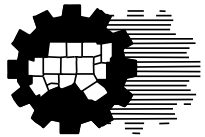


Comparing the Use of CTPP and LEHD to Create an Employment Distribution in the North Central Texas Regional Travel Model

Applying Census Data for Transportation
November 16, 2017



Arash Mirzaei, Kathy Yu, Liang Zhou
North Central Texas Council of Governments

Outline

- ▶ Purpose
- ▶ Data Sources
- ▶ Regional Level Comparison
- ▶ County Level Comparison
- ▶ Tract Level Comparison
- ▶ Small Geography Comparison In the NCTCOG Travel Model
- ▶ Conclusions
- ▶ Future Work

Purpose

- ▶ To develop an employment distribution to small geographies for travel forecasting.
- ▶ To evaluate the use of Census Transportation Planning Products (CTPP) for creation of an employment distribution for travel forecasting.
- ▶ To evaluate the use of Longitudinal Employer-Household Dynamics (LEHD) for creation of the an employment distribution for travel forecasting.
- ▶ To compare the distributions of employment produced by the CTPP and LEHD.

CTPP

▶ Features:

- ▶ A special set of tabulations of American Community Survey (ACS) data.
- ▶ Connects worker to job/employer.
- ▶ ACS 5-year is a 12.5% sample of households.

▶ Limitations:

- ▶ ACS Data only asks for main workplace. Therefore, does not consider a worker having multiple jobs or various job locations.
- ▶ Data may be sparse at small geographies due to small ACS sample and suppression requirements.
- ▶ Due to geocoding and suppression, the sample becomes 8-10%.

LEHD

▶ Features:

- ▶ Connects firm to jobs
- ▶ Main Data Sources:
 - ▶ Quarterly Unemployment Wage Reports
 - ▶ Quarterly Census of Employment & Wages

▶ Limitations

- ▶ Only includes businesses covered by unemployment insurance.
- ▶ A firm's location could have multiple industries.
- ▶ Headquartering issue: If a list of all locations of a firm is not provided, employment is assigned to headquarters or location where questionnaire was sent.

CTPP-Aggregating Industry Type

Using CTPP 2006-2010, Part 2 Table A202104 - Workers by Industry(15)

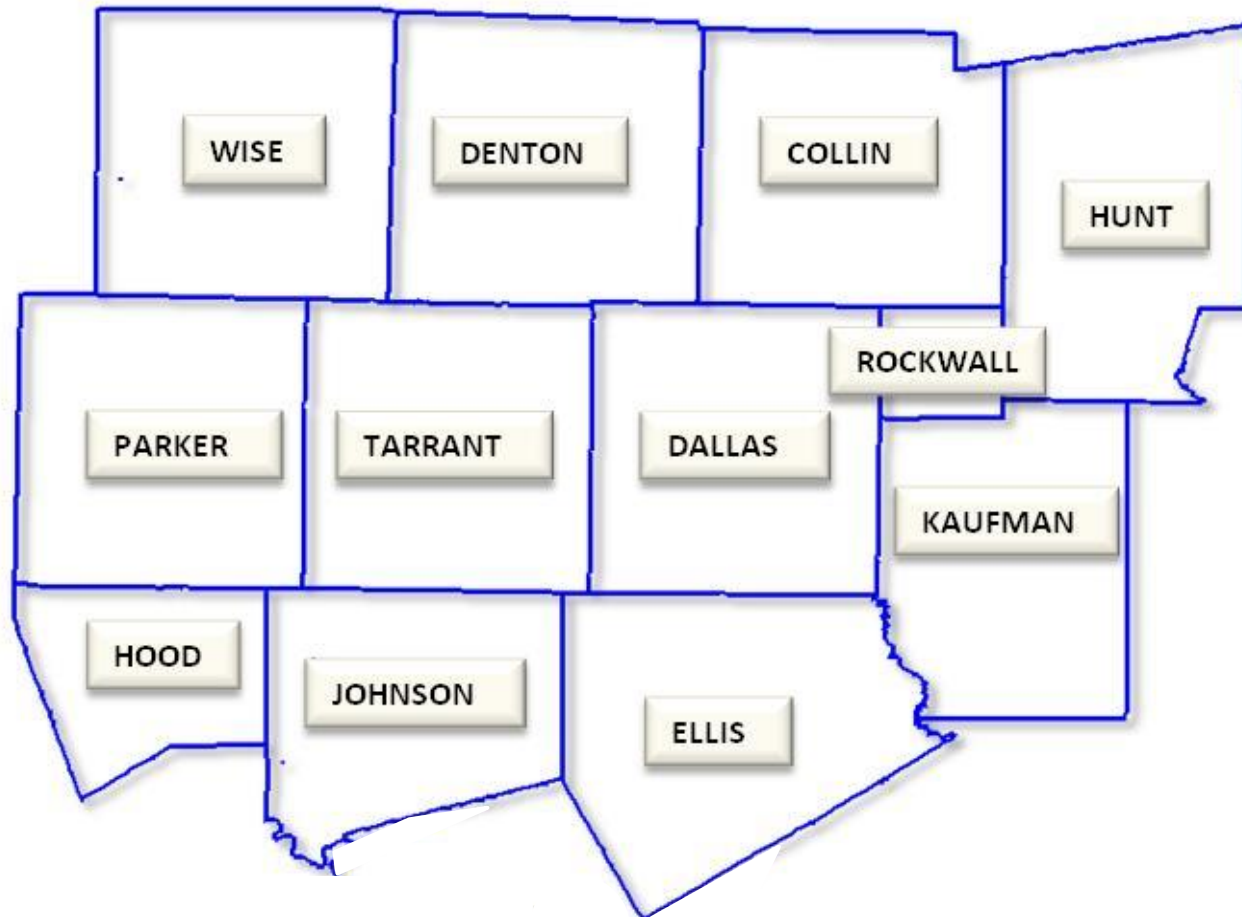
BASIC	Agriculture, forestry, fishing and hunting, and mining
	Construction
	Manufacturing
	Wholesale trade
	Transportation and warehousing, and utilities
RETAIL	Retail trade
SERVICE	Information
	Finance, insurance, real estate and rental and leasing
	Professional, scientific, management, administrative, and waste management services
	Educational, health and social services
	Arts, entertainment, recreation, accommodation and food services
	Other services (except public administration)
	Public administration
Armed forces	

LEHD-Aggregating Industry Type

Using 2010 LEHD Raw data including industry types by census block

BASIC	Agriculture, Forestry, Fishing and Hunting	
	Mining, Quarrying, and Oil and Gas Extraction	
	Utilities	Manufacturing
	Construction	Wholesale Trade
	Transportation and Warehousing	
RETAIL	Retail Trade	
SERVICE	Information	
	Finance and Insurance	
	Real Estate and Rental and Leasing	
	Professional, Scientific, and Technical Services	
	Management of Companies and Enterprises	
	Administrative, Support, Waste Management & Remediation Services	
	Educational Services	
	Health Care and Social Assistance	
	Arts, Entertainment, and Recreation	
	Accommodation and Food Services	
	Other Services [except Public Administration]	
	Public Administration	

