

Forthcoming in Bromley, D. and J. Paavola
*Economics, Ethics, and Environmental Policy:
Contested Choices*, Blackwell, 2002.

ENVIRONMENTAL POLICY WHEN PEOPLE'S PREFERENCES ARE INCONSISTENT, NON- WELFARISTIC, OR SIMPLY NOT DEVELOPED

OLOF JOHANSSON-STENMAN¹

*Department of Economics, Göteborg University,
Box 640, SE-40530 Göteborg, Sweden.
E-mail: Olof.Johansson@economics.gu.se*

ABSTRACT

This paper discusses how a benevolent policy maker should act based on some, possibly non-welfaristic, ethical principle in cases where people's preferences are *not* perfectly informed, consistent and fully developed with regard to all goods, including all kinds of environmental goods, as is normally assumed in mainstream economic theory. When stated or revealed preferences do not reflect the maximization of individual welfare, it is argued that welfare, rather than preferences, has intrinsic value. However, it is also argued that properly designed stated preference methods may provide useful information about people's views about alternative ethical ends, besides human well-being, and that policy makers should take such views seriously.

Key words: ethics, environmental policy, environmental valuation, cost-benefit analysis, endogenous preferences, preference construction, irrationality, bounded rationality, cognitive dissonance, anthropocentrism

JEL-classification: A13; D61; Q28

¹ I am grateful for constructive comments from OCEES workshop participants in Oxford, and in particular from Jouni Paavola and Daniel Bromley who provided very detailed and insightful comments. I have also received useful comments from Fredrik Carlsson, and financial support from the Swedish Transport and Communications Research Board (KFB, or Vinnova) is gratefully acknowledged. The usual disclaimer applies.

Introduction

Policy conclusions in applied welfare economics, such as environmental economics, normally presuppose that people have well-defined consistent preferences. However, there is empirical evidence that people's preferences with respect to environmental goods are often far from complete and often highly context-dependent. This paper will therefore discuss policy issues when people's preferences may not be consistent, or even developed, with respect to all goods. Further, it is almost always assumed that what matters intrinsically for public policy is people's utilities, and nothing else. However, also this assumption can be questioned in the environmental field, and there is evidence that some people hold non-anthropocentric ethical views. We will therefore allow for the possibility that also the environment, or animal welfare, may matter intrinsically from a social point of view, and not only instrumentally through people's utility functions.

Empirical tests have often rejected standard economic assumptions with respect to people's preferences and behavior. Even though this has been discussed intensively in recent years (Conlisk 1996, Thaler 1992, 2000), the implications in practice for applied economics, such as cost-benefit analysis, appear very minor so far. Why is that? There exists at least four different ways to defend the current practice: 1. Applied work becomes too complicated to undertake if the standard assumptions are not maintained; 2. Policy recommendations become less straightforward to derive; 3. The standard assumptions, although strictly incorrect, provide an *approximate* picture which is sufficiently accurate for the tasks at stake; and 4. We must maintain our most fundamental assumptions, otherwise there is almost nothing left of economics. The fourth reason is of course against what is (or should be) the most fundamental characteristics of science, critical thinking and work to replace existing theories with better ones, and can therefore simply be dismissed as non-scientific.² The former three are worth taking seriously, however. It is true that anomalies and deviations from what the standard theory predicts are sometimes relatively small. There is also a tradeoff between simplicity and relevance in economics (as in all science, including social science), and without simplifying assumptions we could not draw *any* conclusions. So, in some cases the standard theory appears to be the appropriate one to use. But sometimes it is not. There is much evidence that expressed preferences and observed behavior with respect to the environment, as well as with respect to risky choices, may deviate largely from what the standard theory predicts. It is therefore important to also consider cases where people's preferences are *not* perfectly informed, consistent and fully developed with regard to all goods, including all kinds of environmental goods. For example, how should we handle situations where people's risk-perceptions are biased? Should public policy be based on people's preferences in terms of choices, or on the consequences in terms of expected welfare? In discussing these issues we will neglect a number of other important and

² Even though such provincial thinking is not very often found in print, it is often put forward, also by respectable economists, in day-to-day talk.

controversial issues such as aggregation problems, equity issues, and intertemporal allocation problems.

Mainstream normative economics is typically based on either a specific ethical theory, such as utilitarianism, or on some weaker minimum requirements of the social objective. In particular, it is almost always assumed that the Pareto principle must not be violated in terms of individual utilities. This implies that if the social objective is expressed as a social welfare function (SWF) to be maximized, this SWF must solely depend on individual utilities. Using the terminology by Sen (1979), such a SWF is *welfaristic*. Environmental quality or animal welfare may then affect social welfare, but only indirectly through the individual utility functions. This paper, on the contrary, also discusses how a benevolent policy maker should act based on some fundamental, possibly *non-welfaristic*, ethical principle, implying that we allow for more general SWFs where animal well-being and/or environmental quality matters *per se*, irrespective of whether people derive any well-being from this or not.

Section 1 discusses generally the choice between individual welfare, as a measure of individual well-being, and preferences, as reflected in revealed choices or stated preferences, as an ‘end’ in itself for the government to pursue. It is concluded that welfare, rather than preferences, is an appropriate end for a reasonable consequentialist ethical theory. Section 2 discusses whether individual welfare should be the only end, or whether there might be other suitable ends for the government. Based on some empirical evidence it is argued that many people seem to value the environment intrinsically, and that these views should be reflected also in social decisions. Section 3 deals with what to do when preferences are inconsistent or (what may be called) irrational in various ways, including cases with cognitive limitations, biased risk perceptions, cognitive dissonance, and myopic behavior. Section 4 discusses if, and if so how, insights on preference formation (or construction) are important from a welfare perspective. It is argued that the actual preferences we are looking for are those which reflect welfare as closely as possible, and in addition provide the most accurate information about the respondents’ view of what should intrinsically matter. Hence, environmental valuation methods should explicitly be constructed to elicit such preferences. Section 5 summarizes and discusses how the insights from this paper might be used in actual policy making.

