their arguments within a cost-benefit analysis framework.

To be fair, the EPA had not provided a cost-benefit analysis of chlorpyrifos registration and tolerances; rather, the reregistration eligibility decision discusses the various "risks" and "benefits" of chlorpyrifos in nonmonetary (though quantified) terms.[111] To use cost-benefit analysis to assess, support, or critique the EPA's action, NRDC and PANNA would have had to construct it themselves, monetizing the enumerated risks and benefits by using figures like the Value of a Statistical Life. As the EPA itself has conceded, "external economic research plays a limited role in the day-to-day economic analysis required for registering and reregistering conventional pesticides," because the "economic questions are typically quite narrow, focusing on the impact of mitigating specific risks from individual pesticides through changes in use patterns with crop-specific or location-specific measures."[112]

Nearly ten years after NRDC and PANNA filed the petition, Administrator Pruitt denied it,[113] stating that the EPA "need[s] to provide regulatory certainty to the thousands of American farms that rely on chlorpyrifos, while still protecting human health and the environment."[114] Previously, in response to an August 2015 Ninth Circuit order that the EPA respond to the petition, the EPA had proposed a revocation of all chlorpyrifos tolerances,[115] and in response to a subsequent August 2016 order for a final response no

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perform its intended function without causing any 'unreasonable adverse effects on the environment.'") (quoting FIFRA, 7 U.S.C. § 136a(c)(5)(C)).

111 *See Reregistration Eligibility Decision for Chlorpyrifos*, EPA, OFF. OF PESTICIDE PROGRAMS (July 31, 2006), https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/red_PC-059101_1-Jul-06.pdf.

112 Derek Berwald, Sharlene Matten, & David Widawsky, *Economic Analysis and Regulating Pesticide Biotechnology at the U.S. Environmental Protection Agency*, *in* REGULATING AGRICULTURAL BIOTECHNOLOGY 21, 27 (Richard E. Just, Julian M. Alston & David Zilberman eds., 2006).

113 *See* Chlorpyrifos; Order Denying PANNA and NRDC's Petition To Revoke Tolerances, 82 Fed. Reg. 16581 (Apr. 5, 2017).

114 *EPA Administrator Pruitt Denies Petition to Ban Widely Used Pesticide*, EPA (Mar. 29, 2017), https://www.epa.gov/newsreleases/epa-administrator-pruitt-denies-petition-ban-widely-used-pesticide-0.

115 *See* Chlorpyrifos; Tolerance Revocations; 80 Fed. Reg. 69080, 69080 (Nov. 6, 2015) ("At this time, the agency is unable to conclude that the risk from aggregate exposure from the use of chlorpyrifos meets the safety standard of section 408(b)(2) of the Federal Food, Drug, and Cosmetic Act (FFDCA). Accordingly, EPA is proposing to revoke all tolerances for chlorpyrifos.").

later than March 31, 2017,[116] the EPA had released a "revised risk assessment that proposed a new regulatory point of departure based on the potential for chlorpyrifos to result in adverse neurodevelopmental effects."[117] The EPA characterizes its 2017 order denying the petition not as a definitive rejection of the merits of the health-related concerns but rather as a postponement of a final decision until the statutorily mandated chlorpyrifos registration review in 2022, when it expects that more information will be available.[118]

If NRDC and PANNA intend to continue to advocate for the cancellation of the chlorpyrifos registration with an eye towards 2022, these groups should consider investing resources—or perhaps enlisting the help of economics-minded environmental groups like Environmental Defense Fund or the Institute for Policy Integrity—in making the argument that properly conducted cost-benefit analysis does not support the continued use of chlorpyrifos.

As in many other areas of environmental regulation, and regulation generally, the increased use of cost-benefit analysis in the context of FIFRA decisionmaking was originally motivated by antiregulatory interests. The 1975 FIFRA amendments made additions to the registration cancellation provision of FIFRA that required the EPA to consider how cancellation could economically affect several specified aspects of the agricultural industry.[119] Legislative history makes clear that the antiregulatory viewpoint of the agricultural industry was well represented in the testimony that senators heard when drafting this amended text:

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116 *See In re Pesticide Action Network North America*, No. 14-72794, Order, at 2 (Aug. 12, 2016).

