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COST-BENEFIT ANALYSIS: NOT A SUITABLE APPROACH FOR EVALUATING CLIMATE REGULATION POLICIES

Gregory Scott Crespi*

Abstract

Cost-benefit analysis is a widely used approach for guiding public sector policy decisions. Given the impetus provided by strong evidence of global warming, numerous scholars are now considering the role that cost-benefit analysis should play, if any, in assessing climate regulation policies, and are offering recommendations as to how this methodology can be better utilized in that context. However, that scholarship invariably overlooks the fact that conventional cost-benefit analyses implicitly embrace the untenable assumption that the genetic identities of future persons are exogenous with regard to the policies being evaluated. The conclusions of such cost-benefit analyses are therefore irrelevant to the real choices at hand, since genetic identity is in fact endogenous relative to the policies that we pursue. In other words, our current policies will not only have long-term impacts upon the wealth of future persons, they will also determine who those persons are, and that important consequence should not be overlooked.

The various recommendations that these scholars offer with regard to improving cost-benefit valuation techniques for measuring the social cost of carbon emissions, or with regard to properly discounting future policy effects, are somewhat beside the point given the fundamentally inapt valuation comparisons that most cost-benefit analysts are making. This scholarship would perhaps be better directed at first of all developing some suitable means for incorporating the endogeniety of identity into cost-benefit analysis.

In this short article I draw upon the work of Derek Parfit to demonstrate the devastating implications that recognition of the endogeniety of identity has for the relevance of conventional cost-benefit analysis for climate regulation policy. I also discuss and criticize for their failure to address this problem several recent efforts by leading scholars to

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critique and improve the application of cost-benefit analysis to climate regulation policy.

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I. Introduction

The evidence is rather convincing that rapid and significant global warming is taking place, and as a result climate regulation policy has become a focus of scholarly attention.[1] One important academic discussion relates to the proper role that cost-benefit analysis should play, if any, in guiding the development of climate regulation measures.[2] Among those scholars who have decided that the cost-benefit methodology is a suitable approach for comparing the relative merits of alternative climate regulation policies there are also discussions regarding how the different valuations that this methodology calls for can be most accurately calculated and rendered comparable with one another.[3]

Unfortunately, however, the efforts being made to assess and improve the application of cost-benefit analysis to the difficult questions posed by climate regulation consistently avoid the central conceptual difficulty presented by the use of that methodology in this context where policy

1. *See* FRANK ACKERMAN & ELIZABETH STANTON, THE SOCIAL COST OF CARBON 1 (2010) (discussing the average expected damages of climate change); Jonathan Masur & Eric Posner, *Climate Regulation and the Limits of Cost-Benefit Analysis* 2 (U. Chi. Pub. Law Working Paper No. 315, 2010) (examining the record of the federal agencies and the Interagency Working Group for agreement on climate change).

2. *See* Richard Revesz & Matthew Shahabian, *Climate Change and Future Generations* 79–82 (NYU Law & Econ. Research Paper No. 10–38, 2010) [hereinafter Revesz & Shahabian] (addressing the more general question of how to properly discount the future policy impacts of various regulatory alternatives to present values for comparison with their current costs).

3. *See id.* at 10–59 (addressing the general question of how to discount the future policy impacts of regulatory alternatives in comparison with current costs).

choices will have important long-term consequences.[4] Virtually none of this recent work addresses a fundamental problem that renders essentially irrelevant the conclusions of cost-benefit analysis whenever the analysts start from conventional baseline assumptions when attempting to assess the long-term consequences of a policy for future persons who have not yet been conceived when the policy is first implemented, as opposed to either starting with more realistic and complex baseline assumptions, or else sharply limiting the scope of the analysis to only assessing the consequences of the policy for those persons already in existence when that policy is implemented.[5] Cost-benefit analysis starting from conventional baseline assumptions is particularly poorly suited as an approach for assessing climate regulation policies, since a crucial aspect of those policies is their impact upon the welfare of future persons not yet conceived when the policies are first implemented.[6]

The problem here is that cost-benefit analysts consistently overlook the crucial fact that the fundamental genetic identities of the members of future generations are endogenous rather than exogenous with regard to the policies being evaluated.[7] Put another way, when a policy is implemented it will not only impact the wealth of the members of future generations, but

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4. *See* Gregory S. Crespi, *A Brief Reflection on the Problem of Person-Altering Consequences*, 2 J. APP. ECON. 13, 13–22 (2009) [hereinafter Crespi, *A Brief Reflection*] (discussing the existence of trade-offs and difficult ethical questions that are far too often overlooked by policy makers); Gregory S. Crespi, *The Fatal Flaw of Cost-Benefit Analysis: The Problem of Person-Altering Consequence*s, 38 ENVTL. L. REP. NEWS & ANALYSIS 10703, 10705 (2008) [hereinafter Crespi, *The Fatal Flaw*] (criticizing the conventional cost-benefit analyses that consistently ignore the pervasive and dramatic person-altering consequences of policies); Gregory S. Crespi, *What's Wrong with Dumping Radioactive Wastes in the Ocean? The Surprising Ethical and Policy Analysis Implications of Person-Altering Consequences*, 37 ENVTL. L. REP. NEWS & ANALYSIS 10873, 10873 (2007) [hereinafter Crespi, *What's Wrong*] (discussing how policy decisions have person-altering consequences and so we have no ethical obligations to future generations who have had their genetic identities significantly altered by those person-altering consequences, since any policy that we might pursue would be a necessary condition of future generation's existence).

5. *See* Crespi, *A Brief Reflection*, *supra* note 4, at 13–22 (discussing the existence trade-offs and the difficult ethical question that is far too often overlooked by policy makers); Crespi, *The Fatal Flaw*, *supra* note 4 at 10706–09 (criticizing the conventional cost-benefit analyses that consistently ignore the pervasive and dramatic person-altering consequences of policies); Crespi, *What's Wrong, supra* note 4, at 10873 (discussing how policy decisions have person-altering consequences and so we have no ethical obligations to future generations who have had their genetic identities significantly altered by those person-altering consequences, since any policy that we might pursue would be a necessary condition of future generation's existence).

6. *See* Crespi, *The Fatal Flaw*, *supra* note 4, at 10705 (criticizing the conventional cost-benefit analyses).

7. Crespi, *A Brief Reflection*, *supra* note 4, at 14 (2009); Crespi, *What's Wrong*, *supra* note 4, at 10880. *See* Crespi, *The Fatal Flaw*, *supra* note 4, at 10708–09 (2008) (criticizing the conventional cost-benefit analyses).

will also, after a relatively short transitional period, even determine who those persons are, i.e., determine the genetic identities of all future persons.[8] The conventional working assumption almost always utilized when conducting cost-benefit analyses, generally implicitly rather than explicitly stated and defended, is that the same future persons with the same genetic endowments will come into existence whether or not a policy is implemented.[9] Under this simplifying assumption the impacts of a policy upon the welfare of those future persons can be measured by comparing the circumstances that they will face if the policy is implemented with the baseline scenario of the circumstances that they will instead face if the policy is not implemented, and then valuing these differences as benefits (or costs) in accordance with those future persons' estimated willingness to pay to enjoy (or to avoid) those policy impacts.[10]

Embrace of the simplifying assumption that genetic identity is exogenous—that the genetic identities of future persons will be unaffected by the policies pursued, which will only affect their wealth—certainly has the advantage that it greatly facilitates assigning valuations to policy consequences, but it is unfortunately an untenable assumption.[11] This assumption is demonstrably false and moreover drastically changes the valuations that are assigned to future policy consequences from what they would have been had they been assessed with regard to a more realistic baseline scenario.[12] The results of a cost-benefit analysis that is done in accordance with this simplifying assumption are therefore essentially irrelevant to the real choices at hand.[13] Unfortunately for cost-benefit analysis, however, the other horn of this dilemma is that if one incorporates the far more realistic recognition of the endogeniety of genetic identity this leads to valuations of policy impacts that are so massively large and so speculative and imprecise as to make any comparisons across policies essentially meaningless.[14] The results of the analyses then will not provide helpful guidance to policy makers, regardless of how rigorously and carefully the valuation calculations are carried out, and regardless of what

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8. Crespi, *A Brief Reflection*, *supra* note 4, at 15–16; Crespi, *The Fatal Flaw*, *supra* note 4, at 10708–09; Crespi, *What's Wrong*, *supra* note 4, at 10880.

9. Crespi, *A Brief Reflection*, *supra* note 4, at 15–16; Crespi, *The Fatal Flaw*, *supra* note 4, at 10710; Crespi, *What's Wrong*, *supra* note 4, at 10878.

10. Crespi, *A Brief Reflection*, *supra* note 4, at 15–16; Crespi, *The Fatal Flaw*, *supra* note 4, at 10710; Crespi, *What's Wrong*, *supra* note 4, at 10879.

11. *See* Gregory S. Crespi, *How Recognizing the Endogeniety of Identity Renders the Discounting Debate Largely Irrelevant*, 30 J. LAND, RESOURCES & ENVTL. L. 75, 75 (2010) (discussing how the typical cost benefit analyses overlook the important endogenous person altering consequences).

12. *Id.*

13. *Id.*

14. *Id.* at 120.

discount rates are then utilized to convert future policy impacts to present value figures.[15]

The problem posed by the endogeniety of identity is quite daunting, and perhaps even fatal, for the usefulness of the cost-benefit methodology.[16] I have written extensively about the significance of the endogeniety of identity problem for cost-benefit analysis and, more generally, for any purely consequentialist evaluative framework that attempts to assess policies solely by considering their consequences for the persons they will affect.[17] In Part II of this article I will first describe this endogeniety of identity problem in greater detail, and then discuss how it renders the cost-benefit methodology particularly unsuitable for the evaluation of climate regulation policies.[18]

To illustrate my point about the conceptual deficiencies of recent scholarly efforts to improve the application of cost-benefit analysis to climate regulation policy, efforts that do not take into account the endogeniety of identity, I will in Part III of this article briefly discuss a few recent and representative examples of climate regulation/cost-benefit analysis scholarship that have been carried out by some of the leading researchers in the area, and that all exhibit this same shortcoming. I will first consider two recent SSRN working papers. One of these papers is by Jonathan Masur and Eric Posner of the University of Chicago, and addresses the question of determining the social cost of carbon emissions,[19] The other paper is by Richard Revesz and Matthew Shahabian of the N.Y.U. Law School, and addresses the more general question of how to properly discount the future policy impacts of various regulatory

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15. *Id.* at 121.

