



Taking Models Out of the Box: Prospects for expanding the scope of travel demand microsimulation

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Demographic Disaggregation

◆ Zones

Old 4-step



◆ Zones / segments

Newer 4-step



◆ Households / individuals Microsimulation



Spatial Disaggregation

◆ Network zones

In-vehicle LOS

◆ Buildings/ parcels/ grids Land use

◆ Point locations



Temporal Disaggregation

◆ Network periods

In-vehicle LOS

◆ Scheduling periods

Activity schedules

◆ Minutes / seconds



New possibilities...

- ◆ Capturing heterogeneity and dynamics
- ◆ Modeling parking behavior
- ◆ Including physical activity/health outcomes
- ◆ Greater use of scenario-based analysis
- ◆ Different types of outputs



Heterogeneity

- ◆ Simulate individual-specific utility functions, drawn from parameter distributions (e.g. mixed logit models)
- ◆ Value of time, mode-specific constants
- ◆ Important for pricing policies, introduction of new services



Dynamics / state-dependence

- ◆ A specific type of heterogeneity related to past circumstances and behavior.
- ◆ People/households with recent major changes are least habit-driven, most likely to shift behavior
- ◆ Where will those people live and work >>> integration with dynamic land-use models



Parking behavior

- ◆ Very important TDM policy in many areas
- ◆ Issues similar to transit access > trips do not end at the parking space
- ◆ More detail in time and space > allows capacity-constrained simulation of parking facilities/spaces in downtown areas



Physical activity/health outcomes

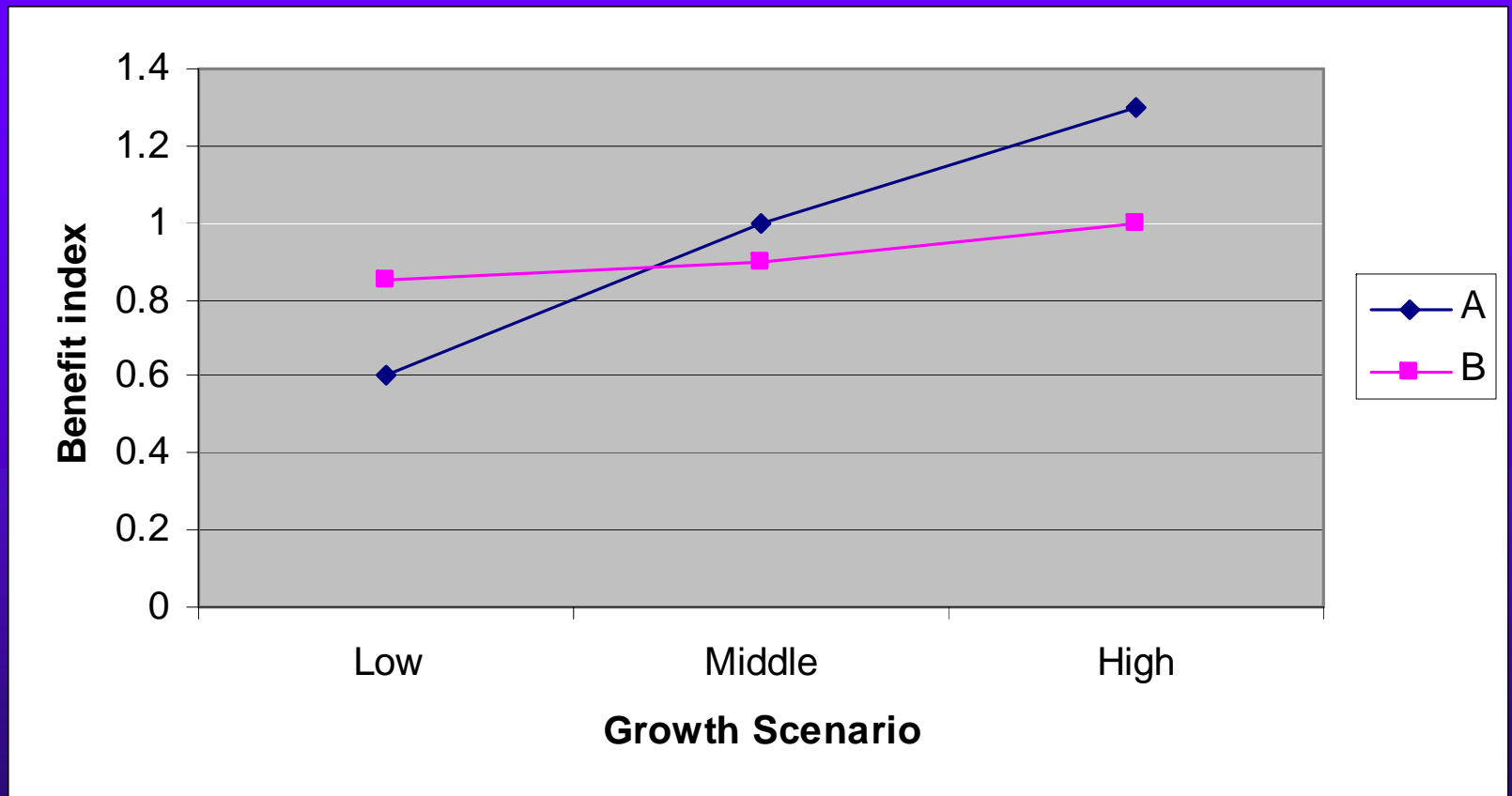
- ◆ Obesity, diabetes are new epidemics >>>
1/3 of today's children will develop diabetes,
life expectancy shorter than their parents
- ◆ Walking, biking, transit use, fitness
activities, access to food outlets are all
important factors that we can simulate



Scenario-based analyses

- ◆ Extrapolation of past socio-economic trends seems less and less reasonable >>> a single, central point forecast also less reasonable
- ◆ If new models can provide more answers, ask them more questions > scenario-based analysis more worthwhile
- ◆ Which policies are more ‘future-proof’?

Hypothetical example....





More types of output...

- ◆ Microsimulation output resembles a household travel-activity diary survey
- ◆ Can look at winners vs. losers in more detail (geographic, socio-economic, attitudinal)
- ◆ Can separate different types of behavioral shifts, learn more about WHY some types of policies are likely to be better or worse.