

Developing a New Methodology for Analyzing Potential Displacement



Research Team

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Presentation Outline

(consistent with chapters in the final report)*

1. Literature Review of Gentrification, Displacement, and the Role of Public Investment
2. Analysis of Historic Patterns of Neighborhood Change
3. Developing Tools for Analyzing Potential Displacement Impacts in Sustainable Communities Strategies (SCS)
 - UrbanSim model (for the Bay Area region), PECAS model (for the LA region), and off-model tools (developed by researchers)
4. Effects on Auto Use of Household Displacement from Rail Station Areas
5. Anti-Displacement Policy Analysis
6. Project Conclusions

* https://www.arb.ca.gov/research/single-project.php?row_id=65188

1. Literature Review of Gentrification, Displacement, and the Role of Public Investment

Literature Review

- Trends in mobility and neighborhood segregation
- Dimensions of neighborhood change
 - Neighborhood decline
 - Neighborhood ascent and gentrification
 - The role of public investments
- Understanding displacement
 - Definitions
 - Measurement
 - Indicators
- Urban simulation models
- Toolkits

Lit Review Findings

1. Neighborhoods change slowly, but are becoming more segregated by income
 - Racial integration is increasing, particularly in growing cities
2. Gentrification is characterized by new real estate investment and an influx of new residents with higher income and educational levels
3. Public investments are related to real estate premiums and demographic change
 - Well documented: rail stations (on housing and commercial prices), schools, parks, highways
 - Emerging evidence: bus rapid transit (BRT)

Lit Review Findings (*cont.*)

4. Displacement occurs when households are compelled to leave their unit and/or neighborhood for reasons beyond their control
 - Disinvestment-related (e.g., substandard housing)
 - Investment-related (e.g., raised rent)
 - Exclusionary (i.e., loss of affordability in previously accessible neighborhoods)
5. Few readily accessible data sources track people over time
 - Diverse approaches to measuring displacement
 - Evictions, loss of vulnerable populations, move-outs, etc.

Lit Review Findings (*cont.*)

6. Issues with studies relating gentrification and displacement

- Assume linear relationship
- Narrow definitions of displacement
- Critiques of comparison group

7. Many indicators and local datasets can help

- Changes in real estate (e.g., sales, assessed value)
- Neighborhood investments (e.g., permits, capital improvmt)
- Disinvestment indicators (e.g., complaints, surveys)
- Changes in tenure*/demographic changes (e.g., census)
- Investment potential (e.g., improvement-to-land ratio)
- Reasons for moves (e.g., surveys of in/out movers)
- Coping strategies (e.g., overcrowding)

* “Tenure” refers to financial arrangements under which someone has the right to live in a house or apartment. Changes in tenure occur when a property/unit goes from owner-occupied to renter-occupied, or vice-versa.

2. Analysis of Historic Patterns of Neighborhood Change

Research Approach & Methods

- Hypothesis:
 - Transit-oriented developments (TODs) are associated with demographic and socioeconomic change
- Approach:
 - Constructed a database on neighborhood change and fixed-rail transit from historic data
 - Geographic focus: LA County and 9-County Bay Area region (i.e., Metropolitan Transportation Commission region)
- Data sources
 - Census tract- and address-level sources
- Unit of analysis
 - “TOD neighborhoods” = census tracts with a transit station w/in ½ mile

Combination of address, parcel, and tract-level data

Tract-level Datasets

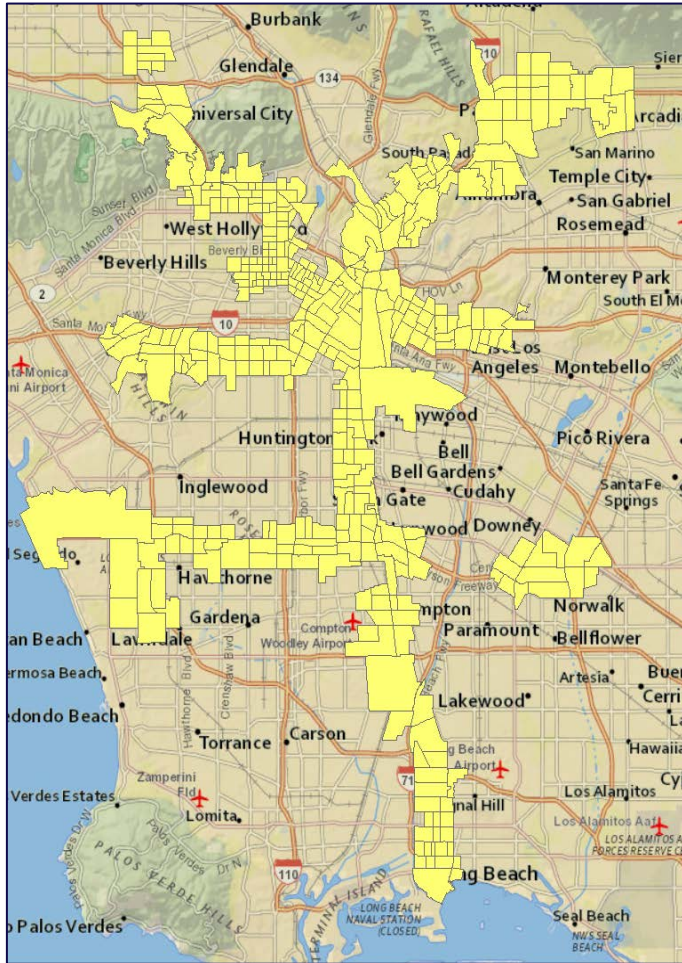
Dataset	Variables	Data Source
Decennial Census and ACS	Demographic, housing, and socioeconomic characteristics	Brown University Census' American Fact Finder
PUMS	Movement in/out of neighborhood (with race, income, education)	Census' American Fact Finder
HUD Picture of Subsidized Housing	# Section 8 voucher recipients # public housing units	HUD

Address and Parcel-level Datasets

Dataset	Variables	Data Source
Transaction and assessor data	Sales value, square footage, etc.	Dataquick
Low-Income Housing Tax Credit (LIHTC)	# housing units constructed	HUD
NETS	# jobs, establishments, sales	Walls & Associates
Evictions	# fault/no-fault evictions (SF), # Ellis Act evictions (LA)	SF Rent Board, HCIDLA
Transit Stations	Presence of rail station	Respective metropolitan transportation agencies

