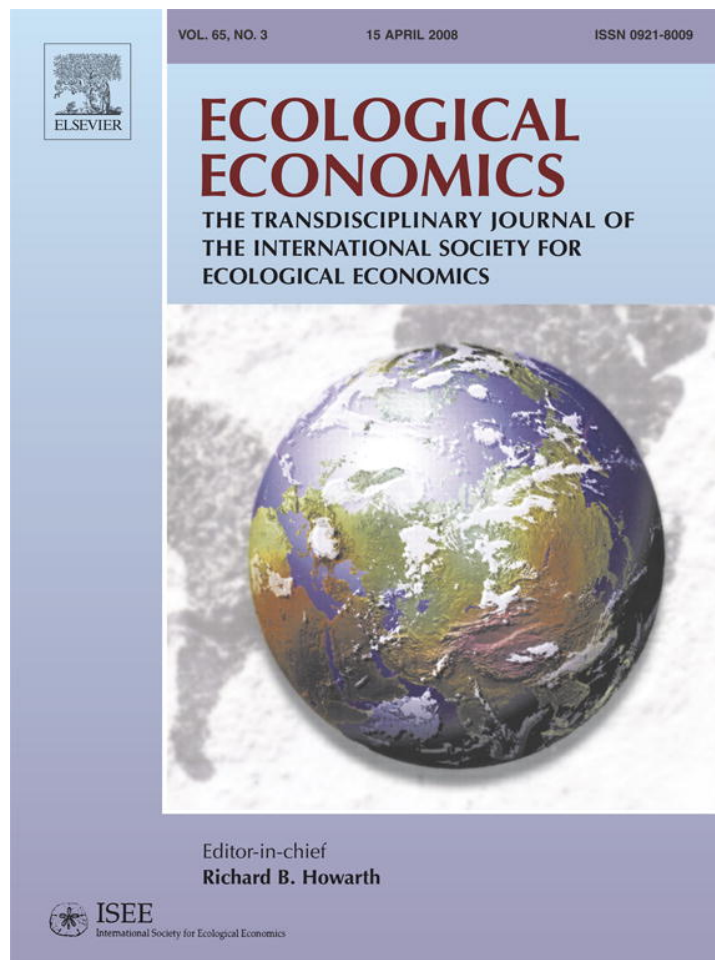


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METHODS

Economists, value judgments, and climate change: A view from feminist economics[☆]

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ABSTRACT

A number of recent discussions about ethical issues in climate change, as engaged in by economists, have focused on the value of the parameter representing the rate of time preference within models of optimal growth. This essay examines many economists' antipathy to serious discussion of ethical matters, and suggests that the avoidance of questions of intergenerational equity is related to another set of value judgments concerning the quality and objectivity of economic practice. Using insights from feminist philosophy of science and research on high reliability organizations, this essay argues that a more ethically transparent, real-world-oriented, and flexible economic practice would lead to more reliable and useful knowledge.

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Following on the October 2006 release of the Stern Review on the Economics of Climate Change (2006), and in discussions of the future of the Kyoto Protocol, a debate has ensued among economists concerning how quickly and drastically societies should move to reduce carbon emissions. Some who consider themselves to be in the mainstream of economic climate research, including [Richard Nordhaus \(2007\)](#) and [Richard Tol and Gary Yohe \(2006\)](#), have taken issue with the Stern Review, arguing that the decisive policy actions it advises are too extreme. While there are many issues involved, a good deal of the ensuing debate has focused on the issue of the intertemporal discounting of utility. Should the rate of time preference parameter, usually denoted as δ (delta) in models of optimal economic growth, be close to zero, or not? Tilting the

number towards zero, as done in the Stern Review, means that costs and benefits appearing out in the future weigh more heavily in current decision-making. This lends support for larger and more drastic abatement efforts, all else equal, since people in the future will be the major beneficiaries of climate change abatement and mitigation policies. Using a higher rate of time preference, as favored by Nordhaus (2007) and Tol and Yohe (2006), greatly reduces consideration of the welfare of future generations.¹

¹ See [Ackerman and Finlayson \(2006\)](#) for a more detailed discussion of the relation of time preference to overall discounting, and a detailed critique of discounting as applied to climate change analysis. Small rates of discounting make a big difference. If future values are discounted at a rate of 3% per year, for example, a benefit or cost worth \$1 million now is worth only \$228,000 if experienced 50 years from now; about \$2700 if experienced 200 years in the future; and \$0.38 if experienced 500 years in the future. Even applying a lower discount rate of 1% per year, the value is less than \$7000 after 500 years, and drops to pennies after 1400 years.

