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Environmental Valuation: Some Problems of Wrong Questions and Misleading Answers¹

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ABSTRACT: Contingent valuation of people's willingness to pay has rapidly become the method of choice to value all manner of environmental damages. The correct measure is, however, the sum people require to compensate them for such losses, an amount which will normally be far larger than their willingness to pay. And on present evidence, responses to contingent valuation questions are not likely to represent any measure of economic values. The results of these valuation practices will, therefore, bias environmental policies and distort incentives.

KEYWORDS: Contingent valuation, endowment effect, valuation

After languishing largely in the domains of scholarly and not so scholarly papers and professional journals, estimates of non-pecuniary resource and environmental values are increasingly being taken seriously in actual choices between resource uses, and in designing environmental policies, setting resource prices, determining damage awards, and guiding judicial decisions. The demands for valuation numbers have never been greater.

But almost simultaneous with this growing enthusiasm, new empirical findings are being reported which raise serious questions about the validity of many valuations and the usefulness of current assessment practices. The results suggest that present efforts may well distort incentives that guide private and public actions, compromise the deterrence function of damage awards, and generally bias environmental policies.

Many of the results of research in these areas, and the conclusions that follow from them, have not been particularly welcome in some quarters. This has, unfortunately, prompted some distracting attempts to excuse current procedures and otherwise unduly delay taking much serious account of the findings. On present evidence, such efforts are likely not serving well the interests of reasonable and fair assessments.

The results of recent research are at variance with normally accepted environmental valuation efforts in several areas. Two of these seem especially important for many current valuations: the disparity between valuations of gains and losses, and the use of contingent valuation methods to estimate the economic value of environmental changes.

THE DISPARITY BETWEEN THE VALUATION OF GAINS AND LOSSES

There is no dispute that economic value of both gains and losses are measured by what people are willing to sacrifice. Gains are valued in terms of what people are willing to pay (WTP) to obtain them, and losses are appropriately valued in terms of what people would demand to accept them (their willingness-to-accept, or WTA). The usual definitions are some variant of: 'the economic value of something is how much someone is willing to pay for it or, if he [or she] has it already how much money he [or she] demands to part with it' (Posner 1986, p.11).

Although income, or wealth, effects or limits on ability to pay may cause the two measures to differ, the differences are normally not a factor of much practical importance and it is generally agreed that they can safely be ignored in most applications. The common view is that, 'for many goods, services, and amenities that command a modest fraction of the consumer's budget, the differences between [the] ... measures are trivial' (Randall 1987, p.244). Consequently, the usual advice is that 'as a practical matter it usually does not make much difference which of these two approaches ... is adopted' (Rhoads 1985, p.125).

In spite of the agreement that losses are appropriately valued by the WTA measure, resource and environmental losses are almost invariably valued, in practice, by the WTP measure. This has been justified on grounds of both convenience – in large part due to the difficulty of estimating WTA – and these assurances of equivalence between the measures.

While it has long been assumed that the two measures would yield essentially equivalent assessments, the empirical evidence strongly suggests otherwise. The findings from essentially all tests of the equivalence assertion show that people commonly value losses much more than objectively commensurate gains – 'the precise magnitudes vary across studies, but ratios of four times to fifteen times are not uncommon...' (Milgrom 1993, p.429). Although such disparities between valuations of gains and losses – often referred to as the endowment effect – have been reported in the professional literature for well over a decade (see, for example, Kahneman and Tversky 1979; Gordon and Knetsch 1979; Thaler 1980), it is only in recent years that these findings have attracted a more general and sympathetic interest among economists – though, curiously, not yet among most people dealing with resource and environmental valuation questions.

EVIDENCE OF A DISPARITY

Large differences between the two measures were first noted in survey studies of people's valuations of various losses of environmental assets or the degradation of environmental quality. For example, individuals in a sample of duck hunters said they would be willing to pay an average of \$247 to save a marsh area used by ducks, but would demand an average of \$1044 to accept the identical loss (Hammack and Brown 1974). There are serious reservations about whether or not these earlier studies really estimated economic values, as such, but they did alert some of us to the real possibility that people value gains and losses differently.

