

***TRACKING AND EXPLAINING
NEIGHBORHOOD SOCIO-ECONOMIC
CHANGE IN U.S. METROPOLITAN AREAS
BETWEEN 1990 AND 2010, WITH SPECIAL
ATTENTION TO GENTRIFICATION***

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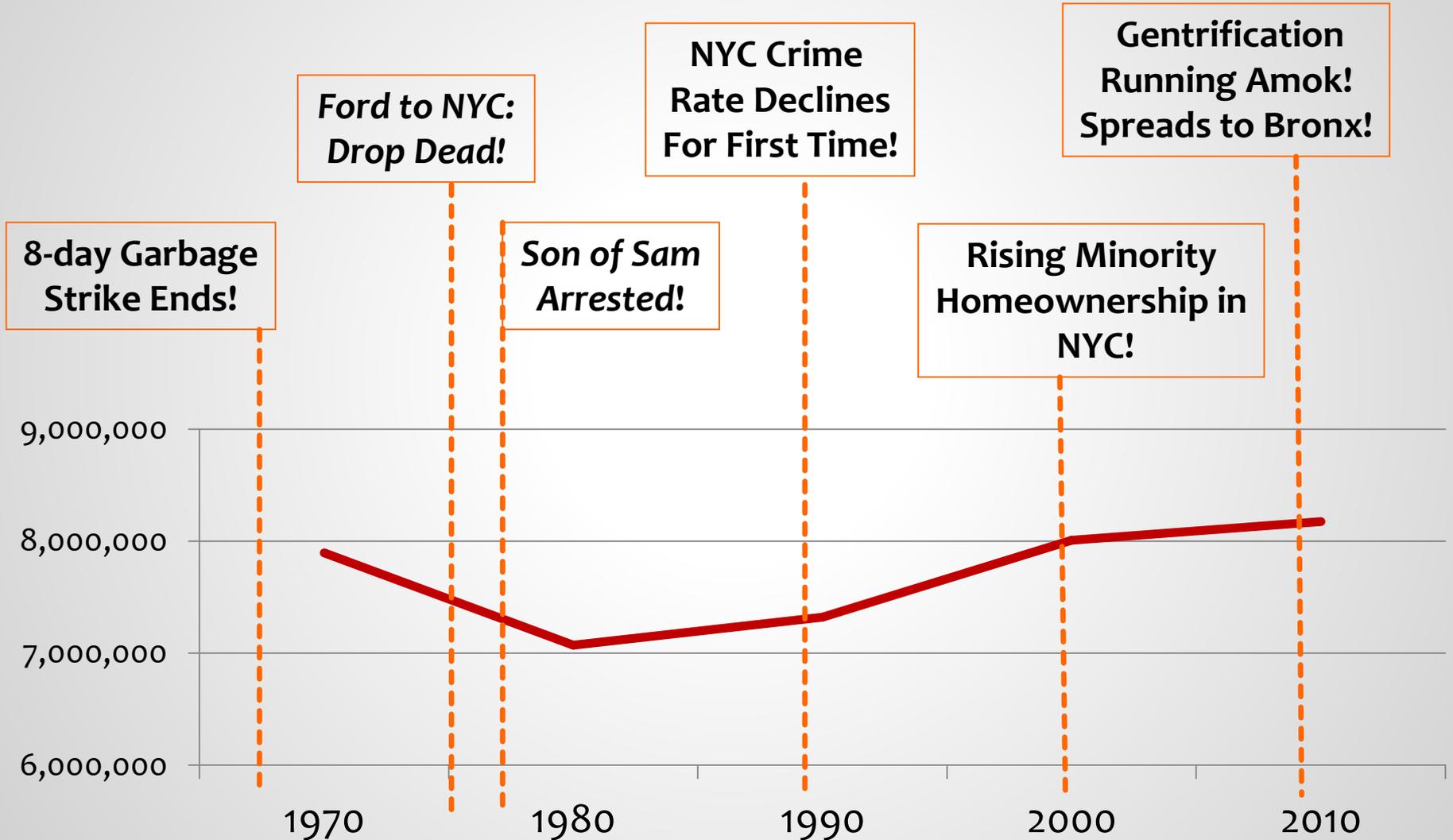
Federal Reserve Bank of Philadelphia Symposium

Reinventing Older Communities:

Bridging Growth and Opportunity

May 12-14, 2014

NEW YORK CITY POPULATION TIMELINE



AGENDA

- NYC Population Timeline
- Four Questions
- Counting Neighborhood Change
- Metro-level Drivers of Neighborhood Change
- Neighborhood-level Drivers of Neighborhood Change
- Turnover and Displacement
- Policy Guidance

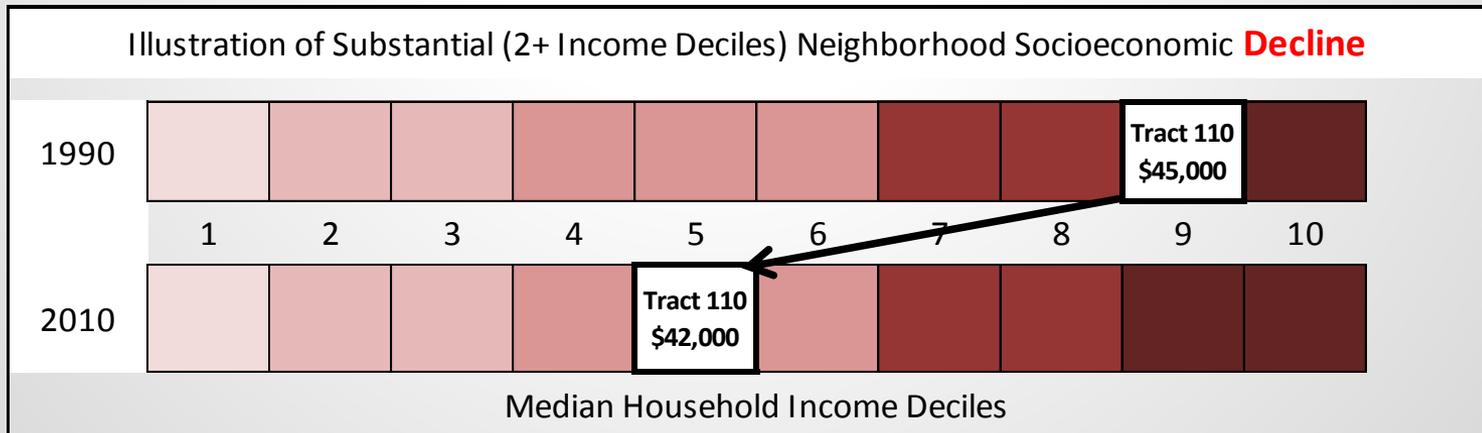
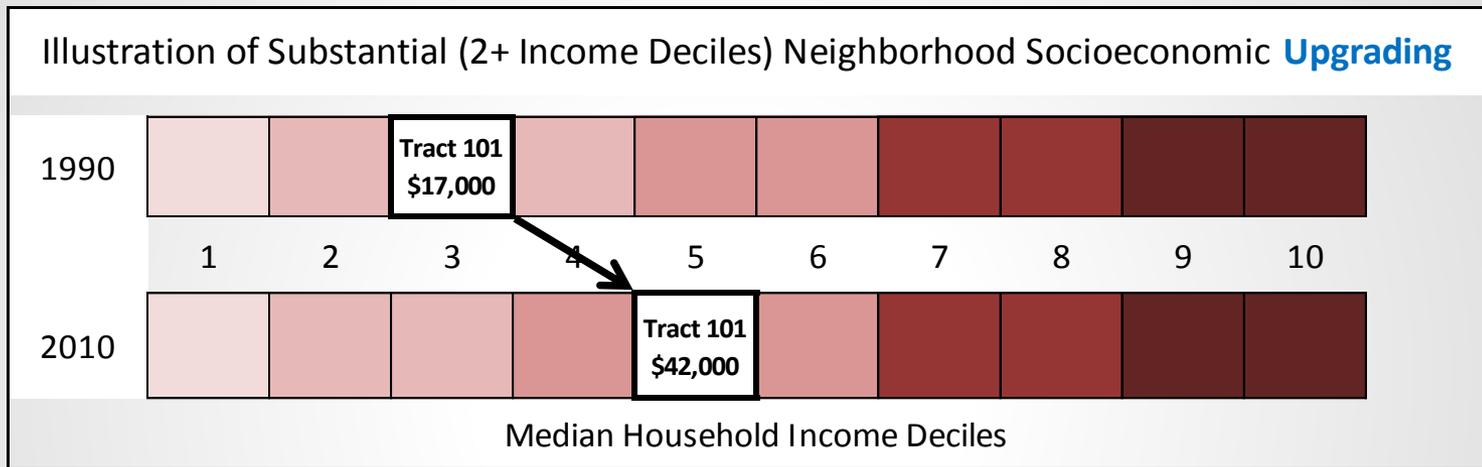
FOUR QUESTIONS

