Gentrification and Neighborhood Dynamics

Nathaniel Baum-Snow, Brown University
Daniel Hartley, Federal Reserve Bank of Cleveland

Research Goals

- Characterize neighborhood change in large U.S. metropolitan areas since 1970, focusing on areas within 5 km of central business districts

- Investigate reasons for the recent gentrification of central neighborhoods

    - Shifts in overall demographic composition
    - Shifts in neighborhood choices made by particular demographic groups

- Examine why neighborhood choices have changed

    - Changes in the labor demand environment in city centers
    - Changes in the consumer amenity value or demand for consumer amenities in city centers

Central Neighborhood Change Since 1970

	Population Within 5 km of a CBD	
	Total	CBSA Share
Levels		
1970	19,382,696	0.237
1980	17,332,137	0.190
1990	16,973,575	0.167
2000	16,967,954	0.149
2010	16,846,052	0.136
Decadal Changes		
1970-1980	-2,050,559	-0.047
1980-1990	-358,562	-0.023
1990-2000	-5,621	-0.018
2000-2010	-121,902	-0.013
1980-2000	-486,085	-0.053

- The big picture here is of less rapid population decline in central neighborhoods
- CBSA share numbers weight each of the 118 CBSAs in our sample equally

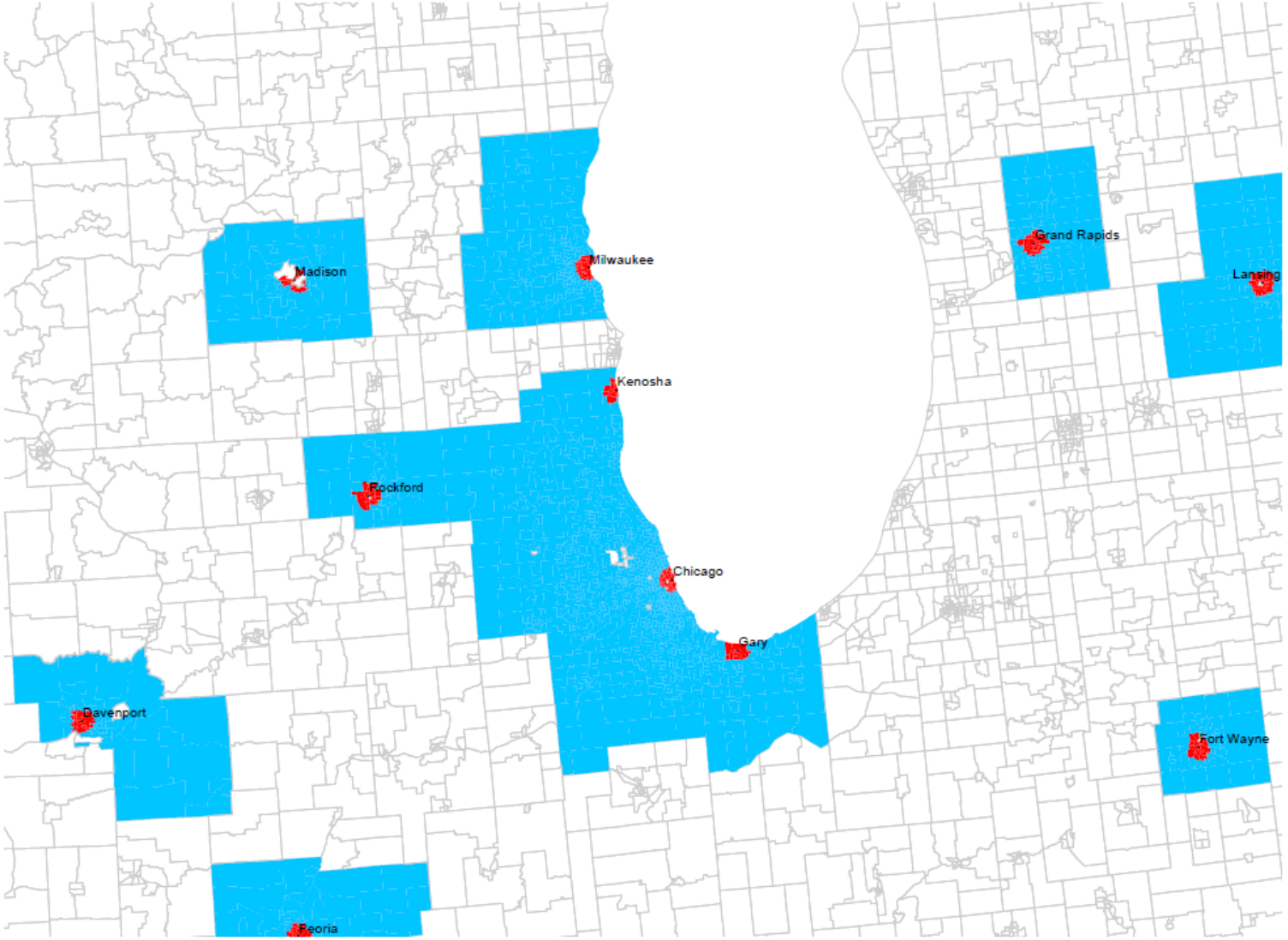
Central Neighborhood Change Since 1970

Share of Pop Within 5km of CBD that Lives in a Top CBSA Tercile Tract

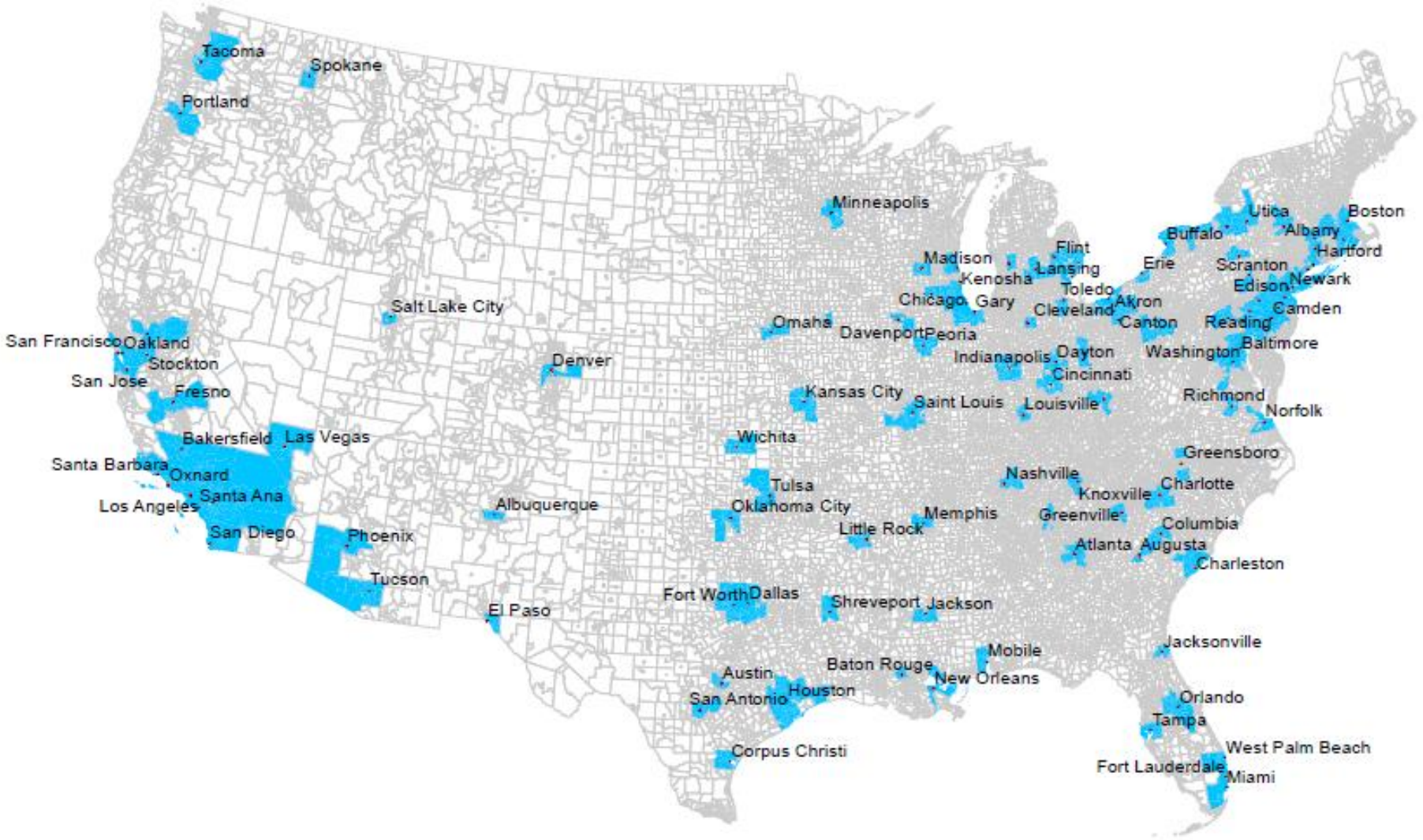
	Fraction White	Frac College Ed	Mean HH Income	SES Index
Levels				
1970	0.138	0.251	0.133	0.179
1980	0.140	0.268	0.093	0.154
1990	0.125	0.271	0.110	0.165
2000	0.125	0.270	0.117	0.168
2010	0.151	0.315	0.153	0.208
Decadal Changes				
1970-1980	0.002	0.016	-0.040	-0.025
1980-1990	-0.015	0.003	0.017	0.012
1990-2000	0.000	-0.001	0.007	0.003
2000-2010	0.026	0.045	0.036	0.040
1980-2000	0.011	0.048	0.060	0.054

