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Judicial Review of Discount Rates Used in Regulatory Cost-Benefit Analysis

Edward R. Morrison†

Executive orders, statutes, and precedent increasingly require cost-benefit analysis of regulations. Presidential executive orders have long required executive agencies to submit regulatory impact analyses[1] to the Office of Management and Budget ("OMB") before issuing regulations,[2] and recent federal legislation exhibits a trend toward mandatory cost-benefit analysis. For example, the Toxic Substances Control Act,[3] the Federal Insecticide, Fungicide and Rodenticide Act,[4] and the recent Safe Drinking Water Act Amendments[5] require the Environmental Protection Agency to balance costs and benefits in regulating chemicals and pesticides. In 1995, Congress passed the Unfunded Mandates Act,[6] requiring cost-benefit analysis of all significant federal regulations that require expenditures by state, local, or tribal governments.[7] Additionally, Congress has proposed several bills that would require federal agencies to apply cost-benefit analysis to all rules.[8]

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[1] A regulatory impact analysis assesses the potential costs and benefits (both monetary and nonmonetary) of a rule. EO 12291, 46 Fed Reg 13193, 13194 (1981). The report contains a "description of alternative approaches that could substantially achieve the same regulatory goal at lower cost, together with an analysis of this potential benefit and costs and a brief explanation of the legal reasons why such alternatives, if proposed, could not be adopted." Id.

[2] Although previous administrations issued executive orders encouraging agencies to consider the economic impact of proposed regulations, President Reagan's executive order, EO 12291, 46 Fed Reg 13193, was the first to require cost-benefit analysis. Section 2 of EO 12291 required agencies to ensure that the social benefits of a proposed regulation exceed its social costs. Id. In 1993, President Clinton issued EO 12866, 58 Fed Reg 51735 (1993), which generally affirms the approach of the Reagan order. Unlike Reagan's order, however, EO 12866 § 1(b) merely endorses cost-benefit analysis as a tool for evaluating regulatory options and does not require that benefits outweigh costs. 58 Fed Reg at 51735-36. See generally Richard H. Pildes and Cass R. Sunstein, *Reinventing the Regulatory State*, 62 U Chi L Rev 1, 3-7 (1995) (comparing the different approaches of the Reagan and Clinton executive orders); OMB, *Draft Report to Congress on the Costs and Benefits of Federal Regulations*, 62 Fed Reg 39352, 39355-57 (1997) (describing the development of regulatory analyses in successive administrations).

[3] 15 USC § 2605(c)(1) (1994).

[4] 7 USC § 136(bb) (1994).

[5] 42 USCA § 300g-1(b)(3) (1991 & Supp 1998).

[6] Pub L No 104-4, 109 Stat 48 (1995), codified at 2 USCA §§ 1501 et seq (1997).

[7] 2 USCA § 1532(a).

This trend raises important questions about the methods agencies use to conduct cost-benefit analysis. To perform the analysis, an agency must first quantify the stream of costs and benefits that a regulation will generate in current and future periods.[9] Quantification, however, is not enough. Because of the time value of money (that is, a dollar today can be invested to yield more than a dollar tomorrow), costs and benefits in different periods are different "goods" and are not strictly comparable. Therefore, the agency must choose a discount rate that will convert future sums into present values. It can then use these present values to compute the net benefit (or "net present value") of the regulation.

Discount rates fundamentally influence judgments about the need for and the effectiveness of cost-benefit analysis. In 1986, OMB economist John Morrall documented extreme variation in the value that regulations implicitly place on human life.[10] On the low end, a National Highway Traffic Safety Administration ("NHTSA") regulation cost $100,000 per life saved;[11] on the high end, an Occupational Safety and Health Administration ("OSHA") rule cost $72 billion per life saved.[12] Although this study has greatly influenced recent congressional and academic proposals for regulatory reform,[13] emerging scholarship shows that Morrall's results depended critically on the discount rate he chose, which differed markedly from the rates NHTSA and OSHA actually employed.[14]

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[8] See, for example, Risk Assessment and Cost-Benefit Act of 1995, HR 1022, 104th Cong, 1st Sess (Feb 23, 1995); Regulatory Improvement Act of 1997, S 981, 105th Cong, 2d Sess (June 27, 1997). See generally Cass R. Sunstein, *Congress, Constitutional Moments, and the Cost-Benefit State*, 48 Stan L Rev 247, 269-86 (1996) (describing regulatory reform efforts of the 104th Congress); Thomas O. McGarity, *The Expanded Debate over the Future of the Regulatory State*, 63 U Chi L Rev 1463, 1528-32 (1996) (same).

[9] This Comment ignores "incommensurability" issues—whether the value of life or other nonmonetary benefits can be measured "along a single metric without doing violence to our considered judgments about how these goods are best characterized." Cass R. Sunstein, *Incommensurability and Valuation in Law*, 92 Mich L Rev 779, 796 (1994).

[10] John F. Morrall III, *A Review of the Record*, Regulation 25, 30 table 4 (Nov/Dec 1986).

[11] *Initial Federal Motor Vehicle Safety Standards*, 32 Fed Reg 2408, 2414-15 (1967).

[12] *Occupational Exposure to Formaldehyde*, 50 Fed Reg 50412 (1985).

[13] See, for example, Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, 107 Yale L J 1981 (1998). Heinzerling notes, id at 1983 n 2, that Morrall's statistics underlie Stephen Breyer, *Breaking the Vicious Circle: Toward Effective Risk Regulation* 24-27 (Harvard 1993). For other commentary relying on Morrall's work, see Pildes and Sunstein, 62 U Chi L Rev at 105 & n 363 (cited in note 2); John D. Graham, *The Risk Not Reduced*, 3 NYU Envir L J 382, 398 n 79 (1994); W. Kip Viscusi, *Equivalent Frames of Reference for Judging Risk Regulation Policies*, 3 NYU Envir L J 431, 449-50 n 42 (1994).

The Morall study is just one example of how small variations in the discount rate can have very large effects on the results of cost-benefit analysis. Consider, for example, a proposed regulation that will generate $100 in benefits in fifty years. The present value[15] of this benefit is $61 at a 1 percent discount rate, $14 at 4 percent, $3 at 7 percent, and less than $1 at 10 percent. Unfortunately, despite the importance of the discount rate in cost-benefit analysis, few standards guide agency practice. Although OMB has issued discount rate guidelines since 1972,[16] discount rates vary significantly within and across agencies.

Few courts have reviewed agency discount rates, in part because relatively few statutes require agencies to conduct cost-benefit analysis, and in part because there are no meaningful standards of review for courts to apply. When courts have addressed the issue, they have either deferred to agency discretion or imposed their own judgments about discounting. The absence of standards for discounting is particularly troubling as cost-benefit analysis has played an ever greater role in new legislation. Although several legal scholars have discussed this problem, none has considered how economic theory can assist courts in reviewing agency discount rates.[17]

This Comment develops a framework for judicial review of an agency's choice of discount rate. Part I discusses the striking variation in the discount rates agencies use. Part II analyzes the economic theory of discounting and develops a simple conceptual framework for evaluating particular discount rates. Finally, Part III uses this conceptual framework to establish a standard of review that courts may apply when reviewing an agency's choice of discount rate.

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[14] See Heinzerling, 107 Yale L J at 1984-85 (cited in note 13).

[15] The general formula for computing the present value (in discrete time) of a sum X paid in n years, where the discount rate is r, is $X/(1 + r)^n$. Thus, when the discount rate is 5 percent, the present value of $100 paid in 50 years is $100/(1 + .05)^{50}$ = $8.72.

[16] See OMB, *Benefit-Cost Analysis of Federal Programs; Guidelines and Discounts*, 57 Fed Reg 53519, 53520 (1992), replacing and rescinding OMB Circular No A-94, *Discount Rate to be Used in Evaluating Time-Distributed Costs and Benefits* (Mar 27, 1972).

[17] One article has explored the appropriate discount rate policy for regulatory agencies. Daniel A. Farber and Paul A. Hemmersbaugh, *The Shadow of the Future: Discount Rates, Later Generations, and the Environment*, 46 Vand L Rev 267 (1993). The authors, however, do not address the appropriate standard of judicial review. Other commentators have discussed agency discount rates without reference to judicial review. See, for example, Heinzerling, 107 Yale L J at 2043-56 (cited in note 13); Bradford C. Mank, *Protecting the Environment for Future Generations: A Proposal for a "Republican" Superagency*, 5 NYU Envir L J 444, 460-62 (1996). See also Cass R. Sunstein, *Behavioral Analysis of Law*, 64 U Chi L Rev 1175, 1193-94 (1997).

I. AGENCY PRACTICE: LARGE VARIATION WITHIN AND ACROSS AGENCIES

Agencies exhibit striking inconsistencies in their use of discount rates. Not only do different agencies use significantly different rates, but often a single agency employs very different rates for various regulations. Administrative records offer little explanation for this variation.

In an effort to standardize agency cost-benefit analysis, OMB has issued discount rate guidelines since 1972.[18] The most recent guidelines, published in 1992, recommend a 7 percent real[19] discount rate for analysis of all "public investments and regulatory programs that provide benefits and costs to the general public."[20] OMB asserts that this rate "approximates the marginal pretax rate of return on an average investment in the private sector in recent years."[21] However, OMB acknowledges that alternative rates may be appropriate in some cases.[22]

OMB's guidelines appear to have had little effect on the discount rates that agencies actually use.[23] This is evident in Tables 1 and 2 (following this Comment), which survey the discount rates agencies have employed during the past five years. Table 1 focuses on long-term regulations that provide costs or benefits over thirty or more years. Some agencies, such as the Department of Housing and Urban Development ("HUD") and the Food and Drug Administration ("FDA"), have used a relatively low rate of 3 percent; others, such as the Environmental Protection Agency ("EPA") and the Bureau of Reclamation, have employed rates in excess of 7 percent. Further, individual agencies have used different rates for different regulations. The EPA, for example, employed a 3 percent discount rate for regulations of lead-based paint but used 7 and 10 percent rates for regulations of drinking water and emissions from locomotives. This variation in discount rates has profound effects on the analysis of long-term regulations. Consider the HUD regulation of lead-based paint.[24] While that regulation had net benefits of $1,080.2 million at a 3 percent discount rate, it had net benefits of only $39 million at a 7 percent rate.[25] Although HUD acknowledged this, it favored the 3 percent rate merely because the regulation affected future generations.[26]

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[18] See OMB, *Benefit-Cost Analysis of Federal Programs*, 57 Fed Reg at 53520 (cited in note 16).

