



Environment & Society



White Horse Press

Full citation:

Hart, Rob and Uwe Latacz-Lohmann, "The Indifference Curve, Motivation, and Morality in Contingent Valuation."

Environmental Values 10, no. 2, (2001): 225-242.

<http://www.environmentandsociety.org/node/5828>

Rights:

All rights reserved. © The White Horse Press 2001. Except for the quotation of short passages for the purpose of criticism or review, no part of this article may be reprinted or reproduced or utilised in any form or by any electronic, mechanical or other means, including photocopying or recording, or in any information storage or retrieval system, without permission from the publisher. For further information please see <http://www.whpress.co.uk/>

The Indifference Curve, Motivation, and Morality in Contingent Valuation

ROB HART

*Department of Economics, The Swedish University of Agricultural Sciences
P.O. Box 7013, S-75007 Uppsala, Sweden*

UWE LATA CZ-LOHMANN¹

*Department of Land Economy, University of Cambridge
19 Silver Street, Cambridge CB3 9EP, UK
and
Agricultural and Resource Economics, University of Western Australia
Nedlands, Perth WA 6007, Australia*

ABSTRACT

Contingent valuation surveys have tended to yield results that seem to go contrary to what is standardly seen as 'rational choice'. We argue that some of the inconsistencies arise because bids for public environmental goods in contingent valuation surveys are often (at least partly) motivated by moral considerations and ethical beliefs. We analyse the expected results of CV surveys given the existence of such ethical motivations, including the valuation of actions as well as states. It is found that we cannot expect bids made on this basis to reveal preferences which obey the rules commonly assumed in the theory of consumer choice. The two standard reactions to these anomalies have been to attack the validity of the method, or to urge greater rigour in survey design and application. By contrast, we conclude that the usefulness of the method for evaluating options concerning environmental public goods depends critically on the problem definition. The method should be used for the direct evaluation of realistic policy packages, rather than to try to extract abstract values for invaluable goods. The conclusion accords with current trends, including the move towards the use of deliberative methodologies.

KEY WORDS

Non-market valuation, contingent valuation, rational choice, utilitarianism.

1. INTRODUCTION: DEFINITIONAL EGOISM AND ENVIRONMENTAL VALUES

The theory of demand for environmental goods rests on ideas which can be traced back to Krutilla (1967), and which were characterised by Sen (1977) as 'definitional egoism'. The theory recognises that people value environmental goods for a variety of reasons not necessarily connected to present use of those goods, but it nevertheless includes all these valuations in the welfare-economic calculus. In particular, Krutilla introduced the concept of existence value, and Weisbrod (1964) the concept of option values for possible future use. The ideas arose to counter the argument of Friedman (1962) that environmental goods such as national parks should not be protected unless they could pay their own way through user fees.

This inclusion in the welfare calculus is tantamount to saying that all motivations are ultimately egoistic. As suggested by Sen (1977), this is a definitional move in that the concept of utility maximisation is defined to be identical with choice. The ultimate statement of this position was made by Mitchell and Carson (1989: 66) who argue that

... it is erroneous to assume that making choices on the basis of ethical beliefs necessarily involves self-sacrifice; in fact, those who make choices of this kind obtain utility from satisfying internalised social norms. ... Far from being counterpreferential, ... choices based on these preferences are motivated by self-interested and egoistic considerations.

Definitional egoism is a cornerstone of the contingent valuation (CV) method as used to value environmental goods, as ethical beliefs are acknowledged as pervasive motives behind people's bids for such goods – existence values, bequest values, stewardship values, altruistic values, etc.² The alternative to invoking definitional egoism is to separate bids into components which depend on different motives, and subsequently remove that part of them which depends on the 'wrong' motive. Although Cummings and Harrison (1995) argue that separating bids into components is not possible, others including Schkade and Payne (1994), Luce et al. (1999) and Price (1999) have been making increasingly convincing attempts to do so. However, while this separation certainly may add explanatory power to CV results, the subsequent disqualification of emotional or moral components (required to circumvent definitional egoism) takes the practitioner onto even more dangerous ground.

Many critics reject the idea of definitional egoism on the grounds that 'genuine altruism' (Sen's 'commitment') does exist.³ However, these arguments miss the definitional nature of the claim which makes it logically invulnerable. Another line of argument says that bids which are made based on 'citizen' type motives (Sagoff, 1988) are not useful fodder for economic analysis. Sagoff (1998) however argues that where choices are about formulat-

THE INDIFFERENCE CURVE...

ing common norms and values rather than mere consumer choice, CV may still have a role to play – it is often the only tool economists have – but that the method needs to adapt towards a more deliberative approach emphasising informed discussion and consensus.

In this essay we reach similar conclusions to Sagoff (1998), but from a different direction. Accepting the definitional move, we go on to analyse how people's motivations can lead to apparently paradoxical bids when interpreted within the standard neo-classical framework of consumer choice. We demonstrate that these paradoxes do not arise from faulty methodology, but from a misguided problem definition. If the problem is to discover the 'true' but abstract demand curves for public goods, then the end result is likely to be paradox. If the problem is to decide whether a specific policy towards a public good is favoured by the public or not, then a deliberative-type CV survey may well provide useful information.