1. Utility, Preferences and Well-Being

In what is often denoted ‘positive’ economics, such as consumer demand analysis, we are interested in explaining and describing observed phenomena, for example consumption patterns in terms of price and income elasticities. The (assumed unobservable) utility function is then typically defined implicitly as a function (with a small amount of imposed structure) which is maximized by the observed consumption pattern, or more generally by individuals’ actions, following Samuelson (1938). In general there is an infinite number of utility

functions that can explain a certain consumption pattern. For example, in the case where a well-behaved³ utility function $u = U(x_1, x_2, \dots, x_n)$ can explain a certain consumption pattern it is straightforward to show that any monotonically increasing transformation $f(u)$ is consistent with the same pattern, see for example Samuelson (1947) or De Graaf (1967).⁴ The utilities, representing preferences, can then clearly not be interpreted in a cardinal way, and statements such as “utility is concave in income” are meaningless.

On the other hand, in what is often described as ‘normative’ economics, including various kinds of policy analysis, utility (cardinal or ordinal) is used to represent individual welfare or well-being. Of course, sometimes there is no need to make a distinction between these two different uses of the word utility. This would be the case if (and only if) people’s choices can be explained *solely* by the maximization of individual welfare. Sometimes this is not the case, however, which appears to be insufficiently analyzed in economics. As remarked by Broome (1999, p. 4): “Welfare economists move, almost without noticing it, between saying a person prefers one thing to another and saying she is better off with the first than with the second.” Here we will therefore distinguish between utility as representing preferences, on the one hand, and welfare on the other. The preferences are defined by choices, actual or what they would have been in a real choice situation (as in Broome 1999), whereas welfare is used interchangeably with well-being, a notion that may be interpreted more broadly than individual happiness, however.

Many philosophers, psychologists, and also some economists, have criticized the narrow description of individuals as concerned exclusively with utility maximization. However, many (most?) economists may consider the following often quoted statement by Gary Becker in his Nobel lecture on *The Economic Approach* to provide an effective end to this discussion: “Individuals maximize utility *as they perceive it*, whether they be selfish, altruistic, loyal, spiteful, or masochistic.” (Becker 1993, p. 386, italics in origin). For example, there is no doubt that altruistic concern is consistent with, and may be modeled within the framework of, utility maximization. And if we think of utility solely as something which is implicitly maximized in order to be consistent with actual behavior, then the statement is of course tautologically true, but also virtually meaningless as a hypothesis. As expressed by Samuelson more than 50 years ago: “Thus, the consumer's market behavior is explained in terms of preferences, which are in turn defined only by behavior. The result can very easily be circular, and in many formulations undoubtedly is. Often nothing more is stated than the conclusion that people behave as they behave, a theorem which has no empirical implication, since it contains no hypothesis and is consistent with all conceivable behavior, while refutable by none.” (Samuelson 1983[1947], p. 91) To say that people are

³That is, increasing, strictly quasi-concave, and twice continuously differentiable in the arguments.

⁴For example, where $f(u) = e^{U(x_1, x_2, \dots, x_n)}$ or $f(u) = \ln(U(x_1, x_2, \dots, x_n))$.

utility maximizers is then like saying that football-players are *Sex*-minimizers, where *Sex* is defined implicitly as something that if it is minimized is consistent with the actual behavior on the field. The only information we get from this statement, however, is that football-players' behavior is not completely random, something which is about as obvious (at least for someone who knows the rules) for football players as it is for consumers. If, on the other hand, utility is seen as a measure of individual well-being, then the Becker statement is certainly not trivially true, but a meaningful hypothesis which in principle is testable and refutable.

The utility function used in policy-oriented economic analysis, such as most of the environmental valuation literature, is often (implicitly) assumed to be both a measure of well-being and of choice simultaneously. This fact is often not recognized, and this is one reason for the confusion which often arises when interpretations of the results from environmental valuation studies are discussed; cf. Broome (1991a, 1999), Johansson-Stenman (1998) and Sen (1991). As repeatedly emphasized by Sen (for example Sen 1977, 1985, 1987), whether people maximize their own well-being or not is ultimately an empirical question, although unfortunately a difficult one. Thus, if well-being is *defined* independently of choice, and an individual chooses state *A* to *B*, it does certainly not follow by logic that the individual's well-being must be larger in state *A* than in *B*. First, people simply make mistakes, and second, people may prefer to sacrifice a certain amount of their own well-being in order to increase some other end, such as ones childrens' well-being. In particular, the fact that an individual derives utility from being kind to another person (sympathy, in Sen's terminology) does not imply that the kindness is caused by a utility maximizing behavior, since the behavior may in part be due to some other motive, such as the welfare experienced by the other person. Hence, the statement by Becker, although perhaps superficially appealing, is not at all obvious, unless utility is defined in a way so as to make the statement tautologically true.⁵

In the special case when preferences are a perfect measure of welfare, it does of course not matter whether we choose preferences or welfare as our unit of analysis. But when preferences and welfare differ, should public decision-making be intrinsically concerned with preferences or welfare? If we limit our analysis to consequentialism, and rule out right-based ethics, it appears straightforward that welfare, rather than preferences, is good in itself. Things may be chosen because they are good, but they are not good because they are chosen.⁶ This position is very similar to the betterness principle argued for by Broome (1991b, 1999),

⁵To the defense of Becker, however, one should add that he himself does not seem to view individual utility maximization as a *hypothesis*, but rather as a *method* of analysis.

⁶This is of course not to say that preferences should not be considered in public decision making, since preferences may often be much easier to observe and they may in many cases be closely correlated with welfare.

and also related (although not identical) to the view of Harsanyi (1982, 1995, 1997), who has repeatedly argued that what should matter in social decision making is the *true* or *informed* preferences, that is, the preferences a rational individual equipped with perfect information would have, rather than actual preferences based on partial information.⁷ Still, as will be argued, not even perfect information and the use of an infinite cognitive capacity will guarantee that a person's preferences will reflect his welfare in cases where a person deliberately chooses to maximize some other end than his own welfare.

It is also difficult to consistently argue in favor of preferences in cases where preferences and welfare differ. For example, how should one argue in the common situations where individuals prefer to have restricted choices (Akerlof, 1991), or that the government should choose for them? And why would they prefer to have restricted choices in the first place, if not because what is intrinsically important is welfare, and they believe that welfare will be higher with restricted choices (including possible cognitive effort etc.)?