1. Is it possible to come up with a robust approach to measuring gentrification and other types of neighborhood socio-economic change *across all U.S. metropolitan areas*?
2. To what degree are gentrification and other forms of substantial neighborhood socio-economic change the result of *metropolitan-scale economic and demographic forces* versus more “bottom-up” and neighborhood-specific forces and dynamics?
3. To what degree are gentrification and other forms of substantial neighborhood socio-economic change shaped by the *actions of individual households, property-owners, developers, and speculators* operating at the neighborhood level?
4. To what extent are gentrification and other forms of substantial neighborhood change *always accompanied by the displacement of existing residents*?

1.

IS IT POSSIBLE TO COME UP WITH A
ROBUST APPROACH TO MEASURING
GENTRIFICATION AND OTHER TYPES OF
NEIGHBORHOOD SOCIO-ECONOMIC
CHANGE ACROSS ALL U.S. METROPOLITAN
AREAS?

COUNTING NEIGHBORHOOD CHANGE: THE 3-D DOUBLE DECILE DIFFERENCE METHOD



THE 3-D DOUBLE DECILE-DIFFERENCE METHOD: PROS & CONS

Pros

- Reasonably straightforward; census tract data readily available; easy to operationalize across many metros
- Use of income deciles is convenient & robust
- Avoids having to track housing occupancy and occupancy change
- “2+” criteria distinguishes big changes from small ones

Cons

- Lacks subtlety; considers only income changes, not housing and occupancy changes
- Doesn't consider income starting points
- Use of deciles keeps track of relative incomes, not absolute poverty or wealth (e.g., if incomes in every tract grow or decline by \$20K, no change in decile ranks)

EXTENDING THE METHOD

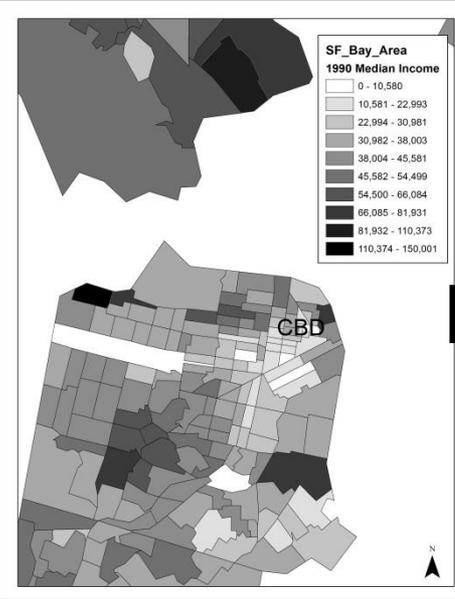
Gentrification: 2+ increase in income decile starting from the 4th or lower income decile.

Core Area vs. Suburban Tracts

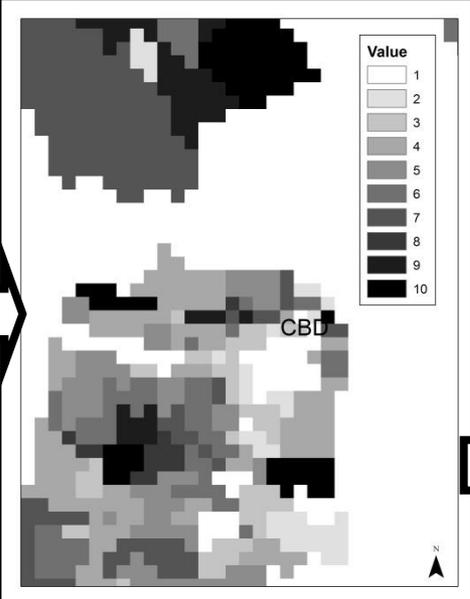
- Core Area tracts are located 10 km (or less) from a central business district or downtown city hall.
- Suburban tracts are located more than 10 km kilometers from the CBD.
- This ten-kilometer threshold reduced (to 8, 6, and 5-kilometers) for smaller metro areas and for metro areas in which closer-in tracts had a lower population density or a younger housing stock; and is increased to 12 and 15 kilometers for larger metro areas or those with older suburban neighborhoods.