16. *See* Gregory S. Crespi, *The Endogeniety Problem in Cost-Benefit Analysis: Valuing Policies that Alter Preferences or Genetic Identities*, 8 GEO. J. L. & PUB. POL'Y. 91, 118 (2010) (explaining the problem of endogeniety of identity).

17. *See* Crespi, *A Brief Reflection*, *supra* note 4, at 14 (discussing how person-altering consequences render the conventional cost-benefit framework useless); Crespi, *The Fatal Flaw*, *supra* note 4, at 10703–16 (analyzing the controversy over cost-benefit analysis's ability to access programs and policies); Crespi *supra* note 11, at 75 (demonstrating that there is much less at stake than generally realized in the debates regarding how to commensurate the adverse impacts upon existing persons with beneficial impacts upon the members of future generations); Gregory S. Crespi, *Incorporating Endogenous Preferences in Cost-Benefit Analysis*, 17 PENN. ST. ENVTL. L. REV. 157, 179–88 (2009) (elaborating upon an internal critique of the cost-benefit methodology that has significant implications for the assessment of policy consequences by the willingness to pay yardstick); *id*. at 118–32 (discussing how the endogeniety of identity is a more serious problem than the endogeniety of preferences); Crespi, *What's Wrong*, *supra* note 4, at 10884 (acknowledging past contributions on the problem of person altering consequences).

18. *See* sources cited *infra* note 26 (discussing the endogeneity of identity problem and the different cost analyses and the impact on the environment).

19. *See* Masur & Posner, *supra* note 1, at 3–4 (illustrating the social costs of carbon emissions).

alternatives to present values for comparison with their current costs.[20] I will then discuss a recent report by Frank Ackerman and Elizabeth Stanton of the Stockholm Environment Institute that was done for the Economics for Equity and the Environment Network, and which also addresses the social cost of carbon emissions and the question of determining appropriate discount rates.[21] Part IV will present a brief overall conclusion.

II. The Endogeneity of Identity

The noted British philosopher Derek Parfit first articulated in 1976[22] a simple yet profound insight that philosophers have since labeled the "non-identity problem,"[23] and which I will refer to in this article as the

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20. *See* Revesz & Shahabian, *supra* note 2, at 79–82 (expounding on the different discounting methods and comparing them).

21. *See* ACKERMAN & STANTON, *supra* note 1, at 11–17 (discussing the social cost of carbon and different discount rates and proposing a method of calculation).

22. *See* Derek Parfit, *On Doing the Best for Our Children*, *in* ETHICS AND POPULATION 100–15 (M. Bayles, ed. 1976) [hereinafter Parfit, *On Doing the Best*] (discussing the problems with Narveson's person-affecting principle and the differences between policies and how they affect us in the short term and long term); *see also* DEREK PARFIT, REASONS AND PERSONS 351–80 (1984) [hereinafter PARFIT, REASONS AND PERSONS] (developing his insights); Gregory S. Kavka, *The Paradox of Future Individuals*, 11 PHIL. PUB. AFF. 93, 93–112 (1982) (arguing that Parfit's insight was also discovered independently at approximately the same time by Robert Adams and by Thomas Schwartz and citing Robert M. Adams, *Existence, Self-Interest, and the Problem of Evil*, 13 NOÛS 53, 57 (1979) (discussing God's decisions in creating and evaluating actions that shape the future), and also citing Thomas Schwartz, *Obligations to Posterity*, *in* OBLIGATIONS TO FUTURE GENERATIONS 3–13 (Richard Sikora & Brian Barry eds., 1978) (arguing that there's no obligation to distant descendants to limit population growth); Derek Parfit, *Comments*, 96 ETHICS 832, 854 (1986) [hereinafter Parfit, *Comments*] (discussing the Non-Identity Problem); Derek Parfit, *Future Generations, Further Problems*, 11 PHIL. PUB. AFF. 113, 115–17 (1982) [hereinafter Parfit, *Future Generations*] (expanding on his insights).

23. *See, e.g.*, PARFIT, REASONS AND PERSONS, *supra* note 22, at 378 (labeling the problem as the Non-Identity Problem and it is generally so described by other academic philosophers); Anthony D'Amato, *What Obligation Does Our Generation Owe to the Next? An Approach to Global Environmental Responsibility: Do We Owe a Duty to Future Generations to Preserve the Global Environment*?, 84 A.J.I.L. 190, 191 (1990) (regarding Parfit's paradox, it may be preferable to pose the problem as a non-paradoxical though difficult question of determining the ethical and policy valuation implications of policies that have among their other long-term effects pervasive endogeniety of identity consequences); Kavka, *supra* note 22, at 95 (describing the problem as the Parfit Paradox); Doran Smolkin, *Towards a Rights-Based Solution to the Non-Identity Problem*, 30 J. SOC. PHIL. 194, 194 (1999) (illustrating through examples the non-identity problem); David Wasserman, *The Nonidentity Problem, Disability, and the Role Morality of Prospective Parents*, 116 ETHICS 132, 132–33 (2005) (following Hanser and discussing the duties of prospective parents). *See* Lothar Gundling, *What Obligation Does Our Generation Owe to the Next? An Approach to Global Environmental Responsibility: Our Responsibility to Future Generations*, 84 A.J.I.L. 207, 210 (1990) (referring to this insight as "Parfit's paradox"); Edith Brown Weiss, *What Obligation Does Our Generation Owe to the Next? An Approach to Global Environmental*

recognition of the endogeneity of identity.[24] Once one recognizes that identity is endogenous, the inadequacy of any analysis of policy impacts that overlooks this fact is quite clear, although as I will discuss below it is difficult if not impossible to conduct analyses that do meaningfully incorporate the endogeniety of identity. While the endogeniety of identity has fostered substantial (though inconclusive) discussion among philosophers and other scholars over the last three decades at an abstract, academic level regarding its ethical significance,[25] its dramatic practical implications for policymakers in general and cost-benefit analysts in particular have not yet been adequately appreciated.[26]

Responsibility: Our Rights and Obligations to Future Generations for the Environment, 84 A.J.I.L. 198, 204 (1990) (referring to this insight as "Derek Parfit's famous paradox").

24. In my opinion, Parfit's Non-Identity Problem label obscures somewhat the precise nature of the problem for those who are not academic philosophers and are not familiar with the problem and the body of scholarship that it has engendered. I therefore will use in this article the more straightforward descriptive phrase endogeneity of identity.

25. *See, e.g.*, Adams, *supra* note 22, at 57 (discussing God's decisions in creation and evaluating actions that shape the future); Ori J. Herstein, *Historic Injustice and the Non-Identity Problem: The Limitations of the Subsequent-Wrong Solution and Towards a New Solution*, 27 LAW & PHIL. 505, 505–31 (2008) (detailing the problems more recently); Kavka, *supra* note 22, at 93–95 (discussing why we are under no moral obligation to future people to pursue controlled growth policies in order to promote their well-being); Schwartz, *supra* note 22, at 3–4 (arguing that there's no obligation to distant descendants to limit population growth); Smolkin, *supra* note 23, at 194 (illustrating through examples the non-identity problem). *See* Joanna Pasek, *Environmental Policy and 'The Identity Problem'* 1–2 (CSERGE Working Paper GEC 93-13, 2008) (arguing that the identity problem follows logically from assumptions concerning the concepts of harm and personal identity.); James Woodward, *The Non-Identity Problem*, 96 ETHICS 804, 804–31 (1986) (discussing Derek Parfit's treatment of the Non-Identity Problem in part 4 of REASONS AND PERSONS).

26. *See, e.g.*, I. Glenn Cohen, *Intentional Diminishment, the Non-Identity Problem and Legal Liability*, 60 HAST. L. J. 347, 348 (2008) (discussing the problems with Smolensky's arguments in her article); Carter J. Dillard, *Rethinking the Procreative Right*, 10 YALE HUM. RTS. & DEV. L.J. 1, 7 (2007) (seeking to define the procreative right); Michael Laudor, *In Defense of Wrongful Life: Bringing Political Theory to the Defense of a Tort*, 62 FORD. L. REV. 1675, 1676 (1994) (focusing on problems of future interests, the problems inherent in one standard conception of harm, Parfit's solution and his recognition of the shortcomings of the conception of harm, the failures of some attempts to reformulate utilitarianism, and the roots of the problems of future people's interests); Lukas H. Meyer, *The Palestinian Refugees and the Right of Return: Theoretical Perspectives: Historical Injustice and the Right of Return*, 5 THEORETICAL INQ. L. 305, 307–11 (2004) (considering the significance of the endogeniety of identity for the validity of the claims made by the descendants of displaced Palestinian refugees for a right to return to their ancestral homeland); Phillip G. Peters, *Harming Future Persons: Obligations to the Children of Reproductive Technology*, 8 S. CAL. INTERDISC. L.J. 375, 376 (1999) (exploring an alternative way of determining whether an existence inducing act is harmful to children); Eric Rakowski, *Who Should Pay for Bad Genes?*, 90 CAL. L. REV. 1345, 1390 (2002) (discussing the practical implications on policy-makers as well as the effect on insurance arrangements as a result of choosing genes); John A. Robertson, *Procreative Liberty and Harm to Offspring in Assisted Reproduction*, 30 AM. J.L. & MED. 7, 8 (2004) (arguing that even if children are not harmed, other effects or implications of the situation may be relevant in making professional and policy decisions

In this short article I will not attempt to fully articulate or resolve the complex philosophical arguments that have been offered regarding the implications of the endogeniety of identity, although I will reference much of that literature for those philosophically-oriented readers who wish to later explore this problem in a more comprehensive fashion.[27] I will instead discuss the problem in a more condensed and straightforward manner that is intended to be helpful to lawyers, public policy analysts, and academics in other fields who are not deeply versed in these technical philosophical debates, but who nevertheless wish to better understand the endogeniety of identity and its devastating implications for the wisdom of using of cost-benefit analyses for guidance in climate regulation policy.

