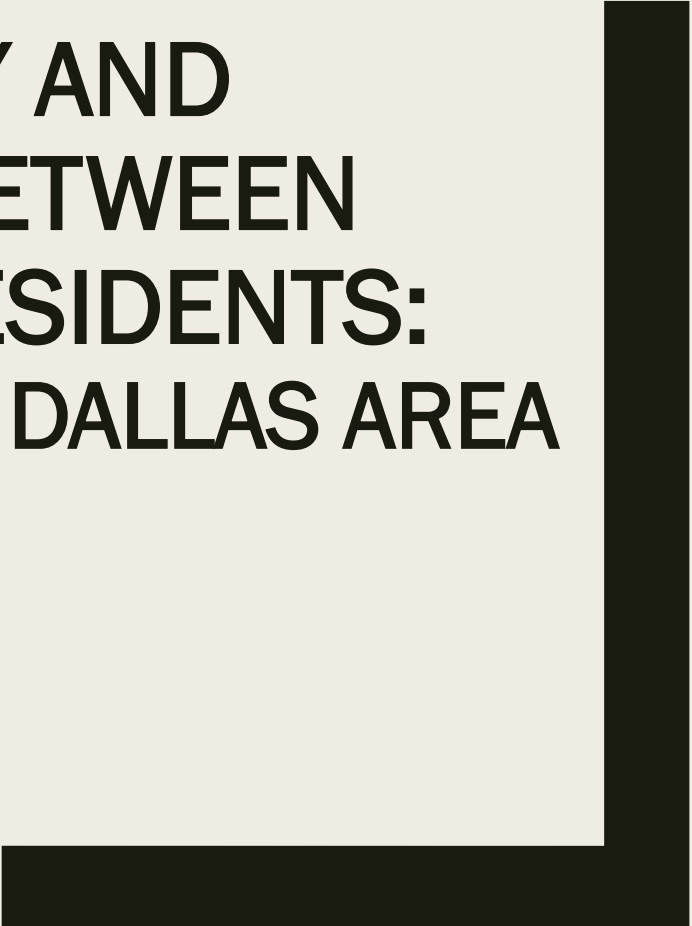


**TRANSIT ACCESSIBILITY AND
THE SPATIAL MISMATCH BETWEEN
JOBS AND LOW-INCOME RESIDENTS:
EMPIRICAL FINDINGS WITHIN THE DALLAS AREA**

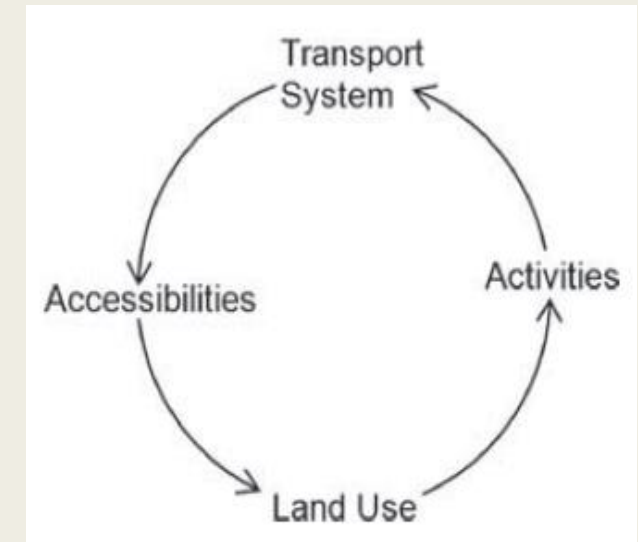
Reza Sardari, GISP | Shima Hamidi, PhD

College of Architecture, Planning and Public Affairs
The University of Texas at Arlington (UTA)



Social Equity and Accessibility

- **Job accessibility** is an important equity focus. (Cheng and Bertolini, 2013; Le Vine et al., 2013; Chen et al., 2014; Lin et al., 2014; Golub and Martens, 2014; Karou and Hull, 2014).
- **Land-use patterns** and the transportation system define the urban framework and, thus, affect transport accessibility (Wang and Chen, 2015, Sung et al., 2014) .
- Transportation investment can help reduce access poverty. (Wang and Chen, 2015; Golub and Martens , 2014).
- Lack of fair and appropriate **transport accessibility** might result in a **spatial mismatch** between social groups and social benefits (Blumenberg and Shiki, 2003).



Source: Wegener, 2004

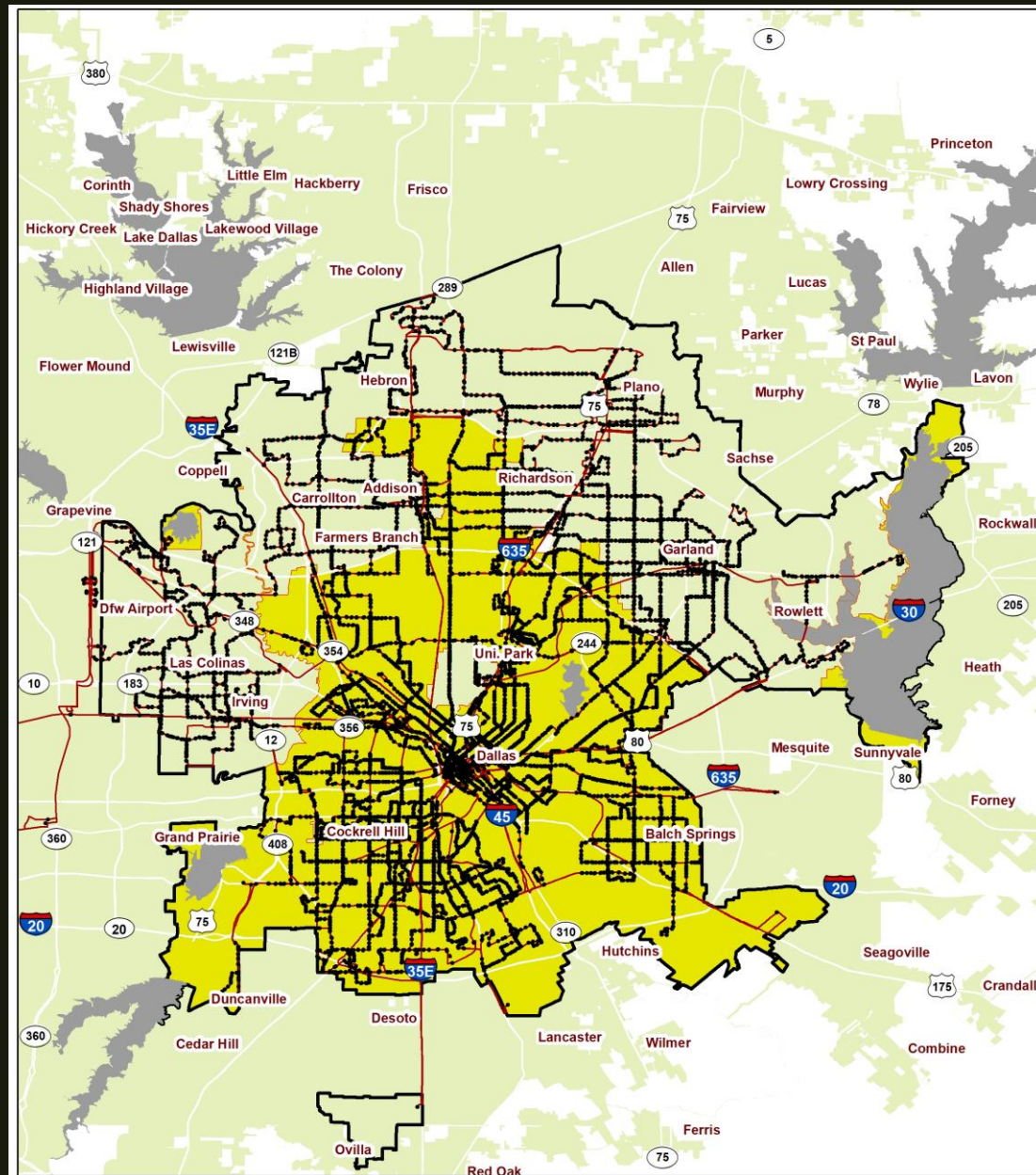
- John F. Kain (1965, 1968)
- The spatial mismatch hypothesis argues that geographical locations of employment diminish minorities' access to job opportunities, resulting in greater joblessness for minorities compared with non-minorities.
- [Richard Arnott, 1998](#)
- Economic Theory and the Spatial Mismatch Hypothesis
- The spatial mismatch hypothesis is that "Serious limitations on black residential choice, combined with the steady **dispersal of jobs from central cities**, are responsible for the low rates of employment and low earnings of Afro-American workers" (Kain, 1994, p. 371).
- **Blacks are constrained to live downtown but the matching jobs are growing in suburbia.**

Spatial Mismatch Hypothesis

DART STUDY AREA

Dallas Area Rapid Transit (DART)

- The service area consists of 13 cities
- Geographic Service Area: 700 square miles
- Dallas Area Rapid Transit (DART) is a regional transit agency authorized under Chapter 452 of the Texas Transportation Code and was created by voters and funded with a one-cent local sales tax on August 13, 1983.
- The DART ranks 23 out of 39 large and medium sized transit agencies in the US (APTA, 2014).