San Francisco County: Conversion of 1990 and 2010 Tract Income to Income Deciles to Neighborhood Change Categories

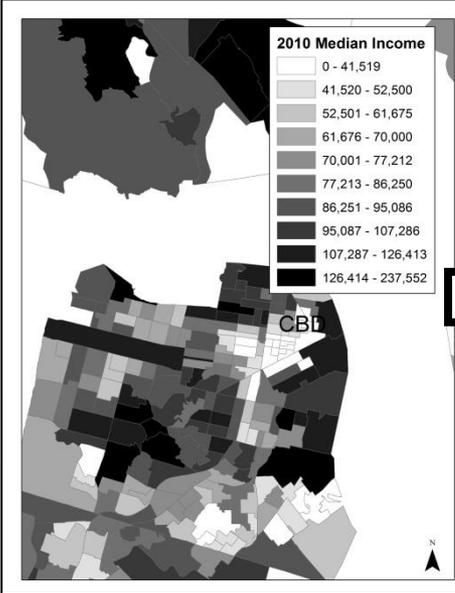
1990 Income Deciles



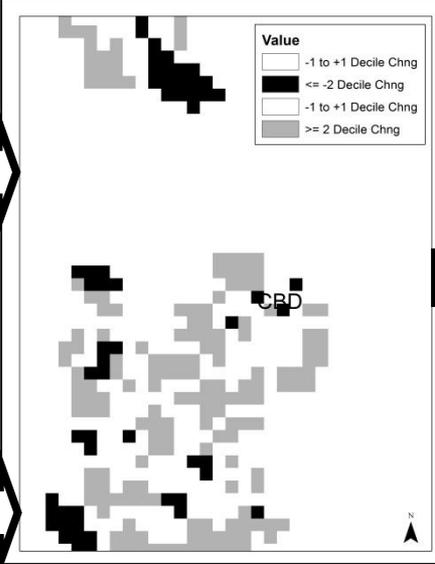
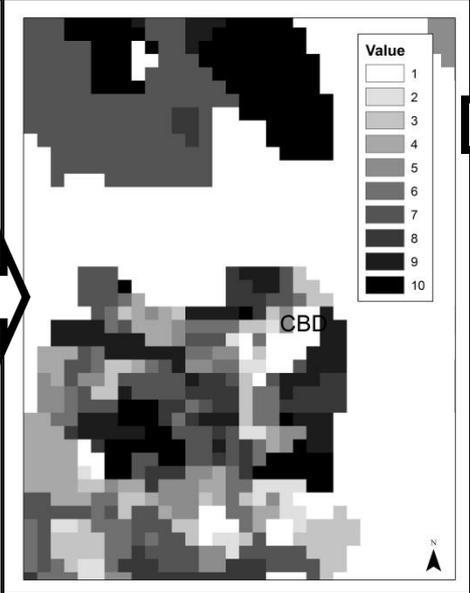
Rasterized Deciles



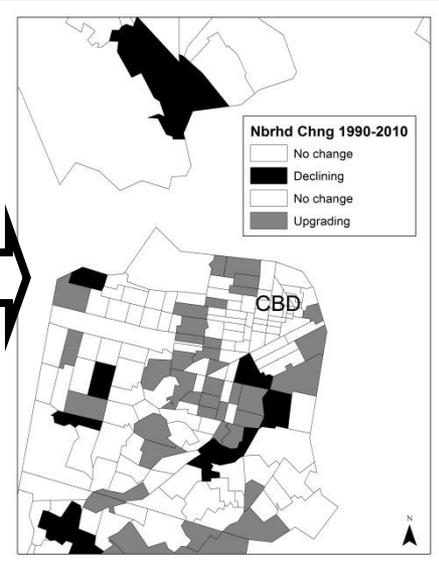
2010 Income Deciles



Rasterized Deciles

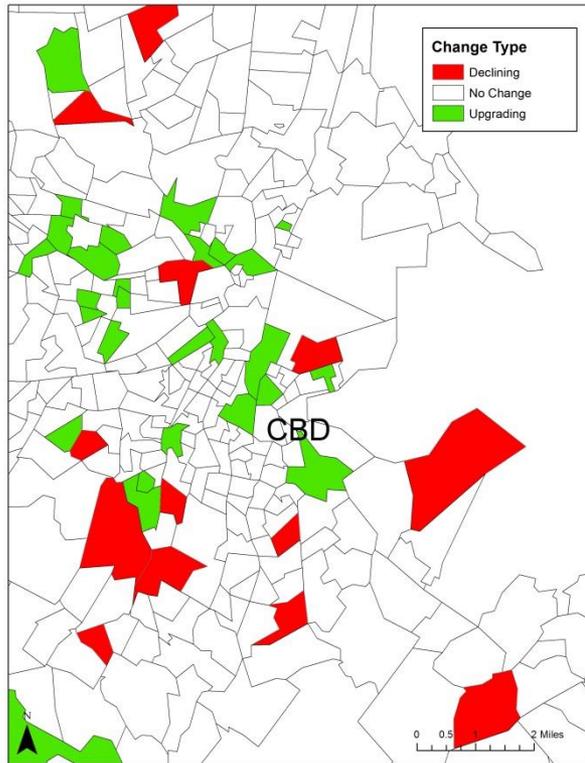


Difference
Between
2010 &
1990
Raster
Values

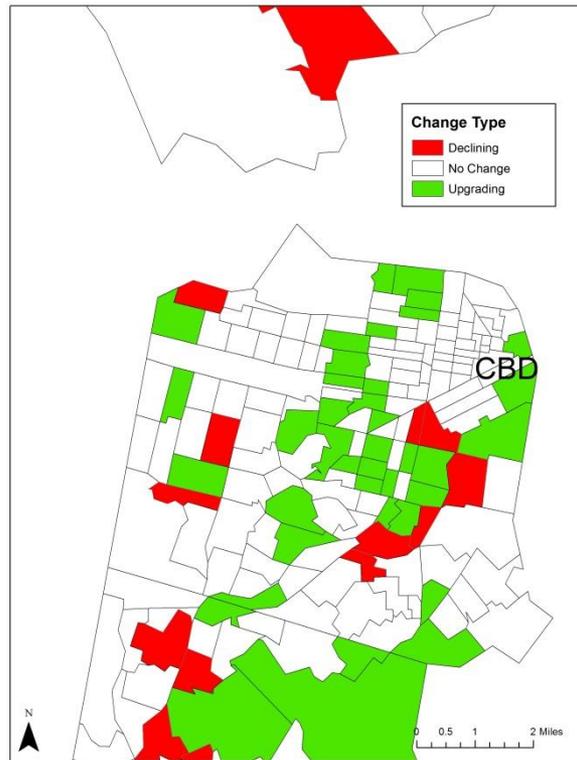


Raster
Difference
Summarized
by 1990 Tract
Boundaries

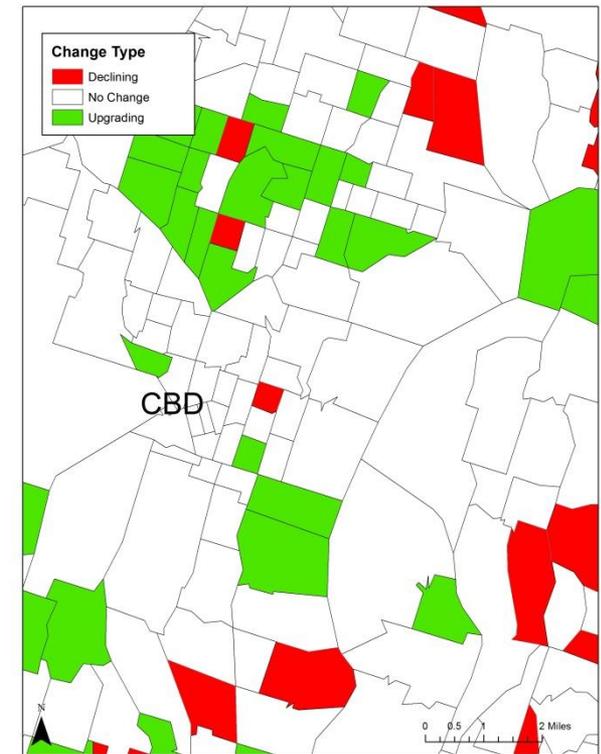
Results of the 3-D Double Decile Difference Method (1990-2010) for Central Boston, San Francisco, and Seattle: Black indicates declining neighborhood; Gray indicates upgrading neighborhoods



