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HOW RECOGNIZING THE ENDOGENEITY OF IDENTITY RENDERS THE DISCOUNTING DEBATE LARGELY IRRELEVANT

Gregory Scott Crespi*

Abstract

Many social policies require the substantial commitment of resources in order to provide benefits for future generations. Conventional policy assessment by the usual willingness to pay valuation criterion raises the issues of whether the future benefits of a policy should first be discounted to a smaller present value before comparison with its current costs in order to assess its merits, and if so then what discount rate should be utilized for these calculations. There is, however, less at stake in this debate than the partisans on either side commonly realize. This is because of the failure of policy analysts to recognize that all policies have pervasive and eventually universal and eternal “person-altering consequences” for genetic identities, the nature of which is explained in this Article. These consequences, if measured by estimated willingness to pay, will provide truly massive benefits for future generations, but they are not amenable to meaningful quantification. Therefore, these discounting issues do not arise with regard to these kinds of consequences. Moreover, because the largest proportion by far of the persons who will be impacted by a policy will be affected in a person-altering manner, the resolution of these discounting issues with regard to valuing the future impacts of a policy on existing persons is of limited practical importance.

I. INTRODUCTION

Many social policies require the substantial commitment of resources in order to provide benefits for future generations. Important examples include crucial environmental policies, such as radioactive waste storage measures or fossil fuel use restrictions undertaken to mitigate global warming trends.¹ In assessing the merits of such policies there is considerable controversy as to how to render commensurate their adverse impacts upon existing persons with their beneficial impacts upon the members of future generations, so that an overall assessment can be made that properly reflects the rights and interests of all affected persons. Much

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¹ Measures now taken to isolate high-level radioactive wastes from the biological environment impose substantial current costs, with the benefits accruing largely (though not exclusively) to the members of future generations. Measures that may be taken in coming years to limit fossil fuel use so as to mitigate global warming trends will similarly impose large current costs and will provide future benefits that will largely (though likely not exclusively) accrue to members of future generations.

of this controversy centers on the question of whether impacts on the members of future generations that are valued in accordance with conventional cost-benefit valuation criteria—that is, measured by the estimated willingness to pay of the members of those future generations to benefit from or avoid those consequences²—should first be “discounted” to a smaller present value before aggregation with the comparably-valued current impacts upon existing persons, in the same manner as is commonly done for discounted cash flow financial valuations.³ Among advocates favoring the use of such discounting, there remains considerable controversy regarding the question of the proper “discount rate” to use for such calculations.⁴ I hereinafter refer to these two questions taken together—the policy analysis methodology and discount rate—as the “discounting issues.”

What I intend to do in this brief Article is demonstrate that there is much less at stake in these debates than generally realized. The relevance of the resolution of these discounting issues is far more restricted in scope than is recognized by the partisans on either side of those debates.

Generally implicit, rather than explicit, in these discussions about the merits of discounting future policy impacts, is an assumption that the fundamental genetic identity of the members of future generations is exogenous with regard to and thus unaffected by the policies that we pursue. In other words, the analysis of policies that will have long-term impacts generally proceeds on the basis of the simplifying assumption that the same future persons will be conceived and born whether or not the policy at issue is implemented. However, this assumption is not merely implausible but also demonstrably false. The fundamental genetic identities of the members of future generations, after a relatively modest period of time, are in fact endogenous to, or products of, the policies that we pursue. Any social policy, even one with only minor and local initial impacts, will have exponentially proliferating and eventually universal and eternal “person-altering consequences.”⁵ I discuss these consequences below.

These person-altering consequences play havoc with attempts to assess long-term policy impacts upon future generations by the usual willingness to pay metric. The willingness to pay of those future persons to enjoy or avoid policy impacts

² See Gregory Scott Crespi, *The Fatal Flaw of Cost-Benefit Analysis: The Problem of Person-Altering Consequences*, 38 ENVTL. L. REP. 10703, 10704 (2008) [hereinafter Crespi, *Cost-Benefit Analysis*].

³ See Richard L. Revesz, *Environmental Regulation, Cost-Benefit Analysis, and the Discounting of Human Lives*, 99 COLUM. L. REV. 941, 943-48, 950-55 (1999). See also Joseph H. Guth, *Resolving the Paradoxes of Discounting in Environmental Decisions*, 18 TRANSNAT'L. L. & CONTEMP. PROBS. 95, 95-97 (2009).

⁴ Revesz, *supra* note 3, at 974-81; Guth, *supra* note 3, at 97.

⁵ I discuss the nature of these person-altering consequences in some detail in this article. See also Crespi, *Cost-Benefit Analysis*, *supra* note 2; Gregory Scott Crespi, *Would it be Unethical to Dump Radioactive Wastes in the Ocean? The Surprising Implications of the Person-Altering Consequences of Policies*, 35 ECOLOGY L. CURRENTS 43 (2008); Gregory Scott Crespi, *What's Wrong with Dumping Radioactive Wastes in the Ocean? The Surprising Ethical and Policy Analysis Implications of the Problem of Person-Altering Consequences*, 37 ENVTL. L. REP. 10873 (2007) [hereinafter Crespi, *What's Wrong*].

cannot be meaningfully calculated, given the person-altering nature of those consequences, beyond a qualitative recognition that those persons will experience truly massive benefits from any policies that we pursue. Without a reasonably precise estimate of future benefits to work with, one will not even reach the issue of whether such benefits should first be discounted to some present value before they are aggregated with comparably valued current impacts.

This problem significantly reduces the importance of resolving these discounting issues. The controversies over discounting issues remain relevant with regard to assessment of that limited set of policy impacts that affect only those persons born (or at least conceived) at the time that the policies are implemented (or shortly thereafter). However, those issues do not arise with regard to assessing policy impacts upon those many persons whose fundamental genetic identities have been altered by those policies which, as discussed below, arguably includes everyone conceived and born after a relatively modest interval of time has elapsed after the policy's initial implementation. Some new assessment methodology for future policy impacts that can generate plausible quantitative estimates of their value, and that does not rest upon estimating the willingness to pay of the members of future generations, will first have to be developed to meaningfully evaluate these long-term, person-altering consequences before these discounting issues will arise and can be addressed in that context. Until then, however, the debate regarding discounting issues actually has limited practical importance, because generally the overwhelming proportion of the people affected by a policy will be impacted in a person-altering manner.

In Part II of this essay I attempt to make clear the essential nature of these person-altering consequences of policies. In Part III I demonstrate that attempts to value those consequences in accordance with the estimated willingness to pay of those persons cannot provide sufficiently precise quantitative estimates of the magnitude of those benefits to distinguish among alternative policy options. In Part IV I discuss the general irrelevance of discounting issues to policy valuation, given these essentially unquantifiable person-altering consequences. In Part V I present a brief conclusion.

