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The Divergence Between Willingness-To-Pay and Willingness-To-Accept
Measures of Value

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ABSTRACT

Do people value commodities more when they own the commodities than when they do not? Although economic models generally presume that economic agents evaluate commodities independently of whether the agents own those commodities or not, an assumption that we term the "basic independence" assumption, researchers in economics and law are starting to doubt that this is true. These doubts about the soundness of the basic independence assumption challenge accepted economic doctrine. Most theoretical and applied models in economics use the basic independence assumption both to predict and assess the operation of markets. And in the relatively new discipline of law and economics, the basic independence assumption produces the Coase Theorem, which is the starting point for much economic analysis of legal rules.

In this paper we present, organize, and critique the modern evidence on the basic independence assumption so as to draw together the learning of the economists and the lawyers. We will first investigate the evidence on the divergence between willingness-to-accept and willingness-to-pay measures of value, and then ask about possible explanations for the evidence. Next, we will explore the implications of the divergence for analysis in law and economics. Last, we will show that although the divergence between willingness-to-accept and willingness-to-pay measures of value may entail substantially limiting the role of cost-benefit analysis, we cannot precisely map those limits without answering some difficult questions about the source of the disparity between willingness-to-accept and willingness-to-pay.

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PROLOGUE

In 1975, I (Matthew Spitzer) attended Professor Robert Ellickson's class on Real Estate Transactions at the University of Southern California Law Center. Early in the semester Professor Ellickson turned to the class and asked us all the following question. "For how little would you be willing to sell your casebook from first year Torts class? Not just any copy of that text, but the one in which you put your own marginal notes and underlining." He elicited the answers from us. Then Professor Ellickson asked, "Now, assume that you lost your book, that it was turned into the lost and found, and that the applicable rules about finders would give undisputed title to the book to the lost and found. How much would you be willing to pay to get back your old casebook from first year Torts?" Professor Ellickson collected the answers and compared them. Noticing that most of the students claimed to demand much more to sell their old Torts casebooks than they would be willing to pay to get the same books back, he frowned and shook his head from side to side. "This can't be right," he said. "These answers are supposed to be the same. Some of you must not be telling the truth." But my classmates protested that they had answered honestly. Professor Ellickson considered the possibility for a moment and then asked, "But if you would pay no more than $1 or $2 to buy back your Torts casebook, why wouldn't you sell it for less than $5 or $10?" My classmates were stymied, managing only to convey the sense that the two situations seemed quite different. I, on the other hand, who had finished the first year introductory sequence of graduate courses in economics, had a pat answer. "Wealth effects" I shouted from the back of the room. Again Professor Ellickson frowned and shook his head. "Wealth effects are probably too small to to produce this sort of result. There has to be something else going on." I thought for a moment, decided that if my classmates had well-behaved, twice differentiable utility functions Professor Ellickson was probably right, and resolved to follow Samuel Clemens' advice about keeping your mouth shut and letting people think you a fool--at least for the remainder of the class hour. Professor Ellickson shrugged and went on with his lesson plan.

I. INTRODUCTION

Do people value commodities more when they own the commodities than when they do not? Although economic models generally presume that economic agents evaluate commodities independently of whether the agents own those commodities or not, an assumption that we term "basic independence" assumption, researchers in economics and law are starting to doubt that this is true. These doubts about the soundness of the basic independence assumption, challenge accepted economic doctrine. Most theoretical and applied models in economics use the basic independence assumption both to predict and to assess the operation of markets. And in the relatively new discipline of law and economics, the basic independence assumption produces the Coase Theorem,[1] which is the starting point for much economic analysis of legal rules.

To better understand the importance of the basic independence assumption, consider the following example. A homeowner lives next to a smelter. The smelter's operations emit smoke that smells bad and interferes with the homeowner's view of the mountains. Under these circumstances the law might give the homeowner a legal right to clean air and require the smelter to buy the homeowner's permission to emit smoke. Alternatively, the law might give the smelter the right to emit smoke, in effect requiring the homeowner to buy the right to clean air from the smelter.

If valuation is not affected by the distribution of ownership (and a number of other assumptions hold), then to predict how much smoke will ultimately be emitted by the smelter, one need only ascertain each side's willingness to pay for air at different quality levels. If the homeowner is willing to pay a great deal for relatively clean air and the smelter is not willing to pay very much to produce smoke, then not much smoke will be emitted, regardless of which side has the legal right to the air. If the law assigns the right to the smelter, the homeowner will purchase a large reduction in smoke from the smelter. If the law assigns the right to the homeowner, the smelter will not purchase rights to emit very much smoke. In fact, the prediction is that exactly the same amount of smoke will be emitted, <u>regardless of which side is initially assigned</u> the rights to the air.[2]

The prediction that the final distribution of rights is independent of the initial assignment of rights is known as the Coase Theorem, and serves as the basis for many normative arguments. Some claim that the operation of this perfect market should serve as a normative benchmark -- when one side values the right more than the other side at every level of quality the common law should assign property rights to those who would end up with them. If values do not change based

upon who starts with the right, this normative prescription closely tracks the Kaldor-Hicks compensation criterion.[3] Others claim that regardless of whether we should embrace the Kaldor-Hicks compensation criterion, we should award rights to those who value them the most so as to save the transactions costs of rearranging the rights.[4] Still others suggest that we should use damage rules, rather than property rules, where the parties would find it costly to rearrange the rights.[5] Moreover, the damages rules themselves probably incorporate the basic independence assumption, for the analysis of damages rules usually defines damages independently of who owns the rights.[6] These arguments are lengthy and complex, and provide the focus of some of the most spirited debates in law and economics.[7]

But if the basic independence assumption fails, all of this may change. Consider the following variation of our example involving a homeowner and a smelter. If the law assigns clean air rights to the homeowner, he will not allow the smelter to degrade the air unless the smelter pays enough money to the homeowner. Call the minimum amount the homeowner would accept in exchange for his right to a given level of air quality "WTA," for "willingness to accept." If the law assigns the right to clean air to the smelter, on the other hand, the homeowner will pay no more for a given improvement in air quality than the improvement is worth to him. Call the maximum amount he would pay for the right to a given improvement in air quality, "WTP," for "willingness to pay." Also, call the amount the smelter would be willing to pay for a given reduction in air quality, "S," which is exactly the same amount the smelter would accept to refrain from reducing air quality to that extent. (In other words, WTA=WTP for the smelter.)

If WTA>S>WTP for a given change in air quality, the homeowner will refuse to sell if he already owns the right to clean air. But, if the smelter owns the right to dirty the air the homeowner will refuse to buy. In the limit, if WTA>S>WTP at every air quality level, then the homeowner will neither sell any rights to the smelter (if the homeowner owns the rights), nor buy any rights to clean air (if the smelter owns the rights).

If WTA>WTP, as described above, then many normative arguments may change. For example, even if there are no transactions costs, there is no longer a unique, well-defined outcome of Coasian bargaining for those who would argue that it provides a benchmark for the Common Law. The Kaldor-Hicks compensation criterion (and all versions of cost-benefit analysis deriving therefrom) similarly lose whatever precision they might have had. They now may require a reference to the status quo for their definition. The subsidiary arguments about saving transactions costs may either gain or lose force, depending upon how one wants to regard them. Damages rules may also require reference to the status quo.

The basic independence assumption has been scrutinized by economists and other social scientists attempting to describe consumer valuation. Applied welfare economists have been particularly interested in refining the technology of cost-benefit analysis for deciding whether to undertake the provision of large-scale public goods, such as environmental improvements.[9] Although these economists have paid <u>some</u> attention to the normative issues, their main concern has been the careful elucidation of the complexities and subtleties surrounding the disparity between WTA and WTP. In contrast, the legal scholars -- primarily Duncan Kennedy and Mark Kelman -- have concentrated on the normative implications of presuming that WTA>WTP. Their discussions, however, have not taken account of the subtle and intricate evidence from economics.[10] They were, perhaps, more concerned with undermining confidence in cost-benefit analysis, and the liberal vision of society under law that they claim rests (in part) upon cost-benefit analysis, than with evaluating the evidence they were using for their critiques.

In this paper we present, organize, and critique the modern evidence on the question of WTA and WTP, so as to draw together the learning of the economists and the lawyers. We will first investigate the evidence on the divergence between WTA and WTP, and then examine possible explanations for the evidence.[11] Next, we will explore the implications of a possible divergence for analysis in law and economics. Last, we will show that, although the divergence between WTA and WTP may entail substantially limiting the role of cost-benefit analysis, we cannot precisely map those limits without answering some difficult questions about the sources of the disparity between WTA and WTP.

II. EVIDENCE ON WTA AND WTP

A. Survey evidence

There are two sources of evidence pertaining to the divergence between WTA and WTP: surveys and experiments. Historically, survey evidence was generated first. Economists were frequently given the task of estimating the costs and benefits of proposed large-scale projects, such as power plants. To do this, economists had to value the loss of environmental goods such as clean air and water. However, there were no direct markets for spectacular views of national parks, so there were no prices to observe. Therefore, in order to value the environmental goods, economists had to develop new sources of data. They began asking individuals affected by such large-scale projects either how much they would be willing to pay to avoid some potential environmental deterioration (WTP) or how much they would have to be compensated to accept the same environmental deterioration (WTA).

Economists have known for a long time that WTP and WTA might differ if those selling their rights were, in some sense, wealthier than those buying them. But a very influential work by Robert Willig[12] argued that under most circumstances the divergence would be small, probably less than 5%. Economists have assumed that Willig's analysis applied in the case of environmental goods, and have proceeded to value environmental commodities by asking about WTP in surveys of consumers.[13] A typical survey might focus on a potential increase or decrease in visible air pollution, and prepare pictures of both current air quality and how the air would look (on average) with increased or decreased pollution. The survey takers would show the pictures to subjects and ask them how much they would be willing to pay either to avoid a pictured increase or to enjoy a pictured decrease in air pollution. Some surveys would then give each subject a chance to change his answer: the surveyors might ask the subject if he would be willing to pay a bit more for the decrease in pollution, and keep asking the subject to pay more until he refused. The survey takers would then use the WTP responses as indicative of values in the target population and compute either the total damage from increasing pollution or the total value from reducing pollution by extrapolating from the survey responses.

A few surveys, however, have asked explicitly about both WTP and WTA, and the answers have diverged far more than theory suggested they should. In response, economists have been skeptical, suggesting that there are several types of errors affecting these results. Such errors include strategic responses, where the respondents lie to the surveyor in an effort to manipulate the outcome in accord with the respondents' true preferences; information biases, where the surveyor (perhaps inadvertently) manipulates the responses by supplying information about the proposed program that is designed to elicit the responses; instrument bias, where the surveyor's questioning techniques mold the results; and bias produced by nonrandom sampling techniques.[14]

In the last few years, some experimental economists and psychologists have begun to design and run experiments to test whether WTA is substantially larger than WTP. We will examine these experiments in some detail. They show, as a group, that there is some evidence that WTA may exceed WTP by a substantial amount. This seems most likely in the case of consumer items that are not bought and sold repeatedly.

B. Experimental evidence

This section will concentrate on answering four main questions. 1) Does WTA exceed WTP in real experimental markets? 2) Assuming that it does, is this true only for consumer goods that are

owned by consumers, or is this also true of rights to income flows, such as securities?   3) Does repeated participation in markets for rights as a buyer and seller reduce an individual's WTA/WTP spread? 4) By what factor does WTA exceed WTP?

1. Does WTA exceed WTP in experimental markets?
a. Coursey, Hovis and Schulze

Coursey, Hovis and Schulze devised a set of experiments to compare WTP to WTA in both survey and experimental market circumstances.[15] First,.they devised a bidding mechanism for leading subjects to reveal their true WTP and WTA values for holding a one-ounce cup of sucrose octa-acetate (SOA) — a safe but very bitter-tasting liquid — in their mouths for twenty seconds. Each subject in these experiments was allowed to sample a drop or two of SOA at one point in the experiment.

The WTP experiments proceeded, in essence, by asking each of 8 subjects to state a willingness to pay to avoid tasting the SOA. The four highest bidders avoided tasting the SOA. The remaining subjects had to taste it. But, the four high bidders had to pay the experimenter only the amount of the fifth highest bid. Under these circumstances, it is in the self-interest of each subject to bid his true willingness to pay to avoid tasting the SOA. Because the size of the subject's bid determines only whether it will be accepted, not how much he will have to pay if it is accepted, the subject can gain nothing by bidding too high or too low.

To see this, consider the costs and benefits of deception. If the subject bids more than his true value and wins the auction, he neither gains nor loses if his true value is actually greater than or equal to the fifth highest bid. However, if his true value is less than the fifth highest bid, he ends up paying more than he is willing to pay to avoid tasting SOA. Now consider what happens if he bids less than his true value and he loses the auction. If his true value is actually less than or equal to the fifth highest bid, he neither gains nor loses by such deception. However, if his true value is greater than the fifth highest bid, then he ends up tasting SOA, even though he would have been willing to pay the fifth highest bid price to avoid tasting it. In sum, he never gains, and he can lose by bidding other than his true value. Coursey, Hovis and Schulze ran these experiments several times with the same subjects, so the subjects had a chance to learn these properties of the bidding mechanism.

The WTA experiments were run in an identical fashion to the WTP experiments, except that subjects were asked to reveal their willingness to accept payment for agreement to taste the SOA,

and only the four low bids were accepted. The four low bidders were paid the amount of the fifth lowest bid.

Coursey, Hovis and Schulze also collected survey data from their subjects regarding their hypothetical WTA and WTP values. They first just described SOA to the subjects before asking for WTA or WTP. Then they allowed each subject to sample a drop of SOA before repeating the WTA or WTP question. In both types of surveys, WTA averaged between $7.00 and $15.00, but WTP averaged only $3.00-$4.50. In contrast, in the incentive-compatible bidding experiments described in the paragraphs above, WTA was much greater than WTP in the first few rounds of the experiments; but as the subjects participated in more rounds of the experiments the WTA values dropped. By the last (tenth) round, WTA had dropped to an average of about $4.00. This was still slightly above average WTP, but was so close as to be statistically indistinguishable. The average WTP was the same in the hypothetical and incentive-compatible rounds.

Coursey, Hovis and Schulze interpret their result to mean that "true" WTP does not differ from "true" WTA. They also claim that their results indicate that surveys asking for WTP data are likely to be reliable indicators of individuals' true values for goods, but that WTA survey data is likely to be substantially inflated. However, several alternative interpretations of their data remain. To see this, we must decompose their claims into four steps. They claim that 1) WTP and WTA converge to the same value in the incentive-compatible auctions (auctions that in theory induce subjects to bid true value); 2) the final bids in the incentive-compatible auctions represent true values; and 3) hypothetical WTP equals real WTP in their experimental data. These three claims then lead to claim 4) that respondents to hypothetical surveys of WTP reveal their true WTP=WTA. We will show that claim 1) may not be correct.[16] Next, we will show that the experimental results on the behavioral properties of second-price and fifth-price, sealed-bid auctions suggest that claim 2) may not be correct. Claim 3) emerges from their data. However, claim 4) is not supported, since it rests on claims 1)-3) all being correct. Thus, we cannot assume on the basis of Coursey, Hovis, and Schulze's results that responses to hypothetical WTP surveys represent true WTP=WTA.

Claim 1): Because WTA did stay slightly above WTP, true WTA may exceed WTP by a small amount. Gregory and Furby[17] reanalyzed the data by excluding wildly aberrant responses before applying any statistical tests. They conclude that WTA exceeded WTP by a statistically significant amount (about **$1.00),** even on the final round of the auction.

Claim 2: Perhaps the iterative experiments failed to prompt subjects to reveal their true valuations. Gregory and Furby suggest that it is very difficult for most people to understand why the auction should lead them to reveal their true values.[18] If subjects do not understand that it is

in their best interests to reveal true values, the bids might represent strategic bids in a (futile) effort to manipulate the auction. The convergence of WTA to WTP would then best be regarded as a convergence of strategies, rather than a convergence of true values.

This last criticism is supported by a careful re-analysis of the evidence linking bids in an incentive-compatible auction and true values. Coursey, Hovis, and Schulze[19] cite Cox, Roberson, and Smith[20] and Coursey and Smith[21] in support of their contention that responses in the incentive-compatible auctions represent true values.

Cox, Roberson, and Smith studied the behavioral properties of second-price, sealed-bid auctions, in which each bidder submits a sealed bid to purchase a coupon, redeemable at a given price. In this auction the highest bidder wins the auction and pays only the second-highest bid price. In each auction each subject was given a redemption value, which specified the amount to be earned if he or she won that auction. Each subject received a different redemption value and redemption values were randomly reassigned for the next auction in a series of auctions with the same subjects. This feature gave each subject a chance to be an auction winner at least once over a series of auctions. Like the fifth-price auction discussed above, the second-price, sealed bid auction should lead subjects to bid their true values because the winner of the auction pays the second-highest bid price. However, Cox, Roberson and Smith found that bidders in these experimental auctions did not tend to behave as predicted at first. In particular, they tended to bid less than their true values. But, over time, most participants learned to bid their true values. Thus, Cox, Roberson, and Smith's results provide evidence that participants in an incentive-compatible auction can learn over time to bid their true values.

Unfortunately, the Cox, Roberson, and Smith results have not been replicated consistently. Cox and Smith, themselves, and others[22] found that many high-valuation subjects actually bid more than their true values in these auctions. Moreover, many low-valuation subjects bid less.