Central Boston
Census Tracts

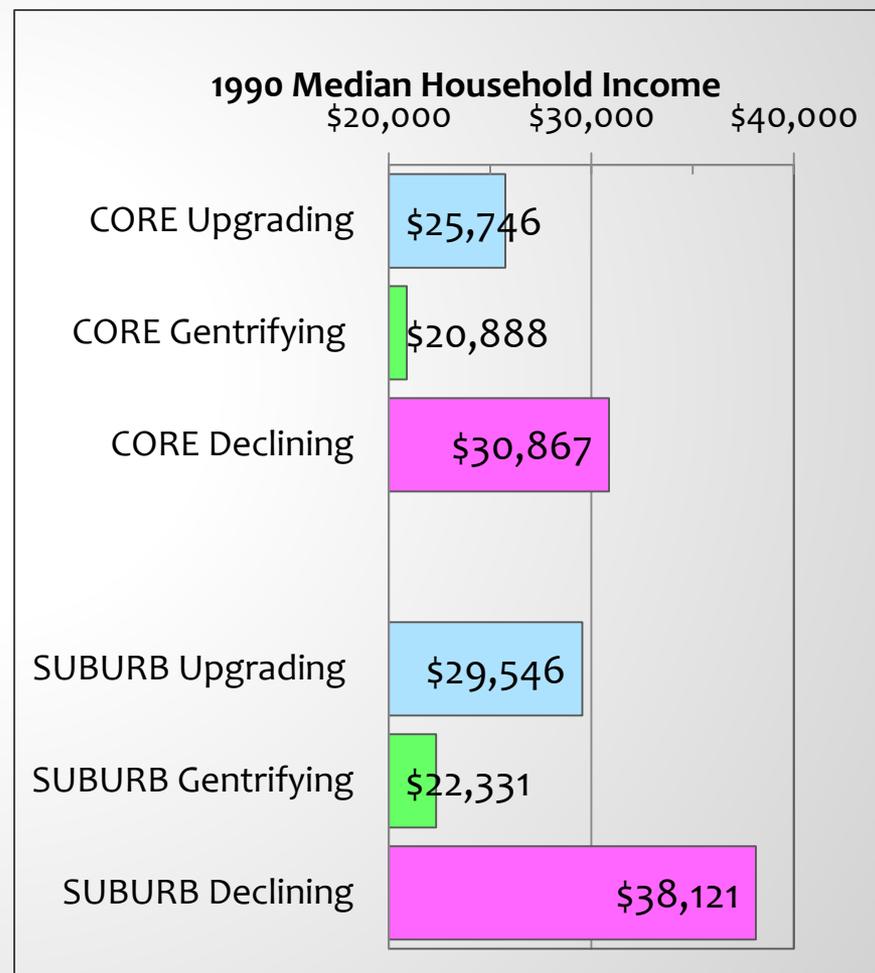
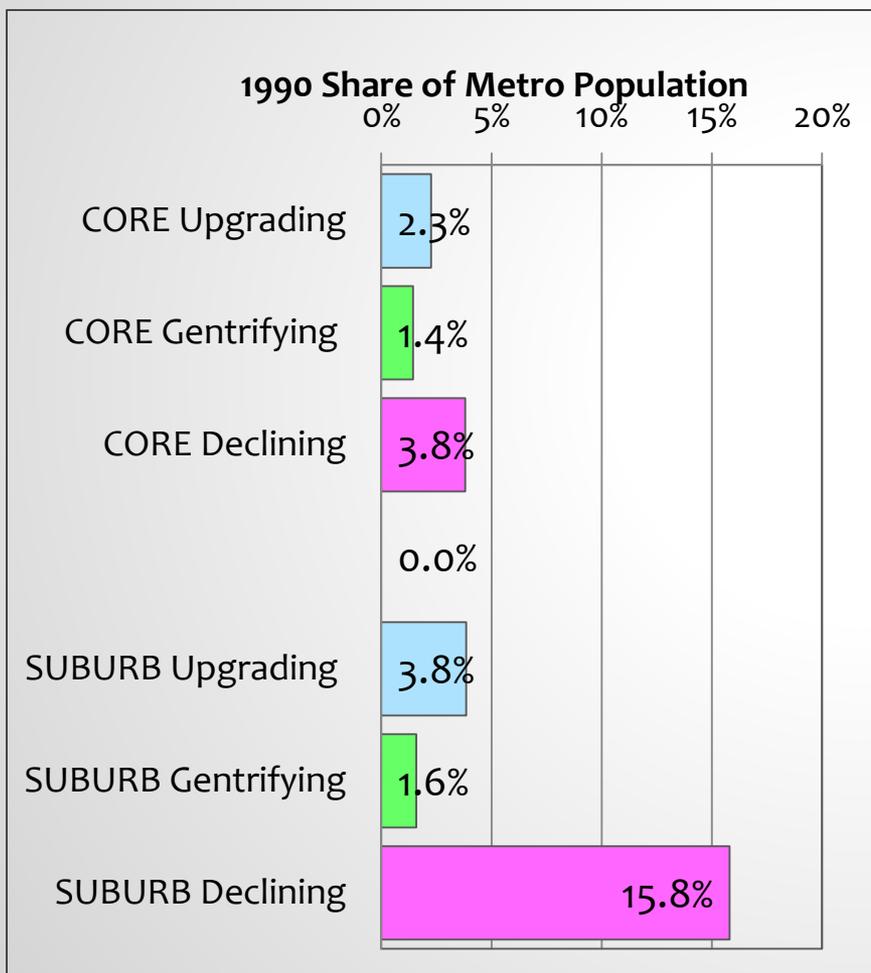


