



Value of time – A citizen perspective



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ABSTRACT

The dominant empirical approach to infer Value of Time is based on experiments in which respondents are typically asked to make hypothetical travel choices as if they were paying travel costs from their own budget, in exchange for personal travel time gains. However, many scholars have argued that such travel choice decisions of individuals in their role of consumer of mobility are likely to be a poor proxy of how they in their role of citizen believe government should spend tax money to generate travel time gains for large numbers of travelers. So far, this possible deviation between what we call ‘consumer VoT’ and ‘citizen VoT’ has not been studied empirically. In this paper, we fill this gap, by designing a Stated Choice experiment with eight different frames; some representing a typical consumer choice situation, others gradually approaching a citizen perspective. We find that individuals’ willingness to pay from previously collected tax money for travel time gains created by a government policy, is significantly higher than their willingness to pay, from their after tax income, for time gains obtained by choosing a different route. This result implies that citizen VoT is higher than consumer VoT. This difference does not stem from a stronger willingness to spend previously collected tax money compared to spending one’s own income, but from a difference in the value attached to travel gains: a travel time gain resulting from government action is valued more than the same travel time gain obtained by one’s own route choices. This and a range of other empirical results are discussed in depth, in light of the conceptual differences between preferences of individuals in a role of consumer or citizen.

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1. Introduction

Without a doubt, the notion of a traveler’s Value of Time (VoT) is one of the most important and well-researched concepts in transport economics. VoT is a key ingredient of Cost-Benefit Analyses of transport policies and infrastructure projects; it transforms travel time gains, which often constitute the large majority of benefits of policies and projects, into monetary benefit estimates which allows for a consistent comparison with project costs. Since the advent of choice models and stated choice (SC) data collection methods in the mid-1970s, hundreds, if not thousands, of SC-studies have been undertaken to derive travelers’ marginal rate of substitution between travel time and travel costs (e.g. [Abrantes and Wardman, 2011](#); [Mackie et al., 2001](#)). In the overwhelming majority of such experiments, individuals are asked to make a choice between different travel options with different travel times and travel costs (e.g. [Axhausen et al., 2006](#); [Börjesson and Eliasson, 2014](#); [Ehreke et al., 2014](#); [Fosgerau et al., 2007](#); [Kouwenhoven et al., 2014](#); [Mackie et al., 2003](#); [Ramjerdi et al., 2010](#); [UK Dept. for Transport, 2015](#)). Crucially, in these experiments travelers are asked to make these choices as if they were paying travel

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costs from their own budget (whereas transport projects are paid by taxes), and as if the travel time is only experienced by themselves (whereas the benefits of projects are typically experienced by large numbers of travelers).

This so-called consumer sovereignty-based approach to estimate the monetary value of non-market goods such as travel time gains, has been contested by several economic-philosophers (e.g. Ackerman and Heinzerling, 2002; Kelman, 1981; Marglin, 1963; Nyborg, 2012; Sagoff, 1988; Sunstein, 2004). These scholars argue that decisions of individuals in their role as *consumers* (such as those observed in conventional SC-experiments into VoT) are likely to be a poor proxy of how the same individuals in their role as *citizens* believe that government should allocate tax payers' money. Critics of this 'citizen sovereignty-based approach' have in turn argued that although its supporters showcase a parade of appealing real world examples in which the assessment of an individual in her role as a consumer clearly deviates from the assessment in her role as a citizen, they fail to provide a convincing alternative for an assessment of government projects based on micro-economic theory (Hanley, 2009).

