

The Use of Hypothetical Baselines in Stated Preference Surveys

Dale Whittington and Wiktor Adamowicz



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Abstract

Researchers using stated preference (SP) techniques have increasingly come to rely on what we call “hypothetical baselines.” By this we mean that respondents are provided with a description of a current state, or baseline, but that this baseline is intentionally not the actual state of environmental quality, health, or other condition. The researcher then poses a valuation question or choice task that is contingent, not on the existing status quo, but rather on the state of the world described in this new hypothetical baseline. In this paper, we argue that researchers using SP techniques have often used hypothetical baselines without carefully considering the cognitive challenges this poses for respondents or the difficulties this practice creates for advising policymakers. We present a simple typology of four types of SP studies, two of which rely on hypothetical baselines, and give six examples of conditions that an SP researcher may change to create a hypothetical baseline. We discuss four main reasons why SP analysts use hypothetical baselines in their research designs, plus some of the risks associated with the use of hypothetical baselines. Finally, we offer guidance for the use of hypothetical baselines in future SP surveys.

Key Words: stated preference, environmental valuation, health valuation, contingent valuation, choice experiments, baseline, status quo

JEL Classification: Q51, D61, Q56

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Introduction

Researchers using stated preference (SP) techniques have increasingly come to rely on what we call “hypothetical baselines.” By the term “hypothetical baseline,” we mean that respondents are provided with a description of a current state, or baseline, but that this baseline is intentionally not the actual state of environmental quality, health, or other baseline condition. Respondents are asked to disregard their existing status quo conditions point from which to measure, compare, or answer. The SP researcher then poses a valuation question or choice task that is contingent, not on the existing status quo state of the world, but rather the state of the world described in this new hypothetical baseline.

In this paper, we argue that SP researchers have often used hypothetical baselines without carefully considering the cognitive challenges this poses for respondents or the difficulties this practice creates for advising policy makers. We discuss the implications of hypothetical baselines on valuation and policy analysis, using arguments from the behavioral economics literature, as well as from standard theory.

In the next section of the paper, we define more precisely what we mean by a “hypothetical baseline.” Section 2 presents a simple typology of four types of SP studies, two of which rely on hypothetical baselines. In the third section, we give six examples of conditions that an SP researcher may change to create a hypothetical baseline; in the fourth section, we list four main reasons why SP analysts use hypothetical baselines in their research designs. Section 5 discusses some of the risks associated with the use of hypothetical baselines, and in section 6, we offer some guidance for the use of hypothetical baselines in SP surveys. Section 7 concludes.

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We thank Stephanie Simpson for her research assistance and thank the participants at the EEPSEA Biannual Meeting in Hanoi, Vietnam, in November 2009, for their helpful comments. We would also like to thank Gunnar Köhlin and Fredrik Carlsson for the opportunity to present a preliminary version of this paper at a seminar at the Department of Economics, Gothenburg University, Sweden, in December 2009.

1. What Is a “Hypothetical Baseline”?

In his 2002 acceptance speech for his Nobel prize in economics, Daniel Kahneman used a deck of cards to illustrate the difference between our intuitive mind and our analytical mind. Kahneman asked his Stockholm audience, “What is the volume of a deck of cards?” He pointed out that our intuitive mind provides a lightning fast and very reliable answer to this question. But, if one asks, “What is the sum of the area of all the cards in the deck?” our intuitive mind is stumped. One must turn to the analytical mind and take some time to do the necessary calculations. Kahneman’s point was that our intuitive mind is very fast and reliable for answering some kinds of questions, but it tends to make mistakes—or fall prey to systematic biases—for some other types of problems.

Kahneman might equally have used a traditional balance scale instead of a deck of cards to make his point because our intuitive mind almost instantly grasps the essence of such a scale. If the scale is in balance, the quantities on the two sides weigh the same. If one side of the scale dips down, the quantity on this side weighs more (is heavier).

In Hindu culture, one of the ruler’s duties is charity. The *tuladaan* ceremony was a public ritual in which the king himself was weighed and his weight in gold was distributed to the poor. The king sat on a balancing scale and gold was added until the king rose and the scale balanced. The amount of gold on one side equaled the weight of the king on the other. The weight of the king was the status quo condition, and the quantity of gold to be given to the poor was unknown and to be determined.

Just like the weighing of quantities on a scale, the task in economic valuation is to find a balance between the utility or well-being an individual derives from status quo conditions (one side of the scale), and the utility or well-being derived from a new state of the world that results from a change from status quo conditions (the other side of the scale). Consider the task of comparing not gold and the weight of a king, but two levels of an individual’s well-being. $W_0(Y_0, E_0)$ is the well-being an individual receives from his status quo income Y_0 and environmental quality level E_0 , and $W_1(Y_0, E_1)$ is the well-being the individual receives from his status quo income and a new level of environmental quality E_1 . If the individual judges E_1 to be an improvement over E_0 , then if we weigh $W_1(Y_0, E_1)$ and $W_0(Y_0, E_0)$ on a scale, $W_1(Y_0, E_1)$ is “heavier,” i.e., provides more well-being, and the scale tips in favor of $W_1(Y_0, E_1)$.