II. THE NATURE OF PERSON-ALTERING CONSEQUENCES

The noted British philosopher Derek Parfit first articulated in 1976⁶ a simple, yet profound, insight which philosophers have since labeled “the Non-Identity

⁶ Derek Parfit, *On Doing the Best for Our Children*, ETHICS AND POPULATION 100, 100-115 (M. Bayles, ed., 1976) [hereinafter *Best for Our Children*]. Gregory Kavka argues that Parfit's insight was also discovered independently at approximately the same time by Robert Adams and by Thomas Schwartz. Gregory S. Kavka, *The Paradox of Future Individuals*, 11 PHIL & PUB. AFF. 93, 93-112 (1982) (citing Robert M. Adams, *Existence, Self-Interest, and the Problem of Evil*, 13 NOUS 53, 57 (1979)); Thomas Schwartz, *Obligations to Posterity*, in OBLIGATIONS TO FUTURE GENERATIONS 3, 3-13, (Richard Sikora & Brian Barry eds., 1978). Parfit further discusses his insights in Derek Parfit, *Future Generations, Further Problems*, 11 PHIL & PUB. AFF. 113, 115-17 (1982) [hereinafter *Future Generations*], DEREK PARFIT, REASONS AND PERSONS 351-80 (1984) [hereinafter *Reasons and Persons*], and Derek Parfit, *Comments*, 96 ETHICS 832 (1986) [hereinafter *Comments*].

Problem,”⁷ and which I refer to in this essay as either the problem of “endogeneity of identity” or the problem of “person-altering consequences.”⁸ This insight calls into question whether we have any ethical obligations to distant future generations that can be justified on the basis of conventional secular, consequentialist ethical premises.⁹ Further, this insight also renders inadequate any analytical efforts to assess policies that overlook those person-altering consequences. While this problem has fostered substantial (though inconclusive) discussion among philosophers and other scholars over the last three decades at an abstract, academic

⁷ Parfit later labeled this problem as the “Non-Identity Problem,” *Reasons and Persons*, *supra* note 6, at 378, and it is generally so described by other academic philosophers. See, e.g., Doran Smolkin, *Towards a Rights-Based Solution to the Non-Identity Problem*, 30 J. SOC. PHIL. 194 (1999); David Wasserman, *The Nonidentity Problem, Disability, and the Role Morality of Prospective Parents*, 116 ETHICS 132 (2005). The problem also is described by other scholars as the “Parfit Paradox.” See, e.g., Kavka, *supra* note 6, at 95 (“[Parfit’s] argument poses a . . . Paradox of Future Individuals”); Edith Brown Weiss, *What Obligation Does Our Generation Owe to the Next? An Approach to Global Environmental Responsibility: Our Rights and Obligations to Future Generations for the Environment*, 84 AM. J. INT’L L. 198, 204 (1990) (referring to this insight as “Derek Parfit’s famous paradox”); Lothar Gundling, *What Obligation Does Our Generation Owe to the Next? An Approach to Global Environmental Responsibility: Our Responsibility to Future Generations*, 84 AM. J. INT’L L. 207, 210 (1990) (referring to this insight as “Parfit’s paradox”). Those scholars who regard Parfit’s insight as posing a paradox commonly state the question that he poses along the lines of, “How can we owe a duty to future persons if the very act of discharging that duty wipes out the very individuals to whom we allegedly owe that duty?” See, e.g., 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 AM. J. INT’L L. 190, 191 (1990). I prefer 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 person-altering consequences—the elimination of the existence of all yet-unborn future persons who would have been born absent the policy’s impacts, and the birth instead of a different set of future persons.

⁸ In my opinion, Parfit’s own “Non-Identity Problem” label is more apt than the “Parfit Paradox” label because the question is not really a paradox so much as it is a conceptual problem regarding the existence of ethical obligations. However, Parfit’s 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 phrases “endogeneity of identity” or “person-altering consequences.”

⁹ By the phrase “secular premises” I refer to ethical premises that are derived from reflections on the human condition that are agnostic with regard to the existence of a supreme supernatural being of ethical relevance. I will not address in this article the difficult question as to whether there is a sufficient basis in one or more of the mainstream religious traditions for recognizing an ethical obligation to the members of distant future generations. By the phrase “consequentialist premises” I refer to the ethical premise that actions have ethical relevance only to the extent that they have consequences for the rights or interests of specific persons, and that actions have no ethical relevance in and of themselves apart from those consequences.

level regarding its ethical significance,¹⁰ its dramatic practical implications for policymakers have not yet been adequately addressed.¹¹

Rather than attempt to detail or resolve the complex philosophical arguments that have been offered regarding the problem of person-altering consequences,¹² I instead discuss the problem in a more condensed and straightforward manner that

¹⁰ See, e.g., Adams, *supra* note 6; Kavka, *supra* note 6; Schwartz, *supra* note 6; Smolkin, *supra* note 7; James Woodward, *The Non-Identity Problem*, 96 ETHICS 804 (1986). See also 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 (2008); Joanna Pasek, *Environmental Policy and 'The Identity Problem'* (CSERGE, Working Paper GEC 93-13, 2008) for more recent discussions.

¹¹ But see Crespi, *What's Wrong*, *supra* note 5, where I have attempted to contribute to a fuller assessment. There is a legal literature of modest size and scope that addresses some of the implications of the problem of person-altering consequences, but that literature fails to fully incorporate the insights of the philosophers who have addressed the matter. See 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.”). Most of the relevant legal literature focuses on the specific person-altering consequences issues raised by assisted reproductive technologies; whether persons born with birth defects as a result of such technologies but who would not have otherwise been born have standing to claim that they were thereby injured by a “wrongful life” tort. See, e.g., I. Glenn Cohen, *Intentional Diminishment, the Non-Identity Problem, and Legal Liability*, 60 HASTINGS L.J. 347 (2008); Carter J. Dillard, *Rethinking the Procreative Right*, 10 YALE HUM. RTS. & DEV. L.J. 1 (2007); Michael B. Laudor, *In Defense of Wrongful Life: Bringing Political Theory to the Defense of a Tort*, 62 FORDHAM L. REV. 1675 (1994); Philip G. Peters, Jr., *Harming Future Persons: Obligations to the Children of Reproductive Technology*, 8 S. CAL. INTERDISC. L.J. 375 (1999); Eric Rakowski, *Who Should Pay for Bad Genes?*, 90 CAL. L. REV. 1345 (2002); John A. Robertson, *Procreative Liberty and Harm to Offspring in Assisted Reproduction*, 30 AM. J.L. & MED. 7 (2004); Kirsten Rabe Smolensky, *Creating Children with Disabilities: Parental Tort Liability for Preimplantation Genetic Interventions*, 60 HASTINGS L.J. 299 (2008). There are only a few articles in the legal literature that consider the significance of person-altering consequences in other contexts. See, e.g., 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 (2004) (considering the significance of person-altering consequences for the validity of the claims made by the descendants of displaced Palestinian refugees for a right to return to their ancestral homeland); Amy J. Sepinwall, *Responsibility for Historical Injustices: Reconceiving the Case for Reparations*, 22 J.L. & POL. 183 (2006) (considering the significance of person-altering consequences for the validity of the claims made by the descendants of slaves for reparations payments). I am not aware of any prior attempts to more broadly assess the significance of person-altering consequences for the conduct and relevance of cost-benefit analysis in all contexts whatsoever, although Douglas Kysar has recently recognized that those consequences do 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.” Douglas A. Kysar, *It Might Have Been: Risk, Precaution and Opportunity Costs*, 22 J. LAND USE & ENVTL. L. 1, 37 (2006).