In addition, Coursey and Smith[23] and Cox, Smith and Walker[24] tested the behavioral properties of a fifth-price auction very similar to the fifth-price auction used in Coursey, Hovis, and Schulze[25]. Coursey and Smith[26] and Cox, Smith, and Walker[27] assigned redemption values to subjects, as in Cox, Roberson, and Smith[28], and then conducted a series of fifth-price, sealed-bid auctions for four units to be sold to the four highest bidders at the fifth-highest bid price. They found that some high-valuation participants bid more than their true values, while many others bid

less. Low-valuation participants generally bid less than their true values. The average bid price was significantly below the average redemption value for the four highest valuation participants.[29]

Thus, subjects tend to both overbid and underbid in both second-price and fifth-price, sealed-bid auctions, even though both auctions should theoretically induce subjects to bid their true values. These findings suggest that we cannot accept the revelations of value in the fifth-price auction for SOA as representing true value.

Many of the experimental works that we review below use some version of the fifth (or second, or "nth") price auction to derive values from subjects. To the extent that the responses are not trustworthy, many of the experiments may be suspect. When we discuss the experimental results we will not repeat this criticism at each point. However, the reader should keep in mind that this critique could apply to any of the experiments utilizing these theoretically demand-revealing mechanisms.

Summary of Critique of Coursey. Hovis and Schulze: Coursey, Hovis and Schulze ask us to believe that responses to hypothetical WTP surveys represent true WTP=WTA. They claim that 1) WTP and WTA converge to the same value in the incentive-compatible auctions; 2) the final bids in the incentive-compatible auctions represent true values; and 3) hypothetical WTP equals real WTP in their experimental data. These three claims then lead to claim 4) that respondents to hypothetical surveys of WTP reveal their true WTP=WTA. We have already seen that claim 1) may not be correct.[30] The experimental results on the behavioral properties of second-price and fifth-price, sealed-bid auctions suggest that claim 2) may not be correct. Claim 3) emerges from their data. However, claim 4) is not supported, since it rests on claims 1)-3) all being correct. Thus, we cannot assume at this time that responses to hypothetical WTP surveys represent true WTP=WTA.

b. Boyce, et. al.

Boyce, et. al.[31] investigated whether WTA might exceed WTP for an irreversible choice about preserving animal or plant species, or of environmental amenities. Such preservation value is referred to as existence value or option value in the environmental economics literature.[32]

To identify existence value and test for any difference between WTA and WTP, Boyce, et. al. used a houseplant which looks and grows like a pine tree (a Norfolk Island pine). Because of previous criticism of the behavioral properties of fifth-price auctions, the authors decided to use a different incentive-compatible mechanism---termed "BDM"—for eliciting WTP and WTA values.[33]

Boyce, et. al., obtain WTP and WTA values in two types of experiments: kin and np. kill. In the kill experiments subjects are told that any trees not sold or kept are to be <u>killed</u> at the end of the experiment. To manitain credibility without inflicting undue psychic pain, one subject, chosen randomly by a bingo ball draw, witnesses the tree killing and then reports to the others that the trees have been destroyed. In the no. kill version of the WTP and WTA experiments, subjects are given no information about the tress' prospects for happiness, and any remaining trees are recycled for future use. Boyce, et. al., also obtain WTA and WTP values, in both kill and no. kill versions, in hypothetical trial questionnaires.[34]

The complete experimental design is illustrated in Figure 1. Each subject in the laboratory experiment participated in both a hypothetical survey and a real auction, using the BDM method for valuation. For the hypothetical survey and the real auction, each subject participated in one of four experimental treatments: WTP/kill, WTP/no kill, WTA/kill, WTA/no kill. In addition, another group of participants was administered either a WTP/kill or a WTA/kill survey outside the laboratory.

[Table 1 about here]

Boyce, <u>et. al</u>.[35] find that WTA is slightly higher than WTP in the <u>no kill</u> experimental auctions. Mean WTA is $8.00 and mean WTP is $4.81. In the kill experiments, on the other hand, the difference is substantially larger. Moreover, WTP kill is greater than WTP <u>no kill</u> and WTA kill is greater than WTA <u>no kill</u>. Mean WTA kill is $18.43 and mean WTP kill is $7.81.[36]

Comparing hypothetical responses and auction bids, Boyce, <u>et. al.</u> find substantial differences between the laboratory and the field. In the laboratory, the hypothetical responses are significantly higher than the auction bids in both the WTP and the WTA experiments. Numerous subjects in the WTA kill treatment indicate they would not sell their plants at any price. The researchers code all such responses as WTA>$50.00. Few participants in the WTA auctions actually bid more than $50.00. The mean response in the WTP/kill laboratory survey is $16.80, more than twice the mean response in the WTP/kill auction. Yet, the hypothetical response in the WTP/kill field survey is actually slightly less than the mean bid in the WTP/kill purchase auction. The difference is not statistically significant. In contrast to the WTP responses, the WTA/kiH field survey responses are more similar to the WTA/kill laboratory survey responses than to the WTA/kill auction results.

Boyce, <u>et. al.</u> interpret their results as indicating that WTA>WTP, especially when preservation of the plant is at stake (existence value, in their interpretation). Moreover, both WTP

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and WTA are higher in the presence of existence value. Finally, field surveys of WTP conform to bids in an incentive-compatible auction, suggesting to the researchers that field surveys of WTP may be reliable indicators of true willingness-to-pay.

While we cannot yet evaluate these results in the depth we have evaluated the Coursey, Hovis, and Schulze[37] results, they are suggestive of a real difference between WTP and WTA. The BDM mechanism has not yet received independent testing; although Schulze and other coauthors have presented some preliminary work suggesting it performs significantly better than the fifth-price auction.[38] This approach to elicitation of value requires further study. Should the BDM mechanism survive further scrutiny, we could conclude on the basis of Boyce, et. al.'s results that WTA>WTP in the context of this experiment.

c. Other Experimental Work

Knetsch, Thaler, and Kahneman also tested whether WTA>WTP in both experimental markets and in survey data.[39] Their experimental markets started by distributing a small consumer item -- in some experiments Cornell coffee mugs and in other experiments boxed ball point pens with price tags indicating that the pens could be purchased at the Cornell University student store for $3.98 — to one half of an assembled group. After everyone had examined the consumer goods each person was asked a series of questions. Those who had received the mugs or pens were asked if they would agree to part with the mugs or pens at various prices. Those who did not get a consumer good were asked if they would agree to buy the good at various prices. Subjects were told that the actual price would be selected later. The subjects participated in four identical markets in a row, and were told beforehand that one of the markets would be selected at random. Their answers for the selected market would determine whether or not they would buy (or sell) a consumer good at the price selected in the market.

Knetsch, Thaler, and Kahneman argue that, under these circumstances, subjects have very little incentive to misrepresent their preferences. That is because, just as in the Coursey, Hovis and Schulze experiments, statements of WTP or WTA determined whether or not a bid or offer would be accepted, but not the price. The price was determined by the market. With many subjects in an experiment, as Knetsch, Thaler, and Kahneman had, no individual subject could reasonably think that changing his own bid would likely affect the market price.[40]

Knetsch, Thaler, and Kahneman then go on to argue that if subjects reveal their true WTA and WTP, and if WTA=WTP, one can expect, on average, about half of the consumer goods will trade

hands in each experiment. On the other hand, if WTA>WTP, significantly fewer than half of the goods will trade. They found that only about one sixth of the consumer goods traded, rather than the one half predicted by the WTA=WTP hypothesis. In addition, the buyers' median WTP tended to be less than half of the sellers' median WTA.[41]

Knetsch, Thaler, and Kahneman ran another set of mug experiments, in which they divided subjects into buyers, sellers, and choosers. The buyers were asked to name buying prices (maximum WTP) and the sellers were asked to name selling prices (minimum WTA), as in the first experiment. Choosers were asked choose between a mug and cash at each possible price. The relative prices named by the buyers and sellers were indistinguishable from those in the previous experiment. Mean selling prices were significantly higher than mean buying prices. However, the mean price for choosers was the same as the mean price for buyers, suggesting a real divergence between WTA and WTP, independent of any wealth effects.

Knetsch, Thaler, and Kahneman also ran a set of Coasian bargaining experiments designed to test whether WTA exceeds WTP in a two person bargaining setting. Fifty-two subjects were paired off. One person in each pair was given a coffee mug and was told that he or she could either keep it and take it home or sell it to his or her partner. Using their analysis, if WTA=WTP, we would expect on average about 13 trades. But, only six trades occurred, suggesting that WTA>WTP in this Coasian setting.

2. Does WTA exceed WTP for rights to future cash flows,
such as securities?

There is very little evidence on this issue, but what there is suggests that WTA=WTP for the simplest form of security — the right to a certain cash payment. But for more complex securities, such as the right to the outcome of a fairly simple gamble or the purchase of insurance, WTA may exceed WTP.

Knetsch, Thaler, and Kahneman conducted some experiments in which a security representing the right to an immediate and certain cash payment was traded.[42] These experiments took place in both an organized market and in a two-person, Coasian bargaining setting. In both forms the evidence strongly suggested that WTA=WTP.

In the market experiments Knetsch, Thaler and Kahneman distributed 3 x 5 cards to subjects, who were given the following instructions:[43]

In this market the objects being traded are tokens (3 x 5 cards). You are an owner, so you now own a token, [You are a buyer, so you have an opportunity to buy a token] which has a value to you of $x. It has this value to you because the experimenter will give you this much money for it. The value of the token is different for different individuals. A price for the tokens will be determined later. For each of the prices listed below, please indicate whether you prefer to:

(1) Sell your token at this price, and receive the market price. [Buy a token at this price and cash it in for the sum of money indicated above.]

(2) Keep your token and cash it in for the sum of money indicated above. [Not buy a token at this price.]

For each price indicate your decision by marking an X in the appropriate column.

At a price of $Y I will sell [buy]_____I will not sell [buy]_____

The redemption values for the 3 x 5 cards produced one set of supply and demand curves, and the subjects' responses produced a second set of curves. The subjects were truthfully told that the price in the experimental market would be set by the intersection of the supply and demand curves produced by their responses, and that all offers to sell [buy] 3 x 5 cards below [above] that price would be executed. Knetsch, Thaler and Kahneman were able to compute the expected price and quantity traded in the experimental market, on the assumption that WTA=WTP, from the supply and demand curves produced by the redemption values. The experimenters then compared the expected price and quantity to the observed price and quantity, and found that they were so close that the hypothesis that WTA=WTP could not be rejected.

The Coasian bargaining experiments proceeded somewhat differently. Subjects were designated as either buyers or sellers, and were given personalized redemption values for the coupons distributed by the experimenters. The subjects were placed into 39 pairs -- one buyer and one seller per pair -- and a coupon was distributed to each seller. All sellers had redemption values of **$1.50,** while buyers had redemption values of either $2.00 or **$4**.00. Applying their previous argument, if WTA=WTP, we would expect all 39 coupons to be sold. However, if WTA>WTP by a significant amount, sales volume would be lower, as some sellers would value their coupons at more than the buyers would be willing to pay. They found that 38 out of 39 coupons were sold — a result clearly consistent with WTA=WTP.

Knez, Smith, and Williams ran experiments that suggest that hypothetical WTA may exceed hypothetical WTP for relatively simple securities.[44] They ran three sets of experiments, each consisting of several independent trading periods for a security that paid $.50 with probability 50% and $2.00 with probability 50%. Hence, the expected value of this security was $1.25. They gave each of the nine subjects in each experiment some securities and some cash. Before trading began in each period, the experimenters asked each subject to state his or her WTP and WTA for such a security. Trading then proceeded, securities changed hands, and the holders of the securities were paid their dividends.

They found that at the beginning of each experiment individual subjects typically stated a higher WTA price than WTP price. However, the actual trading price was always less than or equal to the WTA price and greater than or equal to the WTP price. This suggests that subjects may state different buying and selling prices, but are willing to actually trade at a compromise price. Moreover, there was a tendency for WTA and WTP to converge as each experiment progressed. This suggests that repeated experience with the markets caused the subjects to reevaluate their responses so as to bring both WTP and WTA closer to actual trading prices.

McClelland, Schulze, and Coursey[45] conducted a series of experiments in which subjects could " . . . either submit bids to buy (WTP) or offers to sell (WTA) either a lottery ticket (40% chance of winning $10--a gain) or an insurance policy (against a 40% chance of losing $10--a 'loss')."[46] In the WTP loss experiments subjects were given $25 up front and then participated in a fifth-price auction for the insurance policy. The four highest bidders purchased the policy for the fifth-highest bid price. After the auction, a chip was drawn from an urn containing 40% red chips and 60% white chips. If a red chip was drawn, those who did not purchase the insurance policy sustained the loss.

In the WTA loss experiment each subject was endowed with $25 and the insurance policy described above and was asked to submit a bid for what he or she would be willing to accept to sell that policy. The market price to sell the policy was also determined by a fifth-price auction in which the four lowest offers sold the policy for the fifth lowest price. Those who sold their policies then sustained the loss if a red chip was drawn.

The gain experiments were symmetric. In the WTP gain experiments subjects started with $25 and submitted bids for lottery tickets for a 40% chance to win a $10 prize. The tickets were sold in a fifth price auction. Those who purchased the tickets then won $10 if a red chip was drawn from the urn. In the WTA gain experiments subjects were endowed with $25 and lottery tickets, and four tickets were sold back in a fifth price auction.

McClelland, Schulze, and Coursey find that in three of the four experimental treatments (WTA and WTP gain and WTP loss) both the mean and mode of individual bids or offers is only marginally above the expected value of $4. Moreover, between 60% and 80% of all such bids are about $5. However, in the WTA loss treatment there is a bi-modal distribution with a fat tail on the high end. The two modes are at about $5 and $10, with substantial secondary modes at about $12.50, $15, $20, and even $30. In other words, many subjects in the WTA loss experiments are essentially signalling either that they will only sell for the full value of the loss, if it occurs, or that they will not sell at any price. In the other three experimental treatments subjects quickly learn the expected value of the insurance policy or lottery ticket. In a separate paper, McClelland and Schulze[47] offer an explanation for these results, which we find quite underdeveloped.[48]

summarized above, is mixed. Knez, Smith, and Williams'[49] results suggest that subjects learn over time to bring WTA=WTP, even when faced with risk. However, McClelland, Schulze, and Coursey's[50] results suggest that WTA>WTP for risky monetary assets under certain special circumstances, even after learning.

3. Does repeated participation in a market reduce the spread between WTA and WTP?

We have already reviewed all of the studies dealing with this question. Knetsch, Thaler, and Kahneman found no trend towards WTA=WTP in their four-period experiments, but Coursey, Hovis and Schulze; and Knez, Smith, and Williams did find such a trend in their multi-period experiments. Moreover, McClelland, Schulze, and Coursey found that WTA=WTP when bidding for a lottery ticket, but WTA>WTP when bidding for insurance against a loss. Thus, this issue is unresolved and may depend on particular circumstances and contexts.

4. By what factor does WTA exceed WTP?

We have already reviewed most of the evidence on this question, and the answers we have observed range from Coursey, Hovis and Schulze's conclusion that WTA exceeds WTP by a very small amount, to the survey data that finds ratios of four to one, and sometimes even higher ratios.

5. Unhelpful Experimental Designs

Brookshire and Coursey[5] conducted two surveys and one experiment designed to test whether WTA>WTP for adding more trees to a new park located in the City of Fort Collins, Colorado. They contacted homeowners surrounding the site of the new park and showed the homeowners an artist's rendition of how the park would look with different numbers of trees. Those homeowners who were asked about their willingness to pay were shown pictures of the park with 200, 225, and 250 trees. Those who were queried about willingness to accept compensation saw pictures of the park with 200, 175, and 150 trees.

The WTA survey first showed the pictures to the homeowners and then asked the subjects "What minimum dollar amount would your household be willing to accept to decrease the base plan to 175 trees under this one time payment?" Brookshire and Coursey repeated the question, but with a decrease to 150 trees. The WTP subjects were asked "What maximum dollar amount would your household be willing to contribute to a fund to increase the base plan from 200 to 225 trees under this one time payment?" The question was then repeated, but with an increase to 250 trees. These questions were hypothetical, in the sense that no money was actually collected or paid, and the park's tree density did not depend on the homeowners' answers.

The second type of hypothetical survey utilized a "Smith auction." The Smith auction begins by telling a group of people, in this case the homeowners, that they are participating in a group decision. Every homeowner surveyed (in the WTP version) was asked to submit an offer to pay for expanding the number of trees in the park to 225 or 250, and was told that all other homeowners being surveyed were also being queried. Brookshire and Coursey continue:[52]

> The interview team explained that there were three possible outcomes depending on the sum of the payments from the households. First, if the sum of the payments was less than the cost of the additional trees, the base plan [200 trees] would not be expanded and the household would pay nothing. Second, if the sum of the payments equaled the cost of the additional trees, the base plan would be expanded and the household would pay exactly the amount it had offered. Third, if the sum of the payments was greater than the cost of the additional trees, the base plan would also be expanded. However, the household would not have to pay the full amount it offered. The offers in this case would be proportionally scaled back so that their sum exactly equaled the cost of the trees. Numerical examples of all three cases were provided to the respondent.

After explaining the three possibilities to the homeowners, Brookshire and Coursey told them the cost of increasing the number of trees from 200 to 225 and asked "What maximum dollar amount would your household be willing to contribute to a fund to implement this expansion?"[53] Brookshire and Coursey then told the homeowners how much it would cost to increase the number of trees to 250 and asked the WTP question again.

