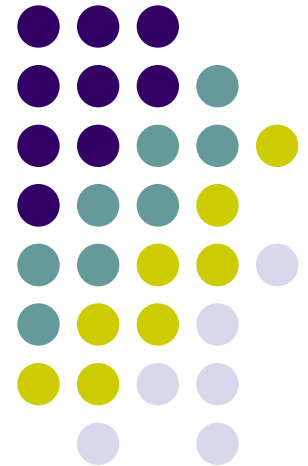
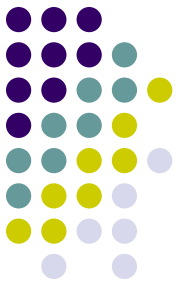


Airport and Station Accessibility as a Determinant of Mode Choice

A Case Study of
Japanese Intercity Travel

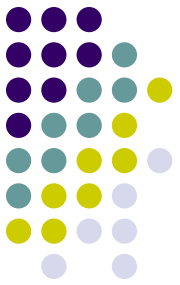


Technical Terms



Access → Linehaul → Egress

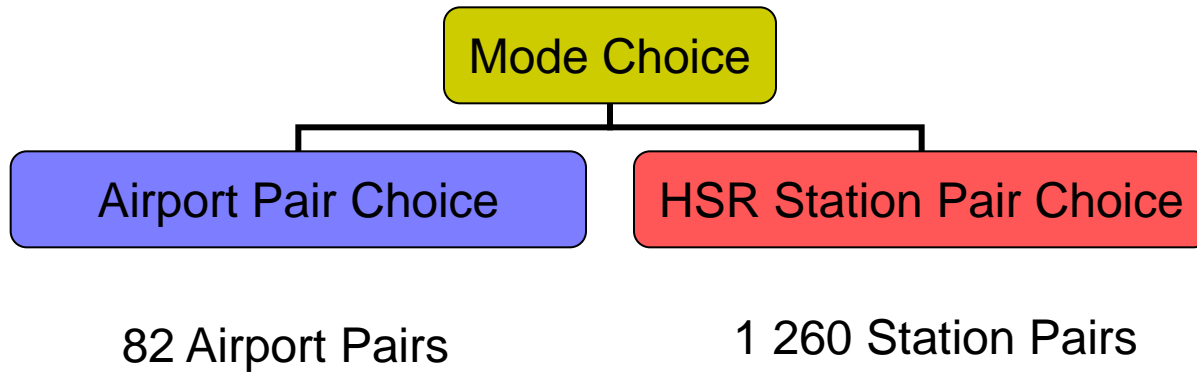
Main Point



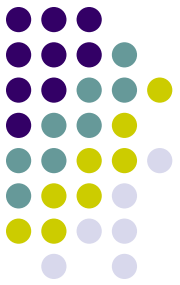
- Access and egress is important for mode share.
- Did not have to be considered in Europe/Japan.
- But it cannot be overlooked in the U.S. (and Korea)



Basic Model Structure

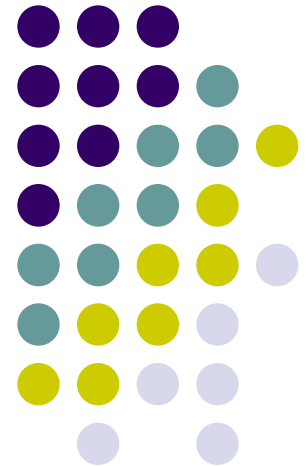


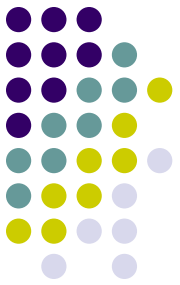
The Phenomenon



Market	Linehaul Time		HSR Market Share
	Air	HSR	
London - Paris	1h	2:45 h	67%
New York - Washington	1h	2:45 h	> 40%
Tokyo - Osaka	1h	2:30 h	80%

Access as a Stepchild





Paucity of Useful Data

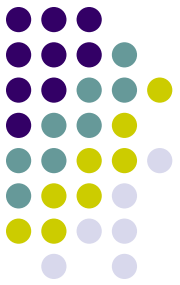
Government-owned and Confidential

- American Travel Survey
- Enquête Française
- Japanese Intercity Travel Survey
- Korea Transport Database

Proprietary

- Amtrak's KPMG Northeast Corridor telephone survey data
- German Rail's Mobility 97

Literature Review Highlights



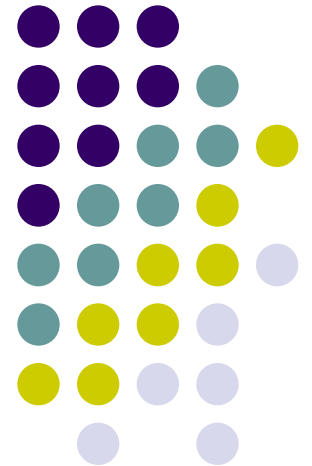
Beimborn, 1968	An Examination of the Effects of the Access Portion of a Trip upon an Intercity Mode Choice
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Literature Review Highlights



Hensher, 1997	“access and egress time are approximately valued at 1.5 times the main mode in-vehicle time – a generally accepted ratio.”
Stopher et al., 1999	Found ratio in his literature review to be between 2 and 10.
Walther, 1991	The disutility of OVT time rises exponentially with OVT time.