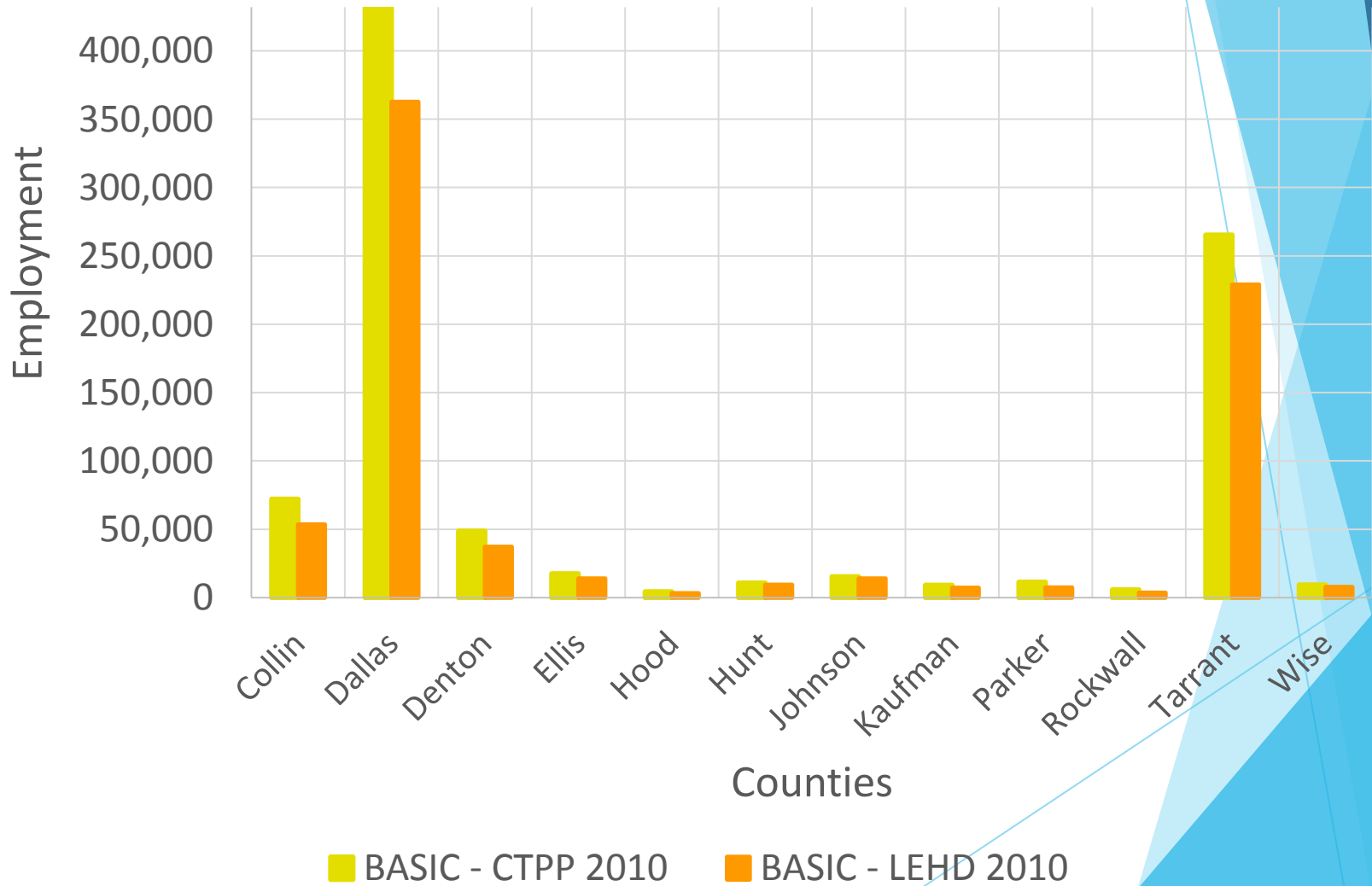
NCTCOG Modeling Area



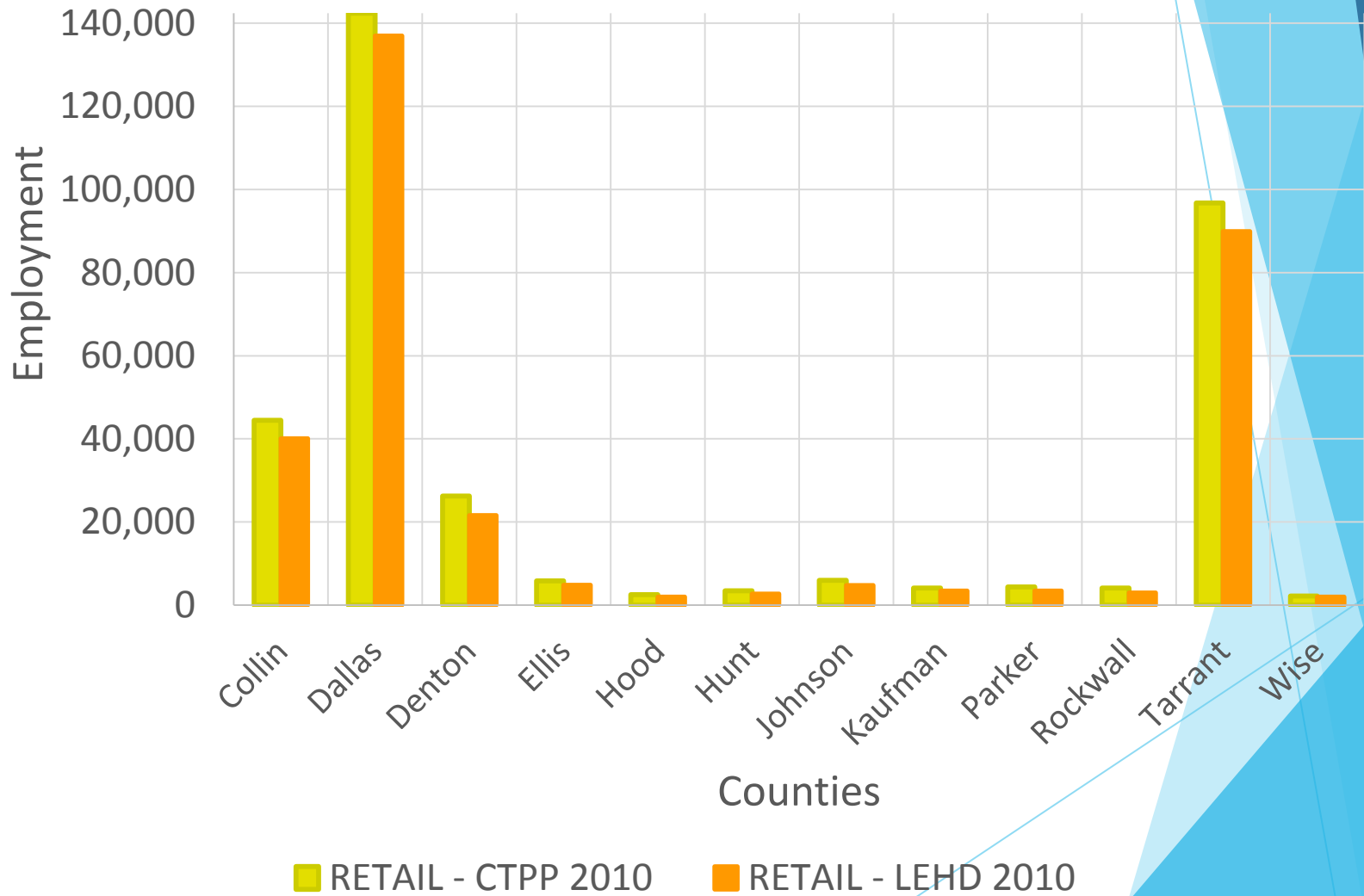
Regional Level Comparison: CTPP 2006-2010 vs LEHD 2010 Raw

Data Source	MPA Employment			
	Basic	Retail	Service	Total
LEHD Raw 2010	748,878	314,631	1,792,812	2,856,321
CTPP 2010 (County)	902,438	342,321	1,746,093	2,990,852
Difference	-153,560	-27,690	46,719	-134,531

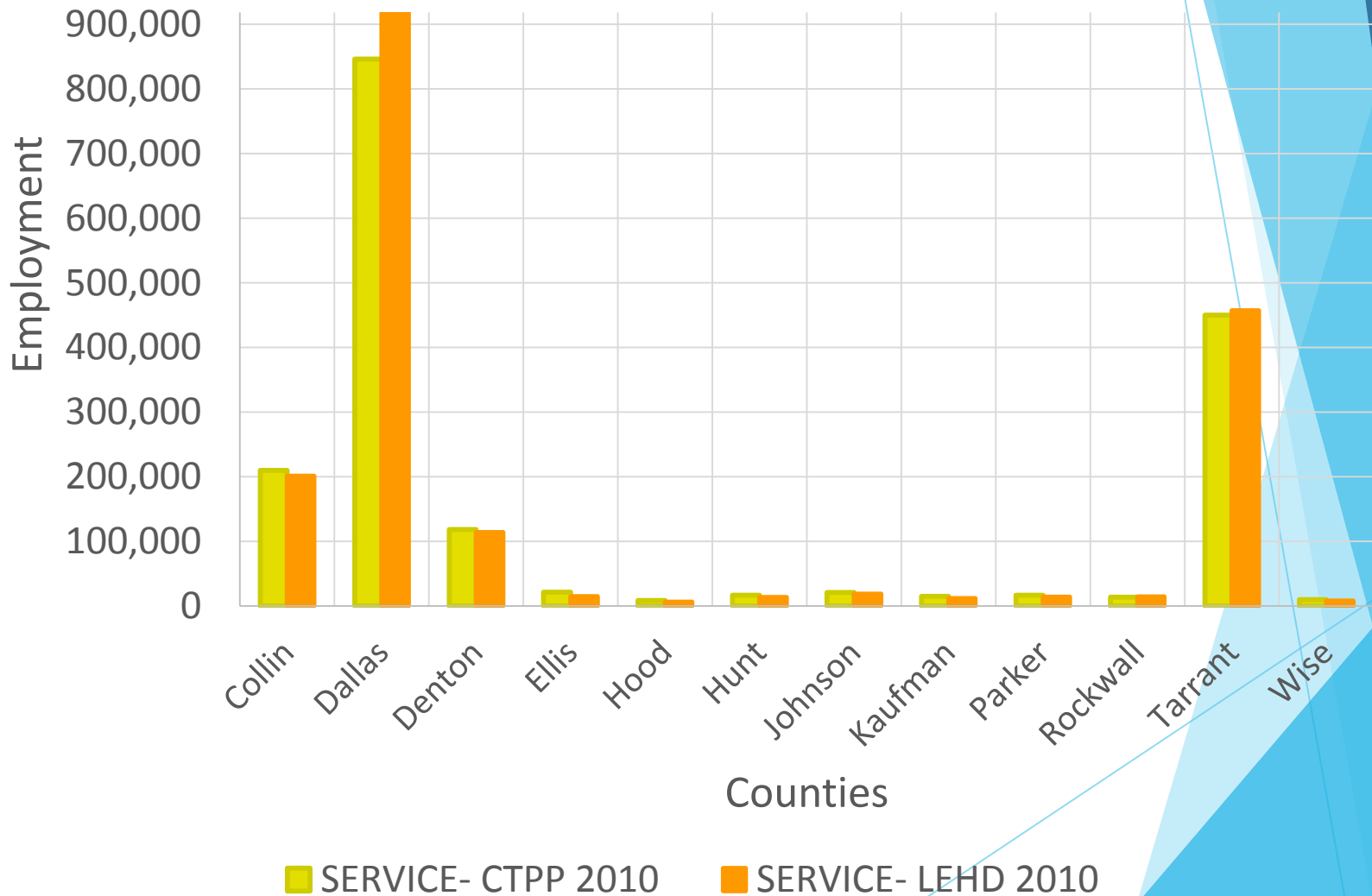
County Level Comparison: Basic



County Level Comparison: Retail



County Level Comparison: Service



Tract Level Comparison

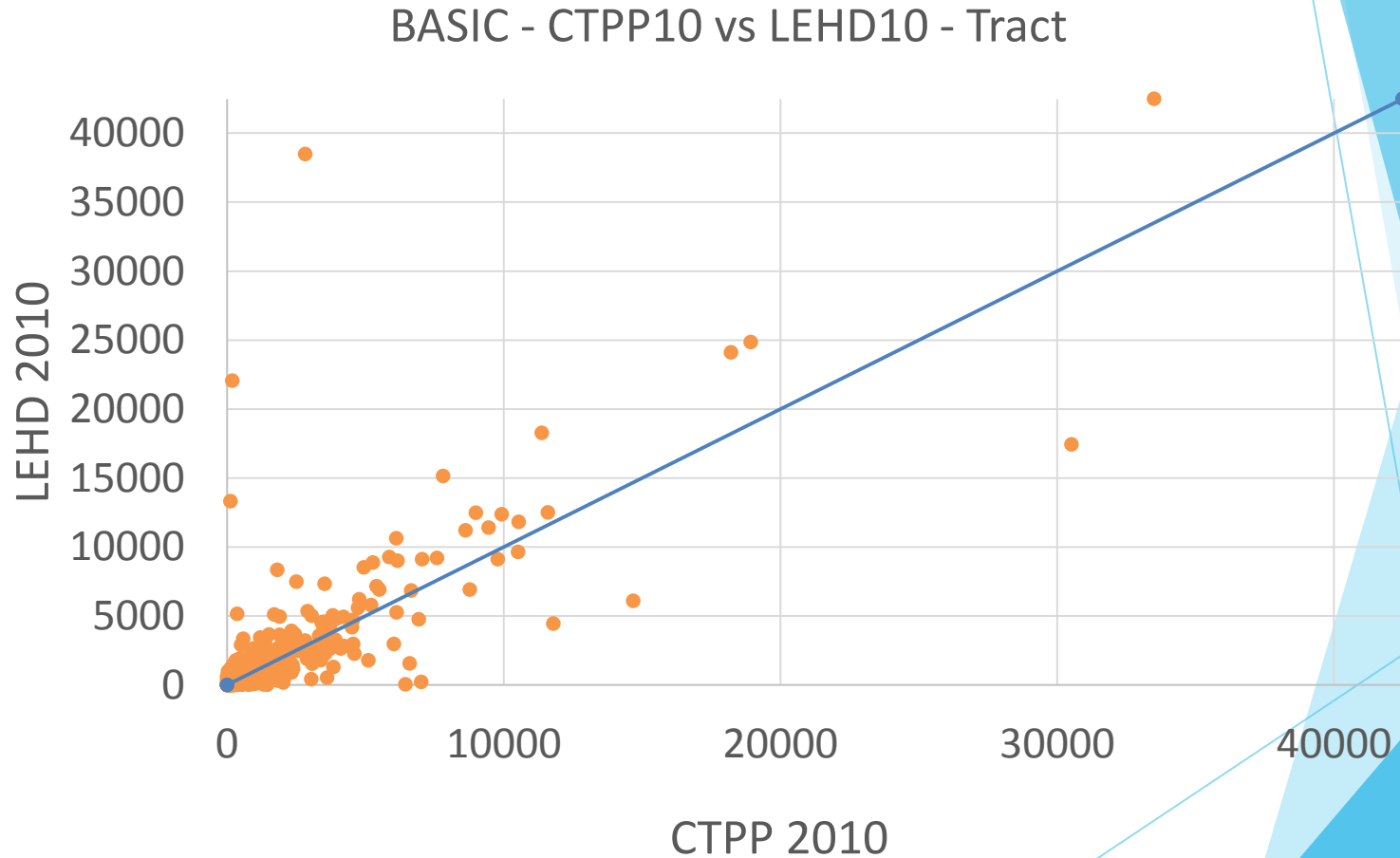
- ▶ To focus on the differences between the distribution of employment at the tract level, the tract level numbers of the CTPP and LEHD were updated to reach the same county totals.
- ▶ County Totals were from 2014 Bureau of Economic Analysis (BEA).
- ▶ For each tract in each industry category(Basic, Retail, Service), find the percentage of the county total that comes from the tract. For example,