To value a policy or project that causes the change from E_0 to E_1 , income Y_0 must be reduced on the side of the scale that initially held $W_1(Y_0, E_1)$ until the two sides of the scale are just in balance. The challenge in SP studies is to truly engage both the intuitive mind and the

analytical mind of the individual respondents in this balancing task, so that weighing the two sides of the scale is carefully and thoughtfully done. The objective is, in effect, for the intuitive mind and the analytical mind to concur, to reach a consensus on the balancing of these two levels of well-being, although this is not always possible.

To achieve this goal, SP researchers have largely focused on describing the management plan and/or good or service that would achieve this new state of the world (in this example, the plan that improved environmental quality from E_0 to E_1), and on the consequences of this change (the attributes of the new state of the world with E_1). The guidance to SP researchers has thus been to write contingent valuation (CV) or choice experiment (CE) scenarios that are realistic and engage respondents in careful consideration of what the new state of the world would be worth to them.

In this paper, our focus is on the other side of the scale. We argue that SP researchers have paid too little attention to respondents' assessments of the well-being associated with the status quo condition [$W_0(Y_0, E_0)$]. This lack of attention to the assessment of status quo conditions is understandable if the SP researcher leaves respondents at their current baselines (Y_0, E_0) because it seems reasonable to assume that, since the respondents have lived with (been in) this situation, they know how they like it (i.e., they have already experienced and thus likely assessed their current status quo conditions).

Increasingly, however, in their CV or CE scenarios, SP researchers do not leave respondents at their actual status quo condition (Y_0, E_0). Instead they ask respondents first to move to a new, alternative condition (the hypothetical baseline), and second to assess the management plan and its consequences from this new perspective or reference point.¹ To make this point more concrete, suppose the SP researcher tells the respondents to imagine that their income has increased from Y_0 to Y_2 for some reason unrelated to the management plan. The respondents' new hypothetical baseline condition is (Y_2, E_0), and now the respondents must place the well-being associated with the hypothetical baseline condition $W_0'(Y_2, E_0)$ on the scale, with $W_1(Y_2, E_1)$ on the other side, and then start the weighing process by removing income on the side of the scale with $W_1(Y_2, E_1)$. Note that W_0 and W_0' will generally not be equal nor will the respondent necessarily be familiar with the well-being associated with (Y_2, E_0). The same

¹ Note that in choice experiments the use of hypothetical baselines occurs in both "state of the world" tasks in which alternatives cannot exist simultaneously, and in multiple option tasks in which several alternatives exist simultaneously.

issue applies when asking a respondent, currently at $W_0(Y_0, E_0)$, to evaluate the difference between $W_0''(Y_0, E_2)$ and $W_1(Y_0, E_1)$.

2. A Typology of Stated Preference Studies

Table 1 presents a simple typology of four types of SP studies. The rows distinguish between 1) SP studies that use management plans and/or goods and services that are real, and 2) those studies that use management plans and/or goods and services that are hypothetical.² The columns distinguish between SP studies that 1) ask the respondent to value the new state of the world with the management plan and good or service from the perspective of his or her actual status quo circumstances, and 2) those SP studies that ask the respondent to view the new state of the world with the management plan and good or service from a different, hypothetical baseline condition.

Table 1. A Typology of Stated Preference Studies

	Respondent's baseline is real.	Respondent's baseline is hypothetical.
Proposed management plan in CV/CE scenario, and good or service, are real.	Case A	Case C
Management plan and/or good or service are hypothetical.	Case B	Case D

Case A is the simplest of the four types of SP studies. The SP researcher poses a valuation question in which the management plan and good or service are real, and respondents are asked to value this new state of the world from their current status quo conditions. An example of case A-type surveys would be a poll on an actual upcoming referendum. The respondents could be asked how they would vote given their current status quo circumstances and the real details of the proposed referendum.

² It is possible for a management plan to be hypothetical and for the good or service to be real, or for both the management plan and the good or service to be hypothetical—but this is not a distinction we wish to make in table 1.

In another example, suppose there was an actual H1N1 flu vaccination program that would be launched in a community in the near future. The vaccination program included a plan to charge participants a specified fee or price. Respondents could be asked whether they would choose to participate in this actual program with a real H1N1 vaccine.

Case A surveys are most common in political polling and market research. A classic example of case A using private goods is Bishop et al.'s (1988) study of deer hunting permits in Wisconsin. Respondents were asked if they were interested in buying or selling actual hunting permits (real programs). Bishop et al. evaluated willingness to pay and accept for hypothetical and real transactions of the real program (or hunting permit). Examples of case A that involve referendum contingent valuation questions about actual programs (e.g., funding open space or riverfront improvement) are Vossler et al. (2003) and Vossler and Kerkvliet (2003).