Section 2 reviews the experimental results which cause problems for the standard model. Section 3 analyses methodological difficulties arising from uncertainties about what people are bidding for. Section 4 presents a more fundamental problem: however well we refine our methodology, people's bids for public goods are likely to be motivated by valuation of *actions* as well as *states*. This will make CV results impossible to interpret within a framework in which only the state of a good is traded off against income. Consequences of this fact for the applicability and practice of CV are analysed in Section 5.

2. ANOMALOUS EXPERIMENTAL RESULTS

Choices (bids) made by CV respondents are expected to fit into the framework developed to describe preferences for ordinary market goods. That is, the preferences revealed by people's bids should generally be complete, reflexive, transitive, continuous, monotonic, locally non-satiated and convex.⁴ Given the assumptions about preferences, conclusions can be drawn about the properties of the underlying indifference curves. One important conclusion is that, when income effects are zero, WTP and WTA⁵ should be equal (e.g. Randall and Stoll, 1980).

2.1. 'Irrational' responses and lexicographic preferences

In many cases, researchers have had great difficulty reconciling observed bids with the expected properties of indifference curves. For example, Stevens et al. (1991) conducted a CV survey to investigate existence values of wildlife in New England. They found that many people's expressed views about the rights of wildlife did not seem to correspond to their bids. For instance, 79 percent agreed that 'all species of wildlife have a right to exist independent of any benefit or

harm to people', yet far from being willing to pay everything they could to prevent loss of wildlife, they often refused to pay altogether. This observation clearly contradicts the standard indifference curve model in which a zero bid suggests that the bidder doesn't care at all about the quantity of the good, and hence is unwilling to trade any money against changes in that quantity.

Stevens et al. invoke the concept of lexicographic preferences to describe people's feelings about public goods. The idea is that no amount of money can compensate the valuer for a diminution in the public good in question, hence the indifference curve in that good is vertical. Where preferences are lexicographic, WTA is expected to be infinite. If we assume that a refusal to bid is equivalent to a very high or infinite bid, then we appear to have resolved many of the contradictions at a stroke.

The citation of lexicographic preferences stretches the reader's credulity. Do respondents really care whether 4,800 or 4,780 wild turkeys exist in New England? Is it reasonable that they should care so much as to be beyond compensation in the latter case? If those birds were an endangered species, the findings of Stevens et al. would be easier to follow as the conservation option may be seen as containing the existence value of that species, as noted by Brookshire et al. (1986). But the birds in question were not of the threatened type.

2.2. Differences between WTP and WTA

The problem of the disparity between WTP and WTA has long been recognised within the monetary valuation literature. The indifference curve model predicts that, for small changes in provision of a public good (i.e. when income effects are small), the difference between the two must be small (Randall and Stoll, 1980). Indeed, it must be zero if income effects are compensated for, or if preferences are quasi-linear. Income effects *are* compensated for in the experiments of Boyce et al. (1992) and Morrison (1997b), and the WTP/WTA difference is still observed. Furthermore, significant WTP/WTA differences are observed in experiments where mean bids are low relative to total income (Cummings et al., 1986), although such bids should imply a low income effect and thus a low difference.

Hanemann's non-substitutable public goods

Hanemann (1991) demonstrates mathematically that a large difference between WTP and WTA is possible for public goods. Hanemann's argument is a more sophisticated treatment of the idea of lexicographic preferences, under the label of non-substitutable public goods. He invites the reader to consider two extreme cases, that where a perfect substitute exists for the good, and that where nothing can substitute for the good (a lexicographic preference). In the first case, the difference between WTP and WTA must be zero. The change in consumption is due entirely to a substitution effect. In the second case, where no substitute exists,

THE INDIFFERENCE CURVE...

there may be circumstances in which no amount of extra income can compensate for a forgone increase in provision of the good. WTA to forgo such an increase is thus infinite. On the other hand, WTP for the increase is finite, as the bidder has finite wealth. Thus in this extreme case of an entirely non-substitutable public good (or a lexicographic preference) there may be an infinite difference between WTP and WTA.

Hanemann uses these extreme cases to illustrate the theory, and then goes on to develop a mathematical expression for the difference between WTP and WTA for different degrees of substitutability. If the elasticity of substitution is small then we can have a large difference, even in the absence of a large income effect.

Hanemann's argument about non-substitutable public goods is theoretically elegant, and is weakly supported by the work of Adamowicz et al. (1993). However, as Diamond (1996) points out, it leaves the difference between WTP and WTA resting on a mysterious and unestimated concept, i.e. the elasticity of substitution between public and private goods. What evidence is there that this elasticity is low, as it needs to be to explain the difference?

An experiment directed explicitly at testing Hanemann's thesis is that of Shogren et al. (1994), who conclude that lack of a market substitute is an important factor in causing the difference between WTP and WTA. Morrison (1997a) however points out that this does not demonstrate that the difference is explained by Hanemann's analysis. In particular, she proposes a simple experiment in which compensating payments are made to the WTP group, which according to Hanemann should lead to the difference disappearing. In Morrison (1997b), she describes the preliminary results of such experiments, in which directly contradictory results are obtained. Further support is obtained from Bateman et al. (1997).

Endowment effect and loss aversion

Morrison (1997a,b) and others (Knetsch, 1989; Kahneman et al, 1990, Kahneman and Tversky, 1979) attribute the observed difference between WTP and WTA to an endowment effect, suggesting that people value goods more highly once they own them and that people are generally more conservative when losses are possible than when they may make gains.