Central San Francisco
Census Tracts

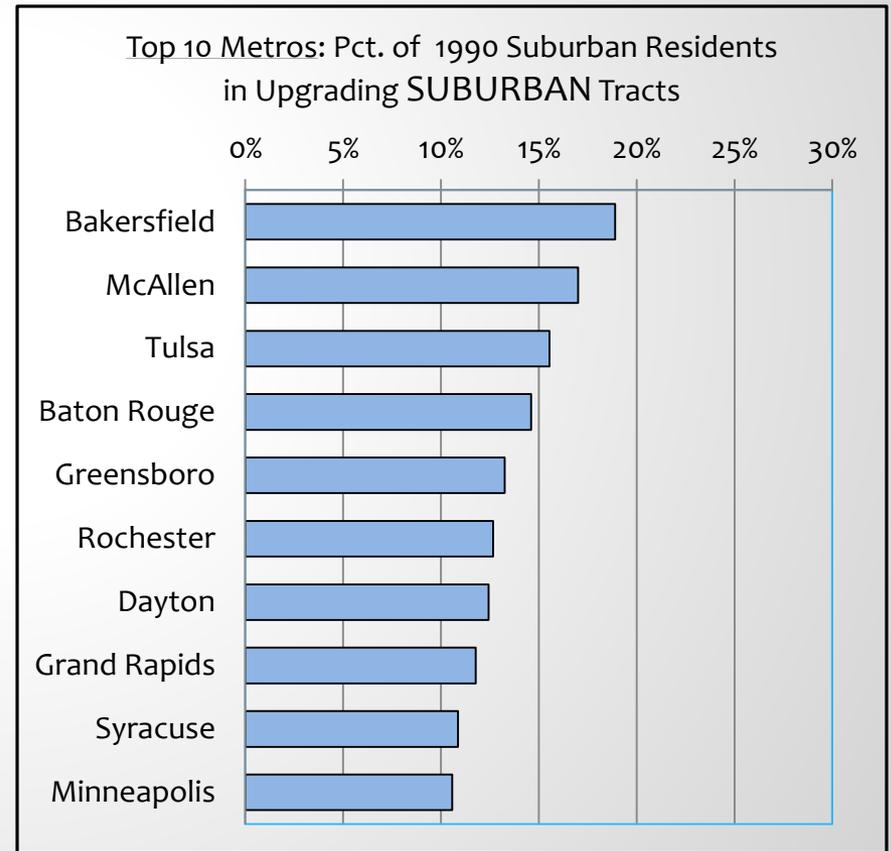
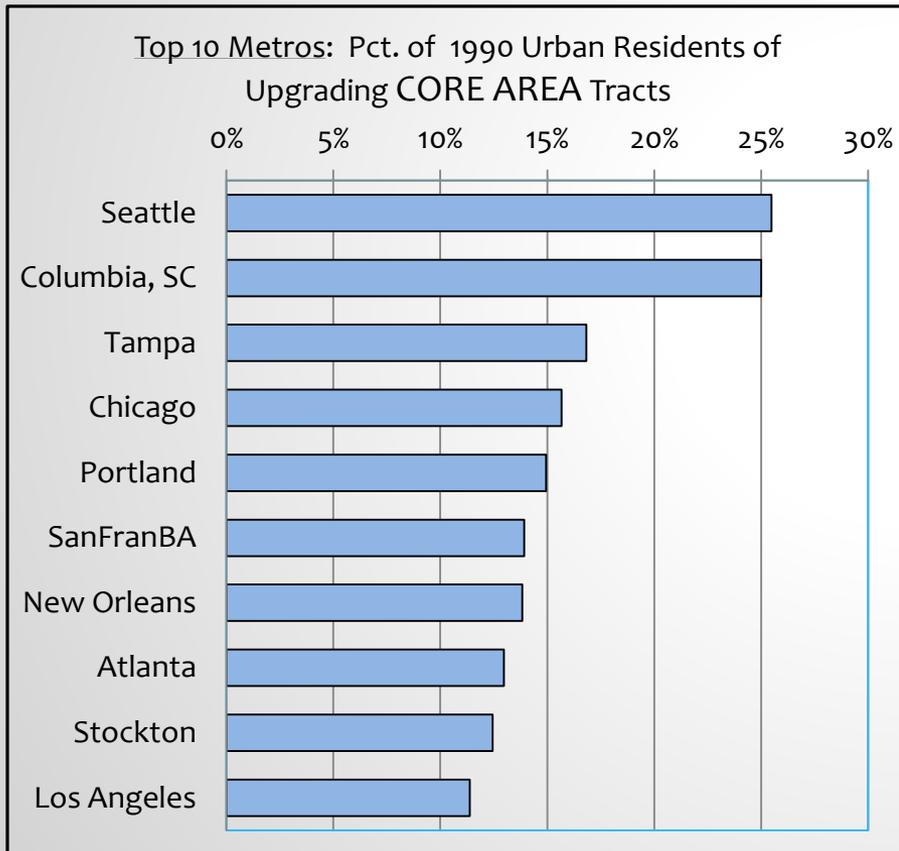