We observe that the heated debate concerning the usefulness of the 'consumer sovereignty-based approach' and the 'citizen sovereignty-based approach' for policy appraisal, has so far been purely normative. Especially arguments supporting the latter approach are based on thought experiments and normative value judgements. It is striking that so far, no empirical evidence has been put forward which scrutinizes whether 'consumer values' in fact *differ* from 'citizen values'. Also for the VoT it is unclear if and to what extent an individual's trade-off between time and money for her personal travel (i.e., her consumer VoT) would differ from her beliefs concerning how government should trade-off travel time and tax money when evaluating transport policies (i.e., her citizen VoT). In this paper, we fill this gap, by means of collecting and analyzing travel choice data in a series of carefully constructed SC experiments. More specifically, by careful use of wording in the experimental set-up, we are able to frame choice tasks as either a typical 'consumer' choice, a typical 'citizen' choice, and several in-between framings. Choice models are then estimated, and the implied VoTs obtained from these estimations are compared across frames. As we will show, this leads to valuable empirical – as opposed to normative – insights into the presence and meaning of differences between consumer- and citizen-VoTs.

Crucially, throughout this paper we adopt a completely agnostic standpoint regarding the above mentioned *normative* debate concerning whether 'consumer VoTs' or 'citizen VoTs' should be used in evaluating transport policies. We merely aim to add *empirical* knowledge about the actual difference between these VoT-notions, which may help guide and shape this debate in the future. In Section 2, we conceptualize and operationalize our different framings of consumer- and citizen-VoT. Section 3 discusses data collection and analysis. Subsequently, we present and interpret results in Section 4. In Section 5, we draw conclusions and raise further topics for discussion.

2. Conceptualization and operationalization of consumer- and citizen-VoT

In the broader Economics literature, it has been well-established that preferences of individuals in their role as consumers are restricted by their budget constraints (e.g. Fuguitt and Wilcox, 1999; Sagoff, 1988). In other words, observing consumer preferences involves observing how individuals allocate their after-tax income in (hypothetical) markets (Sagoff, 1988). On the contrary, observing preferences of individuals in their role as citizens involves observing their behavior in public social life (e.g. Kelman, 1981); individuals display their preferences as citizens supporting or opposing government policies in public spheres like elections, referenda, demonstrations and social media, etc. Although an analysis of the expressions of individuals in these public spheres is useful for eliciting the attitudes of citizens towards government policies, citizens' Willingness to Pay for specific aspects of a policy (e.g. her VoT in the context of a particular transport policy) cannot be directly derived from these expressions. To enable the derivation of citizen-VoT and facilitate a direct comparison with consumer-VoT, we adopt the SC data collection paradigm as one single empirical approach for both the citizen- and consumer-perspectives on VoT. Although the literature discusses many shortcomings of stated-preference surveys (e.g. Diamond and Hausman, 1994) there is considerable evidence for the external validity of the application of this approach in the transport domain. Louviere (1988) demonstrates that the predictions of models developed from SC studies correlate well with the observed behavior of aggregates of real people other than those who were studied. Moreover, regarding Value of Time studies, Wardman (1998) observed an encouraging level of similarity between Values of Time based on stated choices and revealed choices in a review of 105 British Value of Time studies.

Under the generic stated choice methodological umbrella, we carefully and systematically frame binary discrete choice tasks in a way that allows us to distinguish between consumer- and citizen-VoTs and in-between variants. Given the subtle nature of the framings, and also given that little guidance is available in the literature concerning the citizen frames, we performed an extensive pretesting of our survey, which involved pilot experiments and focus groups where respondents were interviewed about their understanding and perception of the different frames, and were explicitly asked if particular frames made sense to them. Since participants considered binary choice settings in which one of the alternatives represents the status quo to be the most meaningful and realistic design for the citizen frames, we adopted this format in our study. This format is also used in other important previous Value of Time studies such as the UK Value of Time study (e.g. Mackie et al., 2003; Ojeda-Cabral et al., 2016). Moreover, this format is one of the most commonly used preference elicitation formats and has a long history of use in survey research (Carson and Groves, 2007). We aspired to design frames that are incentive compatible, in the sense that a truthful response to the actual question asked constitutes an optimal strategy for the respondent (Carson and Groves, 2007). Our frames of citizen-VoT are inspired by three different argumentations that have been put

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