Loss aversion seems to be able to account for the difference between WTP and WTA. WTA (to accept a loss) is higher than WTP (for a gain). Yet this idea is difficult to interpret within the indifference curve model. It has often been interpreted as showing that the utility function is kinked at the reference value. This not only weakens the basis of the model (if we have to redraw the curve every time the reference value changes then it is no longer a general description of consumer preferences) but also fails to explain the results. Morrison (1997b) points out that a consistently large difference between WTP and WTA for small changes demands a *step* in the curve at the reference value, or a rotation in the indifference curves.

An alternative, not necessarily contradictory, explanation is that something different is being valued in the WTP and the WTA case. Diamond (1996) argues, 'a large difference between stated WTP and WTA is inconsistent with the hypothesis that both surveys measure the same economic preferences'. Because one change involves payment to the valuer and the other involves the acceptance of compensation we can, in general, expect the observed values to be different.

Moral values and WTP/WTA

People may value something not just for self-interested reasons. They may also attach value to something because they consider it to be good (as opposed to bad), or in the case of an action right. This corresponds to Sen's idea (1977) of acting out of *commitment*. Their WTP to prevent an action they consider to be wrong may be high. On the other hand, they may be unwilling to accept any compensation for the occurrence of such an act, as such acceptance may well be interpreted as implying complicity in the act. Such an unwillingness may be reflected in zero bids, or in very high bids, precisely as is so frequently observed.

Boyce et al. (1992) tested the idea of moral values in their investigation of the causes of the difference between WTP and WTA. They asked different groups of people their WTP for a Norfolk Pine tree (available in the market) and their WTA for losing it. With two more groups, they asked the same two questions but told the respondents that if the experimenter got the tree then it would be destroyed. Respondents offered significantly higher valuations in the kill case, and the difference between WTP and WTA increased in this case. The important conclusions are, first, that people attach a negative value to the *action* of destroying the tree and are willing to pay to prevent it, and, second, that the moral responsibility that people feel for that destruction in the WTA case leads to a significant increase in the WTP/WTA disparity.

Luce et al. (1999) investigate similar types of motivation under the label of 'emotional trade-off difficulty'. They attempt to separate out *emotional* motivations for bids from effects attributable to subjects' relative importance weights for the quality versus currency attributes. They argue that such motivations are important, and that marketers (the audience for their paper) should consider this 'emotional trade-off difficulty' when attempting to predict and explain consumer choice patterns. How much more so when it is choices about *public* goods which are at stake!

2.3. Embedding, scale and scope effects

Another problem discussed in the literature is the observation of anomalous effects of changing the scale and scope of the good to be valued (sometimes referred to as embedding). We consider here the survey of Boyle et al. (1994), which has been perceived as particularly damaging to the pretensions of the CV method. The survey investigated WTP of Atlanta residents to cover waste oil

THE INDIFFERENCE CURVE...

ponds and hence prevent the deaths of migratory birds in the central flyway of the USA. Different respondents were told radically different figures for the number of birds that would be saved, but no significant difference in WTP between the samples was found.⁶

These results appear absurd if we interpret them through an indifference curve in which numbers of surviving migratory birds are traded off against income. Figure 1 shows such a curve. It has a peculiar shape in which a small drop in bird numbers requires a large income change in order to compensate, whereas subsequent (very much larger) drops in numbers cause no loss of utility at all.⁷ Preferences appear to be 'concave'. Such problems are generally dealt with by criticism of the survey techniques used in these experiments. For instance, Hanemann (1994) criticises the methods of Boyle et al., including the fact that their survey was conducted by brief shopping mall intercepts. This criticism has not proved entirely convincing, especially in the light of the work of Schkade and Payne (1994), who repeated the experiment of Boyle et al. using text-book methods (such as bringing respondents to a central location to be interviewed) and arrived at very similar results. Hanemann also criticises the assumption by Boyle et al. that bids should reveal a well-behaved indifference curve in bird *numbers*, suggesting that it may well be bird *deaths* that respondents are concerned about.

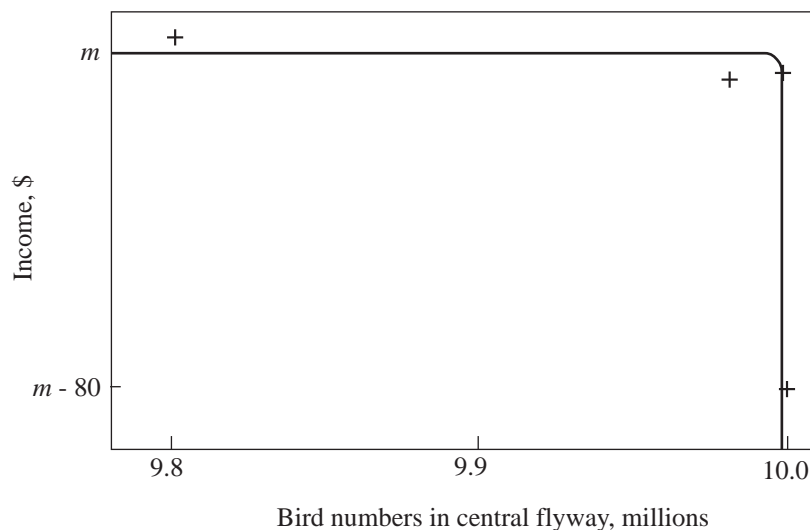


FIGURE 1. An indifference curve in bird numbers based on the results of Boyle et al.