[19] A real discount rate (as opposed to a nominal rate) excludes the premium for expected inflation.

[20] OMB, *Benefit-Cost Analysis of Federal Programs*, 57 Fed Reg at 53522-23 (cited in note 16). Prior to 1992, OMB recommended a 10 percent rate. OMB, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*, 57 Fed Reg 35613, 35613-14 (1992).

[21] OMB, *Benefit-Cost Analysis of Federal Programs*, 57 Fed Reg at 53523 (cited in note 16).

[22] An agency, however, must gain OMB permission to use alternative discount rates, such as the "shadow price of capital," instead of the recommended 7 percent rate. Id.

[23] OMB has acknowledged as much. See OMB, *Draft Report to Congress*, 62 Fed Reg at 39379 (cited in note 2), where OMB notes that the EPA did not use the recommended discount rate in conducting its analysis of its lead-based paint rule.

Slightly less inconsistency characterizes agency analyses of short-term regulations that yield benefits and costs within the next twenty years. Table 2 shows that most agencies use discount rates between 7 and 10 percent. However, there is still significant variation: several agencies, such as the EPA[27] and the FDA,[28] have used 3 percent rates.

The administrative record offers little explanation for the selection of discount rates. Many agencies employ discount rates without discussing the theoretical or political reasons for choosing a particular rate.[29] This seems particularly true for the EPA.[30]

II. THE THEORY OF DISCOUNT RATES

Scholars have long debated what discount rate is appropriate for regulations and other public projects. The debate has ethical, political, and economic dimensions. On one level, scholars debate the threshold issue of whether it is sound public policy for regulatory agencies to discount future benefits, especially when those benefits accrue to future generations. On another level, given the choice to discount future costs and benefits, the debate becomes more economic. Here scholars disagree whether regulatory agencies should derive the appropriate discount rate from rates of return in financial markets or from a normative model of intergenerational social welfare.

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[24] HUD, *Requirements for Notification, Evaluation and Reduction of Lead-Based Paint Hazards in Federally Owned Residential Property and Housing Receiving Federal Assistance*, 61 Fed Reg 29170 (1996).

[25] Id at 29189.

[26] Id. HUD noted that EPA also uses a 3 percent rate. Id.

[27] See EPA, *Comprehensive Guideline for Procurement of Products Containing Recovered Materials*, 62 Fed Reg 60962, 60970 (1997) (employing a 3 percent rate over a ten-year period).

[28] See Department of Health and Human Services, *Tobacco Regulation for Substance Abuse Prevention and Treatment Block Grants*, 61 Fed Reg 1492, 1504, 1506 (1996) (presenting benefit-cost analysis results using both 3 and 7 percent discount rates).

[29] Rare exceptions include the Department of Energy's regulation on energy conservation standards for consumer products, see Department of Energy, *Energy Conservation Program for Consumer Products*, 58 Fed Reg 47326, 47333-35 (1993), and the National Oceanic and Atmospheric Administration rules on natural resource damage assessments, see Department of Commerce, National Oceanic and Atmospheric Administration, *Natural Resource Damage Assessments*, 61 Fed Reg 440, 453-54 (1996), where the agencies justify their decisions to depart from OMB guidelines. See discussion in Part III.C.

[30] See, for example, EPA, *Protection of Stratospheric Ozone; Labeling*, 58 Fed Reg 8136, 8163 (1993) (offering alternative conclusions using a 2 percent and 7 percent rate without providing an explanation for using either discount rate).

This Part surveys both levels of the debate. Part A addresses the ethical, political, and economic debate over the threshold decision to discount future costs and benefits, demonstrating that sound public policy requires a regulatory agency to discount future sums. Part B surveys the economic and political debate over the appropriate discount rate. Finally, Part C synthesizes the discussion in this Part and develops a simple conceptual framework for choosing and evaluating discount rates.

A. The Philosophical Approach to Discount Rates

Philosophers,[31] legal scholars,[32] and several economists[33] have questioned the ethical and logical theory underlying the decision to discount future costs and benefits to future generations. A strong intuition suggests that individual lives today are no more or less valuable than lives in the future.[34] Just as a person's life should not be treated as less valuable because the person lives one hundred miles away, so too a life should not be treated as less valuable because it will exist one hundred years in the future.

Thus philosophers and some economists have argued that a zero discount rate should be used when evaluating projects with consequences that may benefit or harm future generations.[35] This approach recognizes that harms to future generations deserve no less protection than harms to the current generation. As the renowned economist Frank Ramsey explained: "[I]t is assumed that we do not discount later enjoyments in comparison with earlier ones, a practice which is ethically indefensible and arises merely from the weakness of the imagination."[36]

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[31] See, for example, Derek Parfit, *Rationality and Time*, 1983/84 Proceedings of the Aristotelian Society 47, 79-81; Derek Parfit, *Energy Policy and the Further Future: The Social Discount Rate*, in Douglas MacLean and Peter G. Brown, eds, *Energy and the Future* 31-37 (Rowman and Littlefield 1983); John Rawls, *A Theory of Justice* 284-303 (Belknap 1971).

[32] See, for example, Farber and Hemmersbaugh, 46 Vand L Rev at 289-300 (cited in note 17); Mank, 5 NYU Envir L J at 448-50, 460-62 (cited in note 17).

[33] See, for example, R.F. Harrod, *Towards a Dynamic Economics: Some Recent Developments of Economic Theory and their Application to Policy* 37-40 (Macmillan 1948); A.C. Pigou, *The Economics of Welfare* 24-26 (Macmillan 4th ed 1932); F.P. Ramsey, *A Mathematical Theory of Saving*, in J.M. Keynes and D.H. MacGregor, eds, *The Economic Journal: The Journal of the Royal Economic Society* 543 (Macmillan 1928); Robert M. Solow, *The Economics of Resources or the Resources of Economics*, 64 Am Econ Rev: Papers and Proceedings 1, 7-14 (1974).

[34] See Bruce A. Ackerman, *Social Justice in the Liberal State* 203 (Yale 1980).

[35] See id at 203; Harrod, *Towards a Dynamic Economics* at 45 (cited in note 33); Parfit, *Energy Policy* at 31, 36-37 (cited in note 31); Ramsey, *A Mathematical Theory of Saving* at 554 (cited in note 33); Solow, 64 Am Econ Rev: Papers and Proceedings at 9 (cited in note 33).

Some commentators go further, arguing that the "present generation has a fiduciary responsibility to see that future generations enjoy a parity of social value and opportunity."[37] This fiduciary duty implies that the welfare of future generations, especially nearer ones, should be treated on par with (that is to say, not discounted relative to) the welfare of the current generation.[38]

This argument for zero discounting, however, does not deny the time value of money—that a dollar tomorrow is worth less than a dollar today (because a dollar can be invested today and yield more than a dollar tomorrow). Indeed, proponents of zero discount rates likely would agree that society *should* discount a monetary sum payable to future generations. Society can bequeath that benefit to future generations simply by investing a smaller sum in financial markets today. Rather, proponents of zero discounting argue that regulators should not discount *nonmonetary* benefits to future generations. Putting aside difficult commensurability problems, society cannot bequeath these benefits to future generations merely by investing in financial markets. This is especially true for environmental, health, and other less tangible benefits that future generations may be unable to "buy," because previous generations caused irreversible damage to the resources that provide these benefits. For example, if current society improperly stores nuclear waste and leakage causes the death of a child in some future generation, no sum will enable the parent to "buy" back the child's life.

While reasonable, the ethical intuition that the state should not discount benefits to future generations suffers from two weaknesses. First, this ethical standard can beget apparently unethical results. If the current generation is morally obligated to treat the welfare of future generations on par with its own welfare, then logic dictates that the current generation has a duty to undertake almost any sacrifice, short of starvation, to benefit the future.[39] By foregoing consumption today and investing in projects that provide a stream of benefits for future generations, the current generation suffers a finite sacrifice but generates an infinite benefit (due to zero discounting) for the future.[40] Indeed, the moral intuition of zero discounting implies that it may be optimal for the current generation to save two-thirds or more of its annual income.[41] This is unacceptable, however, for "individuals are not morally required to subscribe fully to morality at any cost to themselves."[42] Further, while the argument against discounting seems compelling where future harms (such as the death of a child) are irreversible, this argument is too powerful. Most, if not all, regulations today seek to prevent some form of irreversible damage in the future, perhaps in future generations. Therefore, even the argument against discounting irreversible damage would generate excessive sacrifice today.

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[36] Ramsey, *A Mathematical Theory of Saving* at 261 (cited in note 33).

[37] Mank, 5 NYU Envir L J at 448 (cited in note 17), referring to Ackerman, *Social Justice* at 203 (cited in note 34). See also Rawls, *A Theory of Justice* at 284-93 (cited in note 31); Mark Sagoff, *The Economy of the Earth: Philosophy, Law and the Environment* 63 (Cambridge 1988).

[38] See Farber and Hemmersbaugh, 46 Vand L Rev at 298-99 (cited in note 17).

Second, the moral intuition of zero discounting rests on the questionable assumption that government policy should be based on moral introspection rather than individuals' actual behavior. Unless there is evidence that the current generation is not sufficiently altruistic toward future generations (evidence of a market failure), the observed behavior of individuals may be the most reliable indicator of the beliefs and values that should dictate policy choices in a democracy. Relative to the government, parents (the current generation) probably have superior information about optimal investments in the welfare of their children (future generations). Further, even if surveys indicate that a majority of the members of the current generation favors a zero discount rate, this finding is not persuasive if individuals in society behave *as if* they discount the future.[43] Discounting may be a good description of individual behavior, and a good guide for public policy, regardless of whether individuals believe they discount the future or not.[44]

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[39] See Kenneth J. Arrow, *Discounting, Morality, and Gaming* 3-8, working paper (Dec 24, 1996), available online at <http://www-econ.stanford.edu/econ/wk-workp/swp970004.html> (visited July 6, 1998).

[40] See id at 5.

[41] See id at 6-7, developing a simple model of optimal investment and saving in a world that lasts forever. Empirical estimates of the model's parameters suggest that the optimal savings rate is two-thirds or greater.

