CHAPTER 5

BEHAVIORAL ECONOMICS AND SUSTAINABLE FOREST MANAGEMENT

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Abstract: Taking account of recent findings that, for example, people value losses more than otherwise commensurate gains, discount future losses at lower rates than future gains, and tend to make choices on the basis of mental accounts, could markedly improve the guidance offered by economic analyses of forest management options. Asymmetrical incentives and restraints facing individuals and organizations favour continued use of earlier views of standard economic assumptions and such evidence is now largely ignored as are issues such as the appropriate choice of measure to use in valuing the various gains and losses being traded off in managing forest lands.

1. INTRODUCTION

Forest management decisions overwhelmingly involve tradeoffs – output A vs. output B, gains to some vs. losses to others, consumption in the near term vs. consumption later. In an effort to make more informed decisions, individuals weigh the alternatives – more formally in benefit-cost analyses, quantification of damages, and impact assessments; and less formally in the ways people think about problems that generate resistance to changes or support for interventions to bring them about.

The analyses of problems, the design of policies to deal with them, and, in particular, the valuations of alternatives are, in practice, based on the dictates of standard economic theory – the assumptions and principles displayed in textbooks and reflected in organization manuals and method and procedural guidelines. However, recent findings from behavior economics research are providing a more informed view of both the principles and assumptions underlying valuations and the values often at issue in resource management decisions. While still largely ignored, these findings offer potentials for better understanding current tradeoffs and greatly improving management decisions.

2. WEIGHING TRADEOFFS

Sustainable forest management calls, in large part, for taking account of a wider array of values and uses in forest land management decisions by paying attention not just to timber production, or even to maintaining timber production at some sustained level into the indefinite future, but to other resource values as well: wildlife habitat, soil conservation, forest foods, water retention, carbon repository, biological diversity, aesthetic qualities, recreational opportunities, employment creation, and sense of place.

However, any moves towards taking account of a wider array of uses and values in management and policy decisions will create more than proportionate demands for tradeoffs among them – increases in some may lead to increases in others, but the eventual rule is one of compromises and tradeoffs. This raises problems of identification and quantification, and of weighing or valuation.

All too often little is known about the joint production functions for multiple uses of forest land, so that identification and quantification of the consequences of alternative management practices is not an easy matter (for example, Nautiyal & Rezende, 1985). Further, many of the costs and benefits stemming from forest land management are non-pecuniary in nature, making comparable valuations more difficult, and in some cases problematic at best.

Many, and probably most, of the issues of sustainability are ones for which economic analyses can provide useful guidance and insight, although some are clearly not the exclusive concern of economics. To the extent that economics has been, and continues to be, used in the analysis of sustainable forest management issues, it is economics of a traditional kind. Analysts, and people writing manuals for the guidance of analysts, continue to be regularly admonished – usually by economists – to follow the maxims of standard economic theory: "A core set of economic assumptions should be used in calculating benefits and costs" (Arrow, et al., 1996, p. 222).; "A failure to satisfy the requirements of economic theory would suggest that the appropriate preferences were not being measured" (Diamond, 1996, p. 346). However well-intentioned, and however appropriate this insistence might be for discouraging some of the more egregious misrepresentations of costs and benefits of management options, these exhortations generally ill-serve the cause of more informed decisions in their implicit dismissal of the wealth of empirical findings from recent, and not so recent, behavior studies.

3. BEHAVIOR ECONOMICS

The award of a share of the 2002 Nobel Prize for Economics to Daniel Kahneman, a psychologist, for "having integrated insights from psychological research into economic science…", is recognition of both the progress made in this sub-field and the potential benefits of the findings. In many cases these findings provide a more realistic view of people's choices and economic behavior than is available from the standard theory that forms the basis for current economic practice and analyses. The often observed differences between behavior findings and standard theory are far more than random deviations from an expected outcome; they are, instead,

systematic and often large. Some are the result of the bounded rationality due to human computational and cognitive limitations, but many – and those of most interest – reflect real preferences that are not well modeled by the axioms of standard theory.

