Home telework and household commuting patterns in Great Britain

Patrícia C. Melo a,b,c,*, João de Abreu e Silva d

a ISEG (Lisbon School of Economics & Management), Universidade de Lisboa, Rua do Quelhas, 6, 1200-781 Lisboa, Portugal
b UECE (Research Unit on Complexity and Economics), Rua Miguel Lupi, 20, 1249-078 Lisboa, Portugal
c Social, Economic and Geographical Sciences (SEGS), The James Hutton Institute, Aberdeen, Scotland, UK
d CESUR/Cris, IST, Universidade de Lisboa, Avenida Rovisco Pais, 1049-001 Lisbon, Portugal

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A B S T R A C T

This study provides new evidence on the relationship between household and intra-household commuting travel and home telework for Great Britain using data from the National Travel Survey for the period between 2005 and 2012. The results from the empirical models of individual and household commuting travel suggest there is some evidence of longer weekly commuting distances travelled, but shorter total travel times, for more frequent home teleworkers. The findings also suggest that there is no intra-household compensation effect between partners, that is, the home teleworking status of one of the household's members does not appear to influence his/her partner's commuting travel. We also find that some of the observed differences relate to the definition of home teleworker status, particularly with respect to the level of home telework frequency. Despite the increase in the share of workers using home telework at least once a week, from 4% in 2005 to 6% in 2012, the magnitude of the relationship between home teleworking and weekly commuting length and duration does not seem to have changed over the period studied. Although the findings suggest that home telework tends to increase weekly commuting distances travelled (but not travel times), data-related limitations did not allow us to address issues of selection and/or simultaneity bias; consequently we cannot make causal inference conclusions about the nature and size of the relationship between home telework and commuting patterns, and in turn its policy implications.

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1. Introduction

The relationship between home telework and travel demand has attracted growing interest among urban and transport planners and academics since the advent of widespread information and communication technologies (ICT) in the late 1980s.1 Telework was seen by many as a strategy to cut congestion, air pollution and energy consumption from transport, as a result of the reduction in the number of home-to-work commuting journeys (e.g. Kitamura et al., 1991; Lyons, 1998). Much of the initial optimism for travel substitution effects, however, faded away over time due to growing evidence from studies in the United States (US), and later also in Europe, showing that the short-term net substitution effects due to telework tend to be very small at the aggregate level (e.g. Mokhtarian, 1998; Choo et al., 2005). Moreover, some studies also suggest that by relaxing...
the constraints on residential location, telework can encourage longer home-to-work commutes and exacerbate urban sprawl, and hence induce more travel in the longer term (e.g. Pendyala et al., 1991; Nilles, 1991; Lund and Mokhtarian, 1994; Mokhtarian, 2004).

By and large the existing studies on the effects of home telework on travel patterns have focused on teleworker’s travel behaviour (both work and non-work), while there is considerably much less evidence on the impact of home telework at the household and intra-household levels, and, with a few recent exceptions (Zhu, 2013; Zhu and Mason, 2014; Kim et al., 2015), the little existing evidence refers to small-scale case studies (Kitamura et al., 1991; Pendyala et al., 1991; Hamer et al., 1991, 1992). Home telework has implications not only for the travel patterns of the teleworker, but also for the other household members, in particular the teleworker’s partner. One possible intra-household effect of home telework is that it can encourage residential relocation closer to the workplace of the non-teleworker household member, reducing his/her commute and possibly also the household total commute. On the other hand, if home telework facilitates residential move to locations offering larger homes and greater natural amenities, generally in suburbs and exurbs, its effect will be an increase in the commute of both the teleworker and non-teleworker, and hence household total commute. Therefore, it is difficult to know a priori what the precise direction of the intra-household effect of home teleworking is likely to be.

This study adds to the literature by providing new evidence on the household and intra-household commuting effects of home telework for Great Britain using data from the National Travel Survey (NTS). It develops empirical models at the individual and household level to investigate the relationship between home telework and weekly commuting travel of teleworkers, their partners, and the household during the period between 2005 and 2012. The study also contributes to the empirical literature by adopting a more detailed measure of home telework taking into account its frequency and regularity, while the majority of previous studies have used a binary approach (i.e. telework or non-telework) and hence cannot identify potential threshold or tipping point effects in the relation between home telework and travel patterns. The study analyses one-worker and two-worker households separately because decision making in two-worker households, particularly residential location choice, is likely to be more complex and depend on more factors (e.g. number and age of children, work location of the partner), than in one-worker households, with potential impacts on both individual and household commutes.

The remainder of the paper is structured as follows. Section 2 provides a brief overview of home telework in Great Britain. Section 3 offers a summary of the existing empirical literature on home telework and commuting patterns at the household and intra-household level. Section 4 describes the data used in the empirical models of household and intra-household commute distance and travel time. Section 5 discusses the empirical models, the estimation strategy and main estimation issues to be addressed. Section 6 presents and discusses the main results, while Section 7 presents the results from the sensitivity analysis. Finally, Section 8 summarises the main conclusions and policy implications.

2. Home telework in Great Britain

This study focuses on home telework, but there are other forms of telework, namely travel-telework (people whose job requires frequent traveling and hence do not have a main place of work), remote office- or centre-based telework, and multi-site telework. We use the terms telework, telecommuting and home telework interchangeably. The definition of (home) telework in the UK builds on the definition given by the 2002 European Framework Agreement on Telework, according to which “Telework is a form of organising and/or performing work, using information technology, in the context of an employment contract/relationship, where work, which could also be performed at the employers premises, is carried out away from those premises on a regular basis.” A joint guide on telework called “Telework Guidance” was produced by social partners in the UK in 2003 to facilitate the implementation of the European Framework Agreement onTelework. Since July 2014, the UK legislation allows all workers employed for at least 26 weeks to apply for different forms of flexible working, including home-based work. This right was previously only available to parents/carers of young children and disabled children (since April 2003), and carers of adults (since April 2007).

Official statistics on home telework for the UK are not produced on a regular basis. However, estimates for home telework have been published using the Labour Force Survey (LFS) on a consistent manner between 1997 and 2007. According to the LFS, teleworkers consist of people who work mainly from their home or in different places using their home as a base and use a telephone and computer to carry out their work. LFS statistics indicate that the proportion of teleworkers increased from 4% in 1997 to 5% in 2000, 7% in 2002, 8% in 2004, and 9% in 2007. Unfortunately, we could not find official LFS figures on home telework for more recent periods. The LFS statistics also reveal that teleworkers are more prevalent among self-employed, full-timers, and men. There is also considerable variation in the distribution of teleworkers across occupations and economic sectors, partially reflecting the differences in the nature of work that can be undertaken at home. The occupations in which teleworkers are more prevalent (over 20% in 2007) include managerial, professional and technical occupations, and administrative and secretarial occupations. The industries with the highest numbers of teleworkers (over 30% in 2007) include construction, banking, finance and insurance, and agriculture and fishing (Ruiz and Walling, 2005; Parker, 2008).
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