It seems that what matters is not the *state* (the ultimate number of birds) but the *action* (killing birds through negligently leaving oil ponds uncovered, or saving them by covering the ponds). This is a very natural conclusion. First, it would be astonishing if the utility of Atlanta residents were to be affected in anything other than the tiniest degree by whether there *exist* 10,000,000 or 9,800,000 migratory birds in the central flyway. Second, it is entirely plausible that respondents are motivated by a desire to prevent bird *deaths*, that they feel that such unnatural and pitiful deaths as caused by the waste oil ponds *should* be prevented, and that they (as petrol consumers) do not want to be indirectly responsible for such deaths. Such feelings may be almost unconnected with the *number* of deaths involved. This interpretation is entirely consistent with Schkade and Payne's (1994) experimental evidence from their rerun of the survey in which they used techniques from psychology to gain insight into respondent's motives. Their conclusion was (p. 99): 'The most common consideration in our sample involves first acknowledging that something should be done and then trying to figure out how much an appropriate amount would be.'

What are the theoretical and practical implications of such motivations for the CV method?

3. UNCERTAIN MOTIVES AND METHODOLOGICAL DIFFICULTIES

3.1. Revealed and stated preference

Determining a person's indifference curve for a good depends upon observation of their actions to *reveal* their preferences (Samuelson, 1953). Unfortunately, observation of people's actions cannot reveal the trade-offs they are actually making, their motives, and thus those interpreting CV survey results are forced to make assumptions about these motives. Sagoff (1994) has demonstrated most forcefully that a motive must be attributed in order to know what is being valued:

The same behaviour may be described in innumerable ways. If you eat the turnip stew your mother-in-law has baked, do you prefer it to another dish, say, the spinach lasagne in the refrigerator? Under one description, yes, but not under another. If your 'opportunity set' includes 'pleasing your mother-in-law', then I can interpret your choice to reveal that preference. If it includes 'a low calorie meal', I can explain your eating turnips in terms of a preference to lose weight. (Sagoff 1994: 298)

In a CV survey we are dealing with *stated* preferences, but the problem is essentially the same. We can hypothesise that responses reflect preferences for

... protecting that particular landscape, for wilderness preservation more generally, for environmental protection as a whole, for a 'warm glow' attendant on contributing to wilderness conservation, for moral satisfaction taken in contrib-

THE INDIFFERENCE CURVE...

uting to a noble cause, or even for the pleasure of providing a positive answer to a survey. In short, CV responses are as open as ordinary market behaviour to interpretation. (Ibid.: 299)

Much of CV design focuses on making sure that respondents are answering the question that the survey designer wants them to answer, i.e. that they are motivated by changes in quantity of the good in question. However, the main argument of this paper is that when moral values are concerned there is nothing the surveyor can do to make the responses fit within a simple framework in which quantity is traded off against money. Furthermore, as discussed below, pure valuations of quintessential goods stripped of all 'biases' are a fiction, as any market researcher knows.

3.2. *Contingent valuation and market research*

In the market, the problem of attributing motives is faced by producers and retailers. RightPrice!⁸ observes people's behaviour, both in its stores, in other stores, and in responding to surveys, and attempts to understand people's demand for different goods. For instance, when considering a new apple variety it may want to know whether people buy Granny Smiths because they like thick shiny skin, crisp juicy flesh, a sour taste, a trusted brand, or any one of a host of possibilities. RightPrice! is in the fortunate position of having an immediate test of whether its imputation is correct. If it decides that people actually like the thick shiny skin but dislike the crisp flesh, it will get rapid corrective feedback when it launches its new range of Floury Grannies. Furthermore, it can correct its mistakes rapidly. The environmental manager may not have this luxury.

CV may indeed be seen as a form of market research for public goods. Given the ability of market researchers to test the veracity of their conclusions, it seems that CV practitioners should have much to learn from their experience. We are not aware of anything in the literature suggesting that systematic attempts to do this have been made (but see examples such as Louviere, 1996).

There appear to be two major differences between the approach of a market researcher and that of a CV surveyor. First, the market researcher faces a consumer who, if we ignore bandwagon and similar effects, usually makes purchasing decisions independent of decisions made by other consumers. The amount I pay for apples is usually not affected by what other people pay for apples. The CV surveyor, on the other hand, deals with a 'consumer' who usually *is* very concerned about what other people pay (Sen, 1995). My contribution to a public good *does* depend on how much I expect others to contribute in a joint effort to achieve the desired outcome, making the choice problem an assurance game. Second, the market researcher is not interested in the consumer's valuation of a particular *product* (except in certain cases, such as opinion polling), but is interested in how the consumer reacts to different *concepts*. The product as such is only a part of the total package: place of origin, production methods,

advertising, packaging, retail, *etc.* The CV surveyor, on the other hand, wants to find out some 'true' value for the environmental good, *independent* of extraneous influences. But is there such a thing as a true value for the good? Can the 'good' ever be separated from the 'package'? Maybe this is one thing that CV can learn: that it should not try to value abstract 'goods', but that rather it should aim to value (policy) *packages*.

