Assisted Housing and Income Segregation among Neighborhoods in U.S. Metropolitan Areas

By
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Over the past 40 years, assisted housing in the United States has undergone a dramatic geographic deconcentration, with at least one unit of assisted housing now located in most metropolitan neighborhoods. The location of assisted housing shapes where low-income assisted renters live, and it may also affect the residential choices of nonassisted residents. This article examines whether the deconcentration of assisted housing has reduced the segregation of families by income among neighborhoods in metropolitan areas from 1980 to 2005–9. I find that the deconcentration of assisted housing resulted in modest economic residential integration for very low-income families. However, high-income families became even more segregated, as assisted housing was deconcentrated, potentially offsetting the economic integration gains and ensuring that very low-income families are living in neighborhoods with only slightly higher-income neighbors. I conclude by discussing features of housing policies that might promote greater income integration among neighborhoods.

Keywords: assisted housing; income segregation; housing policy; deconcentration; residential segregation

In the past four decades, assisted housing in the United States has undergone dramatic changes and become geographically deconcentrated across neighborhoods.[1] Historically, housing for low-income renters was subsidized in public housing developments, predominantly located in racially and economically segregated neighborhoods (Schwartz 2010). With the introduction of housing vouchers in 1974,

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NOTE: The author gratefully acknowledges the helpful comments of a reviewer and the editors and thanks the organizers and participants of the Penn State Stratification Conference on Residential Inequality in American Neighborhoods and Communities.

DOI: 10.1177/0002716215576106

low-income renters could rent private market apartments in nearly any neighborhood. Over the next 40 years, the voucher program grew, construction of large public housing developments ceased, many public housing units were demolished, and new housing programs created units for low-income renters in privately owned apartment buildings. As a result of these policy changes, assisted housing became geographically deconcentrated, located in many more and lower-poverty neighborhoods than in the 1970s.

Changes in assisted housing policy affect where some low-income residents live, providing assisted renters with access to higher-income neighborhoods than they could otherwise have afforded. Assisted housing may also influence the residential choices of residents who do not live in assisted housing. High-income residents may not want to live in a neighborhood where new assisted housing units are built or where voucher users are moving in, while low-income residents who do not live in assisted housing may move into neighborhoods with new assisted housing, attracted by the new investments in the neighborhood (Freeman 2003). The changing landscape of assisted housing, then, may shape where both high- and low-income residents live, affecting the income composition of neighborhoods and the degree of income segregation among neighborhoods in metropolitan areas. On one hand, income segregation could decline as assisted housing creates opportunities for low-income residents to live among higher-income neighbors. On the other hand, if higher-income residents avoid neighborhoods with assisted housing, assisted housing may not lead to much income integration.

In this article, I examine whether the geographic deconcentration of assisted housing units has reduced income segregation—the degree to which families are segregated by income among neighborhoods—within U.S. metropolitan areas from 1980 to the late 2000s. I find that the deconcentration of assisted housing reduced the segregation of very low-income residents from higher-income residents among neighborhoods but is not associated with overall income segregation among neighborhoods. I conclude by discussing policy features that might encourage greater income integration.

Income Segregation among Neighborhoods

Trends in segregation by income among neighborhoods have been well documented by social scientists. Economic segregation captures the degree to which families with different incomes live in the same neighborhood or are sorted by income among neighborhoods within a city or metropolitan area. Research shows economic segregation among neighborhoods increased during the 1970s and 1980s, stabilized or declined slightly during the 1990s, and increased again during the 2000s (Jargowsky 1996; Watson 2009; Reardon and Bischoff 2011; Bischoff and Reardon 2014). The rise in economic segregation among neighborhoods from 1970 to 2010 corresponds to a declining number of mixed- or middle-income neighborhoods and a growing number of either very poor or very affluent

neighborhoods (Reardon and Bischoff 2011; Booza, Cutsinger, and Galster 2006).