In case B, the SP researcher poses a valuation question about a hypothetical management plan, and the respondents are asked to value this new state of the world from their status quo conditions. An example would be a CV survey in which respondents in a community without piped water services are told about a hypothetical plan to install a water distribution network and asked whether they would connect to the new water system at a specified connection fee and volumetric tariff, given their current income, health status, and housing circumstances.

In another example, an SP researcher could describe a hypothetical program to vaccinate individuals with a hypothetical vaccine that would protect against HIV infection, and ask respondents whether they would choose to be vaccinated if the hypothetical vaccine cost a specified price. In both cases, the new state of the world that would result from the implementation of the management plan is hypothetical, and the respondent is asked to value this new state of the world from his existing status quo conditions.

Case B surveys are common in both CV and CE applications. The famous Exxon Valdez survey and valuation study fits into this category. The management plan was hypothetical, but respondents were presented with existing status quo conditions (Carson et al. 2003). Note, however, that the U.S. Coast Guard implemented a program that was quite similar to the one described in the valuation survey (Carson et al. 2003).

In case C, the SP researcher tells respondents to assume that for some reason unrelated to the management plan that their baseline circumstances have changed. For example, they could be told to assume that they won the lottery or that a long-lost relative has died and left them with an unanticipated inheritance. They are thus to imagine that their baseline condition is no longer their present status quo, but this new state of the world. In case C, the SP researcher asks respondents

to value a real management plan and/or good or service, assuming they are in this new, hypothetical baseline situation.

As an example, the SP researcher could tell respondents to assume that they have a teenage daughter, even if they do not. The SP researcher then tells the respondents about the cervical cancer vaccine (Gardasil), which is in reality the first vaccine approved by the United States Food and Drug Administration designed to prevent a cancer. The SP researcher tells the respondents that, in the United States, cervical cancer strikes about 10,000 women a year and causes nearly 4,000 deaths.

From this new baseline condition, and not the present status quo, the respondents are then asked to whether they would purchase this cervical cancer vaccine to protect their hypothetical teenage daughters. In effect, the respondents are to consider a new hypothetical state of the world and, from this new perspective, value a second state of the world that would result from the implementation of a real management plan. In our experience, there are few examples of case C surveys in the contingent valuation field in environmental economics; they tend to be more common in market research and for CE applications.

In case D, the SP researcher poses two hypothetical states of the world for the respondents to consider. The SP researcher first tells the respondents to assume their baseline circumstances have changed for some reason unrelated to the hypothetical management plan. The second hypothetical for them to consider is the hypothetical management plan and/or good or service. The respondents are instructed to value the state of the world that would result from the hypothetical management plan from their new hypothetical baseline.

For example, respondents who rent their houses could be instructed to assume that they owned their house—a new hypothetical baseline condition. The SP researcher then describes a hypothetical management plan to deliver piped water services to the community and asks whether the respondents would choose to connect their houses (which they are to assume they own), if it cost a specified connection fee and volumetric tariff.

As another example of a case D survey, the SP researcher could tell the respondents to assume that they have a teenage son (even though they do not). From this new baseline condition, not his present status quo, the respondents are then asked to consider a second hypothetical: that there is a hypothetical program to vaccinate individuals with a hypothetical vaccine that would protect against HIV infection. The SP researcher then asks respondents whether they would choose to vaccinate their hypothetical teenage son, if the hypothetical HIV vaccine cost a specified price. Case D surveys are quite common in both CV and CE

applications, but rarely do SP practitioners acknowledge the double hypothetical that they have posed to respondents or think through the implications of this practice.

A review of the recent literature reveals the extent to which hypothetical baselines are being employed. We reviewed the EconLit® database for the year 2009 and the keyword “contingent valuation”; this search generated 61 studies. Of these studies, 10 focused on methods (and did not discuss baselines) and in 11 the baseline could not be determined. Of the remaining 40 studies, 27 could be classified as using real baselines, 7 used hypothetical baselines, 1 used both (in two treatments), and 5 were probably hypothetical, but we could not ascertain for certain whether the baseline was hypothetical or real. Thus, at least one-fifth of the CV studies in 2009, and possibly as many as one-third, used a hypothetical baseline.

A review of 42 CE studies in the database in 2009 showed that 29 used real baselines, 8 used hypothetical ones, 1 used both, and 4 could not be placed in either category. For this small sample, the ratio of hypothetical to real baselines was quite similar in recent CV and CE applications.