To gather data about WTA Brookshire and Coursey did essentially the same thing, except that homeowners were told how much money would be saved by decreasing the number of trees to 175 or 150, and then were asked what was the minimum payment they would require to agree to the reduction. There were three analogous possible outcomes: the sum of the payments sought could exceed the cost savings, in which case there would be no reduction in the number of trees; the sum of the payments sought could exactly equal the cost savings, in which event the number of trees would be reduced and the homeowners would be paid their requested amounts; or the sum of the payments sought could be less than the cost savings, in which case the number of trees would be reduced and each homeowner would get more than his requested compensation. The responses from this survey, like the responses from Brookshire and Coursey's first survey, were hypothetical. No one actually paid or received money, and the number of trees in the park was unaffected by the homeowners' responses.

Last, Brookshire and Coursey ran an experimental test of the possible divergence between WTA and WTP in which they implemented a Smith auction, similar to the one described above, except that the consequences of subjects' responses were real, not hypothetical. Participants in the WTP experiments were asked to submit bids indicating the maximum they were willing to pay for increases in the number of trees. If the sum of the bids was greater than or equal to the cost of increasing the number of trees, the experiment stopped and the cost of increasing the number of trees was collected from the participants. If the sum of the bids was less than the cost of increasing the number of trees, participants were asked to submit new bids. The bidding process was repeated up to 5 times if the cost was not covered at first. If, at the end of the fifth trial, the bids still totalled less than the cost of increasing the number of trees, the experimenters terminated the experiment, collected no money, and implemented no increase in the number of trees. Participants in the WTA experiments were asked to indicate the minimum amount they would have to be compensated to accept decreases in the number of trees. If, by the fifth trial, the requests totalled less than or equal to the cost savings from reducing the number of trees, the experimenters paid the homeowners for the reduction. In all, "...$1500 was ultimately contributed to the city of Fort Collins' Parks and Recreation Department for use in purchasing trees for Troutman Park."[54]

However, there was no guarantee that the funds would be used to change the number of trees in the park.

Brookshire and Coursey found that WTA greatly exceed WTP in the first and second surveys. In the first survey the WTA/WTP ratio exceeded 60/1 for increments of 25 trees, and approached 90/1 for increments of 50 trees. The second (Smith auction) survey produced even more extreme results; WTA exceeded WTP by vast margins. The experiment produced WTA values that were closer to, but still greater than, WTP. There was some tendency for the disparity to narrow by the final round for the 25 tree increments.

Do the Brookshire and Coursey experiments provide solid evidence of the relationship between WTA and WTP? Unfortunately, they do not, because the structure of their surveys and experiment compared different things for purposes of comparing WTA and WTP. The WTA measures were computed on the homeowners' willingness to accept only 175 or 150 trees in the park, while the WTP measures were for increases to 225 or 250 trees. The central question in this paper is whether WTA>WTP for the same good. To see why Brookshire and Coursey's experiment may be defective, consider a hypothetical homeowner who values trees in the park according to the following schedule:

Number of trees	Value
100	$ 0
150	2,000
175	3,000
200	3,500
225	3,525
250	3,545

Moreover, WTA=WTP for all of these values. The Brookshire and Coursey methodology, however, would determine that this homeowner has a WTP = $25 for an increase of 25 trees over 200 and $45 for a 50 tree increase, but has a WTA of $500 for a 25 tree decrease below 200 and $1,500 for a 50 tree reduction. Thus, they are measuring a disparity between WTA and WTP for different commodities. For that reason, this experiment can only be taken as suggestive of some difference between WTA and WTP, because its results may be quite consistent with WTA=WTP. Because of the ambiguity in interpreting the Brookshire and Coursey experiment, we will not discuss it in the other sections of this paper. However, despite the ambiguity in interpreting Brookshire and Coursey's results, the general results summarized above suggest the possibility that WTA>WTP for some kinds of goods (or bads).

Knetsch and Sinden[55] conducted experiments involving lotteries in consumer goods. In one experiment they gave lottery tickets to 76 subjects and offered one half of the subjects the opportunity to sell the tickets back to the experimenter for $2, while the others were required to pay $2 to keep their tickets. Subjects knew that the winner of the lottery would get "either $70 worth of merchandise vouchers redeemable at a local variety store or, at the choice of the winner, $50 in cash."[56] They claim that, if WTA=WTP and if wealth effects are so small as to be negligible, we would expect about the same number of people to pay $2 to keep the ticket as decided to sell the lottery ticket for $2. If WTA>WTP, however, fewer should sell the lottery ticket. Knetsch and Sinden observed that 19 of 38 subjects agreed to pay $2 for their lottery ticket, but only 9 of 38 agreed to sell the ticket back. Knetsch and Sinden ran four other sets of experiments, similar in design to the one described above. In all but one of the experiments, the results suggested to Knetsch and Sinden that WTA>WTP. The exception was consistent with the hypothesis that WTA=WTP.

They[57] also ran an experiment that suggested to them a divergence between WTA and WTP for securities representing lotteries. They assembled 52 subjects and paired them off. One person in each pair received an envelope. The subjects were told that approximately one third of the envelopes contained $1, one third $2, one third $5, and one envelope contained $20. The subjects were then allowed to sell their envelopes. Using their earlier argument, if WTP=WTA, we would expect about 13 sales to occur in the 26 pairs. However, if WTA>WTP, we would expect to see far fewer than 13 trades. They observed only 5 trades.

Their results may be suggestive of WTA>WTP, as they claim, but there is an equally plausible explanation consistent with WTA=WTP. Suppose, for example, that WTA=WTP for each individual, but the mean WTA=WTP is greater than $2.00. Figure 1 illustrates a normal distribution of WTA=WTP, with a mean of $4.00. Asked to indicate whether they are willing to buy at $2.00, more than half the participants respond positively, because more than half are willing to pay $2.00 *QT more*. However, asked to indicate whether they are willing to sell at $2.00, less than half respond positively, because half are only willing to sell for $4.00 or more. Any distribution with a mean greater than $2.00 will yield similar results. This experimental design could only conclusively show WTP>WTP if we knew the mean WTP was less than or equal to $2.00.

[Figure 1 about here]

Knetsch and Sinden[58] designed another experiment to measure the disparity between WTA and WTP. Unfortunately, it is subject to the same critique as their experiment described immediately above. In this experiment, each of 128 subjects was given a ticket to a lottery in which the winner

would be given $90 in bookstore vouchers or $70 in cash. One half of the subjects were required to pay to keep the tickets, while the others were offered cash to give the tickets back. The buyers were divided into four equally sized groups and were required to pay $1, $2, $3, or $4 for the ticket. The sellers were also divided into four equally sized groups and were offered $1, $2, $3, or $4 for the tickets. More subjects refused the compensation offer than agreed to pay for the tickets, supporting their earlier evidence. They also calculated an expected value for WTA and WTP from this data, by calculating the probability that an individual chosen at random would be willing to accept varying levels of payment, and by calculating the probability that a randomly chosen individual would be willing to pay various amounts of money. They then multiplied the probabilities times the amounts ($1, $2, $3, $4) to get an expected value. They estimated that WTP = $1.28 and WTA = $5.18.[59] Thus, their evidence is consistent with the survey evidence that estimates WTA is 4 to 5 times greater than WTP.

This experiment suffers from the same problem as Knetch and Sinden's other work. If subjects' WTA (= WTP) valuations are normally distributed with mean greater than $2.50, Knetch and Sinden's design will erroneously conclude that WTA > WTP. The calculations of the size of the difference are also flawed.

III. Explanations for the Evidence

In this section of the paper we review several explanations for the evidence presented above. One of the explanations has already been discussed and is based on a reinterpretation of the wealth effect. The other explanations fall into two groups. First, there are psychological theories representing alternatives to the mainstream economic assumption that individuals mentally convert all of their noncash holdings into cash and then choose, from all possible combinations of goods and services that they can afford, the one that maximizes their utility. All of these alternative explanations are more elaborate than the mainstream economic assumption, but their power is undercut by the need to categorize events, on an ad hoc basis, into separate psychological categories. In addition to a reinterpretation of wealth effects, we examine prospect theory, value (or preference) uncertainty, existence values, using a maximin choice rule for WTA for losses, the need to "close" transactions, and the "endowment effect." Second, we also consider the possibility that respondents either interpret WTA and WTP questions in fundamentally different ways or misrepresent their true preferences to experimenters.

A. Wealth Effects

As discussed above in conjunction with the work of Knetsch, Kahneman, and Thaler[60], real differences between WTA and WTP could be the result of a wealth effect associated with ownership, which is consistent with the value of the good owned. To reiterate, a person who can, for example, view the Grand Canyon without smog might very well be willing to pay more to preserve that unobstructed view than the same person who did not have such a view would be willing to pay, even though he or she would be willing to pay the same amount under the same circumstances.

Figure 2 illustrates how such an income effect could be quite large. Figure 2 shows a set of indifference curves for clean air and other goods for a representative consumer. The consumer has G_1 of other goods to consume. If the consumer is endowed with relatively pristine air, he or she is at point B, consuming G_1 other goods and enjoying A_1 amount of clean air. However, if the consumer is endowed with relatively dirty air, he or she is at point C, on a lower indifference curve, still consuming G_1 other goods, but breathing A_2. Asked to name the minimum he or she would accept to move from A_1 to A_2, the consumer endowed with pristine air would say $G_2 - G_1$. With G_2 in other goods, the "wealthier" consumer is able to remain on the same indifference curve (U_1) breathing dirtier air. However, if the same consumer were endowed with dirty air, he or she would say that $G_1 - G_3$ was the maximum he or she would be willing to pay to improve air quality from A_2 to A_1. With G_3 other goods and clean air (A_1), this "poorer" consumer is on the same indifference curve (U_2) breathing cleaner air. Notice that WTA>WTP for a consumer whose preferences accord with the standard economic model of consumer preference.

[Figure 2 about here]

The above point was made in a recent article by Hanemann[61], who goes on to show that the difference between WTA and WTP can get very large if income elasticity is positive and the elasticity of substitution between clean air and other goods is very small. In the limit, as "...substitution elasticity goes to zero, the difference between WTP and WTA goes to infinity for any positive income elasticity."[62] In other words, if the elasticity of substitution between clean air and other goods were zero, a person would be willing to pay nothing to obtain cleaner air but demand an infinite compensation to give it up. This happens because an individual with a zero elasticity of substitution is not willing to substitute one good for another if he or she is to stay on the same indifference curve. Thus, endowed with dirty air, he or she will sacrifice no amount of other goods to obtain cleaner air. Any sacrifice of other goods moves the consumer to a lower

indifference curve. In contrast, endowed with clean air, no amount of other goods will compensate for a deterioration in air quality. Any sacrifice of air quality moves the consumer to a lower indifference curve.

Hanemann's point is illustrated in Figure 3. The assumption of zero elasticity of substitution is captured by the "square" indifference curves. A consumer endowed with relatively pristine air maximizes utility at point D, consuming G_3 other goods and enjoying A_3 amount of clean air. However, a person endowed with relatively dirty air can only maximize utility at point E, consuming G_4 other goods and breathing A_4 clean air. Asked to state WTA for a reduction in air quality from A_3 to A_4, the consumer imagines himself or herself at point D and realizes that no amount of other goods can compensate for any reduction in air quality. On the other hand, asked to state WTP for a comparable increase in air qualtiy, the same consumer imagines himself or herself at point E and realizes that no improvement in air quality can compensate for a loss of goods. Comparing points D and F, holding goods fixed at G_3, the consumer's WTP to move from A_4 to A_3 is G_3 - G_4 (putting the consumer at point H), but his or her WTA to move from A_3 to A_4 is infinite.[63]

[Figure 3 about here]

B. Prospect Theory

Prospect theory was developed by Daniel Kahneman and Amos Tversky to explain choice in risky situations.[64] Kahneman and Tversky posit that individuals have a value function defined with respect to the status quo.[65] This value function has the shape pictured in Figure 4, which indicates that the value of the status quo is zero, the value function for gains is positive and concave, and the value function for losses is negative, convex, and more steeply sloped than the value function for gains.

[Figure 4 about here]

This value function implies that a loss and a gain of equal size will not produce equal amounts of pain and pleasure; the loss will be felt more acutely.[66] It also implies that a person will be risk averse over gains and risk seeking with respect to losses.[67] Although the empirical research underlying the development of prospect theory has been strongly criticized on a number of grounds,[68] we ask only whether it adds anything to explaining the disparity between WTA and WTP.

Prospect theory has been adapted, first by Thaler[69], and then by Knetsch, Thaler, and Kahneman[70] to explain why WTA>WTP. The match is not perfect, however, because prospect theory was developed to explain the behavior of people facing risky choices about money, and the adaptation is about goods. The common theme, however, is that losses loom larger than gains. They argue that this theme can help explain why WTA would exceed WTP. If someone already owns a good and is offered money to part with it, he regards the potential sale as the loss of the good. If he does not own the good, however, and is considering purchasing it, he will view the potential purchase as a gain of the good. Because losses loom larger than gains, the individual will demand more to part with a good he already owns than he will be willing to offer for the same good. In other words, WTA>WTP.

Richard Thaler has also adapted prospect theory, suggesting that WTA exceeds WTP because of the difference between received income and opportunity cost. In order to buy a good an individual must use out-of-pocket money (termed "received income"). To keep a good already owned, an individual must spend money he or she would have received had the good been sold (termed "opportunity cost").[71] Thaler claims that people weight received income more than opportunity costs, and that this difference in weighting causes people to spend opportunity costs more freely. Thus, a person would be willing to pay more in opportunity cost to keep a good he already possesses than he would be willing to spend in received income to acquire the good. As a consequence, WTA>WTP. Thaler refers "to the underweighing of opportunity costs as the endowment effect."[72] The causes of the endowment effect, however, escape explanation or exploration. In essence, the endowment effect is identical to prospect theory's value function, and needs some additional explanation to be useful. Hence, without more work, the endowment effect fails as an explanation for WTA > WTP.

The adaptation of prospect theory's value function to explain WTA > WTP is no more than an elaborate way of saying that the same general theory of value has power at predicting both the disparity between WTA and WTP and choices made in other (often risky) situations. But the principle that losses loom larger than gains is itself unexplained. And it is very close to simply saying, "WTA is greater than WTP." A deeper explanation would center on psychological needs, or perhaps sociobiological advantages of acting in accord with prospect theory. For example, a sociobiological theory would center on possible survival advantages of treating gains and losses differently. Perhaps when humans were hunter-gatherers, living at the edge of survival, significant losses of any sort raised the threat of death and the attendant failure to transmit one's genes to the next generation. Gains, on the other hand, might have produced no symmetrically greater chance of transmitting genes. Hence, from a genetic standpoint, perhaps losses "hurt" more

than gains of equivalent size.   This would explain why humans might evolve so that their decision processes reflect a value function that is steeper for losses than for gains.

We could also reconstruct prospect theory and the endowment effect as a new explanation of WTA > WTP by relying on Margaret Radin's adaptation of Hegel's theory of property.[74] Radin posits that some property becomes bound up with the individual's personality to such an extent that the person regards the property as part of his personhood. Examples of such goods include one's wedding ring, favorite clothes, paintings and other decorations in the house, and, perhaps, the house, itself. Before a good is purchased it has no such status; it is merely a fungible marketplace commodity. But after the good is acquired it can gain such status.

Radin's observation can help explain why WTA exceeds WTP. If Ronald is going to buy a hat in the marketplace he will regard hats as fungible commodities. He will be willing to pay up to some maximum amount, WTP. On the other hand, if Ronald already owns a hat he will regard it as an expression of his personality, as a part of him. When someone tries to buy that hat from Ronald, he will view parting with the hat as parting with some of himself, and demand more money, WTA, to do so. Hence, WTA>WTP.

Radin's theory of property and personhood might help explain the results involving coffee mugs, pens, and perhaps the right not to taste SOA, but it does not explain why some experiments observed a difference between WTA and WTP for securities representing only the rights to cash flows. And for Radin's theory to explain the coffee mugs, pens, and SOA experiments, the integration of marketplace goods into personality must take place very quickly, for in Knetsch, Thaler, and Kahneman's experiments the subjects had ownership of the goods for only a few minutes before they were asked to reveal WTA and WTP.[75]

Other, more complex explanations, would be required to fully explain the shape of the value function in prospect theory. These explanations would be very useful in understanding empirical data and assessing its normative impact. However, until someone proffers a reasonably rich set of underlying explanations for prospect theory as it applies to the disparity between WTA and WTP, prospect theory will remain a primitive explanation.

Prospect theory also has another major problem: in many circumstances it is not clear whether a change in ownership is a gain or a loss.[76] For example, assume that a grandmother tells her devoted granddaughter that when the grandmother dies she will leave her necklace to the granddaughter. Should the necklace be regarded as "owned" by the granddaughter, so that if someone offers, while grandmother is still alive, to pay the granddaughter cash immediately in

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exchange for the necklace when the grandmother dies, the granddaughter will demand WTA? Or is the necklace as yet unacquired, so that the granddaughter will take less? The answer is by no means clear. Or, for a second example, assume that a person enters into a contract to buy a car at a good price from a dealership, delivery to be made in one month. Before delivery is made the dealer goes bankrupt and the contract is cancelled. Will the car buyer regard the car as a loss, or as a foregone gain? We cannot know from prospect theory.

