Asking Willingness-to-Accept Questions in Stated Preference Surveys

A Review and Research Agenda

Dale Whittington, Wiktor Adamowicz, and Patrick Lloyd-Smith

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Abstract

Stated preference (SP) researchers have encountered an increasing number of policy problems for which a willingness-to-accept (WTA) compensation question would seem to be the most reasonable approach to structure the respondent's valuation choice task. However, most SP researchers are still reluctant to pose WTA questions to respondents due to concerns about reliability of responses and confusion about what contexts warrant a WTA question compared to a willingness-to-pay (WTP) question. This paper synthesizes the current literature, provides guidance on when and how to use WTA elicitation formats, and identifies research needs. We present a typology of valuation tasks that illustrates the situations in which WTA questions are appropriate and should be used to estimate welfare-theoretic measures of economic benefits—and when they should be avoided. We also discuss three different design issues that SP researchers need to consider when they use WTA questions: 1) elicitation of reference and status quo conditions, 2) incentive compatibility and private versus public goods, and 3) nonconforming responses. We conclude that good survey design makes it possible to ask respondents "sensible" WTA questions in many cases, yet several key research issues require attention.

Key Words: stated preferences, willingness to accept, willingness to pay, contingent valuation, choice experiments, hypothetical baselines, domain of gains, domain of losses

JEL Codes: H43, Q51, D61

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1. Introduction

As the number of stated preference (SP) applications has increased dramatically over the past few decades, SP researchers have encountered an increasing number of policy problems for which a willingness-to-accept (WTA) compensation question would seem to be the most sensible and appropriate approach to structure the respondent's valuation choice task. In situations where the respondents are adversely affected by a change, and have some form of rights to their original position, WTA questions will be the most natural way to structure the respondents' choice task. Similarly, when asking respondents to make a change to their current practices, as in the case of payments for ecosystem service provision, WTA compensation is often the only relevant question. SP practitioners thus need a sound understanding and carefully considered strategy regarding when and how to ask WTA questions to frame valuation choice tasks.

Economists have been aware for decades of the strikingly large differences between the answers respondents give to willingness-to-pay (WTP) and WTA questions in field experiments, laboratory experiments and SP surveys (Knetsch and Sinden 1984; Horowitz and McConnell 2002; Tuncel and Hammitt 2014). Initially, researchers' most common reaction to the WTP-WTA discrepancy was to dismiss the answers to WTA questions as unreliable and inaccurate. This response had some intuitive appeal because asking respondents an open-ended question about the minimum compensation they would accept for incurring a loss is unbounded and can involve an unusual, sometimes puzzling valuation question. But closed-end WTA valuation questions are also possible and do not necessarily suffer from the same problems.

The 1993 National Oceanic and Atmospheric Administration (NOAA) panel's recommendations captured the conventional wisdom among economists at the time when it recommended that the WTA elicitation format should not be used.[1] But the NOAA panel's

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[1] NOAA Panel: "Elicitation Format: The willingness to pay format should be used instead of the compensation required because the former is the conservative choice."

recommendation to avoid the use of WTA questions was, in fact, oddly reasoned. The authors simply said that the WTP format was preferred because it was the "conservative choice," i.e., the WTP format gave a lower estimate of the economic value for a welfare gain or loss. The panel did not explain why one necessarily would want a lower estimate of the economic value of a good or service. It could well be that a conservative value is too low, and does not accurately reflect individuals' preferences.

As the economics profession has studied and to some extent incorporated the findings of psychologists and behavioral economists into microeconomic theory, the interpretation of the WTA-WTP discrepancy has changed. The challenges of asking WTA questions have not disappeared, but today most economists accept the finding of Kahneman and Tversky (1979) that people value gains and losses differently. Specifically, people hate (suffer from) losses more than they value corresponding gains. When policy interventions impose losses on people, they value these losses more than an expected utility function would suggest. If such respondents are then asked about how much compensation they would accept to agree to this loss, one would expect that their responses could be surprisingly large. Similarly, if a welfare gain is perceived as a reduction in a loss, the economic value of the gain may be surprisingly large.

Despite the general consensus on the explanation for the difference between individuals' valuation of gains and losses, most SP researchers are still reluctant to pose WTA questions to respondents (see Shyamsundar and Kramer 1996 for an early exception). However, we believe that it is often possible to ask respondents "sensible" WTA questions.

The main objective of this paper is to provide guidance on when and how to use WTA elicitation formats. We first discuss four reasons for the reluctance to pose WTA questions. We then present a typology of valuation tasks that illustrates the situations in which WTA questions are appropriate and should be used to estimate welfare-theoretic measures of benefits and costs – and when they should be avoided. We then discuss three different design issues that SP researchers need to consider when they use WTA questions: 1) elicitation of reference and status quo conditions, 2) incentive compatibility and private versus public goods, and 3) nonconforming responses. These three issues form the basis for a research agenda in this area.

2. Background: Four Reasons SP Researchers Have Been Reluctant to Ask WTA Questions

Having been told explicitly not to ask WTA questions by the NOAA panel recommendations cited above, the SP researchers' reluctance to respondents ask WTA questions is perhaps not surprising. But more substantially, there are four main reasons for this reluctance.

Three of these reasons are grounded in concerns that are often also present in WTP questions, but there is a general impression that these issues are more significant in WTA contexts. The fourth involves the use of valuation estimates in the policy process.

First, responses to WTA questions are considered unreliable because respondents are thought not to have an incentive to tell the truth. There has been justifiable concern among SP practitioners about the difficulties of asking an open-ended minimum WTA compensation question. Respondents have few incentives to answer with their minimum acceptable value. In some contexts, carefully constructed discrete choice and choice experiment valuation formats can greatly reduce the problems associated with asking open-ended WTA questions.

Second, WTA questions often suffer from higher levels of nonconforming responses, such as scenario rejecters, protest responses, and non-responses, compared to WTP questions. These responses arise because offers of monetary compensation are more unfamiliar to respondents and social factors such as the bribery effect (Frey et al. 1996), a desire for punitive measures in cases of damage, or impure altruism (Biel et al. 2006) may be more prevalent.

Third, there is some confusion as to which situations warrant a WTA question compared to a WTP question. In general, it is appropriate in most cases to pose WTP questions to receive gains or to avoid losses, and WTA questions to incur losses or to avoid gains. However, as explained in the next section, these distinctions are complicated by differences between the respondent's reference condition and the status quo. Appropriately eliciting respondents' reference conditions and perceptions of the status quo is difficult, and this hinders the use of WTA questions.

The fourth reason for the reluctance has little to do with challenges associated with eliciting accurate responses to WTA questions. The state may have no intention of actually paying compensation, and often will not want this possibility presented to respondents. This is not a hypothetical problem. In South Asia, people often move to sites where dams have been announced so that they can establish claims for compensation when the reservoir floods their homes. A second political reason that leads to avoidance of WTA studies is that often SP studies are undertaken to examine the possibilities for revenue generation or cost recovery for public goods and publicly-provided goods and services, not to obtain welfare-theoretic measures of economic values of the consequences of policy interventions. In these cases, even if WTA is the appropriate measure for some individuals, the state may insist that such questions be avoided.

