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## ASSUMPTIONS, BEHAVIOURAL FINDINGS AND APPLIED ECONOMICS\*

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Much of applied economics is based on a series of behavioural assumptions and various principles derived from them. Some provide useful insights and reasonable predictions. However, the findings from numerous experiments and other behavioural studies suggest that many other conventional assertions provide neither a very good description of people's preferences nor very useful predictions of their reactions to real choices.

Although these differences between assumed and observed behaviour can have substantial implications for the analysis of a wide range of economic issues, conventional practice continues much as before. There is seldom any reckoning, or even acknowledgement, of these contrary findings. Differences in the areas of risk perception, time preferences, and the weighing of gains relative to losses are illustrative of the issue and of the continuing propensity to choose assumptions with lesser material support over propositions with greater empirical backing.

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### Risk Perceptions

One notable area in which behavioural findings are at variance with common economic analysis practice is with respect to the presumed seriousness of different risks. Normal conventions are to assume that people are usually risk averse and that the importance of a risk of an adverse event is solely a function of its expected loss -- the magnitude of the loss multiplied by the probability of its occurrence. Actions that impose risks with greater expected losses are assumed to be more aversive than ones that involve smaller expected costs, and efficiency is therefore best served by making allocation decisions accordingly.

While individuals are indeed commonly risk averse in the domain of gains, they have frequently been found to be risk seeking in the domain of losses (Kahneman and Tversky, 1979). Such behaviour is easily demonstrated by asking a group of people to choose between the certain loss of, say, \$80 and an 80 per cent chance of losing \$100. Even though individuals overwhelmingly choose a certain outcome in the domain of gains -- the usual textbook demonstration of risk aversion -- when the same payoffs are posed as costs, most people indicate a preference for the chance to avoid a loss.

Further, in contrast to the almost singular focus on expected losses, people's actual aversion to uncertain outcomes has been found to vary greatly depending on the nature of the risk and the particular circumstances of their exposure. This gives rise, for example, to findings of low correlations between the rankings of the perceived seriousness of a list of different risks by a random sample of individuals and those by "experts" presumably familiar

with the probable outcomes of these activities. These and other studies clearly show that other attributes of risk are important to people in addition to the simple expected loss considered in most risk analyses and allocation decisions, (Slovic, 1987).

The findings indicate, for instance, that most people react far more negatively to a risk imposed on them by others than to an otherwise identical risk that they assume voluntarily. Further, people are willing to sacrifice much less to avoid a risk over which they feel they have some control than they are to ones with equal expected value over which they feel a lack of influence. They are also much more averse to risks that have more unknown effects, are less familiar, and have delayed outcomes, than they are to more familiar ones with more immediate results.

The negative impacts of risks from the location of a new toxic waste treatment plant are not likely to be fully captured by calculations of expected consequences. Nor are anxieties and resistance from area residents likely to be mollified by favourable comparisons to risks from the use of their automobiles. The attributes of risks associated with a disposal facility -- new, unknown, involuntarily imposed, possibly having delayed consequences, not readily observable, inequitably shared, and potentially catastrophic -- all increase dread and adverse reactions. The nature of risks of further use of automobiles -- old and familiar, readily observable, voluntarily assumed, controllable by individuals themselves, and of limited impact -- are much less aversive.

Risks of hazardous activities have widely varying characteristics that give rise to very different assessments of their

seriousness. A small probability, and therefore small expected value, of an outcome which is the cause of serious worry to people does not necessarily reduce the cost of assuming such a risk to trivial importance. Significant real welfare changes may result which are not dismissible as only due to irrationality and lack of understanding. Therefore, an accounting of the welfare impacts associated with risky activities and events that is based on calculations of expected losses alone is likely to be a poor indicator of actual costs and to distort resource allocation and policy decisions.

#### Time Preferences and Discounting

Another, related, area in which behavioural findings differ from assumptions of conventional practice, is in the accounting of intertemporal preferences. The major applied problem involves the appropriate weighing of consequences that take place at different times. Standard analyses call for discounting the importance of future costs and benefits with uniform positive discount rates. Even though determination of the specific rate to use is a subject of continuing dispute, the convention is not.

