

Sustainability and Displacement: Assessing the Spatial Pattern of Residential Moves near Rail Transit

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Policy Issue

- Rail transit and neighborhood impacts are linked in the public mind
 - Gentrifying neighborhoods are disproportionately near rail transit in San Francisco Bay (Chapple, 2009)
- The concern about gentrification has been refocused on displacement
 - Are long-term, lower-income residents forced out of rail-proximate neighborhoods?



Previous research

- Works on displacement utilize either cross-sectional, simulation, longitudinal housing unit, or aggregated approaches
 - Cross-sectional approaches used to identify a relationship between transit-oriented development (TOD) and affordable housing (Cervero, 2008; Pollack et al., 2010)
 - Land use simulations used to forecast impact of rail transit on gentrification (Dawkins and Moeckel, 2014)
 - Aggregated and longitudinal analyses used to assess relationship between displacement and gentrification (Ellen & O'Regan, 2010; Freeman, 2005; Vigdor et al., 2002)

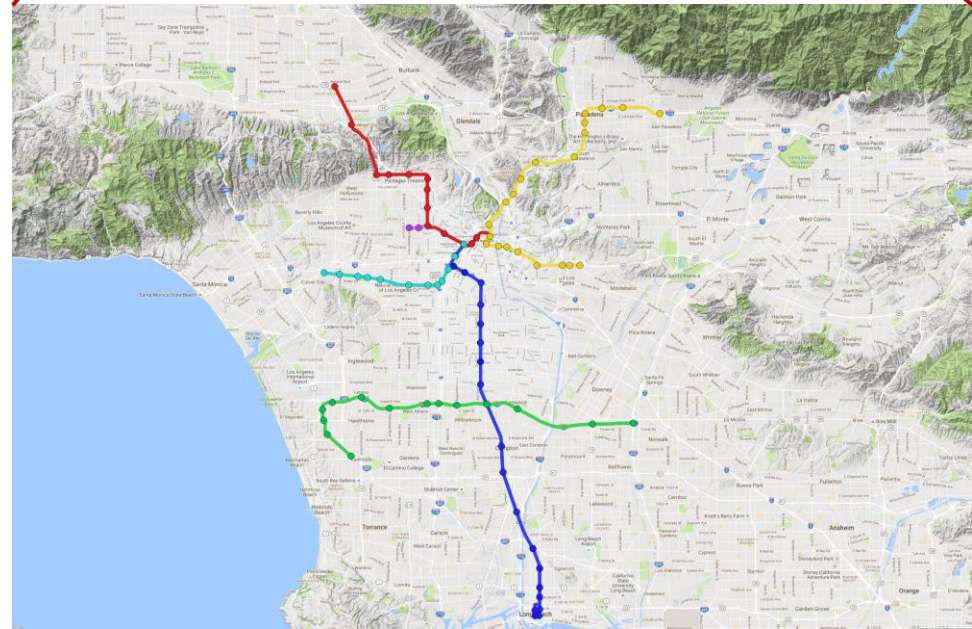
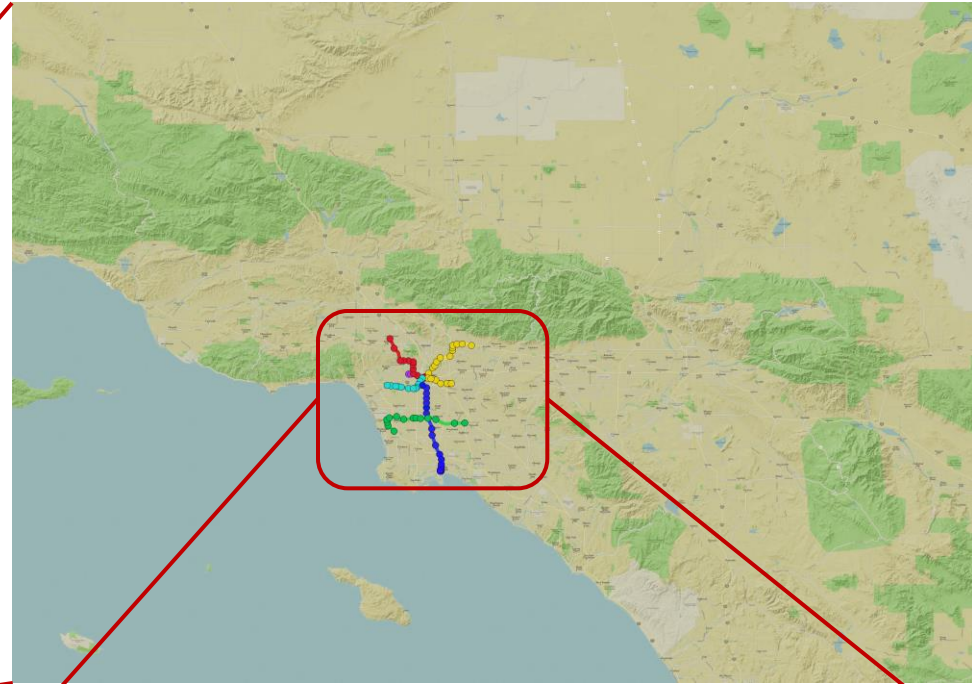
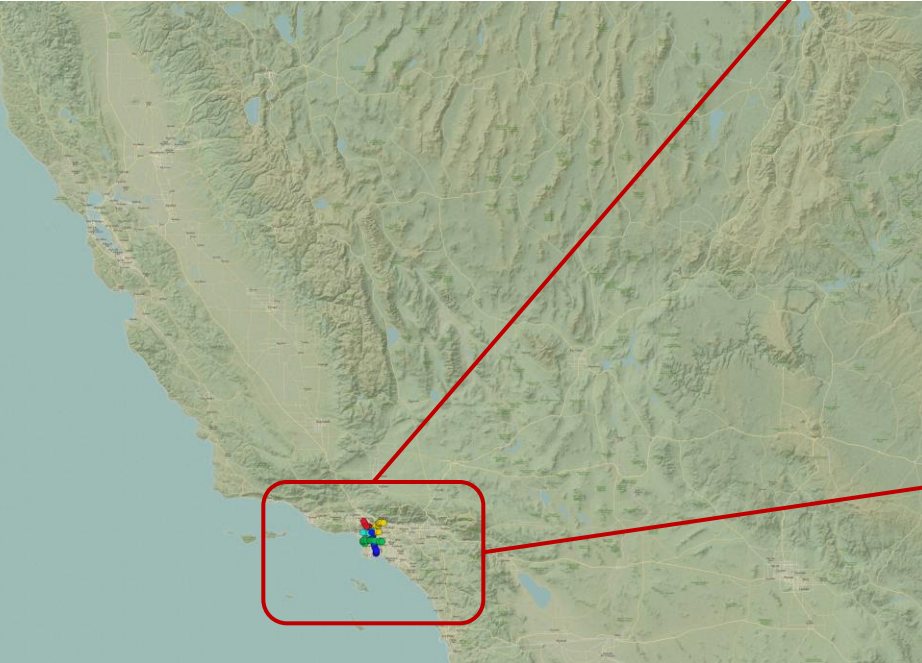