On occasion, clients of SP studies may want to know the minimum compensation that can be paid to induce behavioral changes and the payments needed to induce such changes. For example, in the design of Payments for Environmental Services (PES) schemes, to identify the

costs of provision of ecosystem services, clients may want to know the minimum compensation upstream farmers will accept to participate in watershed protection (Whittington and Pagiola 2012). However, when eliciting WTA for programs like PES schemes, there are often good alternatives to SP surveys for estimating individuals' values, such as reverse auctions or real-money tasks available to estimate respondents' values.

3. A Typology for Understanding When to Ask WTA Questions

We make a distinction between the individual's status quo condition (the state of the world where he actually is) and his reference condition (the state of the world from which a change in well-being, either a welfare loss or a welfare gain, will be assessed). One can think of the reference condition as the "vantage point" from which two states of the world are compared. This reference condition may be viewed as a long-run equilibrium, normal, or expected condition, and could be different from today's status quo conditions. A few examples may help illustrate this distinction between the status quo and reference condition.

First, Christians believe that Adam and Eve originally lived in the Garden of Eden and were without sin (reference condition). But, after being tempted by a serpent and tasting from the tree of knowledge, they were cast out of the Garden of Eden, and suffered a loss. Since that time, humans have lived in a state of "original sin" (status quo). They begin life as sinners, and from this status quo condition, they may seek forgiveness. Because forgiveness is perceived as a reduction in a loss, it is exceedingly valuable.

Second, in the 1930s in the Soviet Union, the population struggled with a nonmarket distribution system for almost all goods and services (status quo), but had been promised a workers' paradise of abundance (reference condition). Many people in the population expected this utopia to be coming soon, and thus experienced the long queues and shortages of almost everything as a loss relative to this future reference condition of abundance.

Third, an individual may be unemployed (status quo condition). If she is usually employed (reference condition), she may expect to have a job soon. Thus, her reference condition may be "employed" while her status quo is "unemployed."

Fourth, an individual may be temporarily sick (status quo condition). But most of the time he is healthy (reference condition). Alternatively, an individual may have a chronic health condition, and he has adjusted to this "new normal." In this case, his status quo health condition and his reference condition may both be "chronic poor health."

Fifth, suppose an environmental disaster such as an oil spill occurs in a pristine lake. An individual living near the lake may view the pre-disaster condition of the environment as the

natural state. In this case, while the "degraded lake" is the status quo condition, the reference condition is "pristine lake."

We consider two types of policy interventions. The first results in a gain (increase) in well-being for the individual. The second results in a loss (reduction) in well-being. For purposes of illustration, we assume that there is one channel (pathway) through which the intervention affects well-being: through health. A policy intervention (A_1) can improve health, and this health improvement increases well-being. A second policy intervention (A_2) is designed to deliver non-health-related benefits, but as a side effect results in a reduction in health of some individuals and thus decreases their well-being. The challenge of economic valuation is to measure the economic value of both the increase (gain) from A_1 and the decrease (loss) in health from A_2 in monetary terms, either as compensating or equivalent variation. SP practitioners can attempt to measure the compensating or equivalent variation with either WTP or WTA elicitation formats. To make this clearer, we next examine three valuation contexts.

3.1. Context 1: Reference Condition = Status Quo

Our first context is a situation where the respondent's status quo condition is the same as his reference condition. In other words, the individual assesses the policy intervention (either A_1 or A_2) from his actual (current) status quo situation. Figure 1 shows a continuum from very poor health to excellent health. Suppose H_0 is the individual's status quo health condition, and it is also the reference point from which he assesses changes in health quality. At H_0, the individual's income is Y_0 and his well-being is $W(Y_0, H_0)$. If policy intervention A_1 is implemented, the individual's health is improved to H_1. The change in health quality is $(H_1 - H_0)$; this change is positive because H_1 is greater than H_0. As a result of this increase in health, his well-being increased to $W(Y_0, H_1)$. The economic value of the intervention A_1 to the individual is associated with the change in well-being: $[W(Y_0, H_1) - W(Y_0, H_0)]$. The policy intervention A_1 results in a welfare gain, so $[W(Y_0, H_1) - W(Y_0, H_0)]$ is positive.

A different policy intervention A_2 results in a reduction in the individual's health from H_0 to H_2. The change in health quality is $(H_2 - H_0)$; this change is negative because H_2 is less than H_0. As a result of this decrease in health, his well-being decreased to $W(Y_0, H_2)$. The resulting change in well-being is $[W(Y_0, H_2) - W(Y_0, H_0)]$. This is a loss because $W(Y_0, H_2)$ is less than $W(Y_0, H_0)$.

To illustrate the task of measuring these gains and losses in well-being, we shift to Figure 2, which shows the relationship between changes in health status on the horizontal axis and the economic value of the change on the vertical axis. Note that the horizontal axis in Figure 2 is not

the same as in Figure 1. In Figure 1, the horizontal line shows a continuum of values of an individual's state of health. In Figure 2, the horizontal axis shows changes (differences) from the status quo condition H_0.[2]

In Figure 2, policy intervention A_1 causes a positive change in health of (H_1-H_0), shown on the horizontal axis. Associated with this positive change in health, there is a corresponding economic value of this change on the vertical axis. In Figure 2, the economic value of this gain on the vertical axis is measured by the compensating variation because the status quo is equal to the reference condition. The economic value of the gain in health resulting from the implementation of A_1 is the WTP compensating variation (WTP^{CV}), i.e., the individual's maximum WTP for the positive change in health status (H_1-H_0). Note that one can refer to "gains" both in 1) health status (horizontal axis), and 2) the economic value of the change in health status (vertical axis).

In most applications, the SP practitioner uses a WTP elicitation procedure to estimate this compensating variation, where maximum WTP^{CV} is defined by $W(Y_0, H_0) = W(Y_0 - WTP^{CV}, H_1)$, where $W(Y_0, H_0)$ is the well-being associated with the status quo health condition H_0 and the status quo income Y_0.

The upward sloping line in the northeast (NE) quadrant of Figure 2 is a segment of the "value function." It illustrates that as the gain in health relative to the status quo increases, so does the economic value of this positive change [Max WTP = $f(H_1 - H_0)$].

Next, we use Figure 2 to illustrate the economic value of the policy intervention A_2 that results in a loss of health (H_2-H_0). This health loss is associated with an economic loss that is measured on the negative portion of the vertical axis that lies below the horizontal axis. Because the status quo and reference conditions are the same, the individual perceives this change $(H_2 - H_0)$ as a loss relative to H_0. As drawn, $(H_1 - H_0) = - (H_2 - H_0)$, i.e., the magnitude of the gain in health status is the same as the magnitude of the reduction in health status.

However, even though the magnitude of the change in health status is comparable, the magnitude of the economic value of the gain is not equal to the negative value of the economic loss. The economic value of this loss is the compensating variation WTA^{CV}, where WTA^{CV} is defined by $W(Y_0, H_0) = W(Y_0 + WTA^{CV}, H_2)$.

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[2] If one assigns the status quo health condition H_0 a value of zero, then a movement to the right of H_0 due to policy intervention A_1 does represent a positive change (i.e., a gain) in health, but a zero value for the status quo condition is not intuitively appealing because a status quo health condition of zero might imply something close to death.