This led to later studies based on real exchange experiments which provided more stringent tests (Knetsch and Sinden 1984). The results were the same. Even when exchanges of real goods and actual cash payments motivated the evaluations, the compensation demanded to give up an entitlement far exceeded the comparable payment measure of values.

An illustration of the general finding is demonstrated by the results of simple exercises involving the choice of whether to keep a good or to exchange it for another. People, typically by overwhelming numbers, choose to keep whatever good is initially given to them, such as a coffee mug or a large chocolate bar, rather than trade it for the alternative.² Mugs, or whatever, are valued higher when they have to be given up to obtain a chocolate bar; and are valued less when they are gained in exchange for giving up a chocolate bar.

More extensive real market exchange experiments have provided direct monetary assessments of gains and losses of a wide variety of goods and entitlements. These studies have further demonstrated the large magnitude of the disparities between valuations of gains and losses and affirmed the persistence of the differences over repeated valuations (Kahneman, Knetsch and Thaler 1990; Kachelmeier and Sheta 1992; Boyce, et al. 1992). The results of these, and other, empirical tests indicate that the differences are pervasive and large, and likely not an artifact of any particular study.

People have also been shown to exhibit similar gain and loss valuation disparities in their actual behaviour and in making ordinary real choices (Kahneman, Knetsch and Thaler 1991). Frey and Pommerehne, for example, have noted the large asymmetry between public support for saving national art treasures and the support for acquiring ones of equal or greater artistic merit (1987). Other examples include the reluctance to sell at a loss, largely attributable to the valuation disparity, evident in the higher volumes of house sales when prices are rising and the smaller volume of sales of securities that have declined in price relative to those for which prices have increased (Shefrin and Statman 1974). There is also evidence of a pattern of greater legal protection accorded to losses over foregone gains in judicial choices (Cohen and Knetsch 1992). An interesting further illustration of the valuation disparity appeared in the choices

made by people in the US states of New Jersey and Pennsylvania between a cheaper automobile insurance policy which limited rights to further recovery of damages and a more expensive one which allowed that possibility. Although the difference in premiums was substantial and little effort was involved in making a change, overwhelming majorities in both states chose the default option rather than give it up for the alternative, even though the limited rights policy was the default in New Jersey and the more expensive one was the default in Pennsylvania (Johnson, et al. 1993).

Although reports of findings of valuation disparities are now quite commonplace, the early studies reporting large valuation disparities tended to generate a good bit of scepticism, and certainly little inclination to take this evidence into account in resource and environmental valuations. While quite appropriate questions were raised about methods and other aspects of the evidence, the major reason for the reluctance to take the results seriously appeared to be that they were inconsistent with long accepted economic theory – a slight perversion of the usual course of scientific inference.³ However, the basic findings have now been replicated by many investigations using widely varied research designs, and the results are now commonly reported in leading professional journals.

IMPLICATIONS OF THE DISPARITY

The disparity between measures of gains and losses is clearly no longer a curiosity. In addition to issues of resource valuation, the differing weights attached to gains and losses have a number of important implications for many other economic analyses. For example, observations that people prefer to keep a good A rather than give it up for another good B, but also to keep B rather than exchange it for A if given the opposite choice, are largely inconsistent with several axioms of preference orderings that are presumed to provide major support for much of contemporary demand theory and a good bit of economic analysis generally (Knetsch, in press). Similarly, the dependence of valuation on the reference position also undermines the primary prediction of the Coase Theorem, as voluntary exchanges will not necessarily assure that final arrangements of entitlements will be efficient and the same regardless of initial assignments (Kahneman, Knetsch and Thaler 1990; Hoffman and Spitzer 1993). Further, the assumption that indifference curves are reversible – that the rate at which people will sacrifice one good for another is independent of their initial entitlements and the direction of exchange offer – is violated to the extent that giving up a good has a greater impact on welfare than gaining the same entitlement (Knetsch 1989 and 1992).

