Discounting and Disaster:
Climate Change and Justice Between Generations

Ethics at Noon, Feb. 28, 2007
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1. Introduction
   - Context: Stern Review (2006) estimates of economic costs of global warming (very large)
   - If reasonably accurate, these estimates justify taking very costly measures now to mitigate warming.
   - Other economists have come up with *much smaller* estimates of costs; this set off lively debate.
   - The difference between Stern and his critics largely comes down to the choice of one little parameter in the calculations, the rate of pure time preference:

$$\delta$$

   - Discounting is the economist's way of summarizing our obligations to future generations and vice versa– i.e., intergenerational justice.
   - Today: I'll explain how discounting works and how it relates to the applied ethics of the climate change issue.

2. Assumptions I will maintain throughout
   - Global warming is real and is being caused to a significant extent by human activity.
   - It is legitimate and useful to think about benefit-cost tradeoffs when discussing policy responses to a problem like global warming.
   - The costs associated with global warming will be very large and will largely be incurred by *future generations*; the costs of preventing or reducing future global warming will also be very large and will be felt disproportionately by *current generations*.

3. A primer in discounting
   - The higher the discount rate, the more we favor present over future values.
   - Discounting works like compound interest. Because of compounding, small differences in the discount rate matter a lot over very long periods of time.
   - Example:

Discount rate (%/ year)	Value in 20 years of one dollar now	Value now of the promise of a dollar received in	
		20 years	50 years
0	\$1.00	\$1.00	\$1.00
1	\$1.22	\$0.82	\$0.61
2	\$1.49	\$0.67	\$0.37
5	\$2.72	\$0.37	\$0.08
10	\$7.39	\$0.14	<\$0.01

   - How discounting is applied to benefit-cost analysis for social decision making
   - The case of global warming: To prevent \$1 of damage a century from now, what's the most we should be willing to give up now?

	Discount rate (%)	
"Naïve egalitarian"	0	\$1.00
"Stern"	2	\$0.14
"Nordhaus"	5	< \$0.01

- In fact, the "Stern" discount rate gives damages one century from now 20 times the weight they receive using the "Nordhaus" calculation!

4. What is the *right* discount rate for the climate change issue?
   - Descriptive approach: What is the *actual* interest rate in the real world? (Not so easy to say....) Would it be appropriate for social decisions?
   - Ethical approach: What discount rate *ought* we to use? Is there any possible justification for using a discount rate other than zero?

5. Utilitarian discount rate
   - In the utilitarian approach, we might choose to discount the future for two reasons:
     (1) People in the future will likely be richer, so a given dollar will be worth less to them in utility terms than it is to us.
     (2) We may have *pure time preference* favoring the present over the future.
   - A simple utilitarian formula for the discount rate: $r = \delta + \eta g$
     g = rate of growth of per capita consumption
     η = measure of rate at which utility of a dollar shrinks as people get richer
     δ = rate of pure time preference (confusingly, sometimes called "social discount rate")
   - Many economists have asserted that $\delta > 0$ is morally indefensible. This view is shared by John Rawls: treat present and future generations symmetrically from behind the veil of ignorance.
   - But assuming $\delta = 0$ can have dire implications for current generations, and appears to be inconsistent with observed behavior.
   - The Stern Review essentially uses $\delta = 0$. Nordhaus uses $\delta = 3\%$.
   - The choice of the parameter η is also controversial: bigger η means more weight given to the interests of the poor. With economic growth, *we* (current generations) are the poor.
   - The enormous uncertainties and "downside risk" of the climate change problem may favor a low, essentially "precautionary" discount rate.

6. Some reflections
   - Ethical decision making must consider benefit-cost tradeoffs, including intergenerational.
   - For now, the world is doing so little about climate change that the intergenerational tradeoffs do not have much "bite;" but once we get serious, they will.
   - As a Rawlsian, I favor universalizability, which seems to require $\delta = 0$. But as an egalitarian, I think η is large. If so, Stern may overstate the future economic costs of climate change. Put more directly, in making the sacrifices necessary to avoid future climate catastrophe, we must not lose sight of the worst off: they live in the here and now.

Further reading:

Arrow, Kenneth J. (1995), "Intergenerational Equity and the Rate of Discount in Long-Term Social Investment," IEA World Congress, http://www-econ.stanford.edu/faculty/workp/swp97005.pdf .

Nordhaus, William (2006), "The *Stern Review* on the Economics of Climate Change," Yale University, http://www.econ.yale.edu/~nordhaus/homepage/SternReviewD2.pdf (accessed 2/16/07).

Quiggin, John (2006), "Stern and the critics on discounting," http://johnquiggin.com/wp-content/uploads/2006/12/sternreviewed06121.pdf (accessed 2/16/07).

Rawls, John. (1971), *A Theory of Justice* (Oxford: Oxford University Press), esp. §44-45.

United Kingdom, HM Treasury (2006, 2007), *Stern Review on the Economics of Climate Change*, http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm, various chapters (accessed 2/16/07).