



Economic Segregation in US Metropolitan Areas, 1970-2010

Paul A. Jargowsky
Professor of Public Policy
Rutgers University – Camden

Christopher Wheeler
Research Economist
N.J. Department of Community Affairs

November 2017

*Prepared for the 21st Century Cities Initiative
at Johns Hopkins University*

Acknowledgements: Thanks to Jacob Rugh and Rolf Pendall for reviewing earlier drafts of this paper.

Introduction

Household income inequality is increasing in the US, both nationally and within metropolitan areas (Owens 2016; Piketty and Saez 2003). Depending on how the housing stock is distributed and how households sort into neighborhoods, metropolitan income inequality translates into unequal neighborhoods. Inequality between neighborhoods causes concentration of poverty and leads to vastly different developmental contexts for children growing up in poor, middle-class, and affluent neighborhoods. This paper examines neighborhood inequality using new measures that highlight the separate contributions of income inequality, on the one hand, and economic segregation on the other. While both matter, we find that economic segregation is the driving force behind the variation between metropolitan areas in the degree of neighborhood inequality and that changes in economic segregation are more important in driving the changes in inequality from one decade to the next. We also examine case studies of metropolitan areas with large and small changes in economic segregation between 1970 and 2010, and examine the role of demographic and housing market changes that underlie these changes.

Economic segregation, i.e. the sorting of households into neighborhoods based on income or social class, is the geographic manifestation of income inequality. The relationship between the two concepts is both definitional and substantive, as they are dynamically related (Owens 2016; Quillian 2012; Reardon and Bischoff 2011). In this paper, we will document household inequality, neighborhood differentiation, and economic segregation in US metropolitan areas. We will examine the changes from 1970 to the present in income inequality in metropolitan areas, as measured by the Gini Coefficient, the income shares going to each quintile, the 90/10 percentile ratio, and other standard inequality measures. We can also examine those same statistics for neighborhoods – in particular, the neighborhood-level Gini Coefficient, the share of

total income going to the richest and poorest quintiles of neighborhoods, etc. Putting these two analyses together, we can then estimate how much of the socioeconomic variation among metropolitan neighborhoods is due to changes in the household income distribution (mostly driven by employment and trends in wage inequality) vs. how much is due to changes in the way income is sorted across neighborhoods (segregation processes like sprawl, gentrification, housing filtering, etc.).

Inequality in metropolitan areas is associated with slower economic and population growth (Glaeser, Resseger, and Tobio 2009). Economic segregation resulting in highly unequal neighborhoods is also linked to many social and economic problems. When low-income persons are segregated in high-poverty neighborhoods, they are systematically cut off from public resources in education, housing, and health care and simultaneously exposed to higher levels of crime, violence, and economic isolation (Sampson 2012; Sharkey 2013). Recent research increasingly documents that high-poverty neighborhoods have significant long-term consequences for their residents, particularly young children who grow up in such places (Chetty et al. 2014; Chetty, Hendren, and Katz 2015; Sharkey 2008).

Negative consequences of unequal neighborhoods are not limited to persons residing in low-income neighborhoods. Failing schools result in a less productive workforce. Crime and violence incur substantial costs in terms of enhanced security, policing, court systems, and incarceration. Poor health outcomes among those with no or publicly funded insurance drive up health care costs. The costs, financial and otherwise, of these outcomes are passed on to more privileged residents of metropolitan areas wherever they might reside (Acs et al. 2017; Dreier, Mollenkopf, and Swanstrom 2014). It can fairly be said that economic segregation exacerbates almost every issue in urban governance; it makes every problem harder to solve. Reducing

economic segregation, in turn, would have benefits across many policy domains and would complement and enhance public investments in education, health, housing, and public safety.

National Trends

We examine inequality among households and neighborhoods in 264 metropolitan areas for the period of 1970 through 2010. We use metropolitan areas as defined by the Office of Management and Budget as of 2010, project these boundaries back in time to 1970 where possible. Our data come from the Decennial Census for 1970, 1980, 1990, and 2000 and from the American Community Survey 5-year file spanning 2008-2012, which we designate by its midpoint, 2010. For household data, we reconstruct the distribution of income from aggregate data using a new technique developed by the authors (Jargowsky and Wheeler 2017). Census tracts serve as proxies for neighborhoods; we use contemporaneous census tracts rather than normalized census tracts as used in other studies to ensure consistency in neighborhood units. In the results presented here, we include all counties for which we had neighborhood data in each decade. The results are virtually identical if we limit the sample to a consistent set of counties in all decades. Further details of our data and methods are spelled out in Appendix A.

Metropolitan Income Inequality.

Much research has documented the national rise in household income inequality (Piketty 2014; Piketty and Saez 2003). Not surprisingly, metropolitan areas have grown more unequal as well (Acs et al. 2017; Owens 2016). Table 1 shows the average statistics on household income distributions for 264 metropolitan areas, weighted by the number of households. The average metropolitan area's mean income was little changed in the 1970s, but increased rapidly from 1980 to 2000, followed by a decline between 2000 and 2010 reflecting the financial crises and the deep recession that followed. Despite that decline, real mean income rose 17 percent

between 1970 and 2010. The variation in household income, as measured by the standard deviation, fell during the 1970s, but – as with the national figures – increased rapidly starting in 1980 before falling again between 2000 and 2010. Over the whole period, the standard deviation of household income increased by nearly 22 percent.

The overall gains reflected by the 18 percent increase in mean household income were not widely shared, however. The first four quintiles of households – four-fifths of the population – experienced a decline in their share of total metropolitan income. The second quintile – a good approximation of the working class – declined the fastest, dropping over 18 percent. Meanwhile the top quintile saw its share of total income rise from 44.8 percent to 49.9 percent. The rising tide lifted only the largest boats, as the most affluent households claimed very nearly half of all metropolitan income.

Table 1: Average Metropolitan Household Income Distribution

Year	Mean	Standard Deviation	Income Shares by Quintile				
			First	Second	Third	Forth	Fifth
1970	69,551	71,282	3.7	10.9	17.1	23.6	44.8
1980	71,162	62,484	4.1	10.4	16.8	24.1	44.6
1990	80,116	85,232	3.8	9.9	15.9	23.3	47.0
2000	87,269	98,389	3.7	9.5	15.2	22.6	49.0
2010	81,441	86,852	3.4	8.9	14.9	22.9	49.9
70-10 Chg (%)	17.1%	21.8%	-8.1%	-18.3%	-12.9%	-3.0%	11.4%

Note: weighted by households; includes all counties in each decade.

The percentiles of the average metropolitan income distribution, shown in Table 2, tell a similar story. The 10th, 25th, 50th (i.e. the median), 75th and 90th percentiles rose almost every decade from 1970 to 2000, but declined between 2000 and 2010. Between 1970 and 2010, the 10th percentile of household distribution in the average metropolitan area increased from \$12,700 to \$14,400 (14 percent), while the 25th percentile actually declined by 5 percent. Median income was little changed, but the 75th and 90th percentiles saw large gains. The 75th percentile rose 17 percent from \$88,000 to \$103,000 and the 90th percentile rose 30 percent from \$123,000 to

\$161,000. As a result of these changes, the gap between the first and third quartiles (IQR) increased from \$56,000 to \$73,000. The 90/10 ratio, a common measure of inequality (Piketty 2014), declined in the 1970s, but increased after that, rising from 9.1 in 1980 to 11.3 in 2010.

Table 2: Percentiles of the Average Metropolitan Household Income Distribution

Year	Percentiles					IQR	90/10 Ratio
	10	25	50	75	90		
1970	12,713	32,163	59,524	88,476	123,455	56,313	10.0
1980	14,926	31,711	59,921	93,242	132,746	61,531	9.1
1990	15,911	33,910	63,674	101,921	148,398	68,011	9.7
2000	16,757	35,468	66,330	108,170	164,505	72,702	10.2
2010	14,442	30,648	60,458	103,166	160,745	72,517	11.3
70-10 Chg (%)	14%	-5%	2%	17%	30%	29%	13%

Other inequality measures confirm the story told by the income shares and percentiles, as indicated in Table 3. The ratio of the mean to the median increased from 1.17 in 1970 to 1.35 in 2010, indicating a growing rightward skew in the income distribution. The Gini coefficient, a common measure of inequality (Gini 1921), increased from 0.41 to 0.46 (13 percent) and the Theil coefficient, which is more sensitive to top incomes (Allison 1978), increased from 0.32 to 0.37 (17 percent).

Table 3: Metropolitan Household Inequality Measures

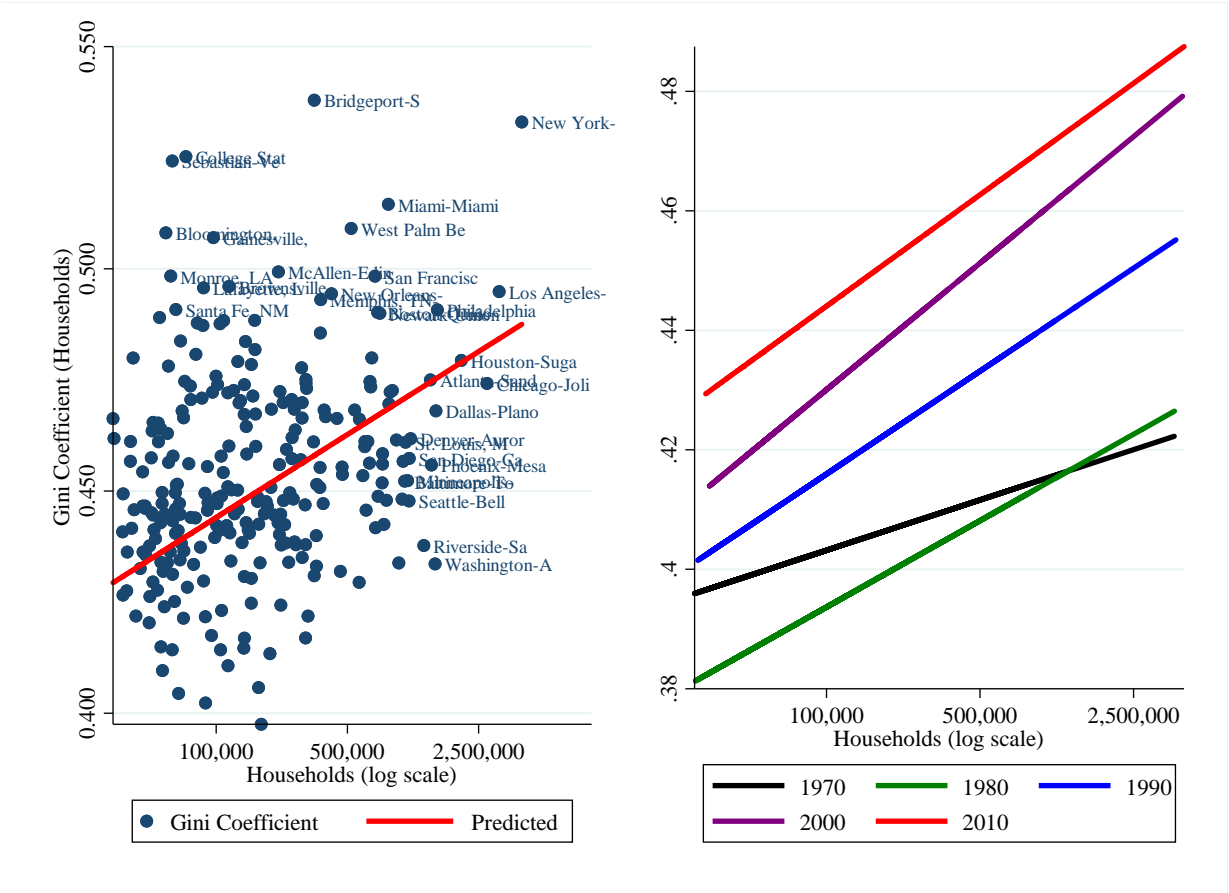
Year	Mean/ Median	Gini	Theil
1970	1.172	0.410	0.315
1980	1.191	0.407	0.289
1990	1.260	0.432	0.338
2000	1.318	0.451	0.368
2010	1.350	0.463	0.369
70-10 Chg (%)	15.2%	12.9%	17.1%

Note: weighted by households; includes all counties in each decade.