The slope of the value function in the southwest (SW) quadrant is different (steeper) than the slope of the value function in the NE quadrant because people experience (value) losses differently than they experience gains. For an equivalent magnitude change in health on the horizontal axis, the economic value of the loss is larger (in absolute value) than the economic value of a gain (both measured on the vertical axis). Thus, the distance on the negative portion of the vertical axis that measures WTA^{CV} is greater than the distance on the positive portion of the vertical axis that measures WTP^{CV}. This kinked value function (i.e., kinked at the reference condition, which is also the status quo in Context 1) is the explanation for the large discrepancy between WTP^{CV} and WTA^{CV}.

When the status quo and reference conditions are the same, SP practitioners may be able to formulate reasonable choice tasks for respondents who suffer losses as a result of a policy intervention such as A_2. Here, the WTA^{CV} measure of the compensating variation associated with a loss is defined as the minimum amount of compensation that the individual would accept to agree to allow the policy intervention A_2 to be implemented. A discrete choice elicitation format can be used to ask the respondent whether he would rather stop the policy, or accept compensation of $x and let the policy proceed. However, one must consider the incentive properties of responses to such a question. We explore this issue below.

3.2. Context 2: Reference Condition > Status Quo - Valuing a Welfare Gain

We next examine the implications for economic valuation and SP questions when the reference condition is different from the status quo. We begin with the case where the reference condition is better than the status quo. This context may occur because the status quo is perceived as a temporary, unfortunate condition that will return to normalcy, or because the individual believes (or has been convinced) that he has a right to a better condition, and thus perceives changes from the vantage point of this different reference condition.

In Figure 3, the individual's reference condition is H_1. The individual's status quo is perceived as a loss $(H_0 - H_1)$ relative to the reference condition H_1. The individual assesses the consequences that result from the implementation of policy intervention A_1 from the vantage point of H_1. A_1 still results in a gain because health improves from H_0 to H_1, but from the vantage point of H_1, this gain is perceived as a reduction in a loss. This is because H_1 (not H_0) is the reference condition, and the respondent perceives herself to be suffering a loss of $(H_0 - H_1)$ at the current status quo condition. The implementation of the policy intervention A_1 thus reduces this perceived loss.

To determine the economic value of the change in well-being from the vantage point (reference condition) H_1, the economist measures the minimum compensation the individual is willing to accept (WTA^{EV}) to forgo the reduction in loss from the policy intervention A_1. This equivalent variation measure of the economic value of the reduction in loss is defined as WTA^{EV}, where $W(Y_0 + WTA^{EV}, H_0) = W(Y_0, H_1)$. As shown in Figure 3, the kink in the value function now occurs at the reference condition (not at the status quo). As shown, this WTA^{EV} compensation to forgo the reduction in loss is greater than the WTP^{CV} for the same gain in health status in Figure 2.[3]

If the SP practitioner knows that the individual perceives the gain in health status from A_1 as a reduction in a loss, then the correct valuation question will be a WTA^{EV} question, not a WTP^{CV} question. For example, the respondent can be asked whether she would forgo or delay the implementation of A_1 in exchange for a specified (discrete choice) compensation amount.

We now consider what would happen if a SP practitioner asked a WTP^{CV} question of a respondent who viewed the consequence of A_1 as a reduction in a loss, not a gain in health status, as in Figure 2. The respondent might well reject the scenario or choice task because he felt that the SP researcher did not recognize his right to the consequences of this intervention. He might respond that he should not have to pay. But if the valuation question recognized the respondent's right to be at the reference condition H_1, and then gave him a choice between the intervention and compensation, the valuation scenario might be quite plausible to the respondent. SP scenarios that utilize the wrong reference condition from the respondent's perspective may be one reason for scenario rejection and seemingly implausible responses to valuation questions. Of course, it may also be that the respondent is behaving strategically, a possibility that the SP researcher should recognize when developing questions to elicit the reference condition.

3.3. Context 3: Reference Condition < Status Quo - Valuing a Welfare Loss

We next examine the context where the reference condition is worse than the status quo. This may occur because the status quo is perceived as a temporary, fortunate condition (e.g., a "windfall") that is "too good to be true." The individual believes (or has been convinced) that H_2 is his normal condition, and the loss resulting from the implementation of policy alternative A_2 returns him to "where he belongs." In other words, he believes that he has no right to remain at

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[3] Knetsch et al. (2012) describe and formalize the concepts surrounding reduction of a loss and forgoing a gain.

H_0, and thus perceives changes from the vantage point of H_2, which is his condition after the implementation of A_2.

In Figure 4, the individual's reference condition is H_2. The individual's status quo is perceived as a gain ($H_0 - H_2$) relative to the reference condition H_2. The individual assesses the consequences that result from the implementation of policy intervention A_2 from the vantage point of H_2. A_2 still results in a loss because health decreases from H_0 to H_2, but from the vantage point of H_2, this loss is perceived as a reduction in a gain. This is because H_2 is now the reference condition, and the respondent perceives herself to be experiencing a gain of ($H_0 - H_2$) at the current status quo condition. The implementation of the policy intervention A_2 thus reduces this perceived gain.

To determine the economic value of the change in well-being from this vantage point (reference condition) H_2, the economist measures the maximum willingness to pay equivalent variation (WTP^{EV}) to "recapture" the gain or, alternatively, to avoid the reduction in gains. This equivalent variation measure of the economic value of the loss (H_2-H_0) is measured by WTP^{EV}, where WTP^{EV} is defined as $W(Y_0 - WTP^{EV}, H_0) = W(Y_0, H_2)$. As shown in Figure 4, the kink in the value function occurs at the reference condition H_2. This WTP^{EV} to avoid a reduction in gains is less than the WTA^{CV} for the same magnitude of loss in health ($H_2 - H_0$) in Figure 2.

If the SP practitioner knows that the individual perceives the welfare loss from A_2 as a reduction in a gain, then the correct valuation question will be a WTP^{EV} question, not a WTA^{CV} question. The respondent can be asked whether she would be WTP to avoid the reduction in gains, or to delay the implementation of A_2.

What would happen if a SP practitioner asked a WTA^{CV} question of a respondent who viewed the consequence of A_2 as a reduction in gains? The respondent might be happy to accept compensation, but this would overestimate his own perception of the magnitude of the loss from A_2.

This typology offers SP practitioners a conceptual foundation for developing a strategy on when and how to ask WTA questions. This framework is summarized in Table 1, which shows that there are two ways to formulate valuation questions for a welfare gain and two ways for a welfare loss. For a welfare gain, the SP practitioner can frame valuation tasks that reveal a respondent's WTP^{CV} for a gain (NE quadrant of Figure 2), or WTA^{EV} compensation to forgo a reduction in a loss (SE quadrant of Figure 3). For a welfare loss, the SP practitioner can ask

about willingness to accept compensation (WTA^{CV}) to incur a loss (SW quadrant of Figure 2), or WTP^{EV} to avoid a reduction in gains (NW quadrant of Figure 4).[4]

Knetsch and Mahasuweerachai (2015) call Case A and Case D the "domain of gains" because the individual perceives the change as either experiencing a gain (Case A) or forgoing a gain (Case D). They refer to Case B and Case C as the "domain of losses," again because the individual perceives the change as either reducing a loss (Case B) or experiencing a loss (Case C). They argue that, for changes of comparable magnitude on the horizontal axis (improvements and reductions in health status in Figure 2-4), the WTP^{CV} and WTP^{EV} measures in the domain of gains will equal each other, and the WTA^{CV} and WTA^{EV} measures in the domain of losses will equal each other.

