



# Rush hour commuting in the Netherlands: Gender-specific household activities and personal attitudes towards responsibility sharing



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## ABSTRACT

Apart from work-hour commitments, rush hour commuting is dependent on household activities and responsibilities. It can also be gender specific when gender differences in performing household activities prevail. To that end, this study investigates gender differences in rush hour commuting in relation to daily household activities using data from TBO 2006 (Dutch Time Use Survey) and MON 2006 (National Travel Survey of the Netherlands). Two separate analyses were carried out, one for the morning rush hour and one for the afternoon rush hour. The analyses considered household activities such as childcare, child chauffeuring, household maintenance and shopping, and working from home. Additionally, we included personal attitudes towards sharing these activities between partners. We found that females in the Netherlands were more likely to commute during morning rush hours but less likely during afternoon rush hours. In terms of household activities, childcare and child chauffeuring before/after a commute led to a higher probability of commuting during morning rush hours. In the afternoon, only childcare activity was significant. As expected, working from home had a negative effect on rush hour commuting for both analyses. Furthermore, we found that personal attitudes regarding the sharing of household activities and responsibilities were of limited additional value.

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## 1. Introduction

Due to the possibly unequal sharing of household activities and responsibilities, women and men may have different transportation needs and levels of accessibility. Therefore, they may execute different behavioral patterns, which affect their professional and personal wellbeing. Transportation policies, specifically policies concerning rush hour traffic, can be misleading and mismatched given the overrepresentation of male participation in the work force. Although the participation of women in the labor market in the Netherlands has increased significantly, it remained lower at 79% compared with 90% for men in 2009 (van der Waard et al., 2013). Moreover, women are more likely to work part-time than men (Roeters and Craig, 2014). To be more equitable and inclusive, transportation policies should focus especially on the needs of women. It is expected that their behavior will have

greater effect than before on the transportation system in general and on rush hour commuting specifically. This study does not analyze people's motivations for rush hour commuting but rather is focused on understanding the impact of the determinants of these commutes. To avoid rush hour commuting, it is necessary to understand that a commute is not only dependent on commuting conditions and resources, and work related attributes but is also related to household tasks and responsibilities. These tasks and responsibilities are often constrained in space and time (Hägerstrand, 1970), thereby affecting the schedule of the journey to and from work. Such constraints are very much gender specific (Kwan, 2000; Gustafson, 2006) because women are more involved in household tasks than men are (Sanchez and Thomson, 1997). Moreover, commuting patterns such as work-trip length also differ between men and women (Hanson and Johnston, 1985; Turner and Niemeier, 1997). This paper aims to account for these often-ignored household issues and gender differences in rush hour commuting.

Work-related issues have received much more attention due to their direct relationship with commuting, particularly in the case of rush hour commuting (Small, 1982; Noland and Small, 1995; Caplice and Mahmassani, 1992). These studies focused on the

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relationship between commute start time and its relationship to arrival time at work. Whereas these issues are important, telecommuting and the possibility of working from home provide structural solutions for avoiding rush hour commuting (Alexander et al., 2010). People have become more flexible in choosing work activities (Handy and Mokhtarian, 1996; Couclelis, 2004), thereby creating options to avoid rush hour traffic. Several studies have indicated that telecommuting could reduce work-related travel (Pendyala et al., 1991; Koenig et al., 1996; Lund and Mokhtarian, 1994). However, progress is slow, and urban roads are still congested, especially during rush hour. Regarding personal attitudes, Mokhtarian and Salomon (1997) found that people may not use work flexibility or homeworking depending on their attitudes toward it even if they have the option to do so. Similarly, the desire to work from home could be affected by household facilities and beliefs about personal life and the home environment (Haddad et al., 2009). Nonetheless, the potential for telecommuting or homeworking to affect rush hour commuting is understandable. In a detailed qualitative investigation, Lyons and Haddad (Lyons and Haddad, 2008) noted commute displacement as a possible outcome of a part-day homeworking. Therefore, work flexibility should be considered in the analysis of rush hour commuting. However, slow improvements in the reduction of congestion call for an investigation beyond working conditions or commuting itself.