Data Sources

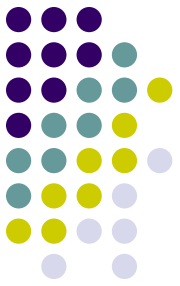


Japanese Intercity Travel Survey



Mode	Number of Observations
Air	161,596
Rail	74,740
Bus	23,104
Car	365,707
Ferry	9,060
Total	634,207

Political Subdivisions in Japan



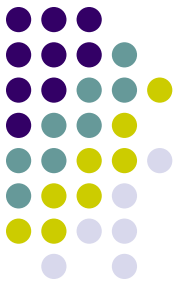
	2-digit	3-digit	5-digit
Name	prefecture	"207-code"	"5-digit code"
Number of Zones	47	207	3230
Example	13= Tokyo prefecture	131= City of Tokyo	13101-13123= 23 wards of Tokyo



Limitations of This Survey

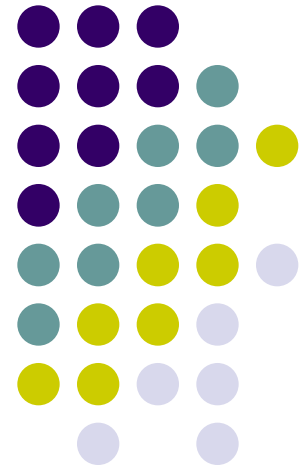
- Only socioeconomic variables:
 - sex, age, and trip purpose/length
- No income, vehicle ownership, pop density
- No information on train category
- No Level of Service information

Other Data Sources

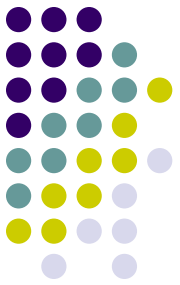


- Jinbunsha Directory
- JR East
- Chiiki Keizai Soran
- Proprietary LOS Database
- HSR Schedules and OAG

Sampling Issues

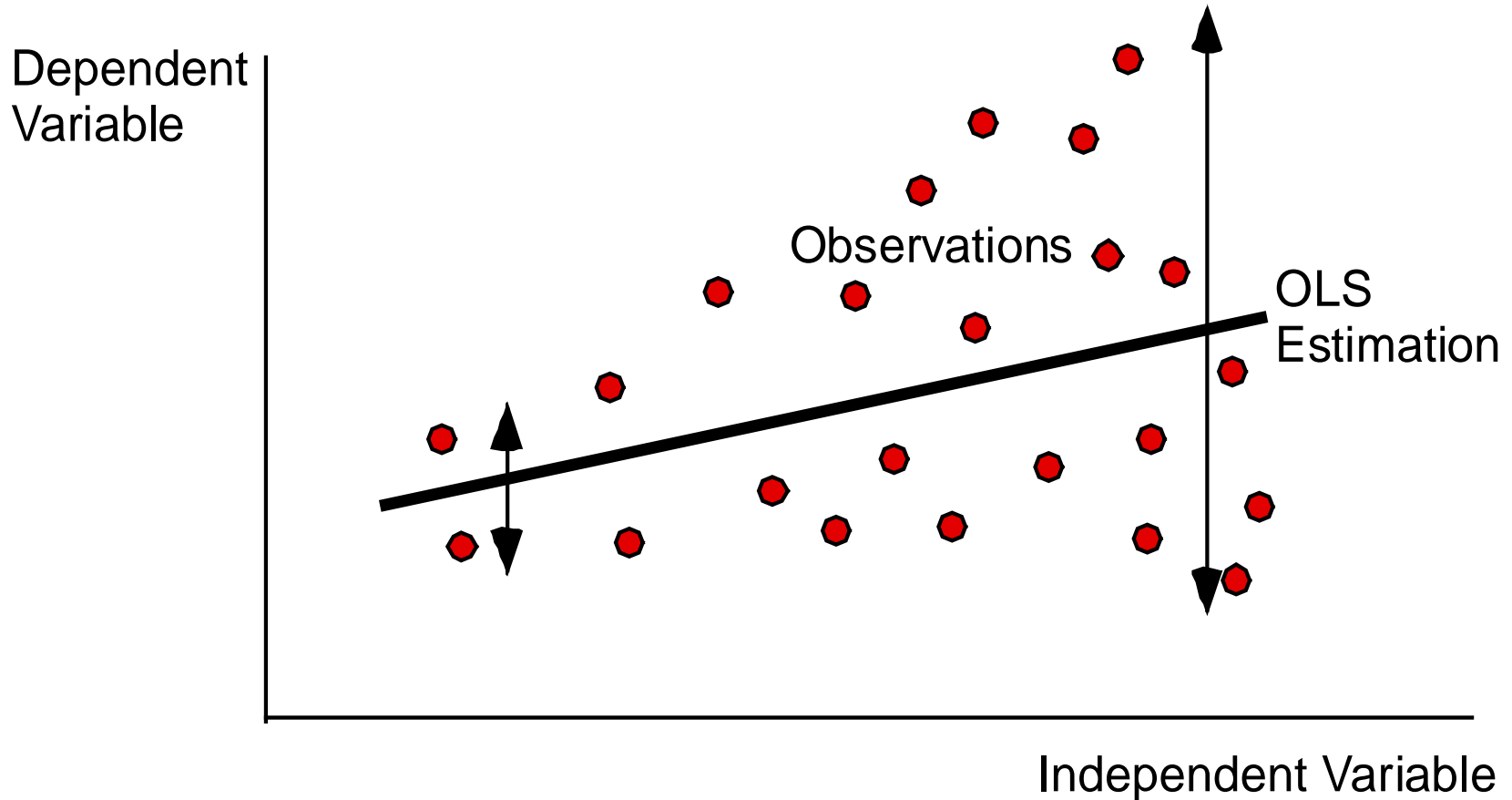
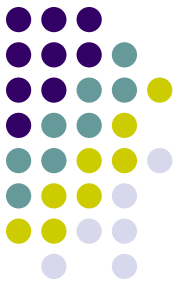


