



Time and Money



Discounting's Problematic Allure

by Paul R. Portney

Acting now to deal with problems whose consequences may not be felt for generations is obviously tricky business. The costs and benefits involved are hard to gauge, since they will be spread out over hundreds—perhaps thousands—of years. Still, waiting for the added certainty the future will bring is not always the best policy; sometimes we have to swallow hard and take preventative measures. Doing so, however, forces us to confront how much we are willing to sacrifice today for benefits that will be enjoyed later in our lives or in the lives of succeeding generations.

With that in mind, economists and other analysts make use of a technique called discounting to compare present with future costs and benefits on an equal basis.



In its conventional use, streams of future benefits and costs are converted to present values through an appropriate discount rate. As long as the discount rate is positive, one dollar tomorrow is worth less than one dollar today. Take, for example, a project that twelve years from today will yield a return of \$200,000. At an annual discount rate of 6 percent (reflecting, for instance, the cost of borrowing money this year versus next) that amount is now worth \$100,000—all that an economist would advise investing.

To ponder whether and how to use discounting over much longer time spans, RFF and the Energy Modeling Forum at Stanford University invited the most influential thinkers on discounting to convene at RFF in November 1996. (During the energy crisis in the 1970s, RFF hosted a similar conference and invited some of the same participants, including Robert Lind. Out of that meeting arose Lind's crystallization of a prescription for the proper discount rate, around which a consensus lasted for some time.) Each of these economists wrote an essay in response to a set of questions eliciting their opinions on how best to use discounting in decisionmaking for the far future. Their varied points of

view are now available in book form. (To order a copy, see page 18.)

A New Book

Though quite technical and no "primer," the recently released RFF book *Discounting and Intergenerational Equity* plainly shows agreement on some broad and basic points. The contributors speak with nearly one voice when they say it is appropriate—indeed essential—to discount future benefits and costs at some positive rate. Even those authors who favor a lower discount rate for the far (as opposed to near) future quite clearly believe that failing to discount would make for poor intergenerational decisionmaking. And even those few that could envision a zero or negative rate suggest such a case would be rare.

At the conference itself, the authors were nearly unanimous in recommending the use of a standard procedure for evaluating projects with timeframes of forty years or less. Within the scope of this relatively short period of time, they generally embraced discounting benefits and costs to make present-value comparisons. What's more, they tended to think the discount rate should reflect the opportunity cost of capital. Beyond the forty-year mark, however, discomfort set in, as the essays reveal.

Clouds in the Crystal Ball

To read the new RFF book is to get a sense of the unease among the best minds in the profession about the technical complexity and ethical ramifications of discounting far into the future. For one thing, there is no mistaking the very small present value of even very large costs and benefits if they will not be realized for hundreds of years.

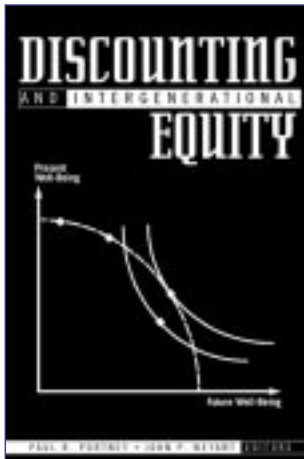
Assume, for example, that the gross domestic product of the world will be \$8 quadrillion in the year 2200 in current dollars. (This assumption is consistent with an annual growth rate of 3 percent from

current world GDP over the next two hundred years.) Suppose next that we want to calculate the present value of that sum using the 7 percent discount rate that the Office of Management and Budget recommends for such purposes. The answer we get is a surprising \$10 billion. In other words, it would not make sense for the world's present inhabitants to spend more than \$10 billion today (or about \$2 per person) on a measure that would prevent the loss of the entire GDP of the world two hundred years from now.

That conclusion may seem stunning. Yet the reason is clear enough: We could invest that same \$10 billion at 7 percent today and have a sum more than sufficient to replace GDP two centuries ahead.