Most SP studies use a WTP^{CV} measure of economic value (NE quadrant of Figure 2), and this is the correct approach for welfare gains when the status quo and the reference condition are the same. People expect to have to pay for many projects or policies that would improve their lives. But people also expect to be compensated when projects or policies cause them losses. When the status quo and the reference point are the same, and the individual incurs a welfare loss, the correct measure of economic value for the loss will be WTA^{CV} (SW quadrant in Figure 2).

When the purpose of the SP research is to estimate welfare-theoretic economic values of policy changes, and the SP question can be framed in a consequential fashion, we encourage SP researchers to accept the challenge of measuring WTA^{CV}, and not to substitute a WTP^{EV} question to measure the economic value of the loss. If the respondent is actually facing a welfare loss such as depicted in the SW quadrant of Figure 2, a WTA^{CV} scenario often will make sense and seem appropriate to respondents, and measuring WTA^{CV} will not pose especially difficult obstacles. On the other hand, asking a WTP question to avoid a reduction in gains (NW quadrant of Figure 4) could easily result in scenario rejection because respondents will not believe that they should have to pay to avoid the loss.

If the reference condition and status quo are different, the reference condition can be identified, and individuals view a welfare gain from the perspective of a reference condition that is better than the status quo, then our advice is again not to shy away from posing a WTA^{EV} valuation task to respondents. If respondents view the consequences of a policy as reducing a

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[4] For welfare losses under Context 2, the appropriate welfare measure is the same as in Case C (WTA^{CV}), whereas the appropriate welfare measure is the same as Case A (WTP^{CV}) for welfare gains under Context 3.

loss, a SP question that asks for WTP^{CV} may lead to scenario rejection. Often it may be possible to design a valuation choice task that frames the problem as accepting compensation to delay a project that will still happen in the future.

Table 2 shows an example of a valuation question that could be used for each of the four cases in Table 1. One important implication of our typology is that not all welfare losses should be measured by a WTA^{CV}. If respondents perceive a loss as a reduction in a gain, then the WTP^{EV} is the appropriate welfare measure (NE quadrant of Figure 4). Nor should all welfare gains be measured by WTP^{CV}.

Researchers do not know the relative frequency with which these four cases in Tables 1 and 2 actually occur among the valuation tasks that SP practitioners confront in practice. Because SP studies often are undertaken to measure benefits for public goods that have not yet been provided, it is likely that the WTP^{CV} compensation measure for welfare gains – the measure used in practice – is appropriate in most cases. But we recommend that the SP researcher test to see whether respondents' reference conditions are different than their status quo conditions. This can be done by careful probing during focus groups and the use of pretest interviews where respondents are asked to "think out loud." Best practice requires that the SP researcher should search for evidence of a discrepancy between respondents' status quo and reference conditions.

4. Three Design Issues that Arise when Asking WTA Questions

Having detailed the situations where posing WTA questions is appropriate, we now discuss three important design issues to consider when using WTA questions in SP surveys.

4.1. Eliciting Reference and Status Quo Conditions

In order to choose the correct approach to frame the respondents' choice task, the SP practitioner needs to know respondents' reference condition and its relationship to the status quo condition. An important aspect of questionnaire design is to make this determination. It is typically clear whether the policy intervention results in a welfare gain or loss, so the SP practitioner is usually choosing between two possible ways of measuring the economic value of the policy intervention (not four).

For a welfare gain, what the SP practitioner wants to know is whether respondents' reference condition is at H_0 or H_1. The first, obvious step to make this determination would be to have respondents discuss in a focus group these two approaches to framing the welfare gain resulting from A_1. For a welfare loss, what the SP practitioner wants to know is whether the reference condition is at H_0 or H_2. Again, focus group discussions and "thinking out loud"

interviews should help reveal the appropriate choice. But there has been little research on how effective such methods are in eliciting reference and status quo conditions (see Knetsch and Mahasuweerachai (2015) for a discussion of these issues).

Neither contingent valuation nor choice experiment practitioners have systematically tested whether respondents have reference conditions that are different from their status quo conditions, and thus have not attempted to determine the appropriate welfare measure for either a gain or a loss. This is thus a promising area for future research.

We do not want to minimize the challenges associated with this task of determining respondents' reference conditions when they are different from the status quo. Do respondents think that the status quo is below or above their reference condition? How does the reference condition change over time? There is some literature that attempts to address these issues and considers the use of expectations as related to the reference point (e.g., Koszegi and Rabin 2006), but this literature is in its infancy. SP practitioners could design questions to identify what people view as their reference condition, and/or could use focus groups. Such questions could be used in focus groups and/or individual interviews. Another promising strategy is the use of a pivot design to help construct SP scenarios that reflect the respondents' current or expected experiences (Barton and Bergland 2010; Hess and Rose 2009).[5] We next discuss four considerations that should be taken into account when eliciting reference and status quo conditions.

Heterogeneous Reference and Status Quo Conditions

In their cost-benefit text, Sugden and Williams (1978) describe two types of economic analysts with two different styles of conducting cost-benefit analysis. The first type of analyst takes people's preferences as a given and reports measures of welfare change from the perspective of the individual (or household). Thus, if an individual views a welfare gain as a reduction in a loss because his reference condition is greater than his status quo, the cost-benefit analyst would not question this individual's reference condition and would seek to measure the economic value of the change resulting from the implementation of the policy alternative as the minimum compensation that the individual would accept to forgo the reduction in a loss.

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[5] A pivot design typically uses attribute levels in the SP task to inform the description of the baseline. These attribute levels are based on answers to earlier questions by respondents, thus helping make the SP task closer to the respondents' actual choices. Because individuals use availability, familiarity and other decision-making heuristics, pivot designs can help improve the credibility and realism of SP surveys.

Sugden and Williams describe the second style of doing cost-benefit analysis as the "decision-making approach." Here the objective is to help a client or policymaker better understand the costs and benefits of his policy alternatives given the assumptions the policymaker chooses to make. In this style of doing cost-benefit analysis, the state may choose not to accept an individual's perception about his reference condition. The individual's way of framing the valuation of the welfare gain may be judged to be "unfair" or "illegitimate." The state need not simply accept an individual's assessment of how he or she prefers to frame a welfare change, i.e., as either a gain or a reduction in losses. In this instance, it may not be a "mistake" for a cost-benefit analyst to use a WTP^{CV} welfare measure to value a gain, even if the individual's perceived reference condition would suggest that a WTA^{EV} measure would be appropriate. (For a related discussion of the use of benefit-cost analysis as a normative or positive analysis, see Hammitt 2013).