117 Chlorpyrifos; Order Denying PANNA and NRDC's Petition To Revoke Tolerances, 82 Fed. Reg. 16581, 16583 (Apr. 5, 2017).

118 *See id*. ("EPA has therefore concluded that it will not complete the human health portion of the registration review or any associated tolerance revocation of chlorpyrifos without first attempting to come to a clearer scientific resolution on those issues.").

119 *See* ENVIRONMENTAL LAW INSTITUTE, A TECHNICAL ANALYSIS OF ECONOMIC-BASED REGULATION IN ENVIRONMENTAL RULEMAKING, *Appendix D: FIFRA*, at 19 (2009) (on file with author) (report funded by EPA) ("During the 1975 hearings on FIFRA reauthorization it was argued that EPA was not adequately considering agricultural development—that is, the benefits of pesticide use—in its decisions. In addressing this claim the 1975 amendments added several sentences to subsection 6(b) that direct the EPA Administrator to take 'into account the impact (of his intent to classify a pesticide, or cancel or suspend a registration) on production and prices of agricultural commodities, retail food prices, and otherwise on the agricultural economy.'") (citing FIFRA § 6(b), 7 U.S.C. § 136d(b)).

> The [Senate Committee on Agriculture and Forestry] concurs in the House position that EPA has not always given adequate consideration to agriculture in its decisions. *This concern was also voiced by many witnesses appearing before the Committee*. The basic well-being of the American people depends upon adequate supplies of reasonably priced food. Failure to *consider carefully the costs, as well as the benefits of pesticide actions*, could deprive the Nation of essential food and fiber.[120]

FIFRA, like many environmental statutes, contemplates that regulation may be needed to address certain environmental health risks and that such regulation may impose financial costs on the regulated industry.

Progressive interests focused on protecting human health and the environment, particularly for disadvantaged societal groups, could make great gains by ensuring that the benefits of regulation are represented in financial terms as well. While FIFRA and the case law interpreting it does not require the EPA to conduct full, monetized cost-benefit analysis at the registration or cancellation stages of regulation, it does give the EPA the discretion to do so. Furthermore, advocates could argue that in order for the EPA to fulfill its statutory mandate of protecting human health from potential pesticide harms, it must engage in such analysis. Otherwise, these benefits will be inherently disadvantaged when compared to monetized costs of regulation. Putting the benefits of the regulation in dollar terms would not discredit the principles that support FIFRA's prioritization of human health, but would rather complement these principles. In cases where monetized benefits of a regulation outweigh its monetized costs, the EPA and environmental justice advocates can better refute industry complaints that regulation is "irrational."

Going beyond the application of cost-benefit analysis in its standard current form, FIFRA may be particularly open to an interpretation permitting equity-weighted cost-benefit analysis. The statutory emphasis on human health, with a functional presumption that a pesticide is harmful, could be quantified as an equity weight. While the court likely did not have this particular method in mind, a foundational D.C. Circuit opinion regarding the registration cancellation process seems to support the idea:

> The cancellation decision does not turn on a scientific

120 S. Rep. No. 452, at 8–9 (94th Cong., 1st Sess., 1975) (as quoted in A TECHNICAL ANALYSIS OF ECONOMIC-BASED REGULATION IN ENVIRONMENTAL RULEMAKING, *Appendix D: FIFRA*, *supra* note 119, at 20) (emphasis added).

> assessment of hazard alone. The statute leaves room to balance the benefits of a pesticide against its risks. The process is a delicate one, in which greater weight should be accorded the value of a pesticide for the control of disease, and less weight should be accorded its value for the protection of a commercial crop.[121]

Equity weighting the costs and benefits of pesticide regulation would align roughly, though not perfectly, with the statutory guidance to assign a greater weight to health costs and benefits than to financial costs and benefits. In theory, if very rich people were among those most heavily exposed to a pesticide, equity weighting might diminish the consideration given to their health harms, in contravention of statutory aims. Likewise, if very poor people were among those who most benefited financially from the sale and use of pesticides, equity weighting might amplify the consideration given to their profits, in contravention of statutory aims.