Two other prominent law professors who have addressed the problem of person-altering consequences at least tangentially in their work are Daniel Farber and Jeffrey Gaba. See Daniel A. Farber, *From Here to Eternity: Environmental Law and Future Generations*, 2003 U. ILL. L. REV. 289, 302 n.69 (2003) (citing Derek Parfit); DANIEL A. FARBER, *ECO-PRAGMATISM: MAKING SENSIBLE ENVIRONMENTAL DECISIONS IN AN UNCERTAIN WORLD* (1999) at 151 n.38 (citing Derek Parfit); 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).

¹² See Crespi, *What's Wrong*, *supra* note 5, for a more comprehensive referencing and review of this literature.

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 nature of the problem of person-altering consequences, and to contemplate its implications for practical policy making and for the controversies surrounding discounting issues.

Parfit has been the primary instigator of and contributor to discussions of the difficulties involved in grappling with the person-altering consequences of policies through pieces he published between 1976 and 1986.¹³ The most significant of these efforts were his original 1976 article¹⁴ and his more comprehensive 1984 book Reasons and Persons,¹⁵ but he has made other contributions to this debate.¹⁶

¹³ See, e.g., *Best for Our Children*, *supra* note 6; *Future Generations*, *supra* note 6; *Reasons and Persons*, *supra* note 6; *Comments*, *supra* note 6.

¹⁴ See *Best for Our Children*, *supra* note 6. In this 1976 essay Parfit uses the hypothetical situation of a woman deciding whether to postpone becoming pregnant until she recovers from an illness that would result in any child conceived being born with a handicap to illustrate the person-altering consequences of a decision for persons who as a result will now not be born. *Id.* at 100-01. Parfit notes that if the pregnancy is postponed and her child is later conceived after the illness is cured, the child that would initially have been born will not now be born without the handicap, but instead will never be born at all. *Id.* at 101. It is instead someone else with a different genetic endowment that will be born without the handicap.

Whether a handicapped child is better off for not being born is an impossible question to answer in abstract, general terms. It seems plausible that most if not all handicapped persons would prefer their lives to nonexistence, particularly if the handicaps are of lesser severity. A mother who decides to become pregnant while suffering such an illness and who therefore bears a handicapped child cannot be criticized on the basis of the consequences for the child unless we assume that the child would have preferred nonexistence to being born. *Id.* Such a sweeping and counterintuitive assumption about the nature of the preferences of future persons is unwarranted. Similarly, it is far more plausible that future people would prefer existence even with severe environmental constraints to nonexistence.

To illustrate the effects of policies with person-altering consequences on people who will be born as a result, Parfit, in this article, poses the hypothetical situation of a policy measure that would have only positive effects upon existing persons, but that would also have very adverse effects for future persons. *Id.* at 101-02. He notes that absent the implementation of the policy those particular future persons would never have been born, and argues that they would prefer living subject to the adverse effects of the policy at issue to the alternative of never having been born. *Id.*

¹⁵*Reasons and Persons*, *supra* note 6. Parfit once again revisited the questions posed by person-altering consequences in this comprehensive 1984 book, now for the first time labeling the issue the “Non-Identity Problem,” *id.* at 378 (“This problem arises because, in the different outcomes, different people would exist. I therefore call this the Non-Identity Problem.”), and devoting an entire chapter to its analysis, *id.* at 351-379, that drew heavily upon his earlier 1982 article, *Future Generations*, *supra* note 6. After an extended analysis of numerous hypothetical situations Parfit concludes by reasserting his position that a policy that has person-altering consequences will not be worse for those persons thereby born as a result of the policy than would be their nonexistence should the policy not have been implemented. *Reasons and Persons*, *supra* note 6, at 378.

Parfit takes in this book what he labels the “No Difference View”; that is, the claim that although a policy will have person-altering consequences and therefore will not be worse for any specific individual it still could be judged to be undesirable on moral grounds. Person-altering consequences that make a policy worse for no one ultimately make no difference in a moral evaluation of that policy. *Id.* at 366-71. He also concludes his chapter on the Non-Identity Problem by reaffirming his earlier broad, aspirational claim first made in his 1982 article, Parfit, *Future Generations*, *supra* note 6, at 169-72, that it may be possible to formulate a valuation approach that appropriately addresses the problem of person-altering consequences, and which can justify moral

Parfit's seminal insight is that virtually any human action, however slight its impacts, is likely to have at least minor effects on the timing of or other circumstances surrounding some acts of sexual reproduction, leading to different sperm-egg fertilizations than would otherwise have taken place, and consequently

condemnation even of policies that hurt no one. *Persons and Reasons*, *supra* note 6, at 377-79. He generically labels this approach "Theory X," *id.* at 378, and states that he will later in the book attempt to formulate such a theory ("In what follows I will try to find Theory X.") *Id.* at 379. He predicts once again that this criterion will not be based upon an assessment of whether its consequences are good or bad for affected future persons. *Id.* His final and more pessimistic conclusion at the end of this book, however, is that he has again failed to formulate an approach that adequately addresses the problem of moral evaluation in the context of person-altering consequences without creating other difficulties that render the approach unacceptable, although he still optimistically believes that it might yet be possible to do so. "Though I failed to discover X, I believe that, if they tried, others could succeed." *Id.* at 443.

Parfit notes several properties that his envisioned "Theory X" would have to satisfy to be an adequate ethical approach: "Theory X must solve the Non-Identity Problem, avoid the Repugnant and Absurd Conclusions, and solve the Mere Addition Paradox. I failed to find a theory that can meet these four requirements." *Id.* at 443. "Most of us would believe that the Repugnant and Absurd Conclusions are what I have called them. Until we know how to avoid both conclusions, and how to solve both the Non-Identity Problem and the Mere Addition Paradox, we will have beliefs that we cannot justify, and that we know to be inconsistent." *Id.* at 452.