Parfit has clearly been the primary instigator of and contributor to discussions of the difficulties involved dealing with the endogeniety of identity through several works that he published over the 1976–1986

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about them); Amy J. Sepinwall, *Responsibility for Historical Injustices: Reconceiving the Case for Reparations*, 22 J. L. & POLITICS 183, 190–91 (2006) (considering the significance of endogeniety of identity consequences for the validity of the claims made by the descendants of slaves for reparations payments); Kirsten Rabe Smolensky, *Creating Children with Disabilities: Parental Tort Liability for Preimplantation Genetic Interventions*, 60 HAST. L. J. 299, 300–01 (2008) (examining both intentional tort claims and ordinary negligence claims in the context of preimplantation genetic choices and concluding that intentional tort claims from PSD should not be allowed because Parfit's Non-Identity Problem prohibits the finding of a legally cognizable injury). *See* DANIEL A. FARBER, ECO-PRAGMATISM: MAKING SENSIBLE ENVIRONMENTAL DECISIONS IN AN UNCERTAIN WORLD 151 n.38 (1999); Aaron-Andrew P. Bruhl, *Justice Unconceived: How Posterity Has Rights*, 14 YALE J.L. & HUMAN. 393, 397 (2002) ("[T]he topic of future generations' rights has spawned a growing literature—or, rather, at least two separate literatures, one in law and the other in philosophy, with very little interaction between the two."); Daniel Farber and Jeffrey Gaba, *From Here to Eternity: Environmental Law and Future Generations*, 2003 U. ILL. L. REV. 289, 302 n.69 (2003) (citing quotes made by Derek Parfit on this topic and addressing the problem of endogeniety of identity at least tangentially); Jeffrey M. Gaba, *Environmental Ethics and Our Moral Relationship to Future Generations: Future Rights and Present Virtue*, 24 COLUM. J. ENVTL. L. 249, 258 n.24 (1999) (referring to Anthony D'Amato, *Do We Owe a Duty to Future Generations to Preserve the Global Environment*, 84 AM. J. INT'L L. 190 (1990) (restating argument first put forth by Derek Parfit in Parfit, *On Doing the Best for Our Children*, in ETHICS &POPULATION 100 (M. Bayles ed. 1976))); sources cited *supra* note 17 (citing several articles where I have attempted to contribute to such a fuller assessment, addressing some of the implications of the problem of the endogeniety of identity, but that literature fails to fully incorporate the insights of the philosophers who have addressed the matter). *See also*, Douglas Kysar, *It Might Have Been: Risk, Precaution, and Opportunity Costs*, 22 J. LAND USE & ENVTL. L. REV. 1, 5–6 (2006) (recognizing that this problem does pose "deep conceptual challenges" to any analytical method such as cost-benefit analysis "that is framed in terms of the rights, preferences, or interests of particular individuals").

27. *See* Crespi, *What's Wrong*, *supra* note 4, at 10873–77 (discussing a more comprehensive review of this literature).

decade.[28] The most significant of these efforts were his seminal 1976 article[29] and his more comprehensive 1984 book *Reasons and Persons*,[30] but he has also made other contributions to this debate.[31] Parfit's seminal insight is that virtually any human action, however slight its initial impacts on the actor or on other persons, is likely to have at least minor indirect effects on the precise timing of or other circumstances surrounding some successful acts of sexual reproduction.[32] Given the radically contingent nature of a particular sperm-egg union, these effects will lead to different sperm-egg fertilizations occurring than would otherwise have taken place, and to the subsequent birth of now genetically different persons with different physical endowments and temperaments from those of the persons that would otherwise have been born.[33] These differences will over time lead to exponentially cascading consequences of a genetic identity-altering nature, as these genetically different individuals mature and lead their unique lives and influence the sexual and other behavior of a broader and broader circle of people, leading indirectly to the alteration of the genetic endowments of larger and larger numbers of later conceived persons.[34]

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28. PARFIT, REASONS AND PERSONS, *supra* note 22, at 351–80; Parfit, *Comments*, *supra* note 22, at 854; Parfit, *Future Generations*, *supra* note 22, at 115–17; Parfit, *On Doing the Best*, *supra* note 22, at 100–15.

29. *See* Parfit, *On Doing the Best*, *supra* note 22, at 100–02 (using the hypothetical of a woman deciding whether to postpone pregnancy due to an illness that would result in her child being born with a handicap to illustrate the endogeniety of identity consequences of policies on the people who will be born as a result of those policies).

30. *See* PARFIT, REASONS AND PERSONS, *supra* note 22, at 351–79 (claiming that it may be possible to formulate a valuation approach that appropriately addresses the problem of the endogeniety of identity, and which can justify moral condemnation even of policies that hurt no one).

31. *See* Parfit, *Comments*, *supra* note 22, at 854 (conceding that he was unable to formulate the needed new theory about beneficence that would justify the No Difference View conclusion). This 1986 article was included in an 1986 ETHICS symposium issue focusing on his 1984 book REASONS AND PERSONS, and which also included contributions by Brian Barry, Susan Wolf, Bart Schultz, Shelly Kagan, Bart Gruzalski, Arthur Kuflik and James Woodward. In that article Parfit responded in detail to each of the other symposium contributors' comments on his 1984 book. In particular, Parfit responded in some detail to James Woodward's article, James Woodward, *The Non-Identity Problem*, 96 ETHICS 804, 804–31 (1986) (specifically focusing on the Non-Identity Problem); Parfit, *Future Generations*, *supra* note 22, at 171–72; *see also* Parfit, *Comments*, *supra* note 22, at 854–62 (concluding that policies with person-altering consequences simply cannot be properly evaluated on the basis of whether the results of those policies are better or worse for the rights or interests of future persons).

32. *See* D'Amato, *supra* note 23, at 190–92 (discussing Parfit's paradox and concluding that any attempted altruism on our part to intervene in the environment to help future persons will make those persons incomparably worse off than if we had not intervened).

33. *Id.* at 191.

34. *Id.*

Parfit's insight is rather obvious and hard to disagree with once it is understood, as are many of the more important intellectual achievements of human history, but its consequences for policy analysis are more subtle yet truly momentous. Any social policy that is significant enough in its direct or indirect impact on human behavior to lead to even a single different sperm-egg fusion taking place will create a genetically different individual than the person that would have been born absent the implementation of the policy.[35] Even the most minor and local policy will surely have that much impact on someone's behavior.[36] And over time, as that now genetically different individual is born and matures and over their life influences numerous other people in major or minor ways, this will result in an exponentially spreading cascade of fundamental genetic changes in the population of individuals subsequently conceived.[37] After a relatively short transitional period, in a historical sense, of probably no more than a few decades at the most the genetic identity of all individuals that are conceived and born over the rest of eternity will be fundamentally different from what it would have been in the absence of the policy.[38] The policy will thus have changed the identity of all of those future persons; they will be different people in the most fundamental genetic sense.[39] The entire human population for the rest of eternity will now be composed of individuals that have significantly different genetic endowments from the genetic endowments of those persons that would have come into existence absent that initial action that first led to perhaps only a single different individual being conceived.[40]

Think about this conundrum for a moment. One rather dramatic impact of virtually any policy measure will thus be the elimination of all members of the population of distant future generations that would have been conceived and born absent the implementation of the policy, and their replacement by an entirely different group of people. Stated more succinctly, the genetic identity of all future persons after a relatively short transitional period is endogenous to the policies pursued. From the perspective of those affected, both those persons who will now be conceived and born as a consequence of the policy, and those "persons," if they can be so described, who as another consequence of the policy will now never come into existence, there could not be a more dramatic

35. *Id.*
36. *Id.*
37. *Id.*
38. *Id.*
39. *Id.*
40. *See id.* (discussing how rapidly the endogeniety of identity consequences of a policy will proliferate, and how quickly the genetic divergence will be large enough to be of major significance to the personal identities of the persons affected, will differ from policy to policy).

impact.[41] These endogeniety of identity consequences will completely dwarf in significance for these persons the combined effect of all other policy consequences.[42] These genetic identity consequences as well as the other consequences of a policy therefore obviously need to be taken into account in any comprehensive assessment of its merits, whether that assessment is done through the cost-benefit methodology or otherwise.

Parfit's insight is clearly correct, as a matter of scientific fact,[43] and is an example of what is commonly referred to as the "butterfly effect" of chaos theory[44] where small perturbations in initial conditions can lead to massive overall systemic effects.[45] Parfit was primarily concerned in his philosophical work on the endogeniety of identity with assessing its ethical implications, which he understandably found to be quite disturbing.[46] In

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41. *See id.* (describing how future persons and those who will never come into existence are both affected by changes in the environment).

42. *See id.* (implying that because endogeneity of identity consequences determine whether or not a person will exist, they are of utmost importance).

43. *See id.* at 192 (noting that Parfit's theory is "scientifically accurate, stemming from the discovery in recent years of chaos theory"). This conclusion assumes, of course, that a person's identity is determined by their genetic endowment, or by the physical and cultural circumstances of their lives, or both, rather than determined by some kind of ethereal Cartesian ego or "soul" that is wholly independent of genetic characteristics or physical or cultural influences. I will assume for the purposes of this article that if the genetic endowment of a person is significantly altered as a consequence of a policy this can be regarded as a change in that person's fundamental identity, whereas any consequence of a policy that does not significantly alter a person's genetic endowment, no matter how significant that consequence otherwise is to that person's life, does not change the fundamental identity of that person.

44. *See id.* at 190–92 ("An environmental intervention as slight as a butterfly flapping its wings near a weather station will change long-term weather predictions.").

45. *See id.* at 191 (describing how "our intervention in the environment will make a sufficient impact to assure that different sperm cells will probably fertilize the egg cells in all procreations that take place subsequent to our environmental intervention").

46. Parfit himself is obviously most uncomfortable with the unavoidable implication of his insight that current policies that favor existing persons but that have adverse or even disastrous impacts upon future persons would nevertheless be regarded as beneficial by those future persons relative to their alternative of nonexistence if the policy is not pursued, and thus those policies cannot be criticized on the usual person-affecting basis that they would injure particular people. *See* Parfit, *On Doing the Best*, *supra* note 22, at 102 ("[T]he long-term effects of social policies, even if clearly disastrous . . . won't be worse for particular people. They are thus ignored. . . . a 'person-affecting' principle gives to the further future no weight. This seems indefensible."). Parfit thus demonstrates that he understands the serious problem posed by endogeniety of identity consequences for any utilitarian criterion or related measure such as the Kaldor-Hicks wealth-maximization criterion that attempts to aggregate in some fashion the impacts of policies upon the affected persons. *See id.* at 100 ("Such difficulties [posed by person-altering consequences] may seem to face only utilitarians. This is not so. They face most of those who give any weight to a utilitarian principle."). He is unfortunately somewhat opaque in this brief 1976 essay regarding how this problem should be resolved. He clearly rejects the alternative of simply ignoring the exponentially cascading endogeniety of identity consequences that will

this article, however, I will focus instead upon the implications of the endogeniety of identity for the conduct of cost-benefit analyses for evaluating possible climate regulation policies.