Hoehn and Randall (1987) and Price (1999) conclude that surrounding information cannot be separated from the bid (the so-called information bias is not really a bias). Further to this conclusion, we argue that there are certain unique characteristics of the package around public goods which makes them particularly difficult to value in the abstract. Public goods are not normally traded, property rights over them are generally unclear, and they are often valued for ethical rather than practical reasons.

3.3. *Characteristics of the public goods 'package'*

Familiarity

When people value non-traded goods they are faced with huge problems of information and uncertainty, for instance when asked to value changes the effects of which will not be felt for years. Furthermore such effects, when they are felt, may be irreversible. Under these circumstances, people do not have the vital ability to adapt their choices with the benefit of experience. Consider a consumer who wants to buy a juicy apple which also has a thin skin and very sweet taste. Not having bought apples before, and having little source of information, the person buys some Granny Smiths only to find that they are sour and have a thick skin. Only with the benefit of repeated purchases does the individual discover that the apple for her (or him) is the Royal Gala. A one-shot valuation game would have suggested a preference for the Granny Smith which the buyer took one bite of and then threw in the bin. Is it then a good idea to use similar shot-in-the-dark valuations of public goods as a basis for policy?

In the marketing literature, goods characterised by intractable information asymmetries are known as credence goods (Nelson, 1970; Darby and Karni, 1973). The purchaser cannot, even with the benefit of experience,⁹ judge the quality of a credence good. Market examples are long-term health effects of food, or the welfare of the animals used to produce food. With such goods the consumer must select from the information she is given and make a judgement – whom or what does she believe? Public goods characterised by existence value will often be credence goods. If the consumer never uses them, then they must rely on external information to judge their quality. Again, the study of the marketing of credence goods surely contains lessons for environmental valuation.

THE INDIFFERENCE CURVE...

Property rights

People generally accept that if they want to benefit from a market good then they will have to pay for it. Public goods, on the other hand, are generally free and property rights over them are ill-defined and hard to enforce. Under these circumstances, people may well object to being asked to pay for something which they believe to be theirs already. Vадnjal and O'Connor (1994) deliberately investigate this issue in their survey of the WTP of Auckland residents to protect from development a celebrated island opposite the city (Rangitoto). They find that (p. 369) 'the meaning respondents attach to the actual dollar values they offer or bid are inconsistent with the conventional logic that underlies CV ... respondents might be seen to be expressing views about how things ought to be in society'. In particular, there was a widely expressed view that one 'shouldn't have to pay' (p. 378), that an unspoilt Rangitoto was everybody's right. Thus a conventional CV survey may reveal zero WTP for something which is in fact highly valued not because of a refusal to make trade-offs, but because of a rejection of the implicit property right.

Morals

A final characteristic of many public goods is that people attach value to them even when they do not *use* them. These non-use values often have a moral character in that people believe in the rights of wild animals to exist, or they believe that it is wrong to destroy beautiful landscapes. It seems here that people are valuing not just the *state* of the good, but also *actions* relating to that good, as discussed above in relation to the experiment of Boyle et al. (1994). Since any change in the state requires human action, this problem seems particularly intractable to the CV method and merits further discussion below.

4. VALUING ACTIONS

A large number of authors within the valuation literature, going back at least as far as Brookshire et al. (1986), have tentatively suggested the importance of considering the valuation of actions as well as states. However, these authors generally end up questioning the experimental methodology rather than the paradigm (consider Cummings and Harrison, 1995, or Diamond and Hausman, 1994). This questioning is often part of an attempt to discredit the measurement of existence values via the CV method, and the more fundamental questions are not explored. Here the aim is to accept the methodology and investigate how it can be used and developed profitably, given the shortcomings of the theory.

4.1. *Utilitarian and deontological choice*

Sagoff (1998) discusses the distinction between utilitarian and deontological choice. The one is made on the basis of consequences, the other on the basis of ethical rules. The imputation of non-use values, including existence values, may be seen as an attempt to fit deontological values within the utilitarian framework essential to welfare economics. Meanwhile, ideas such as Sen's 'commitment' (Sen, 1977) and Sagoff's 'citizen' (Sagoff, 1988) are attempts to show that such values do not fit within such a framework. For instance, Sagoff (1988) argues that CV tends to force people into the role of consumers when they really want to make citizen-type judgements.

However, individuals and society must and do make trade-offs – even if the environment is given an exalted morally-based status, it must still compete for money along with other worthy causes like health care and education (Beckerman and Pasek, 1997). Cannot valuations made on the basis of ethical motivations also be included in the CV calculus? In any case, they cannot be removed! The central point of this paper is that choices made on the basis of ethical rules have properties which appear paradoxical within a utilitarian framework in which people are expected to care only about quantities of goods. Therefore any attempt to include ethical choices within the welfare calculus must adopt a broader perspective in which the aim is not to derive abstract demand curves for environmental goods, but instead to resolve well-defined policy problems which specify both quantities and actions – the 'package' approach.

4.2. *Quantity and value*

In the conventional indifference curve for a public good, the consumer is seen to trade off quantities of a good against quantities of wealth. Is this framework relevant for measuring existence values made on the basis of *commitment*? What is this commitment to?