For example, rather than treating their monetary wealth as perfectly fungible, or substitutable between different holdings, people often organize their decisions and choices in terms of separate mental accounts or budgets (Thaler, 1999). Even though they plan to draw on both during their retirement years, they treat investments in their retirement fund differently than they do those in other investment accounts. Another interesting example of the strong motivation provided by mental accounting (Camerer, Babcock, Loewenstein, & Thaler, 1997) is the economically curious, and costly, behavior of New York taxi drivers who quit early on busy days and work longer hours on slow days. The reverse would, of course, allow them to earn more in less time over the year. Rather than the maximizing behavior presumably prescribed by standard theory, the cab drivers appear to set daily income targets and drive until they reach them, even though this results in more unproductive time and less productive time. It also imposes a social cost by having a smaller number of taxis available when demand is high and a larger number when demand is low.

Such mental accounting is likely to give rise to much greater restrictions on people's willingness to substitute and trade off one forest output for another than is anticipated by the postulates of standard theory, or by many forest management proposals. It may also account for at least some of the implied preferences for so-called hard sustainability, a strategy that calls for less substitutability among resource outputs, over a course of soft sustainability which allows for a greater accommodation of substituting gains in the productivity of one resource for losses in the productivity of another.

People also commonly give greater weight to changes that insure certainty, than they do to equal probability changes that do not offer this assurance – the difference between probabilities of 0.99 and 1.00, or between 0.01 and 0.00 are much more important than between, say, 0.45 and 0.46 (Kahneman & Tversky, 1995). While usually not taken into account in traditional risk analysis, or in management decisions, this certainty effect often exerts a strong hold over people's preferences and choices. There is often a great demand for certainty even when certainty is not, nor can it be, on offer, and individuals will go to great lengths to avoid otherwise beneficial actions that carry what are seemingly even the most remote possibilities of downside risks.

4. THE VALUATION OF GAINS AND LOSSES

The divergent views of people's valuation of positive and negative changes probably best exemplifies the difference between the directions and suggestions based on standard theory and those based on the empirical evidence from behavior studies. This valuation disparity is also likely the most important and greatest cause for concern, and is therefore used here to illustrate the potential benefits of a greater acknowledgment and consideration of behavior economic findings.

4.1 Measures of Value

A weighing of alternatives and of gains and losses is at the heart of much of the contribution of economics to policy design and management decisions. To deal with such issues, economists and policy analysts focus much of their attention on how much people are willing to sacrifice to secure gains, to mitigate losses, and to avoid present and future problems. This has led to a fairly vast literature on valuation methods and estimates, and to a continuing supply of numbers for benefit-cost analyses and feasibility studies for all manner of proposals. Much good has come of this, not the least of which is a far wider appreciation that economic values include non-market, or non-pecuniary, as well as market returns – that many environmental and preservation returns are equally of economic value as those from timber production..

However, in much of this activity the choice of the particular measure used to assess the economic value of gains and losses has been largely overlooked in favour of easy assumptions and conformity with what has gone before.

There has long been, and continues to be, general agreement among economic analysts that an action or change is considered to be socially beneficial if the gains to those made better off exceed the losses to those adversely affected. This is normally taken to imply that the sums gainers are willing to pay for the gains are sufficient to compensate the losers for their losses – the common interpretation of the potential-Pareto criterion. Accordingly, economists have suggested that the economic value of gains and losses needs to be assessed with different and particular measures: "benefits are measured by the total number of dollars which prospective gainers would be willing to pay to secure adoption, and losses are measured by the total number of dollars which prospective losers would insist on as the price of adoption" (Michelman, 1967, p. 1214).

While valuations of gains and losses call for different measures, the assumption of standard theory, and consequently of economic practice, is that the maximum sum people would be willing to pay (WTP) to gain an entitlement is, except for a normally trivial difference due to an income effect, equal to the minimum sum they would be willing to accept (WTA) to give it up – "…there is no basis consistent with economic assumptions and empirical income effects for WTP and WTA to exhibit sizable differences" (Diamond, Hausman, Leonard, & Denning 1993, p. 66). This remains the empirical assertion of choice, and is seldom questioned by economic analysts.