The disparity between gains and losses has also been found to influence people's judgments of what they regard as being either acceptable or unfair

economic behaviour. If an action is seen to impose a loss on one party for the benefit of another, this will nearly always be widely seen to be unfair – quite apart from whatever economic justification might be thought to exist. For example, raising prices in response to sudden increases in demand is seen to benefit the seller, who has not incurred any cost increase, at the expense of the buyer. It is therefore judged to be unfair. Similarly, cutting wages when unemployment increases is thought to be unfair by the majority of people because the employer benefits in direct proportion to the workers' loss and the impact of the loss is taken to outweigh that of the gain. Reducing a customary bonus payment to workers is apparently viewed as a less aversive foregoing of a gain and is therefore far more acceptable than an equivalent reduction in wages, which is commonly seen as imposing a loss on workers (Kahneman, Knetsch, and Thaler 1986a and 1986b).

People's reactions to proposed remedies for harms imposed on them – including environmental losses – provide another important implication of the valuation disparity. Conventional prescriptions draw on the usual economic critique that presumes that people favour compensation over efforts to mitigate the injury because a money award can be used by them to buy whatever they value most whereas mitigation restricts their remedy to the one particular gain of reducing the adverse impacts of the action. However, the findings of losses being valued more than gains suggest that because mitigation measures reduce losses they will therefore be valued more highly, and because compensation will likely be viewed as a gain it will be discounted. Further, the findings of what people regard as fair and unfair suggest that tying a relief action to the injury, as with the acceptance of passing on costs, greatly increases the acceptability of a remedy. The available survey and field data are consistent with these findings, showing that people do indeed often prefer mitigation over compensation (Zeiss and Atwater 1987; Knetsch 1990).

This raises a possible related implication for policies designed to achieve sustainable development. One prevalent notion of sustainability turns importantly on the acceptability of substituting one form of natural (or even human) capital for another, thereby maintaining the desired level of productivity – a version sometimes referred to as 'soft sustainability'. Thus, if forests are harvested in one area, total productivity might be maintained by planting an alternative species of trees in another region or by enhancing fish or wildlife habitat. However, the preliminary data suggest that people's willingness to accept one resource gain as a substitute for the loss of another resource, may be more constrained than usually presumed.

In much the same way, there appears to be a public finance lesson in this for the use of funds collected from user fees or other special purpose levies. Just as people often prefer mitigation measures to monetary compensation for an injury, they also want such monies used for a purpose related to the levy – the widely

denounced 'earmarking' of funds – rather than put into a general or consolidated revenue account. And for much the same reason, that the funded activity reduces the adverse feeling of the loss if it is seen to be related to the purpose for which the money was taken. The usual public finance dictum that such funds should be put into the central accounts might be in need of some amendment to reflect better the real valuations of the community in these matters.

In addition, the valuation differences have, of course, very direct implications for valuation practice. The near universal use of WTP measure, rather than the more appropriate WTA measure, to assess losses, will result in systematic and on current evidence very serious underestimates of their value. Consequently, activities with negative environmental impacts will be unduly encouraged: the real value of the losses will be underestimated; compensation and damage awards will be too small to provide proper deterrence and restitution; inappropriately lax standards of protection against injuries will be set, as the added costs of further harms will be heavily biased; inadequate mitigation measures will be undertaken, as the value of preventing further losses will be incorrectly measured; choices of legal entitlements will be biased because comparisons between the efficiency of alternative allocations will be based on incorrect measures; too few resources will be devoted to avoiding injuries; and, in general, full accounting and appropriate pricing of non-pecuniary inputs will be frustrated (Knetsch 1990).

An argument can be made that a WTP measure of a loss may be adequate in cases where a critical threshold value has been established. This might be the case, for example, if the value of a development is \$X net of a particular resource cost; it would be uneconomic if that cost exceeded \$X. If a WTP value was sufficient to demonstrate that the cost exceeded the value of the alternative, it would provide useful information. In such cases this might be an appropriate valuation strategy.

