Task 8 –
Potential Short-Term Model Enhancements

Trip Purposes and Special Generators

presented to

TPB Travel Forecasting Subcommittee

presented by

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Task 8
Trip Purposes and Special Generators

- Expand trip purposes and special generators in the model?
  - » Split the nonhome based trip purpose
  - » Split home-based school/university trips from home-based other trips
  - » Special generator models
    - Commercial airports
    - Universities
    - Regional shopping centers
    - Military bases
    - Group quarters
    - Special events
    - Visitors

Trip Purposes
Nonhome-Based

- Nearly two-thirds of the regional models from 28 large metropolitan planning organizations (MPOs) have nonhome-based-work-related (NHB WR) and nonhome-base-other (NHBO) trip purposes
- NHB WR trips have different values of time (VOT) than NHBO trips. Modeling the two separately will allow more accurate representation of VOT in the model and help model and analyze pricing policies in the region
- NHB WR and NHBO trips also have different time of day patterns, and thus splitting NHB trips into the two will help with time of day modeling, which is important to evaluation of pricing policies and peak spreading

Trip Purposes
Nonhome-Based (continued)

- Methods and data
  - » Household travels survey
  - » Similar to those for the NHB trip purpose, including cross-classification, regression, logit-model, and trip rates
- Downstream effects
  - » Mostly in trip generation and distribution
  - » Few regional models develop separate mode choice models for NHB WR and NHBO trip purposes. The two trip purposes are often lumped together for the mode choice process

Trip Purposes
Home-Based University

- Almost half of the regional models from 28 large MPOs have a home-based college/university (HBU) trip purpose. Additional 20 percent treated colleges/universities as part of special trip generators. Another 10 percent include the HBU trip purpose in the home-based school trip purpose
- College/universities tend to be major trip generators in a region, which not only have a dominant role in the local traffic bus also are often regionally significant
- Home-based college/university trips have very distinct travel behaviors that are very different from other home-based-other trips

Trip Purposes
Home-Based University (continued)

- Methods and data
  - » Household travel surveys are commonly used to estimate trip production models
  - » Trip attraction models tend to use enrollment as independent variables
  - » Similar to those for the HBO trip purpose, methods include cross-classification, regression, logit-model, and trip rates
- Downstream effects
  - » Half carry them only through the trip distribution process. Half do mode choice modeling for HBU

Trip Purposes
Home-Based School

- More than two-thirds of the regional models from 28 large MPOs have a home-based school (HBSch) trip purpose
- Home-based school trips have very distinct travel behaviors that are very different from other home-based-other trips, including trip frequencies, travel patterns, mode choice, etc.
- With adding HBSch in trip generation, it is possible to distribute HBSch trips incorporating their unique distribution patterns and to reflect use of school buses and other modes to schools

Trip Purposes
Home-Based School (continued)

- Methods and data
  - » Household travel surveys are commonly used to estimate trip production models
  - » Trip attraction models tend to use enrollment or educational employment as independent variables
  - » Similar to those for the HBO trip purpose, methods include cross-classification, regression, logit-model, and trip rates
  - » Although school locations and enrollment data are generally available for the base year, it may be time-consuming to assemble given the multiple jurisdictions in the model area

Trip Purposes
Home-Based School (continued)

- Downstream effects
  - » Carry HBSch trips through trip distribution and mode choice processes. Examples are BMC and PSRC
  - » Carry HBSch trips through trip distribution and lump them together with other home-based other trips in the mode choice model. Examples are ARC and SEMCOG
  - » Split out school bus trips after trip generation and carry forward those nonschool bus trips to trip distribution

Trip Purposes
Conclusions

- TPB may wish to consider the following options for short-term enhancements of the regional model
  - » Split NHB into NHB WR and NHBO trip purposes and model them at least through trip distribution
  - » Establish a HBU trip category and model it in trip generation and distribution, assuming data are available to support it
  - » Establish a HBSch trip category for trip generation and distribution, assuming data are available to support it

Special Generators
Airport

- Modeling airport trips is a common practice for regional models of large MPOs. Reviews of 28 regional models from the country's largest MPOs indicates a high percentage (over 80 percent) modeling air passenger trips one way or another
- Best practice – develop a separate model set based outside the modeling stream for traditional trip purposes and to include ground access mode choice models with a nested logit structure for at least four market segments (resident business trips, resident nonbusiness trips, nonresident business trips, nonresident nonbusiness trips
- TPB's ongoing air passenger survey program can provide information in support of airport trip modeling

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Special Generators
Visitors

- Visitor trips are often overlooked in regional travel demand models. Of the 28 regional models reviewed by CS, only a quarter explicitly account for trips made by visitors
- Almost all of those models with visitor trips treat them as special generators, without formal visitor models used. Those areas with a lot of tourists such as Orlando and Miami, Florida and San Diego, California tend to explicitly account for visitor/tourist trips
- Formal visitor model – Dallas area

Special Generators
Special Events

- Very few MPOs model special events as part of the regional travel demand model. Of the 28 regional models reviewed by CS, less than 10 percent model special events as special generators in their regional model
- However, special events can be very important for major investment studies such as New Starts applications
- Formal special events model – Dallas area

Special Generators
Shopping Centers/GQ

- Very few MPOs model shopping centers specifically as a special generator in their regional models. Of the 28 regional models, less than 10 percent model shopping centers as special generators

- It is not a common practice to model group quarters, military bases, and colleges/universities as special generators. Of the 28 regional models, only a quarter explicitly treat these as special generators

Special Generators
Conclusions

- TPB may wish to consider the following options for short-term enhancements
  - » Develop an airport trip sub-model set incorporating the current best practice, taking full advantage of the ongoing air passenger travel survey data
  - » Plan a visitor travel survey and a special events survey in support of model development for a visitor model and a special events model

Special Generators
Conclusions (continued)

- TPB may wish to consider the following options for short-term enhancements
  - » Model HBU trips as an independent trip purpose as recommended in the previous section. Other college-related trips from college dormitories and other group quarter trips should be estimated using simplified assumptions or using trip rates from other similar regions
  - » It is not recommended to treat shopping centers as a special generator