Several economic and political changes have spurred the growth in income segregation. First, rising levels of income inequality since 1970 have led to increased income segregation among neighborhoods (Watson 2009; Reardon and Bischoff 2011). Second, land use regulations on building size and density have contributed to income segregation, especially between city and suburban neighborhoods (Pendall 2000a; Rothwell and Massey 2010). Third, economic restructuring has led to a lack of jobs for low-skilled workers and to economic growth outside of central cities, concentrating low-income residents in some urban areas (Wilson 1987). Finally, persistent racial discrimination and segregation among neighborhoods has contributed to economic segregation (Massey and Denton 1993). Black-white racial segregation declined during the period of rising economic segregation (Logan and Stults 2011), highlighting the rise of economic segregation within racial groups (Reardon and Bischoff 2011). Racial segregation does persist and remain high, however, and the association between income and race means that barriers to racial integration in the housing market contribute to economic segregation.

Assisted housing policy has long been implicated as a source of racial and economic segregation, as some have argued that the U.S. Department of Housing and Urban Development (HUD) perpetuated segregation by building public housing in predominantly low-income and minority communities (Hirsch 1983). Since the 1960s, HUD has attempted to address segregation concerns by integrating public housing by race, stopping the construction of large high-rise family public housing developments, and creating programs to geographically disperse residents to more integrated neighborhoods (Goetz 2003; Khadduri 2001). These new programs were seen as having the potential to encourage greater income mix both inside assisted housing developments and in neighborhoods where assisted housing was located, fostering income integration in metropolitan areas.

The Deconcentration of Assisted Housing

Historically, assisted units were in public housing developments located in a relatively small number of U.S. neighborhoods. Several assisted housing programs introduced since 1970 have resulted in the presence of assisted units in many more and lower-poverty neighborhoods. Housing Choice Vouchers (formerly Section 8 vouchers, established in 1974) subsidize rents on the private market, and about two million were in use by 2008 (compared with 1.1 million public housing units) (Schwartz 2010). In 1974, HUD also began to subsidize rents in privately owned buildings through Section 8 projects (where the subsidy is project-based, linked to a particular building, rather than tenant-based and portable, like vouchers), and nearly 850,000 Section 8 project units were subsidized. In 1986, the Low Income Housing Tax Credit (LIHTC) program began, with developers receiving tax credits for building affordable units, 1.6 million of which

existed in 2008. Since the mid-1990s, there has been a 20 percent net loss in the number of public housing units as many public housing developments were demolished or sold, and former residents were often given vouchers to rent units on the private market (Schwartz 2010). Other public housing was redeveloped, often with an aim toward creating income diversity within the developments. Over 250 grants through the HOPE VI program funded the demolition and redevelopment of public housing into mixed-income communities between 1992 and 2010. In addition to new programs, HUD's policies began to focus on the geographic dispersal of both voucher and project-based units and income mix within developments, reflected in the Quality Housing and Work Responsibility Act of 1998 (QHWRA), which includes tenant allocation policies for public housing developments to maximize income diversity and prioritizes very low-income renters for voucher receipt.

This patchwork of programs alongside traditional public housing served to dramatically deconcentrate assisted housing: at least one unit of assisted housing is now located in nearly every tract in the metropolitan United States (Owens 2012). This dramatic geographic deconcentration provides opportunities for low-income, assisted renters to live in neighborhoods they may not otherwise be able to afford and to live alongside higher-income neighbors. Assisted housing is not an entitlement; today only about a quarter of those who are eligible receive it. However, the number of assisted housing units more than tripled from 1977 to 2008, so assisted housing has a bigger impact on where low-income households are located today than in the past. Therefore, assisted housing may increasingly play a role in income integration.

With the introduction of these new programs, assisted housing is now located in slightly lower-poverty neighborhoods compared with public housing in the 1970s. While voucher users live, on average, in lower-poverty neighborhoods than where public housing was historically located, they still do not live in very low-poverty areas (Devine et al. 2003; Pendall 2000b; Newman and Schnare 1997; Galster 2013). The Section 8 project–based program has mixed outcomes, with about a third of units located in neighborhoods with poverty rates below 10 percent but another third located in neighborhoods with poverty rates above 40 percent in 2007, about the same proportion as in the public housing program (Schwartz 2010). LIHTC units are most likely to be in low-poverty neighborhoods, with 40 percent located in neighborhoods with poverty rates below 20 percent and only 6 percent in neighborhoods with poverty rates over 40 percent (Schwartz 2010).