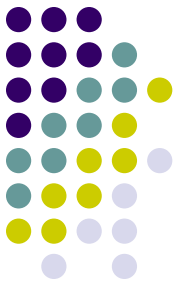
Daily Extension Coefficients



Percentile	Air	HSR
Minimum	0.01	0.03
25.0	1.06	6.93
Median	1.25	10.52
<i>Mean</i>	<i>1.31</i>	<i>11.81</i>
75.0	1.51	20.05
Maximum	6.56	32.36

Heteroskedasticity in Error Term

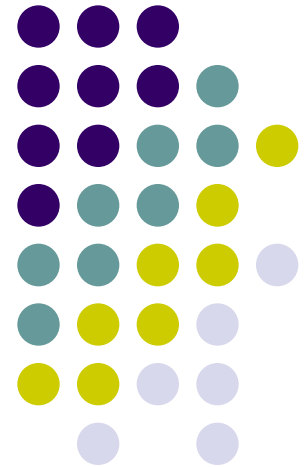




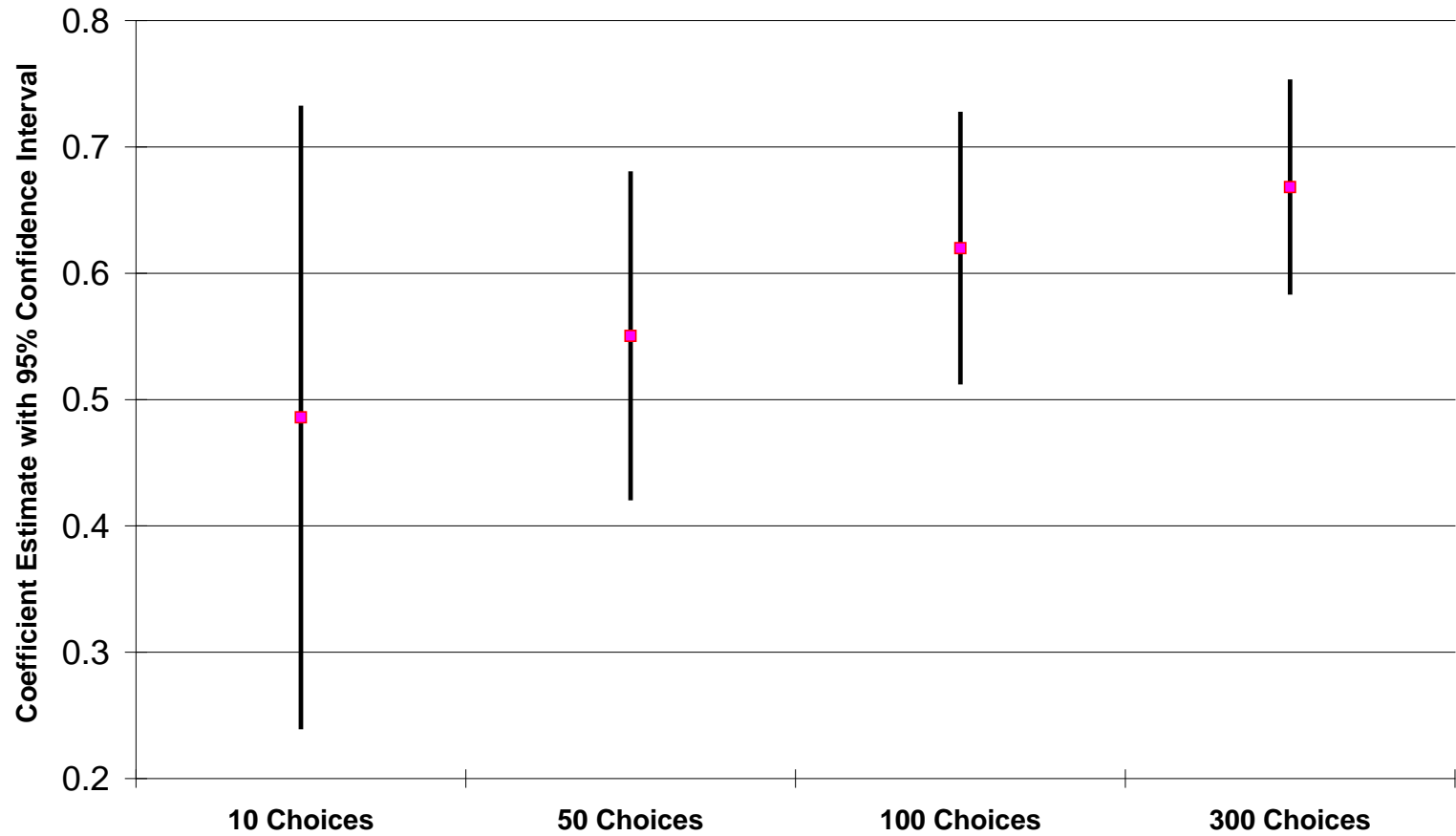
Randomized Choice Sets