Traditional discounting may be "relatively easy to accept, at least when presented in a transparent formal context," (Prelec and Loewenstein, 1991, p. 770). However, it increasingly seems that such accountings of time preferences may not accurately reflect people's actual intertemporal choices for a wide range of important comparisons.

People have been found, for example, to have vastly different discount rates for short and long periods; "the difference between

today and tomorrow will seem greater than the difference between a year from now and a year plus one day," (Thaler, 1981, p.205). Similarly, contrary to the requirements of conventional exponential discount rates, this common difference effect is evident when, "a person who is indifferent, say, between \$20 today and \$25 in one month will most likely prefer \$25 in eleven months to \$20 in ten," (Prelec and Loewenstein, 1991, p. 773). Time preferences commonly also vary with the size of the stake. And, importantly, future losses are usually discounted at significantly lower rates than future gains (Thaler, 1981; Loewenstein and Prelec, 1992).

Further, in other studies people have indicated strong preferences for increasing wage profiles over their careers, even though they could reap greater monetary rewards with a declining trend (Kahneman and Thaler, 1991). Individuals also choose sequences of events that are inconsistent with the usual present value calculus; they prefer, for instance, to put off desired happenings and get undesired ones over quickly (Loewenstein and Prelec, 1991).

Such indications of time preferences may be inconsistent with the usual practice of discounting, but they reflect preferences over a wide range of choices. For example, people's demands for reforestation efforts surely demonstrate valuations that are not captured by the usual view of discounting. It may be, as many contend, that people do not appreciate the low rates of return to such investments relative to what could be earned in some more lucrative alternative; but an explanation at least as plausible as that of such innumeracy is that other attributes of delayed consequences are important.

These same inclinations may more accurately characterize the time preferences that appear to motivate reactions to prospects of global climate change and long term storage of hazardous materials. Nearly any conventional positive discount rate would preclude an easy economic justification of precautionary efforts in such cases. However, in spite of this, people repeatedly demonstrate support for making such expenditures. In part, this seems due to the often greater aversion to a dreaded event if it is long delayed rather than more immediate -- a finding consistent with risk perception studies. However, to the extent that people have low, or even negative, discount rates for such events, this calls for far greater preventive actions than are indicated by the usual calculations of discounted future costs and benefits.

It is now evident that the importance of future events varies depending on individual characteristics of the event. Rather than a single rate, differing accountings may be necessary to capture the actual present value of future outcomes.

#### The Valuation Disparity

A further, and perhaps more pervasive and well known, behavioural finding which runs counter to current applied economic practice, is that people commonly attach greater weight to losses than to commensurate gains. The usual working assumption is that the valuations of gains and losses are for all practical purposes equivalent -- that "according to utility theory, the amount subjects would be willing to pay to clean up a site should be the same as the compensation they would be willing to accept to allow someone to pollute the site (apart from a minor income effect)"

(Phillips and Zeckhauser, 1989, p.527). The assumption that people feel the same about the willingness to pay for a gain and the compensation demanded to accept a loss has long been a staple of economic practice and policy analyses. No reckoning of any difference is made or thought to be necessary. As a result, the more conveniently measured willingness-to-pay has become the measure of choice for both gains and losses.

There is, however, little data to support this traditional view of equivalence or the presumption that willingness-to-pay measures adequately assess the value of losses. Instead, the empirical evidence from many controlled tests consistently shows that losses matter much more to people than gains, and that reductions in losses are more valuable than foregone gains (Knetsch and Sinden, 1984; Kahneman, Knetsch and Thaler, 1991). These differences have been shown to be independent of transaction costs, repetition of trade offers, income effects or wealth constraints (Kahneman, Knetsch and Thaler, 1990).