Applying prospect theory to exchanges of goods for money presents another similar problem. Since the purchase of a good represents a loss of money and the sale of a good represents a gain of money, it is not clear what are gains and what are losses. If prospect theory applies particularly to money, then selling a good is a gain and buying a good is a loss. It seems that prospect theory could be adapted quite conveniently to explain any observed divergence between WTA and WTP.

In sum, prospect theory provides little help, at the present time, in understanding why WTA>WTP. First, we have no general explanation of why the value function is shaped as it is. Second, on a more practical level, prospect theory cannot help us either sort losses and foregone gains or even identify losses and gains. And until we can confidently characterize such situations, prospect theory's power will be limited. Until that time, we must rely on intuition, perhaps derived from introspection, to produce these characterizations.

C. Closing Transactions

Mark Kelman has suggested that people view an exchange as a psychological unit, and that there is a need to complete these psychological units by finishing transactions.[77] This is most obvious, he says, as a way to explain why people do not ignore sunk costs. Kelman uses an example of someone who has paid $100 to join a tennis club, develops a bad elbow, and continues to play through the pain, even though he would not play tennis if he had not paid $100 and tennis were available at no charge. This consumer is acting irrationally, according to traditional utility theory, because the $100 is a sunk cost, gone forever and irrelevant to any new decision. However, Kelman says, the consumer's behavior can be explained by the need to "close" transactions. "Consumers try to 'close' transactions: $100 was spent on tennis, and the consumer wants $100 of tennis value."[78]

The need to close transactions can also help to explain why WTA exceeds WTP, Kelman claims. Once a person has acquired a good he has closed the transaction. When a buyer offers to buy the good the person must consider reopening the old transaction. The psychological need to close transactions, however, militates against this. Only if the person receives a large price for sale

of the good will the psychic cost of reopening an old transaction be compensated. In contrast, when the same person is considering buying the same good, no transaction yet exists, and hence there are no psychic costs associated with making an offer for the good. As a result, Kelman says, WTA>WTP.

Kelman's theory provides a good start at explaining some, but not all, of the results. The theory has most power at explaining results involving consumer items, such as coffee mugs or pens, where consumers habitually purchase the item, consume it, and do not resell it. The theory would seem to have less to say about securities, which are aquired only for the instrumental purpose of making money, possibly by reselling the security if that seems most profitable. But even in the case of consumer items, Kelman's theory applies to experimental settings only if the experimental gifts of coffee mugs and pens count as closed transactions.

Outside of the experimental setting Kelman's theory suffers from similar difficulties. To use Kelman's theory we need a definition of "transaction," together with a way to recognize whether the transaction is closed or open. For example, assume that Ronald offers to buy a hat from George for $10, and George says that he will "think it over." Under contract law it is clear that no agreement has been formed, but this does not tell us whether or not Ronald has entered a psychological transaction. If Ronald has entered into a psychological transaction he may have a need to close it. If so, after a day or two it will be worth his while to offer more money to close the deal. Otherwise, not. Even if we somehow knew whether or not Ronald has entered a "transaction" we would need to know how to recognize closed or open transactions. For example, if George agrees to sell Ronald the hat can the transaction then be considered closed, or do we need to wait until George delivers the hat, or perhaps until Ronald inspects the hat for defects and satisfies himself that there are none? For present purposes, Kelman's closing transaction theory works by using intuitive answers to all of these questions.

D. Value (or Preference) Uncertainty

Heiner[79] proposed a theory which has implications for understanding the disparity between WTA and WTP. He suggested that if preferences are uncertain, information is unreliable, or an individual's ability to process information is unpredictable, economic agents tend to develop behavioral rules of thumb and institutions, which generate predictable economic outcomes, despite the underlying uncertainty. Sometimes these predictable economic outcomes appear to be the result of agents behaving "as if" they are making maximizing decisions and sometimes they do not. One of the non-maximizing outcomes on which he focusses is discussed in the literature by Arrow[80] and Kunreuther, et. al.,[81] and studied experimentally by McClelland, Schulze, and Coursey.[82] In this

well-documented choice anomaly, people will insure against relatively high probability hazards at actuarially fair prices, but will either not insure against very low probability hazards even at extremely favorable prices or pay more than an actuarially fair price. In the field, people have to be subsidized to buy flood insurance in places where floods are relatively rare. In the laboratory, McClelland, Schulze, and Coursey found mean bids for insurance generally equal to the expected value of the loss for loss probabilities between .2 and .9. At a loss probability of .01, however, 25% of the subjects bid zero and almost as many bid twice the expected value.

Bishop, Heberlein and Kealy[83] suggest a way in which preference uncertainty might lead to a divergence between WTA and WTP. They claim that when people are asked about WTA, they state amounts that are very high so as to "play it safe." By stating a high WTA, respondents are choosing an amount "at which they are relatively certain they really would sell. However, this theory also fails to explain the persistence of WTA>WTP in a market setting, because it contains no explanation of how the uncertainty is resolved when a genuine final offer is tendered. Unless this mechanism resolves uncertainty differently for buying and selling, the theory cannot explain the experimental results.

E. Explanations Suggesting True WTA Equals WTP:

1. Misrepresentation

One possibility, suggested by Knetsch, Thaler, and Kahneman[85] is that individuals habitually misstate WTA as greater than WTP because they are rewarded for doing so in many contexts, and that these habits carry over into contexts where there are no such rewards. If this explanation has some power, we should observe WTA moving closer to WTP in a market setting. Once the subject is confronted with a genuine final offer in a real market, there are no longer any gains from misrepresentation.[86]

As discussed above,[87] the evidence on convergence in a market setting is mixed. Coursey, Hovis, and Schulze[88] and Knez, Smith, and Williams[89] find that WTA and WTP do converge when the good in question is the right to avoid tasting SOA or a security, respectively. However, Knetsch, Thaler, and Kahneman[90] come to the opposite conclusion for small consumer goods. McClelland, Schulze, and Coursey[91] find that WTA converges quickly to WTP for uncertain gains, but does not converge at all for uncertain losses. Boyce, et. al.[92] find that WTA converges "close" to WTP for a Norfolk Island pine which will not be destroyed, but does not converge at all for a pine which will be destroyed if sold or not purchased.

2. Experimenters Frame Questions Incorrectly

In hypothetical surveys, respondents might interpret WTP and WTA questions as legitimately asking for different responses. For example, suppose an individual has a normal downward-sloping demand for a good, as shown in Figure 5. When asked for willingness to pay, the individual thinks of some number of units being sold and responds with the lower, shaded rectangle. This is the amount he or she would have to pay to obtain the good in a competitive market. When asked for willingness to accept compensation, on the other hand, the individual responds with the entire consumer's surplus over those units (the area under the demand curve). This total includes the shaded rectangle and the cross-hatched upper triangle. While this area also represents the true maximum willingness to pay, the individual either does not interpret the WTP question as asking for consumer's surplus or does not want to reveal the maximum willingness to pay to a surveyor.

[Figure 5 about here]

While this explanation may help to understand why survey responses to WTP and WTA questions are sometimes different, it also has problems for understanding how to interpret those differences. First, in many surveys it is not clear in what units a good is denominated. The surveyor may think the individual is being asked for WTA and WTP over one unit, while the individual may interpret in terms of multiple units. If each individual assumes a different number of units, there is no comparability across respondents. Second, it does not explain why subjects lowered WTA over the course of Coursey, Hovis, and Schulze's[93] auctions or why they gave WTA=WTP in McClelland, Schulze, and Coursey's[94] WTA/gain auctions. Why would they interpret the questions differently in one kind of WTA experiment and the same in another? Also, it fails to explain those experiments in which there were many fewer transactions than we would have anticipated.

IV. IMPLICATIONS

We will discuss two different types of implications from the WTA, WTP experiments. First, the positive implications center on differences in observed behavior.[95] The differential between WTA and WTP may suggest that both Coasian bargaining and organized markets may work differently than previously thought. Second, the normative implications are those dealing with which options policy makers think society ought to choose.

A. Positive implications

1. The Coase Theorem

In two-person bargaining situations, WTA exceeding WTP would tend to reduce the number of voluntary trades. In particular, if two parties are bargaining over a right, and if each party's WTA is greater than the other party's WTP, no trades can take place. In such circumstances, a buyer would be unable to offer enough money to persuade the owner to part with the right. For example, assume that George owned a hat and Ronald wanted to buy it. George's WTA=$15, but his WTP=$10. Ronald's WTP=$11 and his WTA=$16. Ronald would offer at most $11 while George would accept no less than $15, and no trade would occur. On the other hand, if Ronald owned the hat he would accept no less than $16, while George would offer no more than $10. In such circumstances, the right to the hat is "sticky"; it stays wherever it is.[96]

A profit-maximizing entrepreneur might change the preceding scenario significantly, however. Assume that Geraldine knew of George and Ronald's WTA and WTP. If Ronald owned the hat she could do nothing to make money. But if George owned the hat, she could pay George $15, allow Ronald to use the hat as if he owned it, and then later threaten to take the hat away. If allowing Ronald to use the hat were to raise his valuation of the hat from WTP to WTA, and some of the explanations (particularly the version of the endowment effect suggested by Radin's work) suggest that it would, Geraldine could get up to $16 in exchange for the hat. In this way, Geraldine could make a profit and, regardless of who started with the legal right to the hat, Ronald would end up with it. Further, if George knew the same things that Geraldine knew and had the same entrepeneurial skills, he could execute Geraldine's strategy himself. Hence, the Coase Theorem's invariance result might be restored in this simple scenario.

2. Markets

Recall that our simple model of organized markets involved supply and demand curves. The supply curve represented a graph of all the units that would be supplied in the market at each price. The demand curve represented a graph of all the units that would be demanded at each price. Consider the situation, depicted in Figure 6, in which two individuals, A and B, are exchanging units of a good for money. The vertical axis represents the unit price at which the good can be exchanged for money and the horizontal axis represents units of the good. Q_T represents the total amount of the good available for exchange. At 0 on the horizontal axis, person B owns all of the good. Transfers from B to A are represented by movements to the right along the horizontal

axis. At Q_T on the horizontal axis, person A owns all of the good. Transfers from A to B are represented by movements from Q_T to the left along the horizontal axis. The baseline condition, **in** which WTA=WTP <u>at every **Quantity**</u> for both A and B is represented by the curves $WTP_A=WTA_A$ and $WTA_B=WTP_B$. The graph is set up with A as the buyer and B as the seller, but since WTP=WTA for each person the roles could be reversed without changing the outcome.[97] The outcome, regardless of who owns the good to begin with, will be that A will end up with Q_A units and B will end up with Q_B units. The price for the units exchanged, regardless of who is buying and who is selling, will be P_e.

[Figure 6 about here]

Now, suppose that $WTA_A>WTP_A$ and $WTA_B>WTP_B$. This situation is depicted in Figure 7. The dashed WTP lines represent the baseline case illustrated in Figure 6 and the solid WTA lines illustrate the effect of WTA>WTP. Viewing the graph from left to right, A is the buyer, with the dashed demand curve WTP_A. B is the seller, with solid supply curve WTA_B. Now the equilibrium exchange finds B selling only $Q_A'<Q_A$ units to A at a higher price $(P_A>P_e)$- Similarly, if we view the graph from right to left, B is the buyer, with the dashed demand curve WTP_B. A is the seller, with solid supply curve WTA_A. Now the equilibrium exchange finds A selling only $Q_B'<Q_B$ to B at a price of $P_B>P_e$- Thus A ends up with more of the good, relative to the baseline case, if he or she owns it to begin with. Similarly, B ends up with more if he or she owns it to begin with. The final allocation of the good is not invariant to the initial distribution of rights. P_A might be greater than, less than, or equal to P_B. But, both prices will be higher than P_e, as long as demand is downward sloping (supply upward sloping) for both individuals. Thus, in general, fewer units are transferred at a higher price if WTA>WTP. These results — higher prices with fewer units tranferred from owners -- were derived assuming that the buyer and seller were price takers. If they were price seekers in the full sense of that term, we might reinvent the George/Ronald/Geraldine scenario discussed above. But the price taking assumption seems appropriate for extending these results to markets.

[Figure 7 about here]

The above discussion involving only two individuals extends immediately to competitive markets, simply by thinking of the individual supply and demand curve as market supply and demand curves. We offer two caveats. First, in a market, the equilibrium price and quantity are determined by the WTA and WTP of the marginal market participants. Thus, in a competitive market, it is possible for some participants to have WTA>WTP without that affecting market prices or transactions. As long as a sufficiently large number of participants have WTA=WTP for prices and quantities in the vicinity of the equilibrium we might never observe any reluctance to trade

from market data. However, if the marginal participants exhibit a reluctance to trade, we could observe the situation depicted in Figure 7. Second, the analysis assumes that WTA > WTP on both sides of the market. In many markets for new consumer goods, however, this is probably wrong. Sellers are firms, with WTA = WTP (we presume), while buyers are individuals. Hence, we have only to deal with the firms' WTP (= WTA) curve, and the individuals' WTP curve. But in other markets, such as the one for residential real estate, individuals are on both sides of the market in great numbers. In these markets the analysis applies.[98]

There may also be many implications for the analysis of political "markets." A quickly growing segment of political science analyzes politics from a rational choice perspective. Voters, political representatives, bureaucrats and interest groups all maximize their own welfare, subject to institutional constraints.[99] Virtually all of this work uses some form of expected utility theory as the basis for human motivation. If gains and losses are treated differently, at least by voters, in many situations, the implications for the analysis of politics could be tremendous. A recent article by Roger Noll and James Krier represents the first tentative steps in that direction, attempting to gain some purchase on the politics of risk regulation, when voters are presumed to care more about losses than gains.[100] Such an analysis could be extended to explain the particular political salience of military base closings or factory closings (as opposed to failing to open military bases or factories), increases in the unemployment rate, and many other issues.

B. Normative Implications

In this section we will speculate on some more general normative implications of WTA > WTP, suggesting that they may be extremely important.

1. Resolving Disputes About Rights and Damages

The courts are often called upon to determine which side to a dispute has the legal right to engage in some particular activity. For example, if a homeowner were to sue a smelter for polluting the air, the court would have to determine whether the smelter had the right to pollute or the homeowner had the right to clean air before determining whether an injunction should be allowed[101] or any damages paid.[102]

Calabresi and Melamed suggest that such disputes over rights should often be resolved by estimating the level of pollution which maximizes the net benefits and then assigning the rights so as to minimize the transactions costs associated with enforcing that level of pollution. Net social

benefits are estimated by subtracting the cost of reducing pollution from the benefits to the homeowner from reduced pollution. Net benefits are maximized when the marginal cost of further reductions in pollution exactly equal the marginal benefits.[103]

What is generally left out of this analysis is the possibility that WTA>WTP. If WTA>WTP, which value should be used to determine the benefit to the homeowner of reducing pollution in order to determine which side should have the right? For example, consider a situation in which the dirtiness of air is classified in parts per million (ppm) of particulate pollution. The air is currently dirty (1000 ppm) and the question is whether the smelter should be required to install scrubbers to reduce pollution to lOOppm and to compensate the homeowner for past pollution. Now, suppose the homeowner would require (WTA) $1000 to accept that reduction in air quality if the air started at lOOppm, but would only be willing to pay (WTP) $100 to effect that reduction in pollution if the air started out at lOOOppm. It will cost the smelter $500 to install the scrubbers.

If we accept the status-quo as determining which side has the right (the air is dirty, implying the smelter has the right to pollute) then the cost of reducing pollution is greater than the gain and the decision should be no scrubbers and no compensation. The net benefit from installing scrubbers is $-400. However, if the homeowner has the legal right to clean air, and if the legal right controls the choice of value, then the net benefit is $500 and scrubbers should be installed. Moreover, the homeowner has incurred real damages in excess of the cost of pollution control in the past. Which analysis is correct? Neither, without knowing the allocation of rights a priori. Yet, the determination of net benefits is often a part of the process of determining rights. Such an analysis is decidedly circular when WTA>WTP.[104]

This circularity proves troublesome for particular legal doctrines that rely on estimates of net benefits. For example, when accidents produce damages, tort law frequently allocates losses through use of the negligence rule. One version of the negligence rule asks whether or not a defendant could have taken cost-justified steps to avoid the accident. That is, the defendant is negligent, and hence must pay for the plaintiffs damages (sometimes including pain and suffering), if the defendant could have taken steps to avoid the accident such that the cost of prevention was less than the expected savings in accident costs.[105]

The negligence rule is a bit easier to understand with an example. We will use the famous case of Bolton v. Stone,[106] in which Bessie Stone was hit on the head by a cricket ball hit over the fence at a club across the street from her residence. The batsman's blow was quite unusual; only a few balls had ever been hit out of the park before. Ms. Stone sued the club, claiming that its failure to put up a higher fence was negligent. In effect, Ms. Stone claimed that the cost of putting

up a higher fence would have been less than the expected reduction in accident costs to those standing in their front yards across the street from the club. Because the club was negligent, Ms. Stone contended, the club should pay her medical expenses and other costs associated with her injury. Ms. Stone's claim required the court to compare the cost of putting up a higher fence with the reduction in expected accident costs by preventing the exit of the balls that would be caught by the higher fence. The potential disparity between WTA and WTP adds a crucial element of moral ambiguity into the court's negligence calculus. To see this, assume that it would cost $100 to put up a higher fence, that Ms. Stone would pay only $50 to be free of the cricket ball risk eliminated by the higher fence, but would demand $150 to agree to be subjected to that risk. If the court were to use the WTP values, the club would not be negligent, and Ms. Stone would have no claim against the cricket club. On the other hand, if the court were to use the WTA values, the court would find that the club could have avoided $150 of expected harm by spending only $100, clearly a cost-justified expenditure on accident avoidance. The club would be negligent and liable to Bessie Stone. The crucial question becomes: which figures should the court use? Unfortunately, there is no easy or obviously correct answer.[107]

Jack Knetsch has suggested resolving the moral ambiguity by giving special status to the benefits enjoyed by people in the status quo.[108] He says that if people are enjoying clean air, water, access to sunshine, etc., that any net benefit assessment should use the WTA figures for giving up these benefits, regardless of whether or not the people truly have the legal right to these benefits. We should, he says, discount the value of the resources they are enjoying by the probability that they can continue to enjoy them. "The welfare associated with any set of expectations and entitlements will likely, all other things equal, reflect their security; more tenuous ones will be discounted relative to ones more certain of protection."[109] Thus, if there is a chance that a court will not uphold the losers' legal rights to enjoy the resources they would lose, the value of enjoying those rights should be discounted.

