



Willingness to accept longer commutes for better salaries: Understanding the differences within and between couples



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ABSTRACT

This paper reports on an analysis aiming to understand differences across individual people in their willingness to accept increased commuting time in return for higher salary, using Hierarchical Bayes (HB) analysis of a dataset collected in Sweden. We find that socio-demographic and attitudinal differences are significant in explaining the variations in values of time for individuals, in particular income, who drives when carpooling and hours worked per week. Additionally we also examine the values of individuals when their choices also impact on the salary and commute of their partner, finding that incomes, income differentials, driving behaviour when carpooling, division of housework and car user decisions significantly explain the values assigned to others and variations in an individual's own values once their partner is affected. The overall richness of the results reflect the benefits that posterior analysis can bring, and highlight the computational efficiency of Bayesian methods in producing such conditionals at an individual level.

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1. Introduction

1.1. Commuting behaviour

Commuting forms a key component of travel behaviour. According to recently published results from the Sydney Household Travel Survey (BTS, 2013), 23.3% of all trips made by individuals in Sydney were for commuting or work related purposes, representing almost a quarter of the 16.5 million trips made on weekdays in 2011/12. In 2007 in Sweden, 20% of trips are for the purpose of commuting, down from 30% in 1994 (Borjesson et al., 2012). In the United States, commuting to work constitutes approximately 16% of all person trips and 19% of all person miles of travel. For roadway travel, commuting constitutes 28% of household vehicle miles of travel and, for transit systems, 39% of all transit passenger miles of travel (AASHTO, 2013). The United Kingdom reports similar statistics to those in the United States, with 16% of trips being for the purpose of commuting, accounting for 19% of the average distances travelled by people; with a person making an average of 145 commuting trips and travelling an average of 1279 miles (DfT, 2014).

When comparing the length of commuting trips to other types of trip purposes commuters, on average, travel significantly further than any other trip type. In the UK, a recent report by the Office for National Statistics examined the relationship between commuting to work and personal well-being (ONS, 2014). They found that, ceteris paribus, commuters have lower life satisfaction, a lower sense that their daily activities are worthwhile, lower levels of happiness and higher

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anxiety on average than non-commuters. The worst effects of commuting on personal well-being were associated with journey times lasting between 61 and 90 min. These findings provide ongoing support for previous work that discovered longer commutes are positively correlated with high blood pressure, higher back pains and lower job satisfaction (Kluger, 1998) as well as chronic stress and fatigue symptoms which can induce cardiovascular abnormalities and dysfunctions related to the onset of heart disease (Kageyama et al., 1998).

As both the developed and developing world experience increased urbanisation it is conceivable higher city based populations will contribute significantly to congestion on the roads and crowding on public transportation, and potentially bring into sharper focus the commute decisions of individuals and the recompense required in order to engage in varying types of commuting behaviour. While there is some evidence that telecommuting can decrease the distances travelled (Helminen and Ristimäki, 2007), the reductions are only small (0.7%). Indeed, the well-known phenomenon of Marchetti's Constant, seems to indicate that there is an innate human preference for some degree of travel for commuting each day, which is approximately one hour. A study by IBM (IBM, 2011) provides support for this, with the average one-way commute across the range of international cities being 32 min (with Moscow at 42 min and New Delhi at 41 min having the longest commute).

While the average commute time might be remarkably constant over time and geographic location, there is a distribution of individuals around that mean who are more or less willing to commute. Not only does this willingness vary across the population, but individuals themselves may also change over time. It has been found that 20% of workers change job or residence each year (Dargay and Hanly, 2007). When workers change jobs and/or home or both it is found that just as many increase their commute time as decrease it (Dargay and Hanly, 2003). In a small sample study of workers in Bristol in the UK, it was found that half of those surveyed would be prepared to commute further for a job they wanted, but only a small percentage would be prepared to move house to do so (Mason, 2005).

1.2. Travel activity and household interactions

Adding further complexity to the travel activity of households is the growth in dual-income households. For example, between 1996 and 2006 the number of dual-income families in America increased 31% (US Department of Labor, 2007). Such households have complex trades to make with respect to the balancing of household activities (both social and domestic) as well as the preferences of multiple income earning individuals with respect to where to live and thus how far to travel for work. In responding to a change in employment location for one of the household members, many households choose to avoid moving, to avoid impacting children and the career of the partner whose job has not changed, typically resulting in longer commutes for the partner changing job (Green et al., 1999). There is some evidence that the affected partner views this sacrifice as a gift to their partner (Jain and Lyons, 2008).

Given the volume of trips made for commuting purposes, understanding the valuations attached to such trips is important for a range of policy and economic reasons. Lyons and Chatterjee (2008) clearly state that “The commute in connecting the domestic and employment spheres of people's lives is thus a significant feature of life course decisions; notably residential and job location choices”, concluding that such decisions significantly impact housing and employment markets. In attempting to understand such choices, the residential and job location choice literature is dominated by models considering a single decision-maker in each household (see Timmermans (2006) for a broad overview of the extant literature), however a small but growing field of research is attempting to understand the behaviour of households. For example, it was found that with respect to residential location, preferences between family members differ substantially and group members are largely unaware of the direction and extent of these differences (Molin et al., 1999). The household attitude to inequalities in utilities among the household members when choosing a residential location has also been explored (Zhang and Fujiwara, 2006).

The literature has also examined the role of households in travel activity patterns (which incorporate commuting trips). For example, choices of household activity, assignment of activities and cars to household members, tour generation and assignment affect by individual and household characteristics (Wen and Koppelman, 2000). It was found that the activity patterns of individuals were influenced greatly by the activity patterns of others in the household (Vovsha et al., 2004) and that different activities are more likely to be completed jointly on different days or by different household members (Srinivasan and Bhat, 2005). With respect to who influences the decisions made by households, husbands exert more influence over the allocation of household activities (Zhang et al., 2005). In an interesting examination of husband and wife trip-timing decisions with respect to the morning commute, De Palma et al. (2015) find that the premium a married couple place on time spent at home together is significant in the choice of departure time and resultant congestion.

For a comprehensive review of the extant literature intra-household interactions reviewers should refer to Ho and Mulley (2015), who note that explicitly accommodating such interactions allows for greater insight into travel behaviour, but understanding of how people may respond to policy, thus the creation of better policy. It should also be noted that the importance of choices which are a function of interacting decision makers as also been explored in the context of other transport environments such as holiday choice (Dosman and Adamowicz, 2006; Beharry-Borg et al., 2009) and automobile choice (Beck et al., 2013), as well as household preferences for water quality (Rungie et al., 2014). The methods used in this paper are aligned with these types of models, where choices from individuals within a household are independently collected and modelled.

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