$$\text{Basic \%} = \frac{\text{Tract Basic Employment in CTPP 2010}}{\text{County Basic Employment in CTPP 2010}}$$

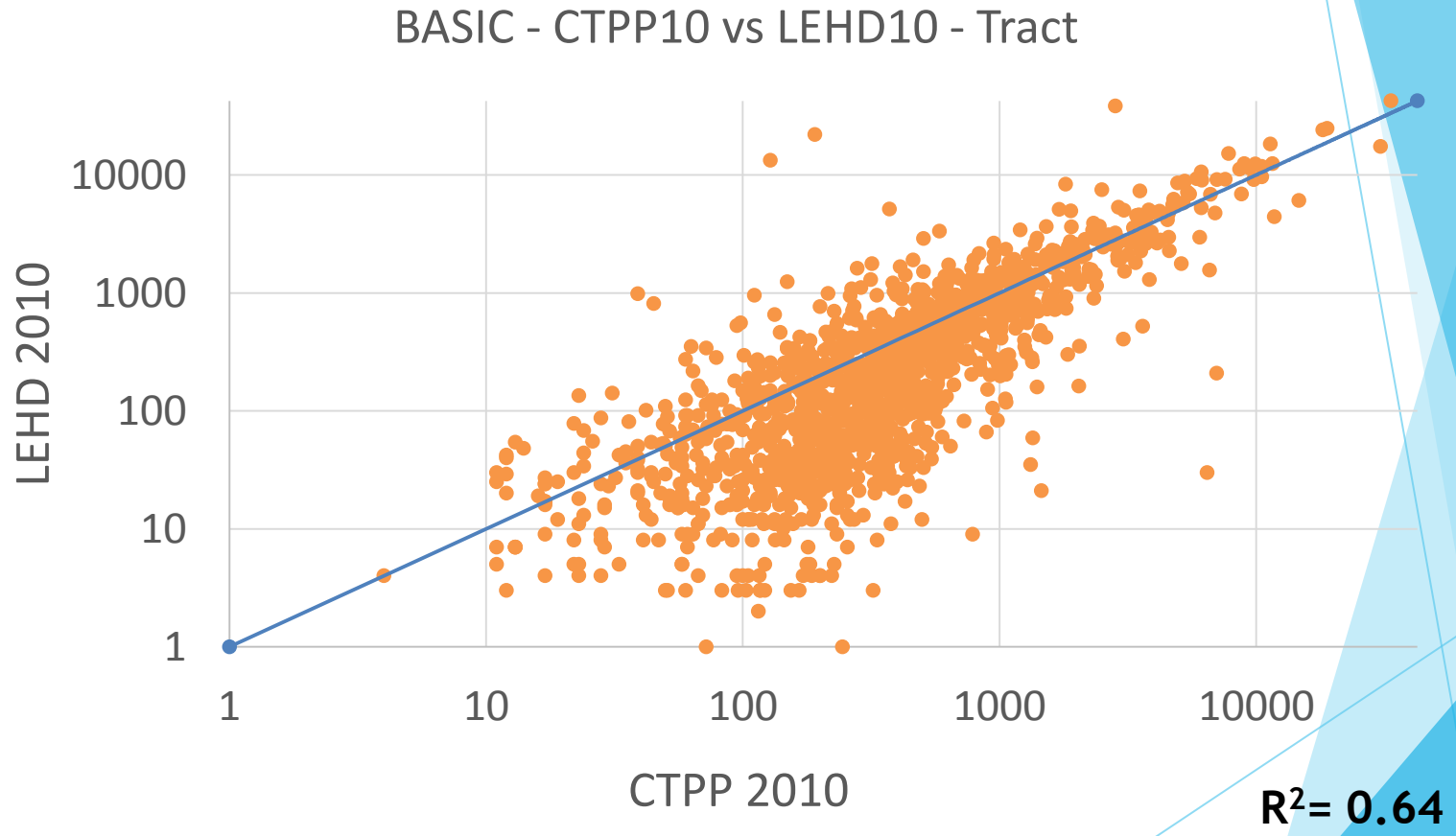
- ▶ Multiple each Tracts' percentage by the county totals to be matched.

$$2014 \text{ Tract Basic Emp} = \text{Basic \%} * \text{County Basic Emp in BEA 2014}$$

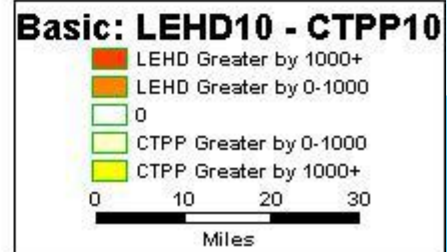
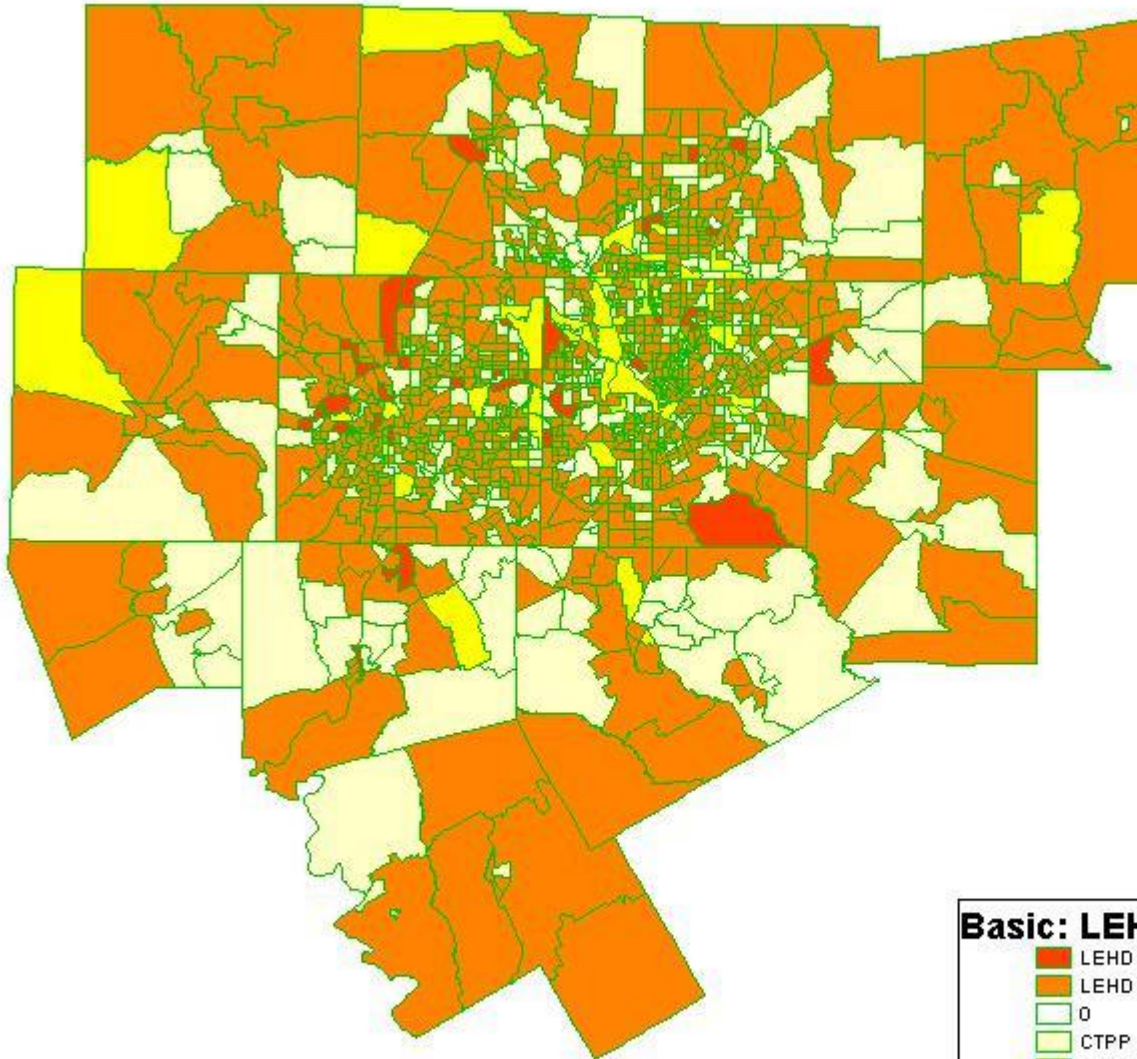
Tract Level Comparison: Basic