In general, however, the use of WTP to measure losses is inappropriate. Even in cases for which a critical threshold has been established, no conclusion is possible if the WTP value fails to provide the needed demonstration and an appropriate WTA measure is not provided. Further, in many cases – in assessing damages, for example – a threshold is simply not available.

It is also not a very defensible position to claim that the willingness-to-pay measure should be used to value losses because it provides a 'conservative choice' (NOAA 1993, p.4603). The assessments are conservative only in the sense of being an underestimate, but the under valuations are likely to be so large as to compromise the valuations and seriously distort incentives. In this case, being conservative is hardly consistent with the notions of responsibility and prudence normally associated with such a choice.

CONTINGENT VALUATION METHODS

In addition to commonly seeking answers to the wrong question when valuing losses, there is the further worry of how well current methods estimate the monetary value of non-pecuniary environmental changes. While techniques such as the travel cost method, hedonic pricing and replacement cost, are frequently used and produce useful value estimates, they are also widely acknowledged to have limited applicability over the broad range of non-pecuniary resource and environmental values which are frequently at issue.

Contingent valuation methods (or CVM) are alleged to be free of such restrictions and are therefore widely used for estimating resource and environmental values. It is the use of CVM that gives rise to newspaper accounts headed by statements such as:

‘Australians Want to Save Kakadu for \$53 a Year’

‘State Residents... Indicated They Would Pay Up to \$10 per Bird for Protecting Them From Future Spills’

‘Studies Have Indicated that the Cost of the Environmental Damage from the [Exxon Valdez] Spill is Between \$3 Billion and \$5 Billion’

Further, estimates derived by asking people how much they would pay to prevent particular environmental losses are taken to produce valuations that are fully comparable to economic values derived from competitive market exchanges and thus to allow direct comparisons of the economic values of alternative resource uses. The now common assertion, or at least hope, of those using CVM estimates is that:

[CVM] is potentially capable of directly measuring a broad range of economic benefits for a wide range goods, including those not yet supplied, in a manner fully consistent with economic theory. (Mitchell and Carson 1989, p.295)

Thus, in cases of allocating a block of old growth forests to either timber sales or wilderness on grounds of maximising economic worth, the CVM estimate of the wilderness value is alleged to be directly comparable to the market value of timber.

The immense popularity of CVM as a means to estimate non-pecuniary resource and environmental values is a fairly recent phenomenon. The first application of the method was by Robert Davis (1963). While Davis demonstrated most of the attributes which present advocates proclaim, little serious use was made of the method until recent US legislation made people who are deemed responsible for environmental degradation – through oil spills and the like – financially liable for the value of the environmental loss. The sudden demand for a number on which to base damage awards turned attention to CVM, the method that promised delivery of such numbers.

Given the legitimacy stemming from court approvals, at least in the US, and from a profusion of favourable reports in professional journals, the method is now being used for all manner of purposes in countries throughout the world. Its uses – and fees for carrying them out – continue to grow at rates seldom seen among adaptations of academic scribblings.

There are now, however, pressing reasons for some sobering reassessment of this enthusiasm. CVM studies produce numbers, but results of recent tests suggest that these numbers are not likely to be measures of economic values. There is also increasing evidence that answers to hypothetical valuation questions may produce seriously biased indications of respondents' actual willingness to sacrifice (Neill, et al. 1994). Further, the methods appear also to be susceptible to serious manipulation – not a good feature of a method on which damage awards and allocation decisions are to be based.