Hypothetical baselines are also used in other literatures that employ preference elicitation techniques. For example, in health economics, two commonly used techniques to elicit preferences over health states are the “standard gamble” and “time trade-off” methods (see, e.g., Sinnott et al. 2007). While there are many variants of these methods, the general framework asks respondents to imagine that they are in a particular health state (most likely a hypothetical state). The respondents are then asked to consider how much they would be willing to trade off in terms of years of perfect health (the time trade-off approach) or what probability of being in a perfect health state—versus sudden death—they would accept (the standard gamble approach) to be as well off as the described health state. If the respondents are not experiencing the condition described, then this is clearly a hypothetical baseline. For the time trade-off case, the number of years in the baseline condition is also hypothetical because it is assumed by the researcher.

Interestingly, the health preference elicitation literature on the difference between “patient preferences and population preferences” is very large and complex. Because health resource-allocation decisions are often based on population or community preferences (rather than patient preferences), there is concern that this may result in a significant misallocation of resources (Ubel et al. 2003). This has led to an expansive set of analyses on what effectively constitute hypothetical baselines.

3. What Kinds of Hypothetical Baseline Conditions Have Stated Preference Researchers Used?

There are numerous attributes of respondents' status quo conditions that SP researchers can change in an SP scenario to create hypothetical baselines. We give several examples. First, an SP researcher could tell respondents to assume that they are in a different location. If the respondents are traveling, perhaps being interviewed in an airport, the SP researcher could tell them to imagine that they are at home. Respondents could be told to imagine that they live in a cold climate (when in fact they do not).

Second, an SP researcher could tell respondents to assume they are older—to move forward in time. Or respondents could be asked to move back in time, and then asked what they would have done if they were younger and confronted with a specific contingent behavior question.

Third, respondents could be asked to imagine that their households have more income or more assets. The SP researcher could then ask the respondents a question about whether they would vote for the implementation of a hypothetical a management plan and/or good or service if it cost them a specified amount of their new wealth.

Fourth, an SP researcher might ask respondents to assume that their households have infrastructure that they do not in fact have. For example, all respondents in a CV survey could be told to assume that they have a piped water connection (even though some do not) and asked whether they would connect to a sewer line at a specified price, if one were available in their neighborhood.

Fifth, an SP researcher could ask respondents to assume that they face different risks than are actually the case. For example, they could be told to suppose that their risk of developing lung cancer was 1 in 100 over their lifetime, instead of the actual risk. Sixth, the SP researcher could put respondents into a new state of the world (a hypothetical baseline), in which their health status was assumed to be different. They could be told to assume that they have been diagnosed with a chronic health condition, such as asthma or arthritis, even though in reality no such diagnosis has been made. Seventh, an SP researcher could tell a respondent to imagine that external economic or social conditions are different than they are in reality. For example, respondents could be instructed to assume that economic conditions are good, even if the economy was in recession, and then asked about their willingness to move if offered a new job with certain attributes. Eighth, the respondents could be told that they are engaged in an activity

that they are not actually engaged in or thinking about doing, such as buying a new house or being interested in purchasing a camera.

There are two points worth noting from these examples of hypothetical baselines. First, they are not mutually exclusive. For example, an SP researcher might create a hypothetical baseline that shifts the respondents' status quo condition in both time and space. Second, in a general population survey, some respondents could be confronted with a new hypothetical baseline and others not. For example, if all households were told to assume that they were homeowners, some would already be homeowners. The baseline would only be hypothetical for respondents who were renters or perhaps living for free in a relative's or friend's house.

4. Why Would Researchers Choose to Use Hypothetical Baselines?

There are four main reasons why SP researchers choose to shift respondents away from their status quo conditions and to ask them to value a hypothetical management plan from the perspective of an alternative, hypothetical baseline condition. First, it is of course possible that the SP researcher really wants to know what households would do if circumstances changed and people were confronted with a new policy or program. In a rapidly growing economy in which household incomes are doubling every 10 years, government infrastructure planners need to know the value households will place on different services when these new services become available and when incomes are much higher, not how households value such services today. In such a case, a hypothetical baseline in which households are told to assume that they have more income than they do today may be the most policy-relevant baseline condition. Similarly, if the present conditions are for some reason abnormal or in disequilibrium, the SP researcher may choose to instruct respondents to return to their "normal" status quo state of the world, and answer the valuation question from this perspective.

Second, SP researchers may be forced to shift the respondent to a hypothetical baseline condition in order to ask a sensible valuation question. This situation has arisen in numerous surveys of foreign tourists visiting cultural heritage or national parks in developing countries. For example, suppose the government of Ecuador wanted to learn more about whether foreign tourists would pay higher entrance fees to visit the Galapagos Islands if the islands were managed in different ways, in other words, subject to different management plans that would improve the experience for the visitors and improve native habitat.

If an SP researcher interviews foreign tourists as they are leaving the Galapagos, what precisely would the respondents be asked? What the researcher wants to know is whether the

tourists would have decided to visit the Galapagos if the entrance fee had been higher and the islands had been as described in a hypothetical management plan. But, this question requires that the respondents move back in time to the point before they made a decision to visit the Galapagos.