Demolition of the most troubled public housing projects and a focus on creating income mix within public housing resulted in a decline in the proportion of public housing units located in neighborhoods with poverty rates over 20 percent (Schwartz 2010). Residents displaced from public housing due to demolition or redevelopment typically moved to lower-poverty neighborhoods, but these neighborhoods are still typically racially segregated with higher poverty rates than the citywide average (Oakley and Burchfield 2009; Kingsley, Johnson, and Pettit 2003). Poverty rates declined in neighborhoods surrounding several HOPE VI sites, providing lower-poverty contexts for the public housing residents that

live there (Holin et al. 2003). Overall, the changes to assisted housing since the 1970s have resulted in low-income assisted renters living in neighborhoods with fewer poor residents. Has this been enough to reduce income segregation?

Assisted Housing and Income Mixing

The deconcentration of assisted housing may affect income segregation among neighborhoods because it shapes where some residents, especially low-income residents, live. The deconcentration of assisted housing may have direct effects on income segregation because low-income families can now use vouchers or find project-based units in neighborhoods with higher-income neighbors than they could otherwise have afforded. This could reduce segregation by income among neighborhoods and create a greater income mix within a neighborhood. The demolition of some large public housing developments may have broken up clusters of low-income residents, creating more income-diverse neighborhoods and leading to more income integration among neighborhoods. However, the transformation of assisted housing's impact on income segregation depends on low-income assisted residents leaving lower-income neighborhoods and moving to higher-income neighborhoods, and this does not always occur, as noted above. While assisted housing policy is a state intervention in the housing market, the location of assisted housing is largely left up to the private market, potentially limiting assisted housing's integrating effects. Further, assisted housing accounts for only about 3 percent of housing units in the United States, and only about 25 percent of the poor live in assisted units, so assisted housing's impact on income segregation may be modest since it does not account for the location of the majority of low-income renters.[2]

The ability of assisted housing to reduce income segregation also depends on the residential location of nonassisted residents. Past research suggests that assisted housing may have indirect effects on the residential choices of nonassisted households that may undermine income integration. Higher-income, nonassisted residents may move out of or avoid neighborhoods with assisted housing because of concerns about property values, safety, or stereotypes linked to assisted renters (Freeman 2003; Owens, forthcoming). These negative perceptions of assisted housing may linger in regard to the neighborhood even after assisted housing has been removed (Owens, forthcoming). Low-income, nonassisted residents are more likely to move into neighborhoods with newly developed assisted housing than other similar neighborhoods, attracted by the investment in the neighborhood (Freeman 2003). Therefore, the deconcentration of assisted housing may simply move pockets of low-income residents from one neighborhood to another, rather than integrating low- and high-income residents within neighborhoods.

Little research has examined the impact of assisted housing on metropolitan-area income segregation. Three studies have examined how the changing location of assisted housing affects poverty concentration, focusing on the degree to

which poor residents are segregated from all other households. Two studies used simulations. Quillian (2005) found that under various relocation criteria, "vouchering out" public housing residents did not substantially reduce poverty concentration because the number of public housing residents was not large enough to have an impact on the distribution of poor residents. Moving beyond public housing demolition, Kucheva (2011) found that the deconcentration of assisted housing units from 1977 to 2008 may have increased segregation of poor and nonpoor residents in the eight counties she studied. In past work (Owens 2012), I have used measures of assisted housing concentration similar to those used here and found that, overall, the deconcentration of assisted housing from 1977 to 2008 only modestly reduced poverty concentration in the 100 largest metropolitan areas.

No study has looked at the relationship between assisted housing and income segregation aside from looking at poverty concentration, which only measures segregation between two groups: those with incomes above and those with incomes below the poverty threshold. The effect of assisted housing on segregation at other points in the income distribution is thus not captured. For example, past research shows that assisted housing is now located in lower-poverty neighborhoods than in the past, but these neighborhoods still often have poverty rates above the national average, so the deconcentration of assisted housing may lead to income integration of the very poor and working poor, both with incomes below the poverty threshold. Alternatively, the deconcentration of assisted housing may lead very affluent residents to become even more segregated if the presence of assisted housing causes them to move out of or avoid neighborhoods, since assisted housing may make low-income neighbors more visible. The following analyses explore these possibilities.

Data and Methods

This article explores how the deconcentration of assisted housing has shaped income segregation among neighborhoods in metropolitan areas from 1980 to 2005–9, using longitudinal regression models.