One problem is that CVM estimates can be very susceptible to anchoring biases, or what is also known in the CVM literature as starting point bias. The difficulty can be illustrated by the results of an early study that Daniel Kahneman and I carried out, using a sequential questioning format. Respondents were asked a 'Yes or No' question of whether or not they would be willing to pay a specific sum to preserve fish populations in an area north of Toronto, Canada. If they said 'Yes', then the question was repeated using a higher sum; if they said 'No' the second question contained a smaller amount. Respondents in different sub-samples were asked to pay varied sums in the first question with individuals in all groups then asked if they would be willing to pay \$50 in a second question. One group, for example, was first asked if they would be willing to pay \$100 to preserve fish populations; those saying 'No' were then asked if they would be willing to pay \$50 for the purpose.⁴ There should, presumably, be little difference in the proportions of respondents willing to pay \$50 regardless of the amount asked in the first question. However, the actual responses indicated anything but a constant rate. Of the respondents first asked if they would pay \$200, 63 per cent indicated a WTP of \$50. Of those first asked if they would pay \$25, only 18 per cent said they would pay \$50! People were quite obviously anchored on the initial sum, and the resulting 'valuations' were varied accordingly.

Partly as a result of findings of large anchoring effects, many CVM studies are now carried out using a 'referendum' or closed ended format. In this procedure, people are asked a WTP question for a single sum, but this sum is varied among respondents. An average WTP can be calculated by (essentially) observing the proportions of respondents who are willing to pay the varied amounts.

Recent tests, however, point to problems with this method as well. In comparing open-ended responses of how much people would pay for a good, the referendum responses show much less variation across the different amounts. That is, the proportions of people willing to pay the amount posed in the question does not differ very much for the varied sums. This results in a much flatter response function, usually indicating much higher average WTP than for other

response formats. For example, Kealy and Turner (1993) recently reported the results of a comparison between referendum and open-ended formats and found that the former procedure produced estimates about twice as large as the latter. (They may inadvertently have admitted more futility of the whole exercise in suggesting at the end of their report that, 'where the estimate is sensitive to question method, one should report both estimates'.) A similar finding was reported by Desvougues, et al. (1993).

While there are other limitations and worries that make CVM estimates suspect in many cases, the problem of what has become known as embedding is turning out to be perhaps the most serious. We described embedding as existing where, 'the same good is assigned a lower value if WTP for it is inferred from WTP for a more inclusive good rather than if the particular good is evaluated on its own' (Kahneman and Knetsch 1992a, p.58).

We first noted this problem in an early series of surveys when we asked three different random samples of Toronto residents if they would be willing to pay \$50 to maintain fish populations in either: (1) a small area of their province of Ontario; (2) a larger area of the province that included the area asked of the first group; or (3) the entire province. The (then) surprising result was that the proportions of people willing to pay \$50 to save the fish did not vary much with the area mentioned in the question in spite of the vastly different numbers of lakes and streams and, consequently, fish that would be protected.

Although others had noted a related phenomenon, which they variously termed a part-whole effect, symbolic effect, or disaggregation effect (see, e.g., Cummings, et al. 1986; Mitchell and Carson 1989), and Kahneman had reported our Ontario results at a 'state of the art' CVM conference (Kahneman 1986), these findings had little or no impact on either evaluation practice or discussions.

One notion we tested further was whether the lack of difference in values of larger or smaller numbers of fish might be due to respondents' feelings that the numbers saved mattered little, as long as the point was to preserve fish. One test consisted of asking different sub-samples if they would pay \$50 for one of two different and unrelated goods, and asking a third group if they would pay \$50 for a package of the two. For example, we asked one group if they would pay \$50 for a weekend in Montreal, a second group about \$50 for gift coupons for linens, and a third whether or not they would pay \$50 for both the Montreal holiday and linen shop coupons. The results were:

Linen shop certificates	24%
Weekend in Montreal	61%
Linens + Montreal weekend	55%

The combination of the two goods was valued, if anything, a bit less than one of the goods alone.

We then did another test using two public environmental goods. In this case, people in each of two sub-samples of Vancouver residents were asked an open-

ended question of how much they would pay for one of the public goods, and a third was asked their willingness to pay for a combination of both goods: maintaining fish populations in the interior regions of the province of British Columbia, and protection of historic buildings throughout the province. The results of the average WTP, again, did not conform to normal valuation expectations:

Fish populations	\$52.35
Historic buildings	\$55.57
Fish + historic buildings	\$51.10

Clearly, both goods are valued positively, yet people seemed unwilling to pay more for both goods than they would pay for either one of them alone.