[42] Id at 2. Philosophers and legal scholars reject this criticism, claiming that it confuses intergenerational efficiency and intergenerational equity. See Tyler Cowen and Derek Parfit, *Against the Social Discount Rate*, in Peter Laslett and James S. Fishkin, eds, *Justice between Age Groups and Generations* 148-49 (Yale 1992); Farber and Hemmersbaugh, 46 Vand L Rev at 291-92 (cited in note 17). In reality, society maximizes two objectives: total welfare and intergenerational equity. See Cowen and Parfit, *Against the Social Discount Rate* at 149 ("[W]e should not simply aim for the greatest net sum of benefits. We should have a second moral aim: that these benefits be fairly shared between different generations."), citing Rawls, *A Theory of Justice* at 297-98 (cited in 31).

[43] For a well-known statement of this principle of economic modeling, see Milton Friedman, *The Methodology of Positive Economics*, in Kurt R. Leube, ed, *The Essence of*

B. The Economic Approach to Discount Rates

Economic theory offers two principal theories for discounting costs and benefits to future generations: the opportunity cost of capital ("OCC") and the social rate of time preference ("SRTP"). Both theories provide strong political and ethical support for positive discount rates. However, economists disagree whether the OCC or SRTP should guide regulators.[45] Although the two theories are logically consistent,[46] they generate very different discount rates in practice. The SRTP yields relatively low rates, around 1 to 3 percent.[47] In contrast, the OCC generally produces rates in excess of 5 percent.[48] This Part introduces the two theories and reviews the major issues underlying the debate.

1. Opportunity cost of capital.

a) The economic theory. The cost of a public investment is not merely the value of the resources consumed. It also includes the opportunity cost of those resources. The opportunity cost reflects the value of the next best use of the resources, such as investment in the private sector. Consider, for example, a proposed regulation that costs $1 million today and promises to reduce

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Friedman 161-66 (Hoover Institution 1987).

[44] Kenneth J. Arrow has demonstrated that this is actually the case in *Intergenerational Equity and the Rate of Discount in Long-Term Social Investment* 19-20, working paper (Dec 1995), available online at <http://www-econ.stanford.edu/econ/workp/swp97005.html> (visited July 5, 1998). Even in a world where each generation wants to treat all future generations equally, every generation will behave as if it discounts the future. This occurs because, as the philosophical critique recognizes, no generation will make excessive sacrifices for the future. Every generation is slightly selfish. Consequently, each generation strategically decides how many resources to transfer to the next generation, given that the next generations may decide not to transfer these resources to the further future. The result of this strategic interaction is a savings rate that corresponds to a positive rate of discount on the welfare of future generations.

[45] See id at 3-10.

[46] See Robert C. Lind, *A Primer on the Major Issues Relating to the Discount Rate for Evaluating National Energy Options*, in Robert C. Lind, ed, *Discounting for Time and Risk in Energy Policy* 27 (Resources for the Future 1982).

[47] See Kenneth J. Arrow, et al, *Intertemporal Equity, Discounting and Economic Efficiency*, in James P. Bruce, Hoesung Lee, and Erik F. Haites, eds, *Climate Change 1995* 131-33 (Cambridge 1996); Richard D. Morgenstern, *Conducting an Economic Analysis: Rationale, Issues, and Requirements*, in Richard D. Morgenstern, ed, *Economic Analyses at EPA: Assessing Regulatory Impact* 36 (Resources for the Future 1997).

[48] See Arrow, et al, *Intertemporal Equity* at 132-33 (cited in note 47); Morgenstern, *Conducting an Economic Analysis* at 36 (cited in note 47).

pollutants that will cause damaging climate change in fifty years. If nothing is done to control the pollutants today, fifty years from now future society will suffer damage requiring $10 million in abatement costs. At first blush, the regulation appears attractive: a $1 million investment avoids a $10 million expenditure in the future. No conclusion about the desirability of the regulation can be drawn, however, without considering the next best use of the $1 million investment today. If the resources could be invested in an asset, such as a long-term bond with a 5 percent return, society would be better served if the government avoided the regulation: the bond would yield over $10 million in fifty years,[49] leaving future generations with more than enough resources to combat the environmental damage. In other words, at a 5 percent discount rate, the proposed regulation does not pass the cost-benefit test because it has a negative net present value.

A standard measure of the opportunity cost of a public investment is the interest rate on assets with similar risk and duration in private financial markets. Public investment generally displaces private investment because it takes resources out of the private sector, either directly (through taxes) or indirectly (through the private costs of complying with regulations).[50] Private assets, therefore, represent the next best investment opportunities for the resources used for public investments.[51]

The fundamental intuition underlying the OCC approach is that the government should choose projects that maximize the resources available to future generations, not those that maximize particular aspects of future welfare, such as environmental well-being. Because the current generation cannot know the economic constraints facing future generations, it is better for the current generation to invest in their general well-being by choosing the projects with the highest rates of return. As proponents of this approach argue:

> Insofar as we today should consider the welfare of future generations, our duty lies not in leaving them exactly the social and environmental life we think they ought to have, but rather in making it possible for them to inherit a climate of open choices—that is, in leaving behind a larger level of general fluid resources to be redirected as they, not we, see fit.[52]

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[49] The actual payoff of the bond would be ($1,000,000)x(1.05)^{50}=$11,467,340.

[50] See, for example, Arrow, *Intergenerational Equity* at 7 (cited in note 44); William J. Baumol, *On the Social Rate of Discount*, 58 Am Econ Rev 788, 789-93 (1968).

[51] See generally *Discounting an Uncertain Future*, FEEM Newsletter 24 (Dec 1997).

[52] Arrow, et al, *Intertemporal Equity* at 133 (cited in note 47), quoting Aaron Wildav-

b) Applying the economic theory. The OCC is a *descriptive* approach to the choice of a social discount rate.[53] The approach assumes that the price system—in particular, the rate of return available in financial markets—accurately reflects the scarcity of resources, expectations about the future, and societal preferences regarding future consumption vis-à-vis current consumption. The OCC approach makes no assumption about what the social discount rate *should* be.

The OCC approach, however, is complicated and may not be appropriate for evaluating all public projects. Critics have identified several limitations to the OCC approach. To begin, the OCC is not directly observable. Rates of return in financial markets include premia for risk,[54] the expected rate of inflation, and taxes that should not affect the social discount rate. Scholars have shown that once these factors are subtracted, the discount rate (in real terms) will generally exceed 5 percent, but it may be as low as 1 percent.[55] The particular rate will vary over time and will change with expectations regarding the welfare of future generations. Critics, however, note that it is very difficult to adjust observed rates of return for taxation, risk, and other factors.[56]

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sky, *Searching for Safety* 216 (Transaction Books 1988).

[53] See Arrow, et al, *Intertemporal Equity* at 132-33 (cited in note 47).

[54] Although risk-averse investors demand a premium to compensate for the risk of an asset, most scholars agree that no such premium is necessary for government investments because (1) the government's investment portfolio (its collection of regulations and investments) is sufficiently broad to eliminate most diversifiable risk, see Baumol, 58 Am Econ Rev at 794 (cited in note 50), and (2) even if a government investment is risky, the cost of risk-bearing is trivial when it is spread among taxpayers, see Kenneth J. Arrow and Robert C. Lind, *Uncertainty and the Evaluation of Public Investment Decisions*, 60 Am Econ Rev 364, 370-74 (1970).

[55] See Arrow, et al, *Intertemporal Equity* at 133 (cited in note 47); Raymond J. Kopp and Paul R. Portney, *Mock Referenda for Intergenerational Decisionmaking*, 5 Discussion Paper 97-48 (Resources for the Future 1997), available online at <http://www.rff.org/disc_papers/PDF_ files/9748.pdf> (visited July 5, 1998).

[56] See Richard H. Thaler and George Loewenstein, *Intertemporal Choice*, in Richard H. Thaler, ed, *The Winner's Curse: Paradoxes and Anomalies of Economic Life* 105-06 (Princeton 1996). Additionally, some scholars object to the use of the OCC when an agency evaluates benefits to future generations because financial markets generally do not offer assets that pay out in future generations. See Farber and Hemmersbaugh, 46 Vand L Rev at 296-97 (cited in note 17); FEEM Newsletter, *Discounting* at 24-25 (cited in note 51). The OCC makes most sense where financial markets offer assets with term structures that are similar to regulations that agencies are considering. In such situations, the agency can directly compare the payoff of the regulation to the payoff of the asset. Where the regulation involves intergenerational welfare, financial markets are unhelpful and therefore the OCC approach is inappropriate. This objection, however, merely points out a complication of the OCC; it does not undermine the approach. Financial markets will exist in future generations, so there are trading strategies whereby individuals could invest sequentially in private assets that collectively have a duration comparable to the long-term public project. The expected rate of return on this strategy would be one logical discount rate for the public investment.

Additionally, critics note that the OCC approach assumes that public projects and regulations divert resources (via taxation) from capital markets. To the contrary, evidence suggests that, in the absence of taxation, members of society would invest only a fraction of their resources in credit markets[57] and would consume the rest. Therefore, to the extent that regulations are financed by resources that would otherwise be consumed, the OCC may overstate the appropriate rate of discount. Instead, the SRTP, which measures the rate at which society is willing to trade current and future *consumption*, may be closer to the relevant rate.[58]

These considerations have led some economists to conclude that the appropriate discount rate may vary with the type of regulation or public project and how it is financed. When the government relies on debt to finance the regulation, the OCC provides more accurate results.[59] When government relies on taxes, however, a combination of the OCC approach and the SRTP approach may be more appropriate.[60] At least one economist, however, has questioned this notion that the discount rate should vary with the government's source of funds.[61] Whether the state uses debt or taxes to finance regulations, it is essentially imposing a tax on production by diverting inputs from productive processes (firms). Therefore, the appropriate discount rate will always be the OCC.

2. Social rate of time preference.

a) The economic theory. While the OCC relies on observable behavior to derive the social discount rate, the SRTP relies on theory to derive that rate. Standard economic theory hypothesizes,[62] and empirical evidence confirms,[63] that individuals value current consumption more than future consumption. The rate at which a person will trade (via a hypothetical asset) current for future consumption is known as the individual rate of time preference. Analogously, the *social* rate of time preference represents the rate at which members of society, on average, are willing to trade current benefits for future benefits. The appropriate measure of the SRTP, however, depends on the government's theory of intergenerational welfare: different models of welfare imply different measures of the SRTP.

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[57] See Arrow, *Intergenerational Equity* at 9 (cited in note 44).