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Reading this literature with an interest in exploring its ethical dimensions, one can notice two distinct but inter-related levels of value judgments. The first and most obvious is the value judgment about the moral weight to be granted to people who are not yet alive.² This is the question represented by δ within the framework of mathematically-formulated optimal growth models, and while not resolved, the issue is at least out on the table. The second is the value judgment made among economists of various stripes as to what counts as quality, rigorous research. This issue is not yet on the table to the same degree.

The purpose of this paper is to demonstrate that this second question of professional values is deeply related to the first question of intergenerational equity: the dominant ways in which both these questions are treated within the economics profession can be traced to a hypervaluation of detachment. By over-emphasizing characteristics of distance, individuality, autonomy, and abstraction within economic thought, the practices of orthodox neoclassical economics have become severely impoverished. Feminist insights into the roles of connection and detachment in the history and philosophy of science can help in analysis of this situation, and in shaping economic practices that can better help address the real ethical and practical questions humanity urgently needs to face.

1. The state of ethical discussions

A striking feature of a number of economists' responses to the Stern Review and discussions of Kyoto is that they appear to argue that rigorous economic analysis of climate change—an issue with vast repercussions concerning distribution among those currently alive and between current and future generations—can be accomplished *without* recourse to ethical value judgments.

William Nordhaus, for example, ridicules the Review as “tak[ing] the lofty vantage point of the world social planner, perhaps stoking the dying embers of the British empire” and accuses the authors of the Review of imposing their own personal ethical viewpoint in their choice of a near-zero δ (Nordhaus, 2007, p. 691). While he attempts to discredit the Review by briefly discussing possible alternate ethical perspectives (2007, pp. 692–3), Nordhaus presents his own optimal growth exercise as essentially divorced from any such considerations. The time discount rate and consumption elasticity (another parameter of the optimal growth model) must, he says, be chosen to match “actual market data” on real interest rates and savings rates (p. 700). By appealing to a presumably objective, observable set of numbers for these parameters, he suggests that his research is more “standard,” “mainstream,” and presumably more scientific and reliable than the analysis in the Review. He furthermore

attempts to distance himself from ethical concerns by presenting policy analysis performed within the “context of the existing distribution of income and investments” (p. 692) not only as standard, but as the only scientifically defensible position. The baseline case, he writes, “does not make a case for the social desirability of the distribution of incomes...any more than a marine biologist makes a moral judgment on the equity of the eating habits of marine organisms” (p. 692). Nordhaus advocates modest reductions in emissions over the near term, with a “ramp” up to stronger policies in the future (p. 687).

The holes in Nordhaus' reasoning are of types that have been well-discussed elsewhere. Even imagining a world of perfect markets, people's demonstrated preferences over their own individual consumption time path (as revealed in savings rates), for example, cannot be assumed to be identical to their judgments about ethically appropriate time paths of consumption or utility across generations. To assume so is, as pointed out by Richard Howarth, to make a fundamental error in logic (2003).³ Meanwhile, the idea that some observable set of consumption preference parameters regarding risk and time can be found that will be consistent with observed behavior has been called a “fantasy” by Martin Weitzman (2007, p. 715) in his response to the Review, in light of asset-return puzzles. Lastly, performing policy evaluation purely from the baseline of the existing income distribution is hardly value-free, but rather a vigorous—and highly questionable—moral endorsement of the status quo, as any serious student of welfare economics must acknowledge. Imputing more decision-making power to some groups over others, whether the sorting factor is dollars to spend or proximity to the present, is inherently an ethically significant move.

But what is significant for the current paper is not so much the details of the flawed arguments, but the observation that economists often exhibit strong aversive reactions to any explicit consideration of ethics. Nordhaus's writings are not the only case. In Richard Tol and Gary Yohe's (2006) response to the Review, they likewise disagree with the Review's assumptions about the rate of time preference, but do not engage in a discussion of ethics. Instead, they engage only in the rhetoric of “scientific studies” and “reason” (p. 245), and appeal to peer-review and accumulation of like-minded studies⁴ to justify their go-slow policy prescriptions. Sheila Olmstead and Robert Stavins avoid discussion of ethics in their discussion of the future of Kyoto, instead simply presenting their go-slow advice as “scientifically sound, economically rational, and politically pragmatic” (2007, p.4). While Weitzman (2007) has interesting insights about the observability of appropriate interest rates for discounting, he is also contemptuous of discussions of ethics—to the point of putting “ethical” in scare quotes in many instances. He claims that arguments for $\delta \approx 0$ given by the

² In a broader sense, the discussion of ethics of climate change includes consideration of nonhuman well-being as well. Since the current paper seeks to engage with the mainstream economics literature, and this literature focuses, at best, on human well-being (and, more commonly, on abstract notions of utility or GDP whose relation to well-being can be tenuous), nonhuman welfare will not be discussed here.

