Version 2.3 travel model
on the 3,722-TAZ area system:
Trip Generation Estimation Update

Presented to the Travel Forecasting Subcommittee
of the TPB Technical Committee
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National Capital Region Transportation Planning Board (TPB)
Metropolitan Washington Council of Governments (COG)

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Acknowledgements

- Trip production rates calculations and I-X Trip analysis performed by Hamid Humeida

Vehicle Availability Model

- Updated because transit accessibility to employment has changed

- Changes in transit accessibility due to:
  - Network corrections
  - Changes in transit paths
    - Updated transfer restrictions table (NOX table)
   - Made KNR and PNR paths to transit more consistent

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Vehicle Availability Model: Before

Number of Vehicles					Old	New
0	1	2	3+	Variable	Coefficient	Coefficient
	X			Constant	0.4325	0.5382
		X		Constant	-3.6419	-3.0820
			X	Constant	-6.9641	-6.8508
X				Household Size	0.1688	0.1693
	X			Household Size	1.3443	1.3439
		X		Household Size	1.6911	1.6910
X				Income level 2	1.4532	1.4535
	X			Income level 2	2.2533	1.8432
		X		Income level 2	2.6483	2.4619
X				Income level 3	1.8426	2.2589
	X			Income level 3	3.4177	3.4209
		X		Income level 3	3.9122	4.6234
X				Income level 4	2.4719	2.6558
	X			Income level 4	4.6359	3.9163
		X		Income level 4	5.5520	5.5402
X				Employment w/in 45 min transit	-1.11E-06	-1.20E-06
	X			Employment w/in 45 min transit	-1.95E-06	-2.04E-06
		X		Employment w/in 45 min transit	-2.27E-06	-2.37E-06
X				Area type	0.2380	0.2092
	X			Area type	0.5199	0.4772
		X		Area type	0.8280	0.7792
X				DC dummy	-0.9798	-0.9448
	X			DC dummy	-1.4522	-1.3977
		X		DC dummy	-1.5987	-1.5294

- Note that the constants were adjusted to better match observed ACS data
- All variables are statistically significant
- Adjusted pseudo-R^2=0.269

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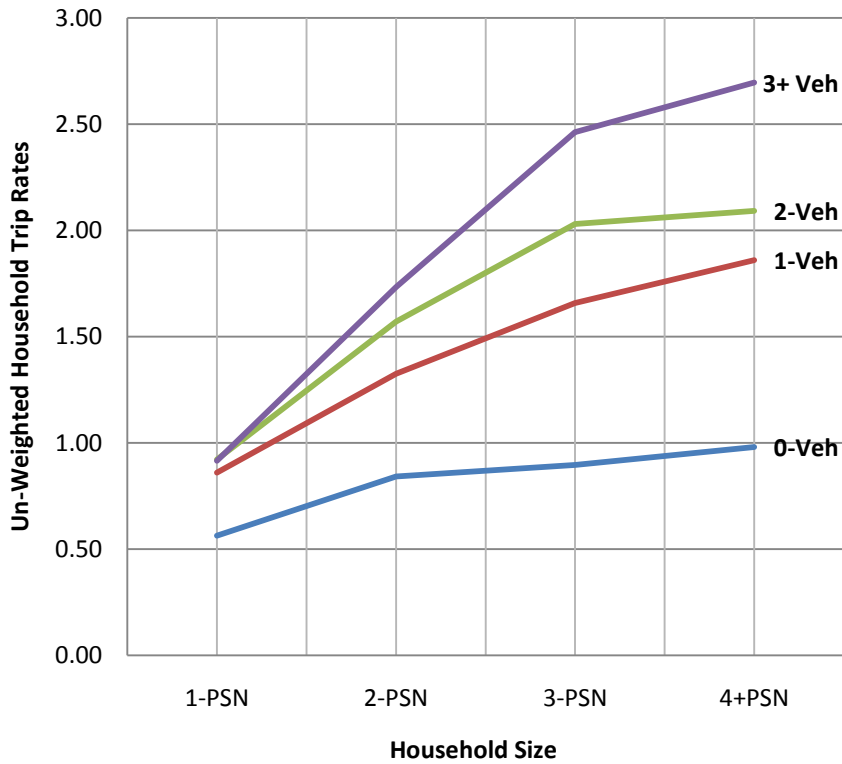
Trip Production Rates