[58] See id; see also Lind, *A Primer on the Major Issues* at 29-32 (cited in note 46); Joel D. Scheraga, *Perspectives on Government Discounting Policies*, 18 J Envir Econ & Mgmt S-65, S-67 (1990). The SRTP is discussed in the following Part.

[59] See, for example, Scheraga, 18 J Envir Econ & Mgmt at S-65 (cited in note 58).

[60] The appropriate discount rate would be a weighted average of the rates derived from the OCC and SRTP approaches, where the weights are approximately equal to the proportion of funds that displaces investment (for the OCC-based rate) and the proportion that displaces consumption (for the SRTP-based rate). See Larry A. Sjaastad and Daniel L. Wisecarver, *The Social Cost of Public Finance*, 85 J Pol Econ 513, 514-16 (1977).

[61] See Baumol, 58 Am Econ Rev at 791-92 (cited in note 50).

[62] See generally Maureen L. Cropper and Frances G. Sussman, *Valuing Future Risks to Life*, 19 J Envir Econ & Mgmt 160, 173-74 (1990) (applying standard theory to the problem of valuing future risks to life); Andreu Mas-Colell, Michael D. Whinston, and Jerry R. Green, *Microeconomic Theory* 732-36 (Oxford 1995) (describing standard theory of intertemporal choice and the theory underlying discounting).

Most welfare models, in which the current government chooses projects to maximize the joint welfare of all generations, show that the SRTP can be written as the sum of two components: pure time preference and the growth rate of per capita income.[64] Pure time preference is a measure of preferences, reflecting each generation's desire (or impatience) to receive benefits sooner rather than later.[65] The more impatient the present generation, the higher the discount rate on benefits to future generations. The growth rate of per capita income is a measure of scarcity, reflecting the relative incomes of different generations.[66] The higher the income of future generations relative to the current generation (that is, the higher the growth rate of per capita income), the higher the discount on benefits to future generations.

The pure time preference component is controversial because it might reflect myopia, a special affinity for nearer generations, or some other defect in "our telescopic faculty" that should not guide government decisions about intergenerational welfare.[67] This criticism is valid insofar as the observed "myopia" of the current generation imposes some negative externality on future gen-

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[63] See, for example, Michael J. Moore and W. Kip Viscusi, *Discounting Environmental Health Risks: New Evidence and Policy Implications*, 18 J Envir Econ & Mgmt S-51, S-61 (1990) (providing evidence that workers discount future job-related health and safety hazards at a 2 percent rate); Thaler and Loewenstein, *Intertemporal Choice* at 92 (cited in note 56) (discussing evidence that discount rates vary with age, irrespective of whether the future outcome is a gain or loss, or whether the size of the gain or loss is large or small).

[64] See Arrow, et al, *Intertemporal Equity* at 134-35 (cited in note 47). There the authors illustrate a popular welfare model: a continuous-time welfare function, where the welfare of each generation is additively separable. In this model, the optimality conditions for public investment yield the expression: $\Delta+\mu g=\text{SRTP}$. Here, Δ is a measure of pure time preference ("impatience"), g is the growth rate of per capita income, and μ is a scale factor equal to the elasticity of marginal utility with respect to consumption (for simplicity, this scale factor can be treated as constant and ignored). While Δ is constant over time, μg will vary with per capita income. The higher the rate of income growth, g, the higher is the social rate of discount r.

[65] See id at 131, 136.

[66] See id.

[67] Pigou, *The Economics of Welfare* at 25 (cited in note 33).

erations, who would pay the current generation to be less myopic if such payments were possible. Thus, the government should override societal preferences in favor of intergenerational welfare.[68] However, given that individuals are altruistic toward future generations (for example, children and grandchildren), it is unclear when the preferences of the current generation will exert a negative externality on future generations.[69]

In contrast, the SRTP's dependence on economic growth has strong economic and ethical justifications. If future generations will be better off than the current generation, optimal resource allocation suggests that the current generation should favor public investments with immediate payoffs over those that benefit future generations.[70] Similarly, the ethical notion that one generation should not sacrifice excessively for another implies that regulatory agencies should discount benefits to future generations—who will be better off than current citizens anyway—when evaluating potential projects.[71]

b) Applying the economic theory. The SRTP is a *prescriptive* approach to the social discount rate. It assumes that society should maximize an arbitrarily chosen intergenerational welfare function,[72] and then derives the social discount rate from the optimality conditions of that function. This approach, however, raises at least three controversial ethical, political, and economic issues.

First, while the OCC approach relies on observable economic behavior, the SRTP rejects such evidence in favor of normative models of intergenerational welfare. Thus the SRTP implicitly assumes a market failure: financial markets provide a poor indicator of society's willingness to invest in particular projects (such as climate control) that benefit future generations.[73] The source of this market failure is unclear. The failure may result from information problems, such as the current generation's inability to assess the costs to future generations (for example, pollution mitigation, medical costs, and risks of mortality) if a particular regulation is not imposed.[74] Alternatively, the market failure may reflect myopia: members of the current generation may not care sufficiently about (or may not be sufficiently altruistic toward) future generations, who would be willing to pay members of the current generation to invest in particular projects.[75] In either case, however, the government likely cannot test whether the market failure is sufficiently serious to warrant the normative approach of the SRTP, which effectively overrides observed societal preferences in favor of a particular welfare model.

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[68] Many economists do not believe that myopic societal preferences justify government intervention. See, for example, Kopp and Portney, *Mock Referenda* at 5 (cited in note 55). See also Arrow, et al, *Intertemporal Equity* at 136 (cited in note 47), where the authors note that a nonzero pure rate of time preference may be defensible because "as a matter of *description*, the current generation gives less value to consumption of future generations."

[69] Once we account for altruism, the societal discount rate will be a function of the rate of intergenerational altruism. See Gary S. Becker, *A Treatise on the Family* 162-69 (Harvard Enlarged ed 1991).

[70] See Arrow, et al, *Intertemporal Equity* at 131, 136-37 (cited in note 47).

[71] See id at 136.

[72] See, for example, the welfare function discussed in note 64.

[73] See Sjaastad and Wisecarver, 85 J Pol Econ at 515-16 (cited in note 60).

Second, even assuming market failures warrant the SRTP approach, it is unclear whether an agency can identify an appropriate intergenerational welfare function and whether that function will generate discount rates that yield better outcomes than rates derived by the OCC approach.[76] Critics claim that even the most simple (and popular) welfare functions yield unreasonable discount rates that are "glaringly inconsistent" with the observed behavior of governments.[77] Further, if the SRTP yields a social discount rate that differs from the rate based on the OCC—thereby forcing society to invest at a rate that differs from market rates—government regulation may not have its intended effect on future generations. Society today can only control the welfare of the immediately succeeding generation.[78] If government today attempts to influence further generations by investing in irreversible projects (such as climate control technology), intermediate generations will merely reduce their investments in the future if they believe that the original investment was excessive. Such a reduction in investments is particularly likely to occur if technological changes have made the original investments worthless.[79]

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[74] See, for example, Amartya K. Sen, *Approaches to the Choice of Discount Rates for Social Benefit-Cost Analysis*, in Lind, ed, *Discounting for Time and Risk* at 349-50 (cited in note 46).

[75] Id at 349.

[76] See Arrow, et al, *Intertemporal Equity* at 131-33 (cited in note 47).

[77] Id at 132. The authors further note that a "discount rate of 2% implies far more investment than actually occurs in any country now, and thus would require a big jump in savings rates to finance." Id at 133.

[78] See Richard A. Epstein, *Justice Across the Generations*, 67 Tex L Rev 1465, 1482 (1989); Arrow, *Discounting, Morality, and Gaming* at 12 (cited in note 39).

[79] This is a variant of the theory of Ricardian Equivalence, which states that government generally cannot force one generation to save for the next by imposing a tax or investing in long-term assets. This forced saving will be "undone" as members of the first generation reduce their private bequests to future generations. For the basic theory of Ricardian Equivalence, see Robert J. Barro, *Are Government Bonds Net Wealth?*, 82 J Pol Econ 1095 (1974).

Contrary to the beliefs of some commentators,[80] economic theory provides strong support for the principle that current society best serves future generations by choosing investments that maximize general welfare in the future, not by choosing investments that protect future societies against particular problems.[81]

Finally, even if a regulator can identify a proper intergenerational welfare function, the regulator faces complex methodological problems. Consider the simple welfare function that describes the SRTP as a function of pure time preference and the growth rate of per capita income. Scholars debate how to measure these components of the SRTP. Although the typical approach is to derive the components from studies of individual behavior, studies in behavioral economics show that individual time preference may vary with age, income, the type of future payoff (that is to say, whether the payoff is a gain or loss, or whether it involves risk to future lives), and the amount of time until the payoff.[82] Indeed, some studies indicate that the SRTP may be much higher than scholars have generally believed and may even exceed the OCC.[83] The SRTP theory offers no guidance here.

Additionally, once an agency computes the SRTP, it faces significant difficulties in applying the rate.[84] Unlike the OCC, the SRTP is an appropriate discount rate for future *consumption*. Thus, an administrative agency must convert all costs and benefits of a proposed regulation into consumption equivalents; as in the OCC approach, the costs of a proposed regulation include the private investment that it displaces.[85]

3. A conceptual framework.

As a threshold matter, it seems unreasonable for agencies not to discount benefits to future generations in their cost-benefit analyses of proposed rules. To begin, without a discount rate, the analysis fails to account for the opportunity cost of resources that are diverted from private investment toward investment in the proposed rule. Having no discount rate may lead the agency to adopt rules that *reduce* the welfare of future generations, because the resources could have been invested in assets with higher rates of return. Additionally, a zero discount rate biases cost-benefit analysis in favor of rules that impose excessive sacrifices on the current generation. Finally, a zero discount rate is inconsistent with the observable behavior of individuals, which is arguably the best guide for policy in a democratic state.

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[80] See Farber and Hemmersbaugh, 46 Vand L Rev at 298-99 (cited in note 17).

[81] See Arrow, *Discounting, Morality, and Gaming* at 12 (cited in note 39).

[82] See generally Thaler and Loewenstein, *Intertemporal Choice* at 92-106 (cited in note 56).

[83] See id. See also Robert C. Lind, *Reassessing the Government's Discount Rate Policy in Light of New Theory and Data in a World Economy with a High Degree of Capital Mobility*, 18 J Envir Econ & Mgmt S-8, S-19 (1990), in which the author points to evidence that credit card debtors pay interest rates in excess of 16 percent.