An example of the difference is provided by the results of a simple experiment in which people were offered a choice between two commonly traded goods.<sup>1</sup> Each individual in one group was given a coffee mug and was then offered a ball point pen (plus five cents<sup>2</sup>) in exchange for their mug. Each participant in a second group was offered the opposite choice: having first

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1. Further details of this test are in Knetsch (1992a).

2. The inclusion of the five cents in each of the offers essentially precluded indifference as the reason for the observed reluctance to trade.



received a pen, each was then offered a mug (plus five cents) in exchange for giving up their pen. All individuals in both groups had exactly the same choice: they could end up with a coffee mug or a pen.

Conventional assumptions suggest that the evaluation of a mug relative to a pen should be the same whether the choice is in the form of giving up a mug for a pen or a pen for a mug -- "since a receipt foregone of a given amount is the equivalent of a payment of the same amount" (Coase, 1960, p.7). The resulting strong prediction that the relative numbers of individuals preferring mugs to pens in the two groups should be roughly equal was strongly contradicted. The numbers varied widely and systematically with the reference point of the individuals.

Group	Proportions Choosing	
	Mug	Pen
1 Give up Mug for Pen	88 per cent	12 per cent
2 Give up Pen for Mug	10 per cent	90 per cent

Both goods were more highly valued when viewed as a potential loss, and worth less when considered as a possible gain.<sup>3</sup>

People have now repeatedly been shown to exhibit similar disparities between their valuations of gains and losses -- not only in experimental settings, as reported by many investigators using a variety of methods to evaluate widely varied assets, but in people's actual behaviour in making everyday choices. Frey and Pommerehne (1987), for example, note that collective endowment ef-

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 3. While this experiment showed strong valuation disparities between subjects, similar differences within subjects have been shown by Kachelmeier and Shehata (1992).

facts clearly motivate many public efforts to protect groups against losses. This is exemplified by restrictions which countries impose on the export of national art treasures and the notable ease of raising funds to prevent the loss of such objects relative to the difficulty of securing similar support when "undertaken in order to buy some art object deemed worthwhile by art experts" (p. 474). The valuation disparity, and the consequent reluctance to sell at a loss, has also been evident in the greater volume of house sales when prices are rising, over the number when they are falling. It is similarly apparent in the smaller volume of sales of securities that have declined in price relative to those for which prices have increased (Shefrin and Statman, 1985). Firms frequently are reluctant to divest themselves of plants and product lines, even though they would not consider buying these same assets, and stock prices often rise when they do give them up.

Another illustration of the differing valuations of gains and losses was given by automobile owners in the U.S. states of New Jersey and Pennsylvania who had a similar choice between a cheaper insurance policy with restrictions on recovery of damages, and a more expensive policy with fewer limitations. In spite of the large difference in premium cost and the ease of choosing, overwhelming proportions of owners in each state chose the default option rather than give it up for the alternative even though the cheaper policy was the default in New Jersey and the alternative more expensive policy was the default in Pennsylvania (Meszaros,

et.al. 1991).

### Behavioural Findings and Applied Economics

The results of many of these behavioural studies have demonstrated that some often-used conventional assumptions are very likely to be systematically wrong. While these findings have not proved to be popular with economic practitioners, they are very much in accord with the intuitions of most other people. A better understanding of preferences and economic motivations might therefore provide a more reasonable basis for predicting behaviour and making choices more consistent with community welfare.

It may be, for example, that the added resources necessary to reduce risks from chemical discharges to minute levels could be put to an attractive alternative use, but an understanding that people's aversion to such risks is due to factors beyond the estimated expected loss might lead to more acceptable mitigation proposals or other accommodation. Similarly, assessments that more closely mirror people's time preferences may justify patterns of forestry practices more consistent with the long term interests of the community.

Judgments of what actions people regard as fair and acceptable or as unfair and unacceptable are also far more in keeping with the behavioural findings, than they are with traditional assertions of economic motivation. Consistent with the findings of pervasive valuation disparities, for example, survey and experi-

mental studies have found that actions which impose losses on particular parties or groups are widely regarded as being more onerous and therefore more unfair than ones which result in foregoing gains (Kahneman, Knetsch and Thaler, 1986a and 1986b; Shiller, Boycko and Korobov, 1991). For instance, cutting wages of workers was viewed as an imposition of a loss and was judged to be unfair, but reducing employees' yearly bonuses by the same amount was seen to be fair. The difference was that the latter option was framed as a less serious foregone gain.