2. Beyond Anthropocentric Welfarism?

The standard model in economics does not distinguish between welfare and preferences, but simply uses utility to represent both, and it is also implicitly assumed that there is nothing intrinsically important besides individual (human) utility. Here, on the contrary, evidence will be presented that many people seem to value the environment intrinsically, and it is argued that the government should take such views seriously.

An anthropocentric and welfaristic social welfare function can be written as $W = w(u^1, u^2, \dots, u^n)$, where W is social welfare and u^i is utility for individual i . Environmental quality or animal welfare may then still affect social welfare, but only indirectly through the individual utility functions as follows:

$$W = w(u^1(x^1, z), u^2(x^2, z), \dots, u^n(x^n, z)) \quad (1)$$

where x^j is j 's consumption of a vector of private goods, and where z is a vector of public goods, including various aspects of environmental quality and/or animal welfare. For example, the suffering of a particular animal species may affect social welfare through altruistic (or sympathetic) concern in one or many individuals' utility functions. Even though such an anthropocentric view is completely dominating in welfare economics, it is not very often clearly expressed in plain English; Baxter (1974:5) is an exception: "Penguins are

⁷ Ng (1999) goes one step further arguing that the logical consequence of Harsanyi's arguments is that the government should be intrinsically concerned solely with individual happiness. This view is certainly not necessary for the arguments here, although most people would presumably agree that happiness is an important element of welfare, or well-being.

important because people enjoy seeing them walk about rocks; and furthermore, the well-being of people would be less impaired by halting use of DDT than by giving up penguins. In short, my observations about environmental problems will be people-oriented, as are my criteria. I have no interest in preserving penguins for their own sake.” Although there is no reason to question that Baxter holds purely anthropocentric values, or that many economists may do so, empirical findings suggest that many people do not. Stevens *et al.* (1991), Spash and Hanley (1995), Russel *et al.* (1999), and others have found that many people seem not only to value human well-being, but also nature in itself, including animal welfare. A more general SWF reflecting such values can be written as follows:

$$W = w(u^1(x^1, z), u^2(x^2, z), \dots, u^n(x^n, z), z) \quad (2)$$

The crucial difference between (1) and (2) is that z is an argument by itself in the SWF in (2), irrespective of individual utilities. For example, in this case we allow for the possibility that social welfare may decrease due to animal suffering even if no human being knows (or cares) about it. The empirical results by Russel *et al.* are particularly interesting in this respect, since one purpose in that study was to trigger private, social and ecological preferences respectively, by changing the framing in words associated with the valuation of a recreation area. In follow-up questions respondents were asked about motives for their choices, including questions about whether the well-being of other people or the value of nature *per se* had affected their responses. Naturally, most respondents gave “much weight” to the consequences for themselves and for their family; less than 50% gave “much weight” to the effects for other visitors. The consequences for “the flora and fauna in the forest” (that is, irrespective of other people’s value of the nature) were in all alternatives given “much weight” for more than 80% of the respondents, and hence also for the alternative with the private framing! This should be contrasted with the mainstream assumption, predicting that 0% would be influenced by such motives. Although one should interpret such survey results with great care, there is evidence that many people attach great value to the environment, irrespective of their own or others’ associated well-being.

Now, given that many people think that the environment and/or animal welfare should be given *some* weight in public decision-making, should the government ‘respect’ these views? Or, more generally, should the government’s objectives be based exclusively on people’s opinions? This is not self-evident and for example Pigou (1920) argued that it is the duty of the government to protect the interest of future generations against the current generations preferences for ourselves. Marglin (1963), on the other hand, argues that the government should only reflect the preferences and opinions of present individuals (who may of course have preferences also for people in the future). However, although the general question is difficult to answer unambiguously, since it relates to conflicts between

fundamental *values* and fundamental *principles* for democratic decision making, it appears less problematic in our specific case. If most people prefer the government to *also* consider the environment *per se*, and animal welfare, in addition to their own welfare, it seems reasonable for the government to do so. Hence, in tradeoffs between human welfare versus nature and animal welfare, it would seem strange if the government would not put *any* weight on the value of nature, or on avoiding animal suffering, if that is what most people want it to do.

It should be emphasized that in order to accept that not only human well-being has an intrinsic value one need not go as far as some utilitarians (such as Singer 1975, 1979), who argue that all suffering should count equally (per suffering unit). Nor do one have to accept that nature or ecosystems have certain absolute rights (see for example O'Neill 1997). Instead it is sufficient that in tradeoffs between human well-being on the one hand, and nature or animal well-being on the other, the weights given to the latter should be larger than zero.

3. Imperfect Information and Inconsistent or Irrational Preferences

It is obvious that people often make decisions that they will later regret due to limited or misleading information. The appropriate response from the government or policy makers in general is less obvious, however. One could argue that the appropriate role is to provide more, and more easily accessible, information for individuals to be able to make informed and rational decisions. However, although information provision is certainly an appropriate task for public authorities, it has its limitations. First, it is well known that many people, for various reasons, often simply do not trust publicly provided information (Slovic 2000). Second, even if they do, it would often be extremely expensive to provide all citizens with perfect information. This suggests that there would often be a tradeoff between welfare costs due to imperfect information, on the one hand, and direct costs associated with the provision of better information on the other. Third, even if perfect information could be provided, people have limited cognitive capacity, and also time, to process all this information in a rational way; see Conlisk (1996) for a survey on bounded rationality. Thus, even though there is a role for public information provision, one must still decide how to deal with situations where people have imperfect information or limited cognitive capacity. For example, it is well-known that most people have great difficulties to deal systematically with stochastic problems, and it is often found that people overestimate small probabilities and underestimate large ones (Slovic 2000; Viscusi 1992, 1998). This is important since how to construct a reasonable environmental policy is largely a problem of how to deal with risk, for example since our knowledge of the ecosystem effects of environmental pollution is very limited.

