Assessment of Telecommuting Behavior and Model Estimation

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Background and Motivations

Telecommuting refers to the substitution for work at the workplace with work at home or other locations close to home. The interest in telecommuting stems from its potential benefits in trip reduction, congestion mitigation, cost saving for office spaces, and better home-work balance, etc. Even though it was considered as early as the 1980s, telecommuting has not been widely adopted. The national household travel survey data during the past decades indicate that 17% of American workers worked from home at least once in two months, while that share decreased almost by half (to less than 9%) in year 2001, and down to 8% in year 2009 (1).

Figure 1 below presents an interesting pattern among telecommuters. In 1995 when the economy was on the verge of great growth and when federal and state governments implemented various programs to stimulate telecommuting, a large percentage of telecommuters worked from home at least once a week. The frequency pattern went to the opposite direction as the economy went into recessions in the early 2000’s and again in 2008.

Figure 1 Telecommuting frequency pattern among teleworkers.
The analysis of telecommuting embraces the complications of the phenomenon of self-employed, home-based business owners, and multiple job workers, etc. The 2009 national survey indicates that about 9% teleworkers have more than one job, and that 12% of multiple jobholders telecommute, among which 6% telecommute almost every day. It is critical to distinguish those who telecommute for their primary job and those who commute to primary work place while telecommute on secondary jobs or home-based businesses. Otherwise it would be impossible to correctly reflect telecommuting behavior in the demand forecasting framework, most of which is built on the simplification of one anchor point representing the workplace (primary) per worker in the daily spatial territory. Figure 2 below might reflect some supporting argument.

![Distance and time to usual work place.](image)

Figure 2  Distance and time to usual work place.

The Figure shows the average distance and usual travel time to usual work place by telecommuting frequency. The patterns among are generally consistent and logical, that is non-telecommuters tend to have less travel distance and travel time to work than telecommuters, and frequent telecommuters had longer distance and travel time to work place. However, those who telecommute almost every day showed shorter travel distance and less travel time than other groups, possibly because this group included those who primarily work from home only and their responses skewed the average to the lower end.

This lack of uniform definition of telecommuting, and lack of consistency and level of detail in worker categories in the data add obstacles in examining whether and to what extent telecommuting could help mitigate traffic congestion and reduce vehicle emissions. Adding to the complexity is the new members of the “telecommuting family”, such as part-day home working and teleworking after regular work hours, which refers to the phenomenon where a
worker commutes to the conventional workplace and at the same day works at home with at least an additional 30 minute work. This situation was usually associated with temporal displacement of commuting.

In addition, the relatively small volume of empirical studies in this subject, and the somewhat outdated and small data samples in previous stated preference surveys point toward the necessity for further study.

Objective

This study aims to explore the complexity in telecommuting patterns associated with a wide variety of worker categories and work arrangements. The goal of this study is to provide some insights on possible approaches to defining and gauging telecommuting behavior and the key data elements that are necessary. After a sound methodology is developed in representing various aspects of the telecommuting phenomenon, then it will be desirable and possible to develop a model to predict the probability and frequency of telecommuting based on socioeconomic and demographic information, land use and travel characteristics.

Another objective of the study is to explore the implications of teleworking on travelers’ entire daily travel pattern. That is, how workers schedule and arrange their non-work activities and trips on telecommuting days differently from regular commute days. Previous study suggests that “telecommuting could help ease temporal constraints (without increasing monetary constraints) and lead to activity travel patterns with higher time use utilities” (2). This study will examine the impacts of telecommuting on trip making due to increased scheduling flexibility over space and time for incorporation in the demand forecasting process.

Data

The Regional Household Travel Survey (RHTS) conducted in the New York metropolitan area in year 2010-2011 will be used for this study. The RHTS covers 28 counties in the three states of New York, New Jersey, and Connecticut. It collects 24-hour travel diary on a “typical” weekday as well as detailed personal and household characteristics from about 18,000 households with 10% of the households carrying personal GPS units instead of filling out the diary. The RHTS data The RHTS provides a rich dataset in socioeconomic demographic and travel characteristics of the residence in this region. It is especially well-suited for this study because it provides a large sample of individual’s telecommuting information, and it also collected detailed at-home activities, which makes it possible to identify whether the respondents worked at home on the recorded travel day, which is critical information needed to study the impact of telecommuting on daily travel pattern. This piece of information is not available from the national datasets, which made this analysis not possible previously.
Contributions

This study contributes to the field by providing a comprehensive analysis in telecommuting phenomenon and updating the literature with analysis using the latest household travel survey data. The analysis advances the understanding in the characteristics of telecommuters by detailed worker category and work arrangement which leads to the capability of estimating and incorporating telecommuting in the travel demand forecasting process. This study will provide clear evidence on the important factors influencing the choice to telecommute and provide some insights on telecommuting market share for programs aims at promoting telecommuting policies.

By examining the impacts of telecommuting on daily travel pattern, and incorporating telecommuting into forecasting process, the traditional trip-generation methods can be greatly improved, which will lead to better decision-making and assessments on related travel demand management policies.

References