Tract Level Comparison: Basic

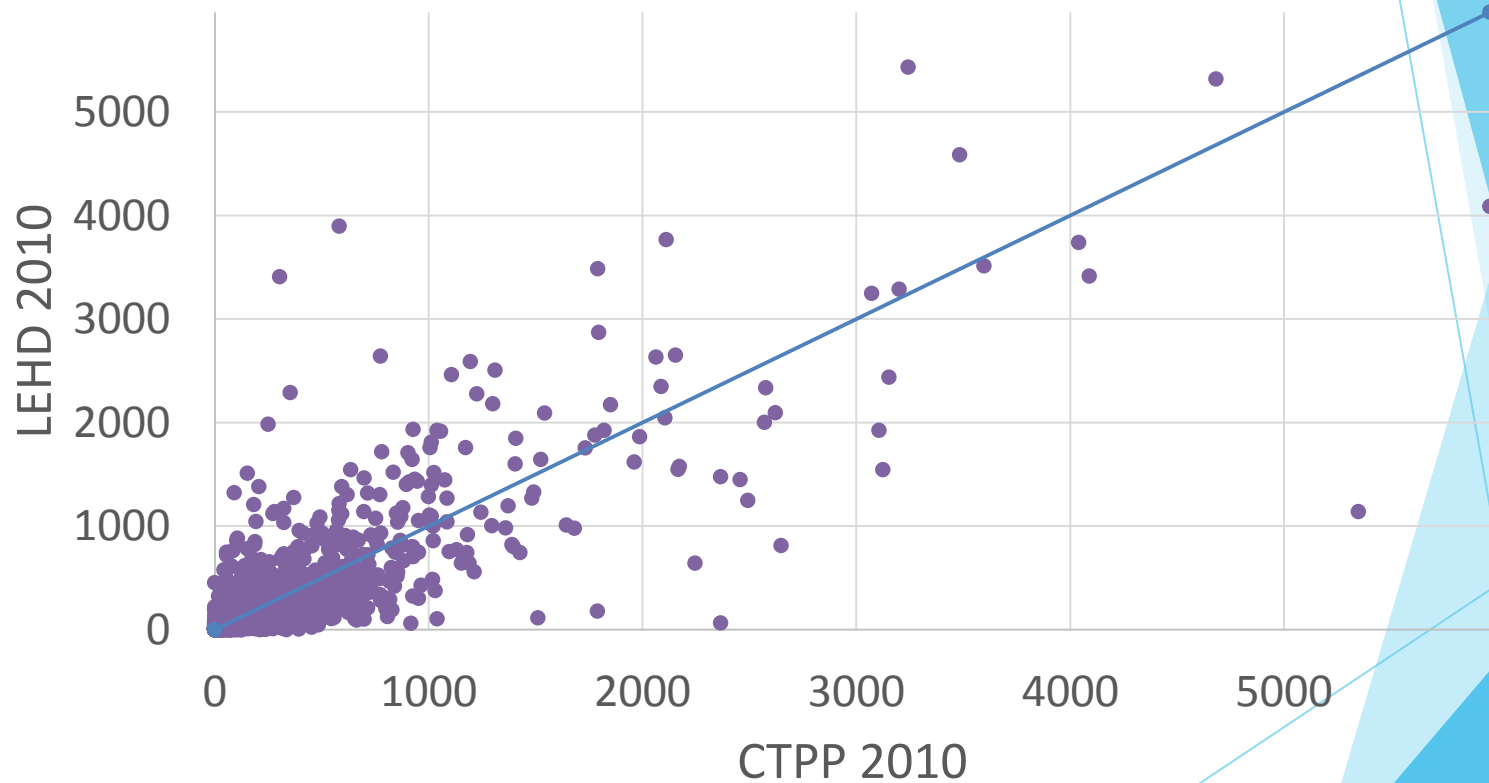


Tract Level Comparison: Basic



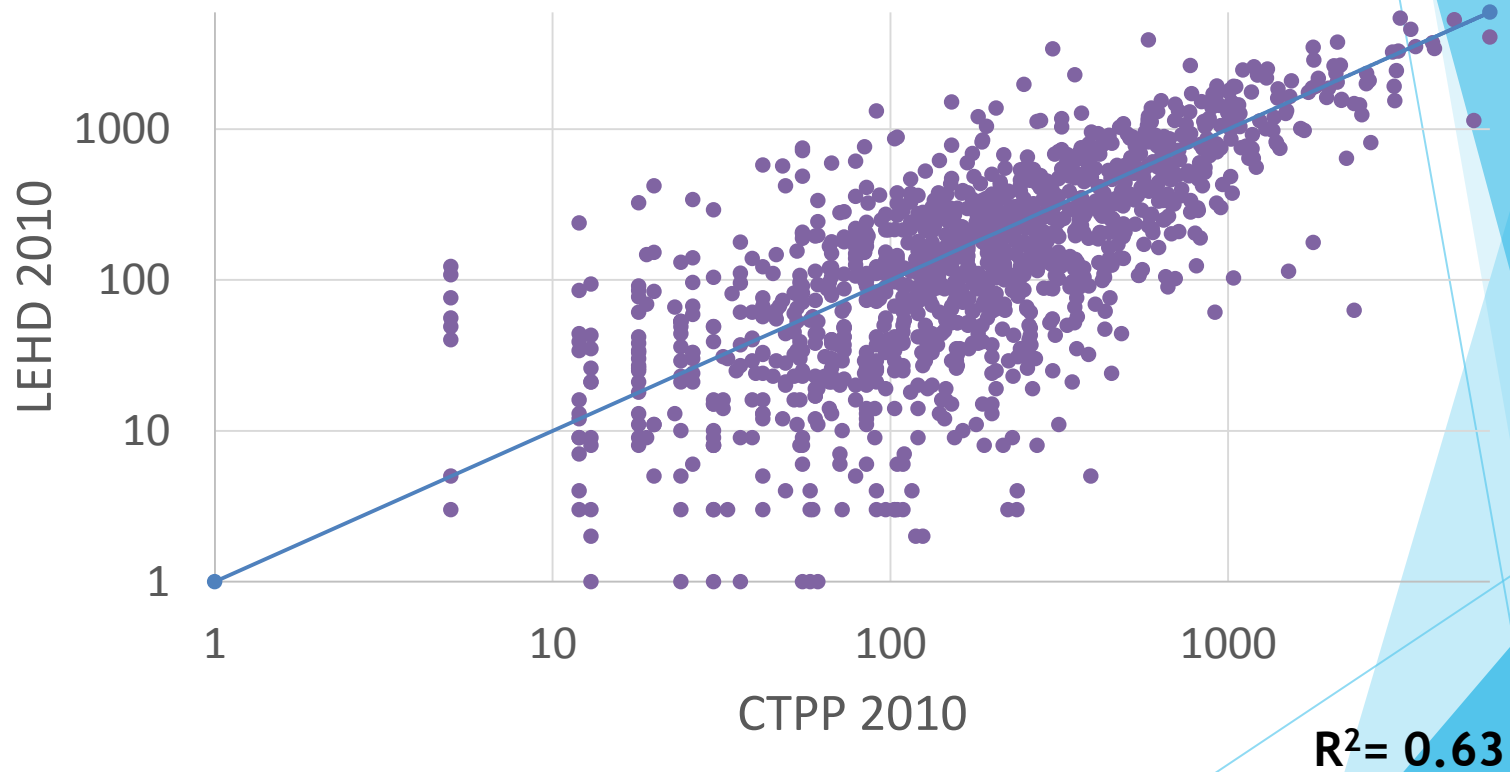
Tract Level Comparison: Retail

RETAIL - CTPP10 vs LEHD10 - Tract

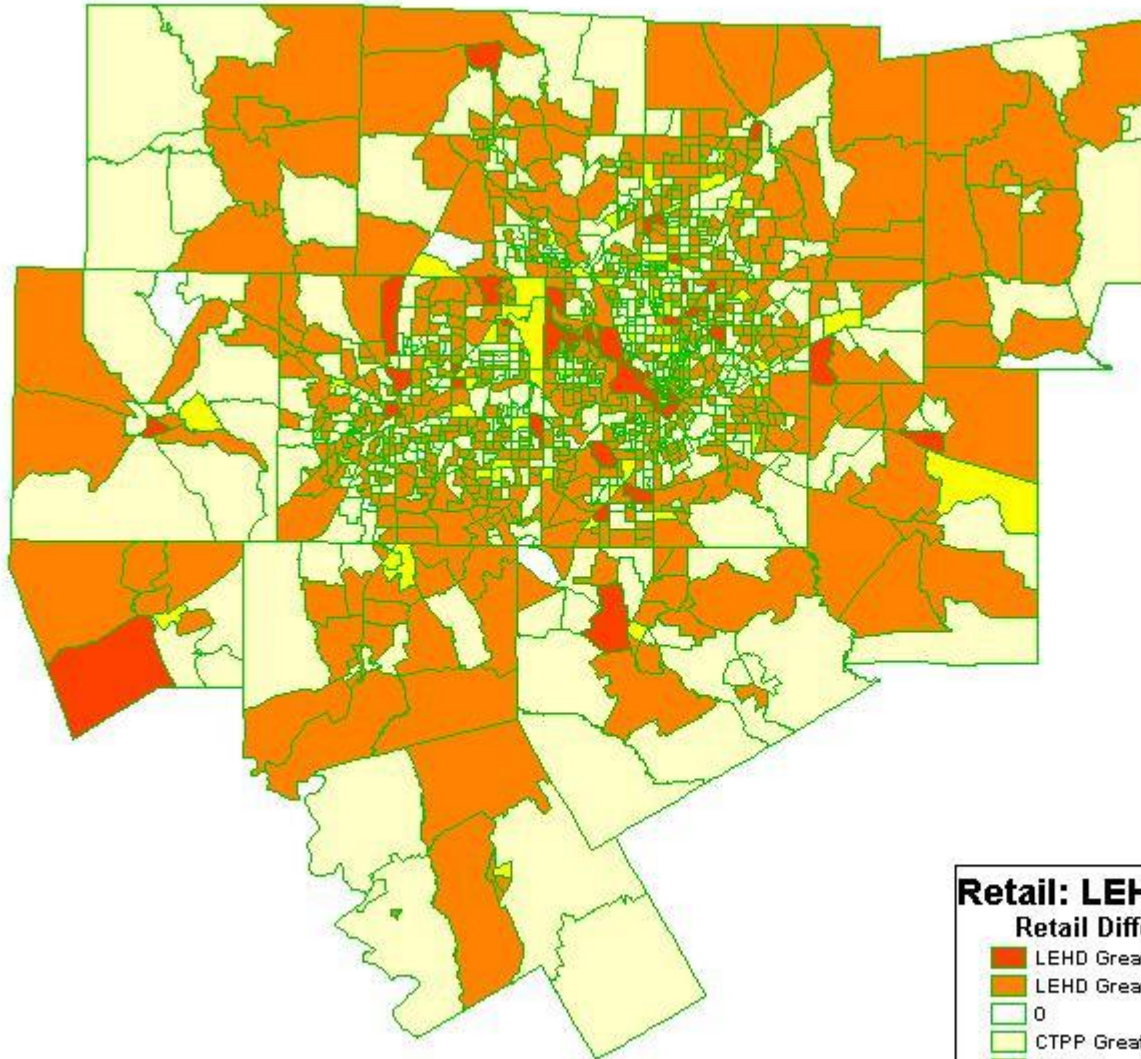


Tract Level Comparison: Retail

RETAIL - CTPP10 vs LEHD10 - Tract



Tract Level Comparison: Retail



Retail: LEHD10 - CTPP10