- Previously presented rates based on un-weighted trips

- The rest of the models are estimated based on weighted trips (trip attraction model, non-motorized trip model)

- Developed weighted trip production rates
  - More consistent with the rest of the travel model
  - Weighted data accounts for over/under sampling in the region
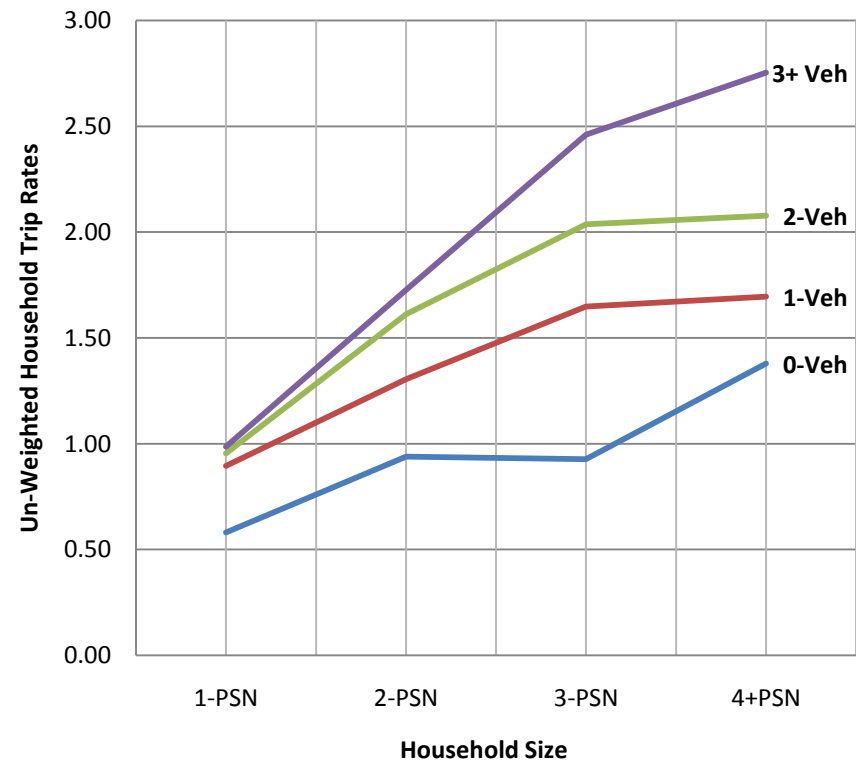
Comparison of Un-Weighted and Weighted Trip Rates