Research Objective

- Using geocoded California income tax information for LA County, we will:
 - Track individual households by income;
 - Analyze household mobility before and after rail investment occurs (station opening);
 - Develop a like for like counterfactual from the same dataset; and
 - Analyze displacement trends at frequencies as often as annual over several years.



Study Area



Methods

- DID approach
 - Monitor movement of tax filers before and after a rail station opening
- Select treatment variables
 - Halfmile buffer zones from sample of 10 LA Metro transit rail stations
 - Dates when individual transit stations opened as focal points
- Select control areas as counterfactual
 - Halfmile buffer zones of comparable areas outside rail influence (Schuetz, Giuliano, & Shin, 2016)

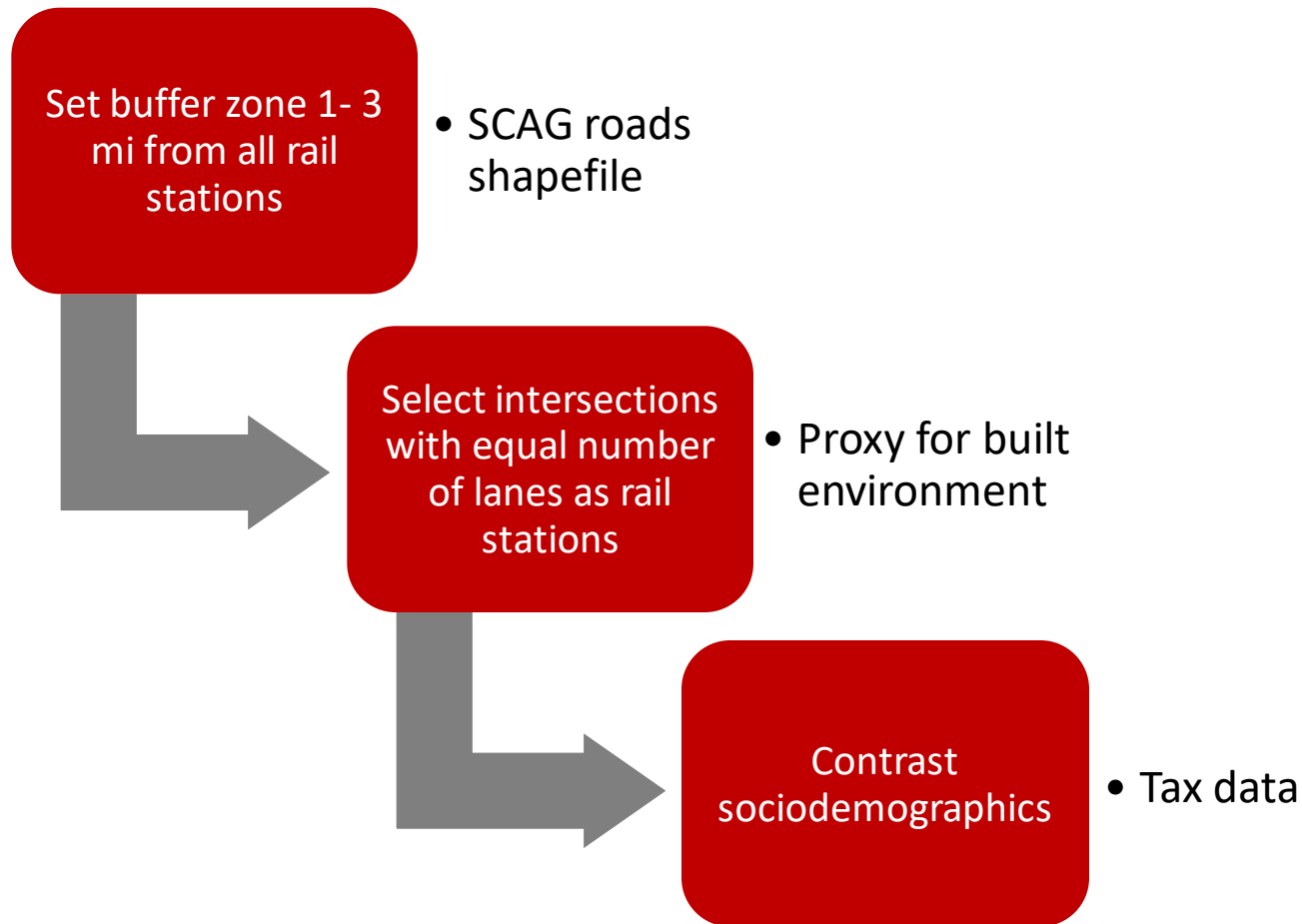


Data Construction

- Panel of ~140 million filing records over 21 years: anyone who has ever filed taxes in Los Angeles County in any year between 1993-2013
- Aggregated by station area / control area using 2 layer geocoding: distance to zip9 centroid and to zip5 centroid
 - Zip9 is ≤ 1 street block; accounts for the majority of the geocoding
 - Zip5 is a much larger geography, but is more fully covered in the dataset
- Stayers are filers who file taxes in the same station / control area in a set of 2 consecutive years (e.g., 1993 and 1994)
 - Out-movers: filed in station area in 1993, but not in 1994
 - In-movers: filed in station area in 1994, but not in 1993