On reflection, this commitment is clearly not to the existence of an arbitrary quantity of an environmental good. Indeed, individuals may be essentially indifferent between different 'stocks' of wildlife as long as they do not fall below some threshold level (Brookshire et al., 1986). Imagine an ecological survey which shows that there exist 480,000 penguins in the Antarctic. The figure is generally known amongst the public. Now imagine that a flaw is found in the survey methodology, and that it is revealed that there are actually only 460,000. It is hard to imagine that the public would care very much, or that there would be a high willingness to pay to boost the population to the previously believed figure of 480,000. On the other hand, there might be a high willingness to pay to eliminate practices in Antarctica (such as dumping of toxic waste) which were shown to have actually reduced the population from 480,000 to 460,000. And experience suggests that there would be very large 'damage estimates' if 20,000 birds were killed as the result of an oil spillage.¹⁰

THE INDIFFERENCE CURVE...

Existence value is a sign of commitment not to the existence of an arbitrary quantity of a good, but to a certain way of looking after that good. That is, it is a commitment not only to a certain *state* of the good, but also to certain *actions* towards that good. Typically these actions will be to avoid disturbing the 'natural' state of the good, or to avoid causing suffering or death to animals. The area of habitat disturbed, or the number of animals which suffer, is less important than the *action* of causing the disturbance or suffering. Hence Krutilla's original phraseology is seen to be misleading. It is not that people derive benefit from 'mere knowledge' of the remaining wilderness, but rather that people are hurt by knowledge of threats to that wilderness. The emphasis is not on the fact it exists, but that it remains undisturbed.

4.3. *Actions and the indifference curve*

Can valuations of actions be represented by a conventional indifference curve? One is tempted to argue that they can, at least in principle. All we need to do, so it seems, is to label our axes correctly, and make sure that all respondents are presented with the same scenario – is it 'birds killed by human negligence' which is the variable, or is it 'birds killed by natural catastrophe'? In other words, when moral values rather than milkshakes are at stake, the variable must be an entire scenario. We cannot construct a simple curve in which bird numbers *in the abstract* vary along the horizontal axis.

Yet, critics may argue that depicting 'bird numbers killed by human negligence' against income implies that it matters to people whether, say, 230,000 or 250,000 birds are killed by human negligence, that people are prepared to trade off income against minor changes in the number of birds. This seems to be inconsistent with the argument that it is the *action* of killing the birds rather than the *number* of birds killed that concerns people. If the source of an increase in welfare is the knowledge that action of a certain kind will not happen, this may well be an all-or-nothing matter. This seems to rule out a marginal rate of substitution as such, let alone one that would yield a well-behaved, conventional indifference curve – an argument well supported by the experiments of Boyle et al. (1994), which revealed similar WTP figures to prevent deaths of 2,000, 20,000 and 200,000 birds. But would we not expect WTP to fall significantly if the number of deaths prevented were to tend towards zero? And even if a particular action is considered wrong, would it not be 'more wrong' if it killed twice as many birds? Denying trade-offs in bird numbers altogether would take us perilously close to claiming that there are lexicographic preferences in which case even the refined indifference curve model would be of little use.

Paying attention to the action is similar in many ways to paying attention to the payment vehicle – factors other than variations in the quantity of the good can have an effect. Indeed, different forms of payment could also be considered as different 'actions'. In choosing a payment vehicle, there is a temptation to choose

one that promotes predictable responses which conform to theory. Similarly, there may be a temptation to choose scenarios in which the 'action' is non-descript or not discussed, so that respondents focus on the 'actual good'. The message of this paper is that such strategies are misguided – all motivations are valid according to the theory of consumer choice on which CV rests, and moral values should not be circumvented through survey design. Instead, their considered expression should be encouraged through the presentation of realistic (policy) packages and the use of discursive methodologies.

5. CONCLUSIONS FOR THE PRACTICE OF CONTINGENT VALUATION

Individuals and society must and do make trade-offs, even when moral values are involved (Beckerman and Pasek, 1997). Yet when we attempt to measure individuals' trade-offs using indifference curves, things break down in a mass of inconsistencies, so-called lexicographic preferences and claims that we are valuing the invaluable. Numerous casual explanations for these 'anomalous' responses have been offered, and most authors recommend experimentation with elicitation techniques as an appropriate remedy. We suggest, in line with Vадnjal and O'Connor (1994), that remedies such as refinement of the questionnaire structure tend to gloss over fundamental questions about how people make choices. Proposed changes in the quantity or quality of public goods inevitably involve moral considerations for many people. To eliminate or circumvent these values (by means of questionnaire design, for example) is to betray the foundation of the method, but to include them is to lose the simplicity of a direct trade-off between a single good and a quantity of money – the valuation of the action introduces an extra dimension. This loss of simplicity means that simple results based on the theory of consumer choice can no longer be expected to hold, an expectation well borne out in practice.

Recognising that individuals value public goods in a complex way may help to rationalise apparently paradoxical results, but does it help us in practical application of the CV method? Luce et al. (1999) argue that accounting for 'emotional' responses can help market researchers, and Louviere (1996) discusses the use of conjoint analysis for market research, in which consumer preferences for different aspects of a product package are investigated. A paper which shows this kind of approach to CV is McDaniels and Roessler (1998). Here respondents are asked for an overall valuation, and subsequently asked specifically about values such as passive use, spiritual, etc. Finally, they are asked to reconcile the two sets of values. The end results are similar to those from a CV referendum-based survey. Another variation is the advocacy of the choice experiment (CE) method (see for instance Adamowicz et al., 1998 or Blamey et

THE INDIFFERENCE CURVE...

al., 2000) in which a series of questions with numerous alternatives is used to allow statistical estimation of preferences over a variety of attributes.