Alternatively, the respondents could be told to both move forward in time and space, and to assume that they were back home and contemplating a second trip to the Galapagos. Would the respondents decide to return to the Galapagos if the new entrance fee and the new hypothetical management plan were in place?

Of course, one trip to the Galapagos might be sufficient for these tourists, however much they liked it the first time. In this example, the use of a hypothetical baseline not only helps the SP researcher ask a sensible question but also helps address a particularly challenging sampling issue. The researcher might wish to have a random sample of tourists who are considering trips to Ecuador, but such a group would be difficult to identify. A choice-based sample (of people who have chosen to visit Ecuador already) is clearly a biased sample, but is a practical alternative to the sampling problem.

Third, SP researchers may use a hypothetical baseline simply as a matter of their own convenience. For example, consider again our example of an SP researcher who wants to know whether or not households in a community without a piped water distribution system would connect to such a system if one were installed. Renters and homeowners will definitely behave differently because a household that is renting will typically not be willing to pay an upfront charge to connect a house (and bear the costs of changes to indoor plumbing) that they do not own. The SP researcher would thus need to employ two different survey instruments: one for renters and one for homeowners.³

Homeowners could be asked whether they would connect to the new piped distribution system at a specified connection charge and volumetric tariff. Renters could perhaps be asked whether they would agree to pay a surcharge on their monthly rent if the landlord connected their house to the distribution system and provided them with piped water. But, fielding two different survey instruments (or one survey instrument with different sections for owners and renters) is somewhat complicated. An easy solution is to simply tell the renters to pretend that they are homeowners and ask all respondents the same questions.

³ Or alternatively employ skip patterns with a section for owners and another section for renters.

In another example, baseline risks of a disease may vary widely across a sample population and determining the baseline risk of different households may be difficult or impossible. An SP researcher can attempt to “make” the variation in baseline risk “go away” by telling respondents to assume it is a single value, so that it is easier for the researcher to understand factors affecting respondents’ valuation of a hypothetical management plan other than baseline risk.

Fourth, the use of a hypothetical baseline may help respondents remove themselves from political or social controversies surrounding status quo conditions and thus take a fresh look at a policy problem from a different, perhaps more neutral perspective. If a status quo condition is controversial, some respondents may have preconceived ideas or well-established positions on how to solve a problem. This can lead to scenario or payment vehicle rejection. SP researchers may decide to use a hypothetical baseline in order to minimize such protest responses.

A related reason for using a hypothetical baseline may be to remove a strong status quo bias that a policymaker or client of the SP researcher feels is unjustified. The SP researcher may employ a hypothetical baseline to reduce such status quo bias, effectively forcing a respondent to think about two new states of the world, and not anchoring on the status quo. Note that this involves a judgment that the status quo bias is unreasonable—something that in itself needs to be assessed or justified.

CE researchers can use this strategy of eliminating the default or status quo option, and force the respondents to choose between two new alternatives each with different attributes (e.g., Breffle and Rowe 2002). Neither is the respondents’ status quo condition. In this case, the CE researcher has employed an implicit hypothetical baseline: “you cannot stay where you are.” Often in CE surveys the respondents are given little explanation as to *why* they cannot stay where they are, in other words, why they must choose between the two (or more) alternatives presented in a choice task.

Breffle and Rowe (2002) discuss the merits of including or excluding a status quo alternative in a choice experiment. They argue that, in some cases, a status quo or actual baseline may not be possible because that situation will not exist in the future. They also argue that presenting a status quo or baseline may provide an “easy out” for respondents who do not wish to engage in the complexity of the stated preference task. They do point out that a status quo option will be necessary when determination of market shares (or the % of Yes votes) is required, and when non-marginal welfare measures (e.g., more than the marginal rates of

substitution) are required. We return to discuss the pros and cons of excluding status quo options below.

5. What Are the Risks of Using Hypothetical Baseline Conditions?

SP researchers have often assigned respondents to hypothetical baseline conditions without sufficient reflection on the potential risks and complications involved. There are numerous reasons to be concerned about invoking a hypothetical baseline that moves respondents away from their actual status quo conditions, many based on the insights from behavioral economics. We first review the potential problems arising from hypothetical baselines in general and then provide a more formal analysis of the risks associated with hypothetical baselines.

5.1 Status Quo Bias and Reference Dependence

First, and perhaps most important, there are numerous legitimate reasons why people may place special value on maintaining their status quo condition. Tversky and Kahneman (1979) pointed out that there is something special about an individual's reference point for valuing gains and losses. An individual's reference point need not be the current status quo conditions, but in most instances it probably is. In some cases, the status quo may be a disequilibrium state, and individuals may anticipate shifting back to their standard reference condition. However, we have never seen an SP researcher make this case for the use of a hypothetical baseline as the normal reference point.