Retail Difference by Tract

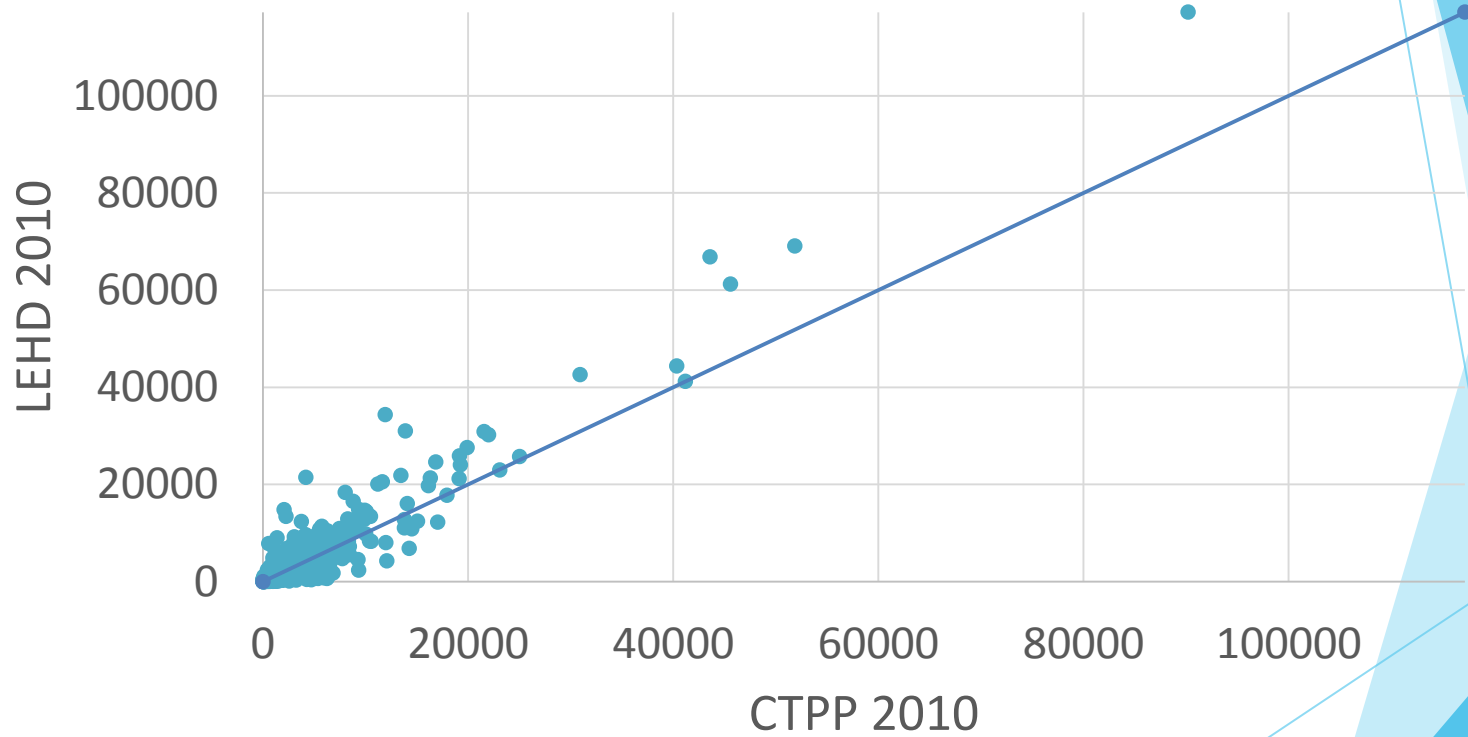
- LEHD Greater by 500+
- LEHD Greater by 0-500
- 0
- CTPP Greater by 0-500
- CTPP Greater by 500+

0 10 20 30

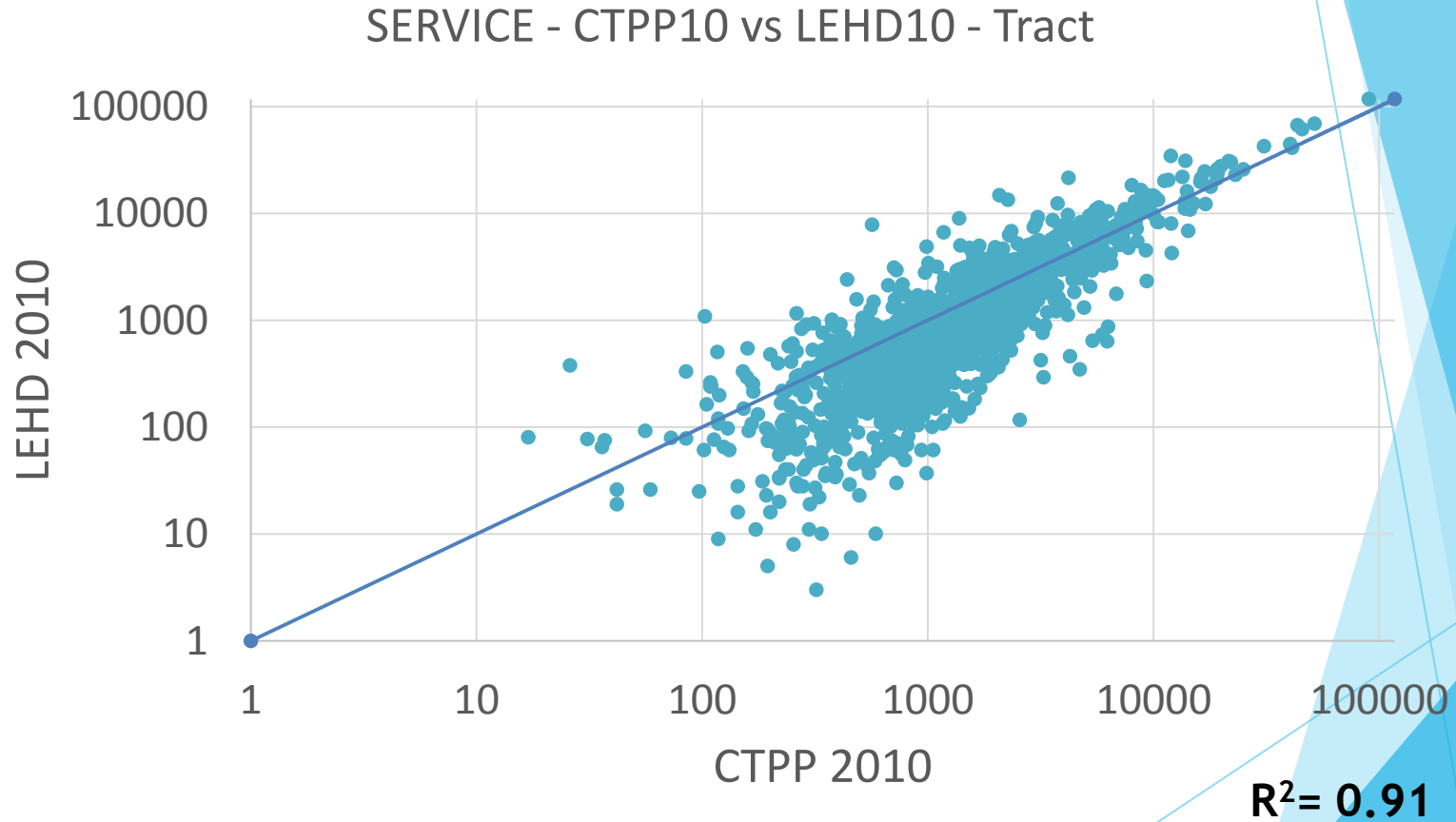
Miles

Tract Level Comparison: Service

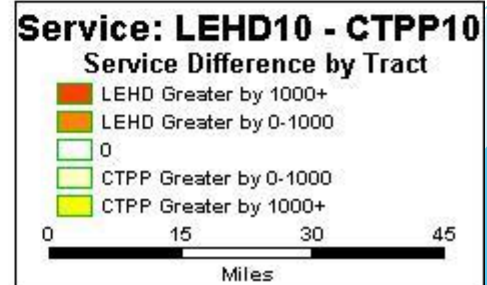
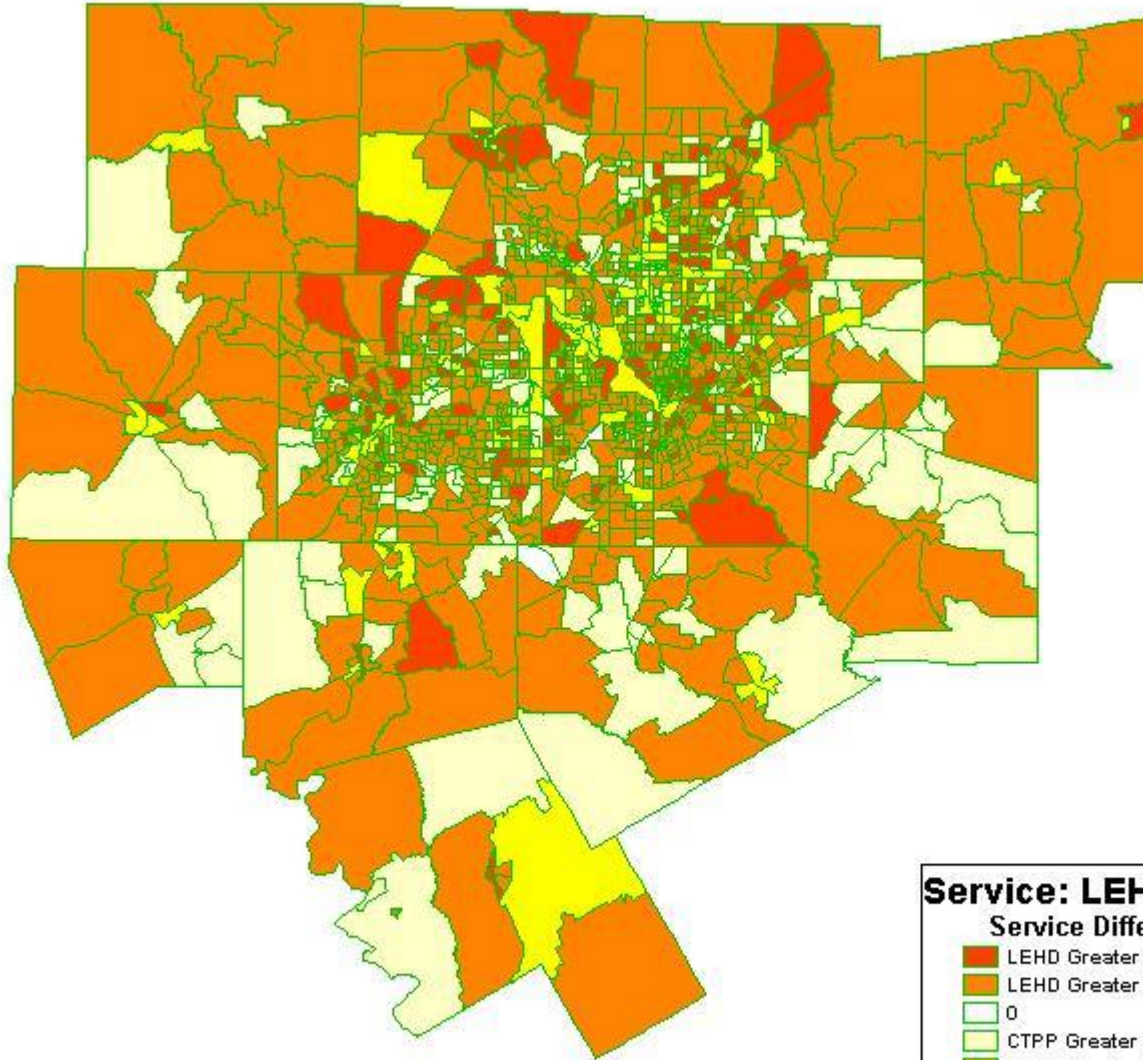
SERVICE - CTPP10 vs LEHD10 - Tract