Income segregation

I estimated income segregation in U.S. metropolitan areas in 1980, 2000, and 2005–9. The 1980 and 2000 U.S. Censuses and the 2005–9 American Community Survey (ACS) provide counts of families in income categories (seventeen in 1980, and sixteen in 2000 and 2005–9).[3] I use the 1999 Office of Management and Budget's definition of Primary Metropolitan Statistical Areas (MSAs) and analyze all 331 MSAs in the United States.[4]

To capture income segregation across the full income distribution, rather than examining poor versus nonpoor or some other measure of segregation between just two groups, I use the rank-order information theory index (*H*). *H* compares

the entropy (variation) in family incomes within census tracts to the entropy in family incomes in the metropolitan area. Entropy is calculated at each income threshold, comparing the number of families with incomes above and below each category cutoff point in the tract to the number in the metro area. Then, the rank order information theory index H is estimated by taking a weighted average of the binary H computed at every threshold between the income categories (Reardon 2009). The online methodological appendix provides more details on estimating H. In theory, H can range from zero (no segregation) to one (total segregation). A value of zero indicates that the family income distributions are identical in all tracts (and therefore identical to the metropolitan area distribution). In contrast, a value of one indicates that every family in each tract has incomes in the same category as all other families in the tract—there is no income diversity.

Table 1 presents the mean and standard deviation of H in 1980, 2000, and 2005–9. Reardon and Bischoff (2011) report mean values of H between 0.13 and 0.16 among the 100 largest metropolitan areas from 1980 to 2000. The estimates here are slightly lower because they include all 331 MSAs in the United States, but the magnitude and trend are similar.

Because H is a weighted average of binary H at each income category, H can be estimated at each percentile in the income distribution by fitting a polynomial regression through the estimates at each category (see Reardon and Bischoff [2011] for details). Therefore, in addition to H averaged across all income categories, I also estimate H at the 10th, 50th, and 90th percentiles of the income distribution to capture the segregation of the poor, between the bottom and top halves of the income distribution, and of the affluent from all others. Table 1 presents the mean and standard deviation of H at these points in the income distribution. Consistent with past research (Reardon and Bischoff 2011), income segregation is highest for the affluent, between those with incomes above and below the 90th percentile. It is also high among the poor, between those with incomes above and below the 10th percentile of the income distribution.

Assisted housing concentration

I measured the segregation of assisted housing in 1977, 2000, and 2008 using data from HUD's *Picture of Subsidized Households*, which provides the number of assisted housing units located in each census tract.[5] The 1977 file provided the number of units in public housing projects. HUD's "Subsidized Housing Projects' Geographic Codes, Form HUD-951" database provided addresses for the projects, which I geocoded to assign projects to census tracts. About 30 percent of assisted units were missing address data. I reduced missing data among eleven MSAs that represent about one-fifth of all assisted units (Chicago, Cleveland, Dallas, Los Angeles, Louisville, New York, Phoenix, Pittsburgh, Providence, Seattle, and Washington, DC) by finding project addresses in HUD documentation and through communication with housing authorities. This reduced the missing data to about 25 percent of assisted units, and in total I assigned approximately 700,000 public housing units to tracts.[6] Programs other than public

TABLE 1
Descriptive Statistics for Income Segregation and Control Variables at the MSA Level, 1980 to 2005–9

Dependent variables	1980	2000	2005–9
MSA income segregation: Rank-order information theory Index *H*	0.095	0.107	0.116
	(0.031)	(0.033)	(0.034)
MSA *H*, 10th percentile	0.109	0.124	0.138
	(0.033)	(0.035)	(0.036)
MSA *H*, 50th percentile	0.088	0.098	0.106
	(0.030)	(0.033)	(0.034)
MSA *H*, 90th percentile	0.128	0.144	0.154
	(0.040)	(0.042)	(0.045)
Control variables			
Poverty rate	0.121	0.124	0.140
	(0.046)	(0.044)	(0.043)
Income inequality (Gini)	35.926	39.259	39.616
	(2.451)	(2.629)	(2.457)
Proportion non-Hispanic white	0.813	0.754	0.719
	(0.146)	(0.168)	(0.172)
Proportion non-Hispanic black	0.105	0.109	0.107
	(0.098)	(0.106)	(0.106)
B-W dissimilarity	0.609	0.514	0.541
	(0.148)	(0.130)	(0.107)
Population density	394.021	437.668	459.983
	(910.996)	(927.571)	(923.890)
Proportion rental units below fair market rate	0.536	0.447	0.475
	(0.127)	(0.081)	(0.068)
Vacancy rate	0.081	0.079	0.081
	(0.029)	(0.029)	(0.030)
Number of affordable housing units	2542	9153	10734
	(6764)	(20,840)	(25,501)
N	265	331	331