TOD Tracts *(tracts with a transit station within ½ mile)*

Los Angeles: 387 tracts with rail stations

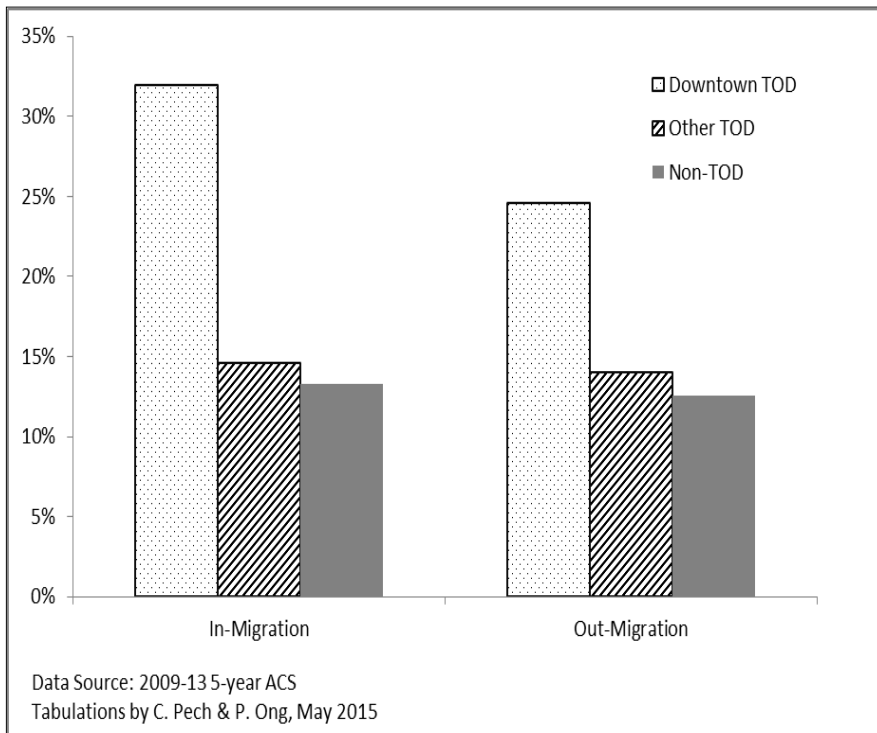


Bay Area: 548 tracts with rail stations

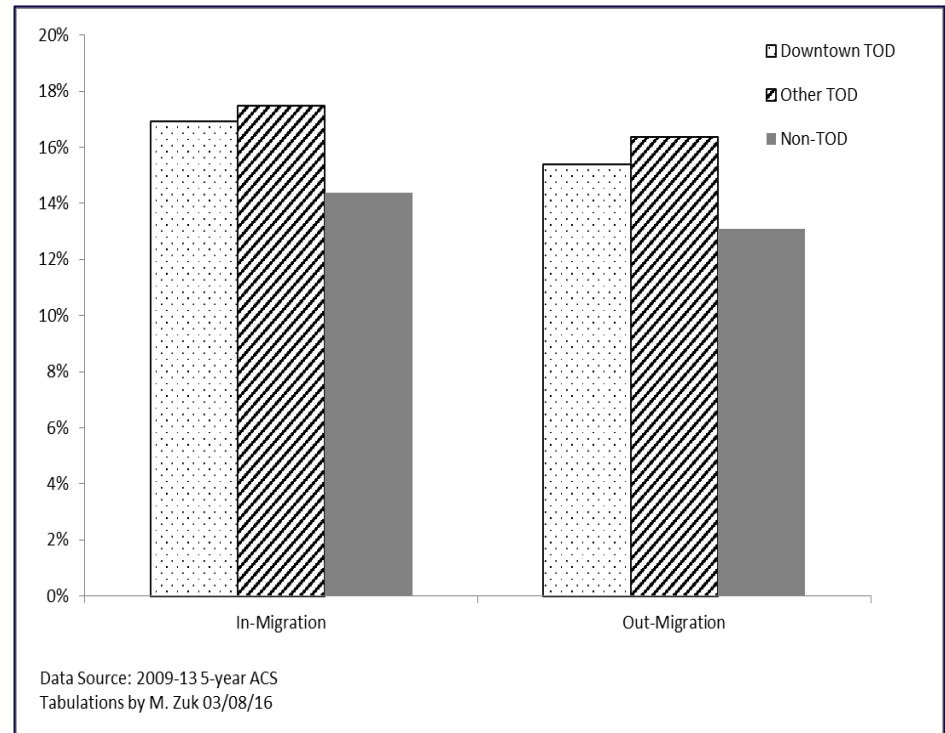


TOD tracts: higher rates of households moving in and out than non-TOD tracts

LA County, In- and Out-Migration Rates (2009-2013)



SF Bay Area, In- and Out-Migration Rates (2009-2013)



In-Movers and TODs

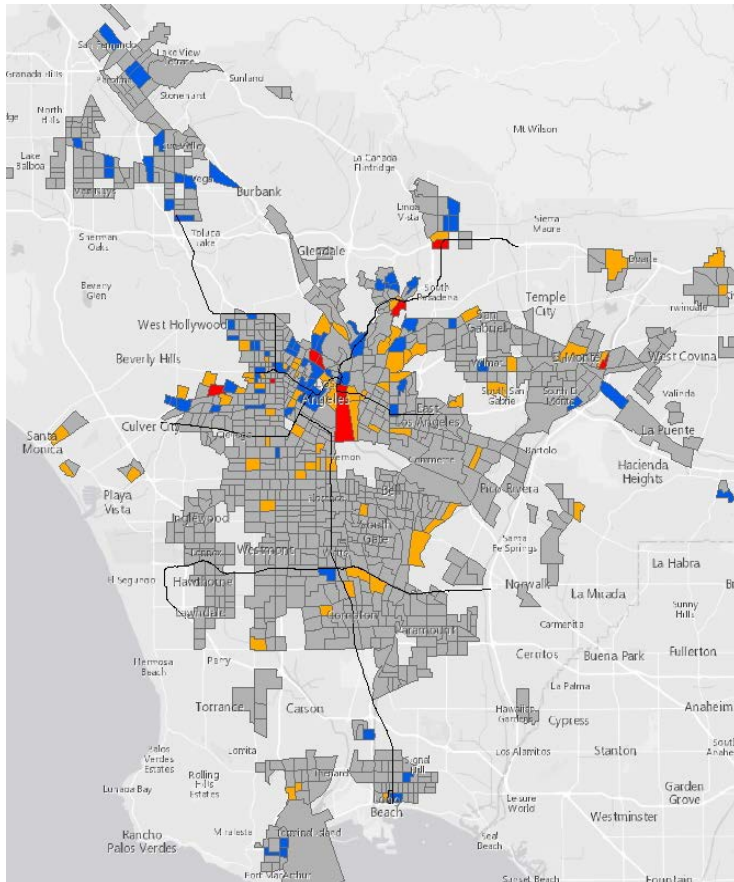
- Multi-variate analysis of in-migration by subgroup **supports** gentrification of TOD hypothesis
- In-movers to TODs are **less** likely to be:
 - Low-income
 - Less educated
- In-movers to TODs are **more** likely to be:
 - Higher income
 - Non-Hispanic White
 - With bachelors degree