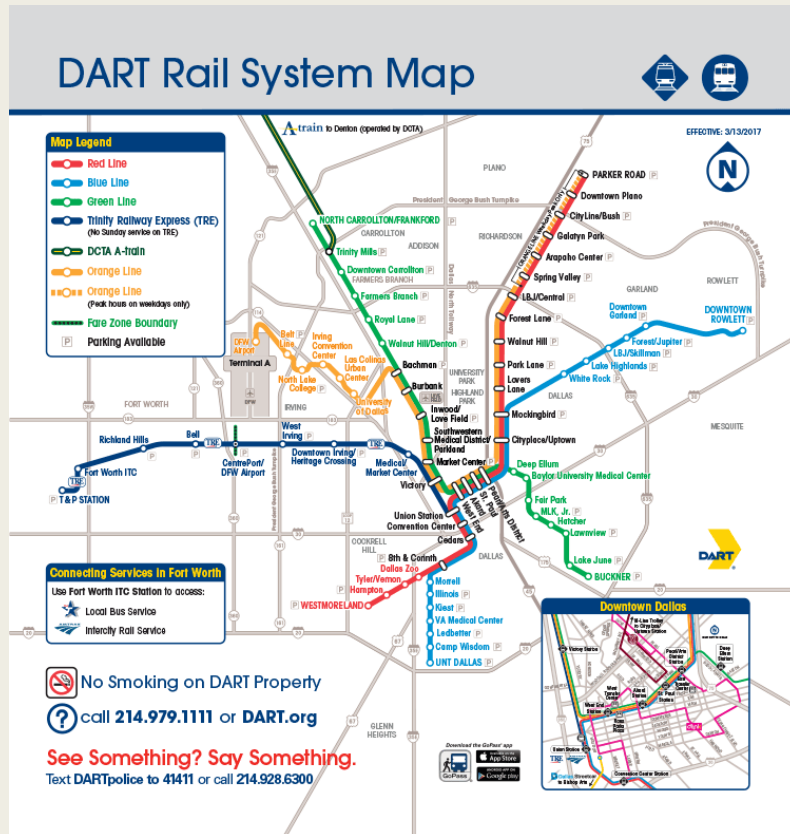


Legend

- DART System
- Transit Stations
- DART Service Area
- City of Dallas



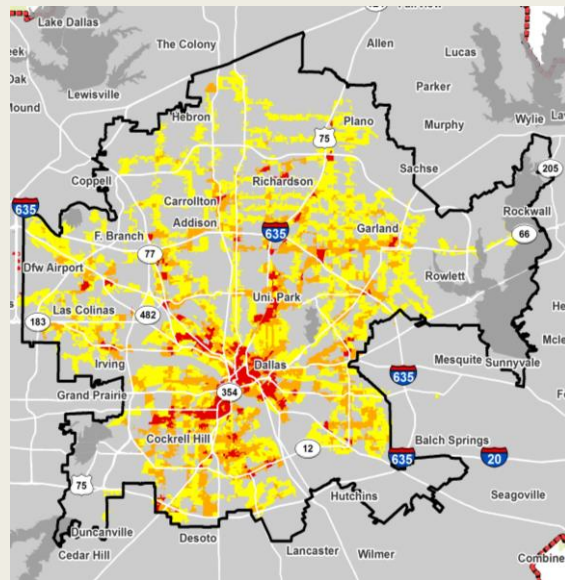
Socioeconomic Characteristics



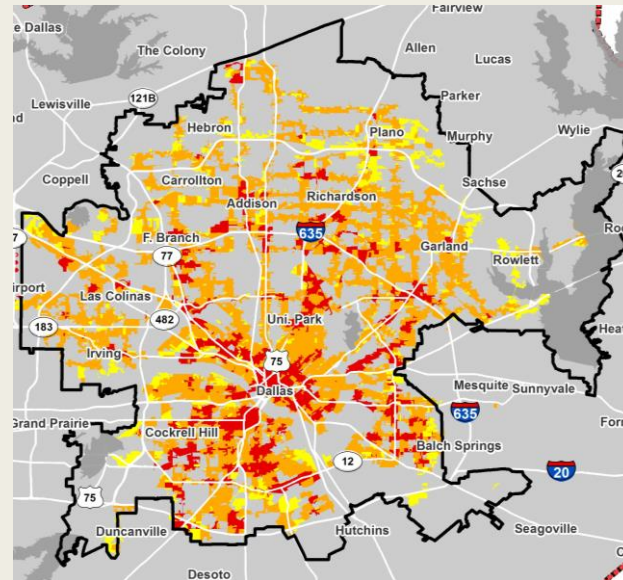
Measurements	City of Dallas	DART Service Area
Population 2014 (estimate, July 2014)	1,263,775	2,359,632
Households	475,879	868,857
Households with Kids	325,864	611,324
% Households with Kids	68%	70%
Jobs	865,985	1,644,811
Low Wage Jobs	163,147	303,692
% Low Wage Jobs	18.8%	18.5%
Workers	535,767	1,067,348
Low Wage Workers	123,063	230,805
% Low Wage Workers	23.0%	21.6%
Area (sq. mi.)	379	694
Density (pop/sq. mi.)	3,331	3,398
Block Groups	918	1,655
Stops	7,473	11,001

Coding GTFS Data in GIS

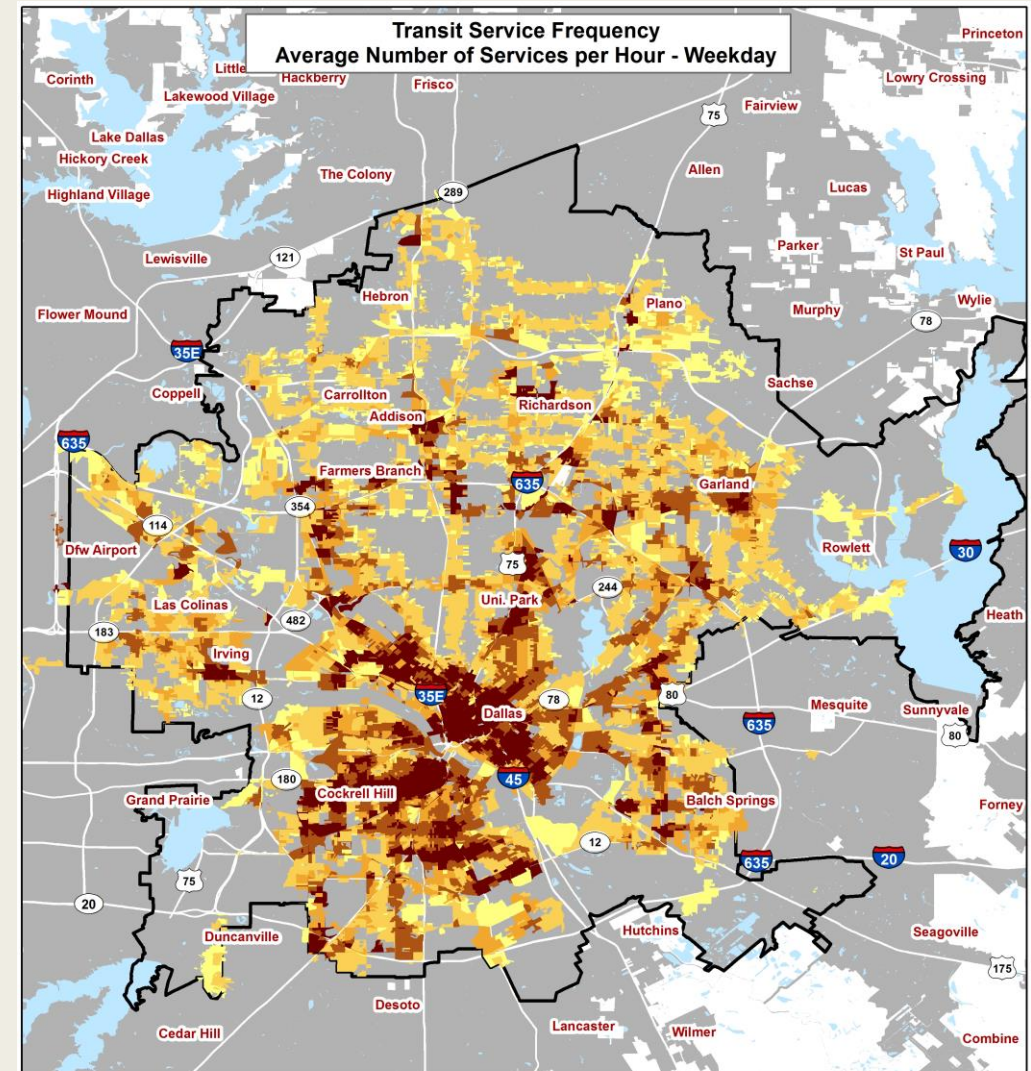
- Developing Multimodal Transit Network Using GTFS Data
- Analyzing Transit Service Frequency by Time of Day



Transit Service Frequency by Blocks (Midday: 11 AM to 13 PM)



Transit Service Frequency by Blocks (Evening Peak: 4 PM to 7 PM)



Legend

Transit Service Frequency
Average Number of Services per Hour*



* Note: Weekday (from 6 a.m. to 9 p.m.)