In conventional cost-benefit analyses these important consequences of policies for the genetic identity of future persons are invariably overlooked.[47] The typical cost-benefit analyst calculates both the benefits and the costs of the policy at issue by the yardstick of the willingness to pay of the affected persons, as compared to the reference point of a hypothetical baseline scenario of a world in which the exact same persons will exist, but without experiencing the policy's impacts.[48] This methodology is tantamount to an implicit assumption that personal identity is exogenous; that the same future population of individuals will exist whether or not a particular policy is implemented.[49] But such an assumption is not merely implausible but is demonstrably false, and is equivalent to simply ignoring the fact of the endogeniety of identity.[50] The calculation of costs and benefits relative to an baseline reference scenario that arbitrarily and most implausibly assumes that identity is exogenous renders the conclusions of such an analysis irrelevant to the real choices at hand among the actual consequences that are possible to achieve through the alternative policies under consideration, given the fact of endogeniety of identity.[51]

It might at first appear that this analytical problem is manageable and could be solved simply by more realistically specifying the hypothetical

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generally occur when a policy is implemented, particularly given that the total number of future persons that would be born will also likely be affected as well as their individual identities. *Id.* at 103. He does state that the problem of endogeneiety of identity implies that the long-term consequences of policies should not be determined by their impacts upon the rights and interests of the affected future persons but he does not offer an alternative valuation method. *Id.* at 102.

47. For example, a recent and otherwise rather comprehensive discussion of cost-benefit analysis written by John Graham, who served as the Director of the Office of Information and Regulatory Affairs within the Office of Management and Budget from 2001–2006, does not even mention the problems posed for the viability of cost-benefit analysis by the endogeniety of identity. *See* John D. Graham, *Saving Lives Through Administrative Law and Economics*, 157 U. PA. L. REV. 395, 403 (2008) (proposing that benefit-cost analysis is an appropriate method for informing the promulgation of regulations).

48. *See id.* at 412 (asserting that the original normative foundation for benefit-cost analysis uses "'willingness to pay' money as the measure of social benefit and 'willingness to accept' money as the measure of social cost").

49. *See id.* at 404 (offering approach to benefit-cost analysis that does not mention the fact of the endogeneity of identity).

50. *See* D'Amato, *supra* note 23, at 192 (asserting that endogeneity is a scientific fact).

51. *See id.* ("People encountering Parfit's thesis for the first time are properly skeptical that a minor intervention in the environment can actually result in entirely different individuals in 100 years . . . . But the result is scientifically accurate, stemming from the discovery in recent years of chaos theory.").

baseline scenario used as a reference point for valuing the impacts of the policy at issue. This baseline scenario could, for example, be specified in a manner that recognizes that different future persons would exist were the policy to be implemented and generate its pervasive and eventually universal gene-altering consequences for personal identities, consequences that would not exist were the policy not to be implemented. The valuations of policy impacts would then be calculated in a much more accurate fashion with reference to the actual alternative of non-existence for the persons impacted had the policy not been implemented. Unfortunately, a little further reflection suggests that the problem is not so easily fixable.

Once a cost-benefit analyst eats of the apple of the tree of knowledge, i.e., recognizes that all policies have pervasive and eventually universal consequences for the genetic identities of future individuals, she is put into in a real bind with no good choices available within the standard methodological framework.[52] Continuing to ignore those consequences, given their overwhelming significance to the persons affected relative to all other policy impacts, would be to disregard the comprehensive willingness to pay valuation principle that underlies the cost-benefit approach, and is not an option if one wants to reach results that are relevant to the actual choices at hand.[53] However, if one attempts to incorporate endogeniety of identity consequences into the analysis one runs into the obstacle that there does not appear to be any way to meaningfully estimate in a willingness to pay-based manner the size of the massive benefits to future generations that would result under each of the various policy options under consideration, so as to provide useful guidance for choosing among them.[54]

Let me explain more fully the seemingly insurmountable measurement problem that presents itself.[55] It is immediately apparent that to evaluate the merits of a policy that will have genetic identity-altering consequences for future persons—which a little reflection reveals includes any policy whatsoever given the inevitability of exponentially spreading genetic consequences from even initially very minor effects—the endogeniety of identity will have to be explicitly incorporated in some manner.[56] The

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52. *See* Crespi, *Fatal Flaw*, *supra* note 4, at 10705 ("The basic analytical conundrum presented is that if one attempts to so incorporate these person-altering consequences into a cost-benefit analysis, rather than simply ignoring them, the valuation calculations become so unwieldy and imprecise as to essentially be indeterminate.").

53. *See id.* ("In light of the seemingly insurmountable problems that the willingness-to-pay-based valuation framework faces in meaningfully assessing the significance of person-altering consequences, it may simply be the case that cost benefit analysis should no longer be regarded as a useful analytical tool.").

54. *Id.*

55. *Id.*

56. *See id.* at 10709 (justifying incorporation of person-altering consequences into an analysis because "it will not be adequate merely to apply a time discount to the policy's future impacts, as is now done").

justifications generally offered for discounting future impacts at an appropriate discount rate are not necessarily affected by inclusion of these consequences, but it is now also necessary to sharply differentiate between the policy's future impacts upon existing persons[57] over the rest of their post-policy implementation lives, which do not include alteration of their genetic identities, and the policy's impacts upon future persons,[58] which after a transitional period will include those genetic identity-altering consequences.[59]

There are two distinct groups of future "persons" that will be affected in fundamentally different ways by the consequences of a policy. There is, first of all, the very large group of future persons who will actually be conceived and born over the subsequent course of history as a result of those consequences. For them, the implementation of the policy is a necessary condition of their existence. Second, there is the vastly larger group of what I will here refer to as "potential but now never to be conceived future persons" who would have been conceived and born as a consequence of our pursuing one or another of the potentially unlimited number of alternative courses of action other than the policy at issue, including the null option of taking no action, but who will not be conceived if the policy at issue is implemented.[60]

It is rather obvious that the hypothetical preferences of this second group of untold trillions of potential but now never to be conceived future persons should not be given any weight in a cost-benefit analysis of the policy at issue. With their very existence at stake, each of these future persons would likely regard any specific policy—other than the single policy that would result in their coming into existence—as imposing

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57. By the term "existing persons" I mean to refer broadly to not only those persons who are already born at the time of the policy in question's implementation, but also those persons already conceived but not yet born at that time, as well as those members of the "transitional generations" following the policy who were conceived after the implementation of the policy and whose genetic identity has not yet been significantly altered by the spreading endogeniety of identity consequences of the policy.

58. By the term "future persons" I mean to refer broadly to those persons conceived after the implementation of the policy in question whose genetic identity has been significantly altered by the spreading endogeniety of identity consequences of the policy. For any policy there will be a transitional period of some length during which some but not all persons born will have had their genetic identities fundamentally altered by the consequences of the policy, before those consequences become universal in scope. *See also supra* note 57 and accompanying text (explaining the term "existing persons").

59. This paragraph and much of the following text builds upon George S. Crespi, *The Endogeneity Problem in Cost-Benefit Analysis*, 8 GEO. J.L. & PUB. POL'Y 9, 91–145 (2010).

60. It is perhaps a misnomer to refer to these wholly imaginary "beings" that never will come into existence as being "persons" in any sense whatsoever, but for lack of a better descriptive phrase I will refer to them as such.

immense costs upon them,[61] resulting in a very large if not infinite aggregate cost measure for any specific policy whatsoever that even if heavily time-discounted would dominate any measure of benefits that is utilized. This absurd result of the massive rejection of any course of action whatsoever (including the null option of taking no action) indicates that it would be a category mistake to accord standing to potential but now never to be conceived future persons in an analysis of the consequences of a policy that necessarily precludes their existence. The hypothetical preferences of those future persons who have the potential to exist under one policy alternative or another, but whose existence would be precluded by the specific policy measure under consideration, should be ignored in assessing that policy's effects.[62]

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61. This is under the assumption that offer prices, a more conservative and constrained measure of willingness to pay, are utilized as the approach for measuring willingness to pay. These aggregate costs would likely be infinite if asking price measures rather than offer price measures were utilized.

62. Jeffrey Gaba has insightfully likened this situation to the science fiction motif of an infinite number of universes being generated each instant as our present decisions create multiple alternative futures. Farber & Gaba, *supra* note 26, at 257 n.24. He also draws the analogy to multi-universe interpretations of the probabilistic results of quantum physics. *Id.* He concludes as do I that the adverse impacts of our policies upon this multitude of potential but now never to be conceived persons should be ignored, though not for the reason that I give that their inclusion in the analysis would lead to absurd results, but instead because their competing interests should be regarded as "cancelling out;" cost-benefit analysis should in effect be "renormalized" to eliminate such infinite values in a manner that parallels what physicists do in their quantum mechanics equations. *Id.* Steven Landsburg, in his entertaining book MORE SEX IS SAFER SEX, also addresses to a modest extent the question of how to value the consequences of our actions for yet-unconceived future persons. STEVEN E. LANDSBURG, MORE SEX IS SAFER SEX 238–43 (2007). Landsburg recognizes that our policy choices raise moral questions with regard to their impacts upon yet-unconceived future generations and that these questions are of practical significance for real-world policymaking. *See id.* at 238, 243 ("Do we have any moral obligation to account for the interests of trillions of potential people, who will never have the opportunity to live unless we conceive them?"). He also recognizes the perhaps insurmountable difficulty of these questions. *Id.* at 239 ("Perhaps [we should just admit] . . . that we're incapable of being logically rigorous about issues involving the unconceived."). His analysis, however, appears to regard unconceived future persons as comprising a single large group who can either be conceived or not, depending on what course of action we pursue, rather than recognizing that they actually constitute a vast multiplicity of alternative groups of persons extending through time. *See id.* at 238–39 (referring to future persons generally as the "unconceived"). A policy action leading the conception of one group would necessarily preclude the conception of all of the other groups, necessitating the development of a framework for addressing these stark intra-group conflicts of interest were any rights for unconceived persons to be recognized. Landsburg does not address this difficulty, and consequently does not appear to understand the full significance of endogeniety of identity consequences for policy analysis. *See id.* at 238 (examining the issue of endogeneity in a perhaps more simplistic fashion: "Do we have any moral obligation to account for the interests of trillions of *potential* people, who will never have the opportunity to live unless we conceive them?").