Defining Gentrification

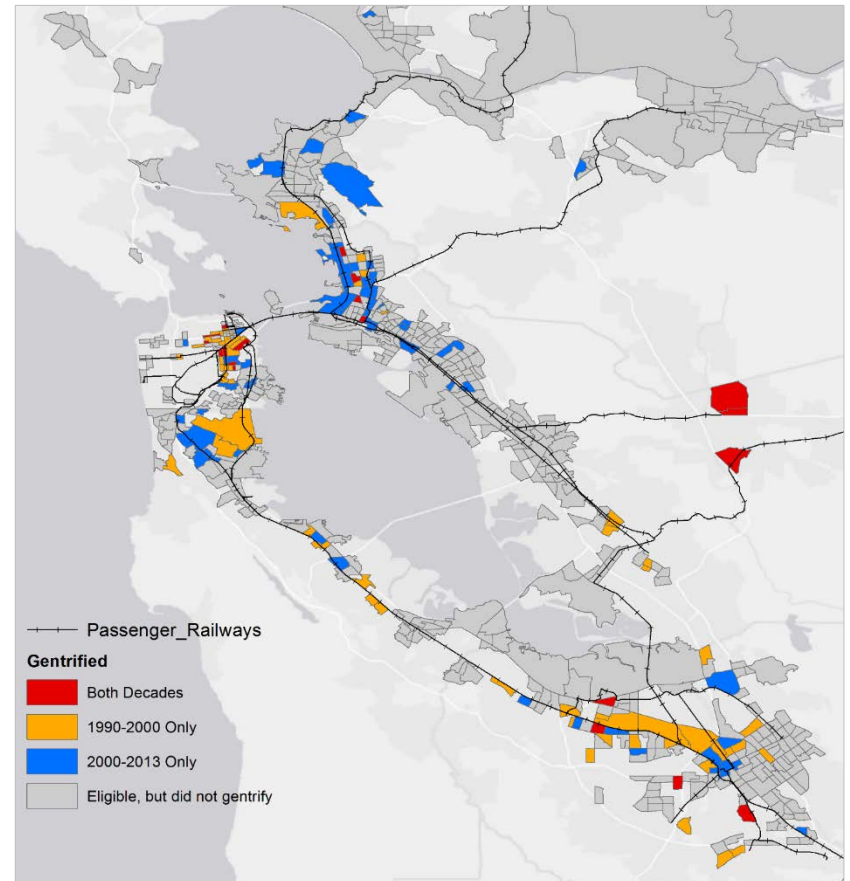
- Indicators to characterize neighborhood change:
 - Base year
 - Populated (>500 people)
 - Low aggregate socio-economic status (income, education level, homeownership, race)
 - Change over time
 - Demographic change (education, race, income)
 - Real estate market (i.e., rent)
- Regional differences resulted in slightly different indicators for real estate variables:
 - LA: median rent
 - Bay Area: home sales/value and market rate development

Gentrification in LA and Bay Area

Los Angeles: 155 tracts gentrified between 1990-2013



Bay Area: 149 tracts gentrified between 1990-2013



TOD and Gentrification

- Multi-variate analysis of gentrification indicators **supports** gentrification of TOD hypothesis
- In Los Angeles
 - Downtown TODs and station areas developed in last two years were **more** likely to gentrify
- In the Bay Area
 - TODs in core cities (SF, SJ, Oakland) were **more** likely to gentrify
- For both regions, older, more established neighborhoods (with large pre-WWII housing stock) were more susceptible to gentrification

Defining Displacement

- Research was limited by lack of out-migration data at census tract-level (especially by vulnerable groups)
- Therefore, test different proxy indicators:
 - Loss of affordable housing
 - # of affordable* rental units
 - Changes in Section 8 vouchers
 - Condo conversions (LA and SF cities only)
 - Change in LIHTC* units
 - Direct displacement
 - Evictions (LA and SF cities only)
 - Loss of low income households (Bay Area only)

* Units are considered affordable when tenants pay less than 30% of their income on rent

* LIHTC = Low-Income Housing Tax Credit (LIHTC)

TOD and Displacement

- In Los Angeles
 - All TODs were **more** likely to lose affordable rental units and experience more condo conversions
 - Non-downtown TODs were **more** likely to lose Section 8 vouchers
 - TODs in Los Angeles City were less likely to have Ellis Act evictions
- In the Bay Area
 - Non core city TODs were **more** likely to lose low income households
 - Station areas in San Francisco (1/4 mile) were **more** likely to experience **fault evictions**
- For both regions, TODs were **more likely to gain LIHTC units**

Ground-Truthing

- Visual observation tool and interview protocols to verify secondary data
 - 3 case studies in each region = 6 total
- Found differences in certain data points (i.e., housing units)
- Overall, field observations matched secondary analysis results
 - *Except* – perceived susceptibility/anticipation of change much higher than analysis indicates

APN/Parcel # 052-520-23 Street Address _____

Does the building appear to be well-maintained?

1 ————— 3 ————— 4 ————— 5
poor average above average new

The # of _____ structure appears to have: 1

The # _____ is _____

The # _____ is _____

3. The _____ off-street vehicles present +

☐ _____ street parking

☐ _____ driveway or parking lot

☐ _____ garage

4. _____ visible people, building, and outdoor space; incl. _____ about household size and composition

6. Other building/other

- ☐ Abandoned
- ☐ For Sale sign
- ☐ For Rent sign
- ☐ Blinds or curtains
- ☐ Blinds or curtains
- ☐ Cracked windows
- ☐ Bars on windows
- ☐ Boarded windows
- ☐ Dirty windows
- ☐ Metal security
- ☐ Vegetable garden
- ☐ New addition
- ☐ New or recently

3. Developing Tools for Analyzing Potential Displacement Impacts in Sustainable Communities Strategies (SCS)

Research Approach & Methods

- Motivating questions:
 - How do/can regional models represent displacement, or what are other ways for MPOs to assess displacement potential?
 - Can models be modified with information from #2 to evaluate potential displacement in SCS development?
- Approach:
 - Examine above questions for the specific models used by MTC¹ (UrbanSim) and SCAG² (PECAS)
 - Develop off-model tools that are more streamlined and less resource-intensive modeling options

¹ Metropolitan Transportation Commission (Bay Area MPO)

² Southern California Association of Governments (LA region MPO)

UrbanSim

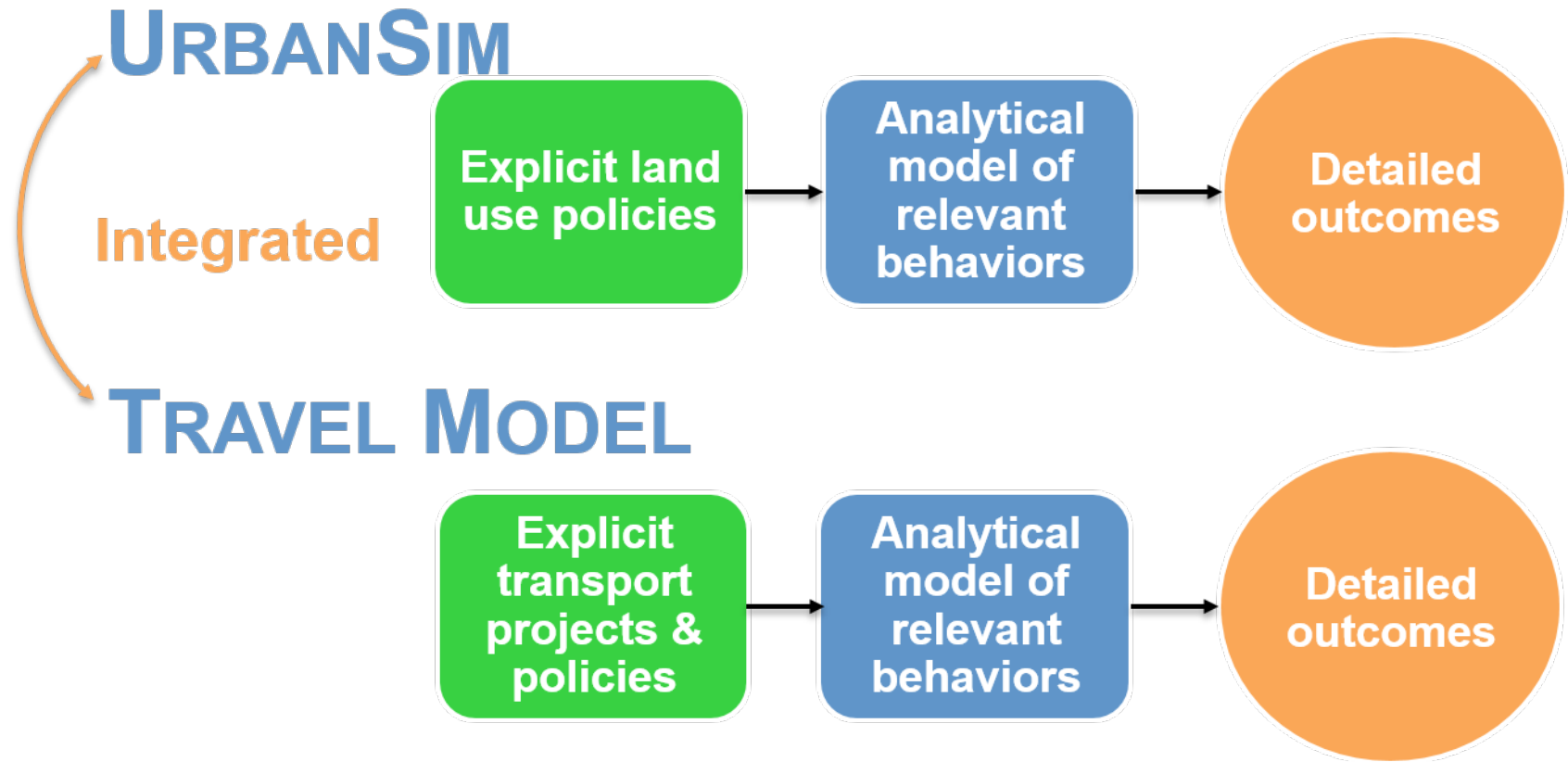
- Tool for forecasting regional land use changes
 - Based on economic and behavioral choices of households, firms, and property developers, in response to policy and market contexts
- Helps MPOs evaluate long-range planning scenarios
 - Used operationally in the San Francisco region since 2011 in the context of the Plan Bay Area* regional transportation plan/SCS
 - Limited capacity to forecast residential displacement