- Big income declines during the 1970s turned around afterwards, with all gentrification indicators showing strong growth by 2000-2010
- Central neighborhoods are still more distressed than average neighborhoods – all levels are less than 0.33.
- SES Index is an equally weighted Z-Score of the three gentrification measures

CBSAs and Central Neighborhoods in The Mid-West

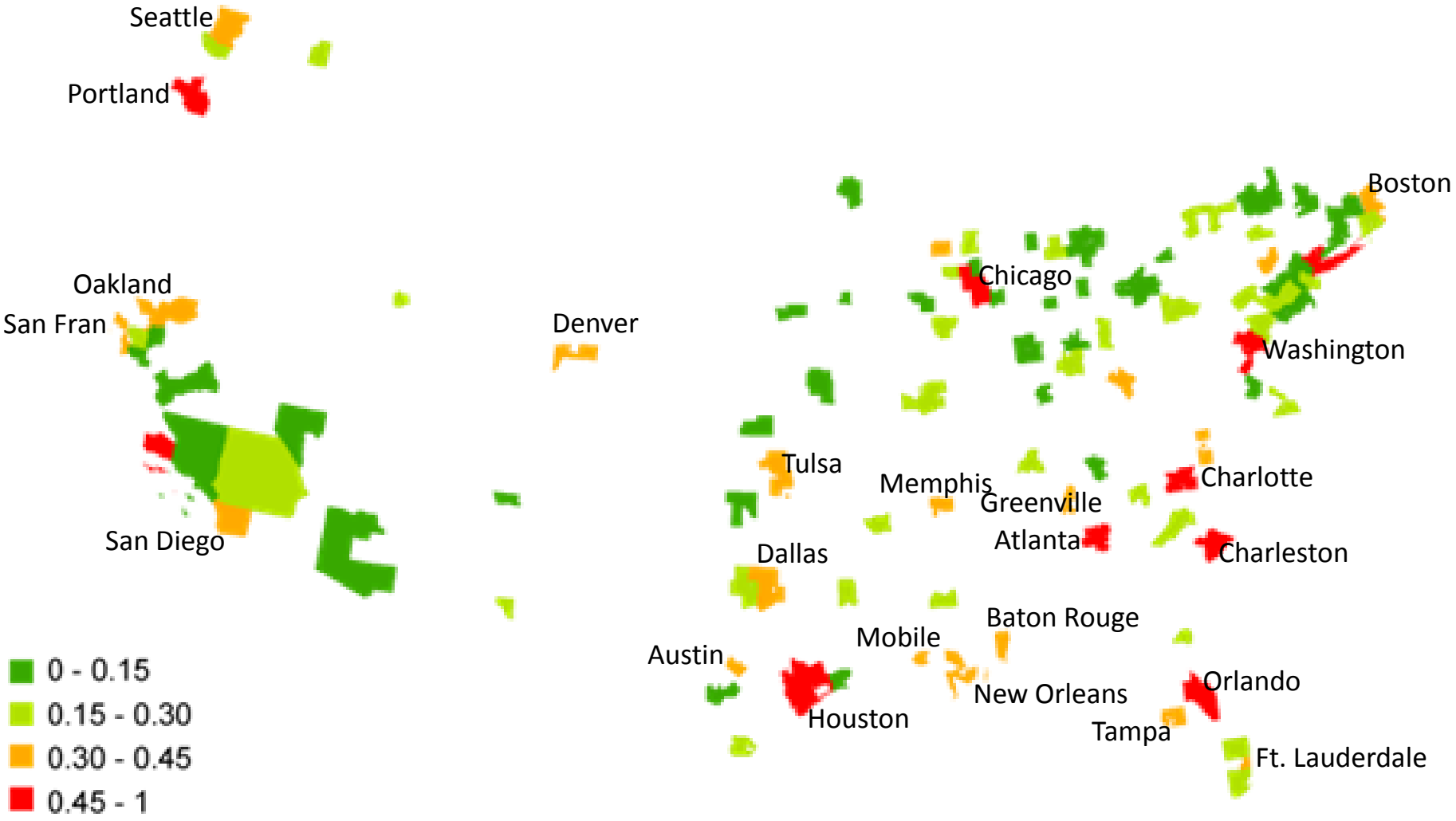


Full Sample of CBSAs



Share of Central Area Residents Living in a Top Tercile Census Tract: 1980

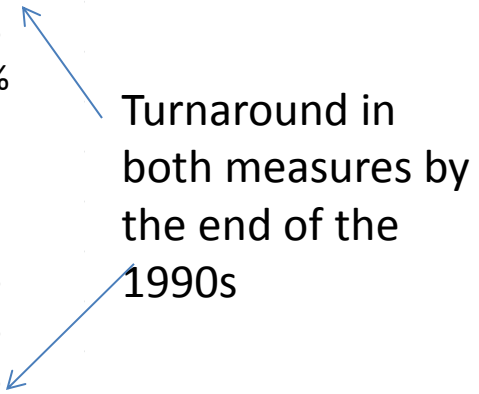
Share of Central Area Residents Living in a Top Tercile Census Tract: 2010