The empirical evidence is, of course, sharply at variance with the conventional assumption of equivalence between the WTP and WTA measures of economic value. The findings – which have been reported in *all* of the leading economics journals, and those of related fields, for over two decades – suggest that people value losses from two to over four times more than otherwise fully commensurate gains.

Consistent evidence of this reference, or endowment, effect has come from a wide range of studies: surveys, replicated real exchange experiments, and recordings of the choices made by individuals in non-experimental decisions (reviewed in, for example, Samuelson & Zeckhauser, 1988; Kahneman, Knetsch, & Thaler, 1991; and Rabin, 1998). In one experimental group, for example, individuals were willing to

pay, on average, $5.60 for a 50 percent chance to win $20.When asked to give up the identical chance to win the same $20 prize, however, those *same* individuals demanded an average of $10.87 (Kachelmeier & Shehata, 1992).

Investors making real portfolio choices also demonstrate a greater sensitivity to losses through their reluctance to realize a loss by selling. This reluctance not only leads to smaller volumes of sales of securities that have declined in price relative to those for which prices have increased (Shefrin & Statman, 1985), but to investors earning substantially lower returns because they replace their winning stocks more often than they do ones with current prices below acquisition prices (Odean, 1998).

In another study of people's actual economic behavior, a significant difference was found in their reactions to price changes. As people value losses more than gains, they were also more sensitive to price increases, which impose a loss, than to price decreases, which provide a benefit. This asymmetry was tested for egg purchases, and resulted in a price elasticity of –1.10 for price increases and only – 0.45 for price decreases (Putler, 1992).

In yet another persuasive demonstration of the valuation disparity, employees increased their private retirement savings rates from 3.5 percent to 11.6 percent when their contributions were changed from payments out of current earnings to the less valued foregoing of a portion of future increases in their wages (Thaler & Benartzi, 2004). A number of other studies provide further examples of the difference in people's valuations of gains and losses: in one, participants demonstrated a strong reluctance to give up a default automobile insurance option when an otherwise more attractive choice was available (Johnson, Hershey, Mesaros, & Kunreuther, 1993); in another, people showed a greater sensitivity to losses in judgments of fairness (Kahneman, Knetsch, & Thaler, 1986); and another revealed that stronger legal protection was accorded to losses over foregone gains in judicial choices (Cohen & Knetsch, 1992).

Many other studies have demonstrated that the valuation disparity is pervasive, usually large (though variable depending on the entitlements at issue and the further particulars of the context of the valuation), and not merely the result of income effects, wealth constraints, or transaction costs (for example, Kahneman, Knetsch, & Thaler, 1990; Knetsch, Tang, & Thaler, 2001).[1] The easy assumption of standard theory that "we shall normally expect the results to be so close together that it would not matter which we choose" (Henderson, 1941, p. 121), is clearly contradicted by these results, and those of many other similar studies (Camerer, 2000).

Although some reports have suggested that the difference between valuations of gains and losses diminishes, or even disappears, with repeated trials, the evidence in most of these demonstrations has come from experiments using a second price Vickrey auction. (In a second price Vickrey auction the highest bidder buys at the second highest bid, and the lowest seller sells at the second lowest offer.) Although substituting a ninth price for a second price in a Vickrey auction should have absolutely no effect on people's valuations, the findings of controlled tests showed that it gave rise to large and rapidly widening differences (Knetsch, Tang, & Thaler, 2001). This finding leaves the conclusions from earlier reports of convergence very much in doubt. Other reports that people in the business of trading are less likely to

exhibit endowment effects, at least with respect to buying and selling goods (for example, List, 2003), is not an unexpected result; it says little, however, about the many other instances of an endowment effect on other types of valuations.

Although differences in the evaluation of gains and losses may not be universal, current evidence strongly suggests that it is pervasive among individuals involved in economic activities or weighing the advantages and disadvantages of proposed changes. Field studies of people's real investment and consumption decisions and choices indicate that this is especially likely to be the case for most consumer dealings and for changes that are likely to be the subject of benefit-cost or other forms of policy analyses. These would include, for example, those involving sustainable forest management. Consequently, the common practice of valuing losses of some forest outputs by using the WTP measure is very likely to seriously understate their value – perhaps by one half or less – and thereby distort management choices. This understatement is not that which might result from errors of estimation, but is due entirely to the wrong choice of measure.