NOTE: Cells present means with standard deviations in parentheses below. Statistics for 1980 are for MSAs with assisted housing units in 1977, as those without are excluded from regression analyses.

housing were not included in the 1977 data even though about 150,000 Section 8 project–based units and more than 100,000 voucher units were in use by 1977 nationwide (Schwartz 2010). Therefore, the 1977 affordable housing units (AHUs) concentration measures include only public housing, so the change from 1977 to 2000 can be interpreted as deconcentration of assisted housing due to introducing new programs other than public housing as well as changes to the public housing program.

The *Picture of Subsidized Households* provided the number of units in census tracts in 2000 and 2008 for all federally assisted housing programs: public housing, vouchers, Section 8 project–based, LIHTC, and other small programs.[7] Some vouchers and project-based units were not assigned to tracts in these years. I could not assign missing tracts for vouchers, as street addresses for individual units were not available, but I again reduced missing data for project-based units among eleven MSAs, after which only about 5 percent of assisted units could not be geocoded. I identified tracts for about 1.9 million project-based units and 1.7 million vouchers in the metropolitan United States in 2000 and 2008. The 2000 and 2008 AHU concentration measures included the federally funded assisted housing programs listed above, and the change from 2000 to 2008 captures dispersal efforts among all these programs.

I measured the degree to which assisted housing is evenly spread throughout the MSA using the binary information theory index (H). This is analogous to the rank-order information theory index described above, except that it compares the distribution of two nominal categories (assisted and nonassisted housing units) rather than many ordered categories. An H of zero suggests the AHU rate in all tracts is equal to the overall MSA AHU rate, while H equals one when some tracts had an AHU rate of 100 percent and other tracts had AHU rates of 0 percent, so no tract had both assisted and nonassisted housing units. Declining levels of segregation of AHUs indicates their deconcentration. In the case of segregation between two groups, the value of H is partially conditioned by the relative number of minority members (AHUs in this case; Massey and Denton 1988; Reardon and Firebaugh 2002). However, it has advantages over other evenness measures like the dissimilarity index, which is affected only by the redistribution of AHUs from areas where they were overrepresented to where they are underrepresented and which is particularly sensitive when the number of minority group members is small compared with the number of units, which is the case in some metros here.

Table 2 presents descriptive statistics for AHU H in 1977, 2000, and 2008. AHU H declined dramatically from 1977 to 2000 due largely to the addition of units in new AHU programs that tended to be located in many more neighborhoods than public housing, like voucher, Section 8 project–based, and LIHTC units. The AHU H in 1977 was very high—0.59 on a zero to one scale (in comparison to segregation levels under 0.12 for income)—and declined to 0.25 by 2000. The decline of nearly 60 percent suggests that assisted housing has been dispersed into more neighborhoods—but residential income desegregation will likely follow only if AHUs have moved not just to more but to higher-income neighborhoods. AHU segregation continued to decline, by an additional 20 percent, from 2000 to 2008, as dispersal became an even bigger focal point of HUD policies after the QHWRA of 1998 and as the LIHTC program—which tends to be located in lower-income neighborhoods—took off, doubling in size after 2000 (Schwartz 2010).