Central Neighborhood Change Since 1970

Share of Population within 5km of CBD in Tract Changing by at Least

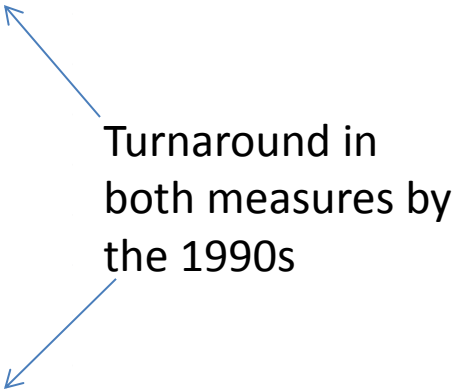
	20 Percentile Points		1/2 Standard Deviation	
	up	down	up	down
Fraction White				
1970-1980	8.3%	11.9%	11.8%	13.8%
1980-1990	5.1%	8.3%	6.8%	9.8%
1990-2000	6.9%	5.7%	9.4%	9.3%
2000-2010	9.3%	5.4%	13.5%	9.0%
1980-2010	9.2%	5.5%	25.3%	19.8%
Fraction College Educated				
1970-1980	6.9%	8.7%	9.8%	7.8%
1980-1990	4.8%	5.0%	6.4%	6.7%
1990-2000	4.1%	4.8%	5.2%	6.3%
2000-2010	9.3%	3.9%	12.5%	5.3%
1980-2010	10.1%	3.8%	19.7%	14.4%