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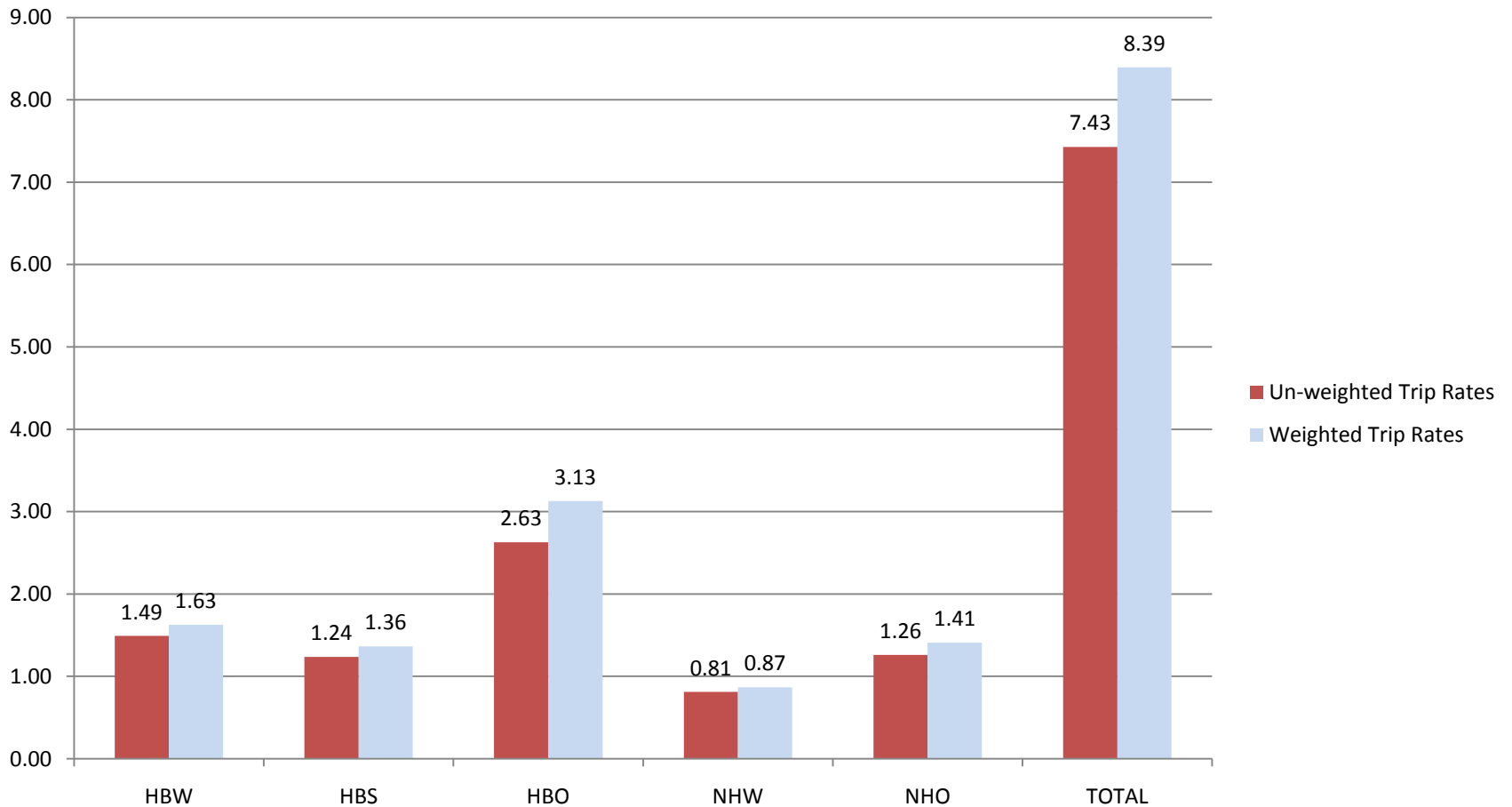
Comparison of Unweighted and Weighted Trip Rates 2

UNWEIGHTED HBW TRIP PRODUCTION
SMOOTHED RATES
By Household Size & Vehicles Available