¹⁶ See, e.g., *Future Generations*, *supra* note 6; *Comments*, *supra* note 6. Parfit later revisited the questions posed by the person-altering consequences of policies that he first raised in his original 1976 article, *Best for Our Children*, *supra* note 6, in a later 1982 article, *Future Generations*, *supra* note 6, which was written as a companion piece to a shorter article on the topic by Gregory Kavka, Kavka, *supra* note 6, that Parfit's 1976 essay had helped to inspire. Kavka, *supra* note 6, at 93. After a long and detailed analysis of the problem, and of Kavka's modified Kantian categorical imperative-type proposals for addressing it, Parfit once again concluded 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. *Future Generations*, *supra* note 6, at 171-72. He again argued that "some new principle of beneficence" not yet identified that is not based on those person-affecting considerations will be needed to judge the merits of such policies. *Id.* He closed by stating that while it would be quite difficult to formulate such a new principle, it would be hasty to conclude that it was impossible to do so, because "non-religious moral philosophy is a very young subject." *Id.* at 172.

Parfit's article, *Comments*, *supra* note 6, was included in a 1986 ethics symposium issue focusing on his 1984 book REASONS AND PERSONS, which also included contributions by Brian Barry, Bart Gruzalski, Shelly Kagan, Arthur Kuflik, Bart Schultz, James Woodward and Susan Wolf. In that article Parfit responded to each of the other symposium contributors' comments on his 1984 book, see *Reasons and Persons*, *supra* note 6. In particular, Parfit responded in some detail to James Woodward's article, see James Woodward, *The Non-Identity Problem*, 96 ETHICS 804 (1986), that specifically focused on the Non-Identity Problem. *Comments*, *supra* note 6, at 854-62. He there reaffirmed his longstanding "No Difference View" conclusion, most fully articulated in *Reasons and Persons*, *supra* note 6, at 366-71, that despite the fact that policies with adverse long-term consequences will not make things worse for any particular future individuals because of those policies' person-altering consequences, there are still moral reasons for not choosing such policies, *Comments*, *supra* note 6, at 854, and that these moral reasons are just as strong in spite of the fact that no particular individuals are harmed by such policies. *Id.* at 855-56. Parfit once again conceded, however, that he was unable to formulate the needed "new theory about beneficence" that would justify this conclusion. *Id.* at 854.

will over time lead to exponentially cascading consequences¹⁷ of a person-altering nature as now genetically different individuals mature and reproduce and in other ways influence the sexual behavior of a broader and broader circle of people.¹⁸ After probably no more than a few decades at the most¹⁹ this will lead for all eternity to the entire human population being composed of individuals that each have significantly different genetic endowments from those persons that would have come into existence absent that initial policy action.²⁰ 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.

Genetic identity is thus an endogenous policy variable after a lapse of probably no more than a few decades.²¹ Put another way, one dramatic consequence of any policy measure, even one of limited and localized initial impact, is that over the longer-term it will eliminate the coming into existence of many and eventually all future persons who would otherwise have been conceived and born.²² It will result instead in the conception and birth of an increasingly and

¹⁷ These consequences will geometrically proliferate both in terms of the growing proportion of conceptions that are impacted, and in terms of the growing number of genetic alterations that result for a typical conception.

¹⁸ For fuller elaboration of this point see D'Amato, *supra* note 7, at 190-92.

¹⁹ While the initial impacts of a policy on the conception and birth of individuals may be quite limited, once those first few genetically altered persons are born and begin to influence the behavior of a wider and wider circle of people it is clear that the extent and magnitude of genetic alterations of further conceptions will spread with exponential rapidity. It is, in my opinion, rather conservative to estimate that it may take as long as twenty or thirty years for these person-altering consequences to begin to impact all subsequent births. For major social policies with broader initial impacts the transitional period involved until those consequences are universal may be quite a bit shorter than this.

²⁰ D'Amato, *supra* note 7, at 191. How rapidly the person-altering 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. The identity of future persons will begin to be altered approximately nine months after the implementation of a policy once persons conceived after the policy's implementation begin to be born (I am classifying those persons conceived before a policy is implemented but perhaps affected in uterus by its consequences as "existing persons" with regard to that policy). One would expect that given the obvious sensitivity of the forming of a particular sperm-egg fusion to a great multitude of circumstances that the scope of the person-altering consequences of a policy would expand with exponential rapidity once some genetically altered individuals are born, and that even relatively isolated human communities would be impacted and then completely transformed within a few years or at most a few decades. In addition, while the initial genetic alterations resulting may in some instances be relatively minor in impact (eye color, "junk" DNA changes, etc.), arguably leaving unaffected the "identity" of the persons genetically altered in such minor fashion, the number of genetic alterations per person will also exponentially increase over time through the same cumulative feedback process, rapidly leading to unarguable fundamental alterations in identity of all future persons.

²¹ See *supra* note 19 (author's comments). See also D'Amato, *supra* note 7, at 19.

²² There will be a post-policy "transitional period" starting approximately nine months after the implementation of a policy during which some but not all of the individuals born will have their fundamental genetic identities altered by the a policy's consequences, before the person-altering consequences are of universal scope. The length of such a transitional period, and the proportion of individuals born with fundamentally altered identities at each point in time during this transitional period, will presumably vary from policy to policy.

eventually entirely genetically different group of people,²³ with their genetic endowments also increasingly diverging over time from that of the persons who would otherwise have been born.²⁴ The policy will thus fundamentally alter the personal identities of all members of distant future generations; one vast group of what might be referred to loosely as “potential persons”²⁵ will now never be conceived and born, and will be replaced by an entirely different group of individuals. From the perspective of those persons who will now be born as a consequence of the policy there could not be a more dramatic impact. These person-altering consequences, as well as the other consequences of a policy, need to be taken into account in any comprehensive assessment of its merits.

Parfit’s insight is correct, as a matter of scientific fact,²⁶ and is an example of what is commonly referred to as the “butterfly effect” of chaos theory²⁷ where small perturbations in initial conditions can lead to massive overall systemic effects. Parfit was primarily concerned in his philosophical work on person-altering consequences with assessing their ethical implications, which he understandably found to be quite disturbing.²⁸ I have elsewhere addressed those

²³ *Id.* (author’s comments).

²⁴ Not only will the proportion of births that are policy-altered increase over time after the implementation of the policy, but the cumulative magnitude of the genetic alterations for typical individuals will also increase over time as the policy’s person-altering consequences become more widely manifested and reinforce one another.

²⁵ See D’Amato, *supra* note 7, at 191.

²⁶ *Id.* at 192. This conclusion assumes a person’s identity is determined by their genetic endowment and/or by the physical and cultural circumstances of their lives, 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 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.

²⁷ *Id.* at 192-94.

²⁸ 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. “[T]he long-term effects of social policies, even if clearly disastrous—even if it clearly affects people for the worse—won’t be worse for particular people. They are thus ignored by our principle. We might claim that we should grant *less* weight to the further future But a ‘person-affecting’ principle gives to the further future *no* weight. This seems indefensible.” *Best for Our Children*, *supra* note 6, at 102.