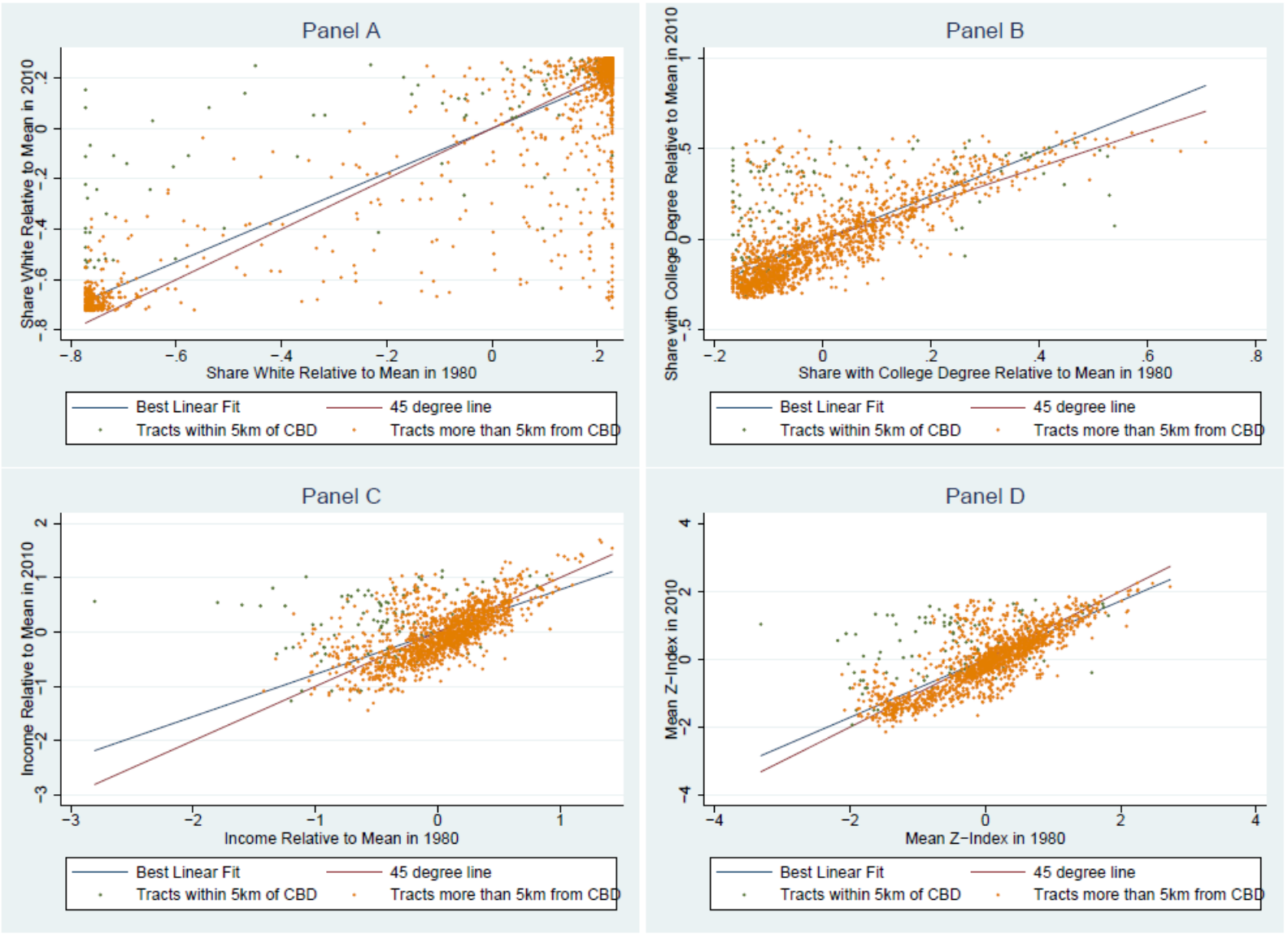
Central Neighborhood Change Since 1970

Share of Population within 5km of CBD in Tract Changing by at Least

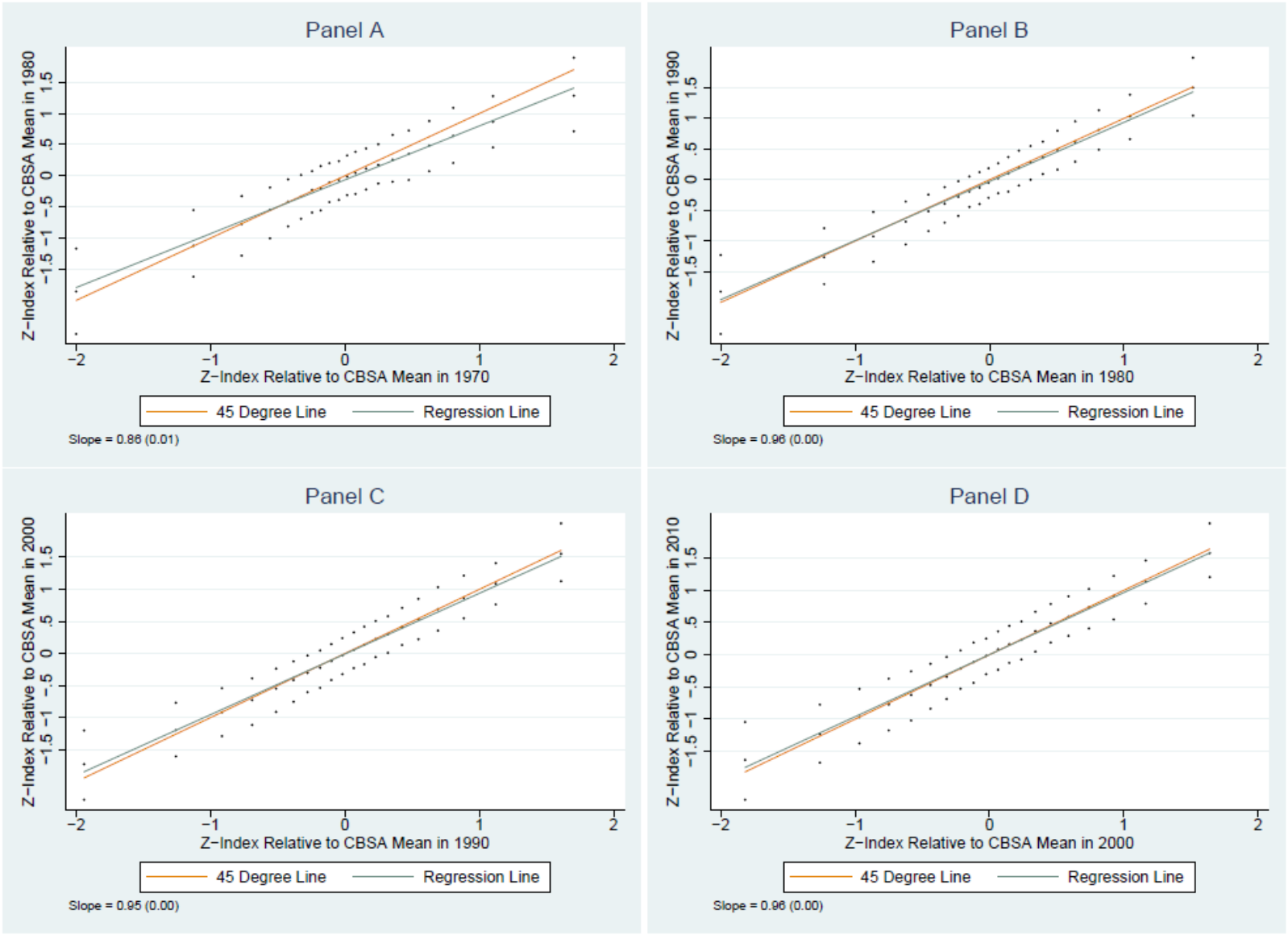
	20 Percentile Points		1/2 Standard Deviation	
	up	down	up	down
Average Income				
1970-1980	1.7%	9.2%	12.9%	14.8%
1980-1990	5.2%	2.1%	9.4%	12.6%
1990-2000	5.3%	2.4%	13.8%	6.2%
2000-2010	8.3%	3.4%	15.5%	11.8%
1980-2010	8.5%	3.5%	24.1%	20.3%
SES Index				
1970-1980	2.8%	7.2%	5.1%	8.6%
1980-1990	2.9%	3.2%	3.5%	3.9%
1990-2000	3.1%	2.5%	5.3%	3.6%
2000-2010	6.8%	2.0%	9.1%	3.4%
1980-2010	7.0%	1.9%	20.0%	13.2%



1980-2010 Neighborhood Change in Chicago



Distributions of Neighborhood Change in Equally Weighted CBSAs



Investigating CBSA Level Neighborhood Convergence

- Use slope of CBSA regression line in tract dynamics analysis as an outcome
  - <1 = Neighborhood Convergence
  - 1 = No change in neighborhood inequality
  - >1 = Neighborhood Divergence