Later, motivated in large part by our belated realisation of how seriously CVM was being taken, we conducted a more thorough test for embedding (Kahneman and Knetsch 1992a). Respondents in one of three sub-groups were asked how much they would pay for a specified group of public goods, and then how much of that sum they would pay for a portion of these goods. Finally they were asked how much of that they would pay for a less inclusive sub-set of the goods – availability of rescue equipment and trained personnel. Individuals in the second sub-sample were first asked how much they would pay for the portion of the list of public goods that made up those in the second question put to the first group of respondents, and then they were asked what portion of that sum they would pay for the same short list of equipment and personnel. Respondents in the third group were simply asked their WTP for equipment and personnel, the identical least inclusive good. The means of the responses showed major embedding:

	Group 1	Group 2	Group 3
Services including disaster	\$136		
Disaster including equip/pers.	\$29	\$152	
Equipment/personnel	\$14	\$77	\$122

The most pertinent result of our test was that the same good, equipment and trained personnel, was valued very differently depending on whether it was valued alone or, initially, as part of a more inclusive good – a difference in this case of ranging from \$14 to \$122. We have called this ‘regular embedding’ to distinguish it from another common result of ‘perfect embedding’, which refers to the common tendency of people to give similar WTP responses to more or less inclusive goods – evident in this case by the lack of any statistically significant difference between the \$136, \$152 and \$122 responses (Kahneman and Knetsch 1992b).

These basic results have now been replicated in further studies. Perhaps the most notable of these is a series of tests carried out by a group of prominent economists, econometricians and psychologists, supported by the EXXON Corporation and initially reported at a conference in 1992 (Hausman 1993).

The demonstrated common presence of embedding in CVM responses seriously undermines the credibility of taking these responses as measures of economic value. The contrast between indicators of economic values and responses to a CVM survey in which embedding is present can be illustrated by a simple hypothetical case of a well-informed shopper desiring two common goods, milk and muffins.

The shopper can be presumed to be aware that milk is readily available from other convenient sources at a price of \$2 per litre, and muffins are priced at \$1 each at a variety of similarly accessible shops. Given the ready availability of substitutes, these prices measure this individual's willingness to pay – to sacrifice – and is, therefore, the economic value of these goods to this shopper.

If there is no embedding, answers to alternative valuation questions put to the shopper can be represented (following our demonstration of embedding) as follows:

Willingness to pay for:

Milk + 2 Muffins	\$4		
2 Muffins	\$2	\$2	
1 Muffin	\$1	\$1	\$1

Thus, if the shopper were asked the maximum sum he or she would be willing to pay for a carton of milk plus two muffins, the reply would be \$4; if asked how much of this would be the value of the two muffins, the response would be \$2; \$1 would be the sum attributable to one muffin. Alternatively, if the same shopper were asked the valuation of only two muffins the honest reply would be \$2, with \$1 of this the value allocated to a single muffin. If the shopper is only asked the value of one muffin, the answer would be \$1. The value of a single muffin is \$1 whether considered by itself, as one of two muffins, or as part of a bundle with another muffin and a carton of milk.

The presence of embedding, so strikingly evident in CVM surveys, would reveal a very different pattern of 'evaluations', such as:

Willingness to pay for:

Milk + 2 Muffins	\$4		
2 Muffins	\$3	\$4	
1 Muffin	\$1	\$2	\$4

Thus, the shopper might say that the maximum willingness to pay for the bundle of two muffins and a litre of milk is \$4, but that \$3 of that is for the two muffins, and of that \$1 is for a single muffin. Alternatively, if asked the value of just two muffins, the response would be \$4, with \$2 the value of just one of these; and if asked the maximum sum for a single muffin alone the answer might well be \$4. The value of a single muffin can then be taken as \$1, \$2 or \$4.

Unlike the elicitation of true economic values that reveals consistent evaluations regardless of the form of the questioning, CVM responses, in the presence of embedding, show a total lack of consistency. The indications of value – the CVM responses – differ depending on how the good is combined with or without other goods.