Household income inequality is related to metropolitan area size, as shown in Figure 1, in which the horizontal axis is the natural log of the number of households. Larger metropolitan areas allow for greater division of labor and specialization, tend to have more global connections, and often host corporate headquarters and active financial sectors, all of which are associated

with income inequality. Our data show a clear and statistically significant relationship between income inequality and metropolitan area size in 2010, as shown in the left panel. The red line on both panels shows the estimated relationship between size and inequality in 2010; the left panel shows how the relationship between metropolitan areas size and inequality has changed since 1980 by replicating the regression line in each decade. Between 1970 and 1980, the average Gini did not change, but the slope of the relationship between (log) size and inequality became steeper, indicating a stronger correlation between the two. Since 1970, the Gini has risen steadily, but the increases have not been limited to larger metros. The entire regression line shifts up over time; the lines are roughly parallel, except for a slightly steeper slope in 2000. The implication is that metropolitan areas of all sizes have experienced increasing inequality.

Figure 1: Household Income Gini Coefficient by Metropolitan Area Size



Neighborhood Income Inequality

Rising household inequality has contributed to greater inequality among neighborhoods (Owens 2016). There is simply more inequality to go around. Many of the same measures that are used to characterize household income distributions can be used to measure the inequality of neighborhoods, except that in the calculation of neighborhood inequality, each neighborhood is weighted by the number of households it contains. Effectively, the distribution of neighborhood income is the distribution of households by the mean income of the neighborhoods in which they reside.

Table 4 shows statistics for average metropolitan distribution of neighborhood income. The means of the household and neighborhood income distributions are identical, since the same households make up both distributions, but the mixing of different incomes within neighborhoods results in smaller standard deviations of neighborhood incomes. For example, the average standard deviation of neighborhood incomes in 2010 was \$35,000, compared to \$87,000 for the household income distribution. However, the neighborhood income standard deviation grew much faster between 1970 and 2010 – a 37 percent increase – than the household standard deviation, which increased by 22 percent as noted above. The Gini coefficient is also lower for neighborhoods than for households, as expected, but also grew faster: 21 percent for neighborhoods, compared to 13 percent for households. The Theil Index increased 38 percent for neighborhoods compared to 17 percent for households.

Table 4: Neighborhood Income Inequality and Economic Segregation

Year	Neighborhood Income				Economic Segregation		
	Mean	Std. Dev	Gini	Theil	NSI	Gini	Theil
1970	69,551	25,490	0.182	0.060	0.353	0.443	0.187
1980	71,162	24,888	0.179	0.056	0.393	0.438	0.192
1990	80,116	33,288	0.205	0.075	0.383	0.472	0.218
2000	87,269	36,042	0.206	0.075	0.358	0.454	0.199
2010	81,441	35,019	0.221	0.083	0.396	0.475	0.222
70-10 Chg (%)	17%	37%	21%	38%	12%	7%	19%

Note: weighted by households; includes all counties in each decade.

The fact that measures of neighborhood inequality grew much faster than measures of household inequality has important implications. It means that the degree of sorting among rich and poor households into rich and poor neighborhoods became more pronounced. Figure 2 and Figure 3 show the values of Gini and Theil normalized to their 1970 values. The figures are quite similar except for the scale. The Theil increased twice as fast, perhaps because of the greater weight given to the highest incomes by that measure. However, both show the neighborhood inequality rose faster than household inequality in the 1980s and 2000s; in the 1990s, household inequality grew faster. Over the whole period, however, neighborhood inequality clearly grew faster than it did at the household level.

Figure 2: Gini Coefficients, Household and Neighborhood, by Decade

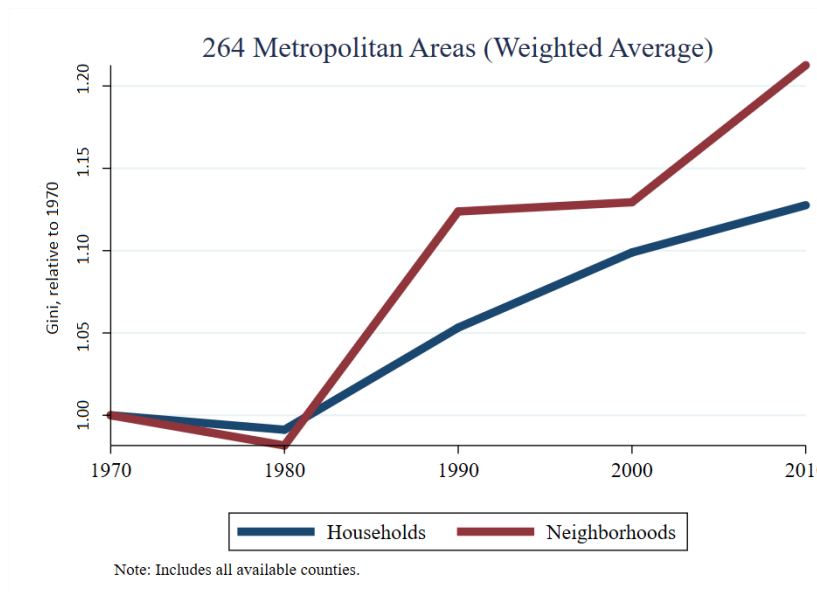
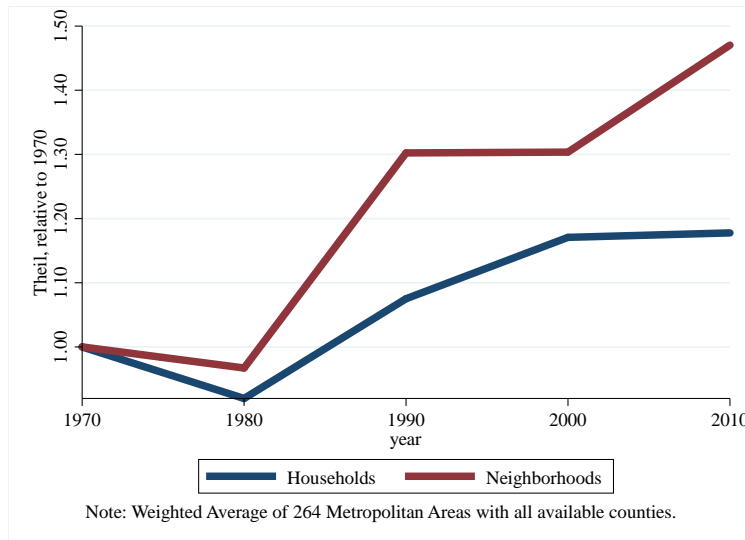


Figure 3: Theil Index, Household and Neighborhood, by Decade



Economic Segregation

Household inequality is a precondition for economic segregation, just as there can be no racial segregation unless there are different racial groups. Given a level of economic inequality, the question is how much of it is translated into differences between neighborhoods. It comes down to the question of how much inequality is *between* rather than *within* neighborhoods. As household income inequality has risen, if the division of that inequality within and between

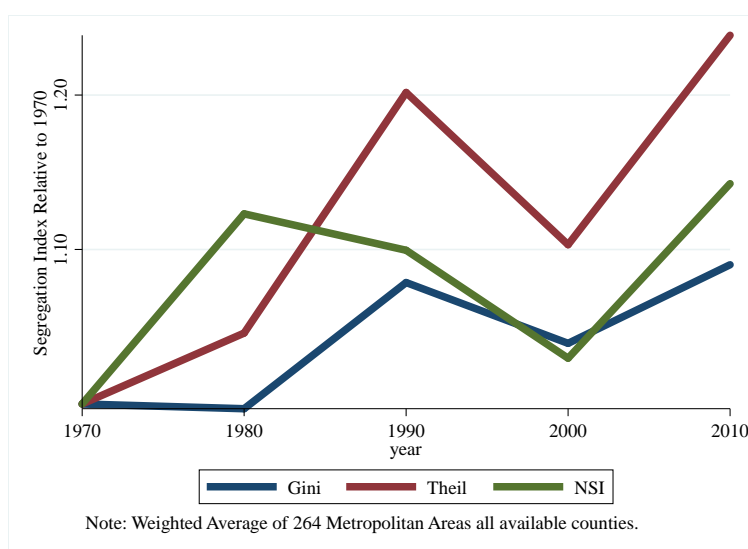
neighborhoods remained the same, neighborhood inequality would have increased at the same rate as household inequality. As we have seen, however, neighborhood inequality grew faster than income inequality. Therefore, economic segregation must have increased.

Table 4 shows statistics for average metropolitan distribution of neighborhood income. The means of the household and neighborhood income distributions are identical, since the same households make up both distributions, but the mixing of different incomes within neighborhoods results in smaller standard deviations of neighborhood incomes. For example, the average standard deviation of neighborhood incomes in 2010 was \$35,000, compared to \$87,000 for the household income distribution. However, the neighborhood income standard deviation grew much faster between 1970 and 2010 – a 37 percent increase – than the household standard deviation, which increased by 22 percent as noted above. The Gini coefficient is also lower for neighborhoods than for households, as expected, but also grew faster: 21 percent for neighborhoods, compared to 13 percent for households. The Theil Index increased 38 percent for neighborhoods compared to 17 percent for households.

Table 4 above on page 8, in addition to showing means and standard deviations of neighborhood income distributions, also shows three measures of economic segregation based on ratios of inequality measures. The Neighborhood Sorting Index (NSI), which is the ratio of standard deviations of neighborhood and household incomes, increased in the 1970s, changed little in the 1980s, declined in the 1990s, and increased again since 2000. Over the whole period, there was a 12 percent increase in economic segregation by this measure. The Gini Index of Segregation (GIS) increased by 7 percent overall. The Theil Index of Segregation (TIS), more sensitive to upper incomes than the other measures, increased the fastest, growing 19 percent between 1970 and 2010. Regardless of the measure employed, overall economic segregation has

increased, though there are some variations in the exact pattern as shown in Figure 4. The principal difference is that the NSI shows a decline in economic segregation in the 1980s while the GIS and TIS indicate increasing economic segregation. All the measures agree that economic segregation declined in the 1990s, a decade that saw a substantial decline in the related phenomenon of concentration of poverty (Jargowsky 2003; Kingsley and Pettit 2003). All three measures agree that economic segregation increased overall between 1970 and 2010.

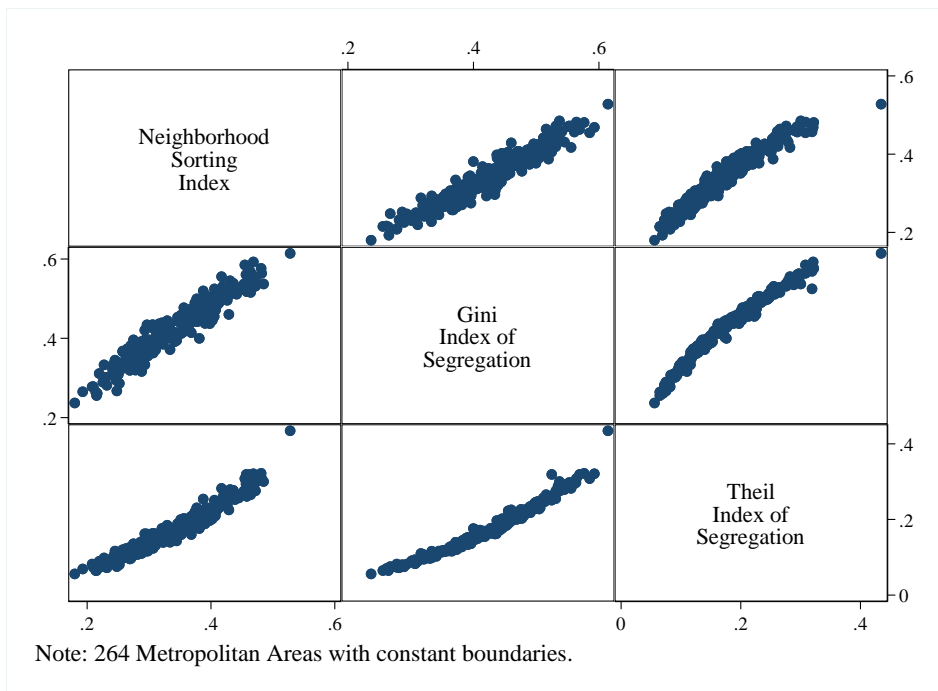
Figure 4: Economic Segregation, Various Measures, by Decade



The somewhat different trend in the economic segregation measures raises the question of which is the preferred measure to use in further analysis. It is worth noting that the three measures are highly correlated cross-sectionally in 2010, as indicated in Figure 5. (Other years look nearly identical.) The Pearson correlation coefficients between the three measures are all above 0.95. The Gini Index of Segregation and the NSI have a nearly linear relationship, whereas the Theil Index increases at a slightly faster rate than either of the other two. The correlations of the change in the measures between 1970 and 2010 is not quite as high, but still exceeds 0.80 in all cases. The NSI is based on the variance of household income. The variance

has been criticized as a measure of inequality because it is not scale invariant – in other words, it is not independent of the mean of the distribution, as both the Gini and Theil are. Given that we conceptualize our economic segregation measures as the ratio of neighborhood to household inequality, that would argue for preferring either the Gini or the Theil to the NSI. Since they are highly collinear and the Gini is more familiar and less dependent on one part of the income distribution, we will rely primarily on that measure in further analysis.

