

TRB 2008

Things that made me go “hmmm”

presented to
TMIP Webinar

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Transportation leadership you can trust.



Outline

- Pricing
- Moving beyond MNL and nested logit models
- Land use models and residential location choice
- Dynamic Traffic Assignment and Air Quality

Pricing Reliability and Value of Information

- People choose reliable routes
 - 5% of Travel Time = 50% more reliability (Steve Boyles, UT Austin)
- Travel time prediction with heavy congestion is unreliable
 - Value of imprecise travel time prediction is not high
 - Value of inaccurate travel time prediction is not high
 - More research is needed
- People do not always follow the route that they are told is optimal (Timmermans)

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Pricing Optimal Pricing Structures

- Intrapersonal variability in Value of Time (VOT)
 - After work VOT > weekend VOT (*Kato et al*)
 - Early VOT vs. late VOT (*Polak et al*)
- Optimizing social welfare
 - Allocation of lanes between bus lanes and toll lanes
- Robust pricing with demand uncertainty (*Gardner et al*)
- Dual optimization of profit and system travel time (*Unnikrishnan et al*)

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Alternate Model Structures Discrete-Continuous Nested Logit

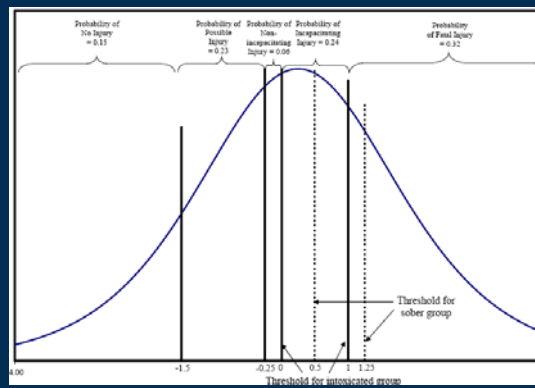
- Discrete-Continuous Nested Logit Model (*Hunt et al*)
 - Upper level discrete (i.e. develop land or not)
 - Lower level continuous (i.e. how much development)

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Alternate Model Structures MGORL

- Mixed Generalized Ordered Response Logit Model (*Eluru et al*)
 - Parameterized barriers in Ordered Response Level



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Alternate Model Structures MNL-MDCEV

- Joint Mixed Multinomial Logit – Multiple Discrete Extreme Value Model (*Pinjari et al*)
- Can jointly analyze:
 - Unordered discrete variable (i.e. residential location choice)
 - Multiple discrete-continuous variables (i.e. activity participation)
- Choices linked by common random coefficients
 - Takes into account synergistic effects
 - Results show significant residential self-selection

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Integrated Land Use Models San Francisco, UrbanSIM (*Waddell et al*)

- Automated interface of LU model and SF travel model
 - Run by different departments, different buildings
- LU estimated at the parcel and building level
 - Transparent
 - Better estimation results than raster
 - Hard to aggregate regions
- UrbanSIM estimation findings:
 - transit access dominates auto access
- Use of open source software: OPUS and QuantumGIS

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Residential Location Choice Effects of Self-Selection

- Self-selection accounts for 10% of VMT difference rural versus urban (*Zhou and Kockelman*)
 - Supports new urbanists' claims
 - 90% of VMT is due to physical environment

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Residential Location Choice Accessibility Tradeoffs (*Chen et al*)

- Incorporate effect of past decisions
 - Puget Sound Panel Dataset (1989-2002)
 - Results show past experience has very significant effect
- Results show limited potential for compact development
 - If open space is decreased then must have MUCH better commute.
 - Willing to pay +40% in commute distance to double open space
 - Less willing to commute farther for increase in floor area

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Air Quality Modeling

- Use Dynamic Traffic Assignment (DTA) with MOBILE6 (*Song Bai et al*)
 - DTA results significantly different than static assignment
 - 10-15% of emissions on whole
 - Up to 37% different for specific pollutants
 - Generally DTA produced higher emissions levels
 - Going to do this for MOVES in future