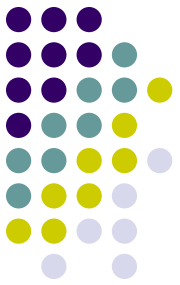
- Each HSR traveler has choice set of $36 \times 35 = 1\,260$ station pairs
 - $18\,395 \times 1\,260 = 23\,177\,700$ records
 - Up to 10 GB file size
- take advantage of IIA property of MNL

Methodological Conclusions



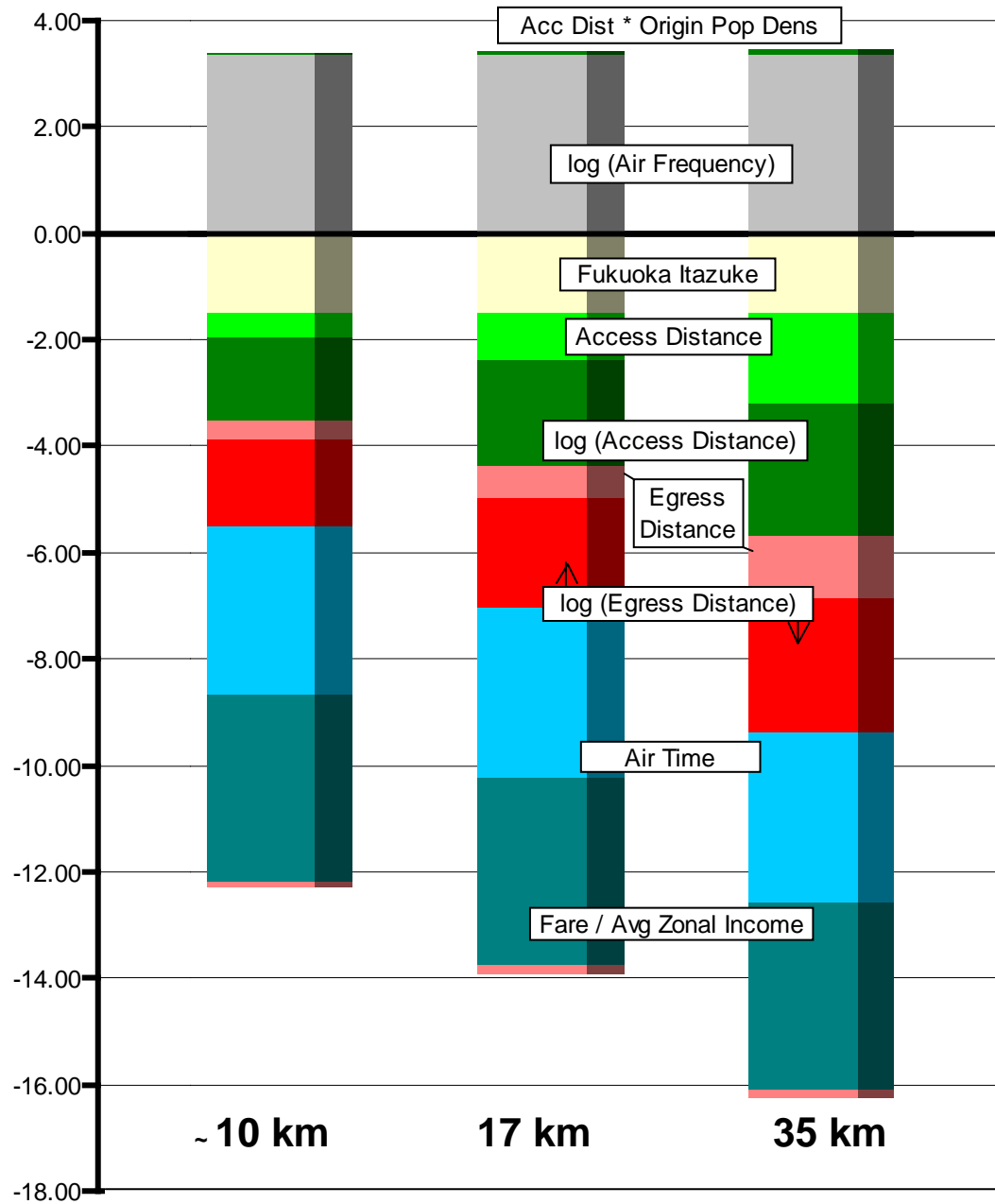
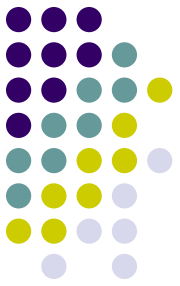
Randomized Choice Sets



