Parameter estimation for activity-based models

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Abstract

Activity-based models (ABM) have seen a significant increase in research focus in the past decade. Based on the fundamental assumption that travel demand is derived from the need to do activities and time and space constraints ([1], [2]). ABM offer a more flexible and behaviorally centered alternative to traditional trip-based approaches. Econometric – or utility-based – activity-based models (e.g. [3], [4]) postulate that the process of activity generation and scheduling can be modelled as discrete choices. Individuals derive a utility from performing activities, and they schedule them as to maximize the total utility. In this paper, we estimate the parameters of the optimization-based activity-based model developed by [5], by defining a discrete choice model where the choices for each individual are full daily schedules, each associated with a utility. The maximum likelihood estimators of the parameters (e.g. scheduling penalties, desired start times and durations, constants…) are evaluated on a choice set of daily schedules sampled using the Metropolis-Hastings algorithm [6], derived for sample of individuals from the 2015 Swiss Mobility and Transport Microcensus [7]. Results show that the proposed methodology significantly improves the calibration of econometric activity-based models.

References

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