³ Nordhaus briefly seems to acknowledge this fact (“The individual rate of time preference, risk preference, and utility functions do not, in principle at least, ...[have any] necessary connection with how social decisions weight different generations,” p. 691). But his later discussion of his own analysis does not carry through on this insight.

⁴ “In the past, benefit-cost analyses have always advocated rather modest emission reductions” (Tol and Yohe, 2006, p. 235, emphasis added).

Stern Review (and, earlier, by William Cline) are “paternalistic” (p. 707) and that they rely

“mostly on a priori philosopher-king ethical judgments... instead of trying to back out what possibly more representative members of society than either Cline or Stern might be revealing from their behavior is their implicit rate of pure time preference. An enormously important part of the ‘discipline’ of economics is supposed to be that economists understand the difference between their own personal preferences for apples over oranges and the preferences of others for apples over oranges...[They are] imposing their own value judgments on the rest of the world.” (p. 712, emphasis in original)

In such a discussion, one sees a strong repugnance towards making value judgments expressed in unusually colorful and vociferous language for an academic publication. What is behind such strength of emotion? Why this passion for dispassion? Feminist reflection on the discipline of economics offers some insights.

2. Feminism, objectivity, and economics

Feminist economics coalesced into a field in the early 1990s, starting with conferences, and proceeding to the formation of the International Association for Feminist Economics in 1992, publication in 1993 of the volume, *Beyond Economic Man: Feminist Theory and Economics* (Ferber and Nelson, 1993), and commencement of the publication of a journal, *Feminist Economics*, in 1995. Feminist economics is not, as is sometimes wrongly presumed, simply a political program, nor should it be confused with an idea of a “feminine” economics in which it might be assumed that women, by nature, do economics differently from men. Rather, perceptive economists in the 1960s and 1970s had raised doubts about the adequacy of neoclassical economic analysis, drawing attention to its neglect and distortion of women’s experiences in labor markets and families. By the late 1980s many feminists were realizing that traditional formal choice-theoretic modeling and a narrow focus on mathematical and econometric methods were a Procrustean bed when it came to analyzing phenomena fraught with connection to others, tradition, and relations of power—whether or not these phenomena had to do with gender per se. Questions were raised about neoclassical economics not because it is too objective, but because it is not objective enough (Nelson, 1996).

This is not the place to go into a full explanation of the breadth of feminist economics,⁵ but a few points relevant to the current discussion can be pointed out. In its efforts to be scientific and objective, neoclassical economics has tended to model itself on early notions of science, in particular adopting Cartesian geometry and Newtonian physics as models of knowledge. Explorations in the history and philosophy of science demonstrated how in the 17th and 18th centuries these early versions of scientific thought were formulated as a particularly masculine affair (e.g., Harding, 1986; Keller, 1985).

In the early 1660s, for example, Henry Oldenburg, the first secretary of the Royal Society of London for Improving Natural Knowledge, stated that the intent of the Society was to “raise a masculine Philosophy... whereby the Mind of Man may be ennobled with the knowledge of Solid Truths” (quoted in Keller 1985, p. 52). One of the primary manifestations of this drive for masculinity was a drive for distance and detachment. Reacting to a medieval world view in which humans were perceived to be embedded in a sacred, living natural world, the rising scientific worldview placed the scientist outside of, and above, nature. The scientist was imagined as autonomous, rational, interested in “hard” knowledge, disinterested, and male. What was left out—human interdependence, embodiment, emotion, “soft” or qualitative aspects of life, uncertainty, value judgments, and interests were coded as feminine, non-scientific, and weaker or of lesser value. Objectivity thus came to be associated with detachment—detachment from social influences, detachment from the object of study, detachment from other researchers, and detachment from practical concerns.

Mathematical formalization seemed to offer an entryway into a cool world of pure reason. Mathematical models can be praised for their clarity, logical rigor, precision, elegance, parsimony, and generality. But the idea that these qualities reflect the height of scientific knowledge and that they guarantee true objectivity—that is, reliability of knowledge untainted by subjective bias—is a chimera, as many scientists, philosophers of science, and others have pointed out. In the words of economist Knut Wicksell (quoted in Georgescu-Roegen, 1971, p. 341), the role of logic and abstraction is merely “to facilitate the argument, clarify the results, and so guard against possible faults of reasoning—that is all.”