The evidence suggests that it is usually seen as unfair for one party to benefit at the expense of another. However, anything that interrupts this "zero-sum game" greatly mitigates the harsh judgment. For example, raising the price of an item in scarce supply was considered unfair, but donating the added profit from the price increase to charity dramatically changed people's verdicts. Similarly, cutting wages of an employee or raising the rent of a sitting tenant was judged unfair, but giving a new worker lower wages or charging more rent to a new tenant was acceptable. Further, raising prices in response to changes in market demand was considered unfair, but raising prices to account for cost increases was viewed as fair. This was another important case of one person not gaining at the expense of another.

Similar disparate views of losses and foregone gains may also influence the acceptability of alternative negotiation and conflict resolution proposals. Early results from current studies suggest that judgments of acceptance are far more sensitive to

direct costs than they are to opportunities foregone (Borges, 1992). This is again consistent with the greater importance accorded to losses. This and other behavioural findings offer encouraging promise of greater understanding of the characteristics that make proposals for resolving conflicts more acceptable. Offers might then be better designed to be more sensitive to people's real, and not just assumed, concerns.

The behavioural observations also call into question several of the usual economic axioms of preference orderings that are presumed to provide major support for much of contemporary demand theory and a good portion of economic analysis generally. Preferences 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, is clearly inconsistent with dominance, independence and completeness criteria. Similarly, people violate transitivity by preferring A over B when asked to give up A for B, preferring not to give up B for C, and yet preferring not to give up C to acquire A (Knetsch, 1992b).

Similarly, the assumption that indifference curves are reversible, that the rate at which people will substitute 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. People would then demand greater compensation to give up a good than they would be willing to pay to acquire it,

thus compromising the reversibility of the trade-off functions. Such nonreversible indifference curves have been demonstrated for a variety of routinely traded goods, and this non-reciprocal relationship might be expected to be a common to many others (Knetsch, 1989 and 1992a).

The seemingly pervasive influence of having or not having an entitlement on the value people place on the right<sup>4</sup> also undermines the primary prediction of the Coase Theorem. Even in the absence of transaction costs, voluntary exchanges will not necessarily assure that final arrangements of entitlements will be efficient and independent of initial assignments -- as a receipt foregone is often not treated the same as a payment of the same amount (Kahneman, Knetsch and Thaler, 1990). Policies designed on the basis of the Coase Theorem may or may not be desirable, but their justification will likely need to be on other grounds.

If the reported differences in people's valuation of gains and losses represent the general case, then not only will the usual assumption of equivalence between gains and losses lead to poor predictions of people's behaviour, but assessments of losses based on willingness-to-pay measures will result in serious understatements. Further, activities with negative environmental impacts will be unduly encouraged as the true adverse impacts will be understated; compensation and damage awards will be under as-

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4. This is not to suggest that ownership necessarily defines the reference point that people use in determining gains and losses. This may frequently be the case, but in many others the reference point will depend on other factors (Knetsch, 1990).

essed; inappropriately lax standards of protection against injuries will be set as, again in this case, the added costs of further harms will be heavily biased toward under assessment; inadequate mitigation measures will be undertaken as the benefits of preventing further losses will be incorrectly measured; choices of preferred legal entitlements will be biased because comparisons between the efficiency of alternative allocations will be based on incorrect measures; and too few resources will be devoted to avoiding injuries (Knetsch, 1990).

An illustrative example of a likely bias toward inefficient policies resulting from failure to take a more realistic account of people's preferences is provided by the choice of compensation payments over mitigation measures as a preferred remedy for harms. The usual economic critique and prescription presumes that people should favour money compensation, which permits injured parties to substitute other goods for the loss, over mitigation measures that eliminate or reduce the injuries. The reasoning turns on the well-known textbook presumption that a monetary award will yield greater welfare gains than an equal sum in the form of a particular good -- the usual demonstration allegedly showing the superiority of money over housing allowances or food vouchers.