Such experiments and methodologies are interesting, but seem to be missing the key point for CV practitioners. This is that although different types of values exist and are valid, they do not all need to be separated out and measured. Instead, surveyors should ask people *exactly* what they want to know, rather than making imputations from valuations for something else. For instance, RightPrice! could have presented customers with the Flourey Granny package, and tested their willingness to purchase. Similarly, the environmental valuer may be able to present respondents with a genuine scenario, so that there is no need to take a detour through indifference curve analysis. For instance, if you want to know how much extra people are willing to pay for their petrol in order to prevent bird deaths in the central flyway (Boyle et al., 1994) then by all means ask them, but don't then try to impute an indifference curve in bird numbers. The CV method is a very useful tool for ranking different multi-dimensional scenarios (involving in the above example petrol costs to different consumers, state of oil ponds, bird numbers, bird deaths, etc.), but it is not a good tool for constructing meaningful two-dimensional pictures in which quantities of single public goods (whether emotional or physical) are traded off against money. We are thus brought back to the parallel between monetary valuation exercises and market research, since market research is also used to investigate operational questions rather than to generate abstract data about preferences. The idea of asking respondents to compare scenarios rather than 'reveal' preferences for pure 'goods' also ties in with Sagoff's (1998) arguments for encouraging deliberative and discursive processes to (p. 224) 'enable individuals to construct values rather than reveal prior preferences'.

NOTES

¹ Part of the research for this paper was conducted while Uwe Latacz-Lohmann was Henry Schapper Fellow in Agricultural and Resource Economics at the University of Western Australia. Financial support from the Henry Schapper Fund is gratefully acknowledged. The authors would like to thank Fredrik Holstein, Clive Spash and the two reviewers, Graham Dawson and Colin Price, for helpful and detailed comments on an earlier draft.

² See Johansson (1993) for an introduction to such values, and Brookshire et al. (1986) for a discussion of their inclusion in the welfare calculus.

³ See Johansson-Stenman (1998) for a recent discussion.

⁴ The reader is referred to standard texts such as Varian (1992) for a definition of these terms.

⁵ WTP is willingness to pay for a gain (or to avoid a loss) in a good. WTA is willingness to accept compensation for not having the gain (or for suffering the loss) in a good.

⁶ The numbers of birds to be saved were 2,000, 20,000 and 200,000 out of a total population of 10,000,000, and the mean bids were around \$80 for all three samples.

⁷ This violates the condition that well-behaved indifference curves should be (strictly) convex, which follows from the assumption that the more I have of Good 1, the less I am prepared to give up of Good 2 (e.g. money) to get another unit of Good 1.

⁸ A powerful (but imaginary) supermarket chain.

⁹ There is another category called an *experience* good, into which apples would fall. The consumer can judge quality *after* purchase.

¹⁰ See Carson et al. (1992) and NOAA (1993) on the valuation of the damages from the Exxon Valdez disaster.

REFERENCES

- Adamowicz, W.L., Bhardwaj, V. and Macnab, B., 1993. 'Experiments on the differences between willingness to pay and willingness to accept'. *Land Economics* **69**(4): 416–27.
- Adamowicz, W., Boxall, P., Williams, M. and Louviere, J., 1998. 'Stated preference approaches for measuring passive use values: Choice experiments and contingent valuation'. *American Journal of Agricultural Economics* **80**: 64–75.
- Bateman, I., Munro, A., Rhodes, B., Starmer, C. and Sugden, R., 1997. 'A test of the theory of reference-dependent preferences'. *Quarterly Journal of Economics* **112**(2): 479–505.
- Beckerman, W. and Pasek, J., 1997. Plural values and environmental valuation. *Environmental Values* **6**(1): 65–86.
- Blamey, R., Rolfe, J., Bennett, J. and Morrison, M., 2000. Valuing remnant vegetation in Central Queensland using choice modelling. *Australian Journal of Agricultural and Resource Economics* **44** (3): 439–56.
- Boyce, R.R., McClelland, G.H., Schulze, W.D., Brown, T. and Peterson G., 1992. 'An experimental examination of intrinsic values as a source of the WTA-WTP disparity'. *American Economic Review* **82**(5): 1366–73.
- Boyle, K.J., Desvousges, W.H., Johnson, F.R., Dunford, R.W. and Hudson, S.P., 1994. 'An investigation of part-whole biases in contingent valuation studies'. *Journal of Environmental Economics and Management* **27**(1): 64–83.
- Brookshire, D., Eubanks, L. and Sorg, C., 1986. 'Existence values and normative economics: implications for valuing water resources'. *Water Resources Research* **22**(11): 1509–18.
- Carson, R.T., Mitchell, R.C., Hanemann, W.M., Kopp, R.J., Presser, S. and Ruud, P.A., 1992. *A contingent valuation study of lost passive use values resulting from the Exxon Valdez oil spill*. A report to the Attorney General of the State of Alaska, 1992.
- Cummings, R.G. and Harrison, G.W., 1995. 'The measurement and decomposition of nonuse values: a critical review'. *Environmental and Resource Economics* **5**(3): 225–47.
- Cummings, R.G., Brookshire, D.S. and Schulze, W.D., eds., 1986. *Valuing environmental goods: a state of the arts assessment of the contingent method*. Totowa, NJ: Rowman and Allanheld.