To that end, we argue that family issues are given scant attention compared with work-related issues in the investigation of commuting choices. The activity travel patterns of individuals in a household are dependent on household tasks and responsibilities such as maintenance, shopping and caregiving activities. The travel behavior implications of these activities have been analyzed in terms of the interdependence between partners (Golob and McNally, 1997; Hanson and Hanson, 1981) and activity participation of partners in households (Zhang et al., 2005; Srinivasan and Bhat, 2005; Turner and Niemeier, 1997). Nevertheless, a reference to rush hour commuting is absent. Moreover, household activity sharing and participation could also be gender specific. Looking into the effect of the built environment on household activity sharing, Schwanen et al. (2007) found that the distribution of household tasks between partners is more equal in higher density and more diverse neighborhoods. They indicated that women perform the bulk of out-of-home household activities and that the impact of working hours and the presence of young children is gender specific. Similarly, Kwan (1999) established that child chauffeuring is more of an obligatory task for women than for men. Therefore, women respond to childbirth differently than men (Oakil, forthcoming). Whereas these studies indicated gender differences in household activities and travel, Presser (1994) found that there is a substantial lack of overlap in the employment hours of husbands and wives and that in over one-fourth of couples, at least one spouse could work a non-daytime shift. Also relevant is the finding that mothers prefer work flexibility to cope with their childcare and domestic responsibilities (Golden, 2001; Presser, 2003; Spitze, 1988). Therefore, different time schedules or flexible time choices for women may mean different commuting times; if one partner travels during rush hours, the other may travel outside peak traffic periods. However, it can also be argued that these responsibilities may require women to be traveling at a certain time as when, for example, picking up or dropping off the children at school, for which business hours can limit the choice of departure time for commuting. In the Netherlands, it has been reported that rewarding schemes to avoid rush hours are less effective for women than for men (MuConsult, 2013).

In this regard, this paper contributes to the understanding of rush hour commuting in different ways. First, this paper provides direct empirical evidence regarding the impact of work flexibility

on rush hour commuting. Previously, this was performed indirectly, for example, by investigating the choice of working from home. Most of those studies addressed factors that facilitate home-working or telecommuting, for instance, Information and Communication Technology (ICT) ownership (Alexander et al., 2010) or household facilities (Haddad et al., 2009). Second, one of the gaps addressed in this paper is the lack of attention paid to the relationship between rush hour commuting and activity scheduling and sharing within households. Whereas work-related issues have received much more attention than family issues (Swanberg et al., 2005), we intend to incorporate family issues by considering daily activities regarding caregiving, maintenance, and shopping, along with partner work activities. In this way, we can explore gender differences by taking into account those household responsibilities that are assumed to cause behavioral differences between men and women rather than looking into gender differences in isolation from these responsibilities.

Analytically, we differentiated between morning and afternoon rush hour. This is an important consideration given the different time windows for performing certain activities that are bounded by institutional constraints such as the business hours of shops and schools. Furthermore, the paper focuses on rush hour commuting by car because cars have the largest share on the road during rush hours. Therefore, car commuting during rush hours has the biggest negative impact on traffic flows on roads and can in these situations be accompanied by great economic loss. In the next section, we will explain our analytical procedure in detail. Following that, we will elaborate on the sample and variables accounted for in Section 3. Section 4 will present the results of our empirical analyses of rush hour commuting. Section 5 will discuss results, and Section 6 will conclude the paper with some policy implications of our results.

## 2. Methods and data

A binary logit analysis was performed to identify the factors that influence rush hour commuting. We defined the morning rush hour from 7 am to 9 am and the afternoon rush hour from 4 pm to 6 pm. This definition was based on the classification used by Statistics Netherlands (CBS). It is also similar to the distribution found in the dataset we used. The distribution of commuting trips is shown in Fig. 1, in which rush hour traffic is marked with dark-colored columns. In two separate models, the morning rush hour commute and the afternoon rush hour commute were investigated. Rush hour commuting was defined by the mid-point of commuting time rather than the start or end time of the journey to and from work. This was performed to capture those individuals who may start just before or arrive just after rush hours but would still be contributing to rush hour traffic. The CBS definition was based on traffic volume at a particular time of the day on the road. Therefore, we considered the mid-point as the most appropriate definition of traveling during rush hours.

The data used in this paper came from TBO 2006 (Dutch Time Use Survey) (Sociaal en Cultureel Planbureau, 2006) and MON 2006 (National Travel Survey of the Netherlands) (Ministerie van Verkeer en Waterstaat et al., 2006). TBO consisted of three parts as follows: basic information about time use, a detailed time use survey and a travel diary. Approximately 1900 individuals participated in the TBO 2006 survey and completed an activity diary for one week. In addition, MON data were used to supplement the TBO data with the necessary socio-demographic variables. This was possible because the TBO 2006 respondents were a selection of the MON 2006 respondents. Because TBO consisted of travel diary data of one week, each individual had multiple observations based on the days s/he traveled to and from work. Therefore, a

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