Central Seattle
Census Tracts

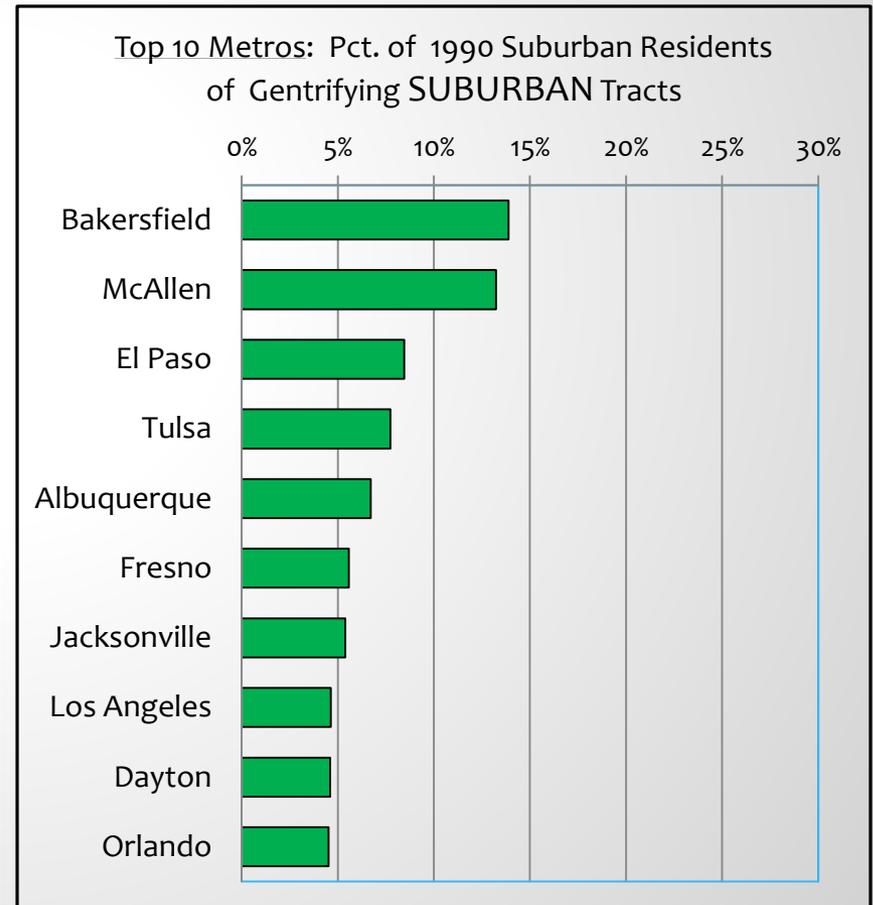
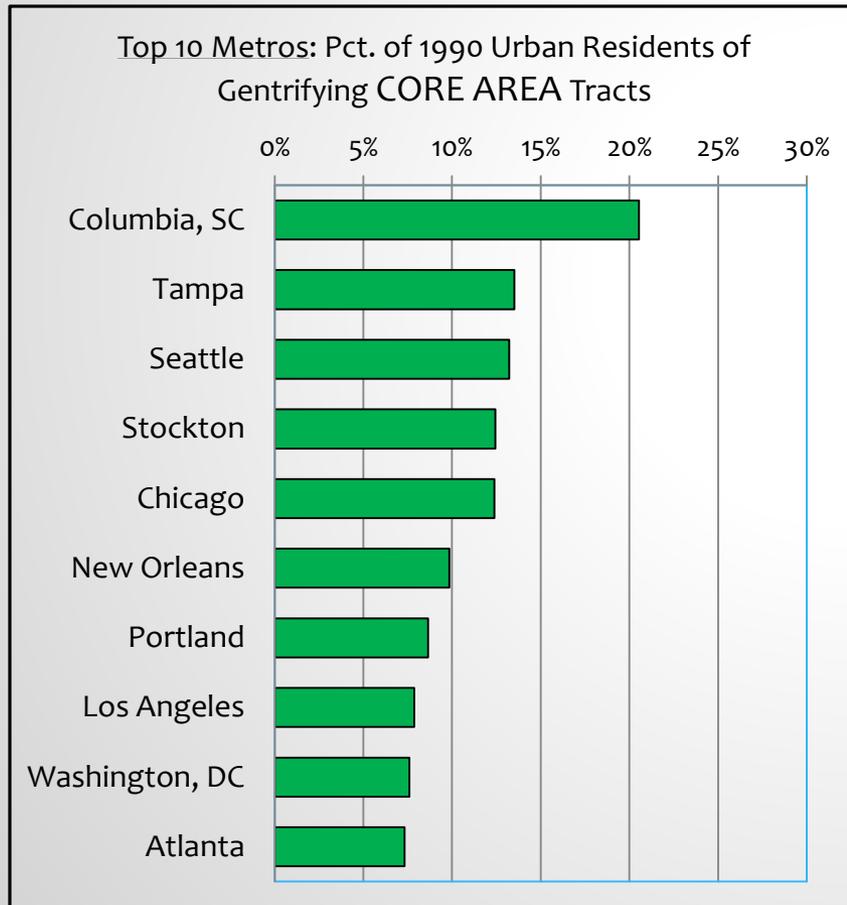
COUNTING NEIGHBORHOOD CHANGE IN THE 70 LARGEST US METROS, 1990 - 2010



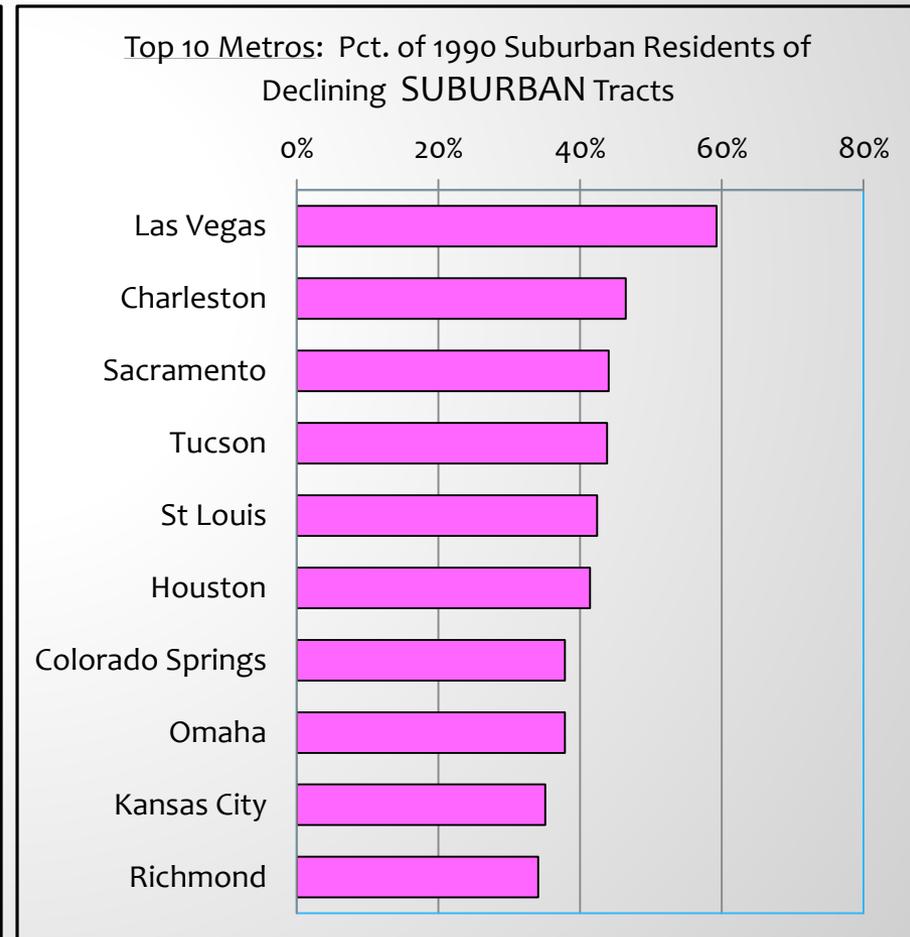
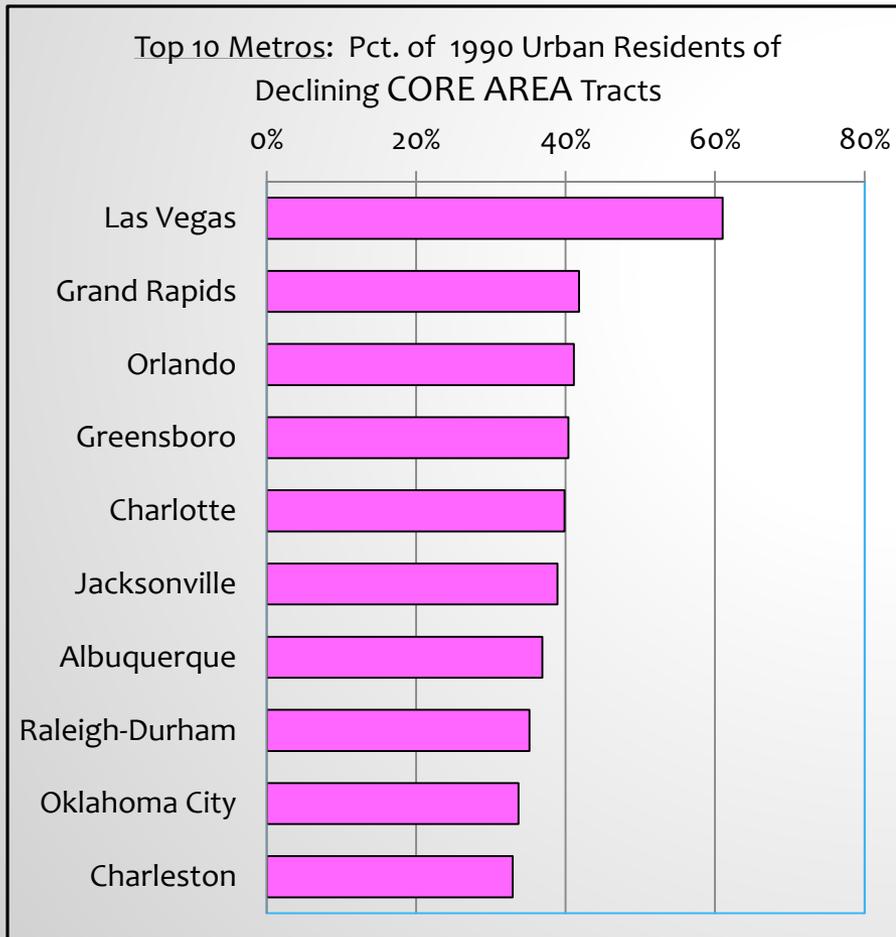
TOP 10 METROS BY CORE AREA AND SUBURBAN UPGRADING SHARES, 1990-2010