* <http://www.planbayarea.org/>

How UrbanSim Works

- Data layer
 - Full household and building representation of the region, including building characteristics, zoning, travel networks, population demographics, property values, etc.
- Model layer
 - Sequence of calculation steps for predicting incremental changes to the data layer
- Key steps
 1. Home price prediction
 2. Household move-out prediction
 3. Demographic transition
 4. Location choice of unmatched households
 5. New housing development or redevelopment
 6. Repeat for subsequent year

UrbanSim and Plan Bay Area

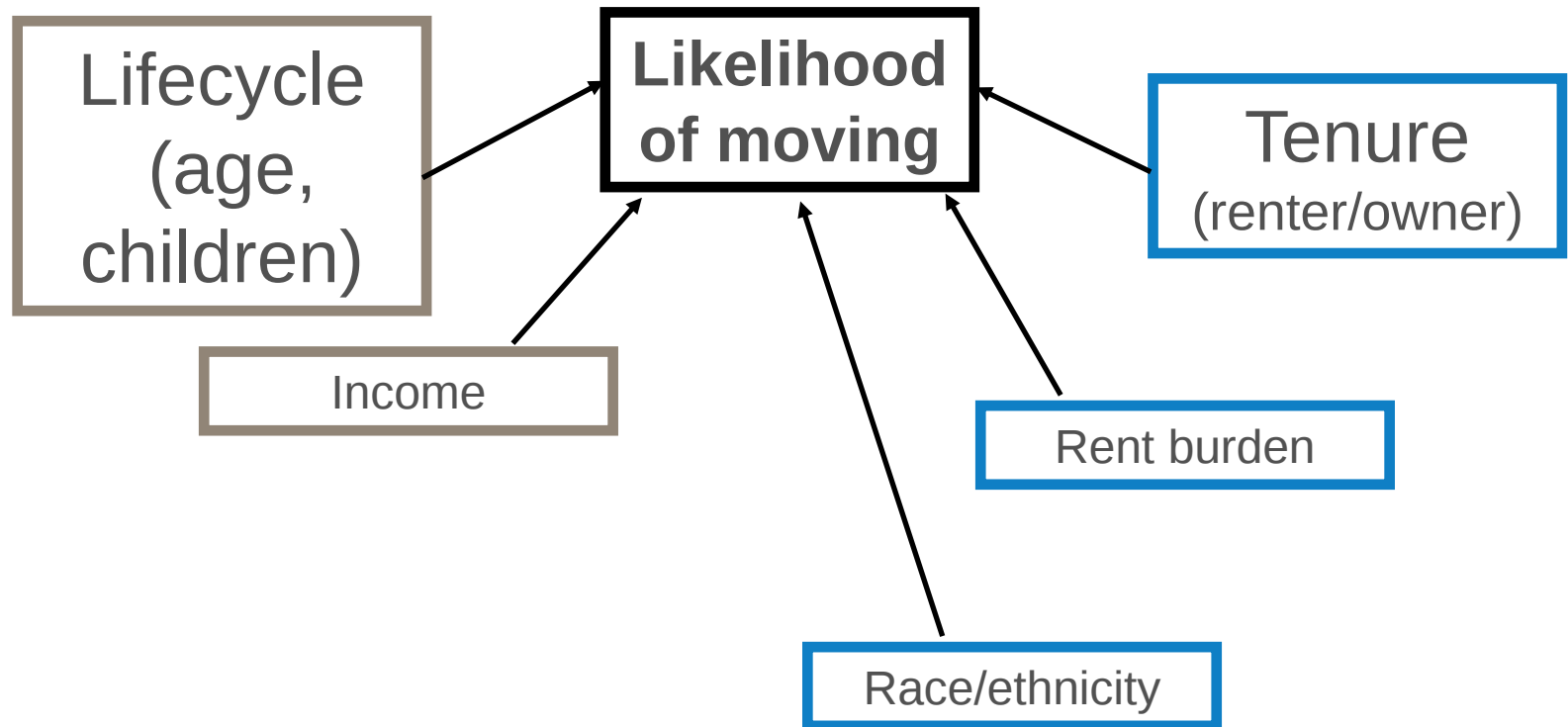


Pro forma* evaluation on all parcels

- Economic inputs
 - Inflation rate
- Demand model data
 - Price per sq ft in buffer area
 - Absorption rate in buffer area
- Policy inputs
 - Zoning (use and bulk)
 - Property taxes
 - Inclusionary zoning and linkage fees
 - Local permit fees
 - Local impact fees
- Operating cost inputs
 - Operating cost per sq ft by bldg type
 - Property insurance
- Finance inputs
 - Loan to cost & value
 - Debt coverage ratios
 - Loan rates & terms
 - Seasoning requirements
 - Cap rates
- Construction inputs
 - Construction cost per sq ft by building type
 - Demolition cost per sq ft by building type
 - Cost per sq ft of road
 - Infrastructure costs
 - Open space costs
 - Geographic multiples
 - Permit timeframe
 - Construction timeframe

* “Pro forma” evaluation considers the cash inflows and outflows of a potential investment (in this case, real estate development) with the outcome being some measure of profitability or return on investment

Limitations for forecasting residential displacement



Strategy for improving the UrbanSim model

- Data layer
 - Add a representation of individual housing units
 - Add a semi-permanent tenure status to each household and unit
 - Add race/ethnicity information to households
 - Add a representation of market rents alongside market sale prices
- Model layer
 - Re-specify each model step to incorporate housing units, tenure, race/ethnicity, rental cost
 - Forecast rents and sale prices separately
 - Forecast move-out decisions separately for renters and owners, with additional input factors
 - Match households to units rather than buildings, with additional input factors

UrbanSim Results

- Model estimation within UrbanSim shows patterns that agree with scholarship on displacement pressures:
 - Renters much more likely to move than owners
 - Higher rent cost burden associated with greater likelihood of moving
 - Households tend to be clustered near others of same race/ethnicity

Work with MTC and Next Steps

1. Enhanced price equilibration algorithms (should be more sensitive to demand pressures from increased transit service driving up prices)
2. Creation of an “Accounts Framework” that enables simulation of policies such as an affordable housing fund or Tax Increment Financing, for allocation within a jurisdiction.
3. Creation of a “Vision Solver” algorithm to reverse engineer what level of subsidy would be required to achieve a specified outcome (e.g. development targets within a Priority Development Area*, or meeting an affordable housing target)
4. Still working on modeling the supply of below-market-rate housing

* Areas within existing communities that local city or county governments have identified and approved for future growth. These areas typically are accessible by one or more transit services; and they are often located near established job centers, shopping districts and other services.