In reality, neither of these wrinkles in the fit of equity weighting to FIFRA aims is significant. The health-based restriction of pesticide use most heavily benefits the people who work on and live near farms where the pesticides are applied, as these are the people who face the most exposure. An estimated 40 to 50 percent of farm workers are migrants, many of whom face disadvantages in terms of language and citizenship status in the United States, in addition to low and inconsistent income.[122] The parties most harmed by stricter regulation of pesticides are presumably large, industrial farming operations; at least in the case of chlorpyrifos, the EPA's small business impacts analysis estimated that over 99.9 percent of small farms, and about 97.5 percent of small farms that use chlorpyrifos, would incur no significant economic impact from the revocation of chlorpyrifos

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121 Envt'l Def. Fund v. Ruckelshaus, 439 F.2d 584, 594 (D.C. Cir. 1971) (preceded the 1975 FIFRA amendments, which included an amendment emphasizing consideration of the benefits of pesticides in the cancellation provision); *See* ENVIRONMENTAL LAW INSTITUTE, A TECHNICAL ANALYSIS OF ECONOMIC-BASED REGULATION IN ENVIRONMENTAL RULEMAKING, *Appendix D: FIFRA*, at 23 (2009) (on file with author) (funded by EPA) ("This process of weighing benefits against risks clearly allows for economic analysis, but the court's holding makes it clear that risks to public health should be given greater weight than benefits derived from the pesticide's use.") (discussing EDF v. Ruckelshaus).

122 *See* Michael Gochfeld & Joanna Burger, *Disproportionate Exposures in Environmental Justice and Other Populations: The Importance of Outliers*, 101 AM. J. OF PUB. HEALTH at S53, S58 (Supp. 1, 2011).

tolerances.[123] Thus, the interests amplified by equity weighting and the interests prioritized by FIFRA are, functionally, overlapping to a large degree.

The distribution of costs of pesticide regulation becomes somewhat more complex if the analysis expands to indirect costs. Assuming that food producers may pass on the costs of regulation to consumers, raising the costs of food production could result in a regressive "tax" on food (that is, an increase in food prices).[124] These financial costs might thus be amplified with equity weighting, in tension with FIFRA priorities. However, given the methodological complexity of equity weighting, it will likely not be practical to include indirect costs and benefits in an equity-weighted cost-benefit analysis, while the approach and the data needed to support it are still developing.

CONCLUSION

Environmental justice advocates know that the causes for which they fight are of great value to their communities; rigorously quantifying this value will protect it from being forgotten in the regulatory process, allowing it to act as a direct counterweight to economic interests. Likewise, applying equity weights is just a quantitative way of acknowledging that impacts are greater on people with fewer resources to handle them. Economic policy technocrats should support these reforms for essentially the same reasons—to put matters in their terms, adjusting the value of regulatory impacts based on how people subjectively experience these impacts will make cost-benefit analysis a better proxy for utility maximization. The complexity of implementing these reforms in practice is undeniable, and it will not be accomplished all at once. The first step is for each faction to recognize that the other has something important to offer it. As the relatively young endeavor of regulatory cost-benefit analysis matures,

123 *See Analysis of the Small Business Impacts of Revoking Chlorpyrifos Food Tolerances*, EPA (Oct. 27, 2015), https://www.regulations.gov/document?D=EPA-HQ-OPP-2015-0653-0002 ("revoking the food tolerances for chlorpyrifos will not have a significant economic impact on a substantial number of small entities.").

124 *See* Cliona Ni Murchu et al., *Food Prices and Consumer Demand: Differences across Income Levels and Ethnic Groups*, PLOS ONE (Oct. 2, 2013) ("[T]axes are potentially regressive by disproportionately affecting lower-income households who spend a greater proportion of their household budget on food."). However, note that the absence of harmful pesticides on foods is a linked, countervailing benefit.

environmental justice advocates and economic policy technocrats should work together to advance the incorporation of equity considerations.