Knetsch's reference to "expectations and entitlements" injects ambiguity into the analysis. If we focus on "entitlements," then Knetsch's resolution of the problem is really the "property rights" solution, described above. Instead of just determining, by some method, whether or not the about-to-be disappointed claimants really have a legal right to use the resources that may be withdrawn from them (and using the WTA value if they have a legal right, the WTP value if they do not) Knetsch would presumably compute the probabilities of the alternative legal outcomes, multiply the WTA and WTP values by their probabilities, and then sum to get the value of the rights. In essence, the correct value, for Knetsch, is grounded in whether or not the claimants have legal rights to the resources they currently enjoy, but discounted for risk. However, this has the same

basic problem that we noted above. If we must rely on who has the rights before we start the analysis, we inject circularity into the whole process.

However, if we focus on "expectations," then Knetsch is saying something quite different. He is claiming that policy analysis and legal decisions ought to turn on values implied by individuals' true beliefs about the status quo, regardless of the legal rules.[110] Such an approach might have some promise, but will face several problems, both practical and normative. On the practical side, it may be difficult to get disputants to reveal their honest beliefs about the status quo when they know that their rights or wealth depend upon the answers.[111] In addition, we will often face situations involving conflicting, inconsistent beliefs about the status quo. Shall the analyst or judge prefer one or another of the beliefs, or construct some new, artificial belief out of those honestly held by the parties involved? If the analyst or judge is to choose the beliefs of one of the parties, he or she must do so on some basis other than the legal rights of the parties, lest we reinvent the circular arguments in the paragraphs above.[112] This will require some moral theory about why we ought to respect some view of the status quo. This moral theory might point to some view of the status quo not held by anyone, in effect requiring the analyst or jurist to construct a new, artificial belief. But this points out the inexorable link between the practical problems and the normative ones. Thinking about how to privilege some beliefs over others requires one to explain why we ought to pay attention to any beliefs about the status quo. If we have good reason for rejecting all beliefs about the status quo as unreasonable, for example, we may not want to use those beliefs as the basis for a cost/benefit analysis that will support policy recommendations or judicial decisions.

The disparity between WTA and WTP could also figure into other normative systems. In a recent working paper[113], Knetsch and coauthor David Cohen suggest that the Aristotelian notion of corrective justice (often referred to as "fairness" in the working paper) depends on this disparity in valuation. Although the exact outline of their argument remains unclear to us after reading their paper, they emphasize that disruptions in our patterns of ownership or possession[114] produce losses that are deeply felt. Apparently, courts should neither allow private parties to impose such losses, nor impose them by judicial act.

The Cohen and Knetsch effort deserves credit. They are trying to build upon this new body ofknowledge about valuation, and integrate this knowledge into a theory of how rights ought to be respected by the court.[115] But they are still a long way from being finished. First, they are far from clear at explaining how the disparity between WTA and WTP fits into their argument. They must show that the disparity strengthens their justice argument to be something more than a thesis about protecting "rights,"[116] without simultaneously leading back to efficiency analysis. As a part of this enterprise, Cohen and Knetsch must solve the same problems of identifying the morally

appropriate status quo. This task is approximately the same as that involved in identifying "reasonable" expectations about the status quo. Second, Cohen and Knetsch build an argument based upon the presumption that WTA > WTP everywhere, for everyone, and at all times. Thus, they "explain" and justify the law of adverse possession,[117] recovery of lost profits in tort and contract,[118] contract modifications,[119] gratuitous promises,[120] opportunistic conduct in contractual performance or negotiation,[121] and repossession,[122] with reference to the same disparity between WTA and WTP. However, some of the parties are individuals, while others are corporations. And the subject matter of the disputes Cohen and Knetsch review range from the very personal (such as jewelry or furniture) to completely fungible (such as aluminum ore or money). The evidence reviewed above suggests that the disparity may vary widely between these cases. Consequently, Cohen and Knetsch's analysis should probably track the variations in the disparity, or else provide a good reason for failing to do so.

A similar critique applies to the most prominent attacks upon cost benefit analysis.

Duncan Kennedy and Mark Kelman made many of the arguments in the paragraphs above, based upon the presumption that WTA>WTP, and suggested that cost/benefit analysis lacks legitimacy. But their analysis rested upon a rather blunt notion that WTA>WTP, without any notion of the limitations of the evidence on that question. Moreover the legal articles that cite Kelman and Kennedy also adopt the same blunt proposition that WTA>WTP.[123]

This brings us to the central normative insights of our paper. If the evidence were to show that WTA>WTP under all circumstances, then the Kelman/Kennedy critique of cost/benefit analysis, and Cohen and Knetsch's corrective justice argument, might represent the state of the art. But the evidence simultaneously suggests a far more complex pattern relating WTA to WTP, and leaves many of the details of this relationship unresolved. If we were to apply the evidence reviewed in this paper to the normative issues involving either assignments of legal rights or determinations of damages, we might produce some different conclusions by resolving some of the issues left unanswered by the experimental evidence. If it is ultimately shown that only consumers have WTA>WTP, then we need not worry about this source of changes in valuation in disputes between commercial firms.[124] In addition, if it turns out that WTA=WTP for securities representing rights to cash flows, then we need not worry about this source of changes in valuation in legal disputes about financial instruments. Resolving questions about whether or not repeated participation in markets causes WTA to equal WTP, about how long it takes for consumers to shift from WTP to WTA for newly acquired rights, about exactly why people have a WTA greater than their WTP, and so forth, could further help to define the circumstances in which we could use the cost/benefit definition of negligence in torts, in which an individual's valuation of his goods could

be the measure of damages, and in which the cost/benefit approach to the allocation of rights might be used with some confidence.[125] Similarly, Cohen and Knetsch could use these guidelines to retire and enhance their corrective justice theories.

Of course, none of this shows that cost/benefit analysis is the appropriate mode of moral discourse for resolving any class of disputes. The critics of the various forms of cost/benefit analysis have launched some extremely powerful attacks upon that norm.[126] Those who have already renounced cost/benefit analysis because of the other attacks will regard our suggestion -- that one should narrow the domain of cost/benefit analysis -- as irrelevant. After all, one can hardly narrow the use of a totally unused norm. But for those who still feel that cost/benefit analysis might have a use, the data reviewed in this article provide crucial, cautionary guidance.

2. Government shaping of preferences

In the long run, different governmental policies can shape individuals' preferences. Public provision of interesting, effective, challenging schools may lead to a taste for better education in the next generation. Laws requiring that dog owners clean up after their pets may lead to a stronger preference for clean streets. Laws preventing people from selling babies or beating their spouses and children may shape our attitudes towards the family. The list can go on indefinitely.

Economists have tended to ignore the interactions between laws and preferences.[127] In order to make analysis tractable, economic analysis has taken individuals' preferences as given and then asked what laws and social institutions would serve those preferences. In fact, microeconomics ' texts explicitly state that economics is not worried about what are good or bad preferences. Instead, economic theory accepts people's preferences as they are and then asks how people behave when guided by these preferences.[128] Economic analysis of law has been no exception to this rule -- preferences have been treated as if they were fixed by other forces.

The evidence of WTA>WTP may ultimately force economists to stop avoiding the interaction between policies and individuals' preferences. The disparity between WTA and WTP seems to arise very quickly, if the Knetsch, Thaler, and Kahneman results are to be believed. This result suggests that preferences might change rather quickly as a result of policy changes. And because the ratio of WTA to WTP ranges between 1.5 and 5, the disparity is too big to be ignored. For example, return to our hypothetical example of a homeowner and a smelter. If they are located next to one another, and the smelter's operations degrade the environment enjoyed by the homeowner, the law will be forced to decide (in our simplified example) whether or not the smelter's operations violate the

homeowner's right to a clean environment. If the homeowner has the right to a clean environment, his WTA » $1000, but if he has no such right, his WTP = $100. When an economic analysis of this law is done, there will be no avoiding the fact that choosing the legal rule also chooses the homeowner's preferences. The economic analysis will have to confront the question of whether the homeowner ought to value the environment highly. At present an economist would not address such a question. Philosophers have already studied this topic,[129] and economists may have to become familiar with the discourse.

V. CONCLUSIONS

The experimental evidence clearly suggests that WTA <u>may</u> exceed WTP by substantial amounts. Exactly when this will occur is not yet clear, nor are the explanations for this phenomenon. In market settings the WTA/WTP disparity tends to raise prices and reduce the number of profitable transactions. In a two-person bargaining setting, WTA>WTP is one reason why rights may be "sticky," in that they tend not to be traded once they are assigned.

Despite the evidence summarized above, however, the verdict is still out on the extent of the difference between WTA and WTP. First, there are many instances in which consumers readily engage in trade: buying and selling of used cars, flea markets, and garage sales. Consumers readily part with their older cars in trade for new or newer models, even when they might have gotten a better price from a private sale. Similarly, at flea markets and garage sales, consumers sell used clothing and housewares for far less then the cost of replacement. Second, the experimental evidence needs further, independent, replication before it will be fully convincing.[130]

If we finally conclude that WTA>WTP in specific circumstances, then the basic normative implications are reasonably clear courts cannot <u>always</u> legitimately use the cost/benefit definition of negligence, nor <u>always</u> rely upon individuals' values as unproblematic measures of damages, nor <u>always</u> use cost/benefit analysis to assign rights. The Kelman and Kennedy critiques anticipated this much. But in some circumstances WTA might equal WTP, and under those circumstances courts <u>might</u> be able to utilize individual values and the various forms of cost/benefit analysis that are based thereon. Further research should help trace the boundaries of these circumstances.
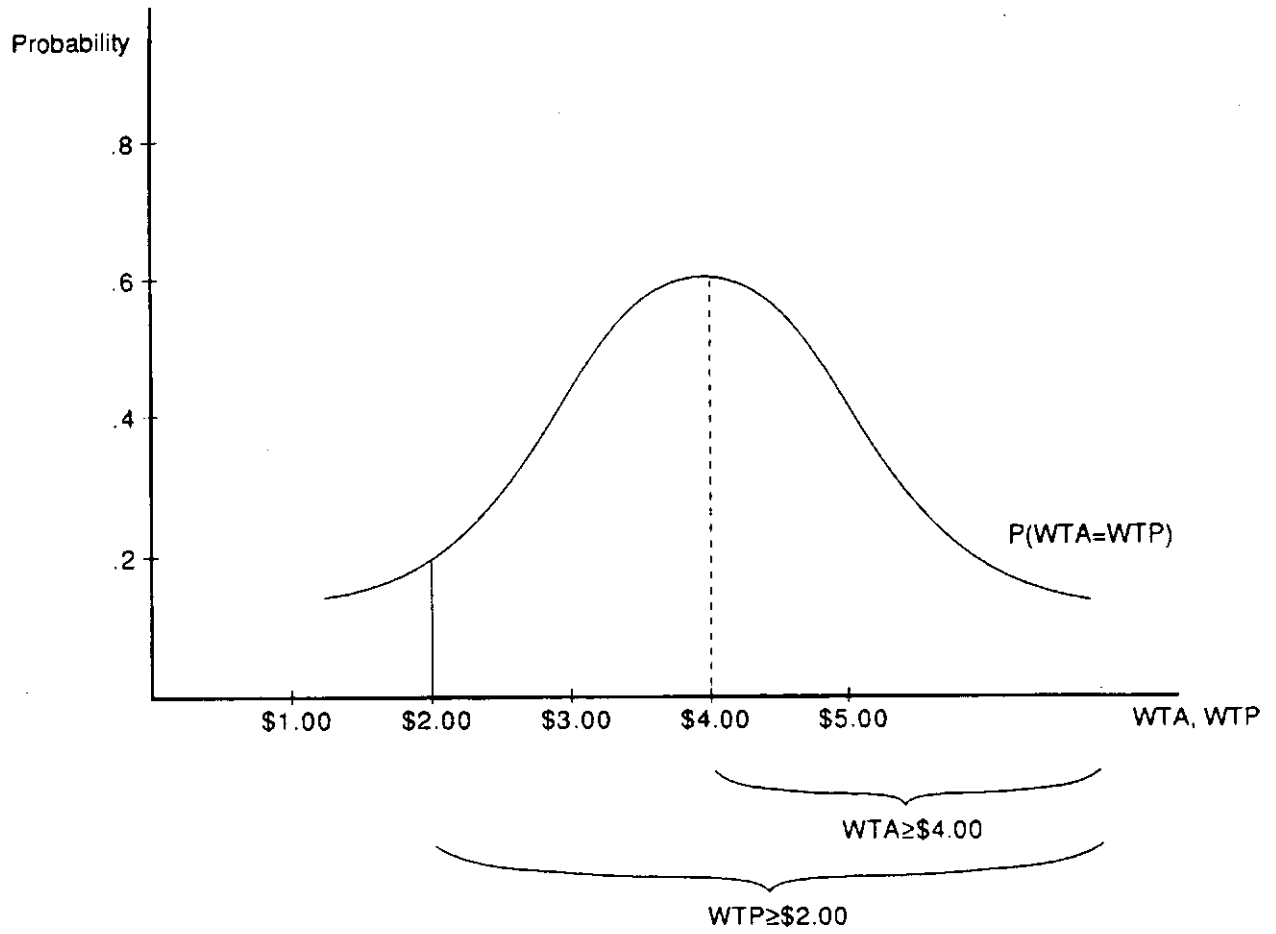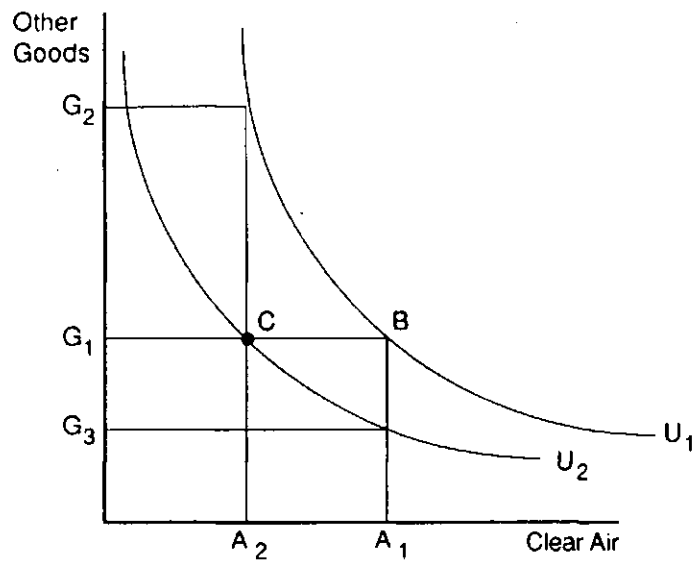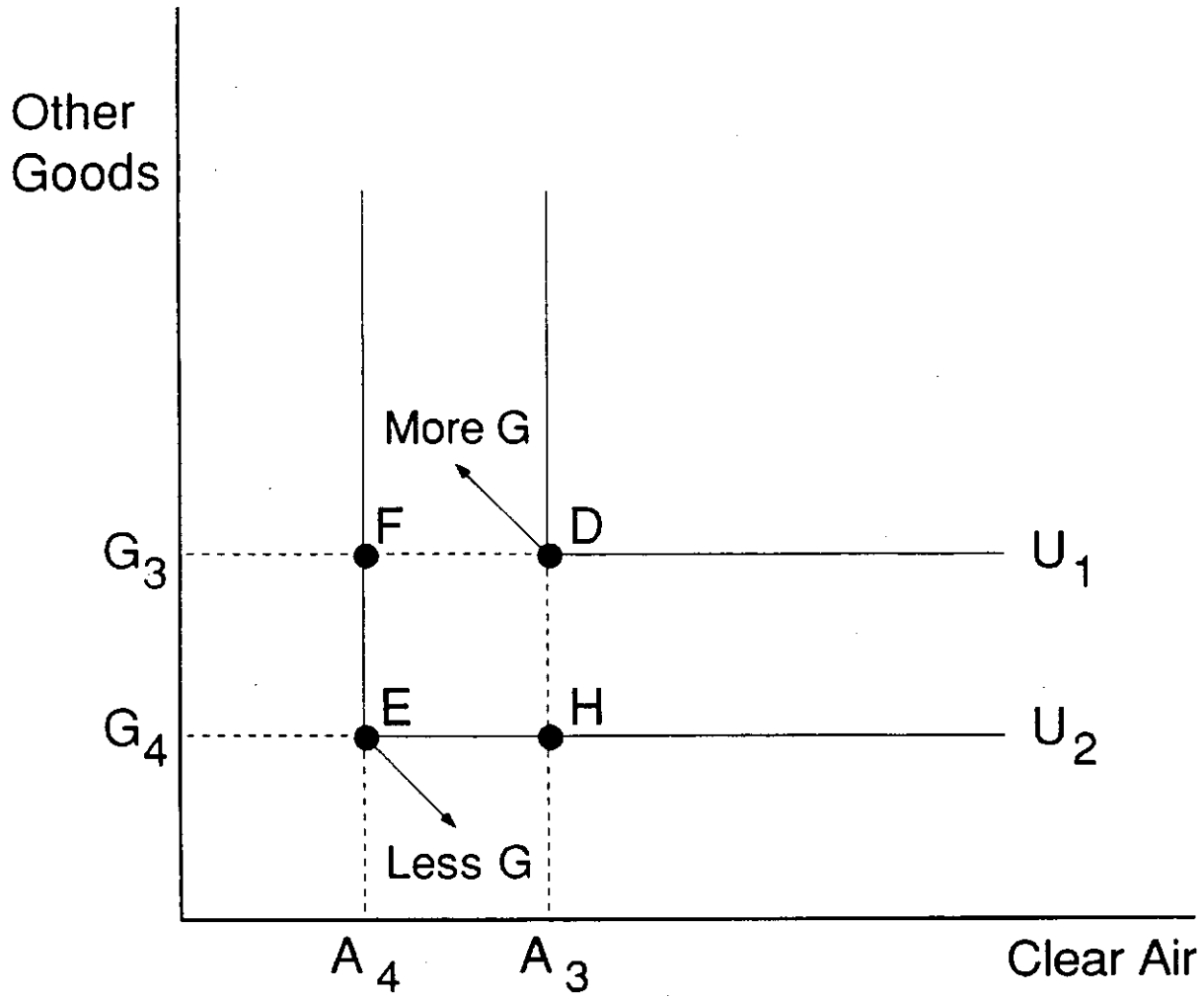
Figure 1