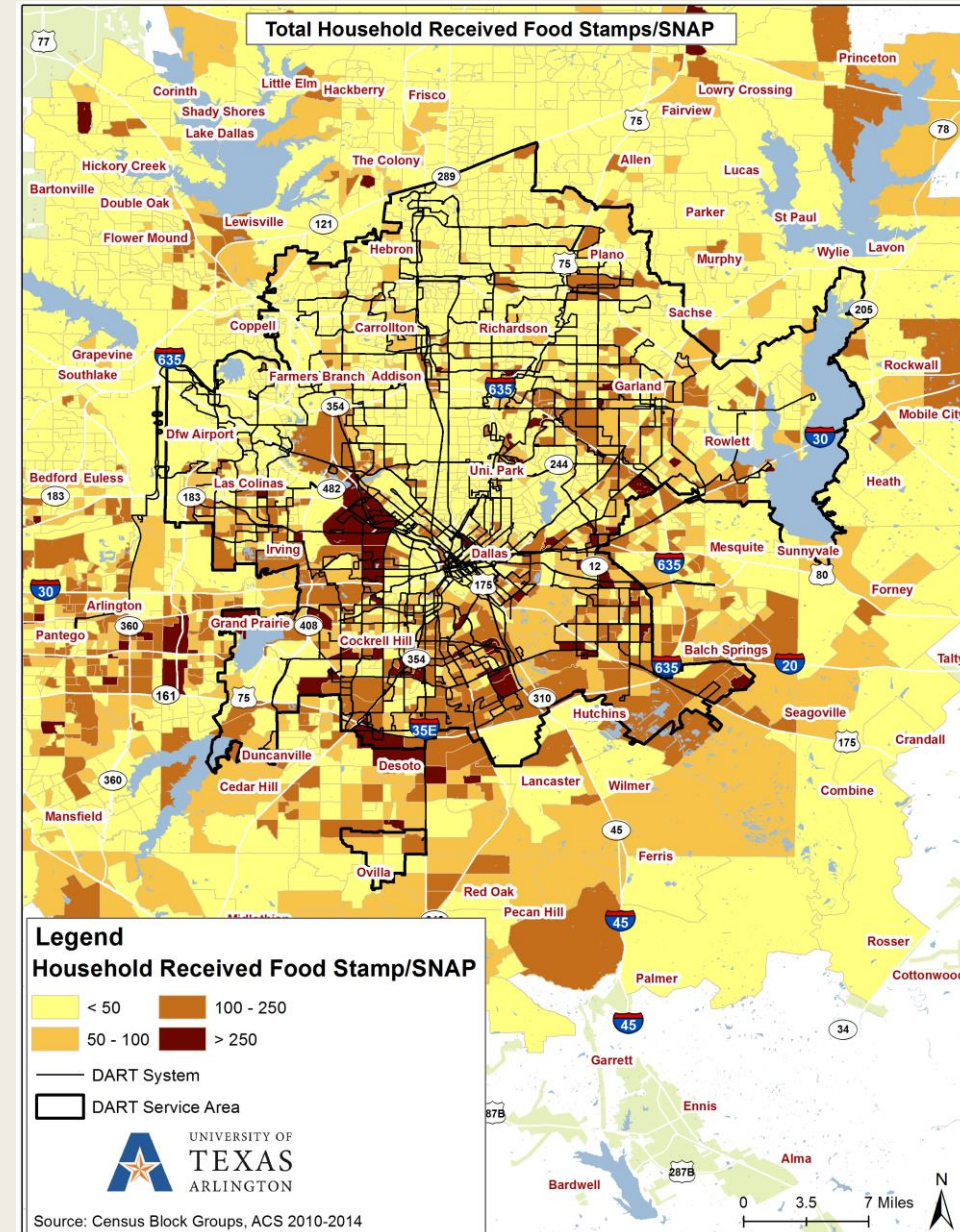


0 3 6 Miles

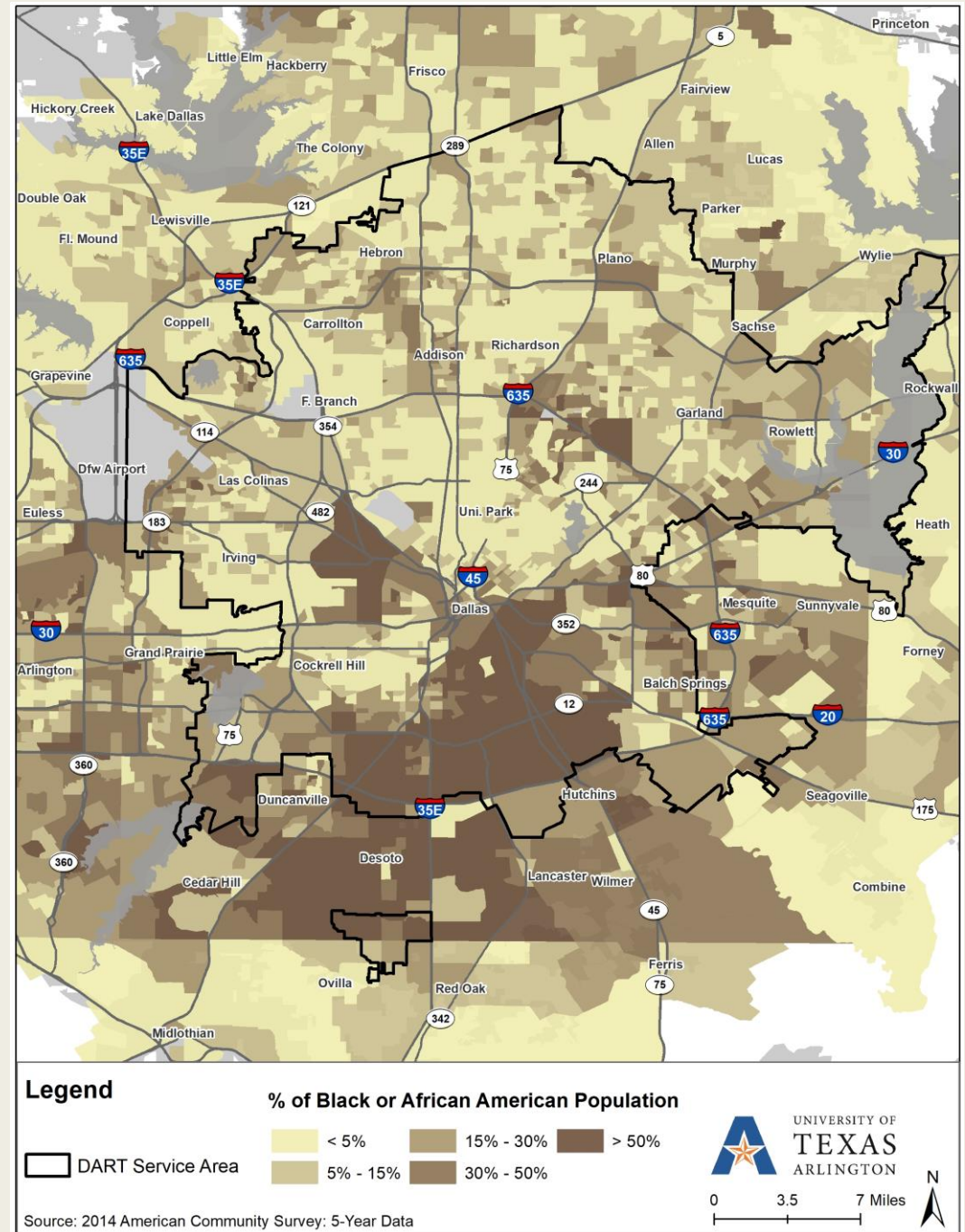
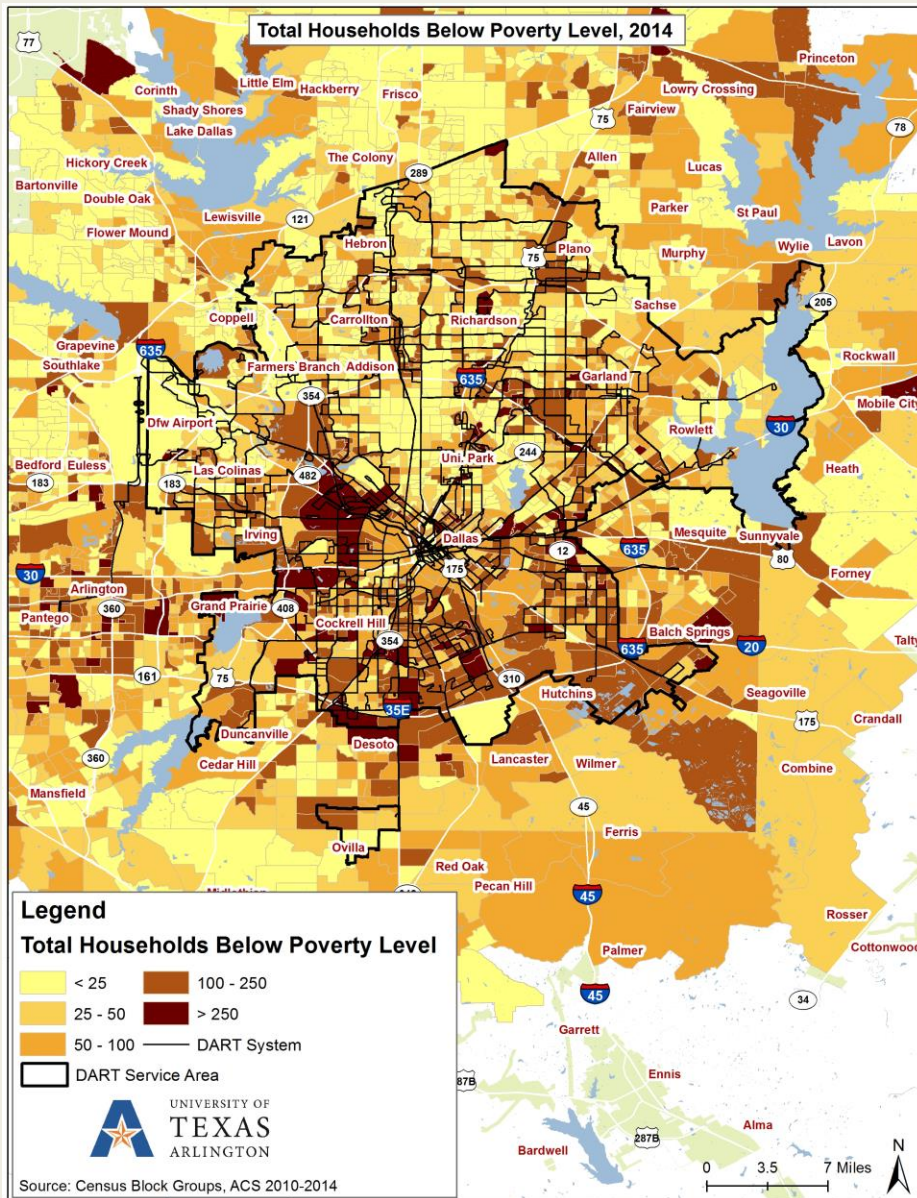