Instead of objectivity, what a strict adherence to narrow methods leads to is something that Evelyn Fox Keller (1985) has called “objectivism”—a romantic belief in the possibility of connection-free knowledge from an outside-of-nature, perspective-free viewpoint. The reality is that scientists—and economists—are inherently embedded in nature, embedded in society, and hence part of, and inherently interested in, the very phenomena we study. There is no Cartesian “view from nowhere” that an individual can adopt, and from it derive perfectly objective knowledge. As Thomas Kuhn (1970, p. 210) wrote, “Scientific knowledge, like language, is intrinsically the common property of a group or else nothing at all.”

The fact that “objectivism” does not work, however, does not mean that attempts at objectivity need to be abandoned in favor of an “anything goes” view.⁶ Instead, it means that objectivity must be arrived at not through purity of logical method, but by holding up the results of research to ever-more-inclusive communities of inquiry. As expressed by feminist philosopher Helen Longino (1990, p. 79), “The objectivity of individuals... consists in their participation in the collective give-and-take of critical discussion and not in some special relation (of detachment, hardheadedness) they may bear to their observations.” Choice-theoretic models of family behavior and labor markets, for example, passed as “objective” among the community of

⁵ See Ferber and Nelson (2003) for a recent survey, and Perkins (1997) for an example of a discussion with an ecological focus.

⁶ Many supporters of formalization present “anything goes” as if it is the only alternative. For example, see Williamson (forthcoming).

economists in the 1960s, until feminist critics noted that they were constructed in such a way as to hide or justify domination and discrimination. Analyses of the costs and benefits of climate change policies that assume the existing global income distribution likewise only appear “objective” until voices from the global South speak up to challenge the unspoken ethical judgments that lie beneath them. Inclusion of the voices of women and the dispossessed—to the extent this has happened—serves to broaden and deepen such discussions, by pointing out the biases in “objectivist” studies and pushing towards more adequate forms of knowledge. Within the field of environmental policy-making, [Byran Norton \(2005\)](#) is among those working on developing pluralistic and empirically grounded approaches, which explicitly provide for community discussion of goals and values.

Objectivity as an activity of an ever-widening community has been called “strong objectivity” by feminist philosopher [Sandra Harding \(1995\)](#). Philosopher and economist [Amartya Sen \(1992\)](#) has used the term “positional objectivity” to describe “an objective inquiry in which the observational position is specified (rather than being treated as an unspecified intrusion—a scientific nuisance).” Sen has argued that any attempt at position-independent objectivity needs to build on positional views (i.e., be “trans-positional”), rather than ignore the position-dependence of views.

All the accusations made about the Stern Review “imposing” value-judgments are really, then, quite silly. The authors of the Review, at least, made their ethical assumptions explicit, discussed their rationale, and put their analysis out for public discussion. It is those economists seeking to disguise their value judgments under a veneer of Cartesian objectivism who are dangerous.

The above discussion, of course, gives economists the benefit of the doubt: it assumes that economists aspire to be balanced and unbiased, but are simply going about it in a mistaken way. There is an alternative explanation. Many of a Marxist or radical ecology persuasion equate market commerce and industrialization with the rape of the planet and the poor, and would regard mainstream economists as no more than the obsequious servants of global elites and global capital.⁷ To the extent that some economists try to hide highly ethically-suspect status-quo-biased value judgments under a veneer of “objective” analysis, they actively invite such reactions. Larry Summer’s World Bank memo on the efficiency of exporting pollution to poor countries, because the value of a life there is presumed to be cheaper, is one famous example. In discussions of climate change, consider [Olmstead and Stavins’s \(2007\)](#) explanation of why emissions targets in the near future should stay close to business-as-usual levels: “Moderate targets in the short term will avoid rendering large parts of the capital stock prematurely obsolete” (p. 2). The authors are particularly interested in protecting investments in electric power plants. While this explicit statement favoring the protection of the interests of capital over the interests of people hands the radical critics their target on a platter, [Olmstead and Stavins](#) try to justify themselves by implying that their position is “the scientifically sound and economic-

ally rational approach” (p. 4). Objectivism can serve as a convenient cover for particularistic and retrograde loyalties; economists should try to do better.

3. What kind of economics do we need?

As members of the human race, we may be concerned about future generations because we reason that such concern for humanity in general is fair and just. Or we may be concerned because we can imagine the distress we might be bringing on our own children and grandchildren by failing to address climate change.⁸ If we feel concern for future generations for any reason, and take what climate science is telling us seriously, we—those of us in the current human generation—are flat out up against a *problem*. The problem is that if we allow our economies to run along a business-as-usual path, we will bequeath to future generations a world whose life-sustaining capacities will be severely compromised. A number of economists (see discussions below) who are less wedded to the Cartesian view of economics or the status quo of industrial power are willing to acknowledge, first, that we have a big problem with ethical ramifications on our hands, and second, that, since the problem has economic aspects, it would be a good idea if economists could contribute something useful to its amelioration.