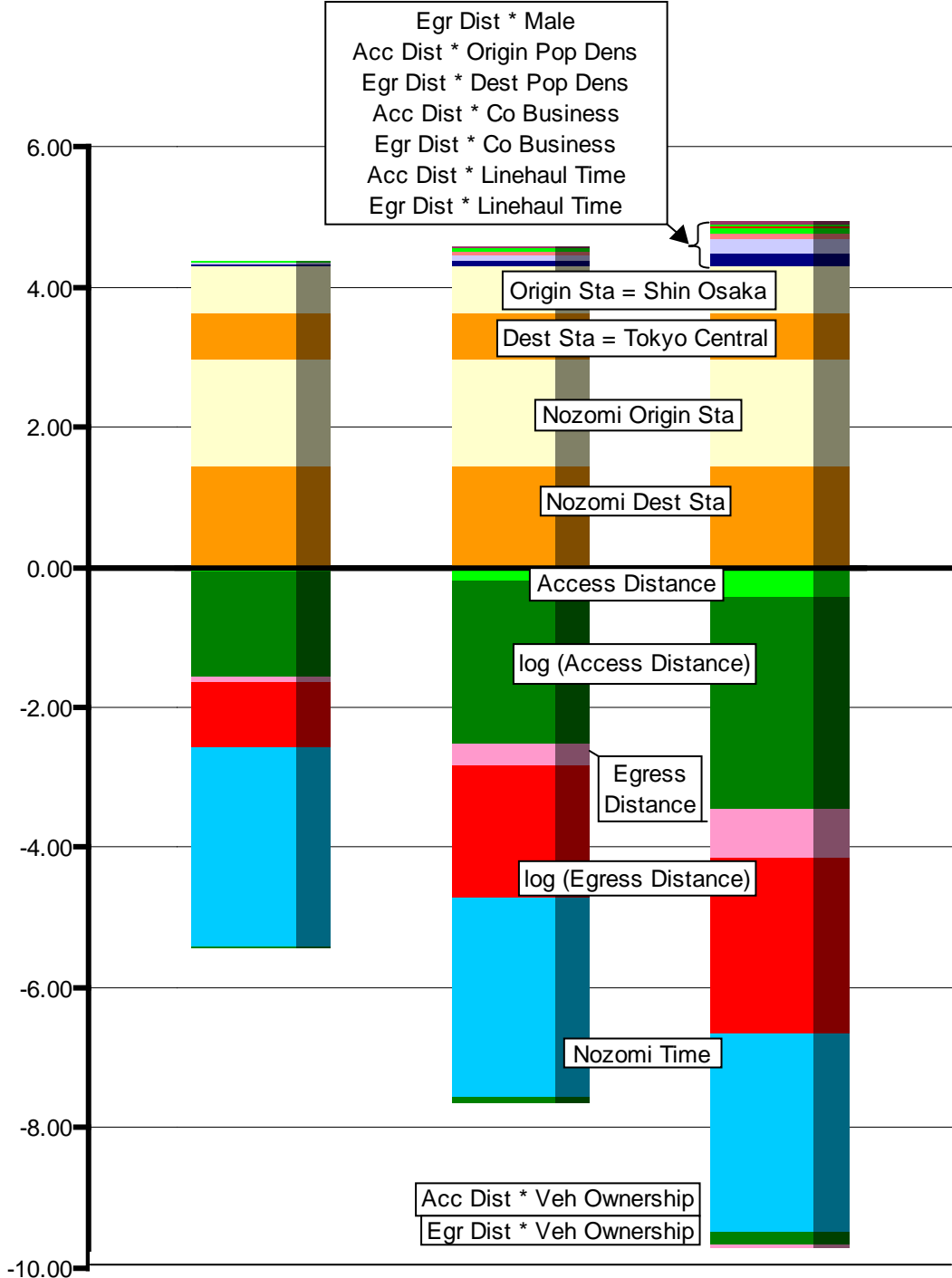


Utility Impact Analysis of Access and Egress

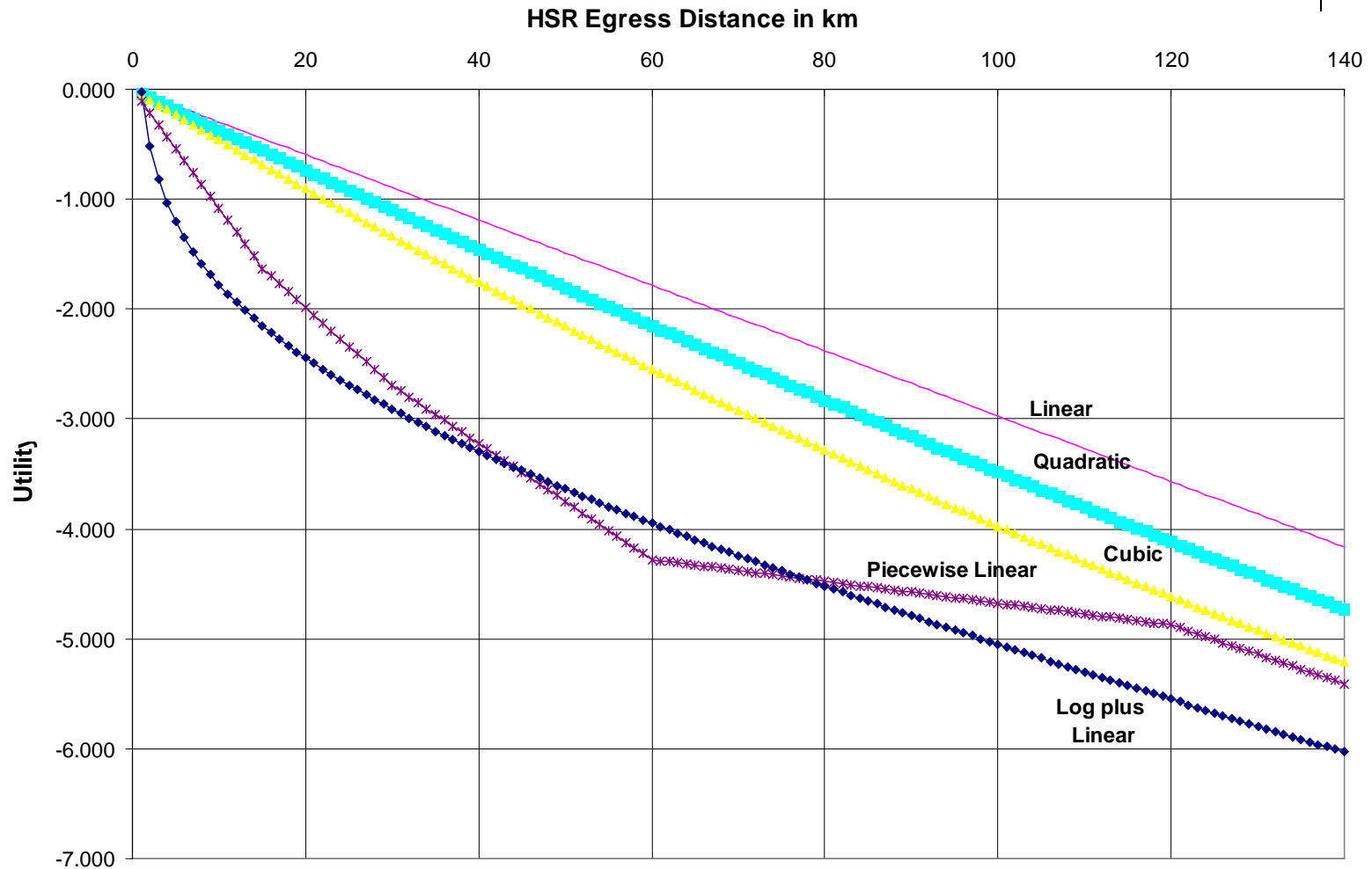