Still, what guarantee is there that the \$10 billion invested would remain untouched during the intervening years? What if, instead, people living a century from now decided to dip into the fund to finance their own consumption? Those living two centuries from now would be left with neither the problem-mitigation project we eschewed nor the fund we created to make them whole.

Another difficulty that discounting the distant future presents is choosing between economic efficiency and distributional equity—and being able to tell the difference. Although the contributors to the RFF book are not among them, some people that are uncomfortable with the distributional consequences of climate change seem eager to tinker with the discount rate to make mitigation policies pass the efficiency test (when in fact they may not). There is no need to do so—efficiency is hardly the only criterion that matters in policy analysis. If, for example, it would be more efficient to reject a climate protection program, say, because it would be cheaper to invest the money in an interest-bearing asset, we might opt for the program, anyway, out of concern for the welfare of our descendants, especially



June 1999
ISBN 0-915707-89-6
224 pages
\$32.95 hardback

Discounting and Intergenerational Equity

Edited by Paul R. Portney and John P. Weyant
With a foreword by Robert M. Solow

The effects of decisions made today about many environmental policies—including climate change and nuclear waste—will be felt across hundreds, if not thousands, of years. In the case of issues with such long-term ramifications, analysts often employ discount rates to compare present and future costs and benefits.

In this landmark book, Paul Portney and John Weyant have assembled some of the world's foremost economists to reconsider the purpose, ethical implications, and application of discounting in light of recent research and current policy concerns.

Contributors include Kenneth J. Arrow, Scott Barrett, David F. Bradford, William R. Cline, Maureen Cropper, Shantayanan Devarajan, Partha Dasgupta, Raymond J. Kopp, David Laibson, Robert C. Lind, Karl-Göran Mäler, Alan S. Manne, W. David Montgomery, William D. Nordhaus, Jerome Rothenberg, Thomas C. Schelling, V. Kerry Smith, Michael A. Toman, and Martin L. Weitzman.

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If we doubt that compensation for now ignoring the problem will be available to future generations.

An Array of Approaches

Some of the book's contributors suggest using different discount rates depending on the period over which net present values are being tallied. This possibility of *nonconstant discounting* has surfaced in a growing number of studies, which show rather consistently that while individuals do appear to attach lower weights to distant benefits, they do not use a constant exponential discount rate. Rather, the longer the time period before effects are felt, the lower the implicit discount rate used.

Perhaps most surprisingly, at least three of the authors question the very utility of standard benefit-cost analysis for problems with significant intergenerational conse-

quences. Thomas Schelling suggests, for instance, that we view the problem of climate change in much the same way that we try to decide the right amount of foreign aid to make available to poorer countries each year.

In an altogether different approach, Raymond Kopp and I suggest a mock referendum. The idea is to elicit from members of the present generation their willingness to pay to reduce both present and future risks associated with climate change. An aggregate willingness to pay would then be compared with the expected costs, say, of climate change mitigation. This approach would circumvent the need to estimate very long-term streams of benefits and costs, as well as the need to choose an appropriate discount rate. But it does present its own problems, such as how to frame and ask the questions to elicit honest responses.

A Fair Future

In the seventies, the energy crisis led people outside academia to think hard about the comparison of benefits and costs across time. Today it is the climate change debate that is largely responsible for reawakening interest in the subject, since it forces us to think about the legacy we may be leaving future generations. As soon as we begin to consider policies to affect the latter, up pops the concept of discounting. If a latter-day consensus on how to use this tool is not in the offing, it is perhaps toward another kind of workability that the essays in the new RFF volume can begin to lead: by clarifying what exactly is being debated and why it is important.

Paul R. Portney is president of Resources for the Future. This article is based on the introduction, which he and John P. Weyant wrote, to *Discounting and Intergenerational Equity*, the new RFF book they edited.