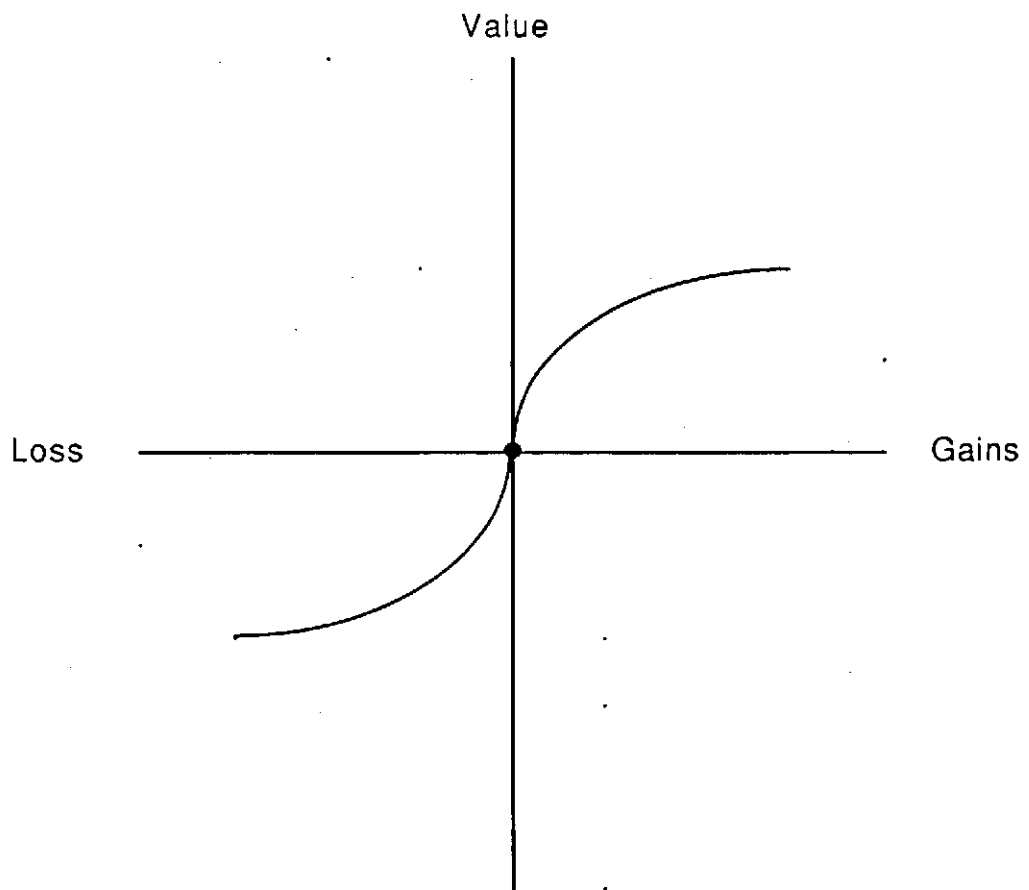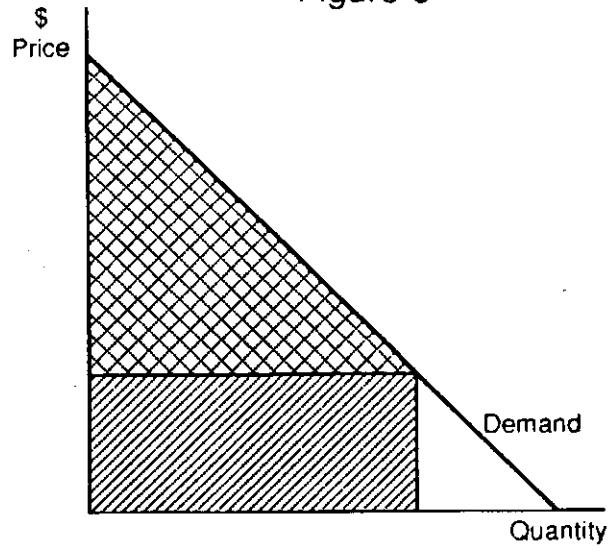# Figure 2

Figure 3

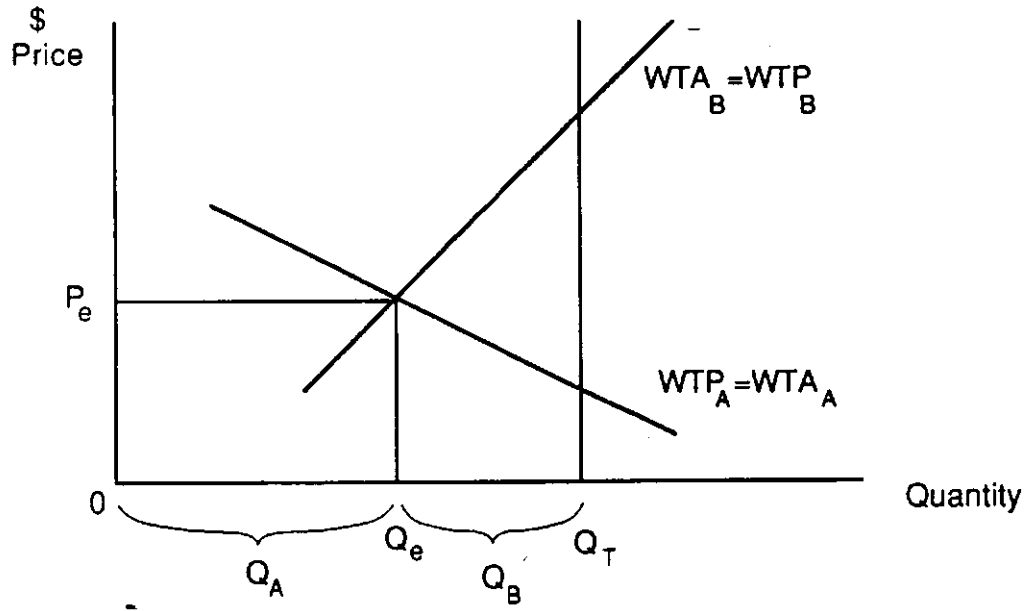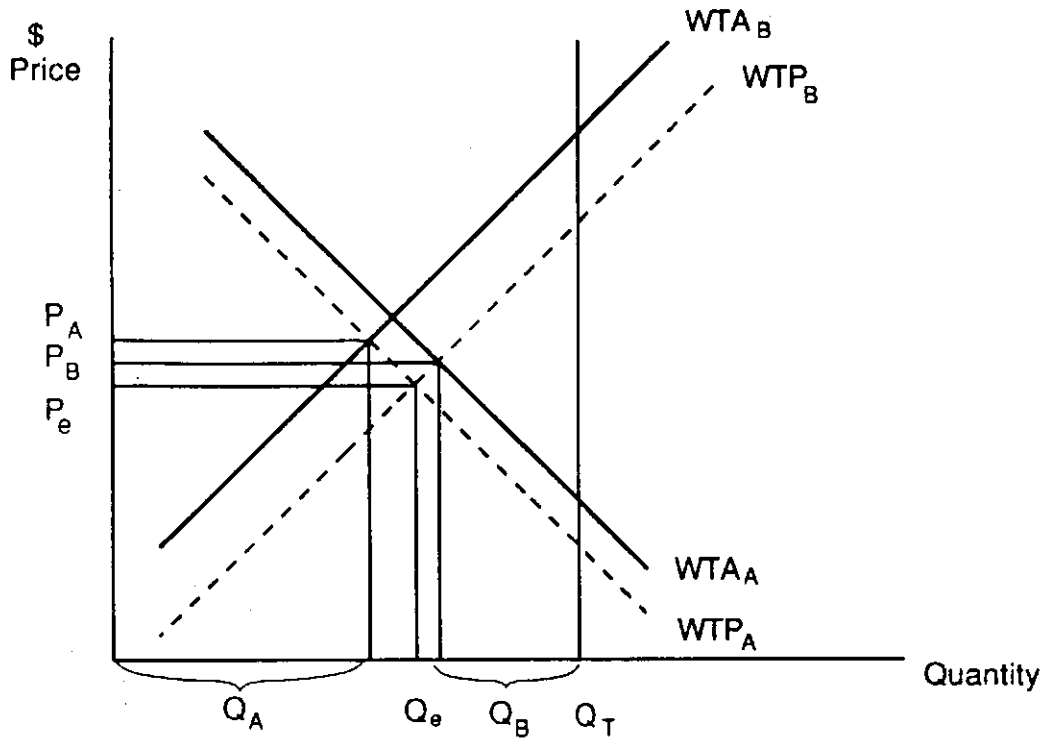# Figure 4

Figure 5

Figure 6

Figure 7

ENDNOTES

* We acknowledge the valuable assistance of Brian R. Binger, Linda Cohen, Richard Craswell, John Ledyard, Charles Plott, and Vernon Smith. We thank Bruce Drossman and Chris O'Brien for research assistance.

1. Ronald Coase, The Problem of Social Cost, 3 J. Law & Econ. 1 (1960). See also Elizabeth Hoffman and Matthew L. Spitzer. The Coase Theorem: Some Experimental Tests. 25 Journal of Law and Economics 73-98 (1982) for a discussion of research on the Coase Theorem.

2. If one side values control of the air more than the other side at every relevant air quality level, then the parties will transfer the entire right to the air to the party that values it more, regardless of which party is assigned the right initially. If the homeowner values this right more than the smelter does, then the homeowner will end up with the right, regardless of the party to which it is assigned by law. When the law assigns the right to the homeowner, the smelter will choose not to purchase the homeowner's permission to degrade the air. But when the law assigns the right to the smelter, the homeowner will pay the smelter to stop polluting completely, in essence purchasing the right to pristine air. On the other hand, if the smelter values the right to emit smoke more than the homeowner values the right at any level of clean air, the smelter will end up with the right to emit as much smoke as it chooses.

3. See, e.g., Jules L. Coleman, Efficiency, Utility, and Wealth Maximization, 8 Hofstra L. Rev. 509 (1980).

4. Richard Posner, Economic Analysis of Law 45 (3rd Ed. 1986).

5. Calabresi & Melamed, Property Rules, Liability Rules and Inalienability: One View of the Cathedral, 85 Harv. L. Rev. 1089 (1972); Mitchell Polinsky, An Introduction to Law and Economics 15-27 (2nd Ed. 1989); William M. Landes & Richard A. Posner, The Economic Structure of Tort Law 36-37 (1987); See also Richard Craswell, Contract Remedies, Renegotiation, and the Theory of the Efficient Breach, 61 So. Cal. L. Rev. 630 (1988)(pointing out that property rules may distort other decisions).

6. Robert Cooter and Thomas Ulen, Law and Economics 344-54 (1988)(using reversible indifference curves to describe damages rules). See also Landes & Posner, supra note 4 (using damage functions that do not depend on the rights defined in the status quo); Steven Shavell, Economic Analysis of Accident Law (1987)(also using damage functions that do not depend upon the allocation of rights); and Werner Z. Hirsch, Law and Economics: An Introductory Analysis (1986)(also discussing liability rules so as to make damages independent of the allocation of rights).

7. See Symposium on Efficiency as a Legal Concern, 8 Hofstra L. Rev. 485 (1980); and A Response to the Efficiency Symposium, 8 Hofstra L. Rev. 811 (1980).

8. The transactions costs arguments might be thought to lose force because they are, in essence, justified by the Kaldor-Hicks compensation criterion, which is no longer well-defined. On the other hand, a pragmatist might argue that although we cannot know who should end up with the right, we should save transactions costs in any situation where we strongly suspect that one party will buy the right, so as to reduce resources that are spent on achieving the inevitable.

9. See discussion in TANs xx - yy, infra.

10. See Duncan Kennedy, Cost-Benefit Analysis of Entitlement Problems: A Critique, 33 Stan. L. Rev. 387 (1981) and Mark Kelman, Consumption Theory, Production Theory, and Ideology in the Coase Theorem, 52 So. Cal. L. Rev. 669 (1979). To be fair, both of these works were produced before much of the work reviewed in this article. However, Kelman's book, A Guide to Critical

Legal Studies, repeats the arguments at 145-48, and was written well <u>after</u> much of the economic work. [Add Baker and others]

11. In this regard, it is responsive to Robert C. Ellickson, Bringing Culture and Human Frailty to Rational Actors: A Critique of Classical Law and Economics, 65 Chi-Kent L. Rev. 23, 35-40 (1989).

12. R. D. Willig, Consumer's Surplus without Apology, 66 American Economic Review 589 (1976).

13. See William D. Schulze, Ralph C. d'Arge and David S. Brookshire, Valuing Environmental Commodities: Some Recent Experiments, 57 Land Economics 151-72, at 151 (May 1981); Philip A. Meyer, Publicly Vested Values for Fish and Wildlife: Criteria in Economic Welfare and Interface with the Law, 55 Land Economics 223-35 (May 1979); and Robin Gregory, Interpreting Measures of Economic Loss: Evidence from Contingent Valuation and Experimental Studies, 13 Journal of Environmental Economics and Management 325-37 (1986); W. Kip Viscusi, Wesley A. Magat, and Anne Forrest, Altruistic and Private Valuations of Risk Reduction, 7(2) Journal of Policy Analysis and Management 227-45 (1988); Mark C. Berger, et. al., Valuing Changes in Health Risks: A Comparison of Alternative Measures, 53(4) Southern Economic Journal 967-84 (1987); Trudy Ann Cameron and Michelle James, Efficient Estimation Methods for "Closed-ended" Contingent Valuation Surveys, 69(2) Review of Economics and Statistics 269-76 (1987); Shelby Gerking and Linda R. Stanley, An Economic Analysis of Air Pollution and Health: The Case of St. Louis, 68(1) Review of Economics and Statistics 115-21 (1986); Francis Antonovitz and Terry Roe, A Theoretical and Empirical Approach to the Value of Information in Risky Markets, 68(1) Review of Economics and Statistics 105-14 (1986); M.W. Jones-Lee, M. Hammerton, and P.R. Philips, The Value of Safety: Results from a National Sample Survey, 95 Economic Journal 49-72 (1985); Richard G. Walsh, John B. Loomis, and Richard A. Gillman, Valuing Option, Existence, and Bequest Demands for Wilderness, 60(1) Land Economics 14-29 (1984); I. Majid, J.A. Sinden, and Alan Randall, Benefit Evaluation of Increments to Existing Systems of Public Facilities, 59(1) Land Economics 377-92 (1983).
    See generally R.G. Cummings, D.S. Brookshire and W.D. Schulze, Valuing Environmental Goods: An Assessment of the Contingent Valuation Method (Rowman & Allanheld 1986); Richard T. Carson and Peter Navarro, Fundamental Issues in Natural Resource Damage Assessment, 28 Natural Resources Journal 815 (1988); and Robert C. Mitchell and Richard T. Carson, Using Surveys to Value Public Goods: The Contingent Valuation Method (Resources for the Future, 1989)
    Recent theoretical work on consumers' willingness to pay for non-traded goods fails to take account of any disparity between WTA and WTP. See Jon R. Neill, Bounds on the Willingness to Pay for Non-traded Goods, 30 Journal of Public Economics 267 (1986); and Jon R. Neill, Another Theorem on Using Market Demands to Determine Willingness to Pay for Non-traded Goods, 15 Journal of Environmental Economics and Management 224 (1988).