Rather than imagine economists as detached and neutral observers of the world, a better metaphor for our current situation might be medical research. Medical researchers are, one hopes, objective in the sense of not prejudging their findings and not hiding results that might be inconvenient to their funders. But they are not objective in the sense of detachment and neutrality. Whereas in a Cartesian model, which does not admit interests, a neutrality of the researcher towards the object of study is prescribed, in a cancer research lab 100% of the researchers are anti-cancer. One might hope that 100% of economists could likewise explicitly identify themselves as pro-survival-of-future-generations. In addition, medical researchers are not afraid to be “paternalistic” (or maternalistic) in their dissemination of the results of their research. They do not assume, as some economists would have us do in the case of observed savings rates, that observed behavior is the relevant guide. They would not say that the diet people eat must be the ideal anti-cancer diet, simply because we observe people eating it. They will advise on the diet that their research suggests will make people healthier.

A number of mainstream economists including [Geoffrey Heal \(2000\)](#) and [Brad DeLong \(2006\)](#), as well as [Sir Nicholas Stern and his team \(2006\)](#), have already weighed in with the judgment that climate change policy is inseparable from consideration of ethics, and that the well-being of future generations should

⁷ See, for example, [Shiva \(2005\)](#), [Watson \(2005\)](#), and [Bookchin \(2005\)](#).

⁸ These two approaches are often referred to in the ethics literature as the “justice” orientation, which is based on rules and principles and related to generalized “others,” versus the “care” orientation, which is based on attention to relationships and responsibilities to particular “others.” Evidence suggests that most moral decision-makers draw on both orientations. For discussion in relation to environmental ethics, see [Warren \(2000\)](#) and [Cuomo \(2005\)](#).

receive very substantial weight in any analysis. This points analysis in the right direction.⁹

But what about the form and methodology of their largely neoclassically-based analysis? While much of the discussion currently takes place in the context of optimal growth models, there is nothing magically impartial about assuming an infinite sum of aggregate utilities, being maximized by a hypothetical master planner.¹⁰ In fact, such a formulation is exactly at odds with our actual situation of living in societies with diverse and complicated political decision-making processes, many layers of interdependencies, many sources of well-being and ill-being, wide disparities in distribution, and very little likelihood of the sorts of compensating transfers hypothesized in cost-benefit models ever occurring. And if we take a close look, such models are generally not even internally entirely rigorous, relying on technical assumptions for aggregation and convergence purposes that would otherwise be considered inadmissible (DeCanio, 2003).

It may be that it is rhetorically and political useful, given the current state of economics and politics, to phrase climate change policy in terms of cost-benefit analysis and percentages of GDP, as done in the Stern Review. It may be argued that a radically boiled-down, bumper-sticker-short, punchy “finding” that can serve as a call to action may be what is most needed right now. Despite 20 years of work by ecological economists, citizens and policymakers still tend to associate GDP levels with well-being levels, and endow analysis phrased in such terms with an (often misplaced) aura of expertise. But economists—and society—fall into what Alfred North Whitehead called the “fallacy of misplaced concreteness” (1925) if we start to treat as a chunk of solid fact such simplified aggregate, summary measures as “the overall costs...of climate change will be equivalent to losing at least 5% of global GDP each year” and “the costs of action—reducing greenhouse gas emissions to avoid the worst impacts of climate change—can be limited to around 1% of global GDP each year” (Stern, 2006, Executive Summary, p. 1). Most of the adjustments that will need to be made to mitigate climate change strongly affect the composition of output and consumption, not merely an overall magnitude. They will affect how people live and how they perceive their quality of life in myriad—and perhaps unpredictable—ways.

Reluctance to move away from a mathematical model such as the optimal growth model may be based in a fear of losing clarity, logical rigor, precision, elegance, parsimony, and generality. It is true that the model, at least from some angles, scores high on these criteria, and that these are better goals than, say, sloppiness and vagueness.¹¹ But if we can leave

⁹ Lacking a vocabulary for discussing heartfelt and carefully reasoned value judgments, however, these discussions of inter-generational considerations can dissolve into “anything goes” terms. For example, Geoffrey Heal (2007) argues for $\delta=0$, but phrases this view as simply his own “opinion,” reinforcing the false belief that anything not known with mathematical certainty must therefore be a matter of purely subjective preference.

¹⁰ See also DeCanio (2006).