Conceptually it would be possible to try to determine in advance how each respondent in a survey perceived his or her reference condition, and then offer individuals with different reference conditions different valuation questions. To the best of our knowledge, this has not been attempted. But even if it could be done, it is not obvious how the state would decide to use the mix of welfare measures that would be elicited. Would the state choose to assess the benefits of a welfare gain as the sum of the WTP^{CV} of individuals whose reference condition was the same as their status quo, and the WTA^{EV} of individuals whose reference condition was higher than their status quo? Or would this approach of attributing greater benefits to some individuals due to their own framing of the problem be considered unfair?

As a more concrete example of the type of problem that might arise, suppose a government was considering the installation of piped water infrastructure. The project offered a welfare gain, which could be measured by either the WTP^{CV} or the WTA^{EV} welfare measure. Suppose that in the past the government had promised to provide piped water for free, and that water was seen as a basic human right. But over time most people (say 75% of the population) had grown tired of waiting for the unfulfilled promises, and they had accepted that their reference condition was their current status quo condition of poor water services outside the home. These households were willing to pay for improved piped water services, so the WTP^{CV} measure was appropriate.

On the other hand, the remaining 25% had not yet given up on the government promises. Their reference condition was not their status quo but rather the piped water services that they had been promised and believed was their human right. For them, the current status quo was experienced as a loss from this reference condition, and the welfare gain from the new project

was perceived as a reduction in a loss. For this 25% of the population, the appropriate welfare measure WTA^{EV} would be much higher than the WTP^{CV} of the majority of the population.

Should the state then try to measure the WTP^{CV} of the majority and the WTA^{EV} of the minority and add these together to estimate the total benefits of the improved piped system? This would be one approach, but instead the state might decide that this would be unfair to the majority, in the sense that their preferences counted for less of the total benefits simply because the minority framed the valuation task differently (i.e., had a different reference condition). This could lead to projects being accepted that could not then be financed if the minority actually would not pay user fees at the same level as the majority because they believed water was a human right and should be provided free.

Subjective versus Objective Conditions

A related challenge is that there may be a difference between an "objective" status quo and a respondent's perception of the status quo. For example, an individual may think that air quality is "OK" or at level X, while in reality the air quality is much worse than the individual perceives. In a recent study on heart disease risk perceptions, Adamowicz et al. (2014) show that some groups of individuals appear to have perceptions of risk that are higher than the objective levels. In such contexts, the description of the gain or loss in the SP task will have to be carefully designed because what the researcher describes as the baseline may not be accepted by the individual respondent. This complicates the issue of gains versus losses. A SP task that portrays a "gain" based on the status quo and proposed change may in fact be describing what the individual perceives as a loss relative to her perceived initial condition. Once again, this issue can be addressed by asking respondents (in surveys or in focus groups) about their perceptions of the status quo or reference condition. It may also involve elicitation of perceptions of the status quo condition. This issue is closely related to the topic of hypothetical baselines (Whittington and Adamowicz 2011).

Hypothetical Baselines

Hypothetical baselines pose numerous challenges for SP practitioners. They may create a special problem in the context of asking WTA questions, i.e., hypothetical baselines may change not only the status quo H_0, but also the reference condition from which the respondent assesses the welfare change. If the SP researcher's instructions to the respondent involved shifting the reference condition, this might require the SP researcher to use a different welfare measure (see Barton and Bergland, 2010 for an empirical example).

For example, consider a case in which the SP researcher determines that the status quo and reference condition are the same, and she wishes to measure the economic value of a welfare gain resulting from policy intervention A_1. She wants to change the respondents' status quo, and chooses to deploy a hypothetical baseline and instructs the respondent to imagine that his health was better than it actually is (H_0' in Figure 5). Assume that the policy intervention A_1 still results in an improvement in health to H_1 (just as it did when the status quo was H_0). The welfare gain resulting from the implementation of A_1 is now ($H_1 - H_0$'), and the SP researcher wants to elicit the WTP^{CV} for this change.

If H_0' gets close to H_1, there is a risk that the respondent will shift his reference condition to H_1. If this happens, the appropriate measure of the welfare gain would change from the WTP^{CV} to the WTA^{EV}, i.e., as a result of the introduction of a hypothetical baseline, the individual may perceive the need to accept compensation to forgo a reduction in a loss. In some situations, this might also happen as H_0' moved the respondent farther away from H_1.

Another complication could arise from the use of hypothetical baselines if the reference condition and the status quo are different. For example, suppose that a respondent's reference condition is H_1 in Figure 3 and his status quo is (H_0-H_1). He views the welfare gain from the implementation of policy intervention A_1 as a reduction in a loss. Suppose the SP researcher instructs the respondent to imagine that his status quo health condition is (H_2-H_1) instead of (H_0–H_1) and that the implementation of A_1 will change his health condition from (H_2-H_1) to H_1 (a much larger welfare gain). In this case, the respondent may not continue to treat the reference condition as H_1.

To the best of our knowledge, the risk that hypothetical baselines can shift a respondents' reference condition (both when the reference condition is equal to the status quo and when it is not), and thus change the appropriate measure of economic value, has not been examined in the SP literature.

Strategic Behavior and the Elicitation of Reference Points

The discussion above assumes that respondents are truthful in their revelation of the reference point. But if respondents are strategic, they may misrepresent their reference point. They may insist that the status quo reflects a loss to them, in the interests of capturing additional rents in any potential compensation situation. This of course assumes a high level of effort and strategy by respondents, but since such considerations apply to valuation questions, we see no reason why they should not be considered in the case of reference elicitation questions. This raises the question of what conditions would generate truthful responses to reference point

conditions. This is an unexplored area of research. Below, we explore the issue of incentive compatibility of the valuation question, and leave the reader to consider the parallels between this discussion and application to reference point elicitation questions.

4.2. Incentive Compatibility and Private versus Public Goods

Over the past 10 years, there has been a growing movement to examine strategic behavior in SP questions by understanding the incentives facing the respondent (Carson and Groves 2007, 2011; Carson et al. 2014; Vossler et al., 2012). The focus of this literature is on incentive compatibility of SP questions and ensuring that it is in the respondents' best interest to reveal their true preferences when answering survey questions. One way of operationalizing incentive compatibility is to examine whether the questions are consequential, i.e., whether respondents feel that they will actually pay or receive the money being discussed, and whether they feel that the response they provide will influence the provision of the good. The findings to date are that, in the case of public goods (e.g., voting for a management plan to improve the water quality in a nearby lake), a SP question can be structured to be consequential, and thus incentive compatible. Somewhat surprisingly, this is not the case for private goods.

The mechanism design or consequentiality literature argues that the SP values of public goods can be elicited in an incentive-compatible fashion. This will arise if respondents think that they may actually have to pay the tax (or other coercive payment) and they feel that the amount they reveal in the SP task will influence the provision of the public good. While there has been no published research to date (that we are aware of) that extends this formal analysis of consequentiality to the case of WTA, we see no reason why the same rationale should not apply. Just as in the case of the WTP question, a binary choice or referendum on a single question of whether to accept a payment of a specific amount of money in exchange for a reduction in services, or quality, should be incentive compatible (see Vossler et al. 2012).