But what about the first group of future persons who *will* be conceived and born post-policy with genetic endowments that are influenced by the policy's spreading effects, for whom the policy's implementation is a necessary condition of their existence? One would expect that at least the overwhelming majority, if not all, of these future persons who would owe their very existence to the implementation of a policy would, if given the opportunity, assign very high offer prices[63] to the policy even were that policy to have some adverse or even catastrophic consequences for their well-being. But these genetic identity-altering consequences of a policy will persist and magnify for all eternity, and it is of course not knowable in advance how many future persons from each era would exist to declare their valuations in such a hypothetical referendum, let alone what the wealth endowment and precise preference structure of each of these future persons would be that would constrain the magnitude of their offer prices. While it will therefore not be possible to precisely calculate these benefits nor ascertain the distribution of the costs and benefits of a policy between existing persons and future persons, it is clear that any policy whatsoever, no matter how broadly catastrophic its long-term impacts, would result in truly massive benefits for those future persons[64] who otherwise would not have been born, benefits that would, even if heavily time-discounted, completely dominate the magnitude of any adverse impacts upon existing persons[65] for the obvious reason that all of the untold trillions of future persons whose hypothetical preferences are being considered would owe their very existence to the implementation of that policy.

So the result is that a cost-benefit analysis of any policy measure whatsoever that takes into account the endogeniety of identity, regardless of the nature of the policy's impacts upon existing persons, will result in massive benefits of highly uncertain magnitude for the combined group of existing persons and future persons. Of what use, if any, would such an analysis be for policymakers in choosing among alternatives?

Consider, for example, a radically present-oriented proposal to put all of our high-level radioactive wastes into ordinary steel barrels that will not provide effective long-term containment beyond a century or two and then dump them all overboard into the Pacific Ocean.[66] This policy would free

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63. And likely infinite asking prices if asking prices are the willingness to pay-based measure utilized for the valuations.

64. This is true even if one uses more restrictive offer price measures that are limited by people's wealth endowments, rather than potentially unlimited asking price measures of these benefits.

65. I am assuming that future persons are psychologically similar to existing persons in that they would essentially unanimously prefer life under even quite difficult circumstances over non-existence.

66. This particular hypothetical is analyzed in some detail in my earlier articles on the subject. *See* Crespi, *Fatal Flaw*, *supra* note 4, at 10710–11 ("For those untold trillions of

billions of dollars of resources now devoted each year to radioactive waste storage efforts to be diverted to other pressing social needs.[67] While those future persons born several centuries from now and thereafter may well suffer very significant adverse environmental consequences from such an action, the multi-billion dollar current resource reallocations that such a policy would allow would have cascading genetic identity-altering consequences that would surely be universal in scope well before those barrels began to leak their poisons.

As previously discussed, those potential but now never to be conceived future persons who as a result of those resource reallocations will not be born should not be accorded standing in a cost-benefit analysis of the ocean waste dumping policy.[68] The future persons that will be born as a genetic identity-altering consequence of that ocean waste dumping policy would owe their very existence to it. If they could be asked for their opinions about the policy, if they are at all like existing persons in their psychological make-up they would surely overwhelmingly (if not unanimously) prefer coming into existence, even if their lives involved grappling with a serious radioactive waste problem, to nonexistence. They would of course much prefer existence without the radioactive waste problem, were that an option that could be chosen, but the central insight that comes from recognizing the endogeniety of identity is that this is not possible. The only choice that those future persons should be hypothetically presented with for cost-benefit valuation purposes is the bundled Hobson's Choice of life with the radioactive waste problem or nonexistence, and if they are at all like existing persons given this choice they would assign very large benefits to the policy, however those benefits are assessed.

The ocean waste dumping policy will therefore be very favorably judged by a cost-benefit analysis that incorporates the endogeneity of identity, since at least most of the existing persons who will surely be dead long before the wastes leak into the environment and cause adverse biological consequences would be on balance be net beneficiaries of the large resource reallocations thereby made possible by the policy,[69] and the

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future persons whose identity will be affected by those consequences of a policy, the policy is a necessary condition of their existence. Its impacts will thus be valued very highly by those persons as against their actual alternative of non-existence."); Crespi, *What's Wrong, supra* note 4, at 10873, 10881 ("These future persons that will be born as a consequence of that ocean dumping policy would owe their very existence to it.").

67. *See* Crespi, *What's Wrong*, *supra* note 4, at 108703 (noting who dumping nuclear waste into the Pacific Ocean in reinforced steel barrels would save billions of dollars).

68. *Supra* note 60 and accompanying text.

69. I concede that there may well be existing persons who empathize sufficiently with the environmental problems that the ocean waste dumping policy may cause for the members of distant future generations that they would regard the policy as imposing net costs on themselves, despite the more immediate and tangible benefits that may accrue to

long parade of generations of future persons for whom the policy is a necessary condition of their existence could be plausibly assumed to chime in with declarations of truly massive benefits, although of very uncertain magnitude in the aggregate. As I have already made clear, however, any other policy proposal would also receive a ringing endorsement, even those policies that are broadly disfavored by existing persons, since the cost-benefit calculations would invariably be dominated by the benefits resulting for the vast horde of members of distant future generations for whom the particular policy at issue would be a necessary condition of their existence.

As another example particularly relevant to the subject of this article, consider any of a number of possible policies that would each impose in some significant fashion limitations on fossil fuel use in order to reduce carbon emissions, in an attempt to reduce long-term global warming. The substantial current costs imposed by any of those policies would obviously have significant and quickly universal consequences for the genetic identities of future individuals.[70] Each possible policy that might be pursued would be a necessary condition of the existence of the particular parade of the untold billions of future persons who would later conceived and born as a consequence of that policy.[71] Those persons would doubtless each offer very large positive valuations of that policy, since their actual alternative for comparison would be non-existence. These valuations in the aggregate, even if heavily time-discounted to a much smaller present value figure, would still certainly total gazillions of dollars and would completely dominate the current costs imposed by the policy regardless of their magnitude. Such an indiscriminate and imprecise blanket endorsement of all policy options whatsoever, regardless of their current costs, obviously would not provide climate regulation policymakers with any useful guidance as to which of these various policies, if any, should be pursued.

The valuation problem posed for cost-benefit analysis by the endogeniety of identity is thus squarely posed, and is revealed to perhaps be insurmountable.[72] For any policy measure whatsoever, for those untold billions of future persons who will come into existence over time as a result of the implementation of that particular policy the policy is a necessary condition of their existence. Its impacts will thus be valued very highly by those persons, as against their actual alternative of nonexistence. The

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them from the resource allocation savings. However, I feel confident that on balance the net costs this policy would impose on these unusually empathetic persons will be substantially outweighed by the net benefits for the large number of existing persons whose empathetic time horizons do not span as far into the future as several centuries or more.

70. *Supra* note 62 and accompanying text.

71. S*upra* note 62 and accompanying text.

72. *See* Crespi, *Fatal Flaw*, *supra* note 4, at 10712 ("[A]ttempting to value those person-altering consequences in the usual willingness-to-pay-based manner unfortunately leads to the cost-benefit analysis 'blowing up.'").

conventional practice of valuing the consequences of a policy as compared to the hypothetical baseline scenario of a world in which those same persons would exist, but without experiencing the policy's impacts, makes no sense at all since such an alternative scenario under which those same persons would still exist could not possibly occur. Willingness-to-pay-based assessments of benefits for future persons that are derived in such a fashion are completely arbitrary and irrelevant.

Moreover, assessments so derived are not only arbitrary but are also likely to be biased downwards, in some instances dramatically so. This is because for some policies (such as the ocean waste dumping hypothetical that I have discussed above) many future persons would presumably strongly prefer the unattainable scenario in which they are presumed to still exist, but without experiencing the adverse impacts of the policy at issue, as compared to the world that would actually result for them from the policy's consequences.[73] Under that particular hypothetical comparison those future persons would then likely assign costs rather than very large benefits to the policy's consequences, leading in the aggregate to a massive undervaluation of the future effects of the policy as compared to its valuation if those future persons were to assess it as against their actual alternative of nonexistence.

So the endogeniety of identity can no longer be credibly ignored in policy assessment. But as noted the other horn of the dilemma is that cost-benefit analyses that incorporate the endogeniety of identity, but still attempt to value future consequences in the usual willingness to pay-based manner, will generate unhelpful results since all policy options will now result in truly massive future benefits[74] that even if very heavily time-discounted will still completely dominate any adverse effects of any of the policies upon existing persons.[75] A valuation methodology that essentially ignores adverse policy impacts on existing persons, no matter how substantial they may be, is rather ridiculous. Moreover, those future benefits are simply not measurable with sufficient precision to allow the alternative policy options to be meaningfully compared and ranked.

My criticisms of cost-benefit analysis may appear somewhat harsh, but I do not intend to suggest that cost-benefit analysts have been acting in conscious bad faith when they have used inappropriate and irrelevant baseline scenarios as the standard of comparison in their analyses. I believe

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73. *Supra* note 66 and accompanying text.

74. This is true even if more constrained offer prices measures of willingness to pay are utilized. Policies will clearly all result in infinite net benefits if asking price measures of willingness to pay are utilized, given the endogeniety of identity.

75. *See* Crespi, *Fatal Flaw*, *supra* note 4, at 10712 ("This endogeneity problem may well be fatal to cost-benefit analysis . . . because of the pervasiveness and significance of person-altering consequences meaningful policy recommendations cannot be formulated solely on the basis of conventional secular and consequentialist ethical premises and their willingness-to-pay-based valuation corollary . . . .").

that their failure take into account the endogeniety of identity in their analyses has been due primarily to their overlooking that fact, rather than due to their deliberately and covertly choosing to ignore it in light of its adverse consequences for the relevance of their methodology. There is apparently a general lack of familiarity among cost-benefit analysts with the work of Derek Parfit and other philosophers who have wrestled with the implications of the endogeniety of identity. Nevertheless, it is high time that it become more widely recognized that the endogeniety of identity renders completely inapposite the use of cost-benefit analysis in any context where one wants to take into account the impacts of policies on future persons as well as on existing persons, which is of course very much the case in evaluating climate regulation policies.

III. Some Recent Discussions of the Application of Cost-Benefit Analysis to Climate Regulation

The essential defining feature of cost-benefit analysis is its use of a willingness to pay metric for valuing the costs and benefits of the policy under consideration.[76] Recent scholarship that attempts to assess and improve upon the application of cost-benefit analysis to the difficult questions posed by climate regulation policies unfortunately consistently overlooks the severe problem posed by the endogeniety of identity for efforts to apply the willingness to pay valuation metric to evaluate the long-term future consequences of such policies.[77] That work generally fails to point out the inadequacy of cost-benefit analyses that try to avoid this problem by explicitly or implicitly assuming that genetic identity is exogenous with regard to the policies under consideration.[78]

I will discuss below three recent examples of this work that all evidence this major shortcoming. First, I will consider two SSRN working papers, one by Jonathan Masur and Eric Posner of the University of Chicago that is titled *Climate Regulation and the Limits of Cost-Benefit Analysis*,[79] and the other by Richard Revesz and Matthew Shahabian of the NYU Law School and that is titled "Climate Change and Future Generations."[80] I will also consider a recent report by Frank Ackerman and Elizabeth Stanton of the Stockholm Environment Institute, titled "The

76. *Supra* note 48 and accompanying text.