[84] See Morgenstern, *Conducting an Economic Analysis* at 36 (cited in note 47); Scheraga, 18 J Envir Econ & Mgmt at S-66 (cited in note 58).

[85] See Lind, *A Primer on the Major Issues* at 39-55 (cited in note 46); Lind, 18 J Envir Econ & Mgmt at S-11 (cited in note 83).

The choice of discount rate is primarily a matter of policy and secondarily a matter of methodology.[86] Policy judgments largely dictate the choice between the two competing approaches to discounting. The OCC approach assumes that succeeding generations will be in the best position—because of superior information—to deal with environmental, health, or other problems. Therefore, the optimal regulatory policy is to maximize the wealth of succeeding generations. In contrast, the SRTP approach assumes that current society may be in a better position to deal with particular problems, such as global warming and nuclear waste storage. Thus, the SRTP overrides market prices and chooses seemingly suboptimal investments (relative to prevailing market rates of return) to ensure that future generations do not suffer these risks. Thus, agency choice between the OCC and SRTP approaches should be based, in part, on a determination whether current society is in a better position to deal with long-term problems.

Methodological issues determine the relative costs of applying the OCC or SRTP approaches. While the OCC approach requires detailed information about alternative financial assets and adjustments for taxes, risk, and inflationary expectations, the SRTP requires complex estimates of parameters such as the pure rate of time preference and the growth rate of per capita income.[87] Additionally, the SRTP approach requires an agency to determine the precise effects of the regulation on future *consumption*. Although the regulation may raise future consumption by improving air quality or other public goods, the project may also lower future consumption by diverting funds from private investment. The agency must subtract this "opportunity cost" of the regulation, which raises precisely the same issues as in the OCC approach (specifically, the agency must adjust market rates of return for risk, taxes, inflation, and other distortions).

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[86] This is also described in Arrow, et al, *Intertemporal Equity* at 134 (cited in note 47).

[87] Additionally, as shown in note 64, the SRTP also requires an estimate of a scale factor representing the elasticity of marginal utility with respect to per capita income.

On balance, policy and methodology issues favor the OCC over the SRTP. Because the current generation cannot know the resource constraints or preferences of future generations, regulators take large gambles with scarce resources when they follow the SRTP approach and invest in particular environmental, energy, or other projects that have lower returns than assets in financial markets. Like the Malthusian predictions of overpopulation,[88] these gambles may prove mistaken because they are based on incomplete information about market failures in financial markets and the capabilities of future generations to contend with environmental and other harms. Future generations would be better served (and better able to contend with future harms) if the government invests in rules that maximize their general welfare and enable them to make their own choices regarding the environment, energy, and other public goods.

Additionally, methodological issues favor the OCC approach because it is much simpler to calculate and apply.[89] While the OCC relies on observable financial market data, the SRTP requires that the regulator select a particular welfare function, derive an expression for the social discount rate, and identify empirical analogues for the parameters of the discount rate. Additionally, the regulator must convert all benefits and costs (including opportunity costs) into consumption equivalents.

III. JUDICIAL REVIEW OF AGENCY DISCOUNT RATES

Very few courts have reviewed agency discount rates. When courts have reached the issue, they have either deferred to agency discretion[90] or imposed their own judgment about discounting.[91] No court has developed a meaningful standard of review for agency choice of discount rates. This is troubling because legislation increasingly requires cost-benefit analysis. As such legislation is enacted, courts will encounter challenges to the methods—including discount rates—agencies use to conduct the analysis. Judicial review will prevent arbitrary agency decisions and ensure that statutory cost-benefit requirements have force. Without standards to cabin agency discretion, cost-benefit analysis may become mere window dressing, providing a veneer of scientific backing for agencies' arbitrary choices.[92]

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[88] See generally Gary S. Becker, *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education* 323-25 (Chicago 3d ed 1993).

[89] See Raymond J. Kopp, Alan J. Krupnick, and Michael Toman, *Cost-Benefit Analysis and Regulatory Reform: An Assessment of the Science and the Art* 41, available online at <http://www.rff.org/disc_papers/PDF_files/9719.pdf> (visited July 5, 1998); Morgenstern, *Conducting an Economic Analysis* at 36-37 (cited in note 47).

[90] See, for example, *Ohio v Department of Interior*, 880 F2d 432, 465 (DC Cir 1989) (deferring to Department's choice of discount rate, which is "first and foremost a policy choice").

[91] See, for example, *Corrosion Proof Fittings v EPA*, 947 F2d 1201, 1218 (5th Cir 1991), citing popular press—*What Price Posterity?*, The Economist 73 (Mar 23, 1991)—for the principle that if EPA discounts future costs, it must also discount future benefits.

This Part proposes a standard for judicial review. First, Part A briefly indicates when a court should review agency discount rates. Part B then shows that significant uncertainty surrounds the standard of review that courts should apply to discount rates. In an effort to resolve the uncertainty, this Part proposes a standard of review based on the conceptual framework developed in Part II. Finally, Part C illustrates the proposed standard of review by applying it to discount rates that agencies have employed in recent cost-benefit analyses.

A. When Judicial Review Is Appropriate

A court will review agency discount rates when either the underlying statute requires cost-benefit analysis or the agency relies on such analysis to justify a rule, adjudication, or exercise of discretion.

Statutes increasingly contain direct or indirect requirements for traditional cost-benefit analysis or a less rigorous comparison of the costs and benefits of a regulation. Direct requirements appear in such statutes as the Toxic Substances Control Act ("TSCA"), which requires the agency to consider "reasonably ascertainable economic consequences of the rule,"[93] and the Federal Insecticide, Fungicide and Rodenticide Act ("FIFRA"), which requires the agency to promulgate regulations of toxins after considering the environmental, economic, and social impact of the regulations.[94] Similarly, the Energy Policy and Conservation Act ("EPCA") requires the Department of Energy to assess whether an energy conservation regulation is economically justified,[95] and the 1996 Amendments to the Safe Drinking Water Act ("SDWA") explicitly require cost-benefit[96] and risk-risk[97] analysis of all major drinking water regulations. Additionally, under the Unfunded Mandates Act,[98] *all* federal agencies must conduct cost-benefit analysis of any rule requiring significant (over $100 million) expenditures by state, local, or tribal governments.[99]

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[92] See, for example, Scheraga, 18 J Envir Econ & Mgmt at S-66 (cited in note 58) (The author, an EPA official, noted that "many discounting procedures are subject to manipulation. . . . This can lead to manipulation of the outcomes by some clever (or perhaps ignorant) analyst.").

[93] 15 USC § 2605(c)(1) ("In promulgating any rule under . . . this section with respect to a chemical substance or mixture, the Administrator shall consider and publish a statement with respect to . . . the reasonably ascertainable economic consequences of the rule, after consideration of the effect on the national economy, small business, technological innovation, the environment, and public health.").

[94] 7 USC § 136(bb) defines an "unreasonable adverse effect on the environment" as "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide."

[95] 42 USC § 6295(o)(2)(B)(i)(I) (1994) (providing that the Department of Energy must

Indirect requirements for cost-benefit analysis appear in statutes mandating reasonable regulations, such as regulations that are "reasonably necessary" or that reduce an "unreasonable risk." In *American Textile Manufacturers' Institute, Inc v Donovan* (the *Cotton Dust* case),[100] the Supreme Court noted that Congress likely intends cost-benefit analysis where a statute uses the phrase "unreasonable risk."[101] Similarly, many lower courts have found requirements for cost-benefit analysis in statutory language calling for "reasonably necessary" regulations.[102]

Where statutes contain such direct or indirect language requiring cost-benefit analysis, courts can and should review the methods that agencies use, especially their choice of discount rate. In *Corrosion Proof Fittings v EPA*,[103] the Fifth Circuit reviewed the EPA's choice of discount rate under the TSCA,[104] and in *Natural Resources Defense Council, Inc v Herrington*,[105] the D.C. Circuit reviewed the agency's discount rate in a rulemaking

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consider, among other things, "the economic impact of the standard on manufacturers and on the consumers of products subject to such standard").

[96] 42 USCA §300g-1(b)(3)(C)(i) provides that "[w]hen proposing any national primary drinking water regulation that includes a maximum contaminant level, the Administrator shall" analyze the costs of complying with the regulation and "[t]he incremental costs and benefits associated with each alternative maximum contaminant level considered."

[97] Id § 300g-1(b)(3)(C)(i)(VI) (requiring the Administrator to consider "[a]ny increased health risk that may occur as the result of compliance, including risks associated with co-occurring contaminants").

[98] 2 USCA §§ 1501 et seq.

[99] 2 USCA § 1532(a).

[100] 452 US 490 (1981).

[101] Id at 510 n 30. However, in the same decision, the Court noted that statutory language calling for regulation "to the extent feasible" creates no obligation to conduct such analysis. Id at 509. For further discussion of statutory language that may or may not require cost-benefit analysis, see Cass R. Sunstein, *Interpreting Statutes in the Regulatory State*, 103 Harv L Rev 405, 419, 435 (1989).

[102] See, for example, *National Grain and Feed Association v OSHA*, 866 F2d 717, 728 (5th Cir 1988); *United Automobile Workers v OSHA*, 938 F2d 1310, 1319 (DC Cir 1991) ("Cost-benefit analysis is certainly consistent with the language" of the statute.); *Alabama Power Co v OSHA*, 89 F2d 740, 746 (11th Cir 1996) ("Although the agency does not have to conduct an elaborate cost-benefit analysis, it does have to determine whether the benefits expected from the standard bear a reasonable relationship to the costs imposed by the standard."), citing *American Petroleum Institute v OSHA*, 581 F2d 493, 503 (5th Cir 1978).

[103] 947 F2d 1201 (5th Cir 1991).

[104] Id at 1218.

[105] 768 F2d 1355 (DC Cir 1985).

pursuant to the EPCA.[106] Similarly, in *Ohio v Department of Interior*,[107] the D.C. Circuit reviewed the agency's choice of discount rate in a rulemaking pursuant to the Superfund Act ("CERCLA").[108] These cases—as well as the Administrative Procedure Act ("APA")[109]—make clear that it is appropriate for a court to review the reasonableness of agency cost-benefit analysis.