One defence of the validity of CVM estimates being economic values in the face of pervasive embedding in the responses, is that if the question is context specific to the gain or loss at issue then there is no reason to be concerned that this value would change if the context were changed to be part of a more or less inclusive gain or loss. So if the change is two hectares of wildlife habitat, then the question should be asked about just two hectares of habitat and not about one or three hectares or about two hectares plus a tennis court. If this is done, the responses are alleged to represent the value of the two hectares of habitat in a form fully comparable to and compatible with values derived from well functioning markets. However, this assertion appears a bit disingenuous. The CVM answer is but an artifact of the question, not an indication of the value of the good at issue.

The typical embedding finding could be explained by respondents taking the individual goods in the group as being close substitutes for each other. Thus, if goods A and B are taken to be substitutes, then a respondent would presumably pay no more for the bundle of the two than for either one; that is, if one is acquired, the second would then be redundant and the combination of A and B would be worth no more than either A or B alone. While such degrees of substitutability may not seem plausible for most of the goods used to test for embedding, this explanation remains a possibility.

Indirect tests of the substitution explanation were provided in the EXXON studies (Hausman 1993). For example, different sub-samples of respondents were asked how much they would be willing to pay to preserve particular designated wilderness areas in the US, given that different numbers of other wilderness areas had been destroyed (Diamond, et al. 1993). If other areas are considered as substitutes for the one being valued, then presumably the WTP would be expected to be larger with the demise of more of the other areas – the fewer there are, the more each remaining one should be worth. The results, however, showed no significant differences in the mean WTP regardless of the numbers of ‘substitute’ areas.

A more direct test (suggested by Diamond, et al. 1993; and put in the form of a more practical test by Daniel Kahneman) is to compare respondents’ WTP

for a bundle of two goods to their WTP for one good, given that the other would be provided free of any payment from them. If the two goods are indeed taken to be substitutes, the respondents should be willing to pay much less for one good because the other good is already available to them without cost. We carried out a modest CVM survey to provide such a test and found that contrary to what would be expected on the basis of the substitution supposition, the mean WTP for neither habitat for a rare local animal or preservation of historic buildings was less than the WTP for the inclusive bundle of both historic buildings and habitat. The perception of substitutes may play some role in valuations, but there appears to be little empirical support for believing that such perceptions may be a plausible explanation for reported cases of embedding.

Rather than economic values, CVM responses seem more likely to be an indication of an attitude or good feeling of moral satisfaction (Kahneman and Ritov 1993; Kahneman and Knetsch 1992a). On present findings, the results of CVM studies do not appear comparable to economic values derived from market exchanges. Consequently, CVM results can provide little or no guide to allocation policies nor a reasonable basis for damage assessments.

CONCLUSIONS

The persistence in continuing to use WTP values to measure losses almost certainly seriously biases assessments and undermines policies based on them. And although CVM studies are almost guaranteed to produce numbers – which may itself be one of the real disadvantages of the methods – these numbers do not appear to be economic values. While the enthusiasm for valuations may never have been stronger, the evidence that we may indeed be getting misleading answers to the wrong question is pervasive.

There is now an occasional nod to such possibilities, as in the indirect confirmation appearing in the recent US National Oceanic and Atmospheric Administration proposed treatment of CVM results:

The proposed [Oil Pollution Act] rule provides that the respondents' stated values be divided by two... This calibration procedure is to 'correct' for the combined effects of two countervailing potential biases: the mandated elicitation of willingness to pay (WTP) measures may understate the correct measure of damages [willingness to accept], whereas the elicitation of hypothetical WTP in contingent valuation studies may overstate 'true' WTP. (NOAA Workshop 1994, p.12)

However, beyond this nearly comical response to CVM failures and inappropriate selection of measure, there has been little accommodation, or even recognition, of the evidence pointing to a need to change current valuation practices. Most practitioners of resource valuations, and eager consumers of their findings, remain in a state of denial – a stance somewhat at variance with the growing

demands for the kind of rational and reasoned responses that evaluations are presumably intended to provide.