Identify Transit Dependent Population Using The Census Bureau Data

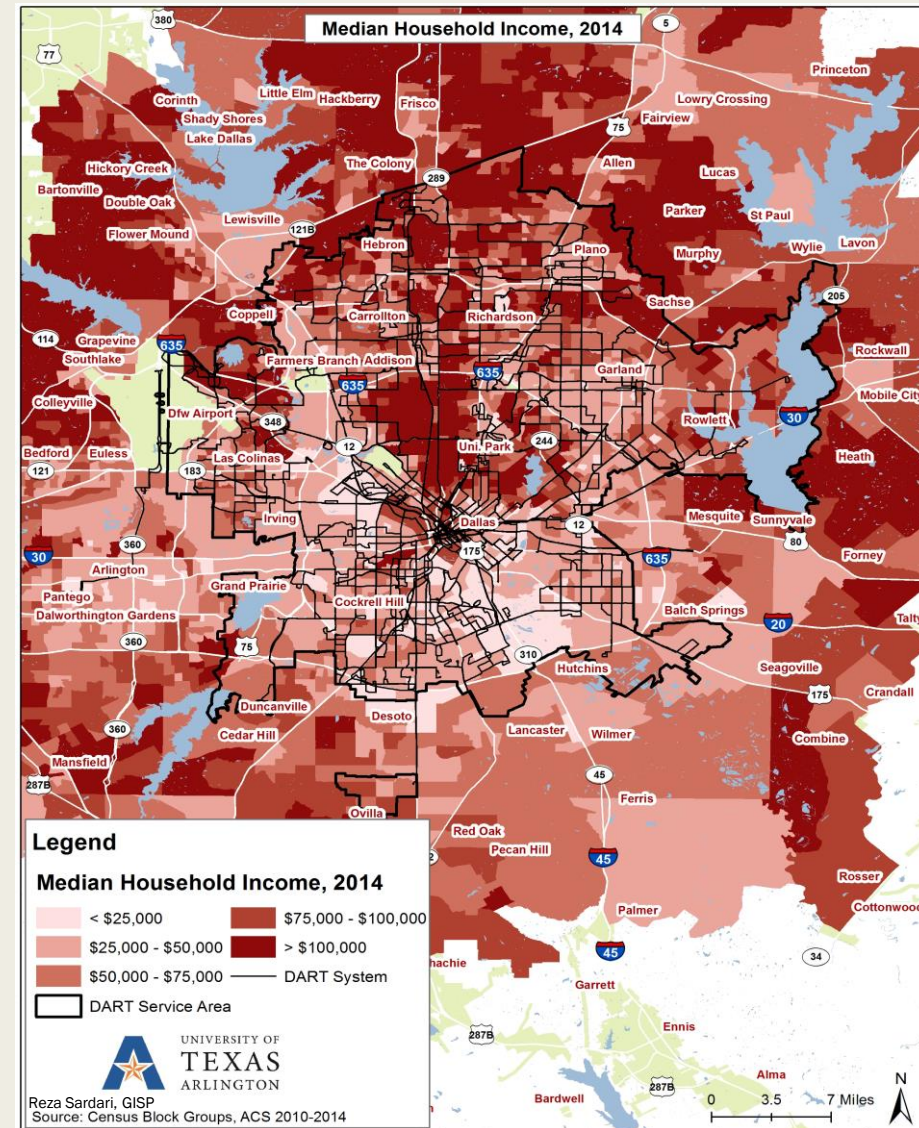
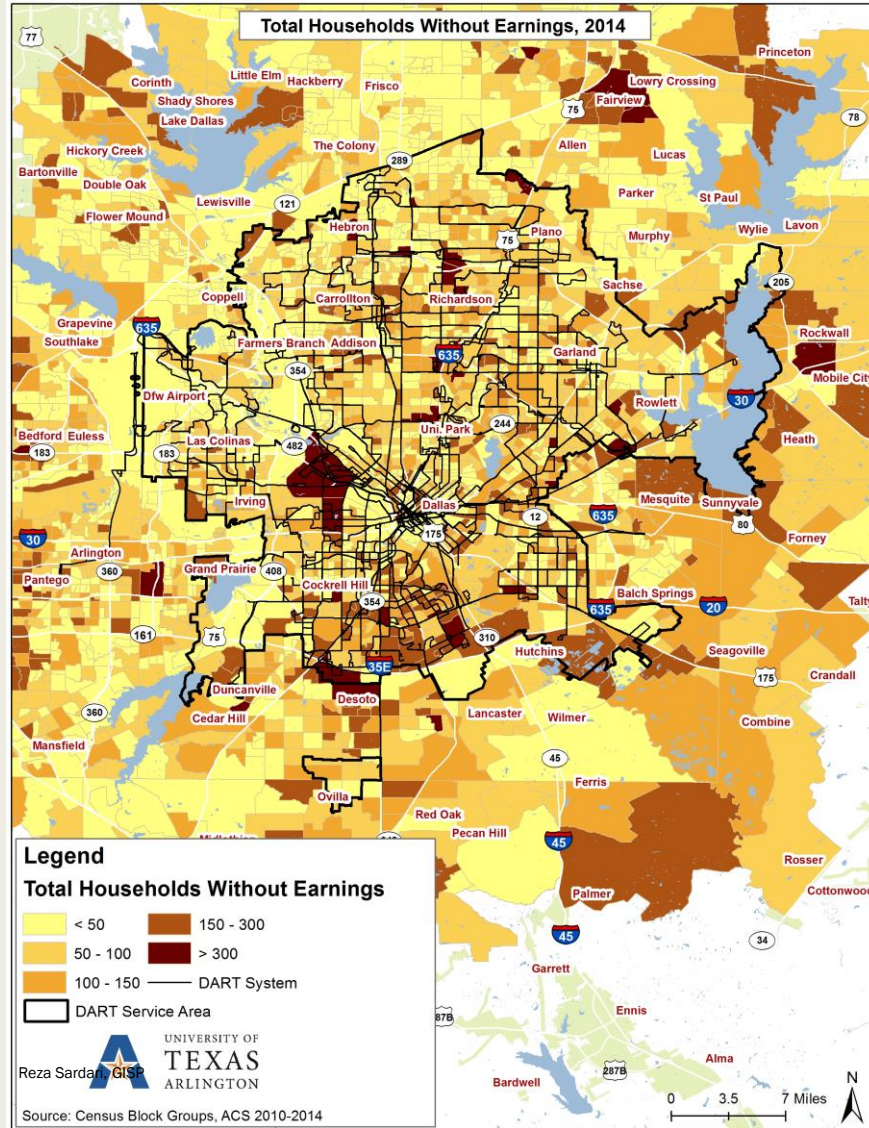
- Household Received Food Stamps/ SNAP
- Poverty Rate
- Race
- Household Median Income
- Households without earnings
- Vehicle Availability
- Means of Transportation to Work
- ...