Figure 5: Correlation of Alternative Economic Segregation Measures, 2010

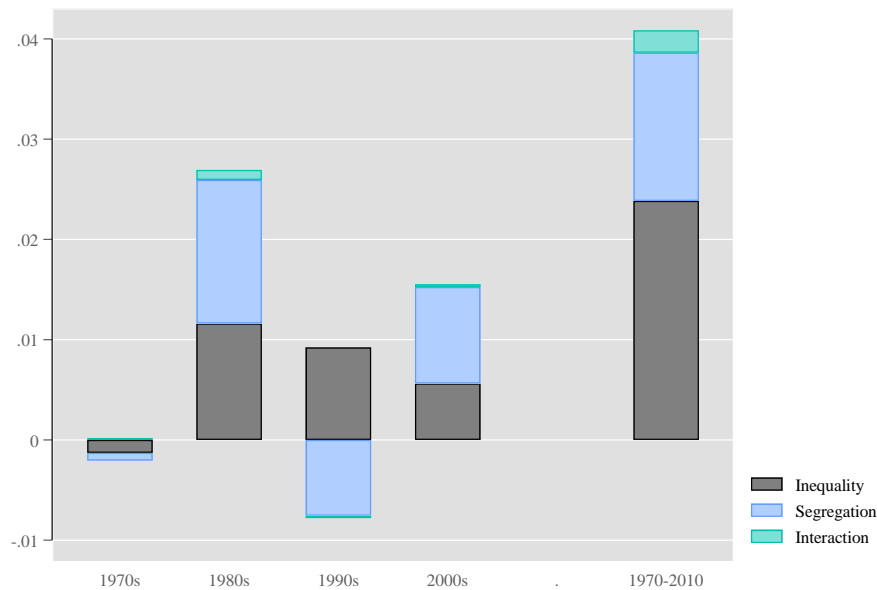


Contributions to Neighborhood Inequality

Neighborhood inequality as measured by the Gini Index of Segregation rose after 1980, but for different reasons in different decades. Figure 6 below breaks down the change in neighborhood inequality in each decade that is due to changes in household income inequality vs. changes in economic segregation, i.e. the degree of sorting by income. (There is also a small residual due to the interaction of the changes in the two variables.) In the 1970s, there was little

change in neighborhood inequality. In the 1980s, the average metropolitan change in segregation was 0.027; more than half of that (0.014, 53 percent) was due to increased sorting by income. The remainder was due to increased income inequality (0.12, 43 percent) and a small component of interaction between them. In the 1990s, the change in neighborhood inequality was small, but was composed of two offsetting effects: continued increases in income inequality and decreases in economic segregation. In effect, the decrease in economic segregation helped to mask the ongoing trend of growing income inequality. In the 2000s, the dominant factor driving the increase was economic segregation (62 percent), to which income inequality contributed 36 percent.

Figure 6: Contribution of Household Inequality and Economic Segregation to Changes in Neighborhood Inequality, by Decade

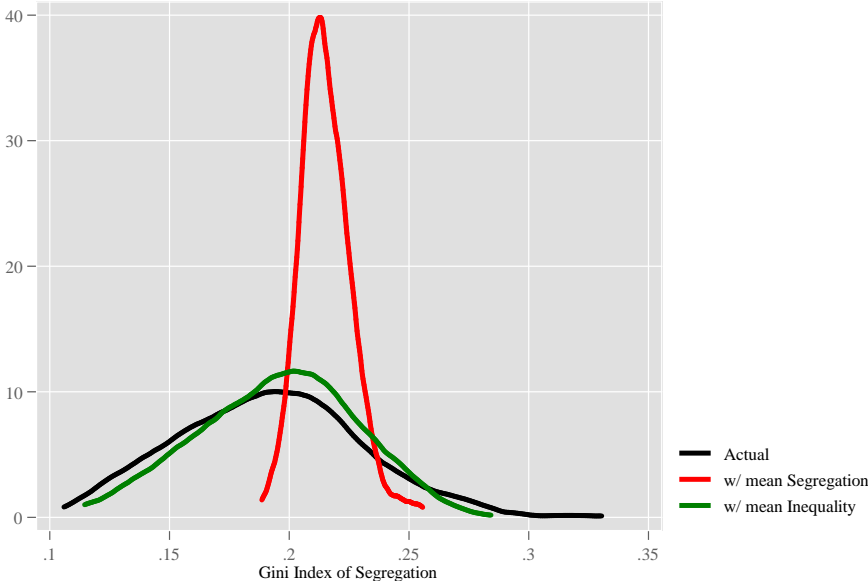


Over the whole period from 1970 to 2010, however, the dominant factor was the steady rise in income inequality, accounting for 58 percent of the total change compared to 36 percent for the fluctuating effect of economic segregation. Economic segregation had the largest effect in each decade, but because it reversed direction in the 1990s it had less effect over four decades

than income inequality. What that suggests, however, is that policies that affect economic segregation can be a powerful lever to address neighborhood inequality and perhaps one that is more amenable to change through policy options available to state and local policymakers.

A similar exercise shows how much of the variation among metropolitan areas in neighborhood inequality is due to household income inequality vs. economic segregation. We compare the actual level of economic segregation to that computed in two different ways: 1) holding income inequality constant at its metropolitan mean, and 2) holding economic segregation constant at its metropolitan mean. Figure 7 below shows the kernel density plots, essentially smoothed histograms, for actual economic segregation and the two variants.

Figure 7: Neighborhood Inequality, Actual and Holding Inequality and Economic Segregation Constant at their Means



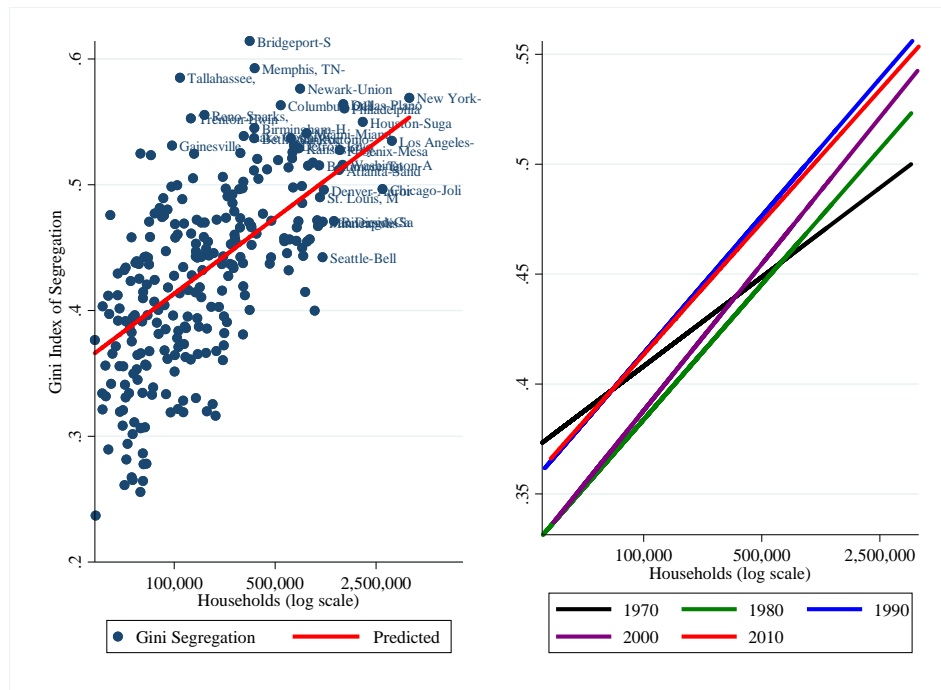
The black curve represents the distribution of actual neighborhood inequality across metropolitan areas. The red curve shows the curve holding economic segregation constant at its mean; there is far less variation among metropolitan areas in neighborhood inequality when differences among them in economic segregation is not taken into account. In contrast, the green

curve shows the variation in neighborhood inequality when household income is held constant. Far more of the variation in neighborhood inequality remains when only information about economic segregation is considered. Both inequality and economic segregation are definitionally related to neighborhood inequality, but the cross-sectional variation in economic segregation, not household income inequality, is what drives the variation among metropolitan areas in the extent of inequality among their neighborhoods.

Variations by Metropolitan Area Size

As noted earlier, household income inequality is related to metropolitan area size. Figure 8 shows that the relationship of metropolitan area size to economic segregation as measured by the Gini Index of Segregation is even stronger. The individual metro areas are more tightly clustered around the regression line of Gini index of Segregation on the natural log of households (see Figure 1). The pattern over time is different as well. Whereas there was a steady increase in the household Gini over time, the GIS follows a different pattern. The slope of the relationship became steeper between 1970 and 1980, then rose sharply in a parallel fashion between 1980 and 1990. The 1990s featured a decline in economic segregation for metropolitan areas of all size, shifting the relationship down, though a bit more slowly for larger metropolitan areas. Finally, since 2000, economic segregation again shifted across the board, nearly matching the height and slope of the 1990 relationship.

Figure 8: Gini Index of Segregation and Metropolitan Area Size



Further detail on the relationship of household income distributions to metropolitan area size is provided in Table 5. Metros are categorized according to the number of households (within the constant boundaries we have defined) in 2010: fewer than 100,000 ($n=103$); 100,000 to 199,999 ($n=60$); 200,000 to 499,999 ($n=54$); 500,000 to 999,999 ($n=31$); and greater than 1,000,000 ($n=16$). All figures in the table are weighted by the number of households. The table confirms that on average the larger metros have higher means at every point in time, and also saw the largest increase in their mean household income. The same can be said of the standard deviation of household income. Household income inequality exhibits the same pattern, but it is not nearly as pronounced. Moreover, while household mean income and the standard deviation declined in all size categories between 2000 and 2010, household inequality as measured by the Gini Coefficient continued to increase.