Table 2 also explores how changes in AHU concentration vary across metropolitan areas. Assisted housing was most concentrated in the Midwest in 1977, and the largest declines by 2008 were in western MSAs, where housing stock is

TABLE 2
Descriptive Statistics for AHU Segregation, 1977 to 2008

Independent variable	1977	2000	2008
MSA AHU segregation: Binary information theory index *H*	0.589 (0.161)	0.249 (0.076)	0.197 (0.058)
By region			
Northeast	0.571	0.277	0.235
Midwest	0.610	0.259	0.195
South	0.590	0.257	0.205
West	0.583	0.194	0.148
By population (2009)			
0–250,000	0.578	0.226	0.176
250,001–500,000	0.571	0.244	0.207
500,001–1,000,000	0.567	0.267	0.211
1,000,001+	0.643	0.293	0.221
By AHU type (2008)			
Majority voucher	0.566	0.207	0.160
Majority public housing	0.491	0.288	0.227
Majority LIHTC	0.631	0.259	0.193
Mix	0.580	0.265	0.219
By AHU prevalence (2008)			
< 2%	0.638	0.247	0.199
2–4%	0.587	0.247	0.194
4–6%	0.580	0.249	0.200
> 6%	0.565	0.274	0.210

NOTE: Cells present means with standard deviations in parentheses below. Statistics for 1977 exclude MSAs without assisted housing.

lower density, perhaps facilitating the distribution of assisted housing. Assisted housing segregation was highest in all years in large metropolitan areas, with more than 1,000,000 residents, but the size of the decline in AHU segregation among these MSAs was second largest, behind small metros with under 150,000 residents. AHU concentration also varies by the type of AHU programs used and by the proportion of housing units that are AHUs (AHU rate). I classified metropolitan areas by whether the majority of their AHUs were vouchers, public housing, LIHTC, or no majority (a mix of programs) in 2008. Metropolitan areas that had more vouchers and LIHTC units had the least segregated AHUs in 2008 and the largest declines since 1977. Metropolitan areas with the highest AHU rates in 2008 had slightly higher levels of AHU segregation in 2008 compared with metropolitan areas with a lower AHU rate in 2008, perhaps because high AHU rates correspond to large developments that cluster AHUs in one neighborhood (and because binary *H* reflects, in part, the AHU rate). Overall, AHU concentration has declined dramatically across metropolitan areas, with the largest declines

occurring in western MSAs, very large and very small MSAs, those that rely on vouchers and LIHTC units, and those with lower AHU rates.

Analyses

I conducted metropolitan-level analyses and explored whether AHU segregation predicts metropolitan-area income segregation using regression with MSA and time-period fixed effects. Income segregation and the sociodemographic control variables are measured in 1980, 2000, and 2005–9 while AHU concentration is measured in 1977, 2000, and 2008. I treated 1977 and 1980 data as the first time point, 2000 data as the second, and the 2008 and 2005–9 data as the third, and pooled observations from all three time points. I also examined the two time periods separately. The online appendix provides more detail on the models.

I controlled for MSA characteristics associated with assisted unit deconcentration and poverty deconcentration: (1) MSA economic characteristics (MSA poverty rate and income inequality; measured with the Gini coefficient); (2) racial composition (proportion non-Hispanic black and non-Hispanic white) and racial segregation (the black-white dissimilarity index, or the proportion of black residents that would have to move to achieve an even distribution across tracts); (3) population density; and (4) housing market characteristics (the proportion of vacant rental units, the proportion of units renting below fair market rate, and the rental limit for voucher use, which is typically set at the 40th percentile of the area rent distribution). Data on the sociodemographic characteristics come from the censuses and ACS. The MSA and time fixed effects account for time invariant characteristics of metros, such as region, and secular time trends across metros. Other time-variant observed or unobserved variables that I do not account for bias causal validity. Descriptive statistics for the control variables are presented in Table 1.[8]

Results

Table 3 presents results for longitudinal regressions predicting MSA-level income segregation from assisted housing segregation with MSA and time fixed effects. The first column presents results from the first time period, the second column presents results from the second, and the third column presents the pooled model with all three waves. A positive coefficient indicates that metropolitan areas with declining geographic concentration of AHUs (where the AHU segregation index declines) have declining income segregation (a positive coefficient could also indicate rising levels of income segregation in MSAs with rising levels of AHU segregation, but since AHU segregation declined in nearly all MSAs, I interpret the results in terms of geographic deconcentration of AHUs).