WEIGHTED HBW TRIP PRODUCTION
SMOOTHED RATES
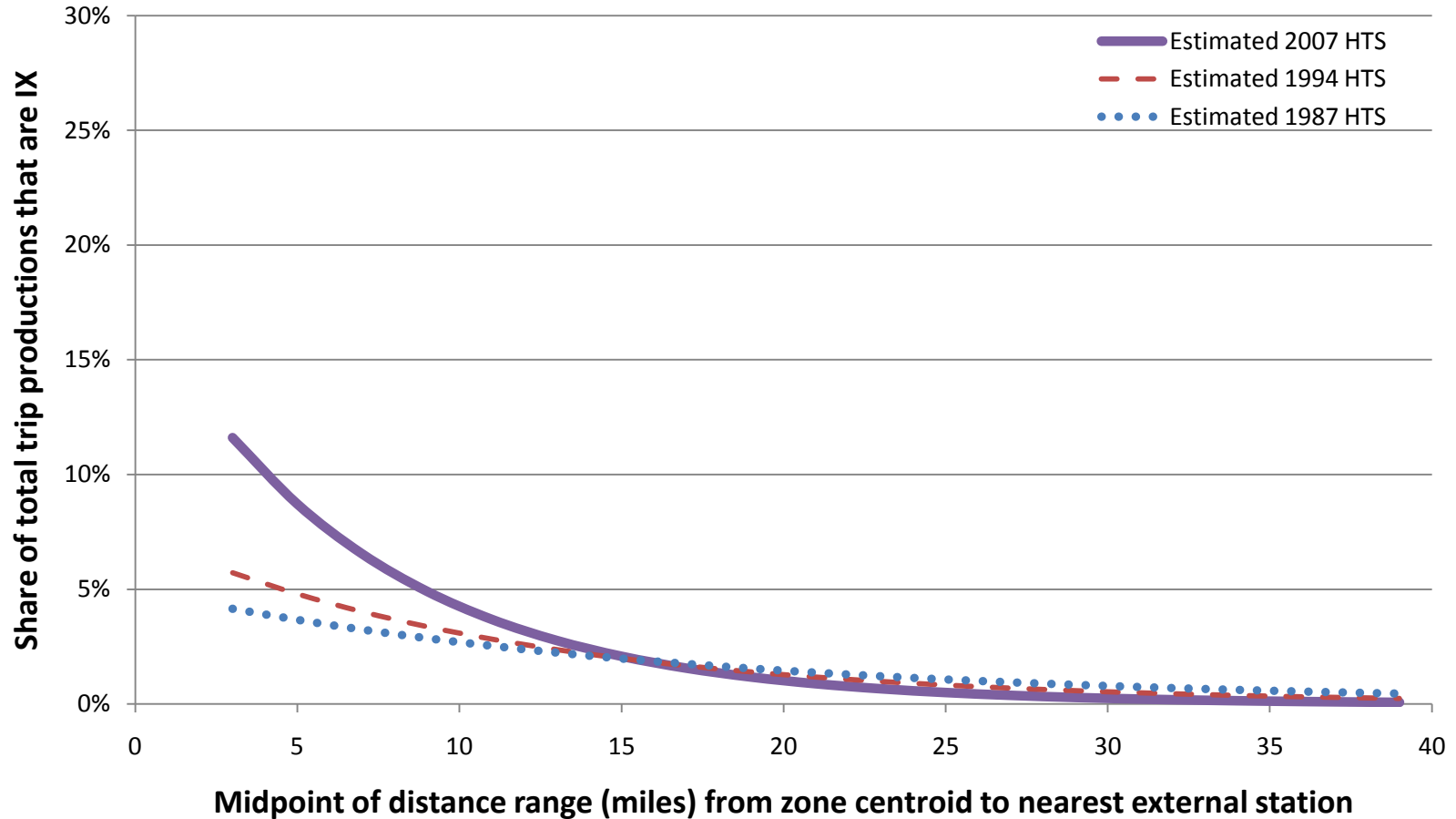By Household Size & Vehicles Available

I-X Trip Extraction Model

- Updated I-X trip model in response to comments at the September TFS meeting
  - Since the new TPB modeled area is larger than 1994 and 1987 modeled areas, may need more than one curve
  - Jurisdictions near Baltimore may have more external trips than others in the region, thus the I-X model was split into Baltimore and non-Baltimore