However, the behavioural findings suggest that mitigation measures might be valued more because they reduce losses, and compensation awards might be heavily discounted by people because they fall in the domain of gains. Further, fairness results sug-

gest that tying a relief action to the injury, as in the case of passing on costs, greatly increases the acceptability of a remedy. The available empirical tests are consistent with these findings and show that people often prefer mitigation over compensation remedies (Zeiss and Atwater, 1987; Knetsch, 1990).

The findings of pervasive valuation disparities, risk perceptions and fairness criteria that seem to give rise to them, suggest that more attention to remedies may well be in order. The often proclaimed directive to use money to "pay off the losers" as a means of "making them whole," and to eliminate opposition to various development projects and activities, seems to be an expensive and ineffective remedy. Remedies better tailored to the perceived dimensions of particular losses are likely to be more effective and efficient than approaches formulated on the basis of more traditional behavioural assumptions. As in the case of risk perception, this might take the form of determining what attributes, or dimensions, of gains and losses people view as being affected by an actual or anticipated change, and designing remedies to more closely offset the adverse impact on these attributes (Gregory, et.al., 1990).

#### Persistent Conventions

The evidence of behaviour differing from that assumed in most applied economic analyses reviewed above, does not represent isolated instances or simply, unimportant anomalies. As Slovic and Lichtenstein observed a decade ago with respect to the evidence of



preference reversals, "reversals can be seen not as an isolated phenomenon, but as one of a broad class of findings that demonstrate violations of preference models due to the strong dependence of choice and preference upon information processing considerations" (1983, p. 597). Further studies have but added to this impression, and the examples of the likely inefficient and less acceptable choices that follow from conventional economic assumptions may be but illustrative of a broad class of policy choices that might well be materially improved by greater attention to the evidence of people's actual preferences.

While the findings that economic behaviour is often seriously at variance with preference and choice assumptions on which conventional analyses are based, there has yet been little accommodation, or even recognition, of these results. Textbooks, for example, continue to pass along traditional behavioural assertions without questions raised by the inconsistent empirical evidence. This is curious, given the large number of reports of such evidence that have regularly appeared, including ones in the most respected and prestigious journals in the field, and the large social costs that are likely resulting from continuing to disregard the possibilities for improvement.

One explanation for this persistence is predicted by the behavioural findings that people characteristically resist giving up present holdings. As Oliver Wendell Holmes, the American jurist, put it nearly a century ago, "A thing which you have enjoyed and

used as your own for a long time, whether property or an opinion, takes root in your being and cannot be torn away without your resenting the act and trying to defend yourself, however you came by it" (1897, p.477).

A second explanation is surely the incentives favouring adherence to common and accepted practice and avoidance of departures provided which are provided by existing professional and other rewards. The predictable consequences are little questioning of conventional assertions and little restraint on the continued use of inappropriate practice as long as others follow similar paths.

While these incentives remain, and while the present inordinate burdens are placed on those providing contrary evidence, little change in practice should be expected. This bias towards the status quo likely comes, however, with appreciable social costs of less efficient and equitable choices.

#### References

- Borges, B., (1992), "Loss Aversion and Community Standards of Fairness: The Role of Costs in Exchange Negotiations", Unpublished MBA Thesis, Simon Fraser University.
- Coase, R.N., (1960), "The Problem of Social Cost," Journal of Law and Economics, 3:1-44.
- Frey, Bruno, and Werner W. Pommerehne, (1987), "International Trade in Art: Attitudes and Behaviour", Rivista Internazionale di Scienze Economiche e Commerciali, 34:465-486.
- Gregory, R., H. Kunreuther, D. Easterling, and K. Richards, (1990), "Incentive Policies to Site Hazardous Waste Facilities", Decision Research and University of Pennsylvania Working Paper.