The first row presents results for average metropolitan-area income segregation across the entire income distribution. Looking at the pooled model with all

TABLE 3
Longitudinal Regression Analyses Predicting Metropolitan-Area Income Segregation from Assisted Housing Segregation with Metropolitan Area and Time Fixed Effects

	1980 to 2000	2000 to 2005–9	Pooled
Average income segregation (H)			
AHU *H*	–0.0004	0.008	0.006
	(0.005)	(0.009)	(0.004)
Income segregation (H), 10th percentile			
AHU *H*	0.006	0.037*	0.014*
	(0.007)	(0.017)	(0.006)
Income segregation (H), 50th percentile			
AHU *H*	–0.003	0.010	0.003
	(0.006)	(0.010)	(0.005)
Income segregation (H), 90th percentile			
AHU *H*	0.000	–0.032*	0.003
	(0.007)	(0.015)	(0.007)
MSA × Time controls	Y	Y	Y
MSA FE	Y	Y	Y
Time FE	Y	Y	Y
N Obs (MSAs × Year)	596	662	927
N MSAs	331	331	331

NOTE: All models include MSA × time control variables shown in Table 1 as well as MSA and time fixed effects. In 1977, some MSAs had no AHUs and are missing observations at that time point, so the number of observations is less than 331 × 3 (993). All significance tests are two-tailed.
*$p \leq .05$.

three time periods, the segregation of assisted housing does not significantly predict income segregation among neighborhoods within MSAs, though the direction of the coefficient is consistent with the hypothesis that MSAs with lower concentration of AHUs have lower levels of income segregation. There is not a significant effect in either time period.

Rows 2–4 in Table 3 show that the concentration of assisted housing has a significant and positive relationship with income segregation among neighborhoods at specific points in the income distribution. The change in AHU segregation from 1977 to 2008 significantly and positively predicts the change in income segregation at the 10th percentile. Very low-income families with incomes below the 10th percentile became more likely to share neighborhoods with higher-income families (those with incomes above the 10th percentile) in MSAs where assisted housing was geographically deconcentrated. The magnitude of the coefficient indicates that a one-unit decline in AHU segregation (moving from complete segregation to no segregation) would reduce income segregation by 1.4 percent (0.014 points on a zero to one scale), a small effect. The change

in average AHU concentration from 1977 to 2008 was –0.392 (Table 2), so the corresponding decline in income segregation would be only about 0.5 percent. During this time, income segregation at the 10th percentile increased by about 0.03, or 3 percent (Table 1). Therefore, AHU deconcentration created an integrating effect that offset about one-sixth of the increase in income segregation experienced during this period.

The relationship is not significant in the earlier time period, and the pooled result is driven by the post-2000 time period. AHU concentration declined, on average, by 0.048 points after 2000, suggesting an average impact on income segregation of 0.002 (0.048×0.037), about one-seventh of the rise in income segregation at the 10th percentile during this time. Income segregation increased, on average, in nearly every MSA, suggesting that other segregating forces (for example, income inequality, racial segregation, or the Great Recession) counteracted the integrating effect of deconcentrating assisted housing. However, income segregation increased less in MSAs where greater AHU deconcentration occurred.

AHU segregation may more strongly shape income segregation at the bottom of the income distribution because low-income families are the most likely to be living in assisted housing and thus are most directly affected by its concentration as it determines where some live. (In 2009, the median income of both voucher and public housing residents was just over $10,000 [Schwartz 2010].) The deconcentration of assisted housing units appears to integrate very low-income families into at least slightly higher-income neighborhoods. This finding suggests "direct" effects of deconcentrating assisted housing—that it contributes to income integration through its effect on those who may live in assisted housing—but I also found evidence of a "spillover" or indirect effect on families not living in assisted housing, in the opposite direction. Table 3 presents a negative and significant relationship between AHU segregation and neighborhood income segregation of the affluent after 2000. In MSAs with declining AHU concentration, families in the top decile of the income distribution increasingly segregated themselves from all others. As AHUs entered into more neighborhoods, affluent residents responded by isolating themselves into high-income neighborhoods. There is no relationship between AHU concentration and income segregation at the top of the income distribution from the bottom (H at the 50th percentile).

AHUs make up a minority of housing units in all metropolitan areas—no MSA has an AHU rate above 15 percent—and AHUs compose a very small amount—less than 3 percent—of housing units in half of all metropolitan areas. That AHUs are only a small proportion of all households may limit their impact—both direct and indirect—on income segregation. Therefore, I examined metropolitan areas by AHU rate, comparing those with AHU rates above and below the median of 3.4 percent in 2008, to see whether the relationship was more robust in MSAs with more AHUs in proportion to total housing units. Table 4 presents the results of the same models estimated in Table 3 but limited to MSAs with AHU rates above the median.