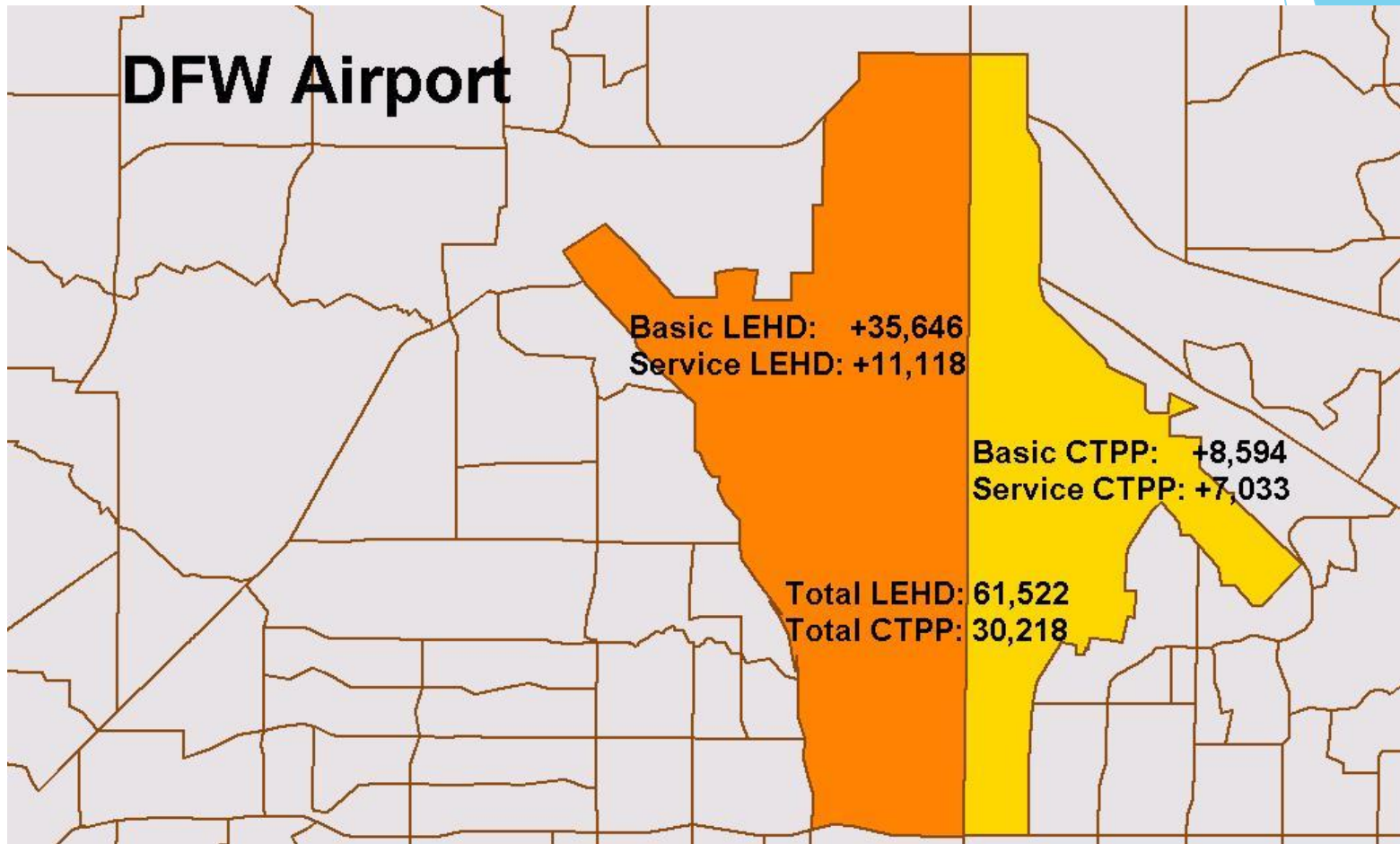
Tract Level Comparison: Service



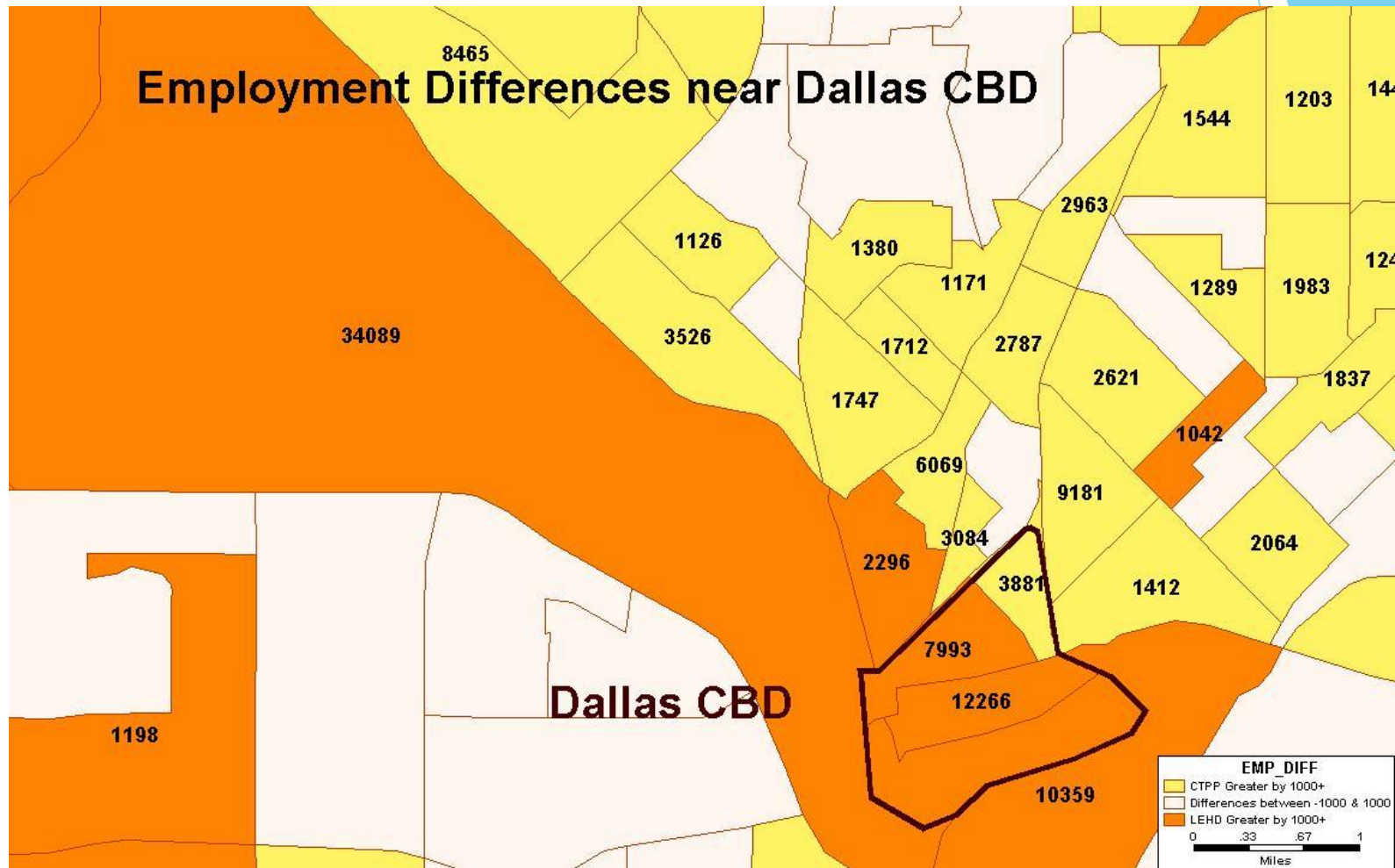
Tract Level Comparison: Service



Tract Level Comparison: DFW Airport



Tract Level Comparison: Near Dallas CBD



Small Geography Comparison

- ▶ As we did with the tract comparison, the TAZ of the CTPP and blocks of LEHD were updated to reach the same 2014 BEA county totals.
- ▶ As we did in tract, for each small geography in each industry category(Basic, Retail, Service), find its percentage of the 2010 county total and multiply the percentage by the 2014 county total

$$\text{Basic CTPP \%} = \frac{\text{TAZ Basic Emp in CTPP 2010} * \text{County Basic Emp in BEA2014}}{\text{County Basic Emp in CTPP 2010}}$$