Table 5: Household Income, Inequality, and Segregation by Size and Year

	2010 Household Size Category					All
	<100K	>=100K	>=200K	>=500K	>1M	Metros
Mean						
1970	59,788	61,987	68,261	72,677	71,897	69,551
1980	63,619	66,403	69,412	74,271	73,732	71,461
1990	63,714	70,535	77,060	85,353	86,541	80,895
2000	70,273	77,175	83,091	94,017	92,866	87,902
2010	64,758	71,147	77,516	86,234	88,190	81,957
Change	4,970	9,160	9,255	13,557	16,293	12,406
Standard Deviation						
1970	59,595	61,055	68,944	73,633	75,964	71,282
1980	54,275	56,961	59,457	64,006	67,680	62,827
1990	65,770	72,142	79,408	89,242	97,073	86,325
2000	78,722	84,955	91,314	104,377	109,375	99,486
2010	69,274	73,916	81,269	91,257	97,555	87,918
Change	9,679	12,861	12,325	17,624	21,591	16,636
Gini (Households)						
1970	0.405	0.406	0.404	0.405	0.420	0.410
1980	0.399	0.398	0.400	0.402	0.420	0.407
1990	0.427	0.422	0.425	0.429	0.446	0.433
2000	0.439	0.438	0.444	0.450	0.467	0.453
2010	0.452	0.450	0.457	0.464	0.478	0.465
Change	0.047	0.044	0.053	0.059	0.058	0.055
Gini (Neighborhoods)						
1970	0.146	0.162	0.176	0.182	0.199	0.182
1980	0.138	0.153	0.171	0.179	0.205	0.180
1990	0.163	0.175	0.198	0.207	0.233	0.207
2000	0.155	0.172	0.199	0.210	0.237	0.209
2010	0.176	0.190	0.215	0.225	0.250	0.224
Change	0.030	0.028	0.039	0.043	0.051	0.042
Gini (Segregation)						
1970	0.357	0.396	0.432	0.448	0.474	0.443
1980	0.344	0.382	0.425	0.444	0.487	0.441
1990	0.379	0.413	0.464	0.481	0.520	0.476
2000	0.350	0.391	0.446	0.466	0.506	0.459
2010	0.388	0.421	0.469	0.484	0.522	0.480
Change	0.031	0.025	0.037	0.036	0.048	0.037

Note: Includes 264 metropolitan areas with constant boundaries.

Neighborhood inequality is positively correlated with metropolitan size in all time periods, as is the change over time. However, between 1990 and 2000, there was very little change in neighborhood inequality, despite the fact that income inequality continued rising in this period. Because increasing inequality between households did not produce increasingly unequal neighborhoods, economic segregation was declining during this period, as shown in the final panel of the table. This was true in all size classes in the 1990s; unfortunately, the increase in economic segregation resumed in the 2000s in metropolitan areas of all size. While the extent

of the problem is greater and increasing faster in larger metropolitan areas, the general pattern of increasing economic segregation since 1980 with a decline the 1990s that was reversed since then seems to be a national phenomenon.

Variations by Region

Regions have gone through very different economic, political, and social transitions since 1970, so it is not surprising to find differences in how income, inequality, and segregation have changed over time. Before discussing those, however, it is worth noting that there are some large differences by region in the size of metropolitan areas and their rate of growth over time, as shown in Figure 9: Metropolitan Area Size by Region and Decade. On average, metropolitan areas in the Northeast dwarfed those in the other regions in 1970. Since then, however, metropolitan areas in the West have grown at a faster rate than any other region and by 2010 the size of Western metropolitan areas converged to those in the Northeast. The South had the smallest metropolitan areas on average in 1970, but grew fast enough to overtake the North Central (a Census category comprised of the Midwest and Plains states). Thus, some of the differences by region may reflect differences in size and the growth of areas over time, and some of the differences by size category may reflect the regions where such areas are found.

Figure 9: Metropolitan Area Size by Region and Decade

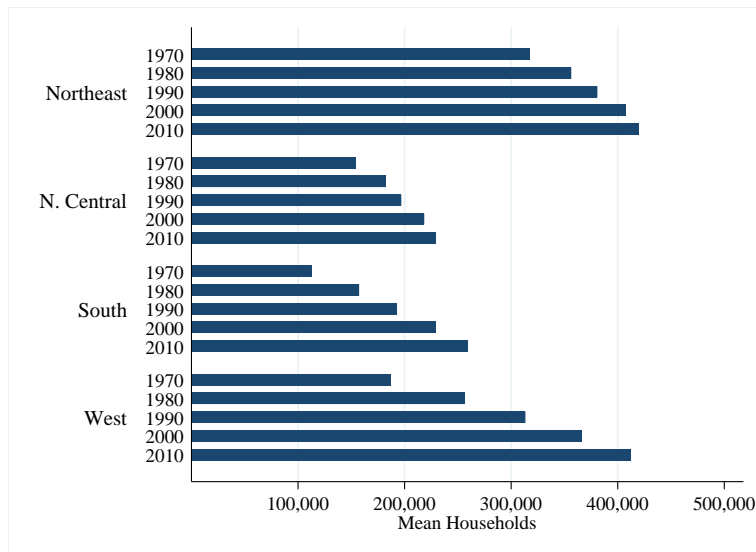


Table 6 below shows household income distribution and economic segregation by region from 1970 to 2010. Metropolitan areas in all regions were not that far off from the US metropolitan mean household income of \$70,000 in 1970. The South came in at \$64,000, but that may well have reflected a lower cost of living characteristic of the region. All regions saw a growth in household income through 2000, followed by a decline by 2010. The North Central, beset by deindustrialization, saw only paltry gains of \$3,400 compared to the national mean of \$12,400. The fastest growth was in the Northeast and West, where incomes grew \$18,000 and \$16,000 respectively. Inequality of both households and neighborhoods grew fastest in the Northeast and North Central. Differences in economic segregation across regions were small compared to those between metropolitan areas of different sizes.

Table 6: Household Income Distribution and Economic Segregation by Region

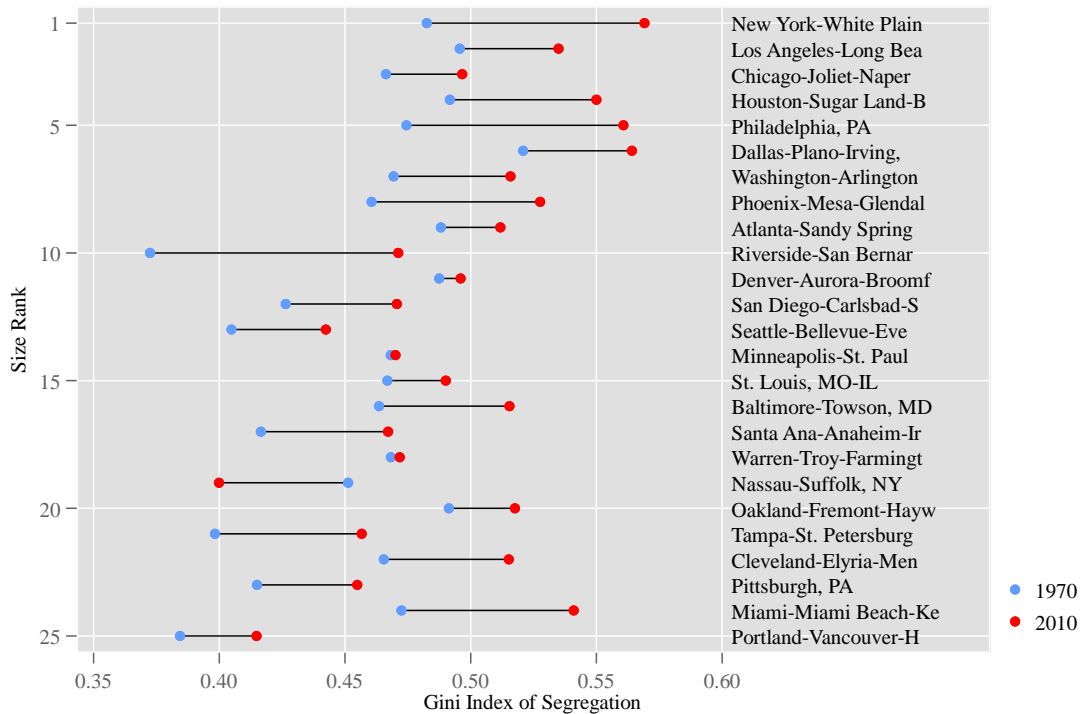
	Region				All
	Northeast	N. Central	South	West	Metros
Mean					
1970	72,435	71,975	63,584	69,423	69,551
1980	70,668	73,460	68,342	73,942	71,461
1990	88,184	76,429	74,902	85,197	80,895
2000	93,280	85,390	82,557	91,879	87,902
2010	90,619	75,396	77,610	85,732	81,957
Change	18,184	3,421	14,026	16,309	12,406
Standard Deviation					
1970	75,452	70,019	68,461	70,356	71,282
1980	61,973	61,029	62,806	65,853	62,827
1990	95,756	79,002	81,643	89,669	86,325
2000	108,973	93,199	94,260	103,033	99,486
2010	100,006	80,080	84,370	88,898	87,918
Change	24,554	10,061	15,909	18,542	16,636
Gini (Households)					
1970	0.412	0.393	0.424	0.414	0.410
1980	0.411	0.392	0.415	0.409	0.407
1990	0.441	0.423	0.438	0.428	0.433
2000	0.468	0.437	0.455	0.450	0.453
2010	0.478	0.456	0.467	0.458	0.465
Change	0.066	0.063	0.043	0.044	0.055
Gini (Neighborhoods)					
1970	0.182	0.172	0.194	0.183	0.182
1980	0.186	0.170	0.182	0.182	0.180
1990	0.213	0.205	0.207	0.203	0.207
2000	0.223	0.196	0.208	0.208	0.209
2010	0.234	0.217	0.228	0.217	0.224
Change	0.052	0.045	0.034	0.034	0.042
Gini (Segregation)					
1970	0.438	0.437	0.457	0.440	0.443
1980	0.449	0.432	0.438	0.443	0.441
1990	0.477	0.482	0.473	0.473	0.476
2000	0.470	0.448	0.457	0.461	0.459
2010	0.485	0.474	0.487	0.472	0.480
Change	0.047	0.037	0.030	0.032	0.037

Note: Includes 264 metropolitan areas with constant boundaries.

Understanding Changes in Specific Metropolitan Areas

Virtually all of the 25 largest metropolitan areas had an increase in economic segregation between 1970 and 2010, as shown in Figure 10. However, it is clear the size of the increase as well as the starting and finishing levels vary a great deal from one metropolitan area to the next.

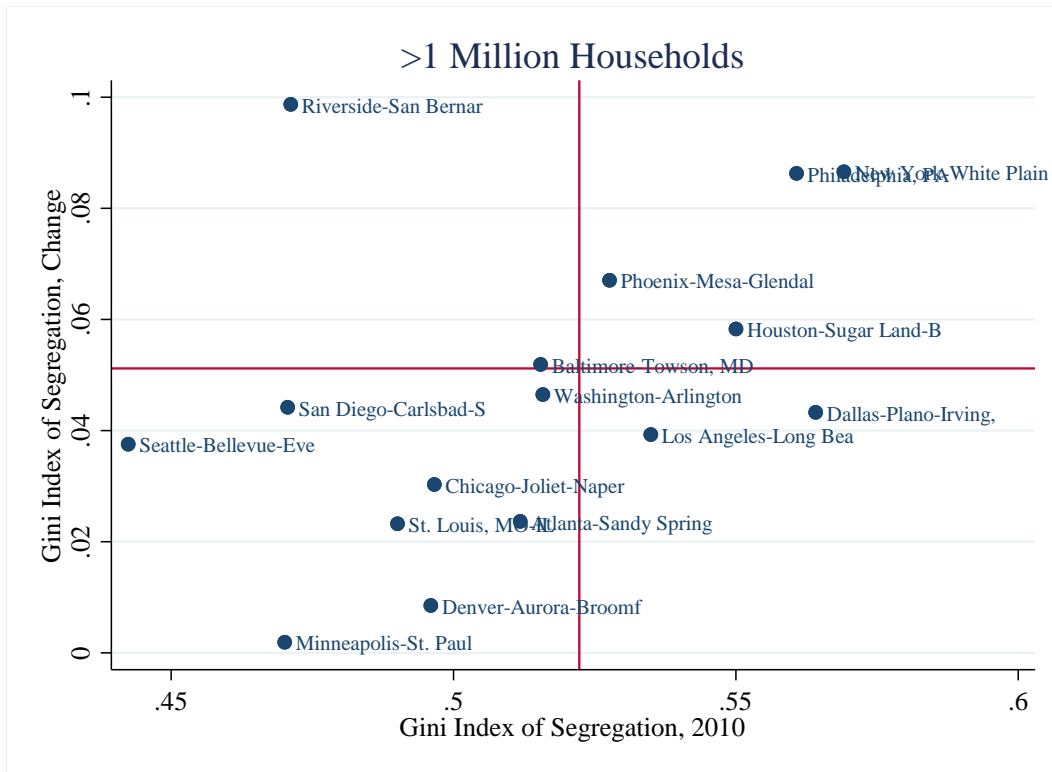
Figure 10: Economic Segregation in 1970 and 2010, 25 Largest Metropolitan Areas



We are interested both in those that have levels of economic segregation relative to their peers *and* those that have experienced rapid increases in economic segregation since 1970.