Pollak (1998) recently concluded a paper by saying that it is still an open issue in economics how policy makers should react to information about (commonly observed) systematic biases in individual risk-perception, and that "Utilitarians --and most welfare

economists and policy analysts approach public policy from a utilitarian perspective -- should consider whose beliefs (the public's or the experts') should be used to calculate expected benefits." Here it is argued that preferences are important only in so far as they provide information about welfare (or suitable alternative ethical ends), and thus that, in principle, we are ultimately interested in welfare. In practice, the policy conclusions may be less straightforward, however. Assume (unrealistically, of course)⁸ that we know both the individuals' preferences and their cardinal welfare functions perfectly, and that individuals overestimate a certain risk. Whether an efficient (in terms of welfare) publicly provided risk-reducing measure should be under or over-provided relative to the first-best (with full information) efficiency rule, in terms of preferences, is then still ambiguous (Johansson-Stenman 2000). This is because the *marginal* change in subjective risk as a function of objective risk may be smaller than one, even when the subjective risk is larger than the objective risk. This would be the result if the subjective risk is higher than the objective one at low risk levels, and lower at high risk levels; Indeed, this seems to be the standard case in the literature (see for example Viscusi 1992, pp. 139-40). Thus, even if people overestimate a certain risk it does not follow that their WTP for a certain risk *reduction* would be larger compared to the case with perfect information (and vice versa).

Besides cognitive limitations, there are many other reasons why individual preferences sometimes are poor indicators of welfare, including limited information and cognitive dissonance. Consider the case of a living area with enhanced radon levels in the publicly provided drinking water, and where people are thus confronted with a correspondingly increased risk of getting lung cancer. Assume that individuals to start with are not aware of any link between radon concentration levels and the probability of getting lung cancer, and that this information is provided at one specific moment in time. Before this moment the individuals' WTPs for measures to decrease the radon level are approximately zero. After the information is provided the WTPs would naturally increase. Most people would probably agree that before this information was provided, the appropriate measures by the authorities should not be based on the actual preferences (reflected in their zero or very low WTPs). This is consistent with the arguments made so far, since the (expected) welfare increase of the measure is (approximately) the same before and after the information is provided, even though the expressed preferences are not. So, we can clearly not use the before-information preferences as a basis for public decision making. But can we use the after-information preferences? Possibly, but not even this is obvious.

Consider the possible influence of cognitive dissonance (Festinger 1957, Akerlof and Dickens 1982). According to this well-established psychological theory individuals try to

⁸Unfortunately it appears that survey-based methods are particularly problematic, and connected with many serious problems, in the area of risk-valuation, see e.g. Beattie *et al.* (1998), Carthy *et al.* (1998), and Jones-Lee and Loomes (1997).

avoid or decrease the ‘dissonance’ between the real circumstances and their view of these circumstances. Often, this is perfectly compatible with standard rational choice theory, so that when a person dislikes a certain event she tries to change it so that she likes it. For example, if you dislike your car very much, and if you are not poor, you will replace it with a car that you like. Sometimes, however, it is very difficult to change the real circumstances, such as in the case of radon in the drinking water. Assume that these people cannot move (or that it would be extremely costly to move), and that they have been living in that specific house for decades. Either they can fully incorporate the information provided and accept that their cumulative water consumption will affect their risk of getting lung cancer in the future, or they may process this information to modify the conclusions towards a view that their risk-increase is negligible, or at least not that large. Since they cannot change the real circumstances of the past, the latter alternative may be tempting. If so, the WTPs associated with measures to decrease these radon levels will also decrease due to this processing. But the associated expected welfare loss due to the increased risk of getting cancer has of course not changed.

Consequently, not even the preferences of people with full information can always be used to guide public decision making, since these may not reflect welfare very accurately. Actually, this example⁹ is not as hypothetical as it might seem. There is much empirical evidence that people do tend to underestimate the risk associated with enhanced radon levels (see for example Pollak 1998 and Slovic 2000, chapter 16), for which cognitive dissonance may be one explanation.

Thus, we have seen that, for various reasons, people’s subjective risk perceptions, and associated economic values, may be biased. However, the real objective risk may often be difficult to estimate also for experts. In addition to the obvious fact that this is often an intrinsically difficult task given the limited scientific evidence available, there is also a possibility of scientific bias which will be discussed below. Sometimes (perhaps often), a situation is so complex that it is doubtful whether the standard model, with which the scientist is familiar, can say very much about a certain phenomenon. Assume that you are an expert on global computable general equilibrium models of climate change, that you have invested largely in terms of time and effort to obtain this knowledge, and that you have much detailed data on natural scientists’ best-guess scenario. Either you could use your data, derive and compute your results, and claim that your results are important for policy. If you at all reflect about uncertainty, you conclude that including such aspects would probably not change anything essential. Or you could do the same thing, but conclude that it is doubtful

⁹ As an alternative example, assume that you live in an area that is very vulnerable to earthquakes, and that you for some reason cannot move. The real choice is then not about changing these circumstances, but about whether you should change your view of these circumstances or not. Either you will live in an area which you know is very vulnerable to earthquakes, or you will live in the same area, but begin to doubt that it really is all that vulnerable.

whether any useful policy conclusions could be drawn from the results, since important low-probability catastrophic events are not included in the model. Consider again the theory of cognitive dissonance, but this time applied on scientists. Presumably, the first alternative is more attractive to the researcher, implying an incentive for the researcher to modify her view of reality in this direction.

The difficulty to deal with such low-probability catastrophic events in a systematic and scientific way is by no means exclusive for economists, but appears to be valid quite generally. Thus, the reason for the deviation between experts' and lay-persons' risk perceptions may not solely be that the uninformed public exaggerates possible low-probability catastrophic events. Experts may also underestimate the expected consequences of such outcomes, simply since they have no good tool to quantify them. It seems that within each discipline we typically learn that the tools we have are in general suitable for the problems we analyze.

Hence, cognitive dissonance, and the mechanisms behind the creation of a self-image, may work in the direction of considering methods and theories that we do not understand to be less important. Clearly, no one can understand everything, but it is much more pleasant to think that what we know is the really important part, than to think that the most important stuff is known by others. (Presumably, most researchers who have tried to engage in interdisciplinary work can recognize these and similar problems.)

