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Addressing empirical challenges related to the incentive compatibility of stated preferences methods

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ABSTRACT

An emerging theoretical literature focused on the incentive compatibility of stated preference surveys offers a new lens through which to view extant evidence on external validity, and provides guidance for practitioners. However, critical theoretical assumptions rest on *latent* respondent beliefs, such as the belief that respondents view surveys as potentially influencing policy (i.e., policy consequentiality), which gives rise to pressing empirical challenges. In this study, we develop a Hybrid Mixed Logit model capable of integrating multiple latent beliefs, and subjective measures of these beliefs, into a discrete choice model of stated preferences. Planned use of a resource, which can also be considered a latent variable, is frequently an important consideration when modelling stated preferences for a change in a good, and we demonstrate how our framework can be used to incorporate this information simultaneously. We further explore whether simple information treatments, which vary the degree to which the potential role of surveys in informing policy is emphasized, can influence respondent beliefs. Our results suggest that latent beliefs over consequentiality, resource use and, to a much lesser extent, the information treatments significantly influence elicited willingness to pay.

1. Introduction

Stated preference surveys continue to be the leading approach for estimating the economic value of products not available in markets, including proposed public policies with passive use value. Although the methodology has been in use for over fifty years, concerns over the ability of surveys to provide valid welfare measures remain, serving as an obstacle to widespread adoption in the legal and policy arenas. Recently, theoretical work has identified conditions for a stated preference survey to be incentive compatible in the sense that it provides incentives for truthful preference revelation. These conditions for incentive compatibility rely heavily on *latent* (i.e., unobserved) respondent beliefs. For instance, when a single binary choice (SBC) question is used, respondents must perceive that the stated cost can be coercively collected upon implementation of the project (i.e., payment consequentiality) and that a response in favor of the proposal weakly monotonically increases the chance of its implementation (i.e., policy consequentiality) (Carson and Groves, 2007; Vossler et al., 2012). In addition to these beliefs, incentive compatibility for the increasingly popular repeated binary discrete choice experiment (binary

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DCE) requires respondents to believe that at most one of the proposed policies can be implemented, and that the perceived implementation rule induces independence between choice sets (i.e., that a vote on one policy in one choice set has no effect on the implementation probability of another policy from another choice set) (Vossler et al., 2012). Our study proposes methods for addressing two of the significant challenges that arise when undertaking empirical work that endeavors to satisfy and/or test the theoretical assumptions tied to respondent beliefs.

One empirical challenge is how to incorporate stated measures of latent/unobservable beliefs, such as Likert-scale responses to a question about perceived policy consequentiality, into models of stated preferences. Direct inclusion of stated measures of beliefs may be problematic for two reasons. First, stated beliefs are measured imprecisely, giving rise to issues of measurement error. Second, stated beliefs may be correlated with other unobserved factors that influence respondents' choices. In prior work, Herriges et al. (2010) develop a Bayesian treatment effect model for SBC data that uses instrumental variables to identify the relationship between stated policy consequentiality and willingness to pay (WTP). Vossler et al. (2012) and Vossler and Watson (2013) briefly mention binary probit instrumental variable models, with the former study suggesting statistical evidence that measured beliefs can be considered exogenous and the latter citing a weak instruments problem. Here, we propose a Hybrid Mixed Logit (HMXL) approach, which models an unobserved belief as a latent variable in a Random Utility Maximization (RUM) framework, and specifies a measurement equation where a stated measure of the belief is a function of the latent variable and an error term, thus recognizing the presence of measurement error.[1] Relative to prior approaches, the proposed HMXL model can: (1) be applied generally to both SBC and DCE data; (2) accommodate multiple latent factors in flexible ways; and (3) incorporate flexible specifications for measurement equations (e.g., ordered choice, multinomial choice, count data models, etc.). Further, as with standard mixed logit models, the HMXL allows the analyst to incorporate various forms of preference heterogeneity. Identification relies on there being available measures of the latent variables, rather than instrumental variables in the case where stated beliefs are directly included in the choice model.

A second challenge, assuming the theoretical incentive compatibility conditions tied to beliefs are not universally met, is how to modify survey design to induce desired beliefs (i.e., make respondents believe in real consequences following from a survey outcome). In most studies, aside from controlled experiments, researchers do not have the ability to manipulate the *actual* consequentiality of a survey. Further, whether and to what extent a survey is actually consequential is rarely known *ex ante*. Under these circumstances, beliefs over consequentiality remain important theoretically, and these beliefs are likely influenced by many aspects of survey design. In their critical review of the literature, Kling et al. (2012) point out that "the effect of consequentiality scripts in stated preference surveys is in its infancy". Using as a case study a binary DCE survey focusing on the public financing of municipal theaters in Warsaw, Poland, we employ a split-sample approach to investigate four information scripts that vary in their emphasis of policy consequentiality.[2] The baseline treatment provides information at a level that is common in stated preference surveys, with additional emphasis placed in the other treatments. As an ancillary benefit, this exogenous variation allows us to identify whether there is a *causal* effect of policy consequentiality on elicited values. As acknowledged in prior work, follow-up consequentiality questions are themselves *in*consequential constructs. This opens up the possibility that identified correlations may be spurious and, similarly, that drivers of responses to consequentiality questions may have little to do with actual beliefs.

In the field survey context, and in a similar spirit to our research, a few prior studies exogenously vary information provided to respondents with the intent of altering perceptions over policy consequentiality.[3] Bulte et al. (2005) find that providing a statement that alerts respondents that the results of the study "will be made available to policymakers, and could serve as a guide for future decisions" decreases WTP. Oehlmann and Meyerhoff (2017) and Drichoutis et al. (2015), in contrast, observe no WTP changes resulting from the inclusion/exclusion of a consequentiality script. Herriges et al. (2010) make use of a published article that provided evidence that survey results directly affected related policy decisions in the past, and find that stated beliefs over policy consequentiality increase when respondents are provided this information. All of these studies used SBC elicitation, and as such our exploration provides primary evidence on this type of inducement for DCE surveys. Further, the scripts we explore can further be easily incorporated into general practice. Indeed, it is presumably rare to have relevant media coverage available that provides a clear third-party link between surveys and policy. An ancillary benefit of the HMXL framework in this context is that it allows one to not only measure whether information treatments alter stated beliefs but also whether such treatments influence stated WTP.

[1] Many researchers state that hybrid choice models address general endogeneity issues (e.g., Daly et al., 2011), such as may arise when unobservables underlying a stated belief measure are correlated with the choice model errors. Budziński and Czajkowski (2017) undertake a Monte Carlo analysis, demonstrating that this is not necessarily the case, and propose an extension to the HMXL that allows errors to be correlated across equations.

[2] Our application is of potential interest in its own right, as few non-market valuation studies have examined the value of the performing arts (Forrest et al., 2000; Hansen, 1997; Willis and Snowball, 2009; Grisolía and Willis, 2010; Grisolía and Willis, 2012; Willis et al., 2012).

[3] A handful of controlled experiment studies exogenously vary the level of *actual* policy consequentiality, for example, by manipulating the probability a vote is binding (Landry and List, 2007; Mitani and Flores, 2012; Carson, et al., 2014), or by introducing treatments the vary the proportion of respondent and "regulator" votes (Collins and Vossler, 2009; Vossler and Evans, 2009).