Figure 11 arrays metropolitan areas on these two dimensions of economic segregation. It is not surprising to see that metropolitan areas where economic segregation grew fast since 1970 tend to have high levels in 2010, but not all metropolitan areas are on the diagonal. Clearly New York and Philadelphia exhibit the worst of both worlds. In contrast, Minneapolis and Denver have low levels, at least for metropolitan areas of their size, and experience almost no growth in economic segregation over the four decades (they are near zero on the change axis).

Figure 11: Segregation, Level in 2010 and Growth since 1970, Large Metropolitan Areas

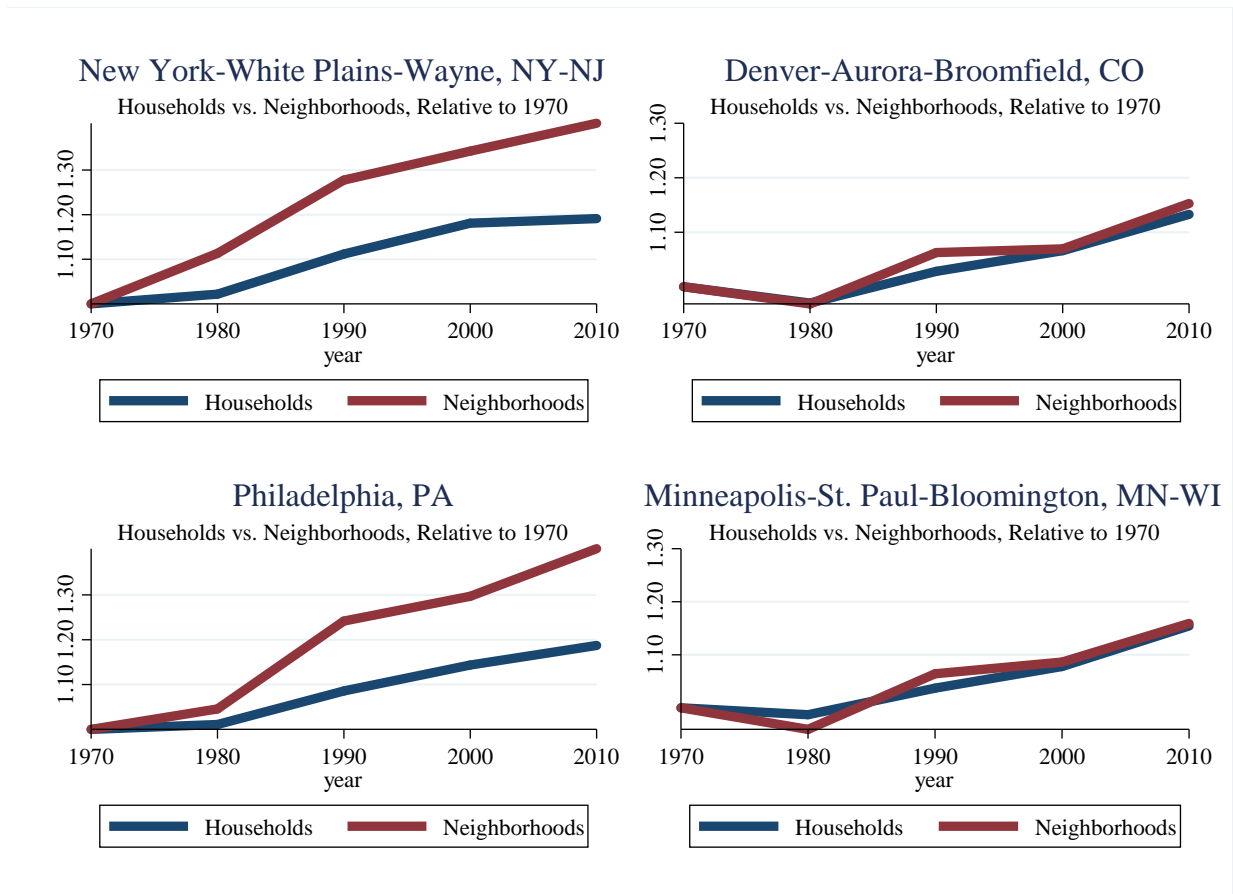


What is driving these differences? It is instructive to compare the trend over time in household and neighborhood inequality in these four metropolitan areas that have followed very different paths. Figure 12 below, as did Figure 2 above, shows household and neighborhood inequality values relative to 1970, but for specific metropolitan areas. New York and Philadelphia both experienced increases in income inequality. The Gini for neighborhoods, however, grew even faster. If the numerator grew even faster than the denominator, then economic segregation – the ratio of the two -- was increasing. But it also points out that there are two things that could be driving neighborhood inequality: households got more unequal and/or there was more sorting of households into neighborhoods.

In some metros, economic segregation increased in combination with increased household inequality to produce a lot of neighborhood inequality. Denver and Minneapolis also

experienced increasing household income inequality; it was a nearly ubiquitous trend in US metropolitan areas. The neighborhood Gini increased in these areas as well, but only in proportion to the increase in the household Gini. In places like Denver and Minneapolis, there was still more neighborhood inequality but mainly because there was more household inequality; the degree of sorting was still the same.

Figure 12: Household and Neighborhood Inequality in 4 Metropolitan Areas



This is an important difference. Household inequality was increasing everywhere, but that was mostly due to factors outside the control of local policymakers – globalization, returns to skill, the national economy, etc. But on top of that, some places made things worse by having more residential sorting of households by income – New York, for example, but not Minneapolis. Much of that could be due to suburban sprawl, zoning, school assignment policies,

and the construction and spatial distribution of different types housing. In the sections that follow, we examine some of the specific factors that contributed to the changes in various metropolitan areas that experienced different trends in economic segregation. These case studies indicate some of the internal population and housing market dynamics driving economic segregation in particular metropolitan areas. Table 8, following the case studies on page 41, pulls together many of the statistics cited in these narratives to facilitate comparisons.

High economic segregation, large 40-year increase

Philadelphia metro

As one of the nation's largest and oldest metropolitan areas, the Philadelphia region has long maintained great income diversity, with concentrations of both high, middle, and low-income groups sorting into distinct neighborhoods. In 1970, of the 200 metropolitan areas that compose the sample¹, the Philadelphia area was the 41st most economically segregated. The region also had the 21st largest increase in economic segregation as measured by the neighborhood Gini, over twice the metro average. Although the area was heavily segregated in 1970, the population was relatively compact and heavily centered in Philadelphia. The 136-square mile city accounted for a majority (50.4 percent) of the region's residents and 47.9 percent of its families living above the poverty line.

However by 2010, the region's population and concentration of wealth had become more widely distributed across metropolitan space. By 2010, Philadelphia accounted for only 38 percent of the region's population, with that remaining 62 percent spread out amongst the 2,051 square miles of the suburban counties. Economic segregation increased by approximately 18 percent as whites left Philadelphia for the four Pennsylvania counties making up its immediate

¹64 metros could not be included in the sample for this analysis due to a lack of central city data in the 1970 Census.

suburbs. Drawn by lower crime, better schools, and newer, more spacious housing options, city dwellers left Philadelphia *en masse*. Most of these departing residents were white. Over that 40-year period, the white population in Philadelphia dropped by over 685,000 (a 55 percent drop) while the suburbs gained a net of 181,000 white residents (10 percent gain). The suburbs also saw significant amounts of black net population growth (over 137,000), which more than doubled, compared to Philadelphia (about 8,900). However whites accounted for the overwhelming majority of the city's net population loss. The departure of whites also drained higher income households from the city. In 1970, white households earned 15 percent more than the typical Philadelphia household. The departure of middle and upper income households for the farther flung suburbs increased economic segregation in the region.

This severe exodus of wealth from Philadelphia was larger than typically experienced by central cities. Philadelphia's share of the region's families above the poverty line dropped over 19 percentage points to 28.7 percent, a much more significant drop than other central cities. Real average income per household rose by only 6.4 percent compared to 33.7 percent in the suburbs. Philadelphia's gain in average household incomes was amongst the lowest for central cities.

The region's Hispanic population also grew significantly, however most of this was in Philadelphia (161,000) compared to the suburbs (104,000). The Hispanic population in Philadelphia exploded from about 6,100 households in 1970 to about 174,000 in 2010. By 2010, nearly two thirds of the region's Hispanics lived in Philadelphia (63.2 percent). Most of these newcomers were low-income, as the average Hispanic household income dropped from \$37,152 to \$13,576 in inflation-adjusted terms over this period. In 2010, the city's Hispanic population had a median household income of \$26,106, over 29 percent below the citywide average.

Targeted immigration of low-income Hispanic households to Philadelphia contributed to economic segregation in the region.

The dramatic spatial shift in the region's population also had implications for the distribution of the metro's housing stock. Philadelphia lost about 4,300 housing units since 1970, while the suburbs gained approximately 406,000. Suburban housing growth exceeded household growth by 12 percent, producing a surplus of available housing. Much of this newly developed suburban housing was larger and more spacious than city offerings. The average room per unit increased by 12.8 percent in the suburbs compared to only 3.5 percent in Philadelphia. The city's older and less appealing housing stock was abandoned in favor of newer and more luxurious suburban offerings. Philadelphia's vacancy rate rose by 8.6 percent, over twice the suburban rate and well above the average for large metros. By 2010, Philadelphia accounted for 56.8 percent of the region's increase in vacant homes and over two-thirds of the increase vacant units not for sale or rent. In addition, although the city only had 53.7 percent of the region's housing in 2010, it accounted for 68.7 percent of the region's vacant housing.

In the Philadelphia region, a massive outmigration of higher income, predominantly white households from the city to the suburbs produced a sharp rise in economic segregation. The allure of a plentiful, higher quality housing stock in the suburbs drove wealthier households out of Philadelphia and into surrounding communities. This produced a "hollowing-out" of the city, yielding an extraordinary amount of vacant housing in Philadelphia. At the same time, a sizable influx of a low-income Hispanic population mostly into select areas of Philadelphia increased economic segregation within the region.

Baltimore metro

Baltimore's experience is similar to Philadelphia. Economic segregation increased by 10.5 percent, and was above the 13 percent average for the sampled metros. Neighborhood inequality increased 24.8 percent, an above average increase. The rise in neighborhood inequality stemmed partly from an outflow of residents from the city neighborhoods to the suburbs. From 1970 to 2010, Baltimore experienced a massive population loss of 285,000 persons or nearly one-third of its population. In 1970, Baltimore had 44 percent of the metropolitan population. By 2010 it had only 23 percent. Most of these lost residents were white, while there were smaller losses in blacks (25,000) that was partially offset by a gain in Hispanics (17,000).

The loss of white residents meant a significant loss in city wealth. In 1970, Baltimore city whites (including Hispanic whites) had an average income per household 19 percent higher than the city as a whole. The exodus of whites from Baltimore city drained residents and incomes away from the city, leading to a sharp 13.5 percent increase in the housing vacancy rate, over twice the average for central cities. This trend also contributed to a shift of regional income gains from city to suburb. Over the forty-year period, average incomes in the suburbs rose approximately 35 percent compared to only 17 percent in the city.