Control areas

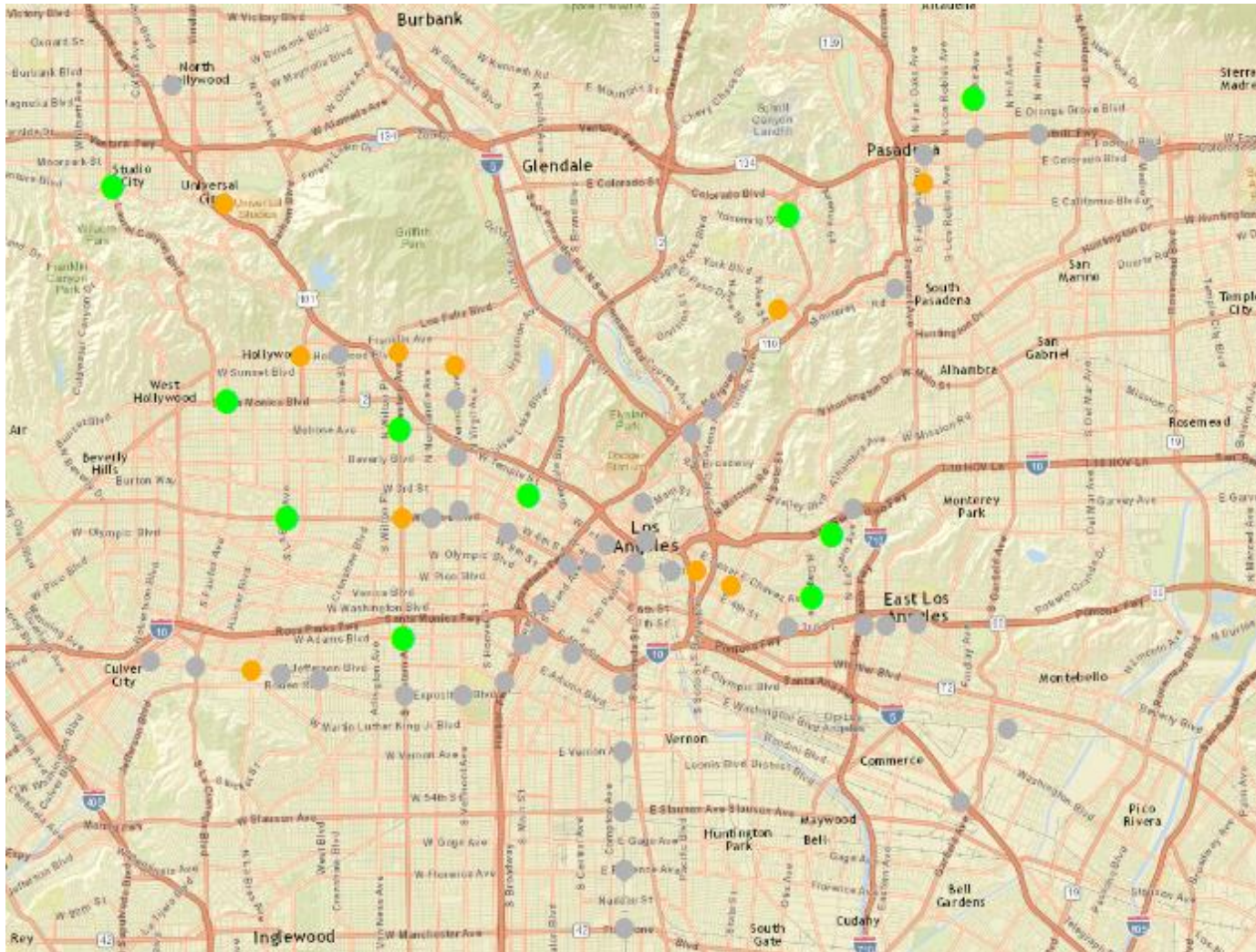


Treatment and Control Areas

Rail station	Paired control area
Del Mar	Mountain-Allen
Hollywood/Highland	Fairfax-Santa Monica
Highland Park	York-Yosemite
Hollywood/Western	Western-Melrose
La Brea	Jefferson-Western
Mariachi Plaza	Gaga-Chavez
Soto	Terrace-Hazard
Universal City	Ventura-Laurel Canyon
Vermont/Sunset	Beverly-Alvarado
Wilshire/Western	La Brea-Wilshire