- Investigate whether local demand shocks (Bartik shocks) predict changes
- Set it up so that the constant equals the average CBSA neighborhood convergence index

Investigating CBSA Level Neighborhood Convergence

Period		Inequality Criterion: Fraction White	Fraction College Ed	Mean HH Income	SES Index
1970-1980	Constant	1.001	1.114	0.883	0.869
		(0.014)	(0.008)	(0.017)	(0.008)
1980-1990	ΔLn(Employment),	-0.080	-0.036	-0.115	-0.038
	standard devs.	(0.032)	(0.013)	(0.055)	(0.013)
	Constant	0.976	1.109	0.910	0.963
		(0.011)	(0.005)	(0.025)	(0.004)
1990-2000	Constant	0.934	1.056	0.896	0.946
		(0.012)	(0.006)	(0.006)	(0.005)
2000-2010	ΔLn(Employment),	-0.043	-0.009	-0.082	-0.032
	standard devs.	(0.023)	(0.011)	(0.025)	(0.011)
	Constant	0.869	1.002	1.006	0.963
		(0.011)	(0.005)	(0.009)	(0.004)
1980-2000	ΔLn(Employment),	-0.123	-0.085	-0.155	-0.091
	standard devs.	(0.053)	(0.026)	(0.064)	(0.023)
	Constant	0.773	1.184	0.846	0.849
		(0.021)	(0.012)	(0.026)	(0.007)