4.2 Different Measures and Different Values

The different valuations of gains and losses give rise to four different measures of sacrifice, as indicated by the 2 x 2 array of Figure 5.1.[2]
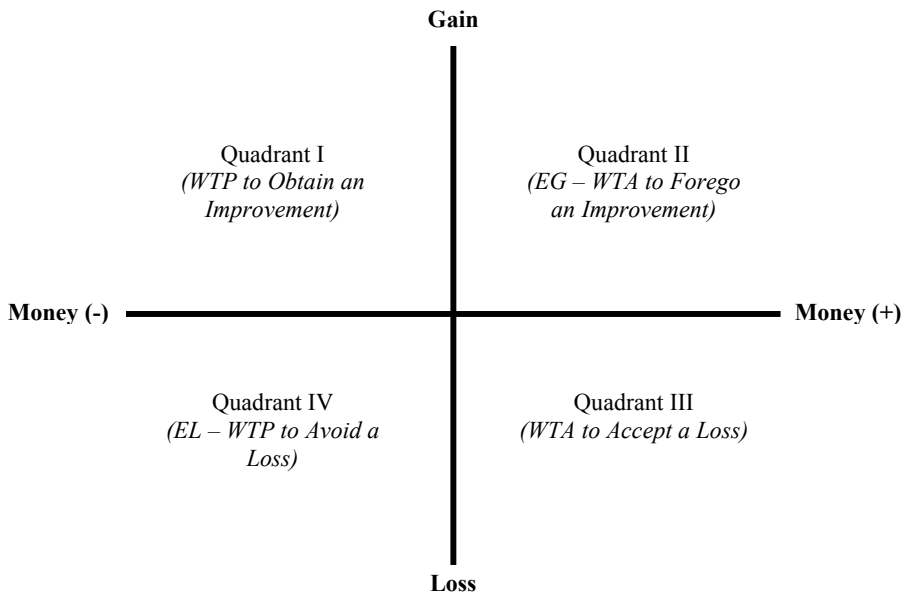

Gain

| Quadrant I
(WTP to Obtain an Improvement) | Quadrant II
(EG – WTA to Forego an Improvement) |

Money (-) ———————————————— **Money (+)**

| Quadrant IV
(EL – WTP to Avoid a Loss) | Quadrant III
(WTA to Accept a Loss) |

Loss

Figure 5.1. *Combinations of Gains and Losses and Differing Valuations.*

The Quadrant I measure is the most an individual would pay to acquire a gain – the WTP measure. The Equivalent Gain (EG) measure of Quadrant II provides a choice between two gains, and values a gain in terms of the sum an individual feels is equivalent to it – the WTA to forego the gain. The Quadrant III measure is the minimum sum a person would demand to accept a loss – the WTA measure of its value. The Equivalent Loss (EL) valuation of Quadrant IV measure assesses the value of a loss in terms of the loss equivalent to it – a measure frequently posed, or framed, as the amount people are willing to pay to avoid a loss.

There are, then, two measures of a gain: (1) the WTP to obtain it, and (2) the EG, or WTA to forego it. Similarly, there are two measures of a loss: (1) the WTA to accept it, and (2) the EL, or WTP to avoid it.

If people's valuations of gains and losses are fully equivalent, as generally prescribed by standard theory and assumed in common practice, then not only would the two gain measures be equal to each other and the two loss measures be equal, but all four measures would yield the same estimates of value[3]. However, rather than being fully equivalent, in many (and likely the vast majority of) cases for which tradeoff rates are estimated or asserted, the tradeoffs and valuations can be expected to vary in a systematic and predictable pattern. As losses of either the entitlement or the numeraire good (usually money) are valued more than gains of the entitlement or money, the WTP measure (Quadrant I) can be expected to yield the smallest valuation (as it involves a *loss* of money to *gain* the entitlement), the WTA measure (Quadrant III) will yield the largest (as it entails *gaining* money and *losing* the entitlement). The Equivalent Gain (Quadrant II) and Equivalent Loss (Quadrant IV) values will be intermediate between the others (Knetsch & Tang, in press).[4]

4.3 The Choice of Measure

A major implication of the valuation disparity evidence is that, given that different valuations will result from the use of different measures, the choice of measure will become an issue of substantial practical importance. Agreements on which measures are appropriate for valuing particular kinds of management or policy outcomes are, however, in short supply – likely due in no small part to the lack of much attention to the disparity issue by economists and the near total absence of interest on the part of public and private agencies and organizations.