¹¹ See DeCanio (2005) for a discussion of the usefulness of modeling exercises for clarifying concepts, ethical foundations, or assumptions. This is quite different, as he points out, from using models to purport to describe—and predict the behavior of—entire economic systems.

Table 1 – High-reliability organizations

Characteristic	Elaboration
Preoccupation with failure	Operating with a chronic wariness of the possibility of unexpected events that may jeopardize safety by engaging in proactive and preemptive analysis and discussion
Reluctance to simplify interpretations	Taking deliberate steps to question assumptions and received wisdom to create a more complete and nuanced picture of ongoing operations
Sensitivity to operations	Ongoing interaction and information-sharing about the human and organizational factors that determine the safety of a system as a whole
Commitment to resilience	Developing capabilities to detect, contain, and bounce back from errors that have already occurred, but before they worsen and cause more serious harm
Deference to expertise	During high-tempo times (i.e., when attempting to resolve a problem or crisis), decision-making authority migrates to the person or people with the most expertise with the problem at hand, regardless of their rank

Source: Vogus and Sutcliffe (2007, p. 48).

behind the old Cartesian model of knowledge, we can acknowledge that an endeavor that values only these criteria will be impoverished, indeed. Aiming at precision is a good counteractive to unnecessary vagueness, for example, but if held up as the only ideal can lead to conclusions that are wildly inaccurate. And so many simplifying assumptions may be needed to get to a logically correct answer, that an analysis ends up saying nothing at all about the real world. What sort of economics would it be useful to have? A truly powerful and resilient economic analysis can only be brought about through a balanced valuing of clarity and realism, logical rigor and real-world richness, precision and accuracy, elegance and appropriate complexity, parsimony and applicability, and generality and usefulness.¹² The lopsided value system that prioritizes the perceived toughness and “masculinity” of an approach over its actual overall quality—including its reliability and its usefulness in addressing critical real-world problems—needs to be abandoned.

4. “High-reliability” economics?

To continue the metaphor with health and safety, consider that economics and other policymakers are currently in a situation with regard to climate change where quick action is needed, within a highly complex situation, and where lives hang in the balance. There is an empirical literature on “high reliability organizations” that has looked at characteristics of successful operations in exactly such situations. These researchers have examined aircraft carrier flight decks, nuclear power plants, and health care organizations—all organizations that have to

¹² For elaboration, see Nelson (1996).

“operate hazardous technologies in a nearly error-free manner under trying conditions rife with complexity, interdependence, and time pressure” (Vogus and Sutcliffe, 2007, p. 47). Case studies of these micro-level organizations have identified five behavior processes that are keys to establishing high-reliability performance. Table 1 lists these five process and their definitions, as they have become evident in this research.

For example, the first characteristic of a high-reliability organization is that it is constantly on the watch for problems and unexpected events. The neoclassical approach to climate change, on the other hand, assumes that standard approaches, focused on marginal adjustments and built up during a time in which natural resource limits could be largely ignored without immediate consequence, should continue to prevail. Standard optimal growth models tend to assume that the future will be much like the past—for example, assuming on-going per capita GDP growth of 1% or more per annum. Smooth substitutability between natural and manufactured capital in production and consumption is generally assumed, as well as the existence of technological fixes for any problem that may arise.¹³ The probability of truly catastrophic events is often assumed to be minimal.¹⁴ Rather than leading proactive discussions, this approach encourages complacency. Characteristics of the neoclassical economics approach are summarized in Table 2.

Another characteristic of high-reliability organization is a reluctance to simplify and a willingness to challenge received wisdom. The neoclassical economics approach, on the other hand, stands for loyalty to a highly stripped-down model of human behavior. For example, the equating of the preferences behind people’s empirically observed savings rates with their ethical judgments about future generations, as discussed earlier, relies on an exceedingly narrow *homo economicus* model that characterizes a person as no more than a set of consumption preferences. More complex judgments that people may make as citizens or ethical beings are excluded. Much analysis is also simplified by extreme aggregation. Heroic claims are made about the appropriateness of benefit-cost analysis based on discounted aggregate utility or, as discussed earlier, the validity of expressing policy implications in terms of changes in aggregate GDP.

High reliability organizations are characterized by high levels of interaction and information-sharing. While neoclassical economic analysts of climate change do selectively borrow information from the physical sciences, they maintain high barriers against interaction with ecological, political, psychological, philosophical, and sociological knowledge that might result in challenges of their core assumptions.

Instead of developing capacities to detect and bounce back from errors, neoclassical methodological values tend toward the development of rigidity and blindness to errors. In fact, if one takes rational agents, consumer sovereignty, and perfect markets as defining the default case, then errors are ruled-by

¹³ See Neumayer (1999) and Sterner and U. Martin Persson (2007) for a fuller critique of the assumption of substitutability between natural and manufactured capital.

