Incorporating residential mobility into residence location choice model in a microsimulation context

Brian Ho-Yin Lee and Paul Waddell, University of Washington

Abstract
There is an abundance of studies on residential mobility and residence location choice. The significance of these related household decisions, with respect to individual and aggregate travel behaviour, is well theorized in the literature. Early works in geography and sociology were primarily concerned with describing the intentions to move and the housing-location choice as a spatial process to adjust housing consumption to changing household and external circumstances (Li and Wu, 2004). Then, econometric advancements in the recent past have allowed these decisions to be statistically analyzed as discrete choice models (McFadden, 1974; 1978).

Motivated by the desire for more realistic assessments of potential transportation impacts, some researchers have modeled residential mobility jointly with residence location choice, using both revealed (Waddell, 1996) and stated preference data (Kim et al, 2005), in random utility-based, nested model structures. These studies validate the interdependence of these two choice dimensions and support the relevance of accessibility in these residential decisions. Despite these advances, however, the move-location choice problem has not been fully explored, particularly with respect to applications in the microsimulation of individuals and households.

In integrated microsimulation urban models of land use and transportation such as UrbanSim (Waddell, 2002; forthcoming) where the agents and the choices are modeled at a highly disaggregated level (e.g., individuals/households and parcels/buildings), residence location choice must depend on the sampling of alternatives to avoid full enumerations of the universal choice set. The familiar multinomial logit model structure is typically used since it has been shown to provide consistent estimates of the parameters when the alternatives are randomly sampled (Ben-Akiva and Lerman, 1979). The sheer size of the choice set, thus, prevents the use of more complex structures for joint models of residential mobility and residence location choice; much information on their interdependence is often lost in the estimation and simulation process with separate sequential models.

The aim of this paper will be to expand the exploration of the residence location choice model in the microsimulation context by incorporating elements of residential mobility, while maintaining tractability for both estimation and simulation. The authors propose to use the Puget Sound Regional Council (PSRC) 2006 Household Activity Survey (Cambridge Systematics Inc., 2007), which obtained spatial and duration information on the current and previous residences for 4,739 households. This unique dataset allows for a longitudinal view of the household residential decisions and the quantification of the housing trade-offs between the current and previous locations for model estimation. A subset of 1,677 households are identified as movers who have relocated in the past 5 years and their move-locate behaviours can be compared to the non-movers who resided in the same residence during the same time period. The utilities of the current residential location (i.e., the chosen choice) and a sampled choice set, relative to the previous location (i.e., a different location for the movers and the same location for the non-movers) can be calculated by using spatial variables (e.g., accessibility measures, neighbourhood characteristics) that reference both locations. A count variable indicating the number of years since last moved can also be included to help describe the temporal stay-move inertia. The authors intend to make inferences on the transaction costs of moving and their impacts on the
household decisions to move and relocate. Further, the relationship between accessibility maximization and the propensity for households to move short distances will be explored.