Poverty & Race

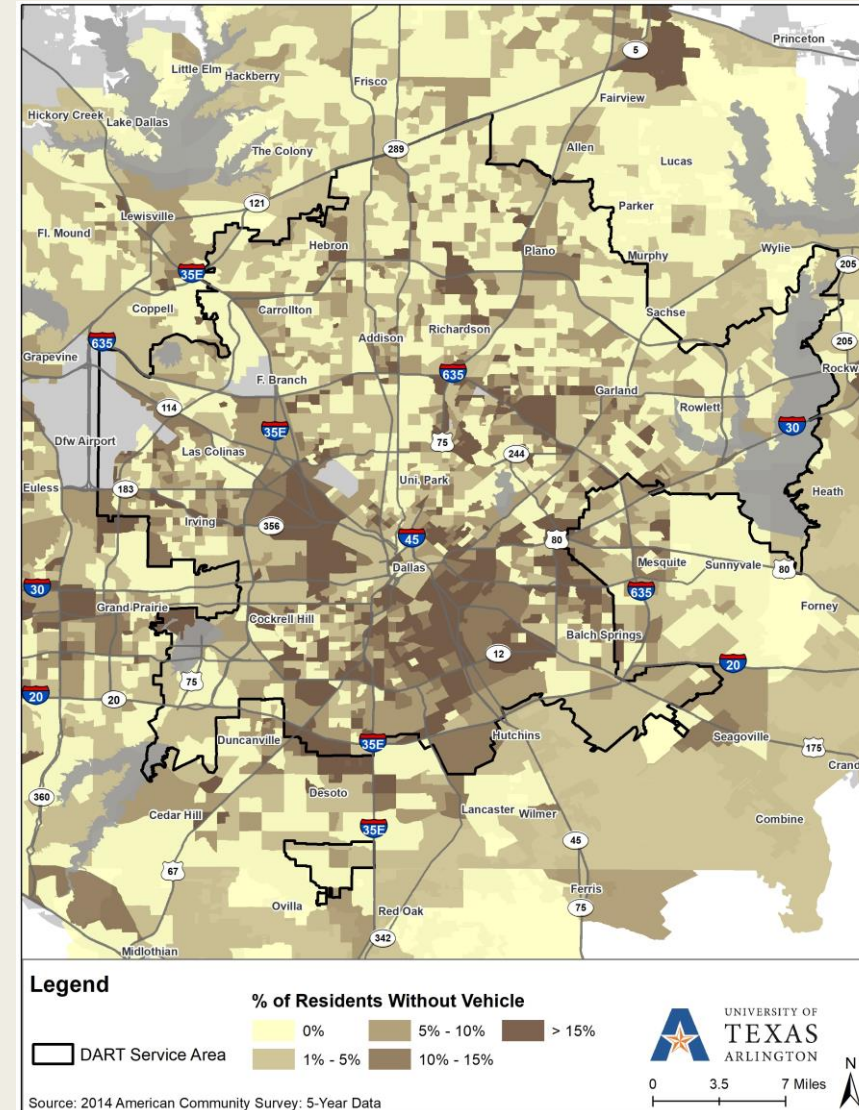
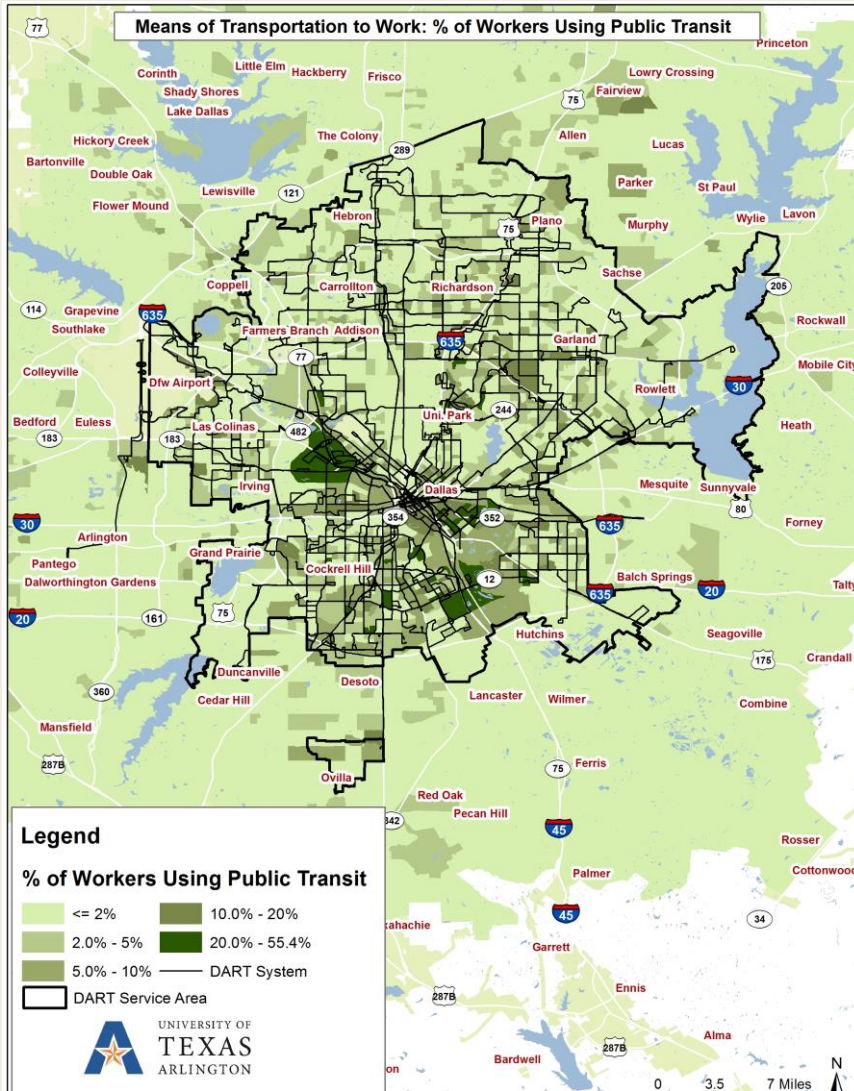


Analyzing The Census Bureau Data (Cont'd)



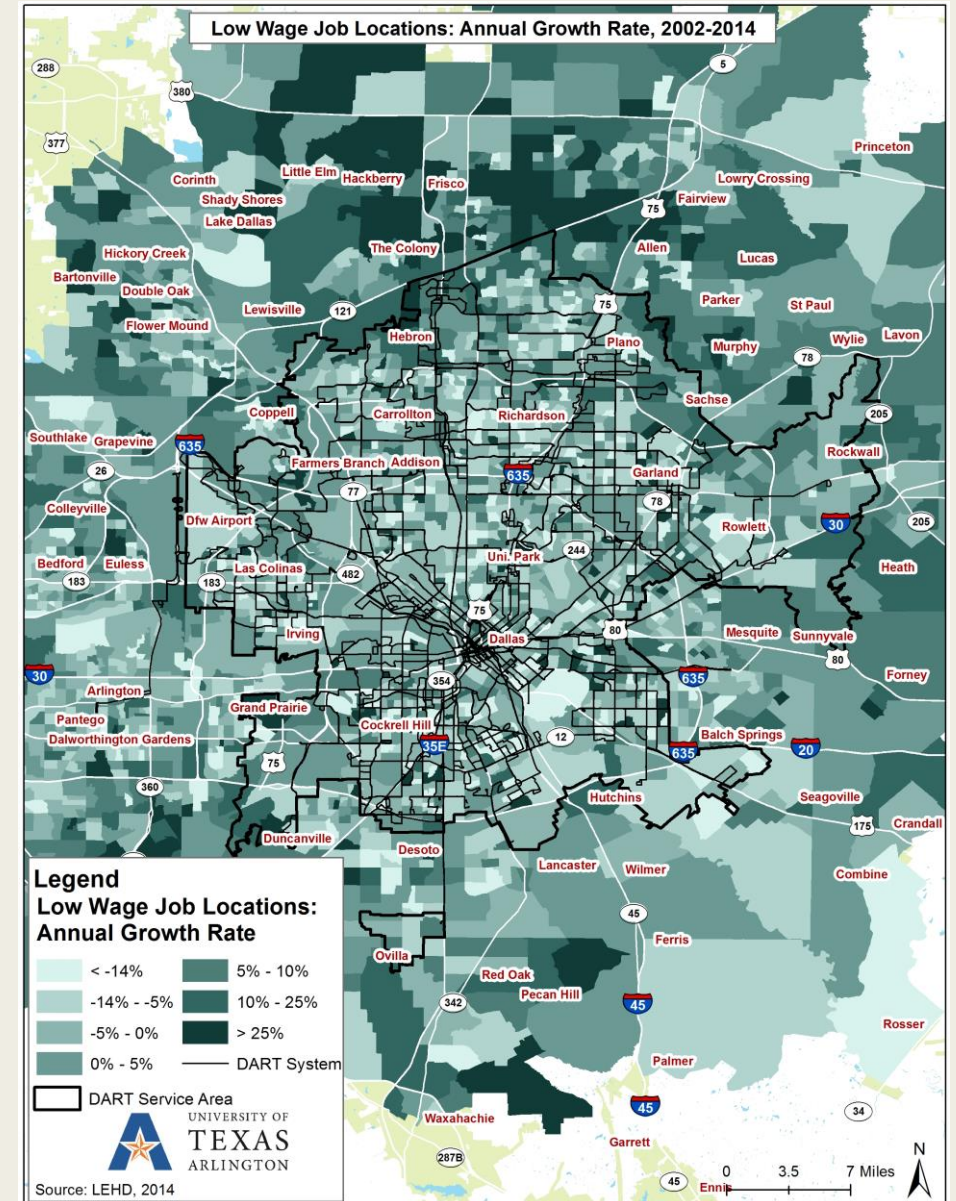
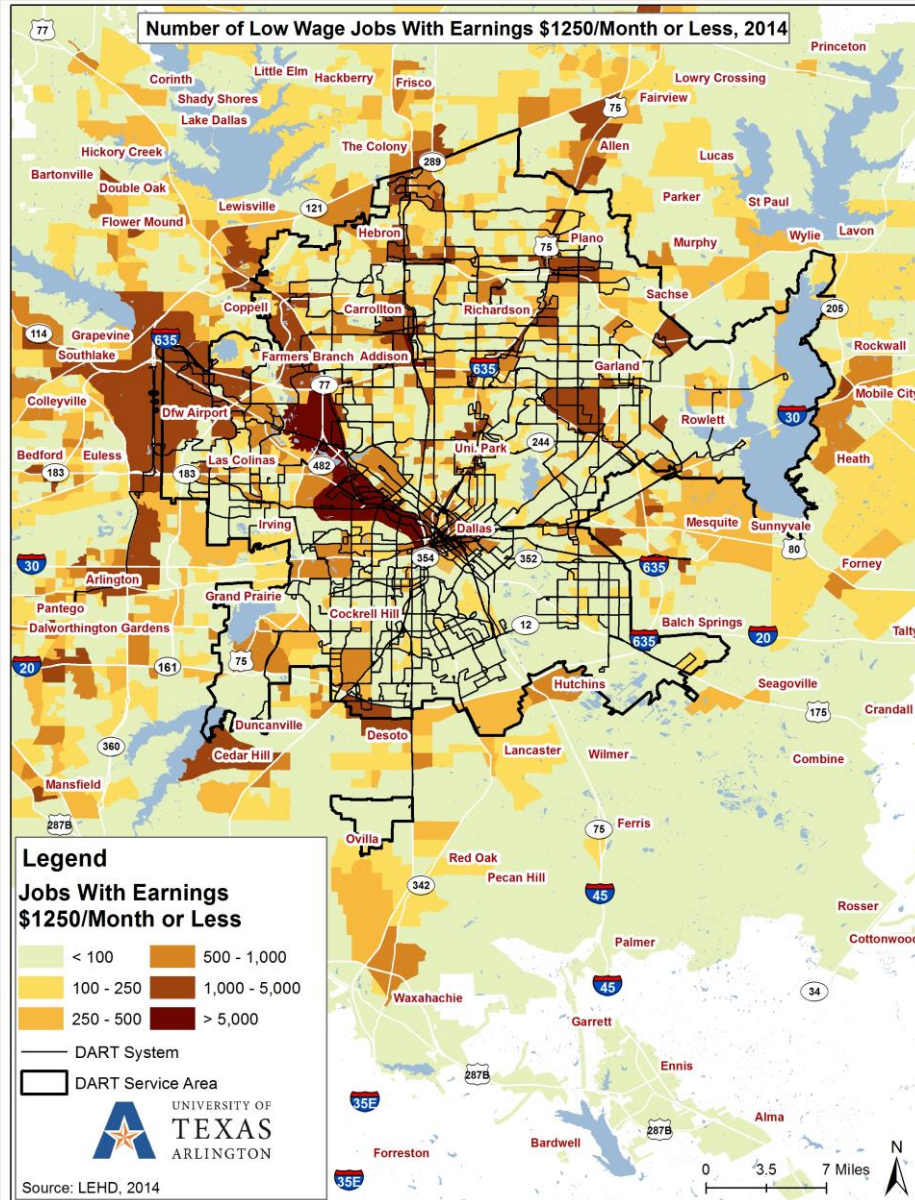
Analyzing CTPP Data:

Means of Transportation to Work & Vehicle Availability



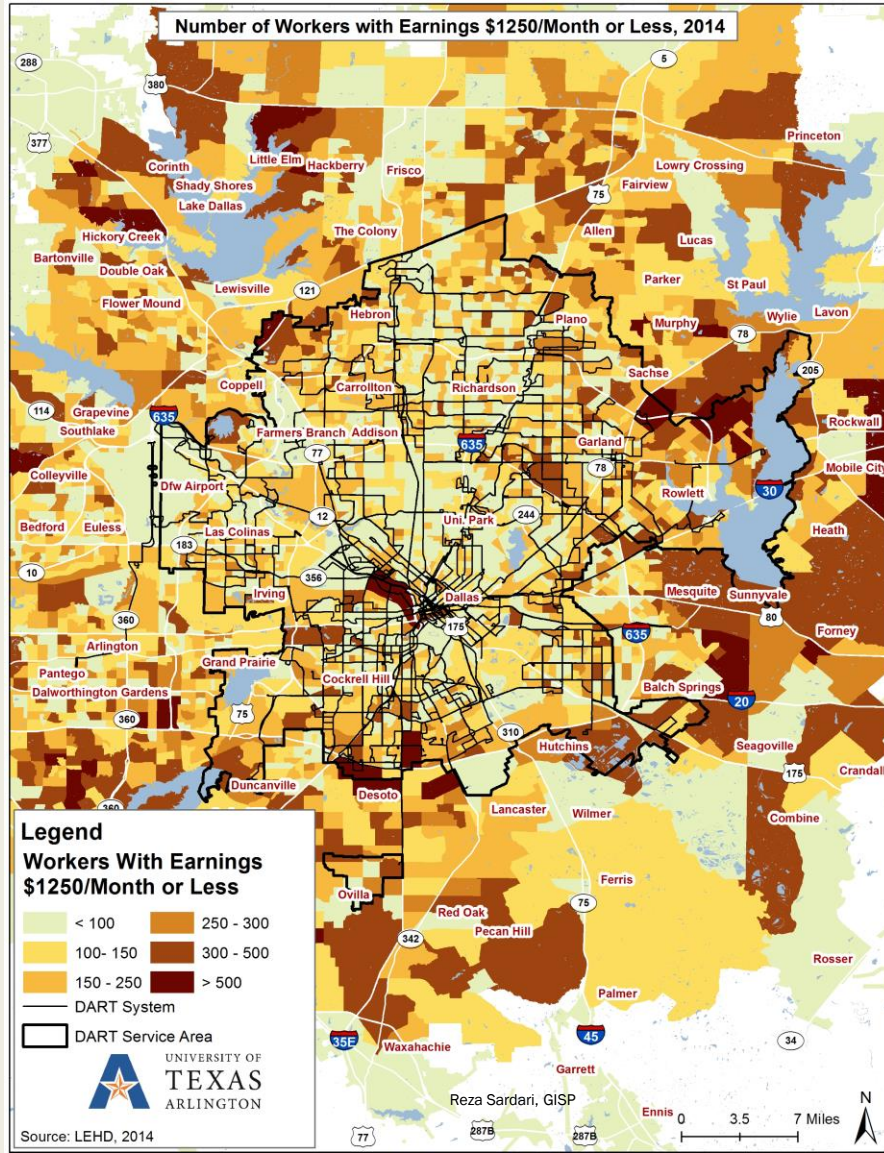
LEHD Data Analysis

Low Wage Jobs - CAGR

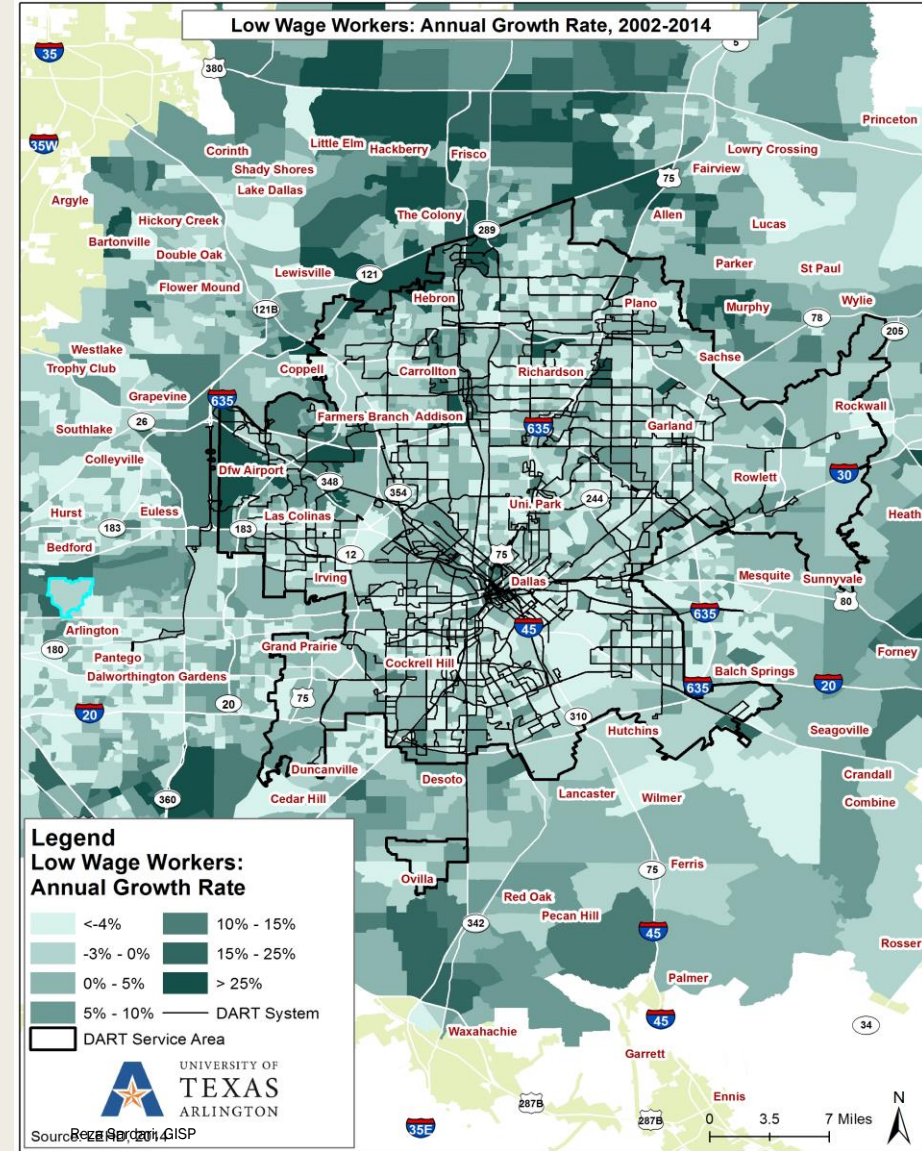


LEHD Data Analysis (Cont'd)