PECAS Overview

- Output – Snapshot of household and job allocation in the region at the Community Statistical Area zone level
- Two internal modules—activity allocation (AA) and space development (SD)
 - AA - Allocates the region's the households and production to the region's buildings (and other land improvements)
 - SD - Represents developers (private or public) as they change the built form of the region
- SCAG PECAS model
 - SCAG version was designed as a sketch tool to provide an region-wide view of policy alternatives.
 - Development during 2008-2010.
 - 302 Zones

SCAG PECAS Model for Analyzing Potential Displacement

- Updated to include median income and gross rent
- Calibrated for downtown and non-downtown TOD zones
- Model is too aggregate to simulate dynamics of displacement:
 - It presents the *net changes* instead of identifying *individual effects* separately
 - Currently no mechanism that associates individual agents (e.g., households) to residential units at parcel level
- SCAG is currently exploring a different modeling platform to be implemented in next several years

Off-Model Tool Development

- Objective
 - Identify neighborhoods (census tracts) at risk of gentrification and displacement in the future
 - May be useful for local governments and agencies to identify where and what may be done to prevent or mitigate displacement
- Framework
 - Based on indicators (identified in Section 2) that significantly predict changes associated with displacement
- Results
 - Off-model tools able to predict gentrification with results ranging from 50% to 86% accuracy

4. Effects on Auto Use of Household Displacement from Rail Station Areas

Research questions

How can we expect gentrification and displacement caused by transit-oriented development to affect regional VMT?

- How does VMT vary among those of different income levels living inside and outside of TODs?
- How much do people of different income levels appear to drive in response to transit accessibility when controlling for other factors?
- Given the above, how would displacement of lower-income by higher-income households likely affect regional VMT?
What about typical gentrifying tracts?

Datasets

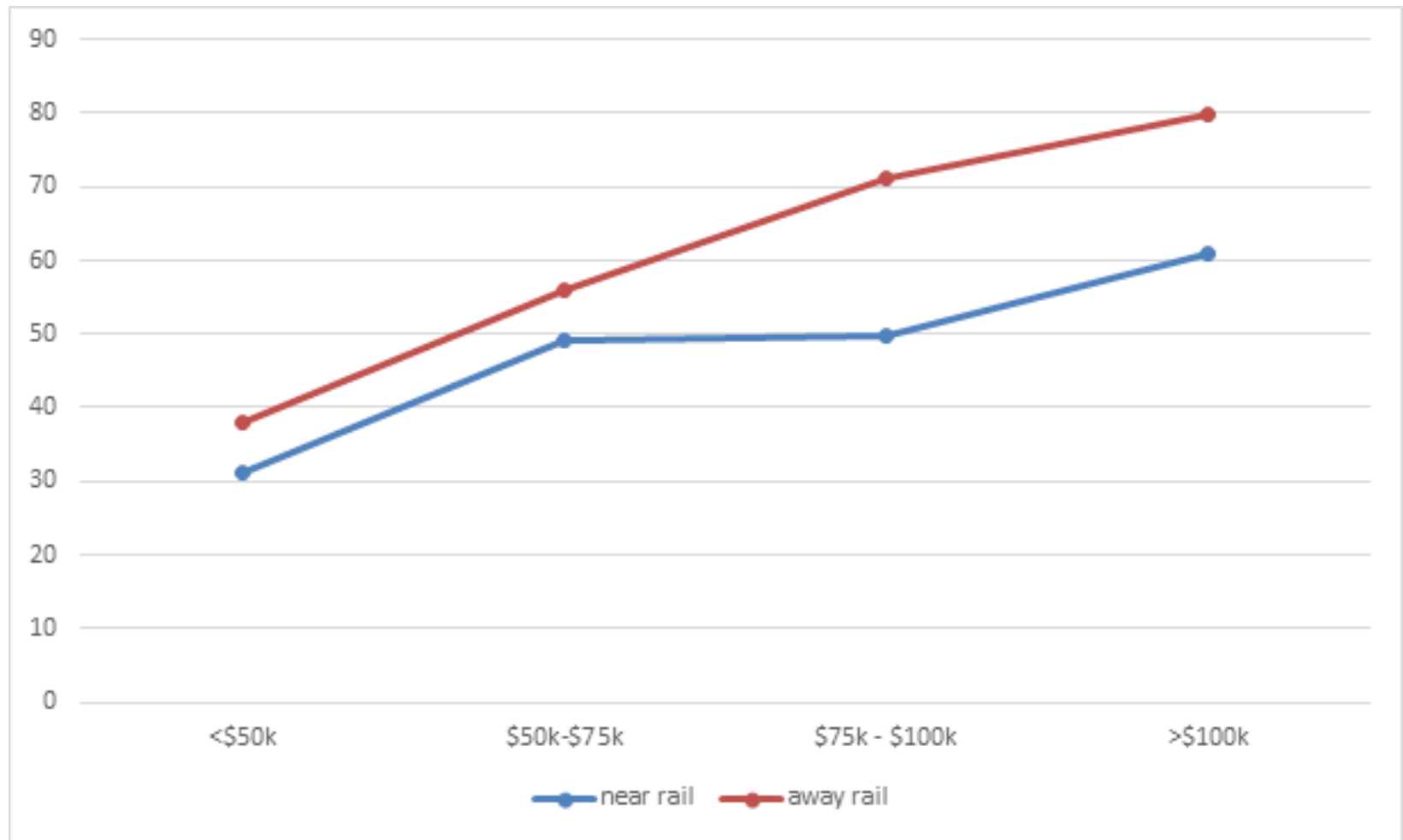
National Household Travel Survey (NHTS) 2009

- Confidential data with household location (Census block group)
- 16,575 households in metropolitan areas in CA
- Annual VMT estimated using vehicle odometer readings