For example, the reason that most valuations of environmental losses continue to use CVM to elicit WTP responses, rather than the more appropriate WTA, seems not to be any widespread belief that WTP is the correct measure, nor any empirical evidence of WTP-WTA equivalence. Instead, the choice of WTP measures appears to be simply a response to the inability of contingent valuation studies to elicit meaningful WTA values. A typical justification is:

Many environmentalists have difficulty in envisaging the minimum compensation they would require to compensate them for the loss of a habitat, or that additional income necessary to generate an equivalent utility if a proposed habitat acquisition or gain was not implemented. To avoid these problems welfare change was measured in terms of WTP. (Willis and Garrod 1993, pp.6-7)

Rather than a continuation of present practice, perhaps socially desired interests and objectives might be better served by a more even-handed regard for empirical findings (and spreading research support more in keeping with potentials for positive contributions), and a greater willingness to explore alternatives to current practices.

One strategy that might well be worth some quite serious exploration is to value what can be valued using procedures agreed to be creditable, and to back off from valuations that are, with current methods, not capable of acceptable monetary assessment, and to rely instead on some form of 'interim damage schedule' to guide compensation awards and allocations in such cases. Such a schedule would not need to provide detail for all possible resource or environmental losses, but it could offer sufficient benchmarks to guide assessments of specific losses as they arise.⁵ These benchmarks could be very rough and yet may be widely accepted because they would not be intended to be values but rather guides for compensation and allocation decisions. The evidence from such areas as injury awards for workers compensation claims in various countries, and awards for pain and suffering from Canadian courts, which are based on equally rough guides that also do not pretend to represent actual monetary values, is encouraging. These guides are widely accepted, and they satisfy most of the purposes which awards are intended to serve.

Environmental and resource loss schedules might serve equally well: they could be implemented quickly; they would provide deterrence incentives; they would provide predictable, and therefore insurable, outcomes; they would likely provide widely accepted degrees of restitution; and they would apply equally to all and thereby have greater appeal as being fair.

The design of the schedules – which should be termed interim on grounds that our fairness findings suggest that a permanent designation would be less acceptable – would probably not be without controversy, but might not be that difficult. While there is little agreement on absolute values, there is fairly wide

agreement on relative values, and this may be largely sufficient for this task.

The interim schedules could reflect the large disparity between measures of gains and of losses. They could also take account of recent findings that people's real intertemporal preferences suggest smaller discount rates for future losses than future gains, and for ones that decrease with longer time spans (Hausman 1979; Thaler 1981; Prelec and Loewenstein 1991; and Loewenstein and Prelec 1992). Such schedules might also be sensitive to the differing perceptions which people have of the seriousness of different kinds of risks, which have been to shown to vary with many characteristics other than simply their expected values (Slovic 1987). There are also grounds for encouragement that newer decision analysis and value structuring techniques – unlike CVM – might provide means to reach wide consensus on the needed schedules (see, for example, Edwards and Winterfeldt 1987; Gregory and Kunreuther 1990).

At this point, the notion of a damage schedule seems worthy of at least a portion of the support and attention being given to present resuscitation efforts on less promising approaches.

NOTES

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² Details of this particular study, showing that people are generally unwilling to give up a mug for a chocolate bar or a chocolate bar for a mug, are described in Knetsch (1989).

³ This is not inconsistent with the early experience with economics which Herbert Simon, winner of the Nobel Prize for Economics in 1978, recalls in his autobiography: 'And since my exposure to the economics profession was still rather minimal, I had not acquired the habit, so common in that profession, of ignoring the real world when it contradicts the theory' (1991, p.371).

⁴ Those saying yes, were then asked if they would or would not pay some higher amount.

⁵ A hint of such a proposal is contained in the recent report of the US NOAA Panel report, in their suggestion that 'the federal government should produce standard damage assessments for a few specific reference oil spills...' (1993, p.4609). The origin of this proposal is not clear, but Daniel Kahneman and I have discussed it for some time and he presented some of our conclusions to the Panel at one of their hearings.

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