The difficulty of generating incentive-compatible (truthful) WTA values in the private goods case has been widely recognized as a limitation (Carson and Groves 2007; Lusk and Shogren 2007). If one asks an individual if she would be WTA $X for a good that she currently owns, what incentives are there that she will not overstate or understate the value? There are at least two ways that a respondent can behave strategically in response to a WTA task. First, suppose the question is about WTA related to participation in a PES program. The respondent may think that the program is very likely to be provided, in which case the incentives are to ask for an amount higher than the minimum in order to influence the payment levels in the actual program.

Second, if the respondent is not sure whether the agency will provide the program in his community, and thinks that the agency is considering the costs of the program, the respondent may bid a low WTA in the SP task to attempt to secure the program. The individual will then be able to demand a higher amount of compensation when the actual program is implemented. Understanding the relative magnitudes of these two opposing effects of strategic behavior is a fruitful area for further research.

These conditions are analogous to those outlined in Carson and Groves (2007; 2011) for SP WTP valuation of private goods. If the respondent feels that the good may not be provided without high WTP values, he will overbid and will then have the item available. If the respondent feels that the good will definitely be provided and the agency is attempting to identify the price that it should charge, the respondent will underbid.

Most empirical strategies to improve the incentive compatibility of WTA responses in private good contexts use auctions, such as the Becker-DeGroot-Marschak mechanism, which are designed to ensure that revealing the true value is the best response (Lusk and Shogren 2007). If one knows that others will also be asked for their WTA, and that the "buyer" will only accept the lowest bids, then the respondent has some incentives to reveal her true minimum WTA. Nevertheless, stated preference methods provide a "low cost" alternative to field experiments with actual market transactions as they are often used to identify the various relevant and desirable attributes of a PES program. There has been a relative explosion of the use of stated preference methods for PES design (Bush et al. 2013; Kaczan et al. 2013), but there are questions remaining about the elicitation of WTA amounts in this context. There have been some attempts to structure SP WTA questions in such a way, using "cheap talk scripts" to frame them as auctions (Krishna et al. 2013; Kanjilal et al. 2015). Another strategy is to pose follow-up questions that seek to identify strategic behavior by respondents (Lusk et al. 2007). These efforts have generated promising results but more research is needed.

While determining whether the good of interest is private or public appears to be a straightforward task, this judgment is subtle in some contexts. For example, PES schemes are often targeted to provide public goods such as carbon sequestration or water quality improvements. However, from a landowner's standpoint, the payments and activities requested of him in these programs more closely mimic private goods. Thus, the strategic behavior concerns outlined above for private goods likely will be present in SP tasks that ask landowners their WTA compensation payments, even if the goods that the PES schemes are targeting are in fact public goods.

4.3. Nonconforming Responses

All SP questions potentially suffer from respondents not engaging meaningfully with valuation questions as intended by the researcher. However, an additional wrinkle arises in the case of WTA questions. They are typically characterized by many more scenario rejecters, protest responses, non-responses, and other nonconforming responses than are WTP questions. Individuals appear to be less willing to accept the scenarios associated with the "loss" of public or private goods. This may be because of strategic behavior, or because they are simply not offered a large enough payment.

Another explanation for these types of responses is the choice of an appropriate payment vehicle that is believable and consequential for respondents. There are many examples of specific fees, surcharges, and taxes that individuals pay for certain projects, which lend credibility to commonly used WTP payment vehicles. However, respondents may struggle to identify past examples of where they directly received monetary compensation for allowing degradation in environmental quality, thus weakening the perceived payment consequentiality of responses. Ensuring that respondents perceive that they will actually receive the money being discussed is an important aspect for SP researchers to consider in designing WTA questions.

Also, people may simply view payments to accept lower environmental quality as unethical and will not respond as calculating neoclassical agents. Suggesting that environmental conditions be reduced in quality may violate social norms. Accepting money to give up environmental "goods" or allow environmental "bads" may be perceived as a form of bribery (Moffitt 1983). For example, Mansfield et al. (2002) find that people prefer being compensated with public goods instead of monetary payments to allow nuisance sites to be situated near their homes. Levitt and List (2007) construct a conceptual model that employs tradeoffs between wealth-based and moral norms-based preferences, and illustrate the possibility that such a framework may generate a wide variety of preference anomalies, many of which are observed in experiments and surveys. This exploration of behavioral economics approaches to incentive compatibility is a fruitful area for future research.

5. Conclusion

Most economists now accept that there is a large difference between WTP and WTA. When WTA is the relevant value for a public good, and WTA elicitation can be consequential, we recommend that it should be elicited. At times it is not clear whether the respondent should be asked a WTP or a WTA question because his reference point may be uncertain. Individuals may view situations with higher-level environmental quality as reductions of a loss rather than as

improvements. The use of pivot questions is one potential solution to incorporate individual reference points and baselines into SP surveys. Identifying individuals' reference points is thus an important task for SP researchers.

The importance of eliciting status quo and reference conditions will also depend on the knowledge and/or experience of respondents regarding the good to be valued. In valuation situations such as uncommon endangered species or complicated health conditions, the differences between status quo and reference condition may be more limited, as respondents do not have a well-defined set of prior perceptions. With more familiar goods, where respondents do have well-defined beliefs, it is somewhat ironic that eliciting reference points and concerns of hypothetical baseline may be more important. Heterogeneity among respondents in terms of those with reference points equal to the status quo, and those with no difference between these, may also be larger in this latter case.

In addition to the conceptual issues surrounding the measurement of WTA, there are also several practical issues, especially regarding the incentives to truthfully reveal the WTA amount. For public goods, adhering to the current protocols for consequentiality should yield incentive-compatible responses. For private goods, the researcher will have to address the issues of incentive compatibility and assess whether respondents are providing their minimum WTA. The elicitation of reference points may also entail strategic behavior. This is a topic that has not been studied extensively. Finally, SP researchers need to understand the reasons why survey respondents give non-conforming answers. Some of the challenges to eliciting WTA may be addressed with good survey design practices, including extensive focus groups and pilot tests, while in other cases additional research is required to identify best practices and protocols.

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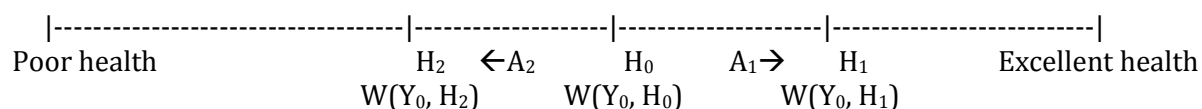
Tables and Figures

Table 1. Relationship between Reference Condition, Status Quo, and Welfare Gains and Losses: Four Cases