TOP 10 METROS BY CORE AREA AND SUBURBAN GENTRIFICATION SHARES, 1990-2010



TOP 10 METROS BY CORE AREA AND SUBURBAN DECLINING SHARES, 1990-2010



2.

TO WHAT DEGREE ARE GENTRIFICATION
AND OTHER FORMS OF NEIGHBORHOOD
CHANGE THE RESULT OF METROPOLITAN-
SCALE ECONOMIC AND DEMOGRAPHIC
FORCES VERSUS MORE “BOTTOM-UP”
AND NEIGHBORHOOD-SPECIFIC FORCES
AND DYNAMICS?

POTENTIAL METRO-SCALE PREDICTORS OF NEIGHBORHOOD CHANGE ACTIVITY

Independent Variables	Expected Relationship to			Data Source
	Upgrading Share	Gentrification Share	Declining Share	
Metropolitan Population (1990)	+	+	+	1990 Census
Percent Population Growth (1990-2010)	+	+	-	1990 Census
Median Household Income (1990)	+	+	-	1990 Census
Percent Change in Real Median HH Income (1990-2010)	+	+	-	1990 Census
Median Home Value (averaged across all tracts, 1990)	+	+	-	1990 Census
FHFA Housing Price Index (2007, 1990=100)	+	+	-	Fed. Housing Fin. Agency
Percent of Homes built prior to 1950 (1990 tract average)	+	+	-	1990 Census
Percent White Residents (averaged across all tracts, 1990)	+	+	?	1990 Census
Percent of Family HHs with Children (2000)	?	?	?	1998 Census
Percent of Adults with Bachelors Degrees (2000)	+	+	?	1999 Census
Percent Foreign-born Population (2000)	+	+	?	2000 Census
Estimated Density Gradient Slope (1990)	-	-	?	estimated from Census
Estimated Density Gradient Intercept (1990)	+	+	?	estimated from Census
Status as Immigration Gateway	+	+	-	Singer, 2004
Presence of Urban Containment Program (0/1)	+	+	-	Pendall & Martin, 2006
Presence of Infrastructure Capacity Limits (0/1)	+	+	-	Pendall & Martin, 2006

STEPWISE REGRESSION RESULTS COMPARING NEIGHBORHOOD CHANGE SHARES WITH SELECTED METRO CHARACTERISTICS (N=68)

Core Upgrading Pop Share (r2= .19)	Core Gentrifying Pop Share (r2=.19)	Core Declining Pop Share (r2=.44)
+ DV_Urb_Contain	+ DV_Urb_Contain	+ %Pop_Ch90-2010
	- Avg % White_1990	- CBD_Density
		- Avg. MedIncome
Suburban Upgrading Pop Share (r2= .28)	Suburban Gentrifying Pop Share (r2=.44)	Suburban Declining Pop Share (r2=.31)
- CBD_Density	+ Pct. HH w/kids	+ %Pop_Ch90-2010
+ Pct. HH w/kids	- CBD_Density	- %Foreign-born

3.

TO WHAT DEGREE ARE GENTRIFICATION AND OTHER TYPES OF NEIGHBORHOOD CHANGE SHAPED BY THE ACTIONS OF INDIVIDUAL HOUSEHOLDS, PROPERTY-OWNERS, DEVELOPERS, AND SPECULATORS ACTING AT THE NEIGHBORHOOD LEVEL?

POTENTIAL TRACT-LEVEL PREDICTORS OF NEIGHBORHOOD CHANGE OUTCOMES

Tract-level Measure	Data Source	Hypothesized Effect on the Probability of a Neighborhood Change Outcome		
		Tract Upgrading	Tract Gentrification	Tract Decline
Median Household Income, 1990	1989 Census	+	+	-
Percent White Population, 1990	1990 Census	+	+	?
Percent African-American Population, 1990	1990 Census	?	?	?
Percent Hispanic Population, 1990	1990 Census	?	?	?
Percent of Families in Poverty, 1990	1990 Census	-	-	+
Percent of Adult Workers with a Bachelors Degree, 1990	1990 Census	+	+	-
Percent of Single-family Homes, 1990	1990 Census	?	?	?
Percent of Multi-family Dwelling Units, 1990	1990 Census	?	?	?
Percent of Dwelling Units Built prior to 1950 (1990)	1990 Census	+	+	+
Percent of Dwelling Units Built between 1950 and 1970	1990 Census	?	?	?
Percent of Dwelling Units Built between 1970 and 1990	1990 Census	?	?	-
Straight Line Distance from Tract Centroid to City Center	1990 Census	+	+	?
Average (Tract) Population Density	Calculated in GIS	+	+	?
Census Tract Centroid X-coordinate	Calculated in GIS	+	+	+
Census Tract Centroid Y-coordinate	Calculated in GIS	+	+	+
Median Rent Level, 1990	1990 Census	+	+	-
Median Home Value, 1990	1990 Census	+	+	-
Estimated Rent Gap	Estimated	-	-	+
Calculated Metropolitan Area Effect	Calculated	+	+	-

NEIL SMITH'S RENT GAP EXPLAINED

- The “rent gap” is the difference between what a given dwelling unit or set of similar units **actually** rents/sells for, and **what it should** rent/sell for given its location and characteristics
- A **positive** rent gap indicates a unit/neighborhood is **overpriced** (selling at a premium) and is thought to deter speculation and gentrification.
- A **negative** rent gap indicates a unit/neighborhood is **underpriced** (selling at a discount) and is thought to encourage speculation and gentrification
- For each metro area, we regressed 1990 median census tract rent against measures of age, distance, density, and neighborhood demographics to create a tract-based median rent estimate; and then subtracted the regression estimates from the actual tract median rent to calculate a rent gap.