THE INDIFFERENCE CURVE...

- Darby, M.R. and Karni, E., 1973. 'Free competition and the optimal amount of fraud'. *Journal of Law and Economics* **16**(1): 67–88.
- Diamond P.A., 1996. 'Testing the internal consistency of contingent valuation surveys'. *Journal of Environmental Economics and Management* **30**(3): 337–47.
- Diamond P.A. and Hausman J.A., 1994. 'Contingent valuation: is some number better than no number?' *Journal of Economic Perspectives* **8**(4): 45–64.
- Friedman, M., 1962. *Capitalism and freedom*. University of Chicago Press.
- Hanemann, W.M., 1991. 'Willingness to pay and willingness to accept: how much can they differ?' *American Economic Review* **81**(3): 635–47.
- Hanemann, W.M., 1994. 'Valuing the environment through contingent valuation'. *Journal of Economic Perspectives* **8**(4): 19–43.
- Hoehn and Randall (1987). 'A satisfactory benefit cost indication from contingent valuation'. *Journal of Environmental Economics and Management* **14**(3): 226–47.
- Johansson, P., 1993. 'Valuing environmental damage'. In: Helm, D. (ed.), *Economic policy towards the environment*. Blackwell, 111–36.
- 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.
- Kahneman, D. and Tversky, A., 1979. 'Prospect theory: an analysis of decisions under risk'. *Econometrica* **47**(2): 263–91.
- Kahneman, D., Knetsch, J.L., and Thaler, R.H. (1990). 'Experimental tests of the endowment effect and the Coase Theorem'. *Journal of Political Economy* **98**(6): 1325–48.
- Knetsch, J.L. (1989). 'The endowment effect and evidence of non-reversible indifference curves'. *American Economic Review* **79**(5): 1277–84.
- Krutilla, J., 1967. 'Conservation reconsidered'. *American Economic Review* **57**, 777–86.
- Louviere, J.J., 1996. 'Relating stated preference measures and models to choices in real markets: calibration of CV responses'. In Bjornstad, D.J. and Kahn, J.R. (eds), *The contingent valuation of environmental resources: methodological issues and research needs*. Brookfield, US: Edward Elgar.
- Luce, M.F., Payne J.W. and Bettman J.R., 1999. 'Emotional trade-off difficulty and choice'. *Journal of Marketing Research* **36**, 143–59.
- McDaniels, T.L. and Roessler, C., 1998. 'Multiattribute elicitation of wilderness preservation benefits: a constructive approach'. *Ecological Economics* **27**, 299–312.
- Mitchell, R.C. and Carson, R.T., 1989. *Using surveys to value public goods: the contingent valuation method*. Baltimore: Johns Hopkins University Press.
- Morrison, G.C., 1997a. 'Resolving differences in willingness to pay and willingness to accept: comment'. *American Economic Review* **87**(1): 236–40.
- Morrison, G.C., 1997b. 'Willingness to pay and willingness to accept: some evidence of an endowment effect'. *Applied Economics* **29**(4): 411–17.
- Nelson, P., 1970. 'Information and consumer behaviour'. *Journal of Political Economy* **78**(2): 311–29.
- NOAA, 1993. 'Report of the NOAA Panel on contingent valuation'. *Federal Register* **58**(10): 4602–14.
- Price, R., 1999. 'Contingent valuation and retrograde information bias'. In Roper, C.S. and Park, A., 1999. *The living forest: non-market benefits of forestry*. London, The Stationary Office, pp. 37–44.

- Randall, A. and Stoll, J.R., 1980. 'Consumer's surplus in commodity space'. *American Economic Review* **70**(3): 449–57.
- Sagoff, M., 1988. *The economy of the Earth: philosophy, law and the environment*. Cambridge University Press.
- Sagoff, M., 1994. 'Four dogmas of environmental economics'. *Environmental Values* **3**(4): 285–310.
- 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., 1953. *Foundations of economic analysis*. Cambridge: Harvard University Press.
- Schkade, D.A. and Payne, J.W., 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**(1): 88–109.
- Sen, A., 1995. 'Environmental evaluation and social choice: contingent valuation and the market analogy'. *The Japanese Economic Review* **46**(1): 23–37.
- Sen, A., 1977. 'Rational fools: a critique of the behavioural foundations of economic theory'. *Philosophy and Public Affairs* **6**(4): 317–44.
- Shogren, J.F., Shin, S.Y., Hayes, D.J. and Klieberstein, J.B., 1994. 'Resolving differences in willingness to pay and willingness to accept'. *American Economic Review* **84**(1): 255–70.
- Stevens, T.H., Echeverria, J., Glass, R.J., Hager, T. and More, T.A., 1991. 'Measuring the existence values of wildlife: what do CVM estimates really show?' *Land Economics* **67**(4): 390–400.
- Vadnjal, D. and O'Connor, M., 1994. 'What is the value of Rangitoto Island?' *Environmental Values* **3**(4): 369–80.
- Varian, H., 1992. *Microeconomic analysis*. Norton, New York.
- Weisbrod, B., 1964. 'Collective-consumption services of individual-consumption goods'. *Quarterly Journal of Economics* **78**(3): 471–77.