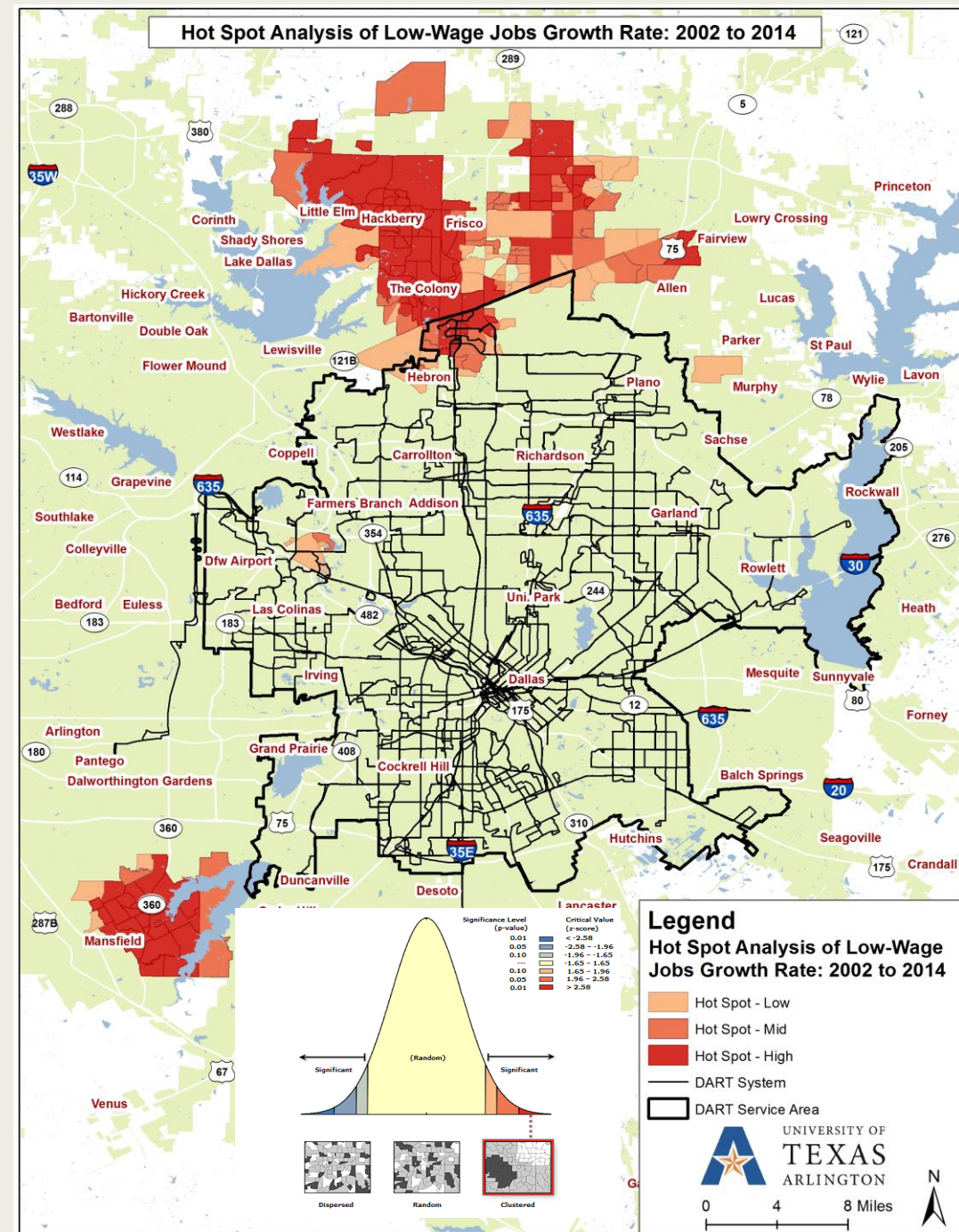
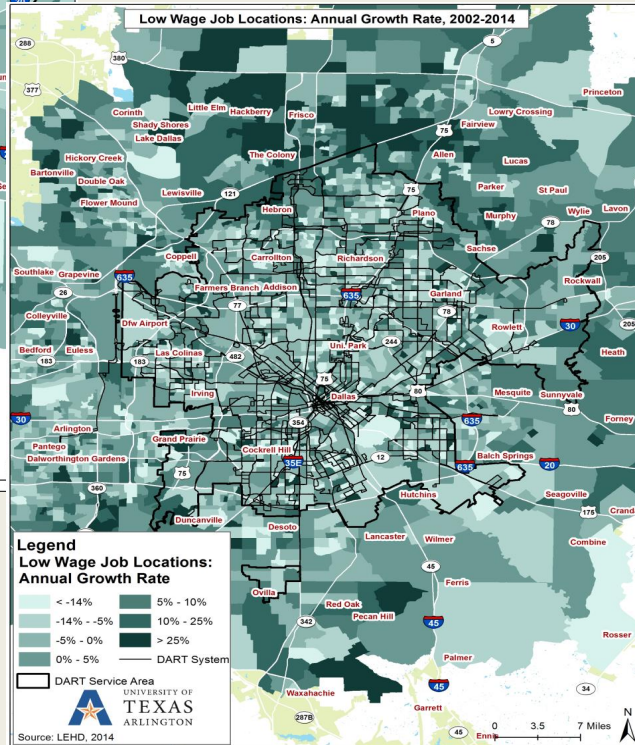
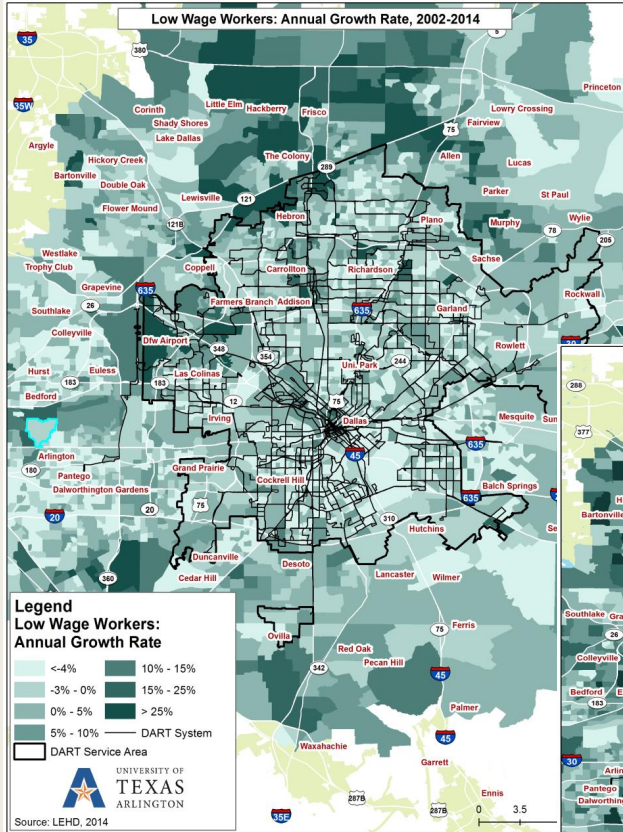
Low Wage Workers