Another problem is the tendency to discount the future to an irrational extent, which is much recognized and discussed in the literature, even though it remains a non-conventional assumption in economic theory.¹⁰ Still, it is discussed by leading economists such as Harrod, Pigou and Ramsey who colorfully denoted this phenomenon “the conquest of reason by passion” (Harrod 1948, p. 40), “the faulty telescopic faculty”(Pigou 1929, p. 25), and the “weakness of imagination” (Ramsey 1928, p. 543). If we, again, are interested in welfare rather than preferences, such myopic behavior could be an argument in favor of compulsory pension savings, health insurance etc. The possibility of shortsightedness is of course also a reality in the environmental field, and not only related to individual but also social decisions. Indeed, both firms' and politicians' narrow shortsightedness are much recognized in the public discussion.

However, perhaps also the scientific community suffers from some “faulty telescopic faculty.” For example, the well-known problem of rapidly increasing antibiotic resistance appears not to have been dealt with adequately, even though the research intensity has increased recently. The strong link in medical research to commercial interests may be one reason, since the ‘external’ costs associated with an excessive antibiotic use are not, or at least very poorly, ‘internalized’. Still, this is hardly the only reason since the social sciences,

¹⁰See Hausman (1979) for an often-quoted paper supporting the view that consumers tend to apply an inefficiently high internal discount rate.

with much looser links to commercial interests, seem to have shown even less interest and ability to deal with these problems.¹¹ Thus, rather than primarily an effect of commercial interests, it may be that most academic disciplines and traditions are poorly adapted to systematically deal with future problems with a stochastic nature. Based on the literature on the economics of science (see Stephan 1996 for an overview), one may think of several mechanisms through the academic reward system (including status and esteem), and through the funding system. According to Stephan (1996, p. 1226) “the grant system [...] encourages scientists to choose sure(r) bet short term projects that in the longer run may have lower social value.” Even though it may be very difficult to change these mechanisms directly, an increased awareness of their existence, by both policy makers and academics, might to some extent mitigate their consequences. Thus, policy makers must be aware of the fact that many agents, including academics, may sometimes suffer from various degrees of shortsightedness.

4. Undeveloped Preferences and Preference Formation

Most people have very limited experience of assigning monetary values to environmental goods, simply because it is typically meaningless in everyday life. One may even question whether people have preferences for all kinds of environmental goods. For example, can we have any preferences for a species that is threatened by extinction, if we never knew it existed before? If we do, these preferences must clearly have been created rather quickly, and are far from being stable over time, as is typically assumed in theory. Therefore, it is important to take the process of preference *formation* seriously. On the other hand, the focus of environmental valuation should be on individual welfare rather than preferences, and the (expected) individual welfare associated with environmental goods may be much more stable than the preferences. Another important task for valuation studies is to elicit people’s ethical views about other ends besides human well-being.

The standard assumption in the environmental valuation literature, such as the contingent valuation (CV) literature (Mitchell and Carson 1989), is that people know their complete preferences with respect to all goods, and that the role of economists is simply to elicit these. An alternative view, which is more common among psychologists, is that we have developed preferences for only a few very familiar goods, and that we in most circumstances use various heuristic choice rules (Tversky and Kahneman 1974, Kahneman and Tversky 1979). This hypothesis is supported by many experiments showing *preference reversals*, where people in a choice between goods *A* and *B* prefer *A*, but that they still would be willing to pay more for good *B* than for good *A* (Slovic and Lichtenstein 1983, Tversky *et al.* 1990). For example, in a carefully designed experiment Gregory *et al.* (1993) found that in

¹¹Indeed, to this date I am aware of only two (2) published academic papers in economics journals on antibiotic resistance (Brown and Layton 1996; Doessel 1998), which can perhaps be seen as an indication of an inefficient institutional and/or incentive structure within the academic knowledge-producing sector.

a choice between improved computer equipment and improved air quality, most people chose improved air quality. But when asking about their maximum WTP, most people had a higher WTP for the computer improvement than for the air quality improvement. Further, there is also much evidence in favor of an *endowment effect*, so that people demand much more in compensation to give up a good than they would be willing to pay to get it, and the related phenomena *loss aversion* (Kahneman and Tversky, 1984) and *status quo bias* (Samuelson and Zeckhauser 1988). There is much evidence that putting a monetary value of an environmental change is a cognitively very demanding task for which people tend to use various simplified context-dependent choice rules, implying that the responses are often difficult to interpret (Schkade and Payne 1994; Vatn and Bromley 1994).

Consequently, according to Gregory *et al.* (1993, p. 179) the appropriate role of CV practitioners is “not as archeologists, carefully uncovering what is there, but as architects, working to build a defensible expression of value.” Even if people have no developed preferences for many environmental goods, their welfare may depend on them, and the corresponding individual welfare functions may be much more stable than the preferences. As argued, even though expressed preferences are not reflecting an appropriate ethical end by themselves, they are important for at least two reasons: First, they may provide a crude estimate of welfare, and second, they may provide useful information about other suitable ends in addition to welfare. For example, even if we do not know about certain contamination, our welfare may depend on it. It may do so either directly, in terms of health effects, or more indirectly through complex ecosystem effects; and it may be straight forward deterministic effects, or stochastic low-probability effects. Hence, when preferences are context-dependent, the actual preferences we are looking for are those reflecting welfare as closely as possible, and in addition (separately) provide the most accurate information about the respondents’ view of what should intrinsically matter. Unfortunately, in most existing valuation studies this distinction is not made; these studies can hence not give any direct information concerning the respondents’ ethical values. Whether the kind of method based on multi-attribute utility theory as proposed by Gregory *et al.* (1993), Gregory and Slovic (1997), and Slovic (1995) is appropriate for these tasks is, however, a non-trivial issue beyond the scope of this paper. One clear drawback is the large amount of resources needed for each respondent, implying that the number of respondents most likely has to be substantially lower than what is current practice in CVM; according to Gregory *et al.* (1993, p. 189): “Depth of value analysis is substituted for breadth of population sampling.” In either case, some insights from studies based on these methods can hopefully be used also to improve more conventional stated-preference methods, in particular with respect to cognitive difficulties and preference construction.