If the usual reference point is the current status quo condition, and losses measured relative to a reference point are especially painful, SP researchers should be cautious about moving respondents away from their status quo baseline because the resulting utility measures will not reflect the special value associated with the stability and comfort of normalcy. When CE researchers do not use a hypothetical baseline and allow respondents to default to their real status quo conditions, they often discover a positive utility associated with the constant in their choice

models, indicating something special about the status quo that is not captured in their listed attributes (e.g., Scarpa et al. 2005; Boxall et al. 2009).⁴

This tendency to choose the default condition is at the core of many of the policy recommendations of behavioral economists. Thaler and Sunstein (2008) have argued that, in numerous instances, a policymaker can design a set of choices for members of the public, so that the choice of the default option enhances individuals' welfare. This effectively takes advantage of people's inclination to gravitate toward this default option. For some policy problems, people will be asked to choose one option or another. A policymaker, influenced by behavioral economics, wants to enhance the chances that people will end up with the option that ex post they wish they had. The typical policy set-up is thus similar to a CE choice task, in which the status quo option has been removed. The policymaker attempts to characterize one of the available choices as the default option, perhaps by making it the option assigned to the individual if nothing is done.

The issue of a hypothetical baseline for SP researchers is different. In the typical economic valuation study, there is no presumption that the SP researcher knows ex ante (i.e., before the study) which policy option or alternative is best for a respondent. The analyst wants to assess individuals' preferences, and often to predict their behavior, as objectively as possible. The individual respondents' preferences and behavior will depend on their current baseline conditions, and they may be under no legal, social, or moral obligation to change this status quo. An SP researcher who assigns a hypothetical baseline to respondents may lose important information about their unwillingness (loss in utility) to move from their existing status quo conditions to the hypothetical baseline state of the world.

5.2 Hypothetical Baselines May Be More Cognitively Challenging

The use of a hypothetical baseline, coupled with a hypothetical management plan and/or a hypothetical good or service, is probably cognitively more challenging for respondents than

⁴ Other research has illustrated the importance of including an actual baseline in modeling behavior. Barton and Berglund (2010), for example, showed that including actual information about the status quo significantly improves the performance of a stated preference statistical model, relative to simply using a generic status quo parameter in the model. Hess and Rose (2009), in a transportation application, showed that parameters associated with "real" reference alternatives are different than parameters associated with hypothetical designed alternatives. These results provide additional evidence suggesting that the inclusion of information about the actual baseline is important in understanding preferences and trade-offs.

confronting a single hypothetical state of the world. To the best of our knowledge, SP researchers have not yet investigated how this increased cognitive burden affects the welfare measures associated with the hypothetical management plan, but there are reasons for pessimism.

SP researchers know that many respondents tire easily and do not enjoy thinking about complex tasks; they thus try to minimize both the number of choice tasks presented to respondents and the complexity of each. Pictures, videos, and other visual aids are often used to make it easy for respondents' intuitive minds to understand a hypothetical management plan and its consequences. There is no a priori reason why one should not be just as careful explaining a hypothetical baseline condition as a hypothetical management plan.

In our experience, SP researchers almost never pay as much attention to hypothetical baselines as to hypothetical management plans and/or goods or services. Typically the information describing a hypothetical baseline is presented in a single sentence or phrase, whereas a few paragraphs (or more) may be devoted to the description of the hypothetical management plan and good or service. This can often result in an ambiguous or vague hypothetical baseline. The risk here is that respondents may interpret or imagine the hypothetical baseline state of the world differently than the SP researcher intends, thus introducing additional bias or noise into the valuation estimates. For example, if respondents are asked to consider a hypothetical baseline of health risks (likelihood of dying from an illness this year), but they know that their own risk is different, they may decide to respond using their own perception of the baseline—a blend of their perception and the provided hypothetical baseline—or the provided baseline. The researcher will not know which baseline is being used.

5.3 A More Formal Analysis of Reference Dependence, Status Quo Bias, and Hypothetical Baselines

A recurring finding in the behavioral and experimental economics literature is reference dependence. One interpretation of reference dependence is that the individuals use the status quo or baseline as a utility reference point, and they judge losses and gains relative to this point. Status quo bias is a related effect discussed in the literature (Samuelson and Zeckhauser 1988; Thaler and Sunstein 2008). With status quo bias, individuals assign greater utility to the status quo situation (or default condition) than can be explained by attributes of the options or goods. Many studies using choice experiments report the presence of status quo bias (Adamowicz et al. 1998; Meyerhoff and Liebe 2009; Scarpa et al. 2005, 2007; Boxall et al. 2009). What are the implications of using a hypothetical baseline in cases where status quo bias or reference

dependence is expected to be present? A slightly more formal analysis of reference dependence and status quo bias sheds light on this question.