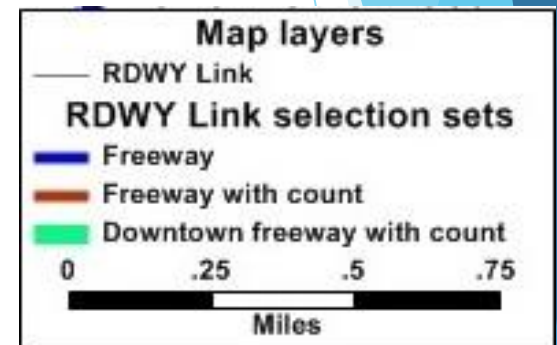
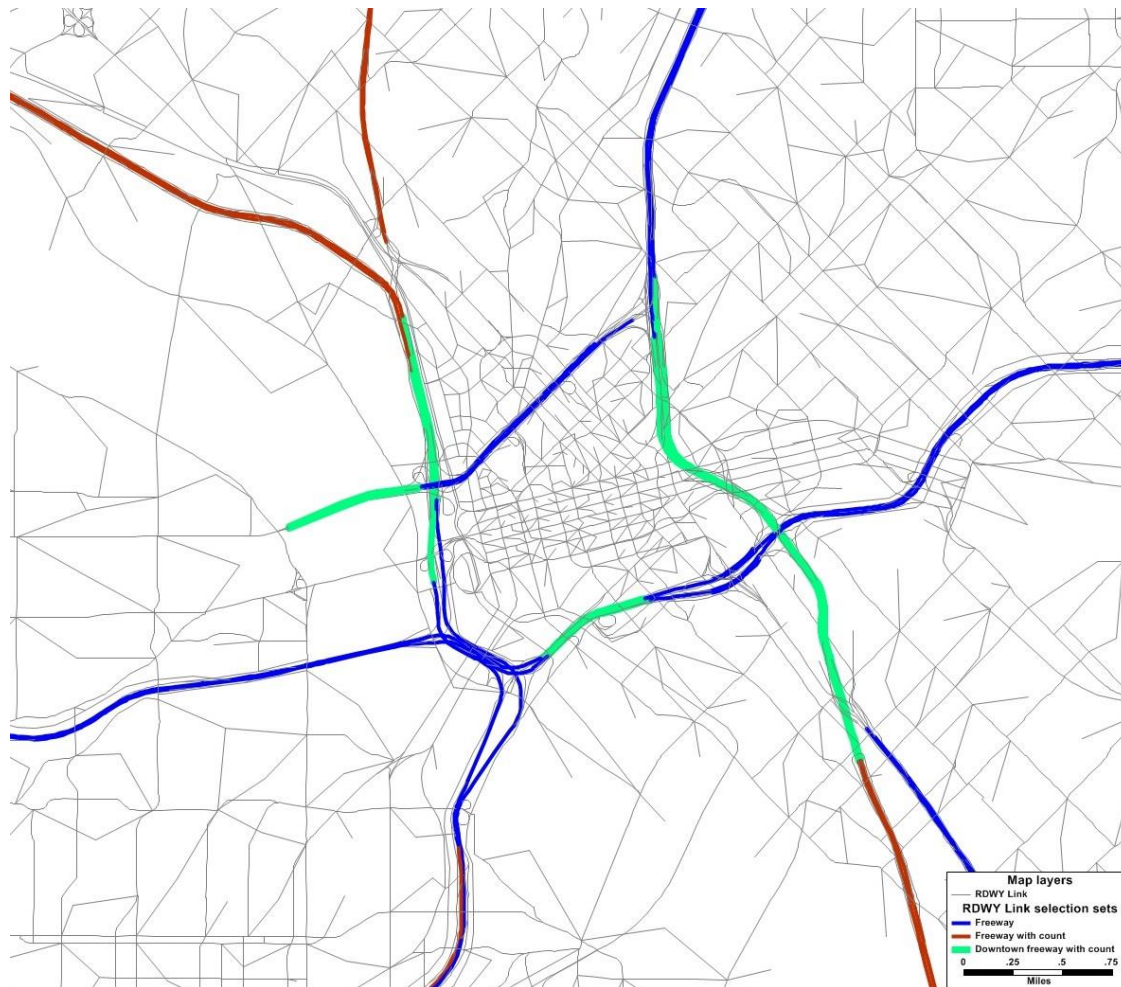
$$\text{Basic LEHD \%} = \frac{\text{Block Basic Emp in LEHD 2010} * \text{County Basic Emp in BEA2014}}{\text{County Basic Emp in LEHD 2010}}$$

- ▶ Use this data to create demographics for NCTCOG travel model and execute a model run each for CTPP and LEHD.

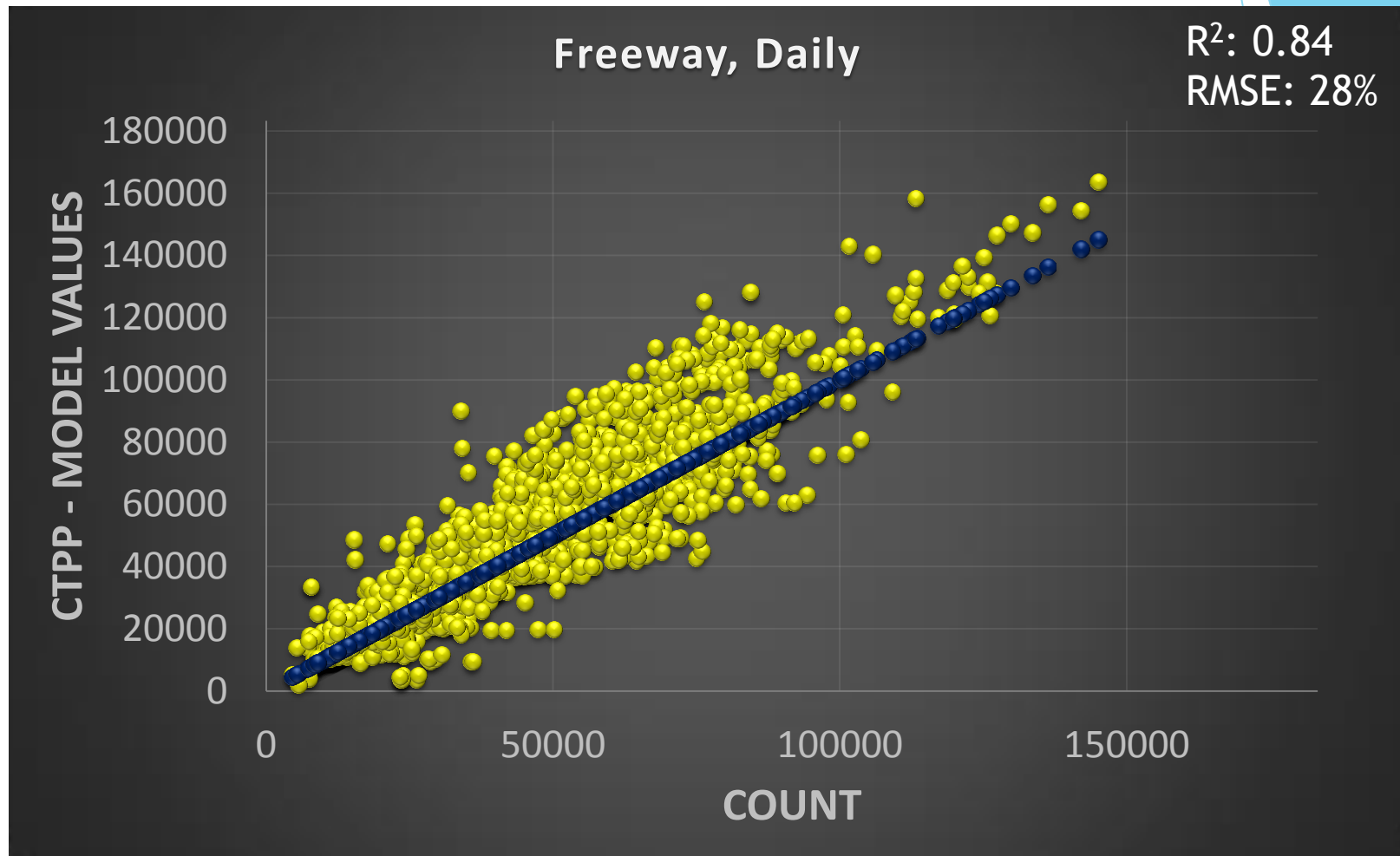
Comparing Transit Results: Model Runs with LEHD Distribution and CTPP Distribution

Data Source	Transit Boardings 2014	Rail Boardings 2014	Light Rail 2014
LEHD Raw 2010 (Blocks)	285,480	116,966	102,586
2014 Transit Survey	243,657	107,087	96,035
CTPP (TAZ)	245,916	89,974	81,621

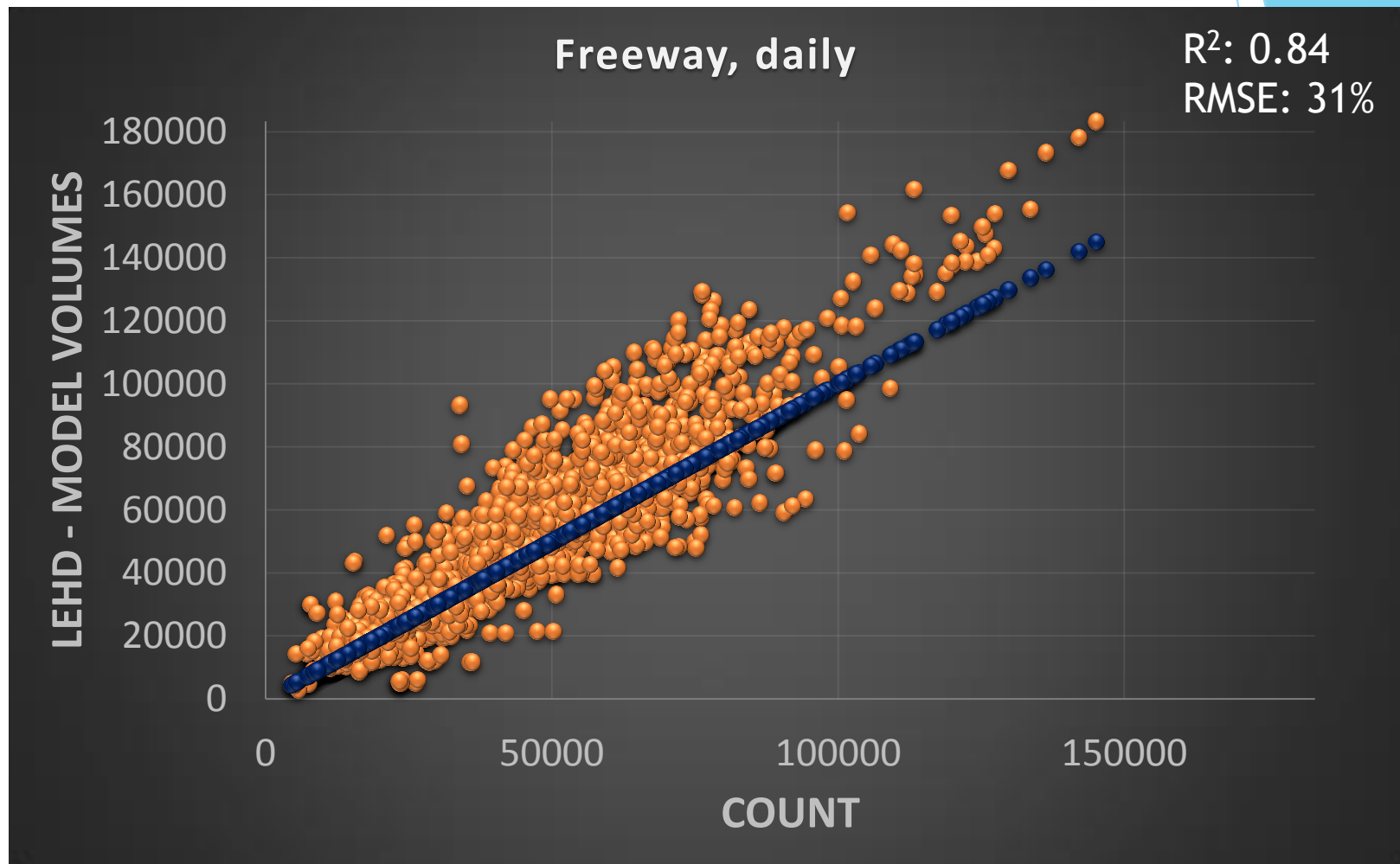
Comparing Roadway Results Freeway with Counts