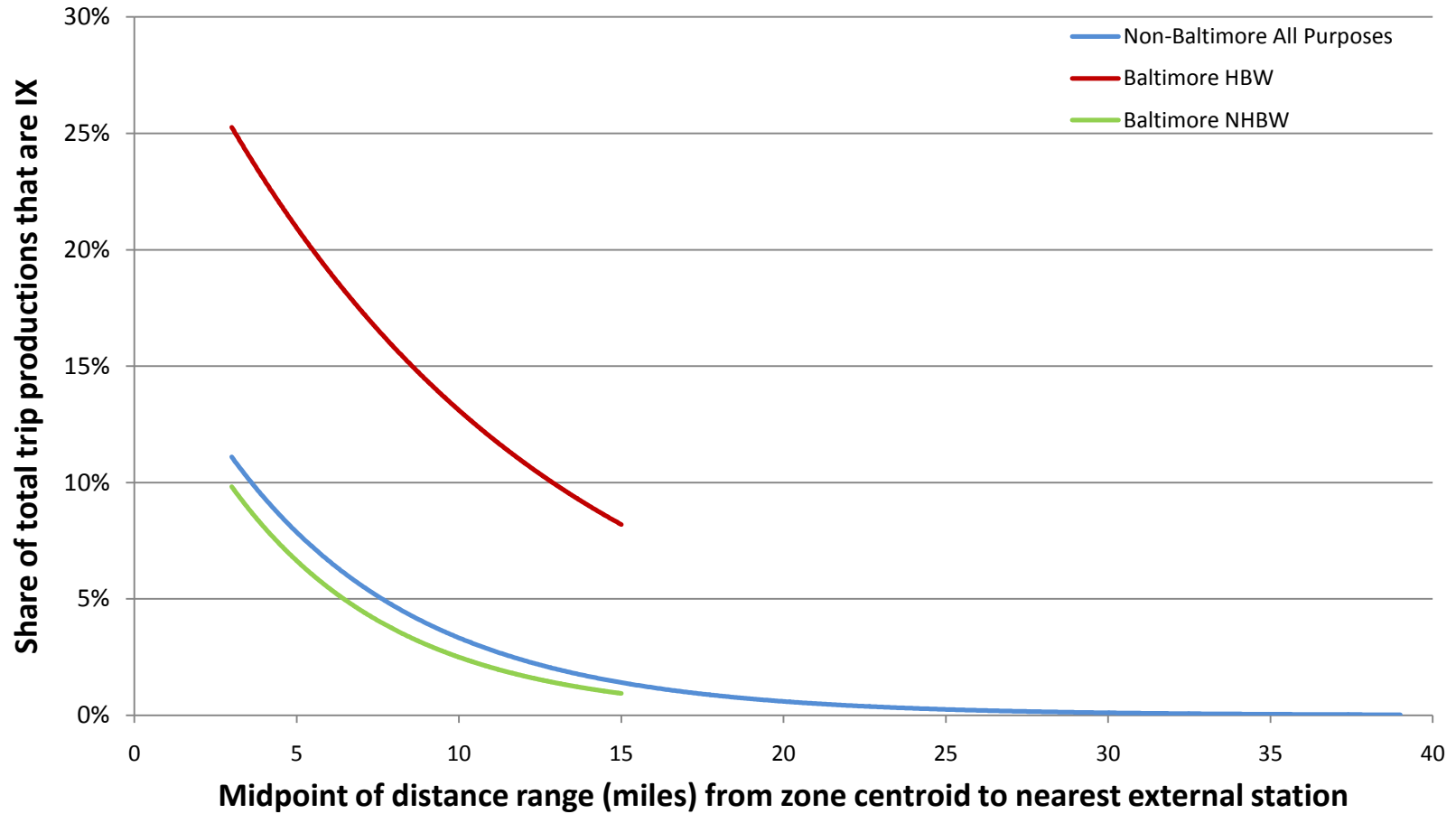Ver. 2.3 travel model, trip generation estimation update

I-X Trip New Trip Extraction Model

- Different curves were developed for Baltimore and non-Baltimore for HBW and Other trip purposes

- The curves for Baltimore and non-Baltimore were different for only HBW trips purpose.

- Thus three curves will be used:
  - HBW Baltimore (Carroll, Howard, and Anne Arundel counties)
  - HBW Non-Baltimore
  - Non-HBW Entire Region

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I-X Model Before

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I-X Model After

Chart showing "Share of total trip productions that are IX" (y-axis, 0% to 30%) versus "Midpoint of distance range (miles) from zone centroid to nearest external station" (x-axis, 0 to 40). Three curves: Non-Baltimore All Purposes (blue), Baltimore HBW (red), Baltimore NHBW (green).

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Non-Motorized Trip Model

- Same as presented at the last TFS
- Linear regression models for productions and attractions
  - Only for area types 1 and 2
  - HBW, NHW, and all other purposes
  - Function of employment density, population density, and block density
- Fixed percentages (averages by area type) for all other area types

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Trip Attraction Models

- Models developed by trip purpose
- For each trip purpose, two models were estimated:
  - Area types 1 and 2
  - Area types 3+
- Function of employment, retail employment, non-retail employment, and population

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Summary and conclusions

- Re-estimated vehicle availability model
  - Change in the inputs
- Updated trip generation rates
  - Now developed based on weighted trips
- Changed I-X model
  - Split HBW I-X trips into those from jurisdictions near Baltimore and other jurisdictions in the region
- Retained the non-motorized trip model and trip attraction model as is