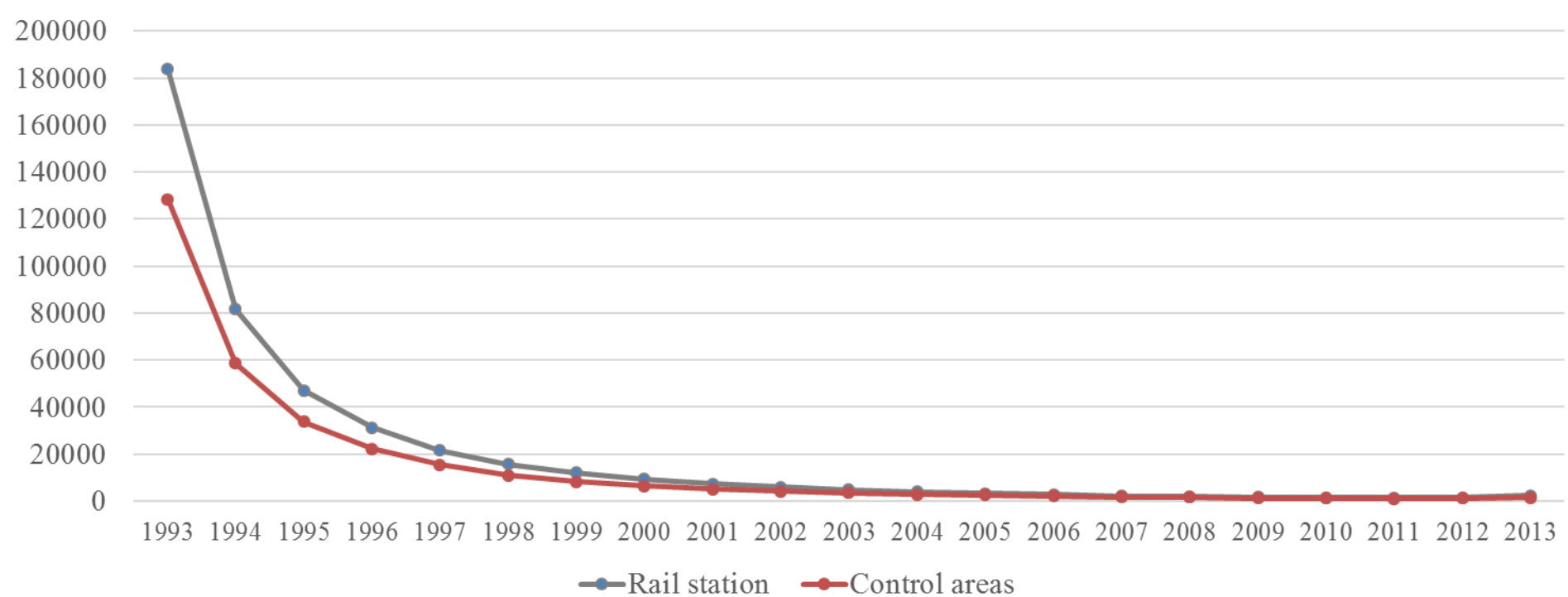


Treatment and Control Areas



Area comparison

Cummulative distribution



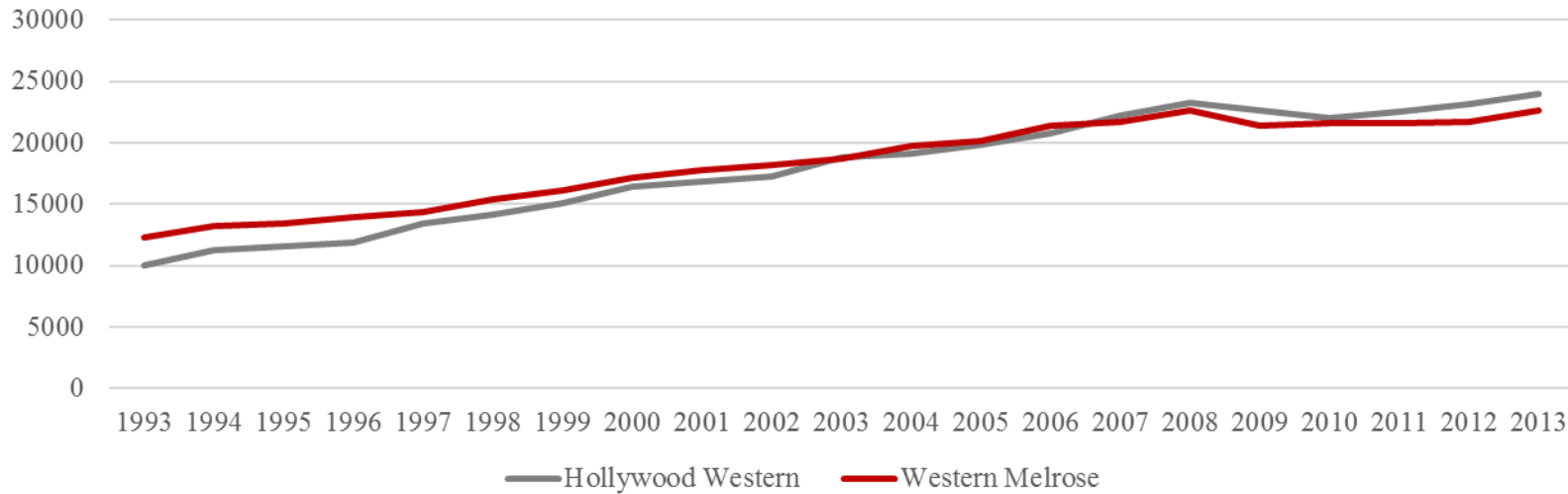
Total number of filers for rail: 443,439