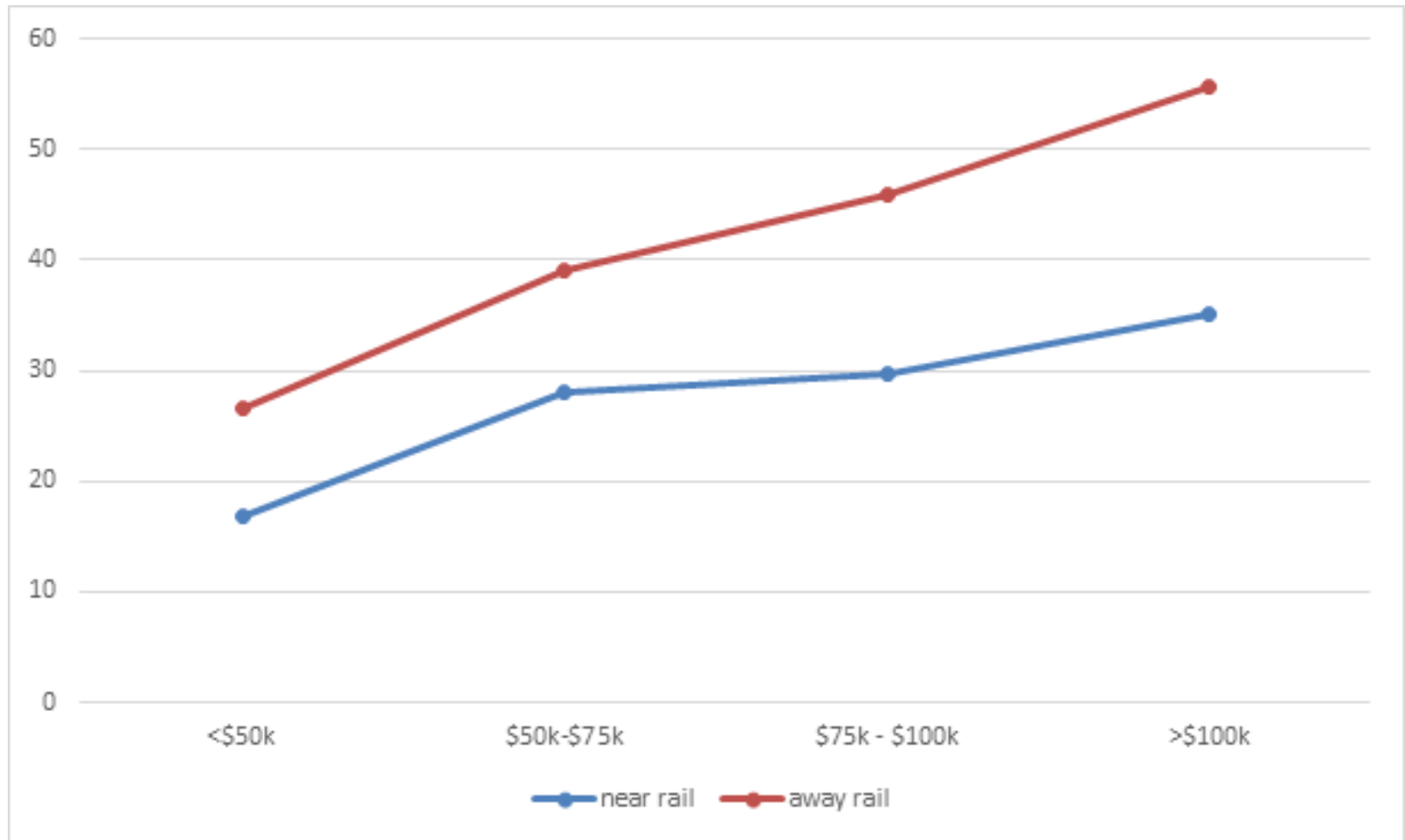
California Household Travel Survey (CHTS) 2010-2012

- Confidential data with household location (latitude & longitude), accessed through a remote system maintained by TSDC
- 25,246 households in metro areas within the state
- VMT calculated by travel diary (fairly accurate network distance for each trip)

Average household VMT by income category and rail access, **NHTS** data, all California metro areas



Average household VMT by income category and rail access, **CHTS** data, all California metro areas



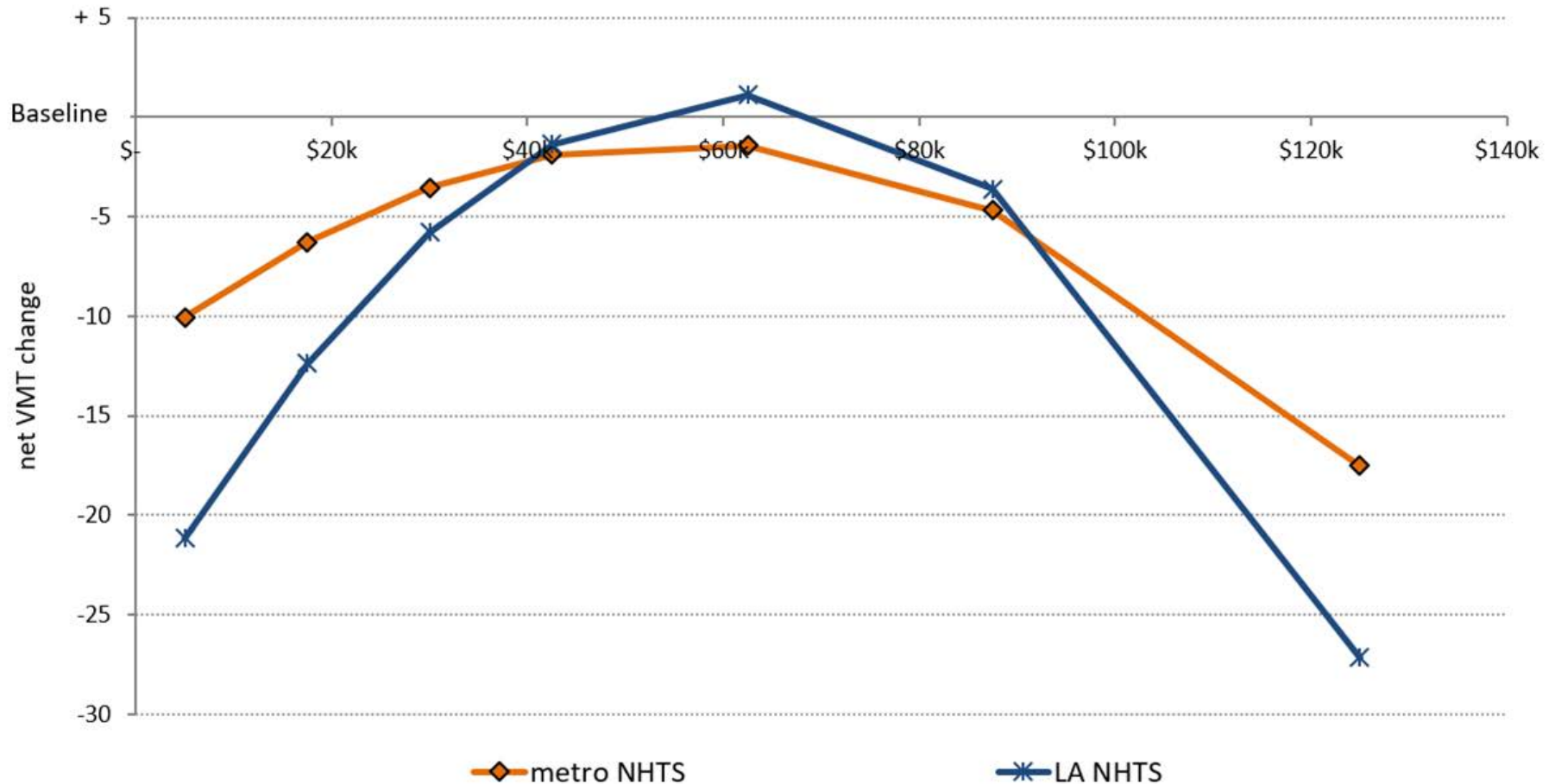
Controlled analysis –specifications

- Dependent variable - household VMT
 - Model form: Tobit, accounting for the fact that some households did not drive on the survey day or did not own vehicles.
- Independent variables:
 - Household income (linear, squared, & threshold terms)
 - Rail proximity (0.5 miles)
 - Interactions between income and rail proximity
 - Socioeconomic control variables
 - Land use / built environment variables (population density, employment density)