- Employment growth only included when it can be instrumented for with Bartik shocks
- Results indicate growing CBSAs experienced more neighborhood convergence

Investigating Central Area Gentrification

- Estimate tract level regressions like the following:

$$\Delta S_{ij} = \rho_j + \sum_{d=1}^{4} \alpha_d cbddis_{ij}^d + \alpha_1^b cbddis_{ij}^1 Bartik_j + \alpha_1^s cbddis_{ij}^1 Spatbartik_j + \sum_{d=1}^{4} \beta_d topdis_{ij}^d + \sum_m \delta_m \ln(amendis_{ij}^m) + \varepsilon_{ij}$$

Change in SES Index Or House Price Index

CBSA Fixed Effects

CBD 5km Distance Interval Fixed Effects

Interaction with Standard CBSA Bartik Demand Shifter

Interaction with Bartik Demand Shifter Calculated on CBD Employment Only (yr 2000 as base)

Distance Intervals To Top Quartile SES Tracts in 1970

Distances to Local Fixed Amenities (Coastlines, Mountains, etc.)

- Separate results for low, middle and high tercile tracts, measured as of 1970

Central Area Neighborhood Change: Bottom Tercile Neighborhoods

	1970-1980	1980-1990	1990-2000	2000-2010	1980-2010
1(< 5km to CBD)	-0.081	-0.047	0.053	0.063	0.081
	(0.023)	(0.019)	(0.017)	(0.021)	(0.038)
Employment Bartik * 1(< 5km to CBD)	-0.053	0.003	0.043	0.007	0.100
	(0.022)	(0.014)	(0.017)	(0.019)	(0.040)
Spatial Employment Bartik * 1(< 5km to CBD)	0.036	0.008	0.004	0.034	0.042
	(0.021)	(0.009)	(0.017)	(0.016)	(0.031)

- Shift from decline to growth around 1990
- Overall demand shifts for CBSAs associated with central declines in the 1970s and (maybe) central area growth in 1990s
- Demand shifts for workers in CBD areas associated with growth of SES status of CBD residents

Central Area Neighborhood Change: Other Neighborhoods

	1970-1980	1980-1990	1990-2000	2000-2010	1980-2010
Middle Tercile					
1(< 5km to CBD)	-0.167	-0.074	-0.066	-0.022	-0.162
	(0.026)	(0.022)	(0.017)	(0.019)	(0.046)
Employment Bartik * 1(< 5km to CBD)	-0.017	-0.001	0.021	0.006	0.098
	(0.018)	(0.017)	(0.020)	(0.019)	(0.046)
Spatial Employment Bartik * 1(< 5km to CBD)	-0.015	0.036	0.015	0.046	0.082
	(0.018)	(0.018)	(0.027)	(0.021)	(0.041)
Top Tercile					
1(< 5km to CBD)	-0.048	0.011	-0.033	0.009	-0.012
	(0.041)	(0.023)	(0.020)	(0.020)	(0.044)
Employment Bartik * 1(< 5km to CBD)	-0.058	0.003	-0.024	-0.025	-0.002
	(0.041)	(0.023)	(0.017)	(0.022)	(0.049)
Spatial Employment Bartik * 1(< 5km to CBD)	0.068	0.019	0.037	0.048	0.088
	(0.042)	(0.021)	(0.023)	(0.028)	(0.050)

- Consistently positive or 0 coefficients on Spatial Employment Bartik interactions
- Less conclusive results otherwise

- Very similar results when using change in home tract home price index as the dependent variable

Investigating Demographic Shifts Versus Changes in Demand

- The reversal of fortunes in central area neighborhoods may reflect growing educational attainment and rising incomes of those above the median of the income distribution
- Or it may reflect changes in neighborhood choices