77. *See generally* Masur & Posner, *Climate Regulation*, *supra* note 1 (discussing how cost-benefit analysis is particularly challenged by climate change regulation).

78. *See id.* (ignoring the issue of endogeneity).

79. *Supra* note 48 and accompanying text.

80. Revesz & Shahabian, *supra* note 2, at 3–4 (arguing that the risks of climate change, proper discount rates, and existing studies justify a higher social cost of carbon than the Obama Administration's estimate of $21 per ton).

Social Cost of Carbon," that was done for the Economics for Equity and the Environment Network.[81]

A. The Masur and Posner Paper

This recent SSRN working paper by Jonathan Masur and Eric Posner[82] promises to be highly influential for several reasons. First of all, it identifies and discusses a surprisingly large number of recent U.S. federal government regulatory initiatives that have been undertaken to address the global climate change implications of carbon dioxide and other greenhouse gas emissions,[83] and also discusses in some detail an important Office of Management and Budget-sponsored Interagency Working Group report regarding the social cost of carbon emissions[84] that has influenced many of these regulatory initiatives, and this report and most of these regulatory initiatives have yet received little if any comment in the law review literature.[85] Second, it provides a thoughtful and powerful critique that points out the inadequacies of the recent efforts of various government regulatory agencies to utilize the technique of cost-benefit analysis to establish the social cost of carbon emissions so as to provide a yardstick for assessing the benefits of various regulatory restraints on such emissions.[86] Finally, Eric Posner is a widely read and highly respected scholar in this area, and his pronouncements will certainly be influential in shaping the subsequent academic and regulatory discourse.[87]

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81. ACKERMAN & STANTON, *supra* note 1, at 1 (evaluating justifications for intergenerational discounting, finding that such discounting diverges from financial market analysis, and recognizing the importance of moral theory in climate change decisions).

82. *See* Masur & Posner, *supra* note 1 (discussing climate change in an article available on the Social Science Research Network ("SSRN")).

83. *See id.* at 2 (introducing some recent actions taken by the U.S. federal government regarding climate change policy).

84. *See id.* at 4, 12–15 (analyzing recent studies concerning the social cost of carbon emissions and climate change).

85. *See id.* at 2 (describing various regulatory activities of the U.S. federal government regarding climate change and the scholarly reaction to those activities).

86. *See id.* at 17–32 (criticizing recent governmental efforts to use cost-benefit analysis in regulating carbon emissions).

87. *See e.g.*, MATTHEW D. ADLER & ERIC A. POSNER, NEW FOUNDATIONS OF COST-BENEFIT ANALYSIS 1–9 (2006) (describing cost-benefit analysis); Matthew D. Adler & Eric A. Posner, *Implementing Cost-Benefit Analysis When Preferences are Distorted*, 29 J. LEG. STUD. 1105, 1105–08 (2000) (criticizing some cost-benefit analysis methodologies); Matthew D. Adler & Eric A. Posner, *Rethinking Cost-Benefit Analysis*, 109 YALE L. J. 165, 167–69 (1999) (arguing for a new approach to the use of cost-benefit analysis); Jonathan A. Masur & Eric A. Posner, *Against Feasibility Analysis*, 77 U. CHI. L. REV. 657, 657–62 (2010) (criticizing feasibility analysis); Eric A. Posner, *Controlling Agencies with Cost-Benefit Analysis*, 68 U. CHI. L. REV. 1137, 1137–42 (2001) (discussing the use of cost-benefit analysis in policy-making); Eric A. Posner & Cass R. Sunstein, *Dollars and Death*, 72 U. CHI. L. REV. 537, 537–43 (2005) (analyzing the downsides of cost-benefit analysis).

Masur and Posner's overall assessment of U.S. government efforts to utilize cost-benefit analysis to guide climate regulation initiatives is knowledgeable and sympathetic, but is on balance relatively critical.[88] They are generally supportive in principle of the use of cost-benefit methodology for routine administrative policy evaluation, although they are well aware of and responsive to many of the various criticisms that have been directed at that approach.[89] They conclude, however, that U.S. regulatory agencies have been evasive in their analyses of climate regulation policies in that they have generally offered only a very broad range of estimates for the social costs of carbon emissions, rather than advancing a more useful and definitive point estimate, and moreover have then subsequently largely disregarded their own calculations when assessing their regulatory initiatives.[90] They also conclude that those agencies have failed to address a number of serious political issues that arise in such cost-benefit analyses with regard to valuing the impacts of climate regulations due to the global nature of climate change,[91] and that further Congressional or Presidential Executive Order action is necessary to resolve these political questions and allow the agencies to focus their efforts on addressing the difficult technical problems that are involved in accurately establishing the social cost of carbon emissions.[92]

Masur and Posner's paper provides a very useful late-2010 snapshot of U.S. regulatory efforts to address the problem of carbon dioxide emissions and their climate change implications, and their critique of the ways in which cost-benefit analyses have been conducted and their results applied in this area is insightful.[93] Unfortunately, however, their critique overlooks the key point that all of the cost-benefit analyses that they refer to ignore the fact of the endogeniety of genetic identity relative to the policies being assessed, and that those analyses consequently reach results that are, as I have discussed in Part II above, irrelevant to the real choices at hand.[94] By not calling attention to this severe deficiency, Masur and Posner also implicitly accept without defending the legitimacy of the conventional cost-

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88. *See* Masur & Posner, *supra* note 1, at 17 (describing the U.S. government's climate change policies).

89. *See id.* at 17, 32–34 (analyzing the pros and cons of cost-benefit analysis in government policy-making).

90. *See id.* at 4, 15–16, 35 (discussing the U.S. government's analysis of the social costs of carbon emissions and the regulation thereof).

91. *See id.* at 25–35 (describing the political issues surrounding climate change policy).

92. *See id.* at 25–35 (criticizing the U.S. government's response to global climate change and recommending a course of action for the U.S. government).

93. *See id.* at 6–16 (describing the U.S. federal government's recent regulations of carbon emissions).

94. *See id.* at 32–34 (criticizing the cost-benefit analysis methodology currently being employed in climate change policy).

benefit valuation framework that rests upon comparing policy consequences with a demonstrably unattainable and thus completely arbitrary and irrelevant baseline scenario.[95] All of their recommendations are directed towards improving the accuracy of the cost-benefit valuations that are calculated with regard to this baseline, and then making better and more politically defensible use of these more accurate valuations.[96]

But as I have discussed above, the immense measurement error that is introduced by an analyst initially making entirely wrong comparisons—by their contrasting the consequences of a policy for future persons to an arbitrary and unattainable baseline scenario that also assumes the existence of those persons without the policy, rather than the actual alternative of those future persons' non-existence if that policy is not pursued, given the endogeniety of identity—is so large that it renders trivial any gains in accuracy that might be obtained by making more technically accurate and politically defensible valuations of these comparisons such as Masur and Posner recommend.[97] The cost-benefit studies that Masur and Posner critique and seek to improve are all fundamentally flawed by their incorrect initial assumptions as to the relevant comparisons, and this is a difficulty that cannot be adequately addressed simply by obtaining more accurate measurements of those inapt comparisons.[98] This conventional cost-benefit methodology that is utilized by regulatory agencies would continue to be fatally flawed even if the substantial technical and political difficulties that are presented by the application of this methodology to climate regulation, and that are well described by Masur and Posner, were to be somehow overcome.[99]

Masur and Posner's efforts would have been more helpful for formulating sound climate regulation policies if had they first attempted to put forward and justify modifications of the conventional cost-benefit analytical framework sufficient to properly reflect the endogeniety of identity, before then addressing the somewhat less difficult, although still formidable, technical and political issues inherent in attempts to measure the social cost of carbon once the proper framework of comparison has been delineated. Alternatively, and more radically, they might have advanced an entirely different normative framework for evaluating proposed climate regulations that does not focus, as does cost-benefit analysis, upon those regulations' impacts upon specific future persons and thereby unavoidably raise these endogeniety of identity difficulties. I

95. *See id.* at 6–34 (analyzing the drawbacks of cost-benefit analysis in social policy).

96. *See id.* at 4–6 (outlining the objectives of Masur and Posner's paper).

97. *See id.* at 32–35 (recommending the U.S. government take a more accurate and politically defensible cost-benefit analysis approach to climate change).

98. *See id.* at 32–34 (criticizing cost-benefit analysis methodologies).

99. *See id.* at 17–34 (discussing the numerous technical and political difficulties underlying regulatory agencies' cost-benefit analyses of climate change).

unfortunately do not have such a non-consequentialist evaluative framework ready at hand to offer, and moreover I am rather skeptical whether one can ever be developed that would obtain widespread support across groups of persons with diverse philosophical and theological beliefs. Nevertheless, it is clear that using conventional cost-benefit methodology, with its implicit assumption that policies do not affect genetic identity, to guide climate regulation policy, is simply not credible in light of the demonstrable endogeniety of identity even were the severe measurement and political difficulties presented by its application and well-described by Masur and Posner to be adequately addressed.[100]

B. The Revesz and Shahabian Paper

This second SSRN working paper by Richard Revesz and Matthew Shahabian also promises to significantly influence the climate regulation policy debate.[101] First of all, it provides a thoughtful and comprehensive discussion of the analytical complexity and moral aspects involved in discounting policy benefits to future generations relative to current costs and benefits.[102] The use of such intergenerational discounting is obviously a critical aspect of any cost-benefit analysis that purports to compare the long-term benefits for future persons of a climate regulation policy with its current costs and benefits. Second, Richard Revesz is one of the world's leading scholars with regard to the philosophical and practical questions presented by attempts to discount future policy consequences, and his thoughts on these questions as they arise in the climate regulation context will certainly be given substantial weight by other important participants in these discussions.[103]

Revesz and Shahabian argue that all of the current justifications offered for discounting the costs and benefits of policies for future persons, before those costs and benefits are then compared to the policies' current costs and benefits, are fundamentally flawed in that they inadequately reflect the nature and complexity of our moral obligations to future

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100. *See id.* at 17–34 (describing the technical and political difficulties of using cost-benefit analysis to develop climate change regulatory policy).

101. *See* Revesz & Shahabian, *supra* note 2, at 1 (discussing the significance of the author's work).

102. *See id.* (outlining Revesz and Shahabian's technical and moral criticisms of discounting techniques).