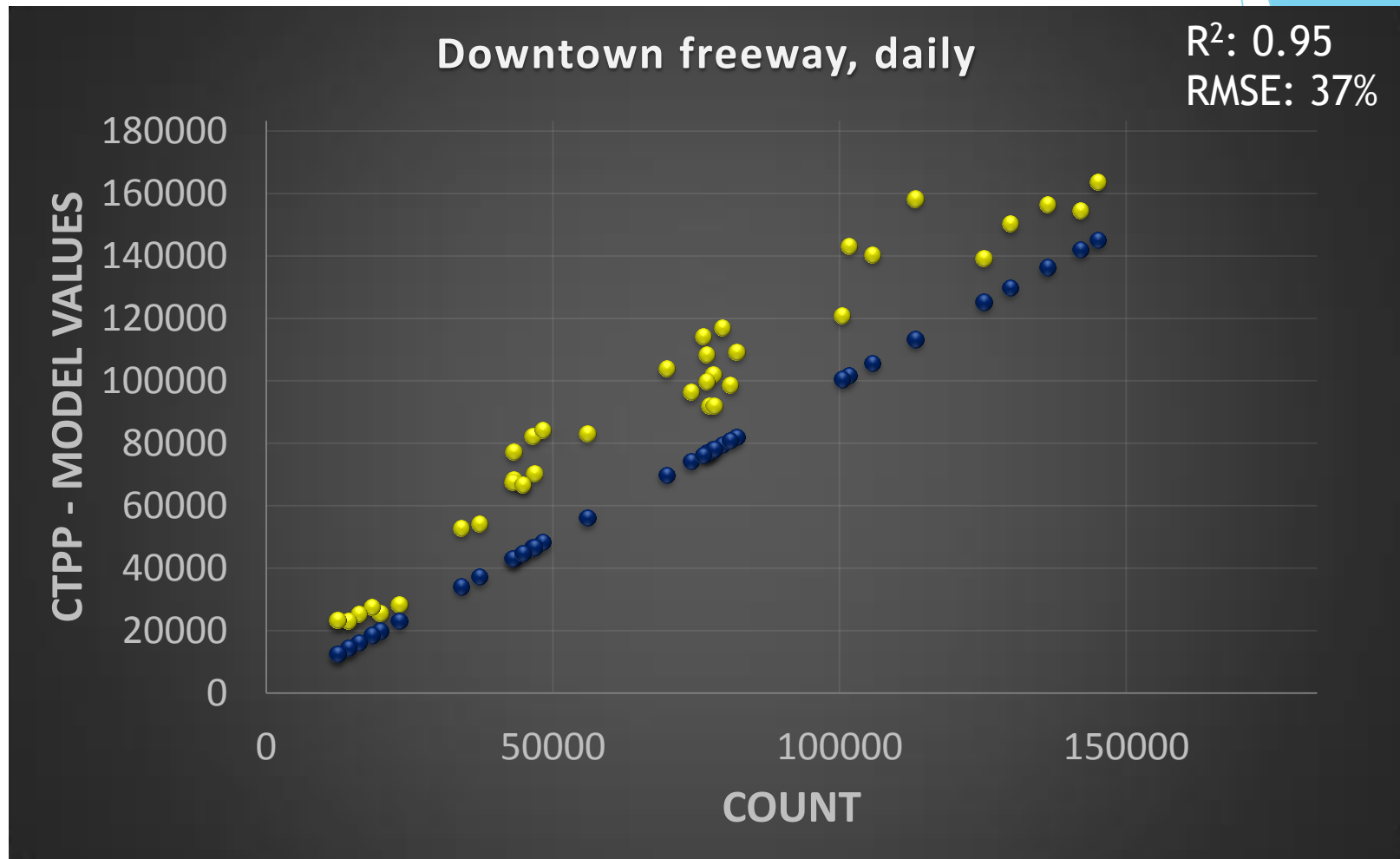
CTPP Distribution Model Run: Freeway Volumes vs Counts



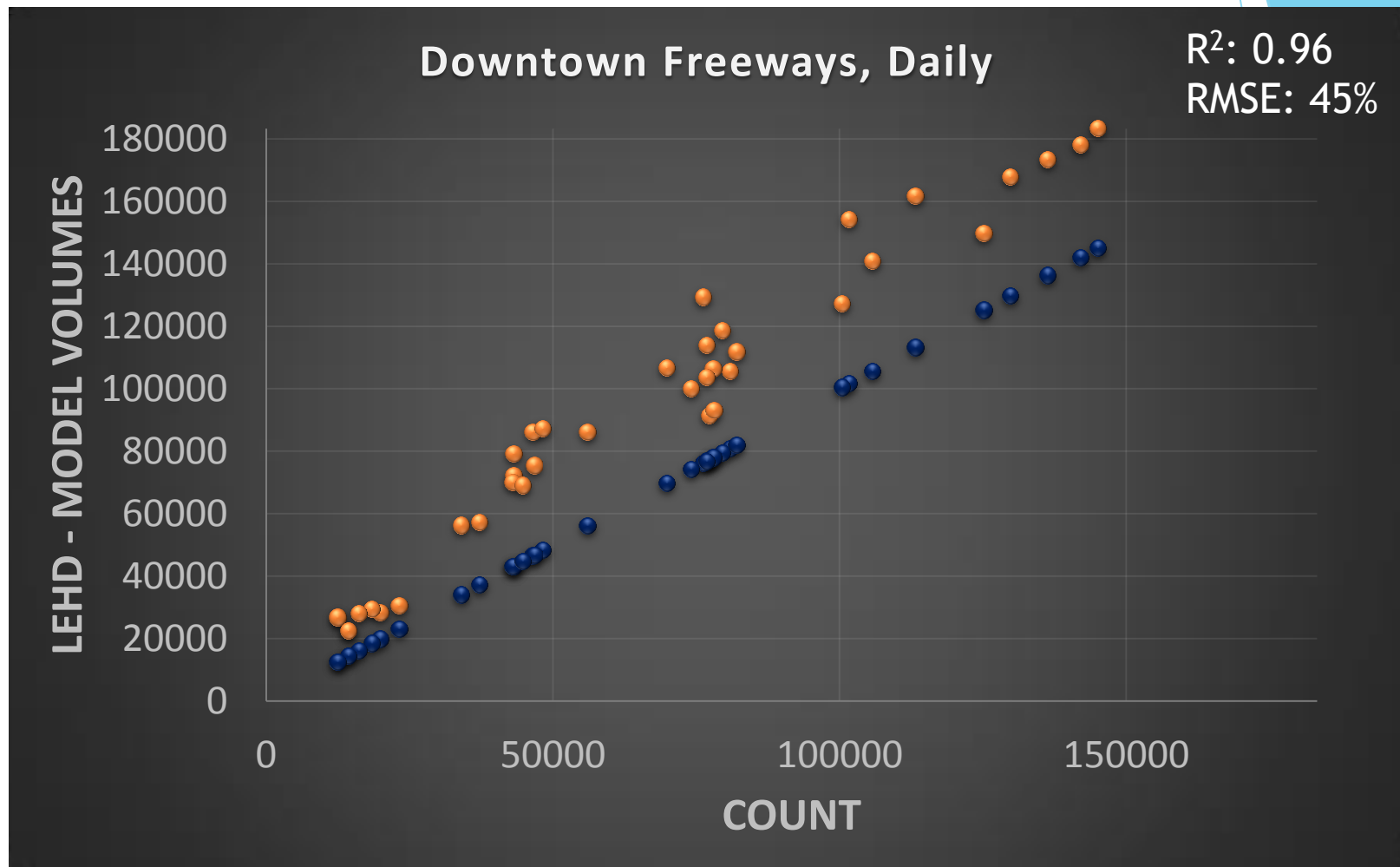
LEHD Distribution Model Run: Freeway Volumes vs Counts



CTPP Distribution Model Run: Downtown Freeway Vols vs Counts



LEHD Distribution Model Run: Downtown Freeway Vols vs Counts



Conclusions

- ▶ County shares differences of CTPP vs LEHD are not meaningfully different.
- ▶ Comparing tract shares of CTPP vs LEHD provide guidance to investigate specific tracts for employment.
- ▶ Using the LEHD distribution at small geographies for the employment distribution shows higher transit ridership, similar light rail ridership, and higher freeway volumes.
- ▶ Using the CTPP distribution at small geographies for the employment distribution shows similar transit ridership, light rail ridership and higher freeway volumes.

Future Work

- ▶ Investigate outlier tracts to understand source of large differences.
- ▶ Test alternate small geography distributions including
 - ▶ 2014 LEHD
 - ▶ CTPP at larger geography: Tract level distribution inherited homogeneously by nested TAZs
 - ▶ Hybrid CTPP/LEHD: CTPP Tract Level values distributed by LEHD at small geographies

Questions

- ▶ Arash Mirzaei, amirzaei@nctcog.org
 - ▶ Kathy Yu, kyu@nctcog.org
 - ▶ Liang Zhou, lzhou@nctcog.org
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- ▶ Special Thanks to Donna Coggeshall and Hong Zheng