These population trends also had implications for housing development in the region. Housing demand in Baltimore city fell significantly while housing development in its surrounding suburbs exploded. The suburban counties gained approximately 485,000 housing units, while Baltimore lost about 8,700. Housing consumption tastes also changed, with families looking for more spacious single-family housing, a rare commodity in row-home dominated Baltimore. Fifty-two percent of the suburban housing units developed from 1970 to 2010 were

single family detached. These new suburban homes were also much roomier– the average number of rooms per housing unit rose by 20 percent in the suburbs but only 10 percent in Baltimore city. This suburban growth did not occur proportionally to the increase in suburban households. Suburban housing growth exceeded household growth by 8 percent, producing a surplus of available housing. Moreover, increasing segregation between higher-income whites and lower-income Hispanics increased economic segregation. Hispanic/non-Hispanic white segregation rose 21 percent, over two times the metro average.

In Baltimore, a massive outflow of wealthier residents to the fast-growing suburbs increased economic segregation, while increased segregation between whites and lower-income Hispanics exacerbated the trend.

Newark-Union metro

In 1970, the Newark area was the nation's seventh most segregated metropolitan area. This region, an integral part of the vibrant New York metropolitan economy, contained a high concentration of wealthy households living in distinct neighborhoods and low-income households living in the city of Newark. By 2010, economic segregation in the region had risen 10.4 percent, reaching the second highest level in the nation, just behind Bridgeport. Much of this can be traced to a massive demographic shift and an outflow of income and wealth to the suburbs. Newark experienced an immense loss in population, losing 106,000 or approximately 28 percent of its population over a forty-year period. Whites represented 91 percent of these net population losses, making Newark one of the most extreme cases of white flight. The city's African-American population also contracted by 87,000. However, the Hispanic population more than tripled, rising by over 64,000 persons. Many of these newcomers were foreign

immigrants drawn to Newark's diverse ethnic communities and plentiful housing stock for low-income families.

Newark's suburbs grew faster than the city over this period. But unlike most other suburbs, most of the net growth did not come from whites, but from African-Americans and Hispanics. Mirroring a general trend across New Jersey, the region's suburban white population dropped by 320,000. These departing whites were replaced by a net 681,000 Hispanics and 338,000 African-Americans, as minorities fled Newark for suburban communities. Immigrants also began to flow to the suburbs, rising by 246,000 in the suburbs compared to only 32,000 in the city. These massive shifts of blacks and Hispanics to the suburbs reduced racial segregation in the region. Black/white segregation fell 43 percent from 1970 to 2010 and Hispanic/white segregation fell 17 percent. Yet this racial desegregation had major implications for economic segregation. Much of the new black and Hispanic population in the suburbs was decidedly wealthier than their remaining city counterparts. In 2010, the average household income for African-American households in Newark's suburbs was two-thirds higher than the city. For Hispanics, the differential was 44 percent. The exodus of higher-income blacks and Hispanics to the suburbs increased economic segregation within the region.

The outflow of minority households was accompanied by a disparity in income gains between city and suburb. Real income gains in the suburbs far outpaced those of the city, with average household incomes rising 42 percent in the suburbs compared to only 11 percent in Newark over that 40-year period. This disparity in income growth was amongst the highest for a metropolitan area. The increase in suburban incomes relative to the city heightened economic segregation in the region.

Dramatic shifts of the population were also tied to substantial changes in the region's housing stock. In Newark, the number of housing units dropped as demolitions reduced the city's housing stock by 14 percent over 1970. By contrast, the suburban stock grew by 38 percent, a high percentage, but lower than the norm for metropolitan areas. Roomier housing was developed in the suburbs, with the average rooms per housing unit rising by 13 percent compared to only 8 percent in Newark. New housing construction was disproportionately concentrated in the suburbs, which had 88 percent of the region's housing units built after 1970. Single family homes accounted for roughly two-thirds of this new suburban housing. Compared to other metros, housing vacancies rose exceptionally in both city and suburb, but Newark's increase (11.1 percent) greatly outpaced the suburban increase (6.9 percent), producing a "hollowing out" of the city's housing stock.

In sum, racial desegregation in Newark had the effect of increasing economic segregation in the Newark area, as higher-income blacks and Hispanics decamped for the suburbs. From 1970 to 2010, income gains occurred disproportionately in the suburbs, which heightened existing economic segregation. Moreover, the suburbs' more plentiful, roomier, and newer housing stock drove wealthier households out of the city and into the suburbs. These trends produced an 11 percent increase in economic segregation.

Low economic segregation, large 40-year increase

Las Vegas metro

In 1970, the Las Vegas area was the 132nd most economically segregated metro in the nation. At the time, the area's population was geographically compact. The entire Las Vegas metro had only 70 census tracts in 1970. After 1970, the area experienced a tremendous amount of growth. As the region's casino and tourism-driven economy expanded rapidly, the area

experienced a population explosion of 1.7 million persons (615 percent) growth over a forty-year period; 42 percent of these net population gains were in the white population and one-third was in the Hispanic population. About 25 percent of this growth came from foreign immigrants. Much of the population growth occurred in the suburbs. In 1970, Las Vegas had about 46 percent of the region's population, well above the metro average (41 percent). By 2010, it had only 30 percent. However, the city's population still grew by over 462,000 persons from 1970 to 2010. Las Vegas did not experience the same population growth as its suburbs, however it grew much faster than other central cities. The net effect of these trends was to increase economic segregation by 21 percent.

Housing development also took off. From 1970 to 2010, nearly 746,000 net housing units were added in the region, 73 percent of which were in the suburbs. Yet unlike many central cities, Las Vegas also experienced a dramatic housing expansion, with a 474 percent boost to its housing stock over 40 years. Much of this new housing was larger, as the average number of rooms per housing unit rose by 14.4 percent in the city, an unusually large increase for a central city. Although housing unit growth exceeded household growth by 21 percent in the suburbs, the difference was a comparable 19 percent in the city. The result was a large supply of more newly developed housing within the central city. Over 86 percent of Las Vegas' current housing stock was built after 1970, very unusual for a central city. Exceptional housing growth produced a surplus amount of housing in Las Vegas relative to its number of households.

As the Las Vegas region grew, the suburbs became wealthier than the city. The suburbs saw a 16 percent gain in average real household incomes compared to 11 percent for Las Vegas. However, the suburban/central city differential in income growth was nearly three-fourths below the metro average. Las Vegas did not lag heavily beyond its suburbs in income growth, as was

the norm for other central cities. Unlike Philadelphia and Baltimore, suburban housing expansion did not produce a substantial net outflow of wealth from Las Vegas to its suburbs. Both Las Vegas and its suburbs experienced exceptional growth in population, housing, and income over this period, although suburban gains exceeded that of the city.

Such rapid population growth also produced a sizable increase in the number of neighborhoods. The Las Vegas metro's original 70 census tracts grew to 487 by 2010. This increased economic segregation as residents sorted into newly developed neighborhoods by income. By 2010, the Las Vegas area had the 71st highest level of economic segregation.

The Las Vegas area's dramatic population and housing unit growth created many more neighborhoods into which households could sort by income, increasing economic segregation. Notably, unlike many other metros, this growth in segregation did not occur mainly at the expense of Las Vegas, which also had exceptional income, population, and housing growth.

Oakland/Fremont/Hayward metro

Like Newark, the Oakland area had a high level of economic segregation in 1970, coming in at the 24st highest. Segregation increased steadily through 2010, reaching the 23th highest in the nation. The region gained 935,000 persons over 1970, but lost a net of 234,000 whites mostly from Oakland and Hayward, the central cities in the region for which 1970 and 2010 data were available. Yet these losses were more than offset by an explosion in the Hispanic population, which rose 228 percent in the suburbs and 193 percent in the central cities. The region's African-American population actually shrunk by 2 percent in the cities and rose 107 percent in the suburbs. As a result, black-white segregation dropped by one third, one of the largest drops for a metropolitan area.

About two-thirds of the region's net population gains can be tied to immigrants, which tend to be lower-income than native-born persons. Most of these immigrants went to the suburbs, however they represented a much higher proportion of newcomers to the cities than to the suburbs. As a result, the central cities became home to a large neighborhood concentration of lower-income immigrants, heightening income disparities with the suburbs.

Income gains in the suburbs exceeded that of the cities by a modest margin, rising 50 percent compared to 42 percent in Oakland and Hayward. This is one of the lowest differentials of any metropolitan area, suggesting that the uneven distribution of income gains only modestly heightened economic segregation in the region.

New housing development from 1970 to 2010 was overwhelming concentrated in the suburbs. 87 percent of the housing stock developed after 1970 and 95 percent of single family housing was built in the suburbs, making the suburbs attractive destinations for those searching for newer housing. In addition, the average rooms per housing unit in the suburbs grew 9.6 percent compared to 7.1 percent in the cities, making the suburbs the preferred location for larger housing. Most of this new housing was single family, accounting for 54 percent of suburban housing growth. The vacancy rate rose slower than average in both city and suburb, but it rose slower in the suburbs than the cities, suggesting a marked preference for suburban housing. The number of housing unit grew faster than the number of households in Oakland and Hayward compared to their suburbs, contributing to the relatively low vacancy rates. As a result, Oakland and Hayward did not see the high level of housing abandonment experienced by cities like Baltimore, Philadelphia, and Newark.

In sum, unlike many other central cities, Oakland and Hayward experienced a housing growth but did not experience the "hollowing out" of its housing stock seen by many older post-

industrial cities. An explosion in the Hispanic and immigrant populations kept demand for housing strong, but heightened income disparities with the suburbs. However, the development of more spacious single-family housing made the suburbs destinations of choice for higher income households, increasing economic segregation.

Low economic segregation, low 40-year increase

Minneapolis/St. Paul/Bloomington metro

Unlike Philadelphia and Baltimore, the Minneapolis/St. Paul/Bloomington area has one of the lowest levels of economic segregation for a large metropolitan area. Segregation in the region has also not changed substantially over forty years. Economic segregation modestly declined by 3.7 percent through 2010. Although neighborhood income inequality increased by 8.6 percent, this was well below the metropolitan average. Overall household income inequality increased by 13 percent, which suggests that the spatial dimension of income inequality did not change much in importance to overall inequality.

The Twin Cities area's population grew over 62 percent from 1970 to 2010, driven almost entirely by suburban growth. Minneapolis, St. Paul, and Bloomington gained approximately 27,000 households combined, while the suburbs gained nearly 637,000. However, housing unit growth occurred in both city and suburb, with the number of housing units growing 14.3 percent in the cities and 193 percent in the suburbs. Notably, housing unit growth in the cities exceeded household growth by 58 percent, compared to only 5 percent in the suburbs. Consequently, the increase in the vacancy rate in the cities (4.2 percentage points) was over twice that of the suburbs, but notably lower than the central city average. The vacancy rate in the cities was also 37 percent lower than the central city average. Minneapolis, St. Paul, and

Bloomington did not experience the widespread population loss and housing abandonment from suburbanization seen in many other older central cities.

Minneapolis, St. Paul, and Bloomington also saw an unusual expansion of more spacious housing, with a 15 percent increase in average rooms per unit, 42 percent above the central city average. This left the cities with an above average number of rooms per housing unit in 2010 for central cities, a more appealing housing stock for higher income households in the region.

In addition, income gains in the Twin Cities region were relatively even between city and suburb. The central city increase in average real household income was 19 percent compared to 21 percent in the suburbs. This 2 percent differential was one of the lowest of any metropolitan area. Unlike most other metros, there was no substantial disparity in income gains between the cities and the suburbs in the Twin Cities region.

Minneapolis, St. Paul, and Bloomington were more desirable cities for higher income households, and these cities did not experience the massive exodus of wealth to the suburbs seen in other metros. When the shift toward larger, more spacious housing occurred, the cities of the Twin Cities region were able to respond with more spacious housing development than was the norm for central cities. These units were more attractive to higher income households. They experienced exceptional housing production relative to household growth, which created a wealth of housing options for the resident population within central city limits, reducing economic segregation.

High economic segregation, low 40-year increase

San Antonio/New Braunfels metro

San Antonio has the 20th highest level of economic segregation of any metro. Much of this economic segregation arose from racial segregation. In 1970, the San Antonio area was the

20th most heavily segregated large metro between Hispanics and non-Hispanic whites, with a segregation level 37 percent above the metro average. The tremendous income disparity between Hispanics and non-Hispanics translated this racial segregation into economic segregation. In 1970, the average income per Hispanic household in the San Antonio area was 23 percent lower than the income across all racial and ethnic groups.