103. *See, e.g.*, RICHARD L. REVESZ & MICHAEL A. LIVERMORE, RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH 10–20 (2008) (discussing how cost-benefit analysis has become increasingly used by the U.S. federal government); Richard L. Revesz, *Environmental Regulation, Cost-Benefit Analysis, and the Discounting of Human Lives*, 99 COLUM. L. REV. 941, 941–1017 (1999) (criticizing the use of cost-benefit analysis in environmental regulation).

generations.[104] In their paper, they classify the justifications commonly offered for discounting future costs and benefits at a specific discount rate into one of four categories.[105] The first category of justifications for such discounting they label "prescriptive pure time preference discounting" justifications, and these justifications are based upon the embrace of one or another underlying ethical norm regarding the weight that current generations should accord to the interests of future generations.[106] The second category they label "descriptive pure time preference discounting" justifications, and these justifications are based upon empirical evidence regarding the choices that people actually make between consumption and savings for the future.[107] Their third category, which they call "opportunity cost discounting" justifications, are justifications based upon consideration of the opportunity costs involved in pursuing a particular policy.[108] Finally, what they label as "growth discounting" justifications are those justifications based upon the observation that since future generations are very likely to be wealthier than current generations, even if those future generations should be treated equally with current generations from an ethical standpoint, discounting future benefits may still be justified on the basis of the diminishing marginal utility of wealth.[109]

Revesz and Shahabian consider and reject each of those justifications for discounting future benefits as providing inadequate support for the use of a specific discount rate in the context of the long-term effects of climate regulation policies.[110] Their analysis is extensive and merits a close

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104. *See* Revesz & Shahabian, *supra* note 2, at 1 (introducing a moral critique of the discounting methods currently employed by climate change policy-makers).

105. *See id*. at 4, 5–7 (outlining and comparing the alleged justifications for using discounting methodology in climate change policy).

106. *See id*. at 9–12 (describing the first of three categories of justifications for using discounting methodology in climate change policy).

107. *See id*. at 12–14 (describing the second of three categories of justifications for using discounting methodology in climate change policy).

108. *See id*. at 15–16 (defining "opportunity costs" as the foregone benefits of a future generation that will result from attempts to benefit that future generation through climate change mitigation).

109. *See id*. at 14–15 (using a formula for the rising discount rate which equals the rate at which per capita consumption grows multiplied by the elasticity of marginal utility gained from an extra unit of consumption, which is a measure of society's "aversion to income inequality").

110. *See generally id*. (summarizing each consideration and rejection of the various justifications); *infra* notes 112–115 and accompanying text (same). They also briefly discuss in their paper the concept of "hyperbolic" discounting, which is a method of discounting whereby future benefits are discounted by a discount rate that gradually declines over time, rather than by a conventional single discount rate that remains constant over time. *Id*. at 17–22. However, they do not regard this form of discounting as resting upon justifications that are independent of the four categories of justifications that they do discuss, but only as a particular application of discounting that would also have to be defended by one or another of those four possible categories of justifications. *Id*. at 22.

reading, and I will not attempt to summarize their reasoning in this short article. Their overall conclusions, however, can be succinctly stated. They conclude that discounting benefits to future generations at any particular discount rate merely because those persons will live in the future rather than in the present is ethically indefensible,[111] that the descriptive pure time preference justification for discounting future benefits inappropriately conflates intrapersonal savings choices with intergenerational decisions,[112] that the opportunity cost discounting justification for discounting future benefits ignores potential irreversibilities of climate change and the rising costs of mitigation measures,[113] and that the growth discounting justification inappropriately conflates environmental goods with consumption goods.[114] Their overarching conclusion is that the choice of a discount rate for a cost-benefit analysis that is based on one or more of these justifications "cannot substitute for a moral theory setting forth our obligations to future generations."[115] This discount rate choice is, in their view, not just a technical matter, but is a broader decision that has fundamental, philosophical, and moral ramifications.[116]

The Revesz and Shabian paper presents a sophisticated analysis and forceful critique of the various justifications that are usually offered (or just implicitly assumed) for the choice of a particular discount rate when a cost-benefit analyst attempts to compare the costs and benefits of a policy for future generations with its current costs and benefits.[117] However, the relevance of their discount rate analysis to the issues presented by climate regulation policy is unfortunately badly undercut by the fact that their analysis is limited to considering the appropriate discount rates to apply to discount the future benefits of a policy when those benefits are calculated with regard to the conventional baseline scenario that assumes the exogeniety of identity; that assumes that if the policy were not pursued then

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111. *See id.* at 79 (arguing that "prescriptive pure time preference discounting is inconsistent with moral intuitions and has little support even among economists").

112. *See id.* at 80 ("The savings rate is not useful as revealed preferences for how society sees its obligations to the future—both because the savings rate does not capture all intergenerational transfers and because of its wide disparity with stated preferences of our obligations to future generations.").

113. *See id.* at 80–81 (explaining that certain investments may reduce mitigation costs; however, "that may be more than offset if future generations are stuck with irreversible, catastrophic damage, or are even forced simply to spend significantly more on climate change mitigation in the future because current generations decided not to").

114. *See id.* at 81 (arguing that future generations are actually likely to value environmental improvements more than current generations, and the discount formula should be adjusted to reflect this).

115. *Id.* at 1; *see also id.* at 82 (discussing the same point in further detail).

116. *Id.* at 1.

117. *See generally supra* notes 104–113 and accompanying text (summarizing their analysis and critique of these justifications).

those same future persons would still come into existence, but now not experience the impacts of the policy.[118] They do not explicitly state and defend the reasonableness of this exogeniety of identity assumption, but their embrace of this assumption is implicit throughout their paper,[119] and while their work is otherwise comprehensively documented, they make no attempt to rebut or even cite to the arguments offered by Derek Parfit and others as to the endogeniety of identity and its implications.[120]

As I have discussed above, however, cost-benefit analyses that attempt to value future benefits through making such an inapt comparison of a policy's projected consequences with the reference point of an irrelevant and demonstrably unattainable baseline scenario that wrongly presupposes that genetic identity is exogenous will result in arbitrary, misleading, and ultimately useless benefit measures.[121] It is somewhat misguided to then expend substantial efforts to determine how to most appropriately discount such essentially meaningless future cost and benefit figures that have been calculated at the outset through such a flawed measurement approach. The consequences of a policy for future persons should first of all be valued with regard to the actual alternative of those persons' non-existence, were that policy not to be pursued. Only then can one meaningfully address the also important but distinctly secondary questions of why and how those future impacts should then be properly discounted, if at all, before their aggregation with the current impacts of the policy.

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118. *See* PARFIT, REASONS AND PERSONS, *supra* note 22, at 351–79 (elaborating even further on previous discussions that emphasize taking into account whether or not persons in a future generation will exist because of the pursuit or non-pursuit of a particular policy when determining whether that policy is morally defensible); Kavka, *supra* note 22, at 95–96 (echoing Parfit's thesis concerning the flaw in assuming endogeneity of identity, but also not labeling it as such); Parfit, *Future Generations*, *supra* note 22, at 171–72 (continuing his earlier analysis and that of Kavka and ultimately concluding that a person-affecting principle should not be used when determining the rightness or wrongness of a particular policy's impact on a future generation); Parfit, *On Doing the Best*, *supra* note 22, at 100–09 (discussing the problems associated with assuming endogeneity of identity, but using a different label for the term); *see also* discussion *supra* Part II (summarizing the concept of endogeneity and why it should be assumed as the baseline scenario rather than exogeneity of identity).

119. *See generally* Revesz & Shahabian, *supra* note 2 (defending their critique of the various justifications for discounting the rate at which the future benefits of a particular climate change policy is converted to present value without accounting for persons who exist solely as a result of not pursuing that particular policy).

120. *See, e.g.*, PARFIT, REASONS AND PERSONS, *supra* note 22 at 351-81 (articulating and defending the concept of endogeneity of identity, but using a different label for the term); *supra* note 118 (same); *but cf.* Revesz & Shahabian *supra* note 2, at 41 n.148 (referring to Derek Parfit's 1984 book REASONS AND PERSONS, but citing that work for other reasons, and not for Parfit's discussion of the endogeniety of identity and its various ethical and analytical implications).

121. *See* discussion *supra* pp. 238–239 and accompanying notes (discussing this point in greater detail).

It would have been more helpful for formulating sound climate regulation policies had Revesz and Shahabian focused their analysis of discounting justifications[122] upon the discounting of the estimates of future costs and benefits that would be obtained under the far more realistic assumption that those future persons impacted by a policy would never have been conceived and born had the particular policy under consideration not been implemented. Those aggregate benefits to those untold billions (or even trillions) of future persons for whom the particular policy in question is a necessary condition of their existence are obviously going to be truly massive if measured by the usual cost-benefit analysis willingness to pay metric (as will also be the benefits of pursuing the null option of taking no action), and those benefits will consequently completely dominate the current costs of that policy, even if those costs are quite large, unless very high discount rates—such as, for example, triple-digit annual rates (!)—are applied to those future benefits. The pressing cost-benefit analysis discount rate question that therefore needs to be answered is whether one can justify the use of such extremely high discount rates that would to reduce these truly massive future benefits, when discounted, to a size roughly commensurate with the current costs of various policies, so that the results of cost-benefit analyses might then possibly provide some meaningful discrimination among policy alternatives and as compared to the null option of inaction. The implicit focus of Revesz and Shahabian's work, however, is a much different and practically somewhat irrelevant question.[123] Their focus is on which, if any, of the various and far smaller single-digit annual discount rates that are now commonly used in conventional cost-benefit analyses can be somehow justified with regard to the long-term future consequences of climate regulation policies,[124] or whether instead the use of a zero or near-zero discount rate is called for, when those future consequences that are to be discounted have been measured against a baseline scenario that assumes the exogeniety of identity.[125] They are

122. *See generally* Revesz & Shahabian, *supra* note 2 (examining discounting for time preference on the basis of ethical norms, discounting for time preference because that is how people treat the future, discounting because future generations will be richer, and discounting because of opportunity costs); *see also supra* text accompanying notes 104–116 (summarizing their conclusions concerning the justifications for the various discount rates).

123. *See supra* text accompanying notes 118–121 (explaining the question on which Revesz and Shahabian focus in their article); *see also* Crespi *supra* note 11, at 94 (concluding that since the future impact of policies will significantly alter the genetic identities of members of future generations, discounting issues will only have minor importance on valuations in the cost-benefit analysis and are therefore irrelevant).

124. *See supra* notes 105–114 and accompanying text (summarizing Revesz and Shahabian's analysis of the justifications for these discount rates).