Air



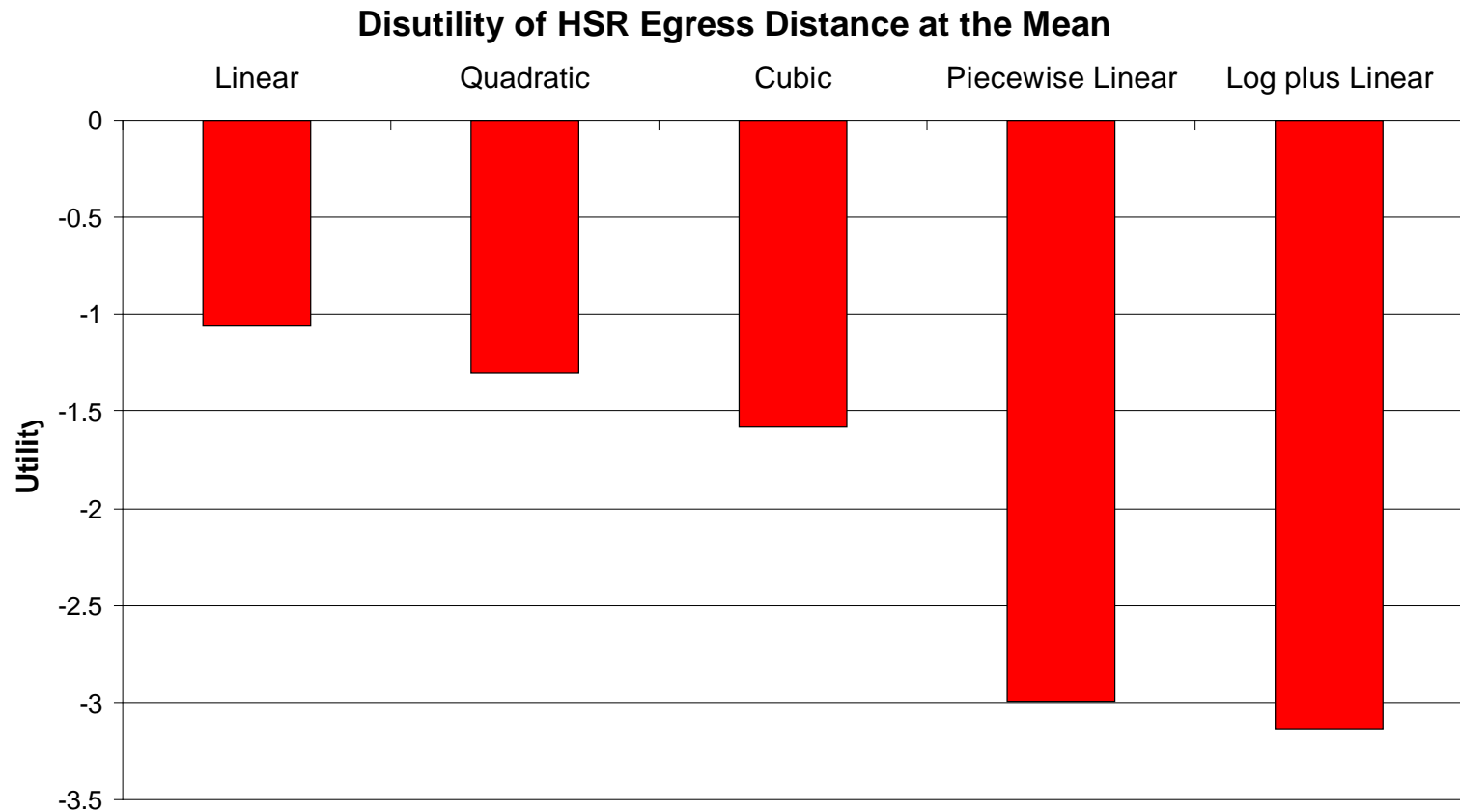
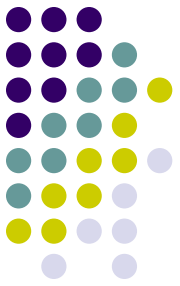
HSR