Forty years of steady racial desegregation moderated the increase in economic segregation. By 2010, Hispanic/white segregation had declined 38 percent from the 20th to the 150th highest of the metros, while economic segregation rose only 1.1 percent, well below the 13 percent average. Household income inequality increased by 7 percent while neighborhood income inequality rose by 8.2 percent, well below the norm.

The San Antonio area saw extraordinary growth of approximately 1.2 million persons since 1970 (57 percent). Most of the population growth has occurred in the city, as the city of San Antonio grew by annexing unincorporated areas of surrounding Bexar County. In 1940, the city comprised roughly 36 square miles. By 2012 the city had grown to 473 square miles, composing a much larger share of the metropolitan area.² Seventy-three percent of the city's population gains came from Hispanics and 21 percent came from foreign immigrants. San Antonio's white population also grew by 16 percent over this period, which was not typical for central cities. Unlike many central cities, San Antonio did not experience a massive net loss of population.

Housing growth in the San Antonio area was heavily concentrated within city limits. The number of housing units grew 14 percent faster than household growth in the city compared to only 11 percent in the suburbs. Metropolitan housing unit growth has also mostly occurred in

²City of San Antonio Annexation Policy. San Antonio Department of Planning and Community Development. February 14, 2013 https://www.sanantonio.gov/Portals/0/Files/Planning/Annexation/AnnexationPolicy_20130214.pdf

the city at 59 percent of post-1970 metro housing. Since 1970, San Antonio has not experienced the widespread housing abandonment faced by many older central cities. The city's vacancy rate increased by only 3.9 percent (well below the norm for central cities), while the suburban vacancy rate fell 1.2 percent. Like Minneapolis, San Antonio saw an unusual expansion of roomier housing, with the average number of rooms per unit increasing 13.1 percent compared to a central city average of 10.2 percent. Most of this new housing was single family (58.2 percent). Suburban communities, however saw a 23 percent increase in the average number of rooms per unit. Real income growth was strong in both city and suburb, at 31 percent in San Antonio and 39 percent in the suburbs. However, the differential between city and suburb income growth is 46 percent below the metro average. San Antonio did not lose wealthier households at the rate of other central cities, contributing to a smaller increase in economic segregation. As San Antonio absorbed more of its metropolitan area, there were fewer independent suburban communities into which higher-income households could sort.

San Antonio was able to produce a sizable quantity of larger, more desirable, single-family housing within its city limits than other central cities, which kept wealthier households within city neighborhoods. Moreover, San Antonio by annexing unincorporated suburban areas, did not experience the exodus of wealth seen by older central cities. The city's annexation activity brought much of the metropolitan area's population and housing under one political jurisdiction, reducing the incentive to move to richer, suburban municipalities outside the central city. Finally, a significant decline in Hispanic/White neighborhood segregation mitigated increases in neighborhood income inequality.

Denver/Aurora/Broomfield metro

The Denver area had the 27th highest level of economic segregation in 1970. Much of this arose from racial segregation. Compared to other metros, Denver had an unusually high level of both black-white and Hispanic-white segregation. However, from 1970 to 2010, racial desegregation, particularly between African-Americans and whites, ameliorated this trend. Hispanic-white segregation also declined, but at a much smaller rate. By 2010, the area had dropped from the 27th to the 29th most economically segregated metropolitan area.

The decline in economic segregation was accompanied by dramatic changes in the demographic makeup of the city. Denver lost 20 percent of its white population, while its black population grew 30 percent and its Hispanic population more than doubled. The Hispanic population went from 17 percent to 32 percent of the city's population, accounting for the majority of the net gain in Denver's (but not the region's) population. Many of these newcomers were immigrants which accounted for 85 percent of the city's net population gain, compared to only 15 percent in the suburbs. The suburbs also had substantial net gains of African-Americans and Hispanics, yet population growth for these groups was dwarfed by growth in the white population. Whites accounted for over 59 percent of suburban population growth.

These demographic changes were accompanied by relatively modest changes in income inequality. The Denver metro experienced an increase in household income inequality commensurate with the nation, but a smaller than average increase in *neighborhood* income inequality. This is due partly to the fact that unlike many other central cities, Denver experienced higher than average income gains through 2010, mitigating the spatial disparity in income between city and suburbs. Much of this was driven by very strong income gains for the city's white population (including white Hispanics), which even by 2010 still formed a majority

of Denver's population. This group had exceptional real average household income gains of 29 percent, a much larger increase than that of whites in other central cities. Inflation-adjusted average household incomes also grew faster in Denver (30 percent) than its suburbs (25 percent). Denver incomes also grew at a much faster rate than the norm for metropolitan areas.

The Denver region also experienced exceptional housing growth from 1970-2010, expanding 73 percent faster than the average metropolitan area. This growth was strong in both city and suburb. Like Minneapolis, housing units grew faster than households in Denver city, producing a relative surplus of housing that kept the city's vacancy rate low. By 2010, Denver had a vacancy rate of only 8.3 percent, 31 percent lower than the average for central cities. The vacancy rate also increased at a very slow rate of 4.0 percent percentage points over 40 years, 38 percent below the central city average. Denver simply did not experience the abandonment and deterioration of housing stock seen in many other central cities.

Although housing growth was strong in the city, suburban housing production far outpaced that of Denver, as suburban sprawl produced an explosion of new housing over this period. The suburban housing stock more than quadrupled in 40 years, expanding by over 739,000 units, a rate of housing expansion that far exceeds the norm for suburban areas. Moreover, much of the region's more spacious housing was produced in the suburbs. The rate of average housing size growth rose 25 percent slower in Denver than its suburbs, and was slower than the norm for central cities. Unlike Minneapolis, housing development in Denver was not biased toward larger, more spacious housing, which like other metros, was developed primarily in the suburbs.

In summary, the city of Denver's strong income gains, continued attractiveness to new residents, and regional racial desegregation mitigated the increase in economic segregation. Like

many cities, Denver lost a significant amount of its population to the suburbs and did not develop the more attractive, roomier housing stock developed in the suburbs. Yet the city did not experience the exodus of wealth seen in many other cities. It also did not see the “hollowing out” of its housing stock as departing white residents were more than replaced by incoming immigrants and Hispanics. Moreover, the city’s remaining white population realized strong income gains that minimized income disparities with the suburbs. Housing production compared to household growth also remained strong relative to other central cities, suggesting the city remained an attractive destination for new residents. These distinct trends contributed to a lower than average increase in economic segregation.

Table 8: 1970 -2010 Change in Metro Demographic, Housing, and Economic Indictors

	Metropolitan Area							
	Philadelphia	Baltimore	San Antonio	Minneapolis	Las Vegas	Denver	Newark	Oakland
1970 - 2010 Change:								
% Change in Econ. Seg.	18.2%	10.5%	1.1%	-3.7%	21.2%	3.7%	10.4%	5.3%
% Change in Black/White Seg.	-34.2%	-42.6%	-34.5%	-30.8%	-27.8%	-43.9%	-43.4%	-32.6%
% Change in Hispanic/White Seg.	-31.3%	20.8%	-37.9%	4.0%	90.1%	-6.8%	-17.2%	-2.2%
% Change in Population	3.7%	31.1%	125.8%	62.4%	615.3%	128.9%	6.6%	57.3%
City	-21.7%	-31.5%	104.1%	-8.6%	367.8%	17.4%	-27.7%	18.3%
Suburbs	29.6%	79.8%	173.4%	111.3%	825.9%	224.2%	14.6%	72.4%
% Change in Whites	-16.5%	4.5%	44.6%	32.6%	304.5%	75.7%	-26.3%	-18.6%
City	-55.0%	-63.4%	15.6%	-40.0%	168.0%	-19.6%	-73.3%	-51.6%
Suburbs	10.1%	34.4%	84.5%	80.1%	416.2%	142.0%	-22.1%	-9.7%
% Change in Blacks	19.5%	59.3%	129.0%	649.9%	726.5%	187.5%	31.0%	38.9%
City	1.4%	-5.9%	81.6%	293.0%	358.7%	29.9%	-30.7%	-2.1%
Suburbs	143.9%	453.3%	360.4%	5129.5%	1207.8%	3283.8%	120.6%	106.6%
% Change in Hispanics	841.9%	552.2%	177.6%	924.1%	3658.2%	336.6%	929.2%	218.1%
City	604.3%	202.7%	146.6%	561.8%	3120.1%	122.4%	235.0%	193.2%
Suburbs	2146.1%	832.1%	314.1%	1562.6%	3990.1%	749.1%	2843.6%	228.2%
% Change in Immigrants	94.1%	323.4%	383.2%	465.6%	3386.9%	761.6%	148.9%	528.7%
City	38.9%	52.9%	327.6%	253.8%	2280.2%	359.6%	77.5%	335.0%
Suburbs	186.3%	607.8%	660.2%	773.6%	4248.8%	1346.7%	169.5%	625.1%
% Increase in Average HH Income	31.9%	41.7%	36.0%	27.4%	14.1%	32.4%	44.4%	51.7%
City	6.4%	17.3%	30.5%	19.1%	10.7%	29.7%	10.9%	41.9%
Suburbs	33.7%	34.5%	38.5%	21.4%	16.0%	25.0%	42.1%	50.1%
% Increase in Housing Units	32.0%	72.5%	183.6%	110.4%	801.6%	186.7%	28.1%	75.9%
City	-0.6%	-2.9%	158.0%	14.3%	473.9%	47.3%	-13.6%	25.1%
Suburbs	69.9%	138.0%	240.3%	192.6%	1083.5%	334.6%	38.0%	99.2%
Ratio of Hsg. Unit to HH Growth	133.3%	118.3%	112.8%	107.3%	120.6%	109.2%	139.1%	113.2%
City	6.9%	18.0%	114.3%	158.4%	119.3%	119.9%	60.4%	139.3%
Suburbs	111.9%	107.5%	110.7%	105.2%	121.2%	107.7%	125.2%	110.8%
Single Family Share of Hsg Grwth.	56.6%	53.6%	63.5%	58.4%	58.9%	56.7%	73.0%	51.2%
City	-280.9%	-65.0%	58.2%	32.2%	59.4%	28.2%	-19.7%	25.7%
Suburbs	53.0%	51.5%	71.3%	60.1%	58.7%	60.9%	65.1%	54.1%
% Increase in Average Rooms	62.0%	107.6%	82.1%	127.7%	78.6%	88.4%	71.7%	51.9%
City	18.2%	51.1%	61.9%	69.1%	68.0%	47.7%	34.4%	31.7%
Suburbs	76.0%	112.9%	112.2%	129.3%	87.7%	74.6%	69.0%	49.6%
% Change in Vacancy Rate	5.2%	4.9%	2.3%	2.4%	10.4%	2.7%	7.3%	3.5%
City	8.6%	13.5%	3.9%	4.2%	9.2%	4.0%	11.1%	4.7%
Suburbs	3.4%	2.3%	-1.2%	1.9%	10.7%	2.1%	6.9%	3.4%
Share of Post-1970 Built Units								
City	19.4%	8.8%	58.0%	11.9%	27.9%	16.8%	12.2%	13.4%
Suburbs	80.6%	91.2%	42.0%	88.1%	72.1%	83.2%	87.8%	86.6%

Implications and Policy Responses

Local decision makers can do little to counter the national and international macroeconomic and political forces that have given rise to the global rise in income inequality. Nevertheless, they do have some policy levers to address income inequality within their regions. Despite globalization, regressive changes in federal tax policy, and increasing returns to skill, state and local governments can focus on factors that directly address metropolitan income distributions. For example, many jurisdictions have raised the local minimum wage. Policies to address educational disparities, such as school assignment policies, can help to break down the correlation of neighborhood economic status and educational quality.

In contrast to the limited options to address income inequality directly, there are many ways that state and local policymakers can affect the extent to which income inequality is translated in to neighborhood inequality via economic segregation. Policies at the state, county, and municipal level determine, or have the capacity to determine, the exact distribution of new housing construction in terms of location and the distribution of units at various levels of affordability. Coordination among levels of government and across competing jurisdictions is complicated by competitive pressures and differing goals, but the current *laissez faire* approach has contributed to an environment where economic segregation has flourished. The case studies presented above suggest a few directions where local governments could coordinate to achieve reductions in the growth of economic segregation.