125. *See supra* notes 118–121 and accompanying text (elaborating on the concept of exogeneity of identity and discussing why using it as a baseline scenario for evaluating justifications for discount rates is a flawed approach to the overall inquiry).

particularly interested in focusing attention on two recent and influential studies of climate change policy, THE STERN REVIEW: REPORT ON THE ECONOMICS OF CLIMATE CHANGE,[126] by Sir Nicholas Stern, and William Nordhaus's A QUESTION OF BALANCE,[127] that utilized very different single-digit annual discount rates,[128] and consequently reached very different recommendations as to what climate regulation measures would be cost-justified.[129] But the Stern and Nordhaus studies both incorrectly valued the benefits of climate regulation measures under the implicit assumption of the exogeniety of identity,[130] so the question of whether either of these studies then used an appropriate discount rate to adjust those radically incorrect future cost and benefit valuations is not of great interest.[131]

While some of Revesz and Shahabain's analysis of the various justifications offered for discounting future policy consequences[132] may well be relevant in some regards for answering the real question as to whether very high discount rates can ever be justified to apply to the future benefits of policies that are estimated under more realistic endogeniety of identity assumptions,[133] they unfortunately do not attempt to apply their analysis in the context of those more realistic assumptions, so it is unclear exactly what weight they would give to these various technical and moral concerns that they raise in the very different context of an assumed exogeniety of identity.[134]

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126. *See generally* Sir Nicholas Stern, THE STERN REVIEW: THE ECONOMICS OF CLIMATE CHANGE (2007) (discussing the effect of global warming on the world economy).

127. *See generally* William Nordhaus, A QUESTION OF BALANCE: WEIGHING THE OPTIONS ON GLOBAL WARMING POLICIES (2008) (analyzing the economic and ecological dynamics of greenhouse gas emissions and mitigation efforts).

128. *See* Revesz & Shahabian, *supra* note 3, at 7 (observing that Stern advocates a low discount rate and Nordhaus advocates a high discount rate).

129. *See id.* (observing that Stern advocates aggressive steps to stop climate change and Norhaus advocates "a more measured response" to climate change).

130. *See* Nordhaus, *supra* note 72, at 165–91 (discussing his approach to discounting benefits in assessing climate change policies without considering the identity of persons who exist solely because a particular policy was or was not pursued); Stern, *supra* note 71, at 35–37 (same).

131. *See* Crespi, *supra* note 1, at 94 (discussing that an analysis that assumes the exogeneity of identity makes inquiries into various discount rates irrelevant); *supra* note 66 and accompanying text (overviewing Crespi's ocean dumping hypothetical).

132. *See supra* notes 105–114 and accompanying text (summarizing Revesz and Shahabian's analysis on the various justifications for discounting future policy consequences).

133. *See supra* Part II (providing a more detailed analysis of why assuming endogeneity of identity is a more realistic assumption).

134. *See supra* text accompanying note 118 (defining the concept of exogeneity of identity).

C. The Ackerman and Stanton Report

The third illustrative example of recent climate regulation scholarship that I would like to discuss and criticize is a short report titled "The Social Cost of Carbon" that was prepared by Frank Ackerman and Elizabeth Stanton for the Economics for Equity and the Environmental Network.[135] This report should also be influential in policy circles because Frank Ackerman, for a number of years, has been one of the leading critics of the use of cost-benefit analysis to shape environmental policy.[136]

This report is in general accord with the two SSRN papers that I have previously discussed in that it does not sweepingly reject the use of cost-benefit analysis altogether in this context, a position that is somewhat surprising given Ackerman's prior trenchant critiques of its application to environmental issues.[137] However, it is highly critical of the specific valuation and discount rate assumptions that have been utilized in recent governmental efforts to establish a social cost of carbon for use in determining which climate regulation measures are cost-effective.[138] It primarily focuses its critique, as does the Masur and Posner paper, upon the range of carbon cost estimates that were endorsed by the OMB-sponsored Interagency Working Group.[139] The report discusses and critiques the several underlying climate models from which that Interagency Working Group derived both its initial and later revised carbon cost estimates.[140] It also criticized the alternative 2.5%, 3% and 5% annual discount rates that

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135. *See generally* ACKERMAN & STANTON, *supra* note 1 (discussing and critiquing government valuations of the social costs of carbon emissions in making climate regulation policies).

136. *See* Frank Ackerman, et al., *Applying Cost-Benefit to Past Decisions: Was Environmental Protection Ever a Good Idea?*, 57 ADMIN. LAW. REV. 155, 157 (2005) ("In practice, therefore, cost-benefit analysis is an opaque and technically intricate process accessible only to experts, and one that all too frequently recommends rejection of sensible policies, on the grounds that their costs exceed economists' estimates of their benefits."); Frank Ackerman & Lisa Heinzerling, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 U. PA. L. REV. 1553, 1553 (2002) ("Cost-benefit analysis differs, however, from other analytical approaches in the following respect: it demands that the advantages and disadvantages of a regulatory policy be reduced, as far as possible, to numbers, and then further reduced to dollars and cents. In this feature of cost-benefit analysis lies its doom.").

137. *See* sources cited *supra* note 136 (illustrating the Ackerman and Stanton's previous criticisms of cost-benefit analyses).

138. *See* ACKERMAN & STANTON, *supra* note 1, at 8–15 (observing that since serious anticipated damages from climate change cannot be quantified or monetized, estimates of the social cost of carbon "may be too low or logically incomplete").

139. *See id.* at 6–7 (describing the agencies participating in the Working Group and critiquing its estimates on the social costs of carbon).

140. *See id.* at 8–11 (arguing that the choice of three specific integrated assessment models is arbitrary and biases the analysis).

were endorsed by that Interagency Working Group,[141] echoing the point developed more fully by Revesz and Shahabian that the choice of a discount rate to use for discounting policy impacts upon future generations is an ethical judgment and not simply a technical matter of accurately measuring "market" discount rates, however they are defined.[142]

The aspect of this report that I want to emphasize here is that Ackerman and Stanton, as do the Masur and Posner and Revesz and Shahabian papers, implicitly accept the legitimacy of valuing the impacts of climate regulation policies under the assumption of the exogeniety of identity.[143] They do not question the meaningfulness of measuring the social costs of carbon emissions for the future persons affected by comparing the impacts of those emissions to the hypothetical baseline scenario of the circumstances that those exact same future persons would face were climate regulation measures now taken to preclude some of those carbon emissions.[144] But once again, to admittedly belabor the simple point that I have made with regard to both the Masur and Posner and Revesz and Shahabian papers, given the endogeniety of identity this is a most inapt comparison of policy consequences with an arbitrary and demonstrably unattainable set of circumstances. The willingness to pay-based valuations of the impacts of any policy upon the future persons who would experience those impacts should instead be calculated as against the actual alternative of those persons' non-existence were that policy not to be pursued.[145] As I noted before when discussing the Revesz and Shahabian paper, it is premature and rather beside the point to call for incremental refinements in valuation methods and/or discount rate choices as long as cost-benefit analysts are not yet even making the proper comparisons.[146]

IV. Conclusion

The recent efforts by Masur and Posner, Revesz and Shahabian, and Ackerman and Stanton are each knowledgeable and sophisticated attempts to assess and improve the application of the cost-benefit methodology in the

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141. *See id.* at 11–12 ("Casual estimates and unsupported judgments are used to justify discount rates that are inappropriately high for analysis that spans several generations.").

142. *See* Revesz & Shahabian, *supra* note 2, at 1 (concluding that "discounting cannot substitute for a moral theory setting forth our obligations to future generations").

143. *See supra* notes 118–122 and accompanying text (discussing the concept of exogeneity of identity and how Revesz and Shahabian assume this concept as a baseline scenario for their analysis of justifications for discounts rates).

144. *See* ACKERMAN & STANTON, *supra* note 1, at 1 (discussing their conclusion advocating a lower discount rate based on ethical grounds).

145. *See* discussion *supra* Part II and note 5 (summarizing this concept in more detail and its background).

146. *See supra* text accompanying note 105 (discussing the irrelevance of analyzing discount rates when assuming exogeneity of identity).

climate regulation context. Unfortunately, however, these efforts each take for granted the appropriateness of conducting cost-benefit analyses that attempt to assess the impacts of policies upon future persons by comparing the circumstances that those policies are projected to create for those future persons with the circumstances that would be supposedly faced by those same future persons were the policy not to be implemented. They each then suggest various refinements in the methods by which those impacts are quantified.[147] However, once one recognizes the demonstrable fact that the fundamental genetic identity of future persons is an endogenous variable with regard to any policy under consideration, it is clear that the cost-benefit methodology as conventionally applied with its implicit exogeniety of identity assumption is fundamentally flawed in a way cannot be remediated simply by more sophisticated valuation or discounting techniques.[148]

Cost-benefit analysts and the scholars that critique their work both need to recognize that the appropriate baseline comparison for valuing the impacts of any policy on future persons is what would be after a transitional period the actual situation if that policy is not implemented: a radically different world in which none of those future persons would exist. Unfortunately, any attempt to value the impacts of a policy on future persons through the use of the willingness to pay metric when those impacts are a necessary condition of their existence, no matter how sophisticated the valuation methods and discounting procedures used, will result in truly massive and essentially meaningless positive valuations for any policy option whatsoever.

The cost-benefit methodology, premised as it is upon assessing the willingness to pay of the persons affected by a policy, is therefore a suitable approach only for valuing the impacts of a policy on those persons who are already in existence, at least in utero, before the policy is implemented. If one for some reason wants to consider only the impacts of a policy on existing persons, and chooses to ignore the far larger endogeniety of identity consequences of the policy for all future generations, the guidance provided by such severely restricted cost-benefit analyses may be helpful, although it is unclear exactly what justification could be offered for taking such a circumscribed approach to assessing a particular policy. However, climate regulation policies are obviously largely or even primarily focused upon the long-term impacts of various courses of action upon future

147. *See* discussion *supra* Part III.A (talking about this idea as it applies to the Masur and Posner paper); discussion *supra* Part III.B (discussing its application to the Revesz and Shahabian paper); discussion *supra* Part III.C (detailing its application to the Ackerman and Stanton paper).

148. *See supra* text accompanying notes 105–115 (illustrating the irrelevance of analyzing discount rates when assuming exogeneity of identity).

persons not yet in existence when the policies are implemented. A cost-benefit analysis limited in scope to evaluating policy impacts upon existing persons would therefore rather obviously be an unsuitable approach in this context. My overall conclusion is that cost-benefit analysis, understood as an attempt to assess policies solely with regard to their consequences for actual persons, and committed to valuing those consequences in accordance with the affected persons' willingness to pay to enjoy (or avoid) those consequences, has no helpful role to play in formulating climate regulation policy.