The appropriate choice of measure appears to turn on what people regard as the reference state, and the directions of change for both the entitlement and the numeraire good from that position. The choice is akin to the distinction between compensating variation (CV) and equivalent variation (EV) measures of the welfare gains and losses associated with price changes and changes in availability of an entitlement. The CV measures take the initial state, for example before a price change, as the reference state for valuing the change in welfare caused by the change. The EV values the welfare change on the basis of the reference being the position after the change.

The parallel here is that the WTP and WTA measures take the state without the change as the reference positions, and are, therefore, CV measures. The maximum

WTP is the sum that an individual would pay to acquire the entitlement and be left as well off as without the exchange – the amount that would leave the person on the same indifference curve as without the exchange. The minimum WTA is the sum that would fully compensate the individual – the amount that would leave the person on the same indifference curve as if the loss had not been encountered.

In contrast, the EG and EL are EV measures as they are based on a reference that incorporates the change. The EG measure is based on a choice between two gains – two points on an indifference curve indicating an improved level of welfare associated with having gained the entitlement. The reference for the valuation is, therefore, the improved state after the change. The EL measure is given by the choice between two losses – two points on an indifference curve indicating a lower level of welfare brought about by the changed circumstances.

The two measures of the value of gains and the two measures of the value of losses, and the relationship to the reference state, can be summarized in the following array:

Welfare Measure	Implied Reference State	Valuation Measures	
		Gain	Loss
Compensating Variation	Present	WTP to Obtain	WTA to Accept
Equivalent Variation	After Change	EG to Forego	EL to Avoid

It is not just the knowledge of a change that is likely to determine the reference state from which valuations are made. It is the expected state, or norm, that is likely to be the determining factor. If people regard their current position, or expectations, as the reference, the WTA measure of losses is needed. The EL measure of a loss – the WTP to Avoid – is correct only if their reference welfare level is that of the changed state. The value of gains is measured by people's WTP if their reference is pre-change, and is aptly assessed with the EG measure – the WTA to Forego – only if their reference is the changed circumstance.

It is often suggested that the alternative measures here being distinguished on the basis of the reference state, are mostly determined as a matter of extant legal entitlements. However, the preferred choice appears instead to depend on what people regard as the appropriate basis for judging the consequences of a change. This seems unlikely to be determined by legal rights, as these are about other issues reflecting not only efficiency, equity, fairness, and other justice goals, but also asymmetries in avoidance costs and costs of enforcement, compliance, and transfer of original entitlements. The choice of measure is about choosing a metric that best reflects actual changes in economic welfare resulting from particular changes in entitlements.

Rather than being determined by legal entitlements, discriminating between the CV and EV measures of gains and losses, and the appropriate choice of measure, may more usefully be determined by what Zerbe (2001) refers to as "psychological ownership" (p. 20). While not an entirely operational definition, the determining

reference state may be one reflected in what people regard as the expected or normal state (Kahneman & Miller, 1986), a differentiation similar to the good neighbour test of what is acceptable or unacceptable behavior (Ellickson, 1973), and the harm/benefit test for legal liability. As Kahneman and Miller suggest, an out of the ordinary event commonly prompts a question of what or how, whereas continuation of the norm would not. Changes assessed from the original, expected, reference state appear likely to call for CV measures; changes that bring about a post-change reference state would call for EV measures.

The common practice of, for example, determining the "value of damages to health (both morbidity and mortality) due to air pollution" on measurement of people's "willingness to pay to avoid such effects" (Alberini & Krupnick, 2000, p. 37), would seem to be justified only on a showing that people regard suffering health damages due to human-caused pollution as being the normal or reference state. In this case, and in many others for which this EL (Quadrant IV, WTP to Avoid) measure is used, this seems unlikely to be an easy task.