14. See Valuing Environmental Goods, supra n._____, at pages 21-33; and Robin Gregory and Donald MacGregor, Valuing Changes in Environmental Assets, in Economic Valuation of Natural Resources: Issues, Theory and Applications (Westview, 1990, R. L. Johnson and G. V. Johnson, Eds.).
    Two of the authors of this book made very similar arguments in an exchange with Mark Kelman. In Mark Kelman, Consumption Theory, Production Theory, and Ideology in the Coase Theorem, 52 Southern California Law Review 669-698 (1979), Kelman stated that informal survey evidence showed that WTP and WTA diverged substantially. In Matthew Spitzer and Elizabeth Hoffman, A Reply to Consumption Theory, Production Theory, and Ideology in the Coase Theorem, 53 Southern California Law Review 1187-1214 (May 1980), we agreed that WTP and WTA might diverge, but contended that Kelman's informal survey evidence was so flawed as to be useless. However, as the text of our current article makes clear, we now believe that reliable evidence suggests that Kelman's central intuition may have been correct. There are also some articles reporting field data that are suggestive of the disparity between WTA and WTP. See especially Russell S. Winer, A Reference Price Model of Brand Choice for Frequently Purchased Products, 13 Journal of Consumer Research 250-56 (1986); Bernard Van Praag, The Welfare

Function of Income in Belgium: An Empirical Investigation, 2 European Economic Review 337-69 (1971). For a recent extension and partial confirmation, see Huib van de Stadt, Arie Kapteyn, and Sara van de Geer, The Relativity of Utility: Evidence From Panel Data, 67 The Review of Economics and Statistics 179 - 87 (1985).

15. D.L. Coursey, J.J. Hovis, and W.D. Schulze, On the Supposed Disparity Between Willingness to Accept and Willingness to Pay Measures of Value, 102 Quarterly Journal of Economics 679-690 (1987). See also R. Gregory and L. Furby, Auctions, Experiments, and Contingent Valuation, 55 Public Choice 273 (1987); and Don L. Coursey, Markets and the Measurement of Value, 55 Public Choice 291 (1987).

16. Gregory and Furby, supra note xx.

17. Gregory and Furby, supra, note xx.

18. IcL, at 279. This point is also argued by Jack L Knetsch and J.A. Sinden, The Persistence of Evaluation Disparities, 102 Quarterly Journal of Economics 691-695 (1987). Knetsch and Sinden criticize Coursey, et. al. for providing a $10 cash payment for participation in the experiment to WTP subjects, but not to WTA subjects. I&. at p. 693.

19. Coursey, Hovis, and Schulze, supra n._____

20. Cox, Roberson, and Smith, supra, n____

21. Don L. Coursey and Vernon L. Smith, Experimental Tests of an Allocation Mechanism for Private, Public, and Externality Goods, 86 Scandinavian Journal of Economics 468 (1984).

22. See Cox, Smith, and Walker, Expected Revenue in Discriminative and Uniform Price Sealed-Bid Auctions, in Smith (ed.), 3 Research in Experimental Economics. (1985); and Kagel, Harstad, and Levin, Information Impact and Allocation Rules in Auctions with Affiliated Private Values, 55 Econometrica 1275 (1987)

23. Coursey   and   Smith,   supra   n .

24. Cox, Smith and Walker, supra n._____.

25. Coursey, Hovis, and Schulze, supra n   .

26. Coursey and Smith, supra n._____.

27. Cox, Smith, and Walker, supra n._____.

28. Cox, Roberson, and Smith, supra n._____.

29. "Column (4) in Table 1, reporting observed market clearing prices for the private good shows a strong tendency to be much below the demand revealing competitive equilibrium prices   (p. 479), Coursey and Smith, supra n._____.

30. Gregory and Furby, supra n._____.

31. Rebecca R. Boyce, Gary H. McClelland, William D. Schulze, Thomas Brown, and George Peterson, "Economic Explanation of the Empirical Disparity Between Willingness to Pay (WTP) and Willingness to Accept (WTA) Compensation," University of Colorado Laboratory for Economics and Psychology Manuscript.

32. The idea is that preserving a species or an unspoiled wilderness area might have value because of the irreversibility of species extinction or environmental deterioration. Preservation maintains the option or future use.

33. The B D M mechanism works as follows in this experiment. In the WTP experiments each participant is asked to name a willingness-to-pay for a specific Norfolk Island pine, placed on his computer terminal. G . M . Becker, M . H . DeGroot, and J. Marshak, "Measuring Utility by a Single-response Sequential Method," 9 Behavioral Science 226 (1964). After each participant has indicated his WTP, a different bingo ball is drawn from a bingo cage, with replacement, for each participant. Thus, each participant's reference value is independent of each other participant's reference value, eliminating one potential reason for misrepresentation in the fifth-price auctions. Each bingo ball represents a different dollar amount and the schedule is known to the participants. If a participant's WTP is greater than or equal to the dollar amount associated with his bingo ball, he pays his WTP and gets to take the houseplant home. If his WTP is less than the dollar amount associated with his bingo ball, he does not purchase the houseplant. Participants in the WTP experiments are given an initial balance of $40.00. There are ten trial auctions. Plants are actually sold in the eleventh auction.

     The WTA experiments are symmetric, with ten trial and one sale auction. Each participant is endowed with a Norfolk Island pine, placed on his computer terminal, and is asked to state a willingness-to-accept to sell the plant back to the experimenter. If the participant's WTA is less than or equal to the dollar amount associated with his bingo ball drawn, then he receives his WTA and does not take home the plant. If his WTA is greater than the dollar amount associated with his bingo ball drawn, then he keeps the plant and receives no additional money. Participants in the WTA experiments are given an initial balance of $30.00. The $10.00 difference is hypothesized to control for wealth effects: in the WTP experiments the participants start with cash only; in the WTA experiments they start with cash plus a plant.

34. Each participant fills out a hypothetical questionnaire before the experiment begins. Each participant is shown a picture of a Norfolk Island pine and read a description of the plant. He is then asked to state either the most be would pay to purchase one or the least he would accept to sell one he owns. Participants who are going to participate in the kill experiments are told the plants would be destroyed if they do not buy or keep them. Participants who are going to participate in the no kill experiments are given no information about the future disposition of the plants. Finally, to reduce the emotional effect of the laboratory environment, the kill surveys are also administered to a sample of University of Colorado staff and students in the workplace. The sample is designed to match, as closely as possible, the participants in the laboratory experiments.

35. Boyce, et. al.. supra n._____.

36. All differences are significant at the 5% level; the hypothesis of equal means can be rejected at the 5% level of significance with a nonparametric Wilcoxon Rank Sum Test.

37. Coursey, Hovis, and Schulze, supra, note_____.

38. Gary McClelland, Michael McK.ee, and William Schulze, "The B D M Lives: Task Transparency and Payoff Dominance," paper presented to the Economic Science Association Annual Meetings, October 26-28, 1990.

39. Jack Knetsch, Richard Thaler, and Daniel Kahneman, Reluctance to Trade: An Experimental Refutation of the Coase Theorem, American Economic Association Meeting, December, 1985; and Jack L. Knetsch, "The Endowment Effect and Evidence of Non-Reversible Indifference Curves," 79 American Economic Review 1277 (1989).

40. Of course, the criticisms of the responses in Coursey, Hovis, and Schulze's experiments apply here as well.

41. Another possible interpretation of their data sheds further light on the relationship between wealth effects and the possibility of a divergence between willingness-to-pay and willingness-to-accept measures of value. Suppose, for example, that, in the absence of any wealth effects, WTP=WTA. Now, suppose we endow half the group with a good such as coffee mugs or pens. That group is now wealthier than the other group by virtue of having a larger endowment. If demand for the good in question is increasing in wealth, then the demand curve for the wealthier group should be higher than the demand curve for the poorer group. Similarly, if we view each subject's supply curve as the number he or she is willing to part with at different prices, the wealthier group is going to require a higher supply price to part with each successive unit. The combination of a low demand price from the poorer buyers and a high supply price from the wealthier sellers results in fewer trades than would be expected if there truly were no wealth effects. While one might reasonably argue that wealth effects are not likely to be that large, the fact is that we cannot tell the extent of wealth effects without assuming a cardinal utility measure. We simply cannot predict the magnitude of a "small" or "large" income effect in a world of ordinal utility.

Applying this reasoning to the observed divergence between WTP and WTA in environmental surveys is straightforward. Suppose we consider the issue of visibility in the Grand Canyon. If the air in the Grand Canyon is pristine you are, in effect, wealthier than if the air is dirty. Thus, by the above argument, you will demand a higher compensation to "sell" some of that pristine air than if you did not own it to begin with. And, symmetrically, if you do not already have clean air, your demand price is lower than if you do. (The authors wish to thank Vernon Smith for suggesting this idea for rationalizing the experimental results.)

42. Knetsch, Thaler, and Kahneman, supra, n._____.

43. Id,, at p. 27.

44. Peter Knez, Vernon L. Smith, and Arlington W. Williams, Individual Rationality, Market Rationality, and Value Estimation, 75 American Economic Review 397 - 402 (May 1985).

45. Gary H. McClelland, William D. Schulze, and Don L. Coursey, "The Effects of Framing and the Status Quo on Compensating and Equivalent Variation Measures of Value," Public Choice Annual Meetings, March, 1987; and Gary McClelland and William Schulze, "Can a Maximin Response to Uncertainty Explain the Unexpected Disparity Between Willingness to Pay and Willingness to Accept Measures of Value?" University of Colorado Manuscript (1989).

46. McClelland, Schulze, and Coursey, Id, at 3.

47. McClelland and Schulze, supra, n._____.

48. McClelland and Schulze suggest that subjects generally bid or ask their estimate of actuarial value when asked. However, in some circumstances some (but not all) subjects respond on the basis of the worst possible outcome, demanding payment equal to the value of the worst possible loss. This is called the "maximin" response, for "maximizing the minimum" outcome. The main drawback to McClelland and Schulze's explanation is that it leaves unexplained why subjects utilize actuarial value responses in three of the four experiments, but (some) suddenly shift to a worst case in the WTA loss experiments. Until McClelland and Schulze provide the missing piece of the puzzle, their explanation must be regarded as the beginning of a theory, promising but not yet complete. Boyce, et. al.'s (Boyce, et. al.. supra, note_____.) argument, summarized above, (See, Infra, p._____.) that WTA>WTP when there is existence value for a good being sold, is similar to the argument that individuals may pursue a worst-case choice rule in some situations. Two of their results support this analysis: 1) WTA>WTP

by substantially more when the plant is to be destroyed than when it is to be recycled; and 2) both WTP and WTA are higher when the plant is to be destroyed.

To see this point, consider the worst case in each experimental treatment. (See Table 1, <u>Infra</u>. p._____.) In the WTP/<u>no kill</u> experiments, for example, the worst case is that an individual will purchase the plant and then not want it. If it is not purchased, it simply goes back to be offered for sale at the next experiment. In the WTA/<u>no kill</u> experiments, the worst case is that an individual will sell the plant and then wish he had kept it. He might indicate a higher WTA than WTP if he is not sure of his preferences for Norfolk Island pines, but the difference could be small. In the WTP/kill experiments, on the other hand, the worst case, for some participants, is that the plant will be destroyed. Moreover, the psychological effect of that worst case could be intensified in the WTA/kill experiments. An individual is likely to feel more responsible for the death of a tree he owned and sold than for the death of one he did not buy.

This explanation may help us to understand why WTA might exceed WTP in circumstances involving either extreme differences in worst-case scenarios or considerable psychological stress. In particular, it may help us understand the large differences between WTA and WTP for environmental amenities. However, it does not help us understand why WTA>WTP for simple consumer goods or for monetary securities.

49. Knez, Smith, and Williams, supra n._____.

50. McClelland, Schulze, and Coursey, supra n._____.

51. David S. Brookshire and Don L. Coursey, Measuring the Value of a Public Good: An Empirical Comparison of Elicitation Procedures, 77 Am. Econ. Rev. 554-6 (April 1987).

52. <u>Id.</u> at 559.

53. <u>Id.</u> at 559.

54. <u>Id.</u> at 560, fn. 6.

55. Jack L. Knetsch and J. A. Sinden, Willingness to Pay and Compensation Demanded: Experimental Evidence of an Unexpected Disparity in Measures of Value, 99 Quarterly Journal of Economics 507-21 (August, 1984).

56. <u>Id.</u>, at 510.

57. Knetsch, Thaler, and Kahneman, supra n. _____.

58. Knetsch and Sinden, supra n. ____, at 514 -16.

59. Notice that this evidence for WTA>WTP is far stronger than their evidence that fewer participants accepted $2.00 to sell than were willing to pay $2.00 to buy. If they are correct that average WTP is $1.28 and average WTA is $5.18, then the observed difference between willingness to buy and willingness to sell <u>is</u> indicative of WTA>WTP.

60. Knetsch, Kahneman, and Thaler, supra n. _____.

61. W. Michael Hanemann, Willingness to Pay Versus Willingness to Accept: How Much Can They Differ? Amer. Econ. Rev. (forthcoming)

62. Quoted by Richard Carson and Peter Navarro, Fundamental Issues in Natural Resource Assessment, 28 Natural Resources Journal 815 (1988).

63. Notice that even this extreme example only violates the assumption of diminishing marginal rates of substitution.

64. Daniel Kahneman and Amos Tversky, Prospect Theory: An Analysis of Decision Under Risk, 47 Econometrica 263 (March 1979). Tversky and Kahneman have recently formalized prospect theory in riskless situations. Amos Tversky and Daniel Kahneman, Loss Aversion In Riskless Choice: A Reference Dependent Model, working paper (1990). They have also extended it to choice situations with more than two options. Amos Tversky and Daniel Kahneman, Cumulative Prospect Theory: An Analysis of Decision under Uncertainty, Working Paper, Stanford University (November 1990).

65. Recently Daniel Kahneman, Jack L. Knetsch and Richard H. Thaler, Fairness and the Assumptions of Economics, 59 Journal of Business S285 (1986), have developed a theory of business fairness based on deviations from the status quo.

66. Of course, simply assuming concavity of the utility function also generates the prediction that losses will be felt more acutely than gains. A concave utility function also generates the prediction that, as an individual becomes wealthier, the marginal utility of gains and the marginal disutility of losses become smaller.

67. This is a more extreme prediction that could be inferred from concavity. A person with a concave utility function is everywhere risk averse.

68. See Ronald R. Macdonald, Credible Conceptions and Implausible Probabilities, 39 British Journal of Mathematical and Statistical Psychology 15 (1986)(claiming that Tversky and Kahneman have utilized the wrong version of probability in interpreting their subjects' responses, have mismodeled the problems posed to their subjects, and have failed to have proper regard for the ambiguous informational cues in the questions given to the subjects.)

69. Richard Thaler, Toward a Positive Theory of Consumer Choice, 1 Journal of Economic Behavior and Organization 39-60 (1980); and Richard Thaler, Mental Accounting and Consumer Choice, 4 Marketing Science 199-214 (Summer 1985).

70. Knetsch, Thaler, and Kahneman, supra, n._____.

71. Richard Thaler, Toward a Positive Theory of Consumer Choice, supra n._____, at 44.

72. Id,, at_____.

73. Of course, an assumption of extreme risk aversion, alone, will also generate this prediction. Sociobiological explanations of individual preference patterns are now part of mainstream economics. See Ingemar Hansson and Charles Stuart, Malthusian Selection of Preferences, 80 American Economic Review 529 (1990).

74. Margaret J. Radin, Property and Personhood, 34 Stanford Law Review 957 (1982). A similar theory is proposed in Don L. Coursey and William D. Schulze, The Application of Laboratory Experimental Economics to the Contingent Valuation of Public Goods, 49 Public Choice 47, 55, 61 (1986). For an experimental test, see Don L. Coursey, Elizabeth Hoffman, and Matthew L. Spitzer, Fear and Loathing in the Coase Theorem: Experimental Tests Involving Physical Discomfort, 16 J. Legal Stud. 217 (1987).

75. Knetsch, Thaler, and Kahneman, supra n._____.

Outside the experimental laboratory, we might observe an endowment effect as a consequence of the tax system. A person in the 30% marginal income tax bracket actually has to earn $100 in

order to purchase a good which sells for $70. Suppose he is only willing to pay $70 to purchase it and does so. Given that he owns it, he would have to be paid $70 in <u>after tax</u> dollars to replace the good. If his basis in the good is less than $70, then anything he is paid over the basis is capital gain, taxed as ordinary income under the current regime. Hence, to produce $70 in after tax dollars, the consumer must be paid more than $70 for the good. Thus, he should not be willing to accept $70 to sell it.

76. See, in this vein, Peregrine Schwartz-Shea and Randy T. Simmons, "Social Dilemmas and perceptions: Experiments on Framing and Inconsequentiality" in David Schroeder (Ed.) <u>Social Dilemmas</u> Praeger Press, Forthcoming

77. Kelman, supra n._____, at 691-93.

78. Kelman, supra n._____, at 691.

79. Ronald A. Heiner, "The Origin of Predictable Behavior," 83(4) <u>American Economic Review</u> 560 (1983).

80. Kenneth J. Arrow, "Risk Perception in Psychology and Economics," 20 <u>Economic Inquiry</u> 1 (1981).

81. Howard Kunreuther, et. al., <u>Disaster Insurance</u> (New York: Wiley, 1978).

82. Gary H. McClelland, William D. Schulze, and Don L. Coursey, "Valuing Low Probability Hazards: Experimental Evidence for a Bimodal Response to Unlikely Events," University of Colorado Manuscript, 1989. See also Gary H. McClelland, William D. Schulze, and B. Hurd, The Effect of Risk Beliefs on Property Values: A Case of a Hazardous Waste Site," University of Colorado Manuscript, 1989.