Holmes, O.W., (1897), "The Path of the Law," Harvard Law Review, 10:457.

Kachelmeier, S.J. and M. Shehata, (1992), "Examining Risk Preferences Under High Monetary Incentives: Experimental Evidence from the People's Republic of China," The American Economic Review, 82:1120-1141

Kahneman, Daniel, Jack L. Knetsch and Richard Thaler, (1986a), "Fairness as a Constraint on Profit Seeking: Entitlements in the Market", The American Economic Review, 76:728-741.

Kahneman, Daniel, Jack L. Knetsch and Richard H. Thaler, (1986b), "Fairness and the Assumptions of Economics," Journal of Business, 59:S285-S300.

Kahneman, Daniel, Jack L. Knetsch and Richard Thaler, (1990), "Experimental Tests of the Endowment Effect and the Coase Theorem", Journal of Political Economy, 98:1325-48.

Kahneman, Daniel, Jack L. Knetsch and Richard H. Thaler, (1991), "The Endowment Effect, Loss Aversion, and Status Quo Bias", Journal of Economics Perspectives, 5:193-206.

Kahneman, Daniel, and Richard H. Thaler, (1991), "Economic Analysis and the Psychology of Utility: Applications to Compensations Policy", American Economic Review, 81:341-346.

Kahneman, Daniel, and Amos Tversky, (1979), "Prospect Theory: An Analysis of Decisions Under Risk," Econometrica, 47:263-91.

Knetsch, J.L., (1989), "The Endowment Effect and Evidence of Non-reversible Indifference Curves," The American Economic Review, 79:1277-84.

Knetsch, J.L., (1990), "Environmental Policy Implications of Disparities Between Willingness to Pay and Compensation Demanded Measures of Values," Journal of Environmental Economics and Management, 18:227-237.

Knetsch, J.L., (1992a), "Preferences and Nonreversibility of Indifference Curves," Journal of Economic Behavior and Organization, 17:131-139.

Knetsch, J.L., (1992b), "Asymmetric Valuation of Gains and Losses and Preference Order Assumptions," Simon Fraser University Working Paper.

Knetsch, J.L., and J.A., (1984), "Willingness to Pay and Compensation Demanded: Experimental Evidence of an Unexpected Disparity in

Measures of Value," The Quarterly Journal of Economics, 99:507-521.

Loewenstein, G. and D. Prelec, (1991), "Negative Time Preferences", American Economic Review, 81:347-352.

Loewenstein, G. and D. Prelec, (1992), "Anomalies in Intertemporal Choice: Evidence and An Interpretation," The Quarterly Journal of Economics, 107:573-597.

Meszaros, J., E. Johnson, J. Hershey, H. Kunreuther, and P. Polittser, (1991), "Framing, Loss Aversion and Insurance Decisions", Working Paper, The Wharton School, The University of Pennsylvania.

Phillips, Carl V., and Richard J. Zeckhauser, (1989), "Contingent Valuation of Damage to Natural Resources: How Accurate? How Appropriate?", Toxics Law Reporter, 520-529.

Prelec, Drazen, and George Loewenstein, (1991), "Decision Making Over Time and Under Uncertainty: A Common Approach," Management Science, 37:770-786.

Shefrin and Statman, (1985), "The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence", Journal of Finance, 40:777-790.

Slovic, Paul, (1987), "Perception of Risk", Science, 236:280-285.

Slovic, Paul, and Sarah Lichtenstein, (1983), "Preference Reversals: A Broader Perspective," American Economic Review, 83:596-605

Shiller, R.J., M. Boycko and V. Korobov, (1991), "Popular Attitudes Towards Free Markets: The Soviet Union and the United States Compared", American Economic Review.

Thaler, R.H., (1981), "Some Empirical Evidence on Dynamic Inconsistency," Economic Letters, 8:201-207.

Zeiss, C., and J. Atwater, (1987), "Waste Facilities in Residential Communities: Impacts and Acceptance," Journal of Urban Planning Development, 113:19-34.