Determination of the reference state is also needed to discriminate between gains and reductions in losses, and between losses and foregone gains. While it is common to treat all positive changes as gains, and measured as such, mitigation of losses and reductions in the risk of loss are more appropriately assessed by the "individual's willingness to accept compensation to tolerate a loss" (Pearce & Seccombe-Hett, 2000, p. 1420). For example, the widely cited value of life study based on "asking over 3,000 members of the general public" (Cropper, Aydede, & Portney, 1994, p. 244), takes the saving of future lives as a future gain, thereby necessarily assuming that people's reference state for valuing premature deaths is one of "exposure to a pollutant, often a cancer-causing one" (p. 243). However, the reference state for such a change seems far more likely to instead be that of being free of such death causing pollution, suggesting that the change is more realistically framed as reducing a loss, and best valued in terms of the WTA needed to put up with this less-than-normal condition.

Determining the appropriate reference state appears to be largely an empirical matter of which state is likely to best describe people's feeling about changes. Although the reference state will often be the status quo, in important cases it may not be: soiled foreshores may be the reality after a marine oil spill, but most people in the area would no doubt regard unspoiled shores as the norm. This would then be the reference for their subjective reactions and valuations of both the loss caused by the spill and the benefit of cleanup activities. As Kahneman and Miller (1986) suggest, a spill would be considered out of the ordinary and would prompt questions of why and how it happened. Another day without a spill would not be out of the ordinary; it would be considered the norm and people would be in no need of an explanation of how it came about. The reference state in this case is the absence of the spill. The loss of welfare resulting from the change would therefore best be measured by the compensation required to retain the level enjoyed in the reference state level, the CV measure of the WTA.

While what most people regard as a reference state is an empirical matter, most changes that are likely to be subject to any form of weighing or valuation appear to

call for the CV measures: the WTP for gains, and WTA for losses. This may be most apparent in cases such as oil spills and sudden discharges of toxic wastes, although it appears likely that people would also weigh the loss of wildlife habitat or water quality or any number of other consequences on a similar basis, as changes from a reference state exclusive of the adverse change. This may not be conclusive, but it does suggest a broad presumption in favour of CV over EV measures.[5]

To the extent that the present reference state is the dominant case, then resource losses and damages will generally need to be assessed in terms of the WTA measure, and not by the amounts people are willing to pay to avoid a loss. While people's being willing or not willing to pay to avoid a loss is a common framing of policy debates, it can also be a very misleading one – posing an issue as an EV test such as "whether it is possible for the losers to bribe the gainers to obtain their consent to forgo the proposed policy change" (Freeman, 2003, p. 62), may not be completely compatible with most people's intuitions about the appropriate reference state and measure.

The distinction between a change being in the domain of losses, for which the WTA is the better measure, or being in the domain of gains (gains and foregone gains), for which the WTP is the better measure, points again to the critical importance of determining the reference state appropriate to the specific valuation at hand. A presumption of most people's reference being one for which most resource changes, or at least those of much concern, appear to fall in the domain of losses, is supported by what seems to be wide agreement with suggestions such as, "The benefits derived from pollution control are the damages prevented" (Tietenberg, 1996, p. 71). To the extent that this is the case, the value is then measured by the compensation people require to be left with no pollution control. Loss of scenic amenities, wildlife habitat and others associated with particular forms of forest harvest, and management generally, would be assessed similarly.

5. DISCOUNTING FUTURE GAINS AND LOSSES

The implications of the behavior findings of gain-loss valuation disparities extend to future outcomes as well as present ones. It is generally understood that gains and losses that occur in the future are worth less than commensurate present outcomes – $100 now is worth more than $100 a year from now. Apart from important questions involving intergenerational comparisons, which seems to be far more than a simple discounting issue, it is generally agreed that intertemporal outcomes can be made comparable by discounting to a common time. In practice, a single rate is taken to reflect people's time preferences, or tradeoffs, for evaluating both future gains and future losses.

While the evidence of some particular patterns of time preferences is a good deal weaker than on others, it does seem clear that people do not use a single rate to discount the value of all future outcomes. Specifically, people discount the value of future losses at a lower rate than they use to discount the value of future gains.