First, the pace of suburban building must be in line with overall population growth. Every metropolitan area discussed in the previous section saw a massive increase in the number of suburban housing units and suburban housing construction was always greater than in the central city. John Dillinger, when asked why he robbed banks, reportedly said “because that’s

where the money is.” Developers could well answer similarly when asked why they build new homes in the suburbs, because that’s where the land is. However, with the exception of Las Vegas, those cities with the most disproportionate suburban construction were the ones where economic segregation increased the fastest. When suburban housing construction outstrips population growth, it leads to actual declines in center city populations, as we saw in Philadelphia, Baltimore, and Newark. San Antonio, Denver, and Minneapolis had more balance in housing construction and did not experience large increases in economic segregation.

Second, economic segregation did not increase in areas where the growth in average household income was not heavily skewed to the suburbs. In San Antonio, Minneapolis, Las Vegas, Denver, and Oakland, household income growth was roughly comparable across central cities and suburbs. The easiest way to facilitate more balanced income growth across jurisdictions within metropolitan areas is for each city and suburb to build housing units at various levels of affordability. When affordable housing is widely distributed, low-income persons are not constrained to live in a limited number of jurisdictions, typically within central cities or older, inner-ring suburbs. Moreover, when many jurisdictions provide some share of affordable housing, no one jurisdiction needs to fear being overwhelmed, reducing the incentive to resist building affordable housing.

Neighborhoods have become increasingly unequal in part because of the world-wide trend toward inequality, but local factors that facilitate and indeed force economic segregation have played an equally important role. Exclusionary zoning, minimum lot sizes, lack of adequate public transportation, and other factors all play a role. As the experience of the 1990s indicates, economic segregation can be reduced. While racial segregation is still with us, and needs to be addressed, it has begun to decline, whereas economic segregation has risen. Given

the mounting evidence of costs to low-income persons and society generally of our unequal neighborhoods, we need to move forward aggressively to reduce such disparities. The alternative is to make the mistake of replacing the Kerner Commission's grim prediction of "two societies – one black, one white – separate and unequal" with "two types of neighborhoods – one rich, one poor – separate and unequal."

Appendix I: Data and Methods

Data

We use census tract data from the US Census for years 1970, 1980, 1990, and 2000. These data differ in subtle ways. For example, the 1970 Census did not fully implement the household concept fundamental to later data. Racial categories are not consistent across the years. However, there is no realistic alternative data for the study we propose to conduct. Thus, we will simply identify these issues and do our best to limit their effect on the resulting analyses. See Appendix A for further information.

We use census tract the American Community Survey (ACS) for 2008-2012 to approximate 2010. In some analyses, we use the first ACS census tract release, 2005-2009, to approximate a pre-recession value and the most recently available release, 2011-2015, to represent the current state of affairs. See Jargowsky (2015, Appendix B) for a detailed discussion of the time-window for the income data in the ACS.

Geographic Concepts

We will use contemporaneous census tracts rather than the Longitudinal Tract Database. We believe that the tracts as drawn in any given Census year are the best representation of tracts in those years. This keeps the average population size of the neighborhood units more consistent over time, and it is well known that segregation measures are sensitive to the size of neighborhood units employed (Openshaw 1984; Reardon and O'Sullivan 2004). Further, we believe that smoothing of populations over areas is a bad idea when the very question is how persons are segregated over areas. This issue grows more serious the longer the time span under consideration.

In contrast, we do keep the metropolitan area definitions constant over time to the extent possible. We use the 2010 Core Based Statistical Areas (CBSAs) when they are not divided, but use the Metropolitan Divisions for divided CBSAs (Logan 2013). We then map these metropolitan definitions backwards in time via the counties which compose them. We are able to track consistent geographies for 264 metropolitan areas from 1970 to 2010, counting both standalone metropolitan areas and metropolitan divisions. See Appendix A for a discussion of our efforts to develop consistent geographies and how we dealt with counties that split, merged, or changed boundaries.

The largest metropolitan area in our data is the New York-White Plains-Wayne, NY-NJ metropolitan division, consisting in 2010 of 4.2 million households living in 10 counties (Putnam County, NY is excluded because it was not tracted in 1970). The smallest is the Pine Bluff, AR metropolitan area, with 38,220 households living in Jefferson County only; Lincoln and Cleveland counties, which included an additional 7,500 households in 2010, are excluded in all years from this analysis because tract-level data is not available for these counties in either 1970 or 1980.

Our paper will be the first to employ some of the measures of economic segregation described below. The data demands for these measures are high, requiring accurate estimates of the parameters of the underlying household distribution of income. While good microdata samples are available for most of the 2010 metros, they are typically not available for the 2010 geographies going back in time, nor for the specific set of counties we can track continuously over time. Thus, we will use a new technique, Mean-Constrained Integration over Brackets (MCIB) to estimate the parameters of the household income distributions from the counts of households by income brackets that are available in the census data for all years (Jargowsky and

Wheeler 2017). By using this technique, our estimates of the household income distribution are exactly aligned with our neighborhoods data.

Measures of Economic Segregation

Jargowsky and Kim (2009) developed a class of measures of economic segregation based on ideas from information theory (Shannon 1948). The basic idea is that there is a certain amount of income inequality between households. These households are then grouped into neighborhoods. While there is inevitably some amount of mixing of households of different income levels within neighborhoods, there is some remaining amount of inequality between neighborhoods. Given any measure of inequality, a corresponding measure of segregation may be formed by the ratio of the neighborhood-level inequality measure to the household-level inequality measure. Let Φ be any measure of inequality; if Φ_i is that measure applied to households and Φ_j is that measure applied to neighborhoods, a measure of segregation, Λ , is formed by the ratio of the two:

$$\Lambda = \frac{\Phi_j}{\Phi_i}$$

An example of a measure constructed this way is the Neighborhood sorting index (Jargowsky 1996), which is the ratio of the household-weighted standard deviation of neighborhood mean incomes to the standard deviation of household income in a given metropolitan area:

$$NSI = \frac{\sigma_j}{\sigma_i} = \frac{\sqrt{\sum_j n_j (\bar{y}_j - \bar{y})^2}}{\sqrt{\sum_i (y_i - \bar{y})^2}}$$

Segregation measures based on the Gini coefficient and the Theil Index (and others) are formed in a similar fashion (Jargowsky and Kim 2009). Allison (1978) showed that different

measures of inequality are more sensitive to inequality in different parts of the income distribution; it follows that the corresponding segregation measures are differentially sensitive to integration among households from different income levels. Thus, we use and compare multiple measures of inequality and segregation so that our results are not dependent on the weighting scheme of any one measure.

By definition, if there is perfect economic integration, all neighborhoods have the same socioeconomic level. Thus, the neighborhood-level inequality measure would be zero. Since this is the numerator of the segregation measure, the segregation measure would be zero as well. In contrast, if there is perfect income segregation, there would be no mixing of households with different incomes within neighborhoods. The neighborhood and household inequality measures would be equal and the segregation measure formed by their ratio would be 1. While it is possible for a neighborhood to be all white or all black, it is far less likely that all households in a neighborhood would have exactly the same income. In practice, there is always variation of income within neighborhoods of any appreciable size, so economic segregation measures typically are less than one.

From the definition of the segregation measure, it follows that neighborhood inequality is the product of household income inequality and economic segregation:

$$\Phi_j = \Lambda \Phi_i.$$

This formula is used in the decompositions of neighborhood inequality. In the decomposition of changes in neighborhood inequality, one of the two terms on the right is held constant at the beginning of the time period while the other is allowed to change. In the cross-sectional decomposition, the metropolitan mean value of each term on the right is substituted while the other varies by metropolitan area.

References

- Acs, Gregory, Rolf Pendall, Mark Treskon, and Amy Khare. 2017. "The Costs of Segregation: National Trends and the Case of Chicago, 1990-2010."
- Allison, Paul D. 1978. "Measures of Inequality." *American Sociological Review* 43(6):865–80.
- Chetty, Raj, Nathaniel Hendren, and Lawrence F. Katz. 2015. *The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment*. National Bureau of Economic Research. Retrieved February 17, 2016 (<http://www.nber.org/papers/w21156>).
- Chetty, Raj, Nathaniel Hendren, Patrick Kline, and Emmanuel Saez. 2014. *Where Is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States*. National Bureau of Economic Research. Retrieved January 30, 2014 (<http://www.nber.org/papers/w19843>).
- Dreier, Peter, John Mollenkopf, and Todd Swanstrom. 2014. *Place Matters: Metropolitcs for the TwentyFirst Century*. 3 edition. Lawrence, Kansas: University Press of Kansas.
- Gini, Corrado. 1921. "Measurement of Inequality of Incomes." *The Economic Journal* 31(121):124–126.
- Glaeser, Edward L., Matt Resseger, and Kristina Tobio. 2009. "Inequality in Cities*." *Journal of Regional Science* 49(4):617–46.
- Jargowsky, Paul A. 1996. "Take the Money and Run: Economic Segregation in US Metropolitan Areas." *American Sociological Review* 61(6):984–98.
- Jargowsky, Paul A. 2003. *Stunning Progress, Hidden Problems: The Dramatic Decline of Concentrated Poverty in the 1990s*. Washington D.C.: Brookings Center on Urban and Metropolitan Policy.
- Jargowsky, Paul A. 2015. *Architecture of Segregation: Civil Unrest, the Concentration of Poverty, and Public Policy*. New York, NY: Century Foundation. Retrieved (http://www.tcf.org/assets/downloads/Jargowsky_ArchitectureofSegregation.pdf).
- Jargowsky, Paul A. and Jeongdai Kim. 2009. "The Information Theory of Segregation: Uniting Segregation and Inequality in a Common Framework." *Research on Economic Inequality* 17:3–31.
- Jargowsky, Paul A. and Christopher Wheeler. 2017. "Estimating Income Statistics from Grouped Data: Mean-Constrained Integration over Brackets."
- Kingsley, G. Thomas and Kathryn L. S. Pettit. 2003. *Concentrated Poverty: A Change in Course*. Washington, D.C.: The Urban Institute.

- Logan, John R. 2013. "The Persistence of Segregation in the 21st Century Metropolis." *City & Community* 12(2):160–68.
- Openshaw, S. 1984. "Ecological Fallacies and the Analysis of Areal Census Data." *Environment and Planning A* 16(1):17–31.
- Owens, Ann. 2016. "Inequality in Children's Contexts: Income Segregation of Households with and without Children." *American Sociological Review* 81(3):549–74.
- Piketty, Thomas. 2014. *Capital in the Twenty First Century*. Cambridge Massachusetts: Belknap Press: An Imprint of Harvard University Press.
- Piketty, Thomas and Emmanuel Saez. 2003. "Income Inequality in the United States, 1913–1998." *The Quarterly Journal of Economics* 118(1):1–41.
- Quillian, Lincoln. 2012. "Segregation and Poverty Concentration The Role of Three Segregations." *American Sociological Review* 77(3):354–79.
- Reardon, Sean F. and Kendra Bischoff. 2011. "Income Inequality and Income Segregation." *American Journal of Sociology* 116(4):1092–1153.
- Reardon, Sean F. and David O'Sullivan. 2004. "Measures of Spatial Segregation." *Sociological Methodology* 34(1):121–162.
- Sampson, Robert J. 2012. *Great American City: Chicago and the Enduring Neighborhood Effect*. Chicago ; London: The University of Chicago Press.
- Shannon, C. E. 1948. "A Mathematical Theory of Communication." *Bell System Technical Journal* 27(3):379–423, 623–56.
- Sharkey, Patrick. 2008. "The Intergenerational Transmission of Context." *American Journal of Sociology* 113(4):931–69.
- Sharkey, Patrick. 2013. *Stuck in Place: Urban Neighborhoods and the End of Progress toward Racial Equality*. University of Chicago Press.