Total number of filers for control areas: 314,802

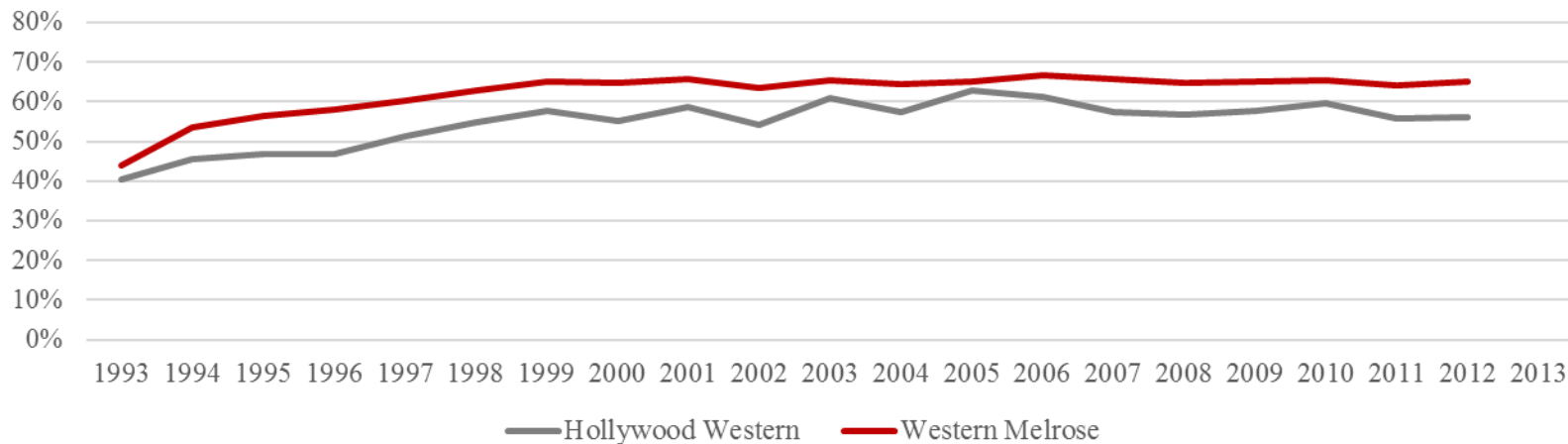


Area comparison

Median income trend



Trend in percent of stayers



Model Set-Up

$$Y_{it} = \alpha + \delta Treatment_{it} + \sum_{t-3}^{t+3} \beta_j Treatment_{it} + \sum_{n=1}^{n=21} \lambda_j Year_n + \sum_{z=1}^{z=20} \gamma_j Station_z$$

Where:

Y = percent of stayers

$Treatment$ = Interactive dummy for rail station open (1 = rail station open, 0 = control area or rail station close)

$Year$ = Fixed effects dummy year variable

$Station$ = Fixed effects dummy station variable



Regression results

Model 1: OLS, using observations 1-420 (n = 400)			
Heteroskedasticity-robust standard errors, variant HC1			
Variable	Coefficient	Std. Error	p-value
const	0.59544	0.01186	8.5E-163 ***
treatment	-0.025330	0.010183	0.0133 **
treatment_plus0	0.011935	0.006904	0.0847 *
treatment_plus1	0.005629	0.006575	0.3925
treatment_plus2	0.019782	0.006899	0.0044 ***
treatment_plus3	0.007106	0.008652	0.412
treatment_minus1	-0.015187	0.010015	0.1303
treatment_minus2	-0.009135	0.008042	0.2568
treatment_minus3	-0.006224	0.008754	0.4775
y1993	-0.169698	0.020765	5.48E-15 ***
:			
:			
y2011	0.00317565	0.008102	0.6953
sa_DM	-0.0223848	0.014056	0.1122
:			
:			
sa_CA11	0.112665	0.010997	9.77E-22 ***
R-squared	0.879854		
Adjusted R-squared	0.864198		
F(46, 353)	69.86735		
P-value(F)	4.90E-150		



Concluding remarks and next steps

- The presence and opening of rail transit stations can have a negative and significant effect over the rate of “staying” households in neighborhoods
 - TOD could increase displacement
 - Baseline household movement is larger than expected
- Next steps:
 - Develop more systematic approach to select control areas (e.g. propensity score matching)
 - Analyze displacement trends in further detail



Questions? Comments?

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