Thus, it is clear that preferences, as defined in terms of actual or hypothetical choices or decisions, are endogenous and may change due to the framing and circumstances, which

has been shown both in an experimental setting and from real life experiences. However, this may in itself not be a major problem *in principle*, since we are ultimately interested in welfare rather than preference. Nevertheless, this may imply large problems *in practice*, since methods to reveal preferences are often important sources of information in order to determine or estimate welfare.

But although welfare is probably not as labile as preferences, also (individual) welfare functions are endogenous and may change over time due to various reasons, including habit formation, addiction etc. Consider again a person who is severely ill, but who did not know this until recently. The new information changed the preferences of the individual, but not the expected welfare associated with the appropriate medical treatment *per se*. But with the information comes also possible anxiety and mental suffering. Assuming that this could be reduced by some kind of therapy, it is clear that also the welfare function has changed due to the new information. (Before the information there was no anxiety and hence no possibility to reduce this by therapy.) Obviously, the appropriate task for public decision-makers is to consider the possibility to reduce suffering given the current state of the world, and not based on such possibilities last week. This trivial example shows that in situations where also welfare functions change over time we should, in principle, be concerned with instantaneous welfare.

In the context of environmental valuation, it is clear that, in addition to so called use-values, many people's welfare depend on environmental goods for other motives, perhaps especially on their own actual or hypothetical contribution to this good (Kahnemann and Knetsch 1992, cf. Andreoni 1990). In principle, there is no reason why these welfare effects should not count for social decision making; indeed, moral satisfaction is as real a satisfaction as other kinds. However, the purpose of a CV study is not primarily to estimate the respondents' instantaneous welfare *from responding to CV questions*, but rather to see the responses as valid also *outside the survey context*. And if the moral satisfaction primarily occurs when responding to the question, all other people who are not part of the sample would clearly not receive this welfare due to moral satisfaction. This appears to be another area where much confusion is still present. For example, in a critical comment to Kahnemann and Knetsch, Harrison (1992) argued that the *motive* for the respondents' utilities is completely irrelevant: "I call my utility 'jolly'. What you call your utility is (...) your business" (Harrison 1992, p. 150). In a cost-benefit perspective this is then clearly incorrect, and the motive behind the preferences and welfare matters a great deal (Johansson-Stenman 1998).¹²

There is much evidence that for some environmental goods so called non-use values

¹²Due to a somewhat unconventional editorial policy, the reply to Harrison by Kahneman and Knetsch was never accepted for publication in *JEEM*. However, the authors did send out letters to all subscribers telling them that the reply was available personally, and many people received a copy this way.

play a dominant role. These are often interpreted as various kinds of altruistically motivated values and, in terms of individual welfare, these can clearly not exist if people do not know about these goods. But, again, preferences are not only reflecting welfare, but also views about other suitable ends in addition to welfare. Hence, even if we knew for sure that no-one would derive any welfare outside the interview situation from the preservation of a certain species, it may still be worth-while doing so if many people hold values that the species by itself, or as a part of a larger eco-system, is intrinsically valuable irrespective of human welfare. Again, however, to be able to elicit such information the valuation studies must be designed to do so.

5. Discussion and Conclusion

In this paper it is argued that when stated or revealed preferences, for whatever reason, do not reflect the maximization of individual welfare, it is welfare, rather than preferences, that has intrinsic value. This is illustrated with examples of imperfect information, limited cognitive capacity, and cognitive dissonance. It is pointed out that also the scientific community may suffer from different kinds of irrationality, such as shortsightedness or an inability to systematically deal with problems characterized by a small probability of a catastrophic outcome, and that policy makers should bear this in mind. Also, when people's responses to various kinds of stated preference surveys do not correspond to welfare maximization, they may in part indicate a non-anthropocentric view, implying that also animals or nature should be valued intrinsically, irrespective of humans' derived well-being. It is argued that actual policy should in principle reflect such views but that more research is needed here.

To illustrate these points, consider the following example: A referendum-mimicking survey is conducted to measure people's WTP for preserving a certain species, and the estimated total WTP exceeds total cost (say 1 million USD) by 50%. There are no direct use-values involved, and currently living people who did not respond to this survey would get no increased welfare at all from preserving the species. Should the species be preserved? On the one hand, assuming we have elicited the preferences correctly the total WTP is larger than the costs. On the other hand the fraction of the total population who responded to the survey is of course typically very small, so the overall monetized *welfare* effects of preserving the species is most likely much smaller than the costs.¹³ On the third hand, people may have other motives than maximization of their own well-being. First, they may believe that future generations would be directly affected through ecosystem effects, and that their (expected) welfare should also count (at least somewhat) in today's decision making. This is clearly a legitimate motive, and if the government has not made such considerations WTP figures based on such motives should clearly not be excluded. Second, as argued, some respondent

¹³ If 1% of the population answered the survey and their responses reflect the welfare effects for them, we have that these welfare effects are just 1.5% of the costs, or 15,000 USD. Recall that the welfare effects for others are zero.

may think that the environment and species should count in social decisions irrespective of indirect effects on human well-being. Thus, figures on individual WTPs, together with costs, are insufficient information for policy. We also need information on individual motives, ethical views, and cognitive strategies and limitations.

However, a caveat must be given regarding possible negative *instrumental* effects from excessive paternalism when policy makers believe that people are making bad or irrational choices. Therefore it may sometimes be advisable for the government to ‘respect’ individual preferences, rather than trying to determine their ‘true’ individual welfare functions. Indeed, we have clearly seen terrible consequences of excessive paternalistic decision making in many countries, and as a basic ‘first principle’ consumer sovereignty appears fundamentally sound. This argument is similar to the recommendation often made by utilitarians, following Sidgwick (1874), *against* the use of utilitarianism as a general decision rule in daily life. The reason is simply that to use such a rule is in itself an action, for which the consequences may be good or bad. If one believes that the overall social consequences would be better if people instead apply some simplified agreed-upon ethical rules, then a convinced utilitarian would argue in favor of using these rules instead.¹⁴ There is nothing inconsistent with this. Still, in our case it is also clear that people do often want to have restricted choices. Rational people simply know that they sometimes (or even often) make bad decisions, and they are aware of their limited self-control and cognitive capacity. Further, it seems clear that all governments, also those who declare themselves as liberals, sometimes in some areas apply a certain degree of paternalism. Thus, to neglect analyzing deviations from consumer sovereignty (in terms of preferences) does not appear to be a reasonable alternative. But it is important to bear possible instrumental considerations in mind when discussing policy recommendations in practice.