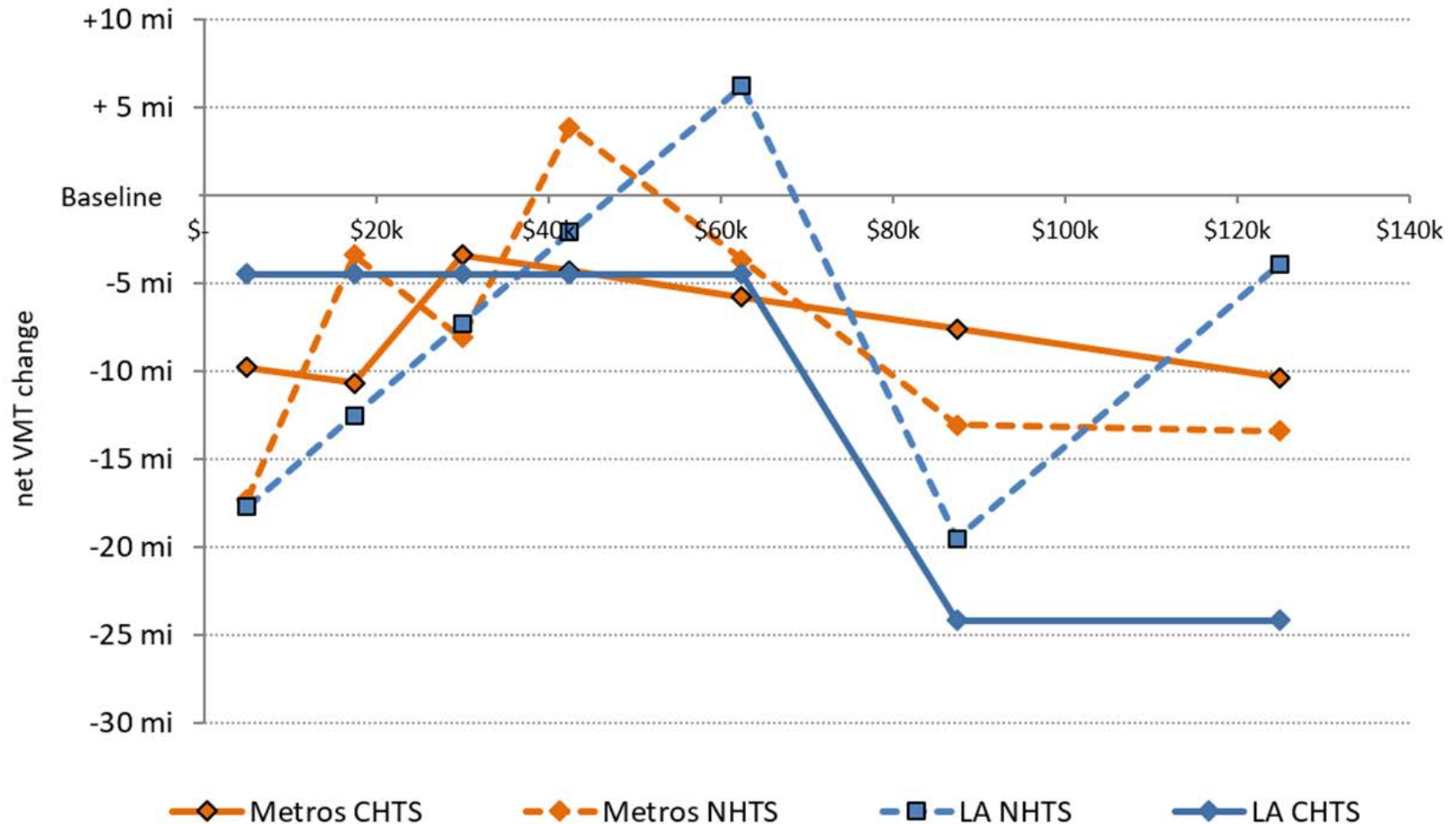
Controlled findings from regression models: Overview

- We estimated models with NHTS and CHTS data; in all metro areas, in LA, and in the SF Bay Area; and representing household income in two ways.
- In six of 12 regressions, there was **no** significant differential effect of rail proximity on VMT by income.
- The regressions using the more reliable CHTS data are unequivocal in finding that the VMT difference associated with rail access is no greater with lower-income than higher-income households.
- In all-metro and LA regressions using NHTS, middle-income households had a smaller VMT reduction with rail proximity than low-income households.

Graphed results from linear and squared income models*



Graphed results from income threshold models*



Hypothetical displacement illustrations – stylized

- Varying only rail proximity, what do these results imply assuming that poor households are displaced by richer households?
 - What if high-income households displaced low-income households on a one-to-one basis?
 - **From no change to a 22% reduction in VMT.**
 - What if each high-income household arriving in the TOD displaced *two* low-income households?
 - **Somewhere between a reduction of 7% to an increase of 23% in VMT.**
-

Hypothetical gentrification illustrations – Census tract data

Census Tract 1905.10, Los Angeles County, California

Change in Low-Income Households Near Transit (1990-2013)			-48	
Change in Non-Low-Income Households Near Transit (1990-2013)			172	
	Uncontrolled Analysis		Controlled Analysis	
	NHTS	CHTS	NHTS	CHTS
1990 VMT	14,137	8,824	12,098	6,454
2013 VMT	10,470	7,366	8,653	4,263
% VMT changes	-26%	-17%	-28%	-34%

Census Tract 5019, Santa Clara County, California

Change in Low-Income Households Near Transit (1990-2013)			411	
Change in Non-Low-Income Households Near Transit (1990-2013)			931	
	Uncontrolled Analysis		Controlled Analysis	
	NHTS	CHTS	NHTS	CHTS
1990 VMT	81,713	62,762	82,369	47,168
2013 VMT	56,446	39,652	68,927	29,959
% VMT changes	-31%	-37%	-16%	-36%

Summary of VMT study findings

- Displacement in TODs will likely *increase* VMT (and thus GHGs) only if the population living in the transit-rich area declines.
- Our data analysis suggests that higher income households reduce VMT as much as or more than lower-income households when locating in TODs.
- .
- Census tracts near rail stations that underwent gentrification in California between 1990 and 2013 also typically increased in population. Any increase in the number of households in typical* rail-served areas will tend to reduce regional VMT.