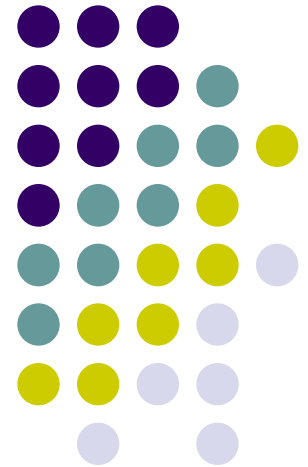
Functional Form of Egress Distance



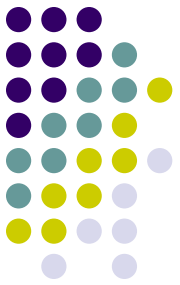
Functional Form of Egress Distance



Empirical Conclusions

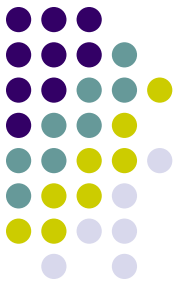


Nested Model Results

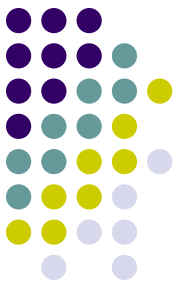


	Parameter Estimate	Standard Error	<i>p</i>-Value
HSR Intercept	2.9299	0.04170	<.0001
Inclusive Value for Air	0.0638	0.00631	<.0001
Inclusive Value for HSR	0.7271	0.01160	<.0001

Key Results – Nested Logit



- Small magnitude of air coefficient suggests high communality between air alternatives
- i.e.: adding another airport pair would mostly draw passengers away from other airport pairs
- or, the only airport pair that really matters is the best one

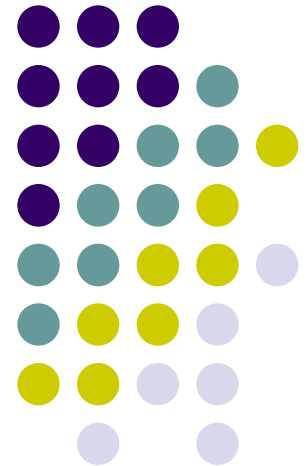


Results – Nested Logit – cont 'd

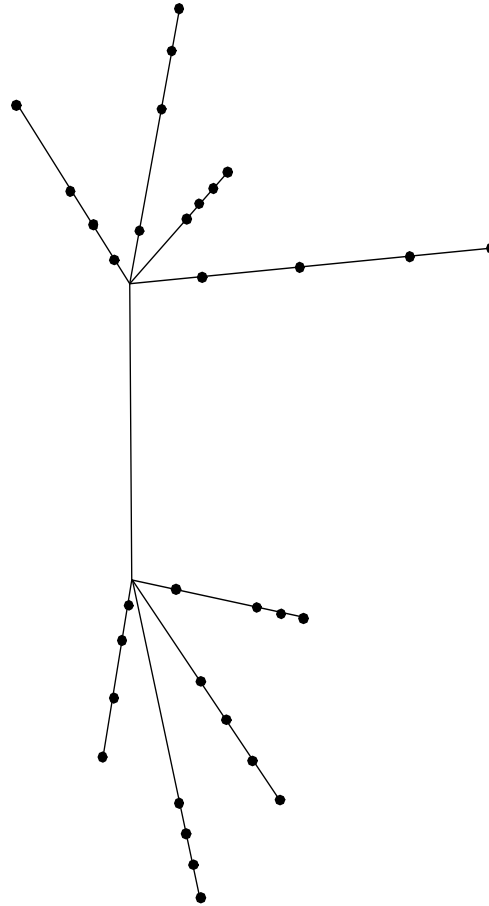
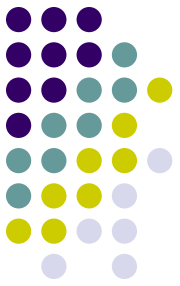
- Adding a choice set for HSR is more sensible
- Adding more stations has a higher impact on other modes
- Tradeoff access time versus linehaul time has to be more closely examined