Similarly, judicial review is appropriate when an agency relies on cost-benefit analysis in a rulemaking, adjudication, or exercise of discretion, even when the underlying statute does not require such analysis. Case law[110] and the APA[111] require the court to review such agency action for reasonableness under the "arbitrary and capricious" test. This implies that the court can and should review the methods—especially the choice of discount rate—that the agency used to perform the cost-benefit analysis.[112] This Comment, however, focuses on cases where the underlying statute contains a requirement for cost-benefit analysis.

B. The Standard of Review

Judicial review of discount rates involves two levels of analysis. First, a court will consider whether the agency action—the decision to discount and the choice of a particular discount rate—represents an interpretation of the underlying statute that the agency administers.[113] This raises a question of law, subject to the two-step standard of review in *Chevron USA, Inc v Natural Resources Defense Council, Inc*.[114] If the agency action raises no question of law, the court will review the agency decision for abuse of discretion under the arbitrary and capricious test.[115] As this Part demonstrates, the threshold decision to discount arguably is a question of law. In contrast, the choice of a particular discount rate is largely a matter of agency discretion.

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[106] Id at 1412-14.

[107] 880 F2d 432 (DC Cir 1989).

[108] Id at 465.

[109] 5 USC § 706(2)(A) (1994) (specifying the arbitrary and capricious test for judicial review of agency actions).

[110] See, for example, *Motor Vehicle Manufacturers Association v State Farm Mutual Automobile Insurance Co*, 463 US 29, 33-34 (1983) (finding that NHTSA abused its discretion to issue motor vehicle safety standards that "shall be practicable, shall meet the need for motor vehicle safety, and shall be stated in objective terms"); *Citizens to Preserve Overton Park, Inc v Volpe*, 401 US 402, 416 (1971) (applying arbitrary and capricious test to agency discretion where the statute required the agency to consider "feasible and prudent" alternatives); *National Coalition Against Misuse of Pesticides v Thomas*, 809 F2d 875, 882-83 (DC Cir 1987) (finding that EPA abused its discretion to promulgate pesticide tolerance levels "to the extent necessary").

[111] 5 USC § 706(2)(A).

[112] Arguably the APA implies that the choice of discount rate is insulated from judicial review because it is "committed to agency discretion by law." 5 USC § 701(a)(2) (1994). In this case there is "no law to apply," *Overton Park*, 401 US at 410 (citation omitted); that is, there is no statutory standard against which a court may judge the agency's use of its discretion. See generally, Richard J. Pierce, Jr., Sidney A. Shapiro, and Paul R. Verkuil, *Administrative Law and Process* § 5.3 at 124-29 (Foundation 2d ed 1992). However, this approach is controversial among scholars. Compare Raoul Berger, *Administrative Arbitrariness and Judicial Review*, 65 Colum L Rev 55, 77-83 (1965) (arguing that the "no law to apply" rationale does not preclude judicial review for abuse of discretion), with Kenneth C. Davis, 4 *Administrative Law Treatise* § 28.16 at 80-81 (West 1958) (arguing that where there is "no law to apply," even abuse of discretion is not reviewable). Additionally, courts regularly review the reasonableness of agency discretion under the "arbitrary and capricious" test even when the underlying statute conveys broad discretionary power. See, for example, *State Farm*, 463 US at 42-43, 51-57; *Overton Park*, 401 US at 411-413, 417.

This Part first considers the question of law and argues that courts generally have reached the right conclusion when they have found that an agency acts unreasonably if it fails to discount future costs and benefits. Next, the Part considers the question of agency discretion, showing that courts have been unable to articulate a meaningful test to determine whether the agency's choice of discount rate is arbitrary and capricious. The Part concludes, therefore, by offering a meaningful test and demonstrating how a court would employ the framework in Part II to take a "hard look" at an agency's choice of discount rate.

1. Review of agency statutory interpretation: The decision to discount future costs and benefits.

Chevron established the well-known standard of review for questions of law.[116] A court will defer to an agency's interpretation of a statute if the interpretation is not contrary to the intent of the statute (*Chevron* Step One) and if it is reasonable (*Chevron* Step Two).[117] The court will apply "traditional tools of statutory construction" to infer Congress's intent.[118] It will test the reasonableness of the agency interpretation by determining whether the agency considered all statutorily relevant factors and ignored statutorily irrelevant factors.[119] This test of reasonableness, however, tends to be quite similar to the arbitrary and capricious standard of review that courts apply to agency discretion.[120]

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[113] A statutory interpretation (a question of law) is reviewable under 5 USC § 706(2)(C).

[114] 467 US 837, 842-45 (1984).

[115] Courts may review agency discretion under 5 USC § 706(2)(A), (D).

[116] 467 US at 837.

[117] Id at 842-45. See also *Ohio*, 880 F2d at 464 ("As petitioners point to no CERCLA provision addressing the precise question in issue [the choice of discount rate], their burden is to show that the imposition of the discount rate was unreasonable or contrary to the statutory purpose.").

[118] *Chevron*, 467 US at 843 n 9. See also *INS v Cardozo Fonseca*, 480 US 421, 446-50 (1987) (employing tools of statutory construction); *Babbitt v Sweet Home Chapter of Communities for a Great Oregon*, 515 US 687, 703-05 (1995) (same).

[119] See *Chevron*, 467 US at 845; *State Farm*, 463 US at 42-44.

Thus, when courts encounter challenges to agency discount rates, *Chevron* Step One implies that they must first interpret the statute in question to determine Congress's intent. However, most statutes—such as TSCA and FIFRA—offer no particular standards for conducting cost-benefit analysis, evidencing no congressional intent as to the appropriate methods for choosing a discount rate. This forces courts to proceed to the next level of analysis—*Chevron* Step Two—and examine the reasonableness of the agency decision.

Thus, in the few cases where courts have reviewed an agency's decision to discount future costs and benefits, they have focused on the reasonableness of the decision, not on whether the decision is consistent with the purpose of the statute. In *Corrosion Proof Fittings*, for example, the court found that the EPA would act unreasonably if it failed to discount future benefits: "Because the EPA must discount costs to perform its evaluations properly, the EPA also should discount benefits to preserve an apples-to-apples comparison, even if this entails discounting benefits of a non-monetary nature."[121] Similarly, in *Ohio*, the court found that the Department of the Interior did not act unreasonably when it followed OMB guidance and discounted future benefits.[122] In neither case, however, did the court articulate a standard of reasonableness. In *Corrosion Proof Fittings*, the court held simply that an agency cannot discount costs without discounting benefits;[123] in *Ohio*, the court deferred to the agency's decision because it was "first and foremost a policy choice."[124]

Although they lack coherent explanations, *Corrosion Proof Fittings* and *Ohio* reach the correct conclusion: discounting is reasonable; not discounting is arbitrary.[125] However, the courts in these cases could have reached the same conclusion more simply by relying on the language of the underlying statutes (*Chevron* Step One). A plain reading of statutory language requiring an agency to consider "the reasonably ascertainable economic consequences of the rule, after consideration for the effect on the national economy"[126] suggests that the agency should use reasonable methods for evaluating the costs and benefits of a regulation. This is precisely the conclusion in *Gas Appliance Manufacturers Association, Inc v Department of Energy*,[127] where the D.C. Circuit considered a statute requiring that regulations be "adequately analyzed in terms of . . . economic cost and benefit, and impact upon affected groups."[128] The court found that this language required the agency to use reasonable methods in its cost-benefit analysis.[129] As demonstrated in Part II, reasonable cost-benefit analysis includes positive discount rates for future costs and benefits.

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[120] See Ronald M. Levin *The Anatomy of* Chevron*: Step Two Reconsidered*, 72 Chi-Kent L Rev 1253, 1266-77 (1997) (demonstrating that analysis of a question of law under *Chevron* Step Two is very similar to—indeed, may be identical to—arbitrary and capricious review).

[121] 947 F2d at 1218.

[122] 880 F2d at 465.

[123] 947 F2d at 1218.

[124] 880 F2d at 465.

[125] See the discussion in Part II.

2. Review of agency discretion: The choice of a particular discount rate.

Most courts treat the choice of discount rate as a matter of agency discretion.[130] Unless the underlying statute calls for stringent review,[131] courts will apply the APA's "arbitrary and capricious" standard of review to the agency's choice.[132] The Supreme Court has interpreted this standard as requiring that courts take a "hard look" at the agency's decision, inquiring whether the agency provided a detailed explanation, investigated reasonable alternatives, and considered statutorily relevant factors and ignored statutorily irrelevant factors.[133]

Although the standard of review calls for a "hard look," most courts have taken a "soft look"[134] at agency discount rates. In *Cor-*

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[126] TSCA, 15 USC § 2605(c)(1)(D).

[127] 998 F2d 1041 (DC Cir 1993).

[128] Id at 1044, quoting the Energy Conservation Standards for New Buildings Act of 1976, 42 USC § 6839 (1988), repealed by the Energy Policy Act of 1992, Pub L No 102-486, Title I § 101(a)(2), 106 Stat 2776, 2783.

[129] 998 F2d at 1045-46.

[130] See, for example, *Corrosion Proof Fittings*, 947 F2d at 1218 n 19 (concluding that the EPA's choice of a 3 percent real discount rate was not unreasonable); *Ohio*, 880 F2d at 465 n 46 (deferring to agency choice of 10 percent rate); *Northern California Power v FERC*, 37 F3d 1517, 1522-23 (DC Cir 1994) ("It was . . . entirely proper for the Commission to calculate the present value . . . using a discount rate that focused on the consumers' value of money.").

[131] TSCA, for example, provides for substantial evidence review. 15 USC § 2618(c)(1)(B)(i).

[132] See 5 USC § 706(2)(A); *Overton Park*, 401 US at 413-16.

[133] See, for example, *State Farm*, 463 US at 43-44; *Vermont Yankee Nuclear Power Corp v Natural Resources Defense Council, Inc*, 435 US 519, 549-55 (1978); *Overton Park*, 401 US at 415-17. See also *Scenic Hudson Preservation Conference v FPC*, 354 F2d 608, 617-18, 620-22 (2d Cir 1965).