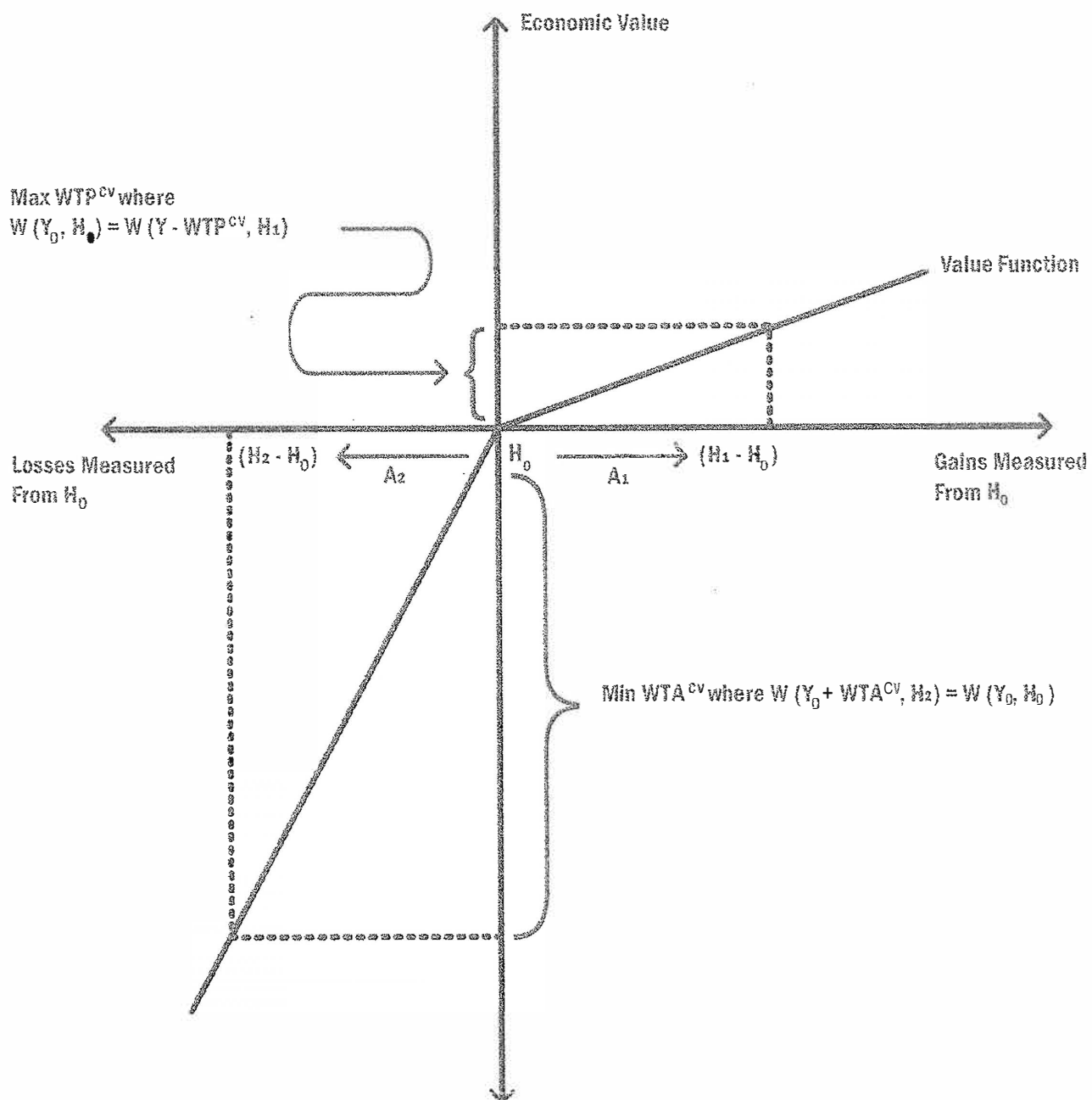|	Context 1:Reference condition = status quo	Context 2: Reference condition > status quo	Context 3: Reference condition < status quo
Welfare Gains	Case A: WTP^{CV} where $W(Y_0, H_0) = W(Y_0 - WTP^{CV}, H_1)$	Case B: WTA^{EV} $W(Y_0, H_1) = W(Y_0 + WTA^{EV}, H_0)$ Note: welfare gain is perceived as a reduction in a loss	Case A: WTP^{CV}
Welfare Losses	Case C: WTA^{CV} where $W(Y_0, H_0) = W(Y_0 + WTA^{CV}, H_2)$	Case C: WTA^{CV}	Case D: WTP^{EV} $W(Y_0 - WTP^{EV}, H_0) = W(Y_0, H_2)$ Note: welfare loss is perceived as forgoing a gain

Table 2. Four Definitions of Economic Value and the Appropriate Valuation Question for Each

	Definition of Economic Value	Correct structure of valuation question
Case A – Welfare gain: WTP^{CV}	$W(Y_0, H_0) = W(Y_0 - WTP^{CV}, H_1)$	Would you be willing to pay $x for the gain?
Case B – Welfare gain: WTA^{EV}	$W(Y_0, H_1) = W(Y_0 + WTA^{EV}, H_0)$	Would you be willing to accept $x in compensation to forgo the gain?
Case C – Welfare loss: WTA^{CV}	$W(Y_0, H_0) = W(Y_0 + WTA^{CV}, H_2)$	Would you be willing to accept $x in compensation to incur the loss?
Case D – Welfare loss: WTP^{EV}	$W(Y_0 - WTP^{EV}, H_0) = W(Y_0, H_2)$	Would you be willing to pay $x to forgo the reduction in a gain?