One formulation of reference dependence is the following (based on DellaVigna 2009; see also Koszegi and Rabin 2006). Utility V is a function of the good x , as well as the deviation of x from the reference point r . Utility can be expressed as:

$$V(x | r) = V(x) - V(r) \text{ if } x \geq r, \text{ and}$$

$$k[V(x) - V(r)] \text{ if } x < r,$$

where $k > 1$ is the loss aversion parameter. This formulation clearly illustrates that losses are treated differently than gains and that the location of the reference point will significantly affect utility calculations and decisions. DellaVigna (2009) reports that values of k are commonly around 2.25.

There is considerable discussion about the formation of r , the reference point. Most often the reference point is assumed to be the status quo or baseline. However, Koszegi and Rabin (2006) argued that the reference point may be better thought of as an expectation of outcomes, which may or may not be the status quo. This means that status quo bias may, in fact, be somewhat different than reference dependence. We investigate the implications of these two issues below.

For now, let us assume that reference point r is the status quo or baseline. Consider an SP researcher who presents a hypothetical baseline or status quo. Let r_h be the hypothetical baseline reference point and the “real” reference point be r_r . The utility calculation should be based on $V(x | r_r)$; however, the respondents may be convinced that the baseline is r_h resulting in decisions based on $V(x | r_h)$, which may be very different than the “real” utility structure.

Alternately, the respondents may engage in some form of updating or averaging, in which their knowledge of the situation suggests $V(x | r_r)$, but because of the baseline information presented they modify this to reflect new information as $V(x | g(r_r, r_h))$, where $g()$ represents an updating function. The latter formulation more closely resembles Koszegi and Rabin’s (2006) concept of reference points reflecting expectations, but now the information on the hypothetical baseline has been assumed to influence the formation of the reference point, and the SP researcher does not know what the respondent’s perceived status quo is.

It is apparent that if utility is reference dependent, and the description of the baseline deviates from the real baseline, utility and values will be affected. Evaluations that involve losses relative to the baseline will most likely be severely affected.

Focusing on status quo bias, independent of reference point arguments, also has implications for the use of hypothetical baseline, when such “biases” exist. Status quo bias can be represented as a positive amount of utility in the indirect utility for the status quo option. The status quo, or baseline utility, is V_0 in the equation below, while the alternative or program is V_1 . Utility is a function of income (y) and quality (q). The parameter α_0 represents the preference for the baseline independent income and quality:

$$\begin{aligned} V_0 &= \alpha_0 + \beta f(y) + \delta q_0 + \varepsilon_0 \\ V_1 &= \beta f(y - c_1) + \delta q_1 + \varepsilon_1 \end{aligned}$$

In empirical work, it is often discovered that $\alpha_0 > 0$, indicating status quo bias. However, questions remain regarding the source of this preference for the status quo (Scarpa et al. 2005). Some studies have suggested that $\alpha_0 > 0$ arises from the complexity of the choice context and thus a kind of processing cost that leads to avoidance of a decision (Boxall et al. 2009). This may explain some of the findings of the popularity of default options (Thaler and Sunstein 2008). It is also possible that in stated preference surveys $\alpha_0 > 0$ because of payment vehicle rejection, protests of some form, or scenario rejection. These outcomes may arise from the increase complexity associated with hypothetical baselines.

However, if the reason that $\alpha_0 > 0$ is due to a pure preference for the status quo, then providing a hypothetical baseline may generate an α_0 that is different from the “real” α_0 that would arise from a real baseline. Alternatively, not providing a baseline at all and simply asking individuals to choose between two non-baseline options (as in Breffle and Rowe 2002) will generate information on parameters β and δ , but will not provide α_0 . In this case, one will be able to measure the marginal utilities or marginal rates of substitution, but one cannot accurately measure the percent of respondents who would choose an option (e.g., percent of yes votes in a referendum context) or the non-marginal willingness to pay for a change.

5.4 Hypothetical Baselines and Policy Relevance

The introduction of hypothetical baseline conditions may make the results of the valuation study less policy relevant. Policymakers will usually want to know how people will behave if confronted with a policy intervention. The people’s behavior will depend on their

actual baseline status quo conditions, not the state of the world described in the hypothetical baseline. SP researchers may argue that they can utilize econometric models to predict how sample respondents will behave under actual baseline conditions, even when presented with a hypothetical baseline. The behavioral economics literature reviewed above, and recent research in experimental economics, suggests that prediction of this type are difficult. Alpízar et al. (2008) illustrated this point by showing that if the contexts between stated and revealed preference valuations differ then comparison between the two methods may not be valid. For us, the hypothetical baseline could constitute a different context relative to the real situation.