[134] The term "soft look" is borrowed from Richard J. Pierce, *Judicial Review of Agency Actions in a Period of Diminishing Agency Resources*, 49 Admin L Rev 61, 90 (1997) (characterizing Judge Easterbrook's dissent in *Salameda v INS*, 70 F3d 447 (7th Cir 1995), as the "soft look" position).

rosion Proof Fittings, for example, the Fifth Circuit deferred to the EPA's choice of a 3 percent discount rate because "historically the real rate of interest has tended to vary between 2% and 4%."[135] The court did not consider alternative measures of the discount rate, nor did it inquire whether the EPA applied this rate appropriately. Similarly, in *Ohio*, the D.C. Circuit deferred to the Department of Interior's choice of a 10 percent discount rate because the choice was "first and foremost a policy choice."[136] Despite this conclusion, the court noted that the agency would need to provide a "reasonable justification" if it revised its discount rate in the future, although it gave no indication what such a justification would be.[137]

The D.C. Circuit has attempted to harden the prevailing "soft look" by inquiring into the theory underlying agency discount rates. In *Northern California Power Agency v FERC*,[138] the parties disputed whether the appropriate discount rate should reflect the average discount rate of members of society (which FERC advocated) or the cost of borrowing for city governments (which the plaintiff municipalities advocated).[139] After reviewing the basic theory of discounting and citing a popular textbook,[140] the court concluded that the appropriate rate should reflect the discount rate of members of society.[141] The court, however, did not inquire whether FERC's particular rate (15 percent) was a good measure of the appropriate social discount rate.

Similarly, in *Herrington*, the D.C. Circuit invalidated the discount rate that the Department of Energy ("DOE") had used in cost-benefit analysis of energy efficiency standards.[142] Applying hard look review, the court found that the DOE failed to explain how it derived this rate. In stark contrast to its approach in *Ohio*, the D.C. Circuit held that the agency could not rely on OMB guidelines to justify its choice: "The disputed OMB circular is essentially a general instruction to government agencies and does not explain the reasoning behind the discount rate it recommends."[143] The court stressed that the "major consequences of the discount rate made it particularly important that DOE fix the rate carefully and explain its decision intelligibly."[144] Although *Herrington* critically examined the DOE's decision, the case is similar to other "soft look" cases because the court offers no standard of review for agency discount rates.

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[135] 947 F2d at 1218 n 19.

[136] 880 F2d at 465.

[137] Id at 465 n 46.

[138] 37 F3d 1517 (DC Cir 1994).

[139] Id at 1522-23.

[140] Id at 1523, citing E.J. Mishan, *Cost Benefit Analysis* 176 (Praeger 1976).

[141] Id ("Additionally, when determining the net present benefit of a project, a discount rate that reflects society's, as opposed to an individual's, preferences is commonly used. It was therefore entirely proper for the Commission to calculate the present value of the net benefits of the projects using a discount rate that focused on the consumers' value of money.") (citations omitted).

[142] 768 F2d at 1410-14.

These cases show that, even where courts attempt to take a hard look at agency discount rates, their inquiry generally ends after testing whether the agency has provided at least a "tolerably terse"[145] explanation for its choice. Courts do not address the other, "harder" elements of this review: whether the agency addressed reasonable alternatives and whether it considered statutorily relevant factors and ignored statutorily irrelevant factors. Courts' "soft look" review of discount rates seems perverse when they will apply a strict hard look review to other elements of agency cost-benefit analysis.[146] The problem appears to be that courts lack a coherent framework for reviewing the agency choice of discount rate.

In evaluating the choice of a discount rate, courts should undertake a three-step analysis. First, as *Herrington* requires, a court must find at least a "tolerably terse" explanation of the agency's choice of discount rate. Second, the court should inquire whether the agency considered reasonable alternatives. As explained in Part II, the choice between the OCC and the SRTP approaches is primarily a matter of policy and secondarily a matter of methodology.[147] The court should find that an agency abused its discretion if it failed to acknowledge these alternative approaches and explain why, in its view, policy and methodology favor one approach over another. Requiring such an explanation ensures not only that the agency's decision has a rational basis, but that the agency recognizes and responds to the social (and administrative) costs and benefits of a particular approach.[148]

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[143] Id at 1413.

[144] Id at 1414.

[145] Id at 1413, quoting *Greater Boston Television Corp v FCC*, 444 F2d 841, 852 (DC Cir 1970).

[146] See, for example, *Competitive Enterprise Institute v NHTSA*, 956 F2d 321, 323-27 (DC Cir 1992), where the court found that NHTSA acted arbitrarily by not considering the risk-risk tradeoffs of new fuel economy standards. For analysis of this case, see Cass R. Sunstein, *Health-Health Tradeoffs*, 63 U Chi L Rev 1533, 1565-67 (1996).

[147] See note 86 and accompanying text.

[148] This is precisely the goal of hard look review, as explained by the Supreme Court in *State Farm*, where the Court stated that "the agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choices made.' . . . In reviewing that explanation, we must 'consider whether the decision was based on a consideration of relevant factors and whether

Finally, given the agency's choice between the OCC and SRTP, courts should examine whether the agency properly applied the chosen method. The OCC and SRTP involve very different methodologies. If an agency applies the OCC, it must consider whether the financial markets offer assets or trading strategies with term structures similar to the proposed regulation. Additionally, the agency must adjust the market rates of return for taxes, risk, inflation, and distortions due to credit constraints. Finally, the agency should consider whether the regulation diverts resources from investment or consumption. In contrast, if an agency applies the SRTP, a court should ask whether the agency converted the future benefits of the regulation into consumption equivalents. Additionally, the agency should reduce future benefits to account for the fact that the regulation may divert resources from private investment and thereby lower future consumption.[149]

Hard look review of agency discount rates would not take the choice of a discount rate out of the hands of administrative agencies, which possess greater competence than courts in this area. Nor would hard look review tax judicial resources or require judges to develop special expertise. Rather, hard look review of agency choice of discount rates asks a series of simple questions that courts generally ask when reviewing agency discretion: Is there a record?[150] Did the agency explain its choice between the relevant alternatives, the SRTP and OCC?[151] Did the agency consider the relevant factors in applying either method?[152]

Admittedly, hard look review of agency discount rates will raise both the cost of judicial review and the cost of conducting cost-benefit analysis. However, the costs of judicial review will

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there has been a clear error of judgment.'" 463 US at 43 (citations omitted).

[149] Hard look review should be particularly strict when an agency applies the SRTP. This method raises more difficult policy issues and creates more complex methodological problems than the OCC. Most academic studies indicate that agencies have very little experience applying this method. See Kopp, Krupnick, and Toman, *Cost-Benefit Analysis and Regulatory Reform* at 41 (cited in note 89).

[150] See, for example, *State Farm*, 463 US at 43 ("We will . . . uphold a decision of less than ideal clarity if the agency's path may reasonably be discerned.") (citations omitted); *SEC v Chenery*, 318 US 80, 94 (1943) ("[T]he orderly functioning of the process of review requires that the grounds upon which the administrative agency acted be clearly disclosed and adequately sustained.").

[151] See, for example, *State Farm*, 463 US at 43 ("Normally, an [agency decision] would be arbitrary and capricious if the agency . . . entirely failed to consider an important aspect of the problem."); *Scenic Hudson*, 354 F2d at 624-25 ("The record as it comes to us fails markedly to make out a case for the [agency decision] on, among other matters, costs, public convenience and necessity, and absence of reasonable alternatives.").

[152] See, for example, *Overton Park*, 401 US at 416 ("[T]he court must consider whether the [agency] decision was based on a consideration of the relevant factors.").

rise only because courts to date have not given serious consideration to agency discount rates. This increased cost is not problematic, because both the APA[153] and case law[154] require the level of serious consideration implied by hard look review.

Additionally, although hard look review will impose costs on agencies by requiring them to prepare detailed explanations of their discount rate choices, these added costs are outweighed by the benefits to society from more careful, reasoned consideration of the methods used in cost-benefit analysis. A primary goal of cost-benefit analysis is to help agencies identify the advantages and disadvantages of various regulatory strategies and thereby allocate their scarce budgetary resources toward regulations that best promote social welfare.[155] By rationalizing and disciplining agency decision making, cost-benefit analysis promotes the regulatory efficiency as well as the political accountability of agencies.[156] Yet, when agencies lack meaningful standards for conducting the analysis, cost-benefit analysis is subject to manipulation, may be ridden with error, and has the appearance of mere window dressing.[157] Hard look review, therefore, strengthens cost-benefit analysis by giving agencies strong incentives to develop consistent and theoretically sound methods of analysis.

C. Applying the Standard of Review to Agency Discount Rates

Hard look review would significantly alter the way agencies select discount rates. As this Part illustrates, many recent discount rate choices by agencies would not survive judicial review under this standard.

Perhaps the most interesting application of hard look review would involve OMB's guidelines for discount rates. Applying this standard, a court would find that an agency *cannot* rely on OMB guidelines to justify its choice of discount rate. Although OMB adopts the OCC approach and provides an adequate explanation for this choice, thereby surviving the first two levels of analysis under hard look review, OMB fails the third level of analysis, because it does not sufficiently explain its application of the OCC approach. In particular, OMB advocates a 7 percent discount rate, *unadjusted* for taxes or risk.[158]

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[153] 5 USC § 706(2)(A) (requiring courts to set aside agency action that is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law").

[154] See text accompanying notes 138-44.

[155] For analysis of the pathologies of administrative decisionmaking in the absence of effective cost-benefit analysis, see Breyer, *Breaking the Vicious Circle* at 10-29 (cited in note 13) and Cass R. Sunstein, *Free Markets and Social Justice* 289-94 (Oxford 1997). See also Thomas O. McGarity and Sidney A. Shapiro, *OSHA's Critics and Regulatory Reform*, 31 Wake Forest L Rev 587, 622-32 (1996) (discussing the costs and benefits of cost-benefit analysis).

[156] See Sunstein, 48 Stan L Rev at 252-53 (cited in note 8).

[157] See, for example, Scherega, 18 J Envir Econ & Mgmt at S-66 (cited in note 58).

Likewise, EPA discount rates generally would not survive hard look review. The agency chooses radically different discount rates for different regulations, generally providing no explanation for this variation.[159] Indeed, EPA practice appears arbitrary because it often chooses relatively high discount rates (between 7 and 10 percent) for regulations imposing future costs[160] and low rates (around 3 percent) for regulations creating future benefits.[161] Because the agency offers no coherent explanation for these choices, its discount rates would fail the second level of analysis under hard look review.