...IN OTHER WORDS



Doonesbury 1997

STEPWISE LOGIT RESULTS COMPARING CORE AREA TRACT OUTCOMES WITH TRACT CHARACTERISTICS

Prob [Tract Upgrading]		Prob [Gentrifying]		Prob [Tract Declining]	
Indepen. Variable	Effect	Indepen. Variable	Effect	Indepen. Variable	Effect
Relative Median Rent	+++	Rel. Median Rent	+++	Rel HH Inc.	+++
Rel %Coll_Educ	++	Rel %White	++	Rel Dist to CBD	+++
Rel %White	++	Rel %Coll_Educ	+	Rel %SF DU	++
Rel %DU < 1950	+	Rel %DU < 1950	+	Rel %MF DU	++
Rel Home_Value	+	Metro-scale Effect	+	Rel %DU 1950-1970	+
Metro-scale effect	+	Median HH Income	+	Metro-scale Effect	+
Median HH Income	+	Rel %Poverty	-	Rel X-coordinate	+
Population	-	Rel HH Income	---	Rel %White	-
Rel Pop. Density	-			Rel %Poverty	-
Rel %DU 1950-1970	-			Rel Med Home Value	--
Rel HH Income	---			Rel Y-coordinate	---
Observations (Tracts)	760	Observat. (Tracts)	583	Observations (Tracts)	797
% Correct Predictions	12%	% Correct Predictions	3%	% Correct Predictions	41%

STEPWISE LOGIT RESULTS COMPARING SUBURBAN TRACT OUTCOMES WITH TRACT CHARACTERISTICS

Prob [Tract Upgrading]		Prob [Gentrifying]		Prob [Tract Declining]	
Indepen. Variable	Effect	Indepen. Variable	Effect	Indepen. Variable	Effect
<i>Rel. Med. Home Value</i>	++	<i>Rel %White</i>	+++	<i>Rel HH Inc.</i>	+++
<i>Rel %White</i>	++	<i>Rel Med Home Value</i>	++	<i>Rel Median Rent</i>	++
Rel %DU < 1950	+	Rel %SF DU	+	<i>Rel %MF DU</i>	++
Rel %DU > 1970	+	Metro-scale Effect	+	Rel %DU 1950-1970	+
Metro-scale Effect	+	Rel Dist to CBD	+	Rel Y-coordinate	+
Rel Dist to CBD	+	Rel %DU > 1970	+	Rel %African-Amer	+
Rel X-coordinate	+	Rel %DU < 1950	+	Metro-scale effect	+
Rel %Poverty	-	Rel X-coordinate	+	Rel Dist to CBD	-
Rel %MF DU	-	<i>Estimated Rent Gap</i>	+	Ren %White	-
Rel Pop. Density	-	<i>Rel %MF DU</i>	-	Rel %DU <1950	-
<i>Rel HH Income</i>	---	<i>Rel HH Income</i>	---	<i>Rel Med Home Value</i>	--
Observations (Tracts)	1129	Observat. (Tracts)	529	Observations (Tracts)	1,882
% Correct Predictions	11%	% Correct Predictions	11	% Correct Predictions	58%

4.

TO WHAT EXTENT ARE GENTRIFICATION
AND OTHER FORMS OF NEIGHBORHOOD
CHANGE ALWAYS ACCOMPANIED BY THE
DISPLACEMENT OF EXISTING
RESIDENTS?

TOP AND BOTTOM 10 METROS BY CORE RANKED BY AVERAGE (2010) ONE-YEAR TURNOVER RATE

Metro Area	2010 One-year Average Turnover Rate	Number of tracts
Colorado	24%	130
Austin	23%	350
Las Vegas	22%	540
New Orleans	22%	402
Phoenix	22%	991
Oklahoma City	21%	362
Sacramento	21%	486
Columbia, SC	21%	164
Little Rock	21%	157
Kansas City	21%	522

Metro Area	2010 One-year Average Turnover Rate	Number of tracts
Providence	14%	266
Hartford	14%	296
Chicago	14%	2,022
Pittsburg	14%	692
Buffalo	14%	297
Philadelphia	13%	998
New York City	12%	2,697
New Haven	12%	417
Seattle	12%	822
Newark	11%	1,102

FACTORS ASSOCIATED WITH HIGHER AND LOWER (ONE-YEAR) TURNOVER RATES AT THE CENSUS TRACT LEVEL

Dependent Variable: Percentage Difference in 2010 One-Year Turnover Rates between Each Census Tract and Its Corresponding Metropolitan Area				
Independent Variable	Coefficient	Significant?	Coefficient	Significant?
Declining Tract, 1990-2010 (0/1)	0.08	Yes	-0.01	No
Upgrading Tract, 1990-2010 (0/1)	-0.02	Marginally	-0.01	No
Median Household Income			0.00	Yes
Relative (Median) HH Income			-0.18	Yes
Relative Median Age			-1.91	Yes
Relative % 1-person Households			0.53	Yes
Relative % Renters			0.07	Yes
Relative Unemployment Rate			-0.08	Yes
Relative % in Poverty			-0.07	Yes
r-squared	0.046		0.39	
Number of Observations	41,991		41,991	

POLICY GUIDANCE

- **Center city planners** seeking to promote neighborhood upgrading should focus their efforts on older and walkable neighborhoods having a diverse and aspirational population.
- **Center city planners** seeking to anticipate and stem decline should keep a close eye on more distant neighborhoods, those with proportionately more multi-family housing, and those with large populations already in poverty. They should also be aware that while decline is spatially contagious—that is, it tends to spillover from one neighborhood to another—upgrading is not.
- **Suburban planners** seeking to promote n upgrading and reinvestment should focus their efforts on older, moderate-density neighborhoods with higher rates of owner-occupancy, and a history of stable property values. These same characteristics also describe suburban neighborhoods poised for gentrification, so as in central cities, the focus of local gentrification policy should not be to stop it, but to safeguard long-time residents from rapidly rising home prices and rents; and, where possible, to make sure that some of the increases in local tax revenues are directed back to the neighborhoods where those increases were generated.

POLICY GUIDANCE

- In terms of anticipating and heading off decline, **suburban planners** should focus their efforts on racially diverse neighborhoods and neighborhoods with a higher proportion of multi-family homes—two characteristics that indicate greater vulnerability to disinvestment; on neighborhoods with comparatively high rents but low property values; and on older, less-walkable neighborhoods.