¹⁴ Weitzman (2007) varies from this approach, arguing that the distribution of the growth rate of the economy could have a thick left tail. Arrow (2007) also puts greater weight on higher cost scenarios.

Table 2 – Neoclassical economics

Characteristic	Elaboration
Preoccupation with status quo	Operating with a chronic assumption that the future will be much like the past.
Dedication to simplified interpretations	Relying on highly simplified characterization of human behavior and highly aggregate analysis.
Sensitivity to disciplinary boundaries	Staying within rational choice modeling boundaries, neglecting most information from other disciplines.
Commitment to rigidity	Encouraging loyalty to accepted models, no matter how dysfunctional they become.
Deference to an established hierarchy	Maintaining image of neoclassical economists, whose work is peer-reviewed by like-minded economists, as sole rational and “mainstream” policy advisors.

definition—to be nearly impossible. In such a framework even harms to life, health, and species survival have to be considered “chosen.” The persistent failure to recognize ecological limits is another example of blindness.

Lastly, high reliability organizations yield decision-making power to the person with most expertise, regardless of rank. In contrast, neoclassical economic climate research is characterized by a closed and self-perpetuating cadre of like-minded researchers, who seek to dismiss the knowledge and wisdom of others.

The comparison between high-reliability organizations and neoclassical economics climate research is not favorable. This analysis suggests that the economics profession will need to undergo massive change, in both its explicitly ethical values and its less explicit methodological values, if it is to help address issues of climate change before they (as phrased in Table 1) “worsen and cause more serious harm.”

5. Conclusion

To provide a useful voice on climate change, economists need to show that they can think as ethically competent human beings in a social world, and that they can escape the limitations of Cartesian-inspired rational choice theory and modeling. Economists could potentially have some useful things to say about socially responsible uses of private property, markets, and global trade; about the design of market institutions, taxes, and regulation; and about consumption, well-being, employment, and investment. But this will only happen if we dig into the particulars of the situation and join in dialog with a proper attitude of modesty, rather than pretend to preach from an imaginary value-free and perfectly rigorous platform located somewhere outside our ecological world and our diverse society. The real question we need to address is not “What discount rate should be applied, within a model of utility maximization?” The first question is, “How do we want to live, in light of the effects of our life choices on other people and living beings, now and in the future?”

Fortunately, at least some economists are moving in this direction. Many contributors to this journal work along such lines. As economist Stephen DeCanio puts it, “Instead of relying on flawed general equilibrium models to point the way, we should start from a specification of the characteristics of the future (or potential futures) we wish to bequeath to our successors and work backwards” (2003, p. 160). Economists Frank Ackerman, Jim Boyce, Kristen Sheeran, and others have formed an organization called Economics for Equity and the Environment (or “E3”), committed to the beliefs that “a clean and safe environment is a birthright of every person” and that “economists can help craft effective solutions and build a more just and sustainable future” by “engaging with real-world problems” (E3 Network, 2006, p.9). Economists just might be able to play an ethically defensible and useful role if we can get over our romance with detachment, put ourselves firmly on the side of survival, roll up our sleeves, and get to work.