Parfit thus demonstrates he understands the serious problem posed by person-altering 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. “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.” *Id.* at 100. He is unfortunately somewhat opaque in this brief 1976 essay regarding how this problem should be resolved. He rejects the alternative of simply ignoring the exponentially cascading person-altering consequences that will 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 person-altering consequences

ethical issues in some detail.²⁹ In this article, however, I address those ethical implications only tangentially and focus instead upon the implications of person-altering consequences for the debate concerning the discounting of future policy impacts.

III. ATTEMPTING TO VALUE PERSON-ALTERING CONSEQUENCES IN ACCORDANCE WITH WILLINGNESS TO PAY

For any policy measure undertaken there will be three groups of persons who are differently situated with regards to that policy. First, there are the persons who are already in existence at the time that the policy is initially implemented, including those persons who have been conceived but not yet born as of that moment. Those persons' fundamental genetic identities have been established prior to the implementation of the policy and will not be altered by that policy. Second, there are those future persons who will be conceived after the policy's implementation and whose genetic identity will be impacted to some significant extent³⁰ by the spreading indirect effects of that policy on acts of conception. Those are the persons for whom that policy will have "person-altering consequences," and whom I will hereinafter refer to as "future persons" with regard to the policy at issue. Third, there is the (rapidly diminishing in size over time) group of persons who are conceived and born during the "transitional period" after the policy has been implemented but before its person-altering consequences have spread widely enough to impact those particular persons' genetic identities.³¹

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, *id.* at 102, but he does not offer an alternative valuation method.

²⁹ See generally Crespi, *Cost-Benefit Analysis*, *supra* note 2.

³⁰ There may be some persons, particularly in the immediate aftermath of a policy's implementation, whose conceptions are genetically altered by the consequences of a policy only to the extent that there is some alteration in their "junk" DNA or in other DNA that does not significantly affect their personal identity. I believe that these persons are best classified as "existing persons" rather than "future persons" under my classification framework. Over time, the person-altering consequences will not only proliferate but also become more substantial, on average, so that the number of such insignificant genetic alterations will rapidly diminish towards zero.

³¹ Including those persons whose genetic identities are altered, but only in ways that are not significant with regard to those person's fundamental personal identities. *Id.* One might also define a fourth group of "beings" if one could call them that, who would consist of the vast horde of now never to be conceived persons who would have been conceived and born had we taken some course of action other than the policy that was pursued, but who now as a consequence of that policy will never come into existence. It is obvious that the hypothetical preferences of this fourth group of untold trillions of wholly imaginary beings should not be given any weight in an analysis of the merits of the policy at issue. With their very existence at stake, each of these beings would likely regard any specific policy—other than the single policy that would result in their coming into existence—as imposing immense costs upon them, resulting in a very large if not infinite aggregate cost measure for any specific policy whatsoever that would dominate any measure of benefits that is utilized. This absurd result of massive rejection of any course of action whatsoever (including the null option of taking no action, which would also of course preclude the conception of many beings) indicates that it would be a category mistake to accord standing to potential but now never to be conceived beings in an analysis of the consequences of a policy that necessarily precludes the

The discounting issues that are widely debated will still arise with regard to the first and third groups of persons described above, whom I will hereinafter describe collectively as “existing persons” with regard to the policy measure at issue. It makes sense to attempt to estimate in the conventional fashion the willingness to pay of those existing persons to enjoy or to avoid policy consequences, and then to discuss whether future policy impacts upon those existing persons should be discounted in some fashion before their being aggregated with the more immediate impacts upon those same persons in assessing the merits of a policy. The debates taking place regarding the discounting issues are still meaningful in the context of future policy impacts upon existing persons.

But what about this second group of future persons who will be conceived and born post-policy implementation, and whose genetic identities will be significantly altered by the person-altering consequences of the policy? For these future persons the policy’s implementation is a necessary condition of their existence, because absent the policy they would never have been conceived and born. In light of this fact, what would be their likely willingness to pay for the policy consequences set in motion before their conception?

The answer to this question appears to me to be rather obvious. One would expect that at least the overwhelming majority (if not all) of these future persons who owe their existence to the implementation of a policy would, if given the opportunity to value its consequences, assign high offer prices³² for those effects, even were that policy to have some adverse or even catastrophic consequences for their well-being, since the alternative scenario they would face would be nonexistence. Consequently, any policy with person-altering consequences, virtually no matter how broadly catastrophic its long-term impacts for future persons, would under the estimated willingness to pay valuation approach almost certainly result in truly massive aggregate benefits for those untold trillions of future persons who will come into existence over the rest of eternity, for the reason that all of those future persons whose hypothetical preferences are being considered would owe their existence to the implementation of that policy.

The severe valuation problem posed by person-altering consequences is thus squarely presented. For those untold trillions of future persons whose fundamental genetic identity will be significantly 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 compared to their actual alternative of nonexistence. The current conventional practice of valuing the consequences of a

existence of those beings. The hypothetical preferences of all of those beings who have the potential to come into existence 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.

³² And likely infinite asking prices if this is the willingness to pay measure utilized. Whether offer prices or instead asking prices should be used to measure costs and benefits is a controversial question that I have elsewhere explored at length. See generally Gregory Scott Crespi, *Valuation in Cost-Benefit Analysis: Choosing Between Offer and Asking Prices as the Appropriate Measure of Willingness to Pay*, 39 J. MAR. L. REV. 429 (2006) [hereinafter Crespi, *Offer and Asking Price*], and plausible arguments can be made for the use of offer price measures of benefits. *Id.* at 464-65.

policy for future persons 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 because such a scenario could not possibly occur. Willingness to pay-based assessments of benefits for future persons derived in such a fashion—based on the valuation reference point of an unattainable alternative—are completely arbitrary and irrelevant to the actual policy choices at hand.

Moreover, valuations so derived are not only arbitrary and irrelevant but are also likely biased downwards, in some instances dramatically so. This is because for some policies, many future persons may strongly prefer this posited (though unattainable) scenario in which they are presumed to exist, though without experiencing the impacts of the policy. Making this comparison, those future persons would then assign costs rather than large benefits to the policy's consequences, leading in the aggregate to a massive undervaluation of the future effects of the policy on those persons, as compared to its valuation if those future persons were asked to assess it as against their actual alternative of nonexistence. The current conventional valuation approach thus may give far too much weight to the consequences of a policy for existing persons, relative to its actual massively beneficial impacts on future persons.