This difference in rates appears to be a predictable extension of the more general findings that individuals commonly value losses more than commensurate gains

(Donkers, Gregory, & Knetsch, in process). Just as people are willing to pay less for a gain than they demand to accept a loss, they can be expected to be willing to pay less for a *future* gain than they require to accept a *future* loss. The present value of a future gain is, of course, the sum that an individual is willing to pay now. Similarly, the present value of a future loss is the sum demanded now. The smaller present value of future gains implies that individuals use a higher rate to discount them, and the larger present value of future losses implies they use a lower rate to discount such future outcomes. Clear empirical demonstrations of such differences are not yet plentiful, but the reported evidence that is available appears to be fully consistent with this interpretation (for example, Loewenstein, 1988; Donkers, Gregory, & Knetsch, in process).

The likelihood that different measures would give rise to different discount rates raises again the issue of choosing an appropriate measure. And again, the criteria remain much the same: the choice depends on the reference state people use to value future outcomes. As in the case of present gains and losses, the use of rates based on how much people would pay to reduce the risks of a future harm, for example, or how much they would demand to forego a future gain, would call for a showing that these equivalent variation measures were justified. Casual observation suggests that quite the opposite is more likely to be the case; the compensating variation WTA and WTP measures appear to be the rule rather than the exception. Here again, knowledge that a future loss is likely to occur does not necessarily change the reference state, it is likely to be viewed as a loss from the current state regardless of any forewarning.

Given that many consequences of management, policy, and project options extend over lengthy time periods, the current practice of using a single rate for discounting gains and losses may very well provide quite distorted views of people's preferences. Taking account of the evidence of differing discount rates would point to quite different policy responses. Rates reflecting observed preferences would, for example, give more, and probably much more, weight to future losses, and justify greater present sacrifices to deal with them, than would be the case following normal present practice. The difference in rates would also likely call for more actions that reduce the risks of future losses (as the lower rates would indicate larger present values) relative to ones that provide future gains (as these are discounted at a higher rate).

6. CONCLUDING COMMENTS

As a result of extensive empirical studies, it is becoming increasingly clear that most economic analyses of resource issues, including those that guide forest management and policy decisions, could be markedly improved by including the insights from the findings of behavior economics. While this is likely the case for a wide range of topics, it seems particularly true of resource valuations, where present exercises based on the conventional assumptions of standard theory seem likely to provide very flawed guidance.

While the empirical results from behavior studies suggest many opportunities to greatly increase the explanatory power and usefulness of economics, the potentials for improvement remain largely unrealized. There is probably no single explanation for the tenacious grip that standard theory has over how economics is done, but the asymmetric incentives and restraints facing individuals and organizations may be at least a partial explanation. Continued use of the accepted and conventional carries fewer risks to careers and support than departures, and the textbook writer's explanation for ignoring behavior findings was undoubtedly correct: "If I put this in my books, no one would adopt them".

NOTES

[1] Hanemann (1991) has correctly pointed out that standard theory can, under particular conditions, allow for a large difference in gain and loss values for an identical entitlement. These include a positive income effect and a lack of substitutes for the good at issue. However, large differences have been observed under conditions that violate those required for this standard theory explanation. The endowment effect is, as Hanemann notes, "a different phenomenon" (1991, p. 645n), but it seems to be a far more general explanation for the observed pervasive differences than the narrow possibilities offered by standard theory.

[2] There may well be other differences depending on other valuation contexts, but only those related to the differing valuations of gains and losses are considered here.

[3] Absent an income, or wealth, effect, which for most cases can be safely ignored.

[4] Bateman, et al. (1997) provide an example of the expected pattern of different valuations for present gains and losses: the proportions of people preferring four tins of Cola to £0.80 was 40 percent, 74 percent, 84 percent, and 50 percent for the four quadrants, I through IV, respectively. Another example, for three of the measures, is the report that people were willing to pay $2.00 to buy a mug, $7.00 to give one up, and chose receiving $3.50 as equivalent to gaining a mug (Kahneman, Knetsch, & Thaler, 1990).

[5] Most policy analyses appear to be consistent with this position, "The CV measure is generally the standard for benefit-cost analysis" (Zerbe, 2001, p. 7n).

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