Cognitive difficulties with hypothetical baselines may also introduce additional measurement errors into individuals' response to choice tasks. The econometric models estimated with respondents' choices conditioned on a hypothetical baseline will fail to adequately capture the heterogeneity across individuals. To the best of our knowledge, SP researchers have never compared (a) forecasts of behavior at status quo conditions, based on a structural model estimated from responses using hypothetical baselines, to (b) respondents' stated behavioral intentions from their actual status quo conditions.⁵ The use of a hypothetical baseline will make it difficult to provide measures of the proportion of respondents who would choose the actual baseline, relative to the proposed programs—often an important piece of information for policy analysis.

5.5 Ethical Implication of Hypothetical Baselines

The ethical issues involved in telling respondents to imagine a counterfactual, hypothetical baseline have not been adequately examined. For example, if an SP researcher tells respondents to suppose that their risk of infection is higher than it actually is, in the absence of better information, respondents may anchor their behavior on this hypothetical baseline risk and take actions that may adversely affect their well-being. Hypothetical baselines are an easy conduit for spreading misinformation (Whittington, 2004).

⁵ Breffle and Rowe's (2002) study is, to a certain degree, an exception to this statement. They compared models with explicit baseline (status quo) options to "forced choice" scenarios.

6. Recommendations on Use of Hypothetical Baselines

In this section, we offer guidance to SP practitioners who are considering the use of a hypothetical baseline in their survey instrument. We created a checklist of issues for SP researchers to consider.

6.1 “Eyes Wide Open”

Albert Hirschman’s (1970) admonition to policy analysts to keep their “eyes wide open” is sound advice for SP researchers using hypothetical baselines. Too often SP researchers confront respondents with a double hypothetical, namely, a hypothetical baseline and a hypothetical management plan, without carefully thinking through the risks involved or the reasons for doing it. We are not arguing that hypothetical baselines should never be used, but in our opinion they are not an option of first choice because they will be cognitively more difficult for respondents and may not provide policy relevant predictions of behavior.

6.2 Detailed Descriptions of the Hypothetical Baseline and Debriefing Questions

If an SP researcher decides that a hypothetical baseline is required, its description should typically be comparable in detail to the description provided in the scenario about the hypothetical management plan. Also, we want to see debriefing and open-ended questions in the survey instrument that are specifically focused on the hypothetical baseline state-of-the world. This provides more confidence that the respondent understands the story in the scenario about the hypothetical baseline and interprets it in the manner that the SP researcher intends.

For example, if respondents are told to imagine that they have to move to another country, we want some assurance that the respondent took this instruction seriously. It would be useful to know if the respondent had ever lived in a foreign country for an extended period or seriously considered moving to a foreign country. If respondents are told to assume that their health status is different than it is today, or that they have a specific health condition, the SP researcher should include debriefing questions to determine whether the respondents ever considered such a possibility, knew anyone with this hypothetical baseline health condition, or generally accepted the possibility that such a hypothetical baseline could happen. Respondents should also be probed on their views about the baseline probabilities or risks presented to them to assess whether they feel that they correspond to their actual or perceived baseline conditions.

6.3 Assessment of Forecasts of Behavior Based on Choices Conditioned on Hypothetical Baselines

For most policy discussions, SP researchers need to be able to describe what respondents would do in response to a policy change, in light of their actual status quo conditions—not in response to a hypothetical baseline state-of-the world. When respondents are presented with a hypothetical baseline and then given choice tasks (asked valuation questions), their responses can be used to estimate behavioral models. The parameters from such models can then be used to generate welfare-theoretic estimates of the hypothetical management plan and to forecast respondents' behavior under actual status quo conditions. SP researchers should compare such model forecasts with what respondents say they would do under actual status quo conditions (i.e., a split-sample of respondents is asked about the hypothetical management plan without the hypothetical baseline).

6.4 Ethical Implications of Hypothetical Baselines

SP researchers employing hypothetical baselines should provide an explicit discussion of the ethical implications of presenting a hypothetical baseline state-of-the-world to respondents. The researchers should debrief respondents at the end of the interview and explain the reasons the hypothetical baseline was used. We are not suggesting that such a discussion is a substitute for Institutional Review Board (IRB) approval of the survey instrument and research project. Yet, because so little attention has been paid to hypothetical baselines in the SP literature, it would be good practice for researchers to assure their readers that respondents have not be mislead or harmed in some way by being told about either the hypothetical baseline or the hypothetical management plan and/or good or service.

7. Conclusions

We outlined a phenomenon that appears to be increasingly common in the stated preference literature, the use of hypothetical baselines. We also described what we believe are the reasons that hypothetical baselines are used and some of the potential pitfalls associated with the use of hypothetical baselines for stated preference research. To the best of our knowledge, this issue has not been formally recognized in the SP literature in economics. Our interest in this area has been heightened by the linkages between findings in behavioral economics and stated preference research.

Behavioral economists have illustrated the importance of default conditions and the phenomena of status quo bias and reference dependence, and are vigorously investigating

underlying reasons for these conditions. We suggest that stated preference researchers consider parallel work on the implications of these features of choice behavior on SP designs, particularly the design of the baseline.

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