So, at the end of the day, how can policy-makers use the conclusions from this paper in practice? Or, expressed alternatively, can they be operationalized in a way that makes them practically useful, or do they solely produce increased confusion and an increased (and possibly depressing) awareness that reality is awfully complex? Some conclusions may be relatively straightforward to apply. For example, if one knows that people’s expressed preferences for a certain good are based on a completely erroneous information, it may be possible to adjust a social CBA for this, in order to reflect better individual welfare. Further, it seems practically possible (although of course difficult) to elicit people’s views about alternative ethical ends besides individual well-being. Given that a large fraction holds values

¹⁴This is the standard utilitarian response to the popular example about killing a healthy persons walking outside a hospital in order to save two dying persons, one in a desperate need of a new heart and one of a new liver. Everything else equal, this would probably be good according to utilitarian ethics, but everything else would not be equal! Indeed, it is easy to imagine far-reaching consequences of the fact that people could not walk safely outside a hospital (or elsewhere), implying that utilitarians would agree with non-utilitarians that it would certainly be a very bad idea to kill the healthy person.

for the environment or animal well-being *per se*, this should be reflected in governmental policy. The extent to which people hold such values, as well as the strength of these values, are still quite uncertain, however, and more research is clearly needed here.

Some conclusions are less straightforward to apply. It does often not appear reasonable that one in practice will (or maybe even should) try to measure various individual degrees of cognitive dissonance, risk misperception, and shortsightedness in order to construct some kind of modified CBA. On the other hand, much (perhaps most) of economic relations and variables are very difficult to quantify, including labor-supply and human-capital relations, but they are still considered to be of practical importance for decision making. An insight can hence clearly be practically useful even when it is difficult to quantify, and when it cannot be added to other information in order to construct a unique index of goodness.¹⁵ So, even though we may not be able to measure cognitive dissonance, or the difference between individual welfare and preferences, very accurately (and most often do not measure them at all), the insights of such information may still be of practical importance in the decision-making process. In all public policy-making there is a certain amount of quantified information, as well as more qualitative information. This paper can hopefully contribute to the appropriate use of the quantified information, such as estimated costs and benefits, and their limitations. In particular, it gives several arguments for why deviations from the conventional CB rule may be socially preferable, and, perhaps more importantly, in what direction such a deviation should go in different cases.

Finally, it should be emphasized that the mere existence of any deviation from standard assumptions in economics should of course *not* be seen as ‘anything goes’-supporting arguments. Indeed, to influence a political decision by for example cognitive-dissonance arguments, some indications of their importance in the particular case, both qualitatively and quantitatively, must be provided. Still, there are presumably many cases where such aspects are crucial, and where their importance can be made likely.

References

- Akerlof, G. A. (1991), ‘Procrastination and Obedience’, *American Economic Review*, 81(2), 1-19.
- Akerlof, G. A. and T. W. Dickens (1982), ‘The Economic consequences of cognitive dissonance’, *American Economic Review*, 72, 307-19.
- Andreoni, J. (1990), ‘Impure altruism and donations to public goods: a theory of warm glow

¹⁵ To illustrate from another field, consider the (difficult) art of bringing up children, which is an area where an enormous amount of advice exists. Clearly, some advice can be practically useful even if it is not used as an input to construct a one-dimensional index measuring whether a certain action is good or bad.

- giving', *Economic Journal*, 100, 464-77.
- Baxter, W.F. (1974) *People or Penguins: The Case for Optimal Pollution*. New York: Columbia University Press.
- Beattie, J. *et al.* (1998), 'On the Contingent Valuation of Safety and the Safety of Contingent Valuation: Part 1-Caveat Investigator', *Journal of Risk and Uncertainty*, 17(1), 5-26.
- Becker, G.S. (1993), 'Nobel Lecture: The Economic Way of Looking at Behavior', *Journal of Political Economy*, 101(3), 385-409.
- Broome, J. (1991a), 'Utility', *Economics and Philosophy*, 7, 1-12.
- Broome, J. (1991b), *Weighing goods*, Cambridge Mass.: Basil Blackwell.
- Broome, J. (1999), *Ethics out of Economics*, Cambridge: Cambridge University Press.
- Brown, G., Layton, D. F. (1996), 'Resistance Economics: Social Cost and the Evolution of Antibiotic Resistance', *Environment and Development Economics*, 1(3), 349-55
- Carthy, T. *et al.* (1998), 'On the Contingent Valuation of Safety and the Safety of Contingent Valuation: Part 2 - The CV/SG "Chained" Approach', *Journal of Risk and Uncertainty*, 17(3), 187-214.
- Conlisk, J. (1996), 'Why bounded rationality', *Journal of Economic literature*, 34(2), 669-700.
- DeGraaf (1967), *Welfare Economics*, Cambridge University Press.
- Doessel, D. P. (1998), 'The "Sleeper" Issue in Medicine: Clem Tisdell's Academic Scribbling on the Economics of Antibiotic Resistance', *International Journal of Social Economics*, 25(6-8), 956-67.
- Festinger, L. (1957), *A Theory of Cognitive Dissonance*, Stanford University press.
- Gregory, R., P. Slovic (1997), 'A Constructive Approach to Environmental Valuation', *Ecological Economics*, 21(3), 175-81.
- Gregory, R., S. Lichtenstein, and P. Slovic (1993), 'Valuing Environmental Resources: A Constructive Approach', *Journal of Risk and Uncertainty*, 7(2), 177-97.
- Harrison, G. W. (1992). 'Valuing public goods with the contingent valuation method: a critique of Kahnemann and Knetch', *Journal of Environmental Economics and Management*, 23(3), 248-57.
- Harrod, R. F. (1948), *Towards a Dynamic Economics*, London: St. Martins Press.
- Harsanyi, J.C. (1982), 'Morality and the theory of rational behavior', in Sen and Williams (1982).
- Harsanyi, J.C. (1995), 'A Theory of Prudential Values and a Rule Utilitarian Theory of Morality', *Social Choice and Welfare*, 12(4), 319-33.
- Harsanyi, J.C. (1997), 'Utilities, Preferences, and Substantive Goods', *Social Choice and Welfare*, 14(1), 129-45.
- Hausman, J.A. (1979), 'Individual Discount Rates and the Purchase and Utilization of Energy-using Durables', *Bell Journal of Economics*, 10(1), 33-54.