“Truly massive” is unfortunately about as precise a phrase as one can use with regard to the estimated aggregate willingness to pay-based value of these person-altering consequences to future persons, if properly calculated with regard to the actual alternative of their nonexistence. These person-altering consequences will persist and increase in magnitude for all eternity, and it is of course not knowable in advance how many future persons from each era will exist or would be offering their valuations in such a hypothetical referendum, let alone what the wealth endowment and precise preference structure of each of these future persons that would constrain the magnitude of their offer prices would be. It is simply not possible to meaningfully quantify the aggregate size of those benefits for future persons, nor ascertain the relative distribution of the costs and benefits of a policy between existing persons and future persons. Since no meaningful numbers can be obtained for valuing these person-altering policy consequences under the usual willingness to pay approach, the discounting issues that quantitative estimates obtained in that fashion would then raise simply do not arise for those person-altering consequences.

Let me offer a salient hypothetical to try to make this abstract analysis more concrete as to its practical implications for the significance of the discounting issues. 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.³³ This policy would free most of the billions of dollars of resources now devoted each year to radioactive waste storage efforts to

³³ This particular hypothetical is analyzed in some detail in my earlier articles on the subject. See Crespi, *Cost-Benefit Analysis*, *supra* note 2, at 10710-11; Crespi, *What's Wrong*, *supra* note 5, at 10873, 10881.

be diverted to other pressing social needs. While those future persons born a century or more from now and thereafter may well suffer significant adverse environmental consequences from such an action, the billions of dollars per year of resource reallocations enabled by such a policy would have immediate and exponentially cascading person-altering consequences that would be universal in scope well before those barrels began to leak their poisons.

Existing persons would likely benefit substantially in the aggregate from this policy, since they could avail themselves of the resources freed for other uses, and would all be long dead before the barrels began leaking their poisons.³⁴ The future persons who will be conceived and born as a person-altering consequence of that ocean waste dumping policy would owe their very existence to the policy. If these future persons were asked for their opinions about the policy, if they are at all like existing persons in their psychological make-up they would overwhelmingly (if not unanimously) prefer coming into existence over non-existence, even if their lives involved grappling with a serious radioactive waste problem. They would of course much prefer existence without the radioactive waste problem, were that an option, but the central insight of the problem of person-altering consequences is that this problem-free scenario is not possible. The only choice that those future persons would be properly hypothetically presented with is the bundled Hobson's Choice of life with the radioactive waste problem or nonexistence. If they are at all like existing persons they would assign large benefits to the policy. But it would of course be impossible as a practical matter to assign a meaningful number to the aggregate willingness to pay of all of those persons who will exist through the rest of eternity for the consequence of their coming into existence. Therefore there will be no plausible quantitative benefit numbers generated that would raise the discounting issues with regard to the consequences of this ocean waste dumping policy for future persons.

In my opinion, the failure of public policy analysts to incorporate person-altering consequences into their analyses has been due primarily to their overlooking those consequences rather than their recognizing those consequences and choosing to ignore them under one rationale or another.³⁵ Apparently, the public policy analysis community is unfamiliar with the work of Derek Parfit and other philosophers who have wrestled with understanding and giving proper weight to these kinds of consequences.

³⁴ Of course, to the extent that some existing persons are uncomfortable with the possibility of leaving distant future generations with a significant ocean radioactive pollution problem, that may reduce or even eliminate the perceived benefits those persons will obtain from the current resource reallocations. Whether or not those persons' concern for the welfare of future generations is grounded in an accurate understanding of the consequences of our current choices, it still would reflect a preference on their part that merits inclusion in a non-paternalistic, willingness to pay-based valuation of the current consequences of that policy.

³⁵ For examples of ignoring person-altering consequences in otherwise comprehensive discussions of cost-benefit analysis and discounting issues see Revesz, *supra* note 3; John D. Graham, *Saving Lives Through Administrative Law and Economics*, 157 U. PA. L. REV. 395, 423-30 (2008); Guth, *supra* note 3.

One could argue that the conventional use for policy valuation of a demonstrably unattainable hypothetical baseline reference scenario that assumes the same persons will exist whether or not a policy is implemented, and thus ignores person-altering consequences, could be justified on the basis of parallels drawn between this endogeneity of identity situation and the lesser problem presented for analysis by endogenous preferences.³⁶ One might attempt to characterize the endogeneity of identity problem presented by person-altering consequences as simply being an extreme extension of the endogenous preferences situation, different only in magnitude and not in its essential character. One might then seek guidance for evaluating policies with person-altering consequences from the ideas that have been proposed for addressing the lesser difficulties posed by endogenous preferences.³⁷

This argument, however, proves unconvincing. In the paradigmatic endogenous preferences situation a group of persons whose circumstances have been impacted by a policy have also had their preference structures altered by the policy, although their fundamental genetic identities are unchanged. The question there posed is whether those persons' pre-policy implementation preferences, or instead their different post-policy implementation preferences, should be utilized to generate their willingness to pay-based cost and benefit assessments of the policy's impacts, as compared to the reference point of the policy not being implemented and those persons' initial circumstances and preference structures both remaining unchanged.³⁸ It is facially plausible at first consideration that the endogeneity of identity problem might be viewed in some regards as simply an extreme extension of the endogenous preferences problem, and thus amenable to some of the same valuation adjustments discussed above.

However, this analogy between the endogenous preferences and endogeneity of identity situations is rather superficial and breaks down under closer inspection. In the endogenous preference situation only existing persons are involved, and a choice need only be made as to which of the two (or more) preference structures that are held by those persons at different points in time is a more appropriate basis for valuation of policy effects. In the endogeneity of identity situation, in sharp contrast, the future persons involved do not exist prior to the implementation of the policy, and have only one preference structure, their post-policy implementation preferences that very strongly favor the policy at issue. The use of the conventional baseline scenario assumption therefore does not merely substitute an earlier and different structure of preferences held by those same persons for use in obtaining those persons' valuation of the policy. That assumption in this instance instead substitutes as the reference point for comparison a hypothetical factual circumstance—those persons' existence but without the policy's consequences—that cannot possibly occur and bears no relationship to those persons' preferences, earlier or later, "true" or otherwise. The arguments made that might justify use of

³⁶ See Gregory Scott Crespi, *Incorporating Endogenous Preferences in Cost-Benefit Analysis*, 17 PENN. ST. ENVTL. L. REV. 157 (2009).

³⁷ *Id.* at 173-87.

³⁸ *Id.* at 166.

pre-policy implementation preferences under some circumstances to value a policy in the endogenous preferences context³⁹ obviously do not justify the use of a demonstrably false “the same persons will exist either way” standard of comparison in the endogeneity of identity context.

