

11 Sensitivity Testing

11.1 Introduction

Testing and documentation of travel demand model sensitivity is not new, but has garnered more interest in recent years due to passage of Senate Bill 375 (SB375), subsequent discussions of travel demand modeling at the Regional Targets Advisory Committee meeting, and the workshops and public meetings leading up to the California Transportation Commission’s (CTC) 2017 update of the “Regional Transportation Plan (RTP) Guidelines”. In combination, these initiatives resulted in expansion of documentation and testing of regional travel demand models.

This chapter reports results of testing SACSIM’s sensitivity to several key policy input variables and other, exogenous inputs. The testing falls into four categories:

- **Traditional “experimental” testing**, where one input factor is systematically varied, holding all other factors constant, and comparing the variations in the input factor to variations in key outputs. Variables tested in this manner are:
 - Auto-operating costs,
 - Off-street parking price,
 - Household income,
 - Transit fares, and
 - Highway capacity.

- **Cross-sectional testing**, where variations in multiple input variables for a single model run are statistically analyzed for correlations to variations in key outputs. Because of the disaggregate nature of SACSIM output for household-generated travel, the options for performing statistical testing of cross-sectional (i.e., single model run) results are more straightforward than for an aggregate “four-step” travel demand model. Variables tested in this manner are land use/transportation interaction variables, also known as “the Ds”:
 - Regional accessibility (or “destinations”),
 - Mix of use (or “diversity”),
 - Proximity to transit (or “distance”),
 - Street pattern (or “design”), and
 - Residential density.

- **Testing of random variation** in the microsimulation of demand for household-generated travel, where the random “seed” for the simulation is varied. A seed variable is common to most simulation models like the DAYSIM submodel of SACSIM. The seed determines the order of simulation of events within the model run. In DAYSIM, it determines the order of simulation of person-level activities. Even with identical input files, the results of the simulation can vary based on the order in which person-level activities are modeled. This testing is not different than the traditional “experimental” testing described above, but the test variable (the random seed) is unique to simulation models and is not a policy variable or exogenous input. The purpose of this testing is to quantify the potential random variation in the simulation results themselves.