REFERENCES

- Ackerman, F., Finlayson, I., 2006. The economics of inaction on climate change: a sensitivity analysis. *Climate Policy* 6 (5), 509–526.
- Arrow, K.J., 2007. Global climate change: a challenge to policy. *Economists' Voice* 4 (3), 1–5.
- Bookchin, M., 2005. What is social ecology? In: Zimmerman, M.E., Callicot, J.B., Warren, K.J., Klaver, I.J., Clark, J. (Eds.), *Environmental Philosophy: From Animal Rights to Radical Ecology*. Pearson Prentice Hall, Upper Saddle River, pp. 462–478.
- Cuomo, C., 2005. Ethics and the eco/feminist self. In: Zimmerman, M.E., Callicot, J.B., Warren, K.J., Klaver, I.J., Clark, J. (Eds.), *Environmental Philosophy: From Animal Rights to Radical Ecology*. Pearson Prentice Hall, Upper Saddle River, pp. 194–207.
- DeCanio, S.J., 2003. *Economic Models of Climate Change: A Critique*. Palgrave Macmillan, New York.
- DeCanio, S.J., 2005. Descriptive or conceptual models? Contributions of economics to the climate policy debate. *International Environmental Agreements* 5 (4), 415–427.
- DeCanio, S.J., 2006. Is economics the wrong language for addressing climate policy? Presented at Energy and Economic Policy Models: A Reexamination of Some Fundamentals, University of California/American Council for an Energy-Efficient Economy (ACEEE) workshop, Washington DC, November 16–17.
- DeLong, B., 2006. What Do We Owe Our Great Grandchildren? Brad DeLong @ Vox.Com (blog).
- E3 Network, 2006. Real People, Real Environments, and Realistic Economics, Economics for Equity and the Environment. http://www.e3network.org/Real_People_Economics.pdf.
- Ferber, M.A., Nelson, J.A. (Eds.), 1993. *Beyond Economic Man: Feminist Theory and Economics*. University of Chicago Press, Chicago.
- Ferber, M.A., Nelson, J.A. (Eds.), 2003. *Feminist Economics Today*. University of Chicago Press, Chicago.
- Georgescu-Roegen, N., 1971. *The Entropy Law and the Economic Process*. Harvard University Press, Cambridge, MA.
- Harding, S., 1986. *The Science Question in Feminism*. Cornell University Press, Ithaca.
- Harding, S., 1995. Can feminist thought make economics more objective? *Feminist Economics* 1 (1), 7–32.
- Heal, G., 2000. *Nature and the Marketplace: Capturing the Value of Ecosystem Services*. Island Press, Washington D.C.
- Heal, G.M., 2007. Human welfare and climate change. Presented at The Economics of Global Warming, Bernard Schwartz Center for Economics Policy Analysis at the New School for Social Research, New York, NY, October 12.
- Howarth, R.B., 2003. Discounting and sustainability: towards reconciliation. *International Journal of Sustainable Development* 6 (1), 87–97.
- Keller, E.F., 1985. *Reflections on Gender and Science*. Yale University Press, New Haven, Conn.
- Kuhn, T., 1970. *The Structure of Scientific Revolutions*. University of Chicago Press, Chicago.
- Longino, H., 1990. *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry*. Princeton University Press, Princeton, NJ.
- Nelson, J.A., 1996. *Feminism, Objectivity and Economics*. Routledge, London.
- Neumayer, E., 1999. Global warming: discounting is not the issue, but substitutability is. *Energy Policy* 27, 33–43.
- Nordhaus, W.D., 2007. A review of the Stern Review on the economics of climate change. *Journal of Economic Literature* 45 (3), 686–702.
- Norton, B.G., 2005. *Sustainability: A Philosophy of Adaptive Ecosystem Management*. University of Chicago Press, Chicago.
- Olmstead, S.M., Stavins, R.N., 2007. A meaningful second commitment period for the Kyoto Protocol. *The Economists' Voice* 4 (3), 1–5.
- Perkins, E. (Ed.), 1997. *Women, Ecology and Economics*. Special issue of *Ecological Economics*, vol. 20(2).
- Sen, A., 1992. *Objectivity and Position*. The Lindley Lecture, University of Kansas.
- Shiva, V., 2005. The impoverishment of the environment: women and children last. In: Zimmerman, M.E., Callicot, J.B., Warren, K.J., Klaver, I.J., Clark, J. (Eds.), *Environmental Philosophy: From Animal Rights to Radical Ecology*. Pearson Prentice Hall, Upper Saddle River, pp. 178–193.
- Stern, S.N., 2006. *Stern Review on the Economics of Climate Change*. HM Treasury, London.
- Thomas Sterner, T., Persson, U.M., 2007. An even Sterner review: introducing relative prices into the discounting debate. Resources for the Future Discussion Paper 07-37, Washington DC.
- Tol, R.S.J., Yohe, G.W., 2006. A review of the Stern Review. *World Economics* 7 (4), 233–250.
- Vogus, T.J., Sutcliffe, K.M., 2007. The safety organizing scale: development and validation of a behavioral measure of safety culture in hospital nursing units. *Medical Care* 45 (1), 46–54.
- Warren, K.J., 2000. *Ecofeminist Philosophy: A Western Perspective on What It Is and Why It Matters*. Rowman & Littlefield, Lanham, Maryland.
- Watson, D., 2005. Against the megamachine: empire and the Earth. In: Zimmerman, M.E., Callicot, J.B., Warren, K.J., Klaver, I.J., Clark, J. (Eds.), *Environmental Philosophy: From Animal Rights to Radical Ecology*. Pearson Prentice Hall, Upper Saddle River, pp. 470–495.
- Weitzman, M.L., 2007. A review of the Stern Review on the economics of climate change. *Journal of Economic Literature* 45 (3), 703–724.
- Whitehead, A.N., 1925. *Science and the Modern World*. The Free Press, New York.
- Williamson, O.E., forthcoming. Pragmatic Methodology. Presented at Allied Social Science Association meetings, Chicago, January 6, 2007. *Journal of Economic Methodology*.