Figure 1. Continuum of Health Conditions and Associated Levels of Well-Being

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|----------------------------------|------------------|-------------------|------------------------|
Poor health                       H₂   ←A₂      H₀      A₁→    H₁           Excellent health
                              W(Y₀, H₂)        W(Y₀, H₀)        W(Y₀, H₁)
```

Figure 2: WTP^{CV} and WTA^{CV} Measures of Economic Value
(Context 1: Reference Condition = Status Quo)

Economic Value

Max WTP^{CV} where
$W(Y_0, H_0) = W(Y - WTP^{CV}, H_1)$

Value Function

Losses Measured From H_0

$(H_2 - H_0)$ A_2 H_0 A_1 $(H_1 - H_0)$

Gains Measured From H_0

Min WTA^{CV} where $W(Y_0 + WTA^{CV}, H_2) = W(Y_0, H_0)$

Figure 3: WTA^{EV} Measure of Economic Vlaue
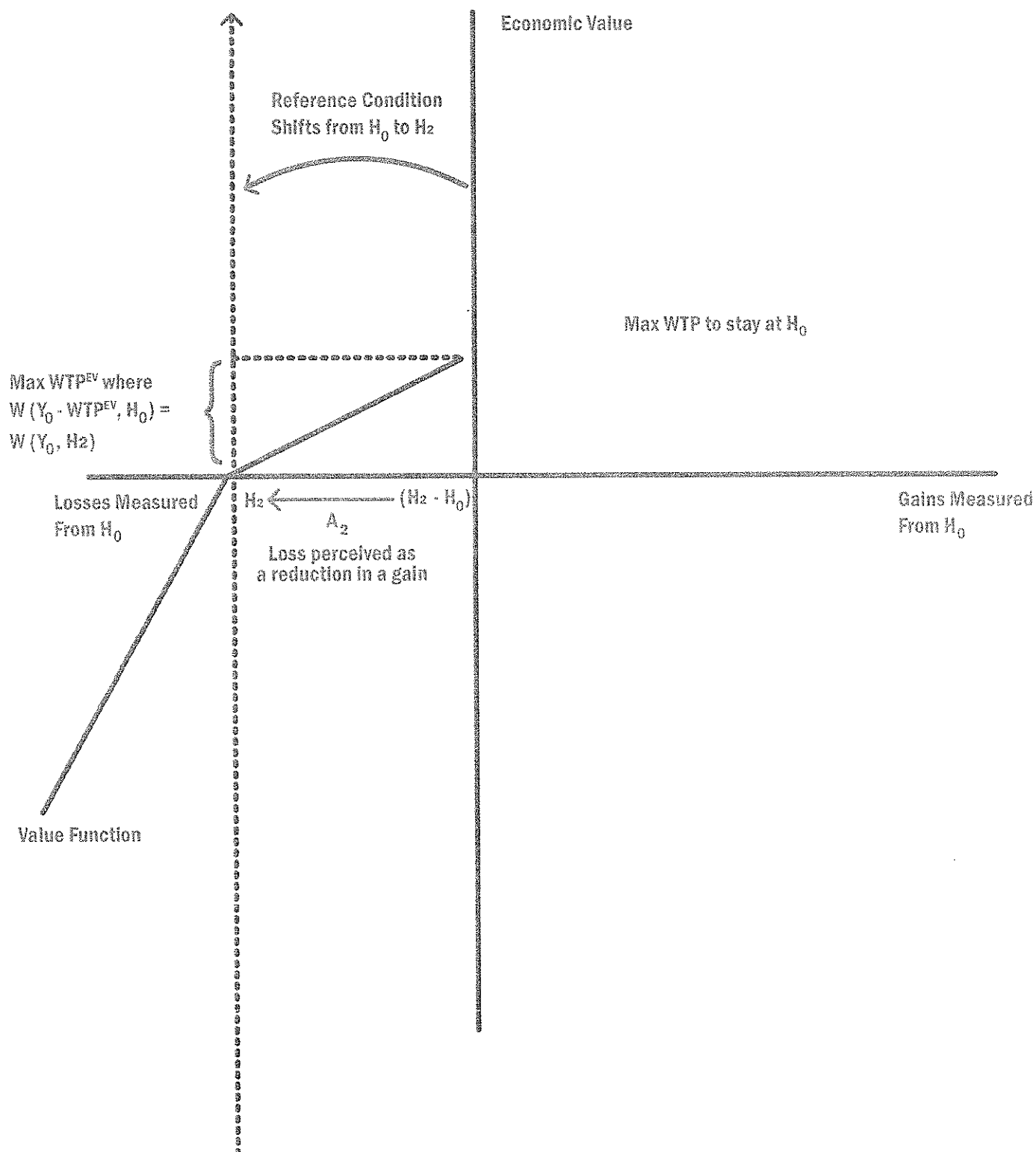(Context 2: Reference Condition > Status Quo)
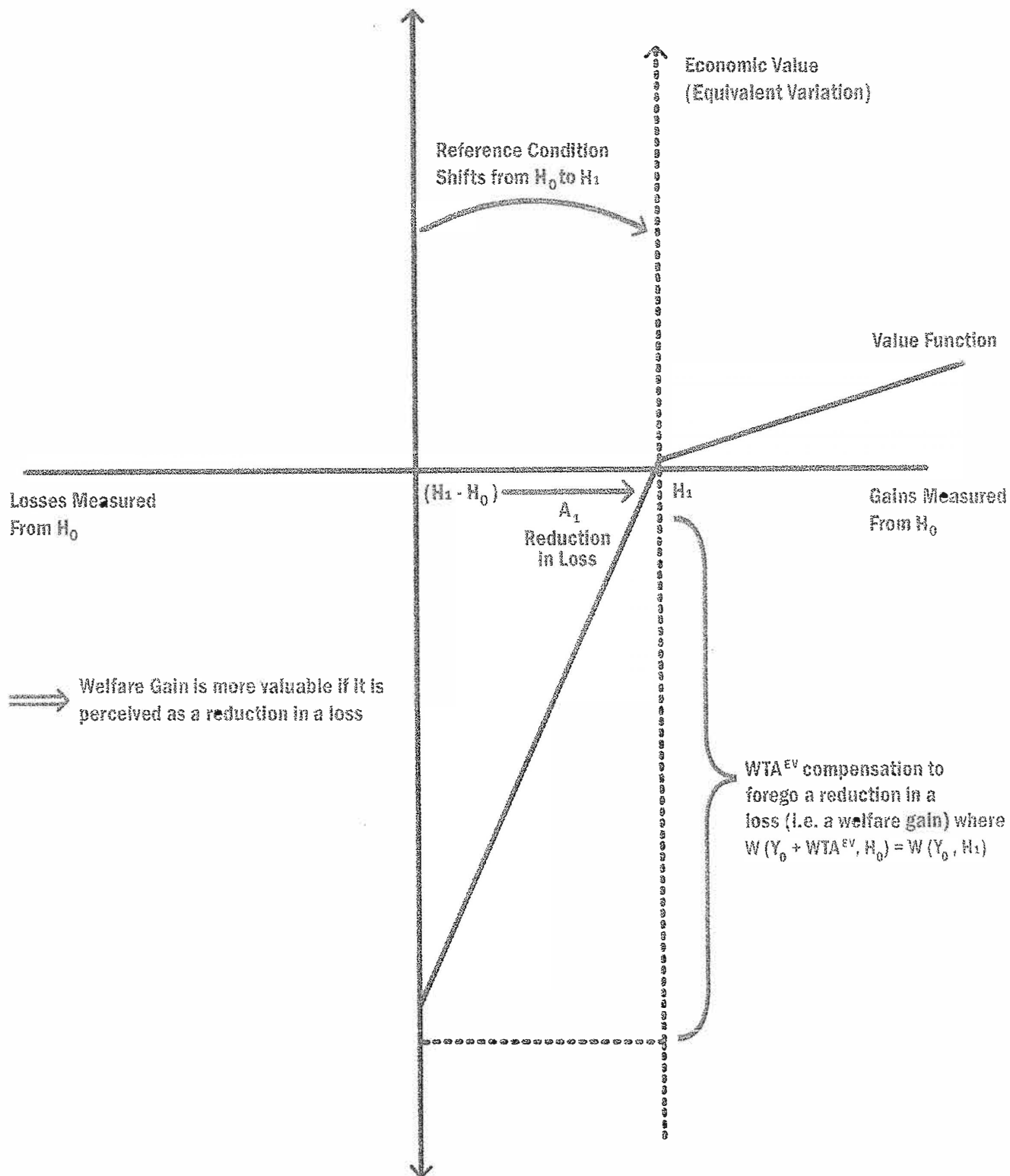
Figure 4: WTP^{EV} Measure of Economic Vlaue
(Context 3: Reference Condition < Status Quo)

Economic Value

Reference Condition
Shifts from H_0 to H_2

Max WTP to stay at H_0

Max WTP^{EV} where
$W(Y_0 - WTP^{EV}, H_0) = W(Y_0, H_2)$

Losses Measured
From H_0

$H_2 \longleftarrow (H_2 - H_0)$

A_2

Loss perceived as
a reduction in a gain

Gains Measured
From H_0

Value Function

Figure 5. Continuum of Health Conditions and Associated Levels of Well-Being: Hypothetical Baselines

```
|----------------------------------|--------------|--------|--------------|------------------------|
Poor health                        H₂   ←    H₀    H₀'  →      H₁       Excellent health
                                 W(Y₀, H₂)    W(Y₀, H₀)       W(Y₀, H₁)
```