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Valuing travel time savings: A case of short-term or long term choices?

Matthew J. Beck [a,*], Stephane Hess [b], Manuel Ojeda Cabral [c], Ilka Dubernet [d]

[a] Institute for Transport and Logistics Studies, University of Sydney, 378 Abercrombie Street, Darlington, Sydney, NSW 2008, Australia
[b] Institute for Transport Studies & Choice Modelling Centre, University of Leeds, 30-40 University Rd, Leeds LS2 9JT, United Kingdom
[c] Institute for Transport Studies, University of Leeds, 30-40 University Rd, Leeds LS2 9JT, United Kingdom
[d] Institute for Transport Planning and Systems (IVT), ETH Zurich, Stefano-Franscini-Platz 5, CH-8093 Zurich, Switzerland

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ABSTRACT

The valuation of travel time is of crucial importance in many transport decisions. Most studies make use of data framed around short-term decisions such as route choice. However, people may have a greater ability to trade time and money in a longer term setting, such as when considering changes in residential or employment locations. We study the value of travel time in both the short and long-term, finding differences in the valuations. Given the importance of these valuations for policy making, our results call for more research into how time-cost trade-offs should be represented with stated preference.

1. Introduction

1.1. Why and how is time valued?

The valuation of travel time (VTT) is a core input into the appraisal of many transport policy and infrastructure schemes that often have substantial economic, societal and environmental implications. As such, it is not surprising that a substantial share of the research in a travel behaviour context has looked at the specification and estimation of VTT. This comes in the form of numerous smaller scale studies (e.g. Devarasetty et al., 2012; Börjesson et al., 2012; Asensio and Matas, 2008; Lam and Small, 2001) as well as large national level projects (e.g. Hess et al., 2015; Significance et al., 2013; Fosgerau et al., 2007; Mackie et al., 2003).

The VTT can be estimated from either revealed preference data where estimates are derived from the actual choices made by travellers (see for example Isacsson and Swardh, 2009; Van Ommeren and Fosgerau, 2009; Tse and Chan, 2003; Lam and Small, 2001), or from stated preference (SP) experiments where travellers are typically required to make choices between hypothetical travel alternatives that vary in both time and cost (see for example Hensher et al., 2015; Small, 2012;

* Corresponding author.
E-mail addresses: matthew.beck@sydney.edu.au (M.J. Beck), s.hess@its.leeds.ac.uk (S. Hess), m.a.ojedacabral@leeds.ac.uk (M.O. Cabral), ilka.ehreke@ivt.baug.ethz.ch (I. Dubernet).

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Axhausen et al., 2008; Tseng and Verhoef, 2007). While each method has positives and negatives,[1] many jurisdictions now use stated preference methods (see Abrantes and Wardman, 2011; Wardman, 1998 for a review) or a combination of the two (e.g. Axhausen et al., 2015). The data from these surveys is then typically analysed using advanced discrete choice models.

Much of the literature in the SP context has focussed on the experimental design of the hypothetical choice scenarios (in terms of number of alternatives, attributes and statistical design properties) and the econometric specification of the models used in the subsequent analysis. Overwhelmingly however, the context of the choices has focussed on presenting respondents with changes between different options for a given journey (i.e. a single trip), either route choice or mode choice. This is the case in national studies in the United Kingdom (ARUP et al., 2015; Mackie et al., 2003), the Netherlands (Kouwenhoven et al., 2014), Sweden (Börjesson and Eliasson, 2014) and Denmark (Fosgerau et al., 2007). While these national studies in Europe use simple settings with two alternatives and two attributes (travel time and travel cost), more local or regional studies, for example in Australia, rely on more complex presentations with often three alternatives and five or six attributes (e.g. Legaspi and Douglas, 2015; Hensher and Greene, 2011). However, the focus on changes to a single journey remains, something we identify as a short-term decision.

1.2. Is this approach appropriate?

The question we ask in this paper goes beyond the much debated issue of how many alternatives and attributes should be included in surveys, and looks instead at the specific context, namely whether the focus on short-term decisions is appropriate? While there are situations in which a short-term choice of route and or mode of transport may involve opposing changes in time and cost (hence leading to a value of time based trade-off), this is not the case for many others, where e.g. the shortest driving route is also the cheapest. Estimating the VTT from such choices thus firstly requires a certain leap of faith by the respondent in terms of realism of the scenarios presented. Secondly, the estimates will likely relate to a very short-term decision (a traveller may choose the expensive route for a one-off journey, but not in general) while policy work will require estimates of a more general and stable VTT measure. In a travel context, this could for example relate to people making changes to their residential or employment location, i.e. a less reversible choice.

The residential location choice literature acknowledges that travel time, commuting and employment changes are significant determinants of choice (see Schirmer et al., 2014 for a comprehensive overview of the extant literature). Dissonance between where a person lives and where a person would like to live can significantly affect commuting behaviour (Schwanen and Mokhtarian, 2005) indicating that the long-term choice of where to live (or desire of where one would like to live) can influence the shorter term choice of how to commute on a day to day basis; or that the short-term values are potentially predicated by longer-term desires. In one interesting study of commuting and location choice, Rouwendal and Meijer (2001) find that households dislike commuting but preferences for some housing attributes are strong enough to make substantially longer commutes acceptable. In other words, there is evidence that the short-term value of time may be overstated compared to the longer term choice of where to live. The latter is however arguably the most realistic way in which many people can significantly vary the length and expense of their commute.

One paper in the transport literature that seeks to examine differences in long and short run values of time is by Peer et al. (2015). This paper examines departure time choices as a function of schedule delays, finding that significant differences exist in the valuation of time and of schedule delays between the long-run and the short-run model. Specifically, the authors find that travel time is valued higher in the long-run model, as changes in travel time are more permanent and can therefore be exploited better through the rescheduling of routines. Schedule delays are valued higher in the short-run model, since scheduling restrictions are typically more binding in the short-run. This analysis provides evidence for our argument that time may be thought of differently in a longer-term context as it is in the long-term when truly large changes to travel times can be made.

1.3. Contribution of this paper

In this paper, we examine differences in the valuation of time between short and long-term choices, using data from SP surveys that reflect the state of practice for the aforementioned national value of time studies. This paper represents one of the first in the transport literature to make this formal comparison, with a view to providing new evidence in the debate on how this important value for transport policy is constructed.

Specifically, we compare and contrast the values estimated in the analysis of short-term commuting changes versus long-term workplace and salary choices. Both represent a time-money trade-off, but with a different context. We do this by using data from a stated preference survey conducted in Sweden where car and public transport users first faced a set of choices where they had to make cost and travel time trade-offs for their commute, before facing an additional set of choices where they considered increases in travel time in return for a higher salary. Trading workplace location clearly represents a long-term choice; it is a decision that is not made easily and cannot be changed quickly. This presents us with the unique opportunity of contrasting valuations in a short-term and a long-term context, for the same respondent. We also gain insights into

[1] Stated preference require respondents to make hypothetical choices which may not be the same as the corresponding real choices, while the reliability of revealed preference can be affected by factors such as unknown choice alternatives, multi-collinearity and difficulties in isolating the effects of key attributes.