5. Anti-Displacement Policy Analysis

Research Approach & Methods

- Motivating questions:
 - What policies and programs are available to prevent or “mitigate” displacement?
- Methods:
 - Inventory of policies from 89 jurisdictions in LA County and 109 jurisdictions of 9-county Bay Area (TOD-specific & not TOD-specific)
 - Close examination of four specific policies:
 1. Inclusionary zoning
 2. Condominium conversion ordinances
 3. Rent control (*b/c of its importance in anti-displacement discourse*)
 4. Mobile-home rent control ordinances (*b/c of their prevalence in the Los Angeles region*)

} *b/c of their prevalence in LA and the Bay Area*

Many Strategies can Address Displacement

Affordable Housing Production Strategies

Fiscal Strategies

Affordable housing impact fees

Jobs-housing balance or commercial impact fees

Community benefits agreements

Housing production trust funds

Taxing Powers

Tax exemptions for non-profit affordable housing

Levying parcel taxes, tax-increment financing districts

Bonds

Land Use Controls

Expedited permitting processes for affordable housing

Reduced parking requirements for affordable housing

Inclusionary housing/zoning

Density bonus in exchange for building affordable units

Accessory dwelling units

Assets and Investments

Public land dedicated to affordable housing

Land banking

Preservation Strategies

Rent stabilization/control

Condominium conversion ordinances

No-net-loss, one-for-one replacement strategies

Single-room occupancy hotels rent and conversion controls

Mobile home rent controls

Tenant protections and support

Rental assistance

Tenant counseling

Proactive code enforcement

Just-Cause eviction policy

Tenant right to purchase laws

Asset Building and Local Economic Development

Minimum wage

Wage theft protections

Local or first source hiring ordinances

Individual development accounts

Homeowner assistance programs

Housing rehabilitation funds

Inventory of Strategies

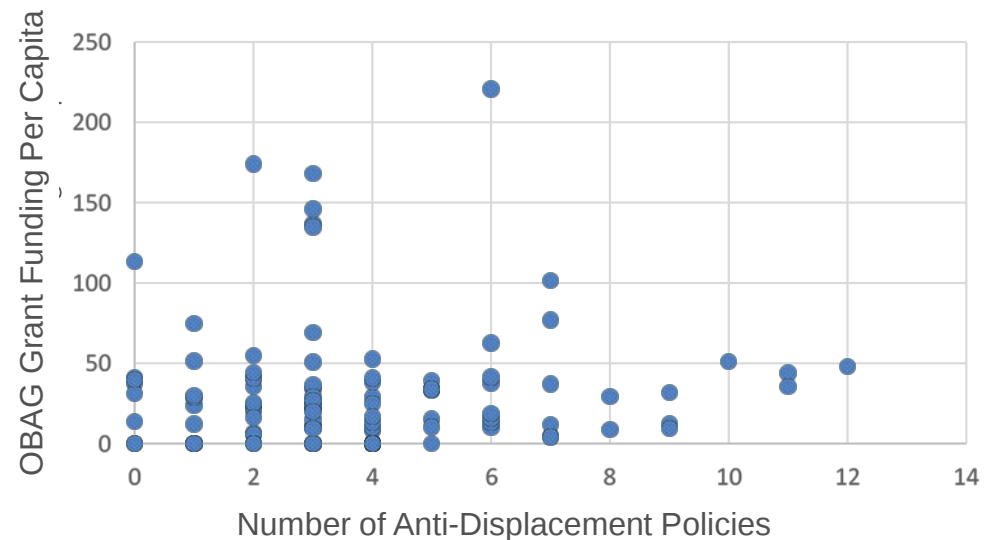
	Policy	Bay Area Cities/ Counties with Policy (%)	Los Angeles Cities with Policy (%)
Preservation Strategies	Just-Cause Eviction Ordinance	7 (6%)	5 (6%)
	Rent Stabilization or Rent Control	9 (8%)	4 (4%)
	Rent Review/Mediation Boards	14 (13%)	2 (2%)
	Preservation of Mobile Homes (Rent Stabilization Ordinance)	34 (31%)	16 (18%)
	SRO Preservation Ordinance	28 (26%)	4 (4%)
	Condominium Conversion regulations	73 (67%)	24 (27%)
	Foreclosure Assistance	45 (41%)	1 (1%)
Affordable Housing Production Strategies	Housing Development Impact Fee (or Jobs-Housing Linkage Fee)	24 (22%)	3 (3%)
	Commercial Linkage Fee/Program	27 (25%)	3 (3%)
	Affordable Housing Trust Fund	15 (14%)	8 (9%)
	Inclusionary Zoning/Housing	78 (72%)	16 (18%)
	Local Density Bonus Ordinance (above state requirements)	19 (17%)	7 (8%)
	Community Land Trusts	26 (24%)	1 (1%)
Asset-Building Strategies	First Source Hiring Ordinances	17 (16%)	1 (1%)

TOD and Anti-Displacement – Bay Area

- MTC's station area planning began in early 2000s
 - TOD Policy required 9 transit expansion plans to include minimum # of housing units and incentivized affordable units
 - “Survey respondents did not feel that the Policy was effective in encouraging the inclusion of affordable housing opportunities within station areas. Most jurisdictions relied on their citywide affordable housing policies rather than making a specific effort to provide affordable housing within the station area plans” (CTOD, CD+A, and Nelson Nygaard 2014)
- Expanded in 2008 → Priority Development Area program in 2012
 - Guidelines encouraged inclusion of “Affordable Housing and Anti-Displacement Strategy”
 - Of 34 completed Station Area Plans, 43% had quantified affordable housing targets

TOD and Anti-Displacement – Bay Area (cont.)

- One Bay Area Grants (beginning in FY 15/16)
 - Required adopted Housing Element
 - Formula to CMA* based on housing production
 - Each CMA came up with own selection criteria
 - Some reward jurisdictions with affordable housing strategies, others do not
 - No clear relationship between # strategies and funding/capita



* CMA = Congestion Management Association

TOD and Anti-Displacement – Los Angeles

- LA Metro Joint Development Policy (2015)
 - “35% of the total housing units in the Metro joint development portfolio [to be] affordable for residents earning 60% or less of the Area Median Income”
 - LA Metro may “discount joint development ground leases” by no more than 30% of fair market value
- Review of 8 Station Neighborhood Area, Specific, and TOD Community Plans
 - 3 include language about displacement
 - Varying degrees of language on affordable housing

Policy Case Studies

Selection Criteria:

1. Low-income tracts
2. At risk of gentrification or displacement in 1990-2000
 - high % pre-WWII buildings, loss of affordable units, high employment density, strong real estate market
3. Did not experience gentrification between 2000 and 2013

6 Selected case study sites:

- Bay Area: SF Chinatown, East Palo Alto, San Jose
- Los Angeles: LA Chinatown, Hollywood/Western, 103rd St./Watts Towers

Policy Case Studies Results

- Local organizing is key
 - SF-Chinatown rezoning, LA-Chinatown CASP*
- Multiple and diverse policies often needed to be effective
 - Esp. rent stabilization and just cause for eviction ordinances, coupled with government commitment to affordability (e.g., East Palo Alto)
- Importance of housing production to offset displacement pressures
 - Both subsidized and market rate (e.g., San Jose)
- Key related issues that deserve attention:
 - Overcrowding (e.g., East Palo Alto, Chinatown, etc.)
 - Neighborhood quality (low achieving schools, lack of amenities, perceived unsafety)

* CASP = Cornfield Arroyo Seco Specific Plan

6. Project Conclusions

Project Conclusions

1. Significant and positive relationship between TOD and gentrification, and in some cases the loss of affordable housing or low-income households
2. Proximity to rail is associated with lower VMT for both lower-income households and higher-income households
 - Net effect of displacement on VMT likely zero or positive, but insufficient data to predict
3. UrbanSim is incorporating elements to capture displacement, but SCAG PECAS doesn't have capacity
4. The effectiveness of policy solutions varies by context
 - More policy evaluation needed and research to match scale of problem and understand tradeoffs between VMT and anti-displacement goals