Another possible argument that might be offered in favor of ignoring person-altering consequences in policy assessment is based on the idea that while those future persons who would be conceived and born as a result of any particular policy choice would ascribe very large benefits to that policy since it provides the necessary conditions for their existence, there is no feasible way to quantify and compare these benefits that would result for each of the different groups of future persons that would be conceived and born under each of our many possible policy options. Given this fact, perhaps it makes sense to simply ignore the massive beneficial impacts of each policy under consideration upon the particular group of future persons that it brings into being and focus only upon the impacts upon existing persons.⁴⁰ Those massive but practically quantifiable benefits to those future persons who are born under each of the different possible policy options might thus be regarded as “cancelling out” across the those policy options and, in a sense, justifying ignoring them in policy analysis.⁴¹

This approach of nominally recognizing the existence of person-altering consequences and then explicitly ignoring them in the valuation calculations under a cancelling out theory is, however, also problematic. Conventional cost-benefit analyses often overlook certain diffuse impacts that the analyst cannot meaningfully reduce to quantitative terms. For example, the diffuse psychological impacts on persons due to their empathetic recognition of benefits conferred or costs imposed on other persons are difficult or impossible to measure with sufficient precision to meaningfully combine with more tangible policy impacts, and are commonly ignored. In many instances this practice of limiting the scope of the analysis to feasibly quantifiable impacts can be justified as a reasonable and

³⁹ See *id.* at 173-76 (discussing the views of Cass Sunstein in this regard).

⁴⁰ Crespi, *Cost-Benefit Analysis*, *supra* note 2, at 10713-14.

⁴¹ See generally Gaba, *supra* note 11 (arguing that the very many different groups of persons whose conception and birth would be precluded by any policy that is chosen from the immense set of possible alternatives should perhaps have their interests ignored in an analysis on the basis that they “cancelled out” in the analysis). While Gaba is only referring to cancelling out the interests of those groups of persons whose birth is precluded by the policy that is chosen, this cancelling out approach might be extended to also ignore in an analysis the interests of those future persons who would be born as a result of the policy under consideration. Such a broader cancelling out approach with regard to both those future persons who will be born as a result of a policy and those potential future persons whose births are precluded by the policy has been suggested by Eric Posner:

For ordinary regulations such as environmental regulation, there will be little reason to think there is a morally significant difference between producing the first group of people [those born if the policy is not implemented] and producing the second group of people [those born if the policy is implemented]. Therefore I think the two would cancel out.

Eric Posner, personal correspondence with the author (February 5, 2008) (on file with the author).

necessary analytical simplification on the basis that those overlooked and practically immeasurable impacts are relatively small in magnitude relative to the more easily measured impacts, and/or that they tend to offset one another in the aggregate, so that the ultimate conclusions of the analysis are not significantly affected by their omission.

Person-altering consequences, however, are different in several ways. First, they are huge in magnitude relative to the measurable impacts upon existing persons, and cannot be overlooked without dramatically affecting the results of the analysis. Second, they do not offset one another across the affected population; virtually all future persons would likely ascribe very large benefits to a policy that is a necessary condition of their existence. The conventional arguments offered for selectively overlooking certain difficult to quantify policy impacts in a cost-benefit analysis thus do not support doing so when person-altering consequences are involved. A second shortcoming is that assigning zero value to the impacts upon future persons may under some circumstances yield results that are even less accurate than are the arbitrary conclusions reached under the conventional approach, and may again lead to an even more pronounced bias towards radically present-oriented policies.

In brief summary, person-altering consequences are ubiquitous and are of great magnitude, and can no longer be simply ignored in policy valuation. But attempting to value those person-altering consequences in the usual willingness to pay-based manner leads to the blanket result that all policy options whatsoever will generate truly massive benefits to future persons, but those benefits are not measurable with sufficient precision to allow the alternative policy options to be meaningfully compared and ranked in that regard. It is necessary for us to develop new assessment methodologies that can provide plausible quantitative assessments of future policy impacts, while still recognizing the pervasiveness and overwhelming significance of person-altering consequences.

IV. DISCOUNTING PERSON-ALTERING CONSEQUENCES

As I have shown above, attempts to value the person-altering consequences of policies by the usual willingness to pay metric, as compared to the actual alternative of nonexistence for those future persons, lead inevitably to the conclusion that any policy will result in truly massive but practically unquantifiable benefits to future generations. Given this insurmountable quantification difficulty, is there any plausible rationale remaining for discounting those benefits which would then raise the discounting issues regarding whether and how this should be done?

At first consideration the answer to this question appears to be negative. The advocates of discounting future benefits typically justify this practice on the basis of either the present-oriented time preferences of people, or on the basis of the positive rates of return that are possible on capital investments.⁴² But application of

⁴² Guth, *supra* note 3, at 97-104.

the relatively modest discount rates that can be justified in these ways⁴³ to the truly massive future benefits that result from any policy that has person-altering consequences, given that those consequences are likely to become universal within decades rather than centuries, would lead to those discounted future benefits completely dominating the costs imposed on existing persons by the policy in question no matter how large those costs may be. While discount rates of such magnitude might suffice to reduce to relative insignificance even very large benefits that occurred a century or two or more in the future,⁴⁴ they would not suffice to prevent the person-altering consequences for the many millions of future people whose genetic identities are likely to be affected within a few years (or at most a few decades) after a policy's implementation, given the great sensitivity of particular sperm-egg unions to even very minor changes in the circumstances of an act of sexual intercourse, from completely dominating the calculations.⁴⁵ The application of discount rates in the normally-utilized range would thus result in a blanket endorsement of all policies whatsoever on account of their person-altering consequences, with no meaningful basis provided for discriminating among them. Such a result would be unhelpful for making policy decisions.

One possible application of the discounting methodology in the person-altering consequences context, however, is worth at least brief consideration. One might first value the impacts of a policy on the members of distant future generations for whom it is a necessary condition of their existence by their estimated offer prices, rather than by their estimated asking prices,⁴⁶ so as to initially generate a finite (although still very large) aggregate benefit measure, rather than an analytically intractable infinite benefit measure, and then discount those future benefits at a very high discount rate; high enough so that they will have an aggregate present value of essentially zero. Under this approach the

⁴³ The highest annual discount rate that has been widely used in recent years by analysts was the 10% discount rate recommended by the Office of Management and Budget ("OMB") for federal agency purposes. Revesz, *supra* note 3, at 950. The OMB now recommends use of lower 7% or 3% annual discount rates. Guth, *supra* note 3, at 98-99. The 7% rate is justified by OMB as reflecting the average before-tax return to private capital in the US, and the 3% rate is justified as the historical real rate of return on long-term government debt which reflects social time preferences. *Id.* The US Environmental Protection Agency now similarly recommends use of 7% and 3% annual discount rates. *Id.* at 99. See also Daniel H. Cole, Regulatory Cost-Benefit Analysis and Collective Action 6 (SSRN Working Paper, 2009), available at <http://ssrn.com/abstract=1369338>, (referring to a range of studies recommending discount rates that range from near zero to 20% annual rates, and to a survey of two thousand economists that in the aggregate recommended using annual discount rates of 4% for near-term effects, diminishing to 1% for long-term effects occurring after seventy five years).