In contrast, a recent DOE regulation likely would survive hard look review. The agency provided detailed justification of its discount rate in a rule setting energy conservation standards for certain major household appliances.[162] After reviewing the theoretical and practical aspects of both the SRTP and the OCC, the Department tentatively advocated the OCC approach, noting that "consideration must be given to the opportunity costs of devoting more economic resources to the production and purchase of more energy-efficient appliances and fewer national resources to other alternative types of investment."[163]

Not all agency choices are as simple to evaluate under hard look review. A harder case appears in a recent regulation by the National Oceanic and Atmospheric Administration ("NOAA"), where the agency established standards for valuing damages to natural resources and the costs of mitigating those damages.[164] There NOAA considered both the SRTP and OCC, explaining the theory and methodological issues underlying each alternative.[165] The agency ultimately advocated a 3 percent discount rate for valuing damages to natural resources because the rate is reasonable in light of existing estimates of the SRTP, the rate is close to the real after-tax rate of return on riskless Treasury bills, and a relatively low discount rate may be appropriate for goods (natural resources) that are not traded in a market.[166] Unfortunately, however, NOAA also concluded—without a coherent explanation—that different discount rates should apply to the benefits (the value of damages to natural resources) and costs (mitigation of damages) of restoring natural resources. While the agency advocated the SRTP for benefits,[167] it supported the relatively high OCC rate for costs.[168] This illogical decision should fail hard look review.

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[158] See notes 18-20 and accompanying text.

[159] The EPA generally offered no explanations for the regulations in Tables 1 and 2. Consider, for example, EPA, *Protection of Stratospheric Ozone*, 58 Fed Reg at 8163 (cited in note 30).

[160] See, for example, EPA, *Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines: Voluntary Standards for Light-Duty Vehicles*, 62 Fed Reg 31192, 31215 (1997) (applying a 10 percent discount rate to pollution credits that the agency will give to manufacturers of automobiles); EPA, *Amended Proposed Test Rule for Hazardous Air Pollutants*, 62 Fed Reg 67466, 67477 (1997) (using a 7 percent discount rate to annualize initial regulatory costs).

[161] See, for example, EPA, *LEAD; Requirements for Lead-Based Paint Activities in Target Housing and Child-Occupied Facilities*, 61 Fed Reg 45778, 45808 (1996) (using a 3 percent discount rate for "core" analysis of future benefits).

[162] DOE, *Energy Conservation Program*, 58 Fed Reg at 47333-35 (cited in note 29).

[163] Id at 47335.

[164] Department of Commerce, NOAA, *Natural Resource Damage Assessments*, 61 Fed Reg at 450-57 (cited in note 29).

CONCLUSION

The discount rate is a critical element of cost-benefit analysis. The value of cost-benefit analysis in improving regulatory decisions depends, in large part, on the reasonableness of the discount rate. Small variations in the discount rate can significantly bias the analysis. Despite the importance of the discount rate, courts have failed to develop a standard of review for agency discount rate choices. This is particularly troubling in light of evidence that agency practice exhibits wide-ranging, and generally unexplained, variation in discount rates. Not only do different agencies employ different rates, but the same agency will sometimes apply different rates to different regulations without explanation.

This Comment seeks to strengthen cost-benefit analysis by providing a framework for judicial review of agency discount rates. As a threshold matter, courts should find, as a matter of law, that an agency acts unreasonably if it fails to discount future costs and benefits, even if they accrue to future generations. Additionally, courts should take a "hard look" at agency discount rates and ask three basic questions: Is there a record for the agency's choice? Did the agency explain its choice between the alternative approaches to discounting, the SRTP and OCC? Did the agency consider the relevant factors in applying the chosen method? While these questions are standard fare in hard look review, they would represent a significant advance in judicial review of discount rates. More importantly, hard look review would provide strong incentives for agencies to adopt morally and economically sensible discount rates.

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[165] Id at 453-54.

[166] Id.

[167] Id at 454.

[168] Id at 456.

Table 1: Agency Choice of Discount Rate: Selected Regulations, 1992-98
Long-Term Regulations (thirty or more years)

Agency	Regulation	Discount Rate		Time Horizon
		Costs	Benefits	
EPA	Emissions Standards for Locomotives and Locomotive Engines, 62 Fed Reg 6366, 6401-02 (1997). Notice of proposed rulemaking (compares to 3 percent rate)	7	7	41
EPA	Requirements for Lead-Based Paint; Activities in Target Housing and Child-Occupied Facilities, 61 Fed Reg 45778, 45808 (1996). Final rule (compares to 7 percent rate)	3	3	50
EPA	Protection of Stratospheric Ozone, 58 Fed Reg 8136, 8163 (1993). Final rule	2, 7	2, 7	75
HUD	Requirements for Notification, Evaluation and Reduction of Lead-Based Paint Hazards in Federally Owned Residential Property and Housing Receiving Federal Assistance, 61 Fed Reg 29170, 29189-90 (1996). Proposed rule	3, 7	3, 7	-
HHS	Tobacco Regulation for Substance Abuse Prevention and Treatment Block Grants, 61 Fed Reg 1492, 1503-06 (1996). Final rule	3, 7	-	-

Agency	Regulation	Discount Rate		Time
		Costs	Benefits	Horizon
DOE	Energy Conservation Program for Consumer Products [air conditioners], 62 Fed Reg 50122, 50141-43 (1997). Final rule (compares to 2 and 15 percent rates)	6	-	30
NRC	License Term for Medical Use Licenses, 62 Fed Reg 40975, 40977 (1997). Proposed rule	7	-	30
Fish & Wildlife Service	Endangered and Threatened Wildlife and Plants, 60 Fed Reg 17296, 17301-03 (1995). Proposed rule and notice of public hearing	3	-	45
NOAA	Natural Resource Damage Assessments, 61 Fed Reg 440, 453-54 (1996). Final rule (T = three month Treasury bill rate)	3, T	3, T	-
Bureau of Reclamation	Change in Discount Rate for Water Resources Planning, 62 Fed Reg 60267, 60267 (1997). Notice of change	7.125	7.125	-

Table 2: Agency Choice of Discount Rate: Selected Regulations, 1992-98
Short-Term Regulations (no more than twenty years)

Agency	Regulation	Discount Rate		Time Horizon
		Costs	Benefits	
EPA	Requirements for testing health effects of hazardous air pollutants, 62 Fed Reg 67466, 67477-78 (1997). Amended proposed rule	7	not quantified	15
EPA	Proposed Reissuance of NPDES General Permits for Storm Water Discharges from Construction Activities, 62 Fed Reg 29786, 29803 (1997). Notice of proposed NPDES general permits	10	-	10
EPA	Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines, 62 Fed Reg 31192, 31215 (1997). Final rule	10	-	4
EPA	National Primary Drinking Water Regulations, 62 Fed Reg 59486, 59544-45 (1997). Notice of data availability (compares to 7 percent rate)	10	-	-
EPA	Effluent Limitations, Guidelines and Pretreatment Standards for the Industrial Laundries Point Source Category, 62 Fed Reg 66182, 66196 (1997). Proposed rule (CC = industry-specific real cost of capital)	CC	-	16
EPA	Test Rule for Hazardous Air Pollutants 62 Fed Reg 67466, 67477-78 (1997). Amended proposed rule	7	-	15

Agency	Regulation	Discount Rate		Time
		Costs	**Benefits**	**Horizon**
EPA	Standards and Techniques for Control of Radon in New Residential Buildings, 59 Fed Reg 13402, 13405 (1994). Notice of publication of final EPA model standards	3, 7	3, 7	-
EPA	Comprehensive Guideline for Procurement of Products Containing Recovered Materials, 62 Fed Reg 60962, 60970 (1997). Final rule	3	not quantified	10
EPA	Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards: Metal Products and Machinery, 60 Fed Reg 28210, 28244 (1995). Proposed rule	7	-	15
OSHA	Respirator Protection, 63 Fed Reg 1152, 1173 (1998). Final rule	7	-	10
OSHA	Occupational Exposure to Methylene Chloride, 62 Fed Reg 1494, 1566 (1997). Final rule	7	-	10
OSHA	Occupational Exposure to Asbestos, 59 Fed Reg 40964, 41042 (1994). Final rule	10	-	-
OSHA	Indoor Air Quality, 59 Fed Reg 15968, 16013 (1994). Notice of proposed rulemaking	10	-	-
FDA	Aluminum in Large and Small Volume Parenterals Used in Total Parenteral Nutrition, 63 Fed Reg 176, 183-84 (1998). Proposed rule	7	-	-

Agency	Regulation	Discount Rate		Time
		Costs	Benefits	Horizon
FDA	Medical Devices; Establishment of a Performance Standard for Electrode Lead Wires and Patient Cables, 62 Fed Reg 25477, 25495 (1997). Final rule	7	-	3
FDA	Quality Mammography Standards, 62 Fed Reg 55852, 55962 (1997). Final rule	7	-	10
FDA	Over-the-Counter Human Drugs; Proposed Labeling Requirements, 62 Fed Reg 9024, 9048 (1997). Proposed rule	7	-	3-6
FDA	Food Labeling Regulations, 58 Fed Reg 2927, 2929 (1993). Regulatory impact analysis statement	5	-	20
FDA	Medical Devices; Current Good Manufacturing Practice ("CGMP"), 61 Fed Reg 52602, 52646 (1996). Final rule	10	-	5
FDA	Regulations Restricting the Sale and Distribution of Cigarettes and Smokeless Tobacco to Protect Children and Adolescents, 61 Fed Reg 44396, 44569 (1996). Final rule (compares to 7 percent rate)	-	3	-
DOE	Energy conservation program for consumer products, 58 Fed Reg 47326, 47333 (1993). Advanced notice of proposed rulemaking (compares to 4 and 10 percent rates)	7	7	-

Agency	Regulation	Discount Rate Costs	Discount Rate Benefits	Time Horizon
FAA	Aircraft Operator Security, 62 Fed Reg 41730, 41744-47 (1997). Notice of proposed rulemaking	7	7	10
Bureau of Reclamation	Offstream Storage of Colorado River Water and Interstate Redemption of Storage Credits in the Lower Division States, 62 Fed Reg 68492, 68498 (1997). Notice of proposed rulemaking	5.75, 8.27	5.75, 8.27	10, 19
NHTSA	Federal Motor Vehicle Safety Standards; Lamps, Reflective Devices and Associated Equipment, 62 Fed Reg 16709, 16712 (1997). Final rule	2-10	2-10	-
Consumer Product Safety Commission	Requirements for Labeling of Retail Containers of Charcoal, 61 Fed Reg 19818, 19825 (1996). Final rule	5, 10	5, 10	-