Low Wage Workers CAGR

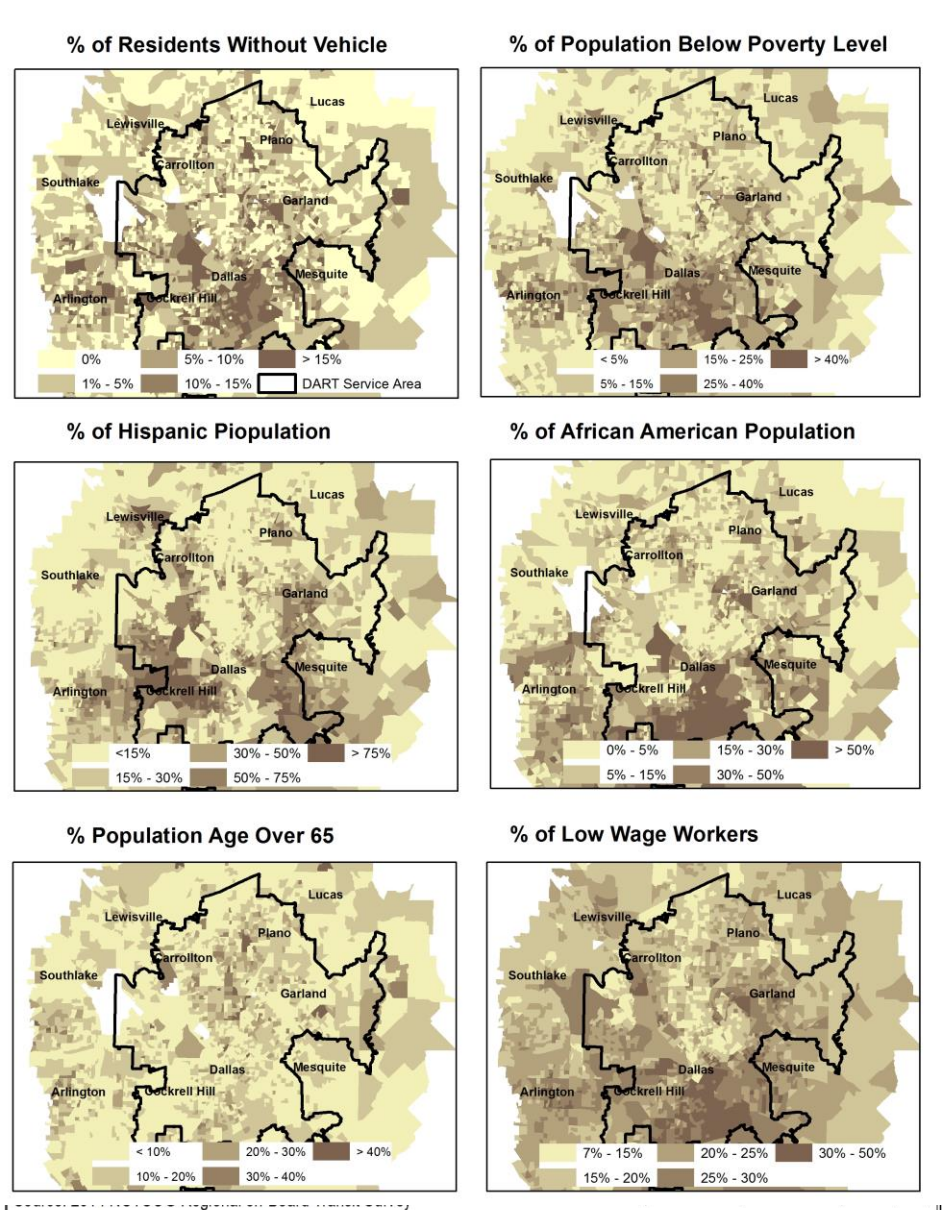


Hot Spot Analysis Using LEHD



Exploring Spatial Mismatch Theory

- U.S Census data, Longitudinal Employer-18 Household Dynamics (LEHD), the National Transit Database, and the North Central Texas 19 Council of Governments (NCTCOG) 2014 on-board transit survey data.

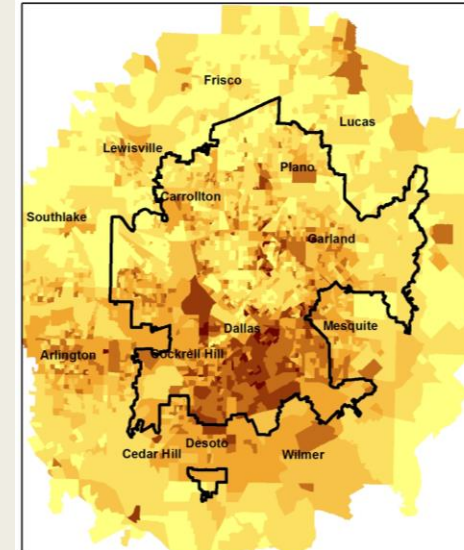


Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-3.076	0.525		-5.9	0.0		
black_ln	0.104	0.036	0.089	2.9	0.0	0.69	1.46
hisp_ln	0.168	0.047	0.109	3.6	0.0	0.68	1.48
noveh_ln	0.346	0.045	0.233	7.6	0.0	0.68	1.47
senior_ln	0.185	0.047	0.106	4.0	0.0	0.90	1.11
poverty_ln	0.181	0.049	0.129	3.7	0.0	0.53	1.90
lowrk_ln	0.394	0.2	0.066	2.0	0.04	0.56	1.77

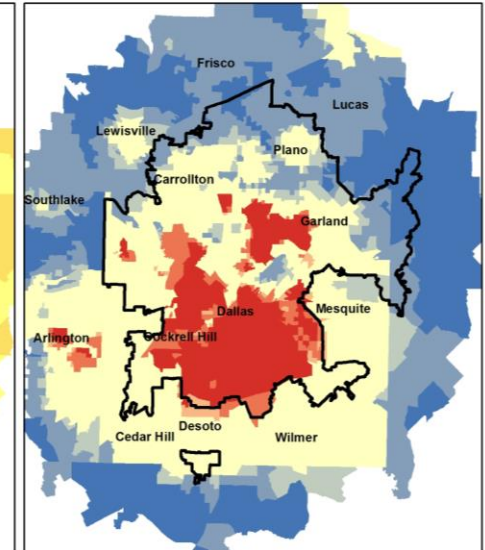
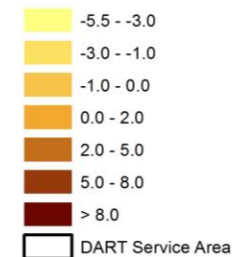
Identify Transit Demand Catchment Area

Hot Spots of Transit Demand and Measuring Spatial Autocorrelation

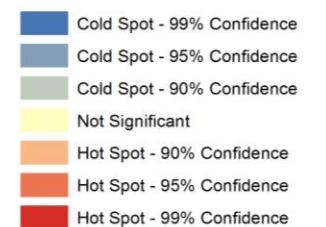
Variables (block group level)	Moran's Index	Z-score	P-value	Results
% of Black population	0.50	126.96	0.0	Clustered
% of Hispanic population	0.44	112.03	0.0	Clustered
% of senior population (age over 65 years)	0.11	29.13	0.0	Clustered
% of households without vehicle	0.22	55.98	0.0	Clustered
% of population below poverty rate	0.31	80.22	0.0	Clustered
% of low wage workers	0.44	113.34	0.0	Clustered



Z-Score of Transit Demand

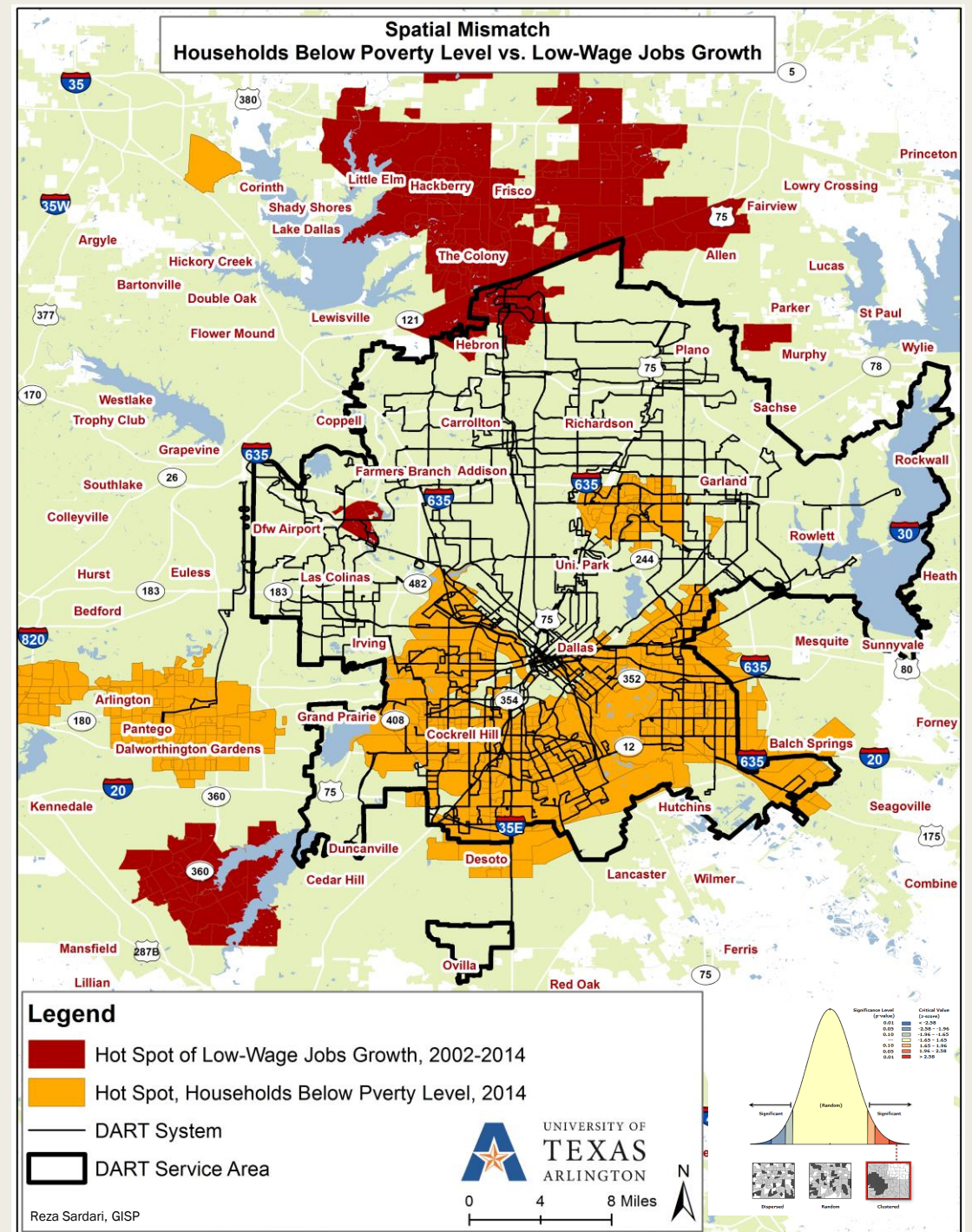


Hot Spots of Transit Demand



Results

- Spatial Mismatch Between Low-Wage Job Growth and Low-Income Residents
- Dallas' Income Inequality
- Access to the low-wage jobs can help the people in poverty for earning an income and supporting their way outside of poverty.
- Data:
 - Longitudinal Employer-Household Dynamics (LEHD 2002 to 2014)
 - Trends: Low-Wage Job Growth (LEHD Data)
 - The Census Bureau Poverty data
 - Poverty Rate (ACS, 2014 Data)
 - CTPP Mean of Transportation to Work



SPEED
LIMIT
30

Thanks

Bus Stop
347