⁴⁴ For example, benefits that occurred one hundred years in the future would by the use of a 10% annual discount rate be reduced by a factor of approximately 13,740, and benefits occurring two hundred years in the future would be reduced by a factor of approximately 1,888,000!

⁴⁵ For example, benefits that occurred five years in the future would by the use of even a 10% annual discount rate only be discounted by a factor of approximately 1.6. Even those benefits that did not occur for thirty years, by which time the person-altering consequences of almost any policy are likely to be universal, would only be discounted by a factor of approximately 17.5, leaving them likely still several orders of magnitude greater than the policy's impacts upon existing persons and thus dominating any recommendations.

⁴⁶ *Supra* note 32 (author's comments). See also Graham, *supra* note 35, at 423-30.

massive benefits of a policy for the members of distant future generations would then be reduced to insignificance by this discounting and thus not overwhelm the effects of the policy on existing persons, which would become essentially the sole consideration in reaching a conclusion.

Let me consider this discounting approach in more detail. First, the use of offer price rather than asking price measures of impacts is plausible. Offer prices are now conventionally used in cost-benefit analyses, rather than asking prices, to measure both the costs and benefits of the policy under consideration.⁴⁷ While some observers regard this choice of valuation measures as arbitrary and imposing a sometimes severe downward bias on the numbers thereby obtained,⁴⁸ a more in-depth analysis of the question suggests that the use of offer prices rather than asking prices can perhaps be adequately justified, at least for benefit measures, although the question of how the cost impacts of a policy are most appropriately measured is a much more difficult question whose proper resolution is still uncertain.⁴⁹

The use of a very high discount rate to minimize the policy benefits for future persons is, however, far more problematic. Annual discount rates in the high triple digits would probably be necessary to reduce those nearer-term truly massive future benefits to insignificance relative to current policy impacts.⁵⁰ High triple-digit annual discount rates, however, cannot be grounded on any plausible theory of social time preferences or rates of return on capital investment. The use of this approach to discount the magnitude of person-altering consequences is a contrived means of nominally addressing person-altering consequences in a willingness to pay-based valuation framework, while in substance ignoring those consequences through manipulation of the mathematics of discounting to avoid the paralyzing computational difficulties. Moreover, this approach is perhaps even less adequate than the current conventional approach in handling the problem of person-altering consequences, if that is possible to imagine.

The current conventional approach, as discussed above, rather than attempting to value person-altering consequences substitutes valuation of a policy's effects relative to a demonstrably unattainable baseline scenario that ignores those consequences. The suggested offer prices/very high discount rate alternative, in

⁴⁷ Crespi, *Offer and Asking Price*, *supra* note 32, at 436; *see also* Graham, *supra* note 35, at 427-30.

⁴⁸ *See generally* Crespi, *Offer and Asking Price*, *supra* note 32, at 440-62.

⁴⁹ The issue of whether offer prices or instead asking prices are the most appropriate way to measure costs and benefits is exhaustively addressed in Crespi, *Offer and Asking Price*, *supra* note 32, and in Russell Korobkin, Note, *Policymaking and the Offer/Asking Problem Price Gap: Towards a Theory of Efficient Entitlement Allocation*, 46 STAN. L. REV. 663 (1994).

⁵⁰ For example, use of even a 100% annual discount rate would discount benefits that occurred five years in the future by a factor of only thirty two, and tenth-year benefits by a factor of only 1,024, which would still result in the truly massive benefits resulting from person-altering consequences dominating the analysis. However, an annual discount rate of, say, 700%, would lead to the discounting of such fifth-year benefits by a factor of 16,807, and tenth-year or later benefits by a factor of 282 billion or more, which might suffice to reduce even the truly massive (though finite) offer-price based benefits of person-altering consequences to an aggregate level that is insignificant relative to the policy's impacts on existing persons.

contrast, candidly recognizes the existence of person-altering consequences as a formal matter but then proceeds to value them at essentially zero through the high discount rate ploy. This zero measure of impacts upon future persons could in some instances be even less accurate than the arbitrary measure that is obtained through the conventional approach, under which it is quite possible to obtain a positive rather than zero aggregate valuation of a policy's impacts on future persons relative to the hypothetical baseline scenario. Thus, the offer prices/very high discount rate alternative might lead, in some cases, to an even more pronounced bias towards radically present-oriented policies, such as my ocean waste dumping hypothetical, than that of the current approach.

Despite these shortcomings, one could argue that an approach that at least in principle recognizes the existence and great magnitude of person-altering consequences, even though it then mathematically manipulates them out of the analysis through the use of a very high discount rate, is at least a small step in the right direction. Those important consequences are now not completely ignored at the outset, and the core willingness to pay-based valuation framework has nominally been retained. However, this approach ultimately avoids confronting in a meaningful fashion the difficult valuation question presented by person-altering consequences, and moreover may suffer from an even stronger bias in favor of radically present-oriented policies than does the conventional approach. I conclude that this offer prices/very high discount rate alternative approach is an inadequate means of modifying policy analysis to incorporate person-altering consequences. There simply is no meaningful way to apply discounting to future policy consequences measured in accordance with estimated willingness to pay when those consequences are of a person-altering nature that will generate truly massive benefits.

V. CONCLUSION

Many significant social policies impose current costs in order to provide long-term benefits. There is considerable controversy regarding whether in assessing the merits of such policies through the conventional willingness to pay framework these future benefits should first be discounted to a smaller present value before being aggregated with current impacts, and if so, then what is the appropriate discount rate to utilize for such calculations.

There is in fact less at stake in the resolution of these discounting issues than is commonly recognized. These questions are still relevant with regard to a policy's future impacts upon those persons existing at the time of a policy's initial implementation. But the future impacts of policies are largely of a person-altering character in that they will significantly alter the fundamental genetic identities of the members of future generations. If such person-altering consequences are valued in accordance with the estimated willingness to pay of the affected future persons the result reached for any policy whatsoever will be truly massive aggregate benefits that cannot be quantified with any real precision. Since no plausible quantitative estimates of the value of future policy consequences can be

generated, there is no need to address the discounting issues with regard to those consequences. Moreover, the largest proportion by far of the persons who will be impacted by a policy over time are future persons who will be impacted in a person-altering fashion. Therefore the resolution of the discounting issues will have only a minor impact on valuations, if those valuations are properly done so as to reflect person-altering consequences, and is thus not nearly as significant for policy assessment as is commonly believed.

If a new policy assessment methodology is developed that allows for meaningful quantitative estimates of future impacts, while still recognizing the pervasiveness and significance of person-altering consequences, the discounting issues would then have to be addressed with regard to those estimates. Until then, however, the debate regarding these issues is of very limited practical importance.