Policy Implications

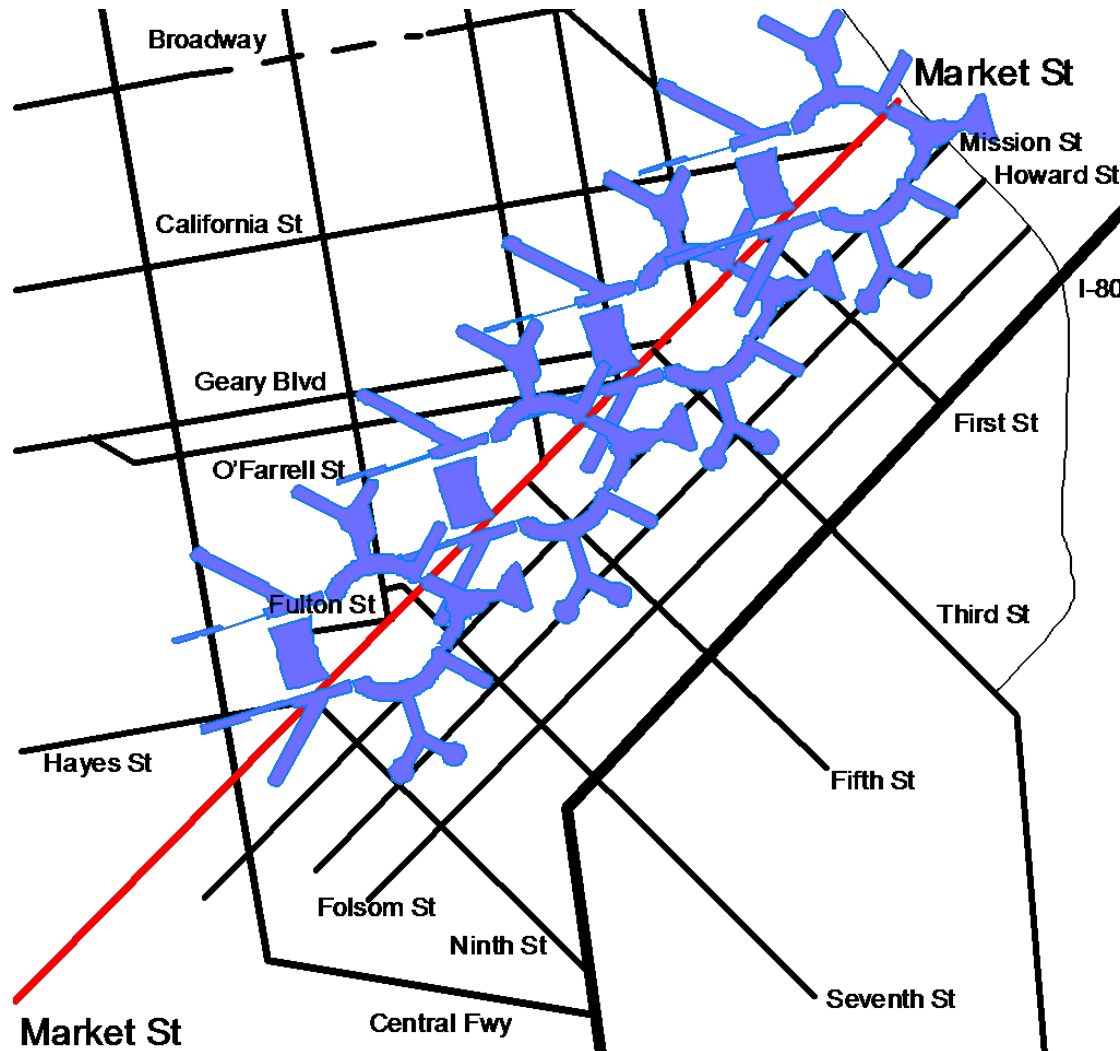
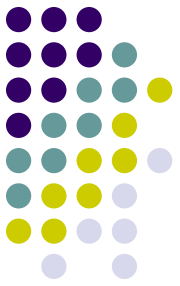
A Paradigm Shift to Convergence

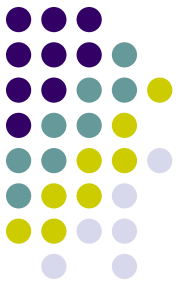


HSR with Access Branches



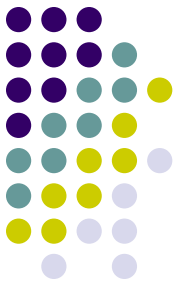
Zero Access Distance Scenario





Thank you !

Post Scriptum



- Available Online:

<http://thinkMetric.com/diss>

- Forward References:

<http://thinkMetric.com/diss/fwd>