- Johansson-Stenman, O. (1998), 'The importance of ethics in environmental economics with a focus on existence values', *Environmental and Resource Economics*, 11(3-4), 429-42.
- Johansson-Stenman, O. (2000), 'Should policy makers be concerned with the subjective or objective risk, or both?' Working paper, Department of Economics, Göteborg University.
- Jones-Lee, M. and G. Loomes (1997), 'Valuing health and safety: Some economic and psychological issues', in Nau, R. Et al. *Economic and Environmental Risk and Uncertainty*, pp. 3-32, Kluwer.
- Kahneman, D. and J. L. Knetsch (1992a), 'Valuing public goods: the purchase of moral satisfaction', *Journal of Environmental Economics and Management*, 22(1), 57-70.
- Kahneman, D. and A. Tversky (1979), 'Prospect theory: an analysis of decision under risk', *Econometrica*, 47, 263-91.
- Marglin, S. (1963), 'The social rate of discount and the optimal rate of investment', *Quarterly Journal of Economics*, 77, 95-111.
- Margolis, H. (1996), *Dealing With Risk: Why the public and the experts disagree on environmental issues*. Chicago: University of Chicago Press.
- Mitchell, R. C. and R. T. Carson (1989) *Using Surveys to Value Public Goods: The Contingent Valuation Method*, Washington, D.C.: Resources for the Future.
- Ng, Y.-K. (1999), 'Utility, Informed Preference, or Happiness: Following Harsanyi's Argument to Its Logical Conclusion', *Social Choice and Welfare*, 16(2), 197-216.
- O'Neill, O. (1997), 'Environmental values, anthropocentrism and speciesism', *Environmental Values*, 6(2), 127-42.
- Pigou, A. C. (1929), *The Economics of Welfare*, London: Macmillan.
- Pollak, R. A. (1998), 'Imagined Risks and Cost-Benefit Analysis', *American Economic Review*, 88(2), 376-80.
- Ramsey, F. (1928), 'A mathematical theory of savings', *Economic Journal*, 138, 543-59.
- Russel, C. et al. (1999), 'Can expressions of altruistic preferences be triggered in valuation surveys?', paper presented at the EAERE-conference in Oslo, 1999.
- Sagoff, M. (1998), 'Aggregation and Deliberation in Valuing Environmental Public Goods: A look Beyond Contingent Pricing', *Ecological Economics*, 24(2, 3), 213-30.
- Samuelson, P. A. (1938), 'A note on the pure theory of consumer behaviour', *Econometrica* 5, 61-71.
- Samuelson, P. A. (1947), *Foundation of Economic Analysis*, Harvard University Press.
- Schkade, D. A., and J. W. Payne. (1994). "How People Respond to Contingent Valuation Questions: A Verbal Protocol Analysis of Willingness to Pay for an Environmental Regulation," *Journal of Environmental Economics and Management*, 26, 88-109.
- Sen, A. K. (1977), 'Rational Fools: a Critique of the Behavioural Assumptions of Economic Theory', *Philosophy and Public Affairs*, 6, 317-44.

- Sen, A. K. (1979), 'Personal utilities and public judgements: or what's wrong with welfare economics?' *Economic Journal*, 89, 537-58.
- Sen, A. K. (1985), 'Goals, Commitment, and Identity', *Journal of Law, Economics and Organization*, 1(2), 341-55.
- Sen, A. K. (1987), *On Ethics & Economics*, Blackwell.
- Sen, A. K. (1991), 'Utility - ideas and terminology', *Economics and Philosophy*, 7, 277-83.
- Sen, A. K. and B. Williams (eds.) (1982) *Utilitarianism and Beyond*, Cambridge: Cambridge University Press.
- Sidgwick, H (1874), *The Methods of Ethics*, MacMillan.
- Singer, P. (1975), *Animal Liberation: A New Ethics for Our Treatment of Animals*, New York: Avon.
- Singer, P. (1979), *Practical Ethics*, Cambridge University Press.
- Slovic, P. (1995), 'The Construction of Preference', *American Psychologist*, 50(5), 364-71.
- Slovic, P. (2000), *The Perception of Risk*, London: Earthscan.
- Slovic, P. and S. Lichtenstein (1983), 'Preference reversals: A broader perspective', *American Economic Review*, 73(4), 596-605.
- Spash, C.L. and N. Hanley (1995), 'Preferences, information and Biodiversity Preservation', *Ecological Economics*, 12, 195-208.
- Stephan, P. (1996), 'The Economics of Science', *Journal of Economic Literature*, 34(3), 1199-1235.
- Stevens, T. H., J. Echeverria, R. J. Glass, T. Hager, and T. A. Moore (1991), 'Measuring the Existence Value of Wildlife: What Do CVM Estimates Really Show?', *Land Economics*, 67(4), 390-400.
- Thaler, R. H. (1992), *The Winner's Curse: Paradoxes and Anomalies of Economic Life*, Princeton University Press.
- Thaler, R. H. (2000), 'From Homo Economicus to Homo Sapiens', *Journal of Economic Perspectives*, 14(1), 133-41.
- Tversky, A. och D. Kahnemann (1974) 'Judgements under uncertainty: Heuristics and Biases', *Science*, 185, 1124-31.
- Tversky, A., P. Slovic, and D. Kahneman (1990), 'The causes of preference reversal', *American Economic Review*, 80(1), 204-17.
- Vatn, A. and D. W. Bromley (1994), 'Choices Without Prices Without Apologies', *Journal of Environmental Economics and Management*, 26(2), 129-48.
- Viscusi, W. K. (1992) *Fatal Tradeoffs, Public and Private Responsibilities for Risk*, Oxford University Press.
- Viscusi, W. K. (1998) *Rational Risk Policy*, Oxford University Press.