83. Richard C. Bishop, Thomas A. Heberlein and Mary Jo Kealy, Contingent Valuation of Environmental Assets: Comparisons with a Simulated Market, 23 Natural Resources Journal 619, 629 (1983).

84. Id,, at 629. See also Ronald A. Heiner, Experimental Economics: Comment, 75 American Economic Review 260 (1985)(proposing that experimental economics be formulated so as to test theories with "value uncertainty.")

85. Knetsch, Thaler, and Kahneman, supra n._____, at 1-2. They attribute this theory to Knez, Smith, and Williams, supra n._____, at 398.

86. However, some of the strategy might be preserved if people are bargaining over an asset with unknown value. See [get cite]

87. See <u>Infra</u>, p._____.

88. Coursey, Hovis, and Schulze, supra n._____.

89. Knez, Smith, and Williams, supra n._____.

90. Knetsch, Thaler, and Kahneman, supra n._____.

91. McClelland, Schulze, and Coursey, supra n._____.

92. Boyce, <u>et. al.</u>. supra n._____.

93. Coursey, Hovis, and Schulze, supra n.

94. McClelland, Schulze, and Coursey, supra n.

95. In an excellent article, Kornhauser points out that WTA>WTP has occupied the center of the CLS assault on positive predictions of law and economics. Lewis A. Kornhauser, The Great Image of Authority, 36 Stan. L. Rev. 349, 358-60 (1984). This assault has had less impact than its authors, particularly Kelman, might have hoped for, because

> most economists regard the offer/asking price problem as a minor anomaly with which economics will eventually cope. After all, the offer/asking price problem arises not at a theoretical level but at a level of application. For any initial allocation of endowments, one can, in theory, calculate the resulting allocations of goods and services, (p. 360)

Regardless of whether or not WTA>WTP is a minor anomaly, Kornhauser is correct that one can compute market outcomes, given starting points. Our text does exactly that.

96. See Jack L. Knetsch, Legal Rules and the Basis for Evaluating Economic Losses, 4 International Review of Law and Economics 5, 10 (1984)(making the point in text).

97. Each curve in Figure 1 simply represents the rate at which each individual is willing to exchange goods for money. Starting from 0 along the quantity axis, person A has money, but no goods. Person B has all the goods, but little money. Similarly, starting from Q_T along the quantity axis, person B has money, but no goods. Person A has all the goods, but little money. Person A's demand curve for goods declines from the left, while his supply curve rises from the right. Person B's demand curve for goods declines from the right, while his supply curve rises from the left. At the equilibrium (Q_e,P_e), supply equals demand from either market perspective.

98. The above discussion of the implications of a divergence between WTA and WTP for marginal participants can also be extended to understand the implication of some subjects using McClelland and Schulze's, supra, note xx and discussion on pages yy, worst case decision rule. For example, in a fifth price auction the market price is determined by the fifth bid price. In their experiments, if all subjects bid close to the actuarial value (as in both WTP experiments and in the WTA gain experiments), then everyone bids close to the market price and most subjects will buy or sell at least once during a series of experimental auctions. However, in the WTA loss experiments, when some subjects are using a worst case bidding strategy and others are bidding close to the actuarial value, the subjects bidding close to the actuarial value will always sell their insurance policies and those bidding the full value of the loss (or more) will typically never sell.

Moreover, there is nothing inherent in the worst case strategy to force individuals who are not thinking about maximization to stop using it. Subjects who follow the worst case approach demand so much money for their insurance policies that they never sell. Unless these subjects start thinking about the opportunity cost of their decision strategy, they never learn that they could make much more money, in the long run, by selling the insurance policies for slightly more than the actuarial value, and occasionally suffering a loss.

99. cite to Levine, Levine and Forrence, Muller, Farber and Frickey, Spitzer, Cohen and Noll [add others].

100. See Roger G. Noll & James E. Krier, Some Implications of Cognitive Psychology for Risk Regulation, 19 Journal of Legal Studies_____-_____(1990); and Matthew L. Spitzer, Comment on Noll and Krier, "Some Implications of Cognitive Psychology for Risk Regulation," *IsL* 801-08.

101. Boomer v. Atlantic Cement Co., Inc., 26 N.Y.2d 219, 309 N.Y.S.2d 312, 257 N.E.2d 870 (Court of Appeals of New York, 1970).

102. Estancias Dallas Corp. v. Schultz, 500 S.W.2d 217 (Tex Crt. Civ. App. 1973).

103. Thus, they would argue that, if the current level of pollution is deemed excessively high and it would be difficult for homeowners to come to a private agreement with the smelter to reduce pollution, the court is likely to grant the right to the homeowners and then determine and enforce a damage assessment scheme. On the other hand, if pollution is moderate and there is only one affected homeowner, who has just moved into this polluted area, the court might grant the smelter the right to pollute and let the homeowner pay the smelter to reduce pollution. However, if there are many homeowners and only one smelter, it might reduce transactions costs to grant the homeowners the right to clean air and make the smelter pay, even if pollution is moderate. Calabresi and Melamed, supra n._____, at 1106-07. See also Cooter in Calif. L. Rev. and Mitchell Polinsky, supra n._____, at 93-95.
     If wealth effects associated with different distributions of rights are small, and if transactions costs are vanishingly small, the Coase Theorem predicts that any distribution of rights will lead to a level of pollution which maximizes net benefits. However, transactions costs associated with differential bargaining power, with strategic behavior, or with information costs might make it easier to reach the level of pollution which maximizes net benefits by assigning rights to one or the other party.

104. See Kennedy, supra n._____.

105. See United States v. Carroll Towing Co., 159 F.2d 169 (2d Cir. 1947); and United States Fidelity and Guarantee Co. v. Jadranska Slobodna Plovibda, 683 F.2d 1022 (7th Cir. 1982).

106. Stone v. Bolton, [1950 1 K.B. 201 (C.A.); Bolton v. Stone, [1951] A.C. 850.

107. Richard S. Markovits, Duncan's Do Nots: Cost-Benefit Analysis and the Determination of Legal Entitlements, 36 Stan. L. Rev. 1169 (1984) suggests that cost/benefit analysis not be used in situations where rights-based norms, such as fairness, justice, or settled expectations, determine allocations of rights. Hence, cost/benefit analysis will be of little use in judicial settings. But in legislative and (perhaps) administrative settings, cost/benefit analysis can be used, possibly in conjunction with other normative approaches, to make social policy.
     Markovits would resolve the problem of WTA>WTP, at least insofar as the disparity is generated by wealth effects, by evaluating a move from policy A to policy B in the following manner. He would use WTP in state B for losers, and WTA in state B for gainers. This, he says, meets the expectations of policymakers and members of the public, id. at 1180, and because these figures will match actual values if the change is made, because no compensation will actually take place. Id. at 1180-81. This, says Markovits, is the only "'correct,' 'nonarbitrary' way to measure the equivalent dollar benefits and costs that a policy will generate." Id. 1182.
     We fail to understand why Markovits' approach is correct or nonarbitrary, although it may in fact match the expectations of policymakers and the general public. The numbers his approach generates may match the values that the individuals will hold if the move from A to B is effected, but why these are the normatively relevant figures is unclear. One could as easily argue that the numbers obtaining with wealth levels in state of the world A are relevant, for the cost/benefit analysis is done before any change is made.
     In addition, Markovits suggests that his resolution of the WTA>WTP problem, because of wealth effects, should also dispose of it if the disparity arises from other psychological causes. Id. 1178. Even if we were to accept Markovits' approach to the wealth effects issue, it would not follow that the normative issues stemming from other sources of WTA>WTP could be handled in the identical manner. [Cite to Kahan, Grady]

108. Knetsch, supra note_____, at 11-12.

109. Knetsch, supra note_____, at 11.

110. In Jack L. Knetsch, Environmental Policy Implications of Disparities between Willingness to Pay and Compensation Demanded Measures of Values, 18 Journal of Environmental Economics and Management 227-37 (1990), he takes exactly this position. See especially page 235.

111. See Gibbard and Satterthwaite; Groves and Ledyard; other stuff.

112. If legal rights imply beliefs about the status quo, which imply values, which in turn imply legal rights, we have a cycle.

113. David Cohen and Jack L. Knetsch, Judicial Choice and Disparities Between Measures of Economic Values, Working Paper, Simon Fraser University (1990).

114. They are deliberately unclear about exactly what determines expectations about the status quo. See Cohen and Knetsch at note 12.

115. Their paper also has a strongly positive flavor. They spend a great deal of their effort trying to show that the courts have decided disputes in accord with their theory of fairness, and that when this fact is understood, many of the "puzzles" of law can be explained.

116. Any rights-protecting theory should look as if it favors, to a large extent, protection of the status quo. What is needed to make Cohen and Knetsch's paper useful is a theory of how to identify the rights by using WTA > WTP.

117. Cohen and Knetsch, at 15-18.

118. Id. at 18-21.

119. Id. at 21-22.

120. Id. at 22-25.

121. Id. at 21-33.

122. Id. at 33-36.

123. See William W. Fisher III, Reconstructing the Fair Use Doctrine, 101 Harv. L. Rev. 1659, 1699 note 196 (1988)(citing Kelman for the fact that WTA and WTP diverge); Duncan Kennedy, The Role of Law in Economic Thought: Essays on the Fetishism of Commodities, 34 Am. U.L. Rev. 939, 963 (1985)(restating Kelman's thesis on a more general level); Joseph William Singer, The Player and the Cards: Nihilism and Legal Theory, 94 Yale L.J. 1 (1984)(referencing Kelman as a critique of law and economics); Jeffrey L. Harrison, Egoism, Altruism and Market Illusions: The Limits of Law and Economics, 33 U.C.L.A.L. Rev. 1309, 1358 (1986)(assuming that WTA>WTP, and citing Kennedy as proof of that proposition); David M. Frankford, Creating and Dividing the Fruits of Collective Economic Activity: Referrals among Health Care Providers, 89 Colum. L. Rev. 1861, 1971 (1989)(citing both Kelman and Kennedy on wealth effects); Stewart E. Sterk, Neighbors in American Land Law, 87 Colum. L. Rev. 55, 71 (1987)(citing Kelman as questioning the Coase Theorem); Note, Subjects of Bargaining Under the NLRA and the Limits of Liberal Political Imagination, 97 Harv. L. Rev. 475, 489 (1983)(citing Kelman for the proposition that a union will value rights more if it already has the rights); Mark Sagoff, The Principles of Federal Pollution Control Law, 71 Minn. L. Rev. 19, 53 (1986)(citing Kelman for the proposition that WTA>WTP); Robert E. Scott, Comment: Error and Rationality in Individual Decisionmaking: An Essay on the Relationship Between Cognitive Illusions and the Management of Choices, 59 S. Cal. L. Rev. 329, 339-40 (1986)(citing Thaler and Kelman for WTA>WTP in consumer, but not producer, context); Carol M. Rose, Mahon Reconstructed: Why the Takings Issue is Still a Muddle, 57 S. Cal. L. Rev. 561, 583 (1984)(citing Kelman for point that wealth effects changing economic allocations); Donald

H. Gjerdingen, The Coase Theorem and the Psychology of Common-Law Thought, 56 S. Cal. L. Rev. 711, 749-51 (1983Xextensively discussing Kelman's examples); Joseph W. Singer, The Reliance Interest in Property, 40 Stan. L. Rev. 614, 720 (1988Xciting both Kennedy and Kelman for WTA>WTP); Michael L. Zigler, Takings Law and the Contract Clause: A Takings Law Approach to Legislative Modifications of Public Contracts, 36 Stan. L. Rev. 1447, 1465 (1984)(applying WTA>WTP to covenants in land); Richard S. Markovits, Duncan's Do Nots: Cost-Benefit Analysis and the Determination of Legal Entitlements, 36 Stan. L. Rev. 1169, 1178 (1984)(claiming to find many errors in Kennedy's attack on cost/benefit analysis, but accepting that WTA>WTP); Lewis Kornhauser, The Great Image of Authority, 36 Stan. L. Rev. 349, xx (1984)(noting that the emphasis upon WTA>WTP distinguishes CLS attacks upon the efficiency norm from economists' critiques); Cass Sunstein, Legal Interference with Private Preferences, 53 U. Chi. L. Rev. 1129, 1151 (1986)(citing Thaler, Kelman, and Kennedy for WTA>WTP, and then speculating on the psychological explanations); Michael A. Fitts, The Vices of Virtue: A Political Party Perspective on Civic Virtue Reforms of the Legislative Process, 136 U. Pa. L. Rev. 1567, 1572 (1988)(describing, but not relying upon, Kelman and Kennedy); Saul Levmore, Explaining Restitution, 71 Va. L. Rev. 65, 76-77 (1985Xciting Kelman and Kennedy for the proposition that "[e]conomic actors may be more concerned with tangible losses than with missed opportunities of equal or greater value."); John J. Donohue III, 99 Yale L.J. 549, 606 (1989Xciting Kelman for the proposition that some would claim "that the power of the market is so great and unyielding that it resembles a surging river that overruns all obstacles."); and Louis Michael Seidman, Public Principle and Private Choice: The Uneasy Case for a Boundary Maintenance Theory of Constitutional Law, 96 Yale L.J. 1006, 1023 (1987)(citing Kelman for WTA>WTP).

124. For a contrary implicit assumption, see Knetsch (1990), <u>supra</u> note_____, at page 234, where he aruges that subsidies and effluent charges will be regarded differently (as gains foregone and loses avoided) by potential polluters, wihtout addressing the issue that many polluters are businesses. See also David Cohen and Jack L. Knetsch, Judicial Choice and Disparities Between Measures of Economic Values, Working Paper, Simon Fraser University (1990), applying WTA > WTP to Essex Aluminum and Alcoa, at page 32. In addition, in the debate over mandatory commercial warranties, we need not be concerned about WTA > WTP due to wealth effects as long as consumers are fairly homogeneous. See Richard Craswell, Are the Costs of Legal Rules Pased On? Efficiency and Distribution in Buyer-Seller Relationships,_____Stan. L. Rev._____,_____ (199_)(forthcoming).

125. Of course, this presumes that cost/benefit analysis has some normative appeal (when WTA = WTP). Kennedy and Kelman would certainly quarrel with that proposition.

126. See especially the articles by Baker, Bebchuk, Rizzo and Kornhauser in the Hofstra symposia, supra n_____.

127. There is some work that makes preferences endogenous. See P.J. Hammond, Changing Tastes and Coherent Dynamic Choice, 43 Rev. Econ. Stud. 159 (1976); P.J. Hammond, Endogenous Tastes and Stable Long-Run Choice, 13 J. Econ. Theory 329 (1976); W.M. Gorman, Tastes, Habits, and Choices, 8 Int. Econ. Rev. 218 (1967); J.S. Harsanyi, Welfare Economics of Variable Tastes, 21 Rev. Econ. Stud. 204 (1954); T.A. Marschak, On the Study of Taste Changing Polcies, 68 Am. Econ. Rev. 386 (1978); and R.A. Pollak, Habit Formation and Dynamic Demand Functions, 78 J. Polit. Econ. 745 (1970).
    For a slightly different approach, se Edi Kami and David Schmeidler, Fixed Preferences and Changing Tastes, 80 American Economic Review 262 (1990).

128. See any intermediate microeconomics textbook; for example, Jack Hirschleifer, Price Theory and Applications 9 (3rd Ed. 1984); Brian R. Binger and Elizabeth Hoffman, Microeconomics with Calculus (1988).

129. Barry Holden, Liberal Democracy and The Social Determination of Ideas, 25 Nomos: Liberal Democracy 289 (J. Roland Pennock & John W. Chapman, eds. 1983); Aaron Wildavsky, Choosing Preferences by Constructing Institutions: A Cultural Theory of Preference Formation, 81 Am. Pol. Sci. Rev. 3 (1987).

130. The problem at this point is that the researchers who believe that WTA>WTP tend to find that in the laboratory; while the researchers who are more convinced that WTA=WTP in most instances tend to get that result. Perhaps each set of experiments should be replicated either blind or by the other side before we can accept the results.

744. Reinganum, Jennifer F. and Wilde, Louis L. "Equilibrium Enforcement and Compliance in the Presence of Tax Practitioners." July 1990.

745. To be announced.

746. Aliprantis, Charalambos D. and Plott, Charles R. "Competitive Equilibria in Overlapping Generations Experiments." August 1990.

747. Noussair, Charles and Porter, David. "Allocating Priority with Auctions: An Experimental Analysis." August 1990.

748. Boylan, Richard T. "Laws of Large Numbers for Dynamical Systems with Randomly Matched Individuals." August 1990.

749. Kousser, Morgan J. "The Voting Rights Act and the Two Reconstructions." September 1990.

750. To be announced.

751. Bossaerts, Peter and Hillion, Pierre. "Arbitrage Restrictions Across Financial Markets: Theory, Methodology and Tests." November 1990.

752. To be announced.

753. Dubin, Jeffrey A. and Wilde, Louis L. "Welfare Economics for Tobit Models." January 1991.

754. To be announced.

755. Hoffman, Elizabeth and Spitzer, Matthew L. "The Divergence Between Willingness-To-Pay and Willingness-To-Accept Measures of Value. November 1990.

756. To be announced.

757. El-Gamal, Mahmoud A.; McKelvey, Richard D. and Palfrey, Thomas R. "A Bayesian Sequential Experimental Study of Learning in Games." February 1991.

758. Plott, Charles R. "Will Economics Become an Experimental Science?" December 1990.

759. Dubin, Jeffrey A. and Zeng, Langche. "The Heterogenous Logit Model." February 1991.