- Investigate this with the following decomposition:

$$f_{jt}(i,r,e) = f_{jt}(i \mid r,e)\, f_{jt}(r \mid e)\, f_{jt}(e)$$

fraction of CBSA *j* population at time *t* with race *r*, education level e and living in tract *i*

fraction of population with race *r* and education level *e* living in tract *I*

(neighborhood choices)

fraction of population with education *e* of race *r*

(conditional shares)

fraction of population with education *e*

- Investigate analogous decompositions over race and income quintiles

Counterfactual Neighborhood Compositions

- Counterfactual 1: Race distribution conditional on education as of 1980

$$\bar{f}_{jt}(i,r,e) = f_{jt}(i \mid r,e)\, f_{j1980}(r \mid e)\, f_{jt}(e)$$

- Counterfactual 2: Full demographic shares reallocation to 1980

$$\hat{f}_{jt}(i,r,e) = f_{jt}(i \mid r,e)\, f_{j1980}(r \mid e)\, f_{j1980}(e)$$

- Counterfactual 3: Allocations reallocation to 1980

$$\tilde{f}_{jt}(i,r,e) = f_{j1980}(i \mid r,e)\, f_{jt}(r \mid e)\, f_{jt}(e)$$

All counterfactuals use total CBSA population from year *t*

Counterfactual Changes in Fraction of Population Within 5 km of CBDs

Race & Education Counterfactuals

	Baseline for Population	Race Shares cond on Edu	Full Shares	Allocations
1980-1990	-0.023	-0.024	-0.020	0.001
1990-2000	-0.018	-0.024	-0.021	0.005
2000-2010	-0.013	-0.013	-0.011	0.001
1980-2010	-0.053	-0.061	-0.052	0.006

Race & National HH Income Quintile Counterfactuals

	Baseline for Fam/HH	Race Shares cond on Income	Full Shares	Allocations
1980-1990	0.010	0.025	0.001	0.029
1990-2000	-0.020	-0.027	-0.014	-0.007
2000-2010	-0.014	-0.017	-0.025	0.015
1980-2010	-0.024	-0.019	-0.038	0.036

- Broad conclusion is that allocations have mattered a lot more than shares
  - Groups with large population shares are living in central areas of cities at much lower rates than in 1980

Counterfactual Changes in Fraction of Population Within 5 km of CBDs That is in a Top Tercile Tract

Race & Education Counterfactuals, Fraction White

	Baseline	Race Share Cond. On Edu	Full Shares	Allocations
1980-1990	-0.015	-0.031	-0.040	0.012
1990-2000	0.000	0.017	0.004	-0.005
2000-2010	0.026	0.030	0.033	-0.001
1980-2010	0.011	0.016	-0.002	0.006

Race & National HH Income Quintile Counterfactuals, Fraction White

	Baseline	Race Share Cond. On Income	Full Shares	Allocations
1980-1990	-0.042	-0.046	-0.020	0.004
1990-2000	-0.001	0.005	-0.008	-0.005
2000-2010	0.024	0.026	0.045	-0.016
1980-2010	-0.019	-0.015	0.017	-0.016

- Racial change and education change go in opposite directions for shares
- Whites are choosing downtown neighborhoods more, raising white share
- Polarization of income distribution has hurt central neighborhoods

Counterfactual Changes in Fraction of Population Within 5 km of CBDs That is in a Top Tercile Tract

Race & Education Counterfactuals, Fraction College

	Baseline	Full Shares	Allocations
1980-1990	0.003	-0.013	0.009
1990-2000	-0.001	0.001	-0.001
2000-2010	0.045	0.032	0.009
1980-2010	0.048	0.020	0.016

Race & National HH Income Quintile Counterfactuals, Mean HH Income

	Baseline	Full Shares	Allocations
1980-1990	0.018	0.023	0.000
1990-2000	0.010	0.030	0.015
2000-2010	0.038	0.043	-0.023
1980-2010	0.066	0.097	0.000

- Shifts in both shares and allocations have promoted central area growth in fraction college
- Shifts in allocations but not shares have promoted central area income growth

Conclusions

- Areas within 5 km of CBDs of many large U.S. metropolitan areas have experienced remarkable demographic change especially since 2000

- Population decline of central areas driven by lower propensities of the poor, less educated and blacks to choose to live in these neighborhoods

- Growth in white populations driven by
  - Greater numbers of educated and high income people in the population (who happen to be more likely to be white)
  - Greater propensity of higher educated people to choose to live in central neighborhoods

- Growth in college fraction driven by
  - Both more educated people in the population and the greater propensity of higher educated people to live in central neighborhoods

- Income growth driven by
  - Greater propensity of high income people to choose to live in central neighborhoods

- Changes in neighborhood choice may be related to changes in labor demand conditions