Row 1 of Table 4 shows that, when examining only the 165 MSAs with high AHU rates (above the median), there is a borderline significant and positive association between AHU segregation and income segregation across the income

TABLE 4
Longitudinal Regression Analyses Predicting Metropolitan Area Income Segregation from Assisted Housing Segregation among MSAs with High AHU Rates

	1980 to 2000	2000 to 2005–9	Pooled
Average income segregation (H)			
AHU *H*	–0.003	0.004	0.011^
	(0.008)	(0.013)	(0.006)
Income segregation (H), 10th percentile			
AHU *H*	0.002	0.054*	0.023*
	(0.011)	(0.027)	(0.010)
Income segregation (H), 50th percentile			
AHU *H*	–0.006	0.002	0.008
	(0.009)	(0.014)	(0.007)
Income segregation (H), 90th percentile			
AHU *H*	0.001	–0.041^	0.008
	(0.011)	(0.022)	(0.010)
MSA × time controls	Y	Y	Y
MSA FE	Y	Y	Y
Time FE	Y	Y	Y
N Obs (MSAs × Year)	305	330	470
N MSAs	165	165	165

NOTE: All models include MSA × time control variables shown in Table 1 as well as MSA and time fixed effects. In 1977, some MSAs had no AHUs and are missing observations at that time point. All significance tests are two-tailed.
*$p \leq .05$. ^$p \leq .10$.

distribution. This suggests that for the deconcentration of AHUs to have an impact on overall income segregation, there must be a larger presence of AHUs—there were no significant relationships between AHU segregation and income segregation among MSAs with AHU rates below the median. Like Table 3, Row 2 shows the effect of AHU concentration is most robust for segregation of the poor and significant only after 2000. The coefficients are about 50–60 percent larger among high-AHU MSAs compared with all MSAs. Segregation of the affluent is again negative but only borderline significant after 2000 (perhaps due to small sample size). A higher presence of AHUs may have more robust effects on income segregation both because the location of more low-income, assisted renters is affected (direct effects) and because nonassisted residents may move in response to assisted units (indirect effects). If there are proportionally more AHUs in an MSA, their presence may be even more salient and visible to nonassisted residents.

In both analyses, the relationship between AHU concentration and income segregation is driven by results after 2000 and is not significant from 1980 to 2000. Several factors may account for the stronger relationship after 2000.

Policies aimed at deconcentrating assisted housing into lower-poverty neighborhoods (not just more neighborhoods) may have had most of their effect, or reached a tipping point at which an impact on income segregation is observed, after 2000. First, the QHWRA of 1998 instituted explicit provisions for income mix in HUD programs and the focus on dispersal became stronger (Goetz 2003). Second, redevelopment of public housing takes time, and many HOPE VI–funded projects did not begin housing residents until after 2000. Demolition of public housing also continued into the 2000s. Third, the LITHC program nearly doubled in size from 2000 to 2008. More LIHTC units are located in low-poverty neighborhoods than other programs, and LIHTC developments house residents with a greater income mix, so the increase in the number of LIHTC units during this time may have tempered income segregation. In addition, the post-2000 period includes the onset of the Great Recession, and deconcentrated AHUs may have helped poor residents to stay in their homes and neighborhoods compared with others without rental subsidies. Housing assistance may have been critically important in creating or maintaining income segregation during this precarious time.

Altogether, the results tell a mixed story. On one hand, income segregation among very low-income families is lower in metropolitan areas where assisted housing has been spread more evenly across neighborhoods. On the other hand, AHU deconcentration has a negative association with the segregation of very high-income residents and does not affect segregation between those with incomes in the top and those in the bottom halves of the income distribution. This suggests that very low-income residents are not being integrated with middle- or upper-income families but likely with other poor or near-poor families. Overall, AHU deconcentration has not substantially reduced income segregation across the income distribution among neighborhoods in metropolitan areas, having only small integrating effects for the very poorest residents and having small segregating effects for the most affluent residents after 2000, and preventing low-income families from accessing very high-income neighborhoods.

Discussion

Over the past several decades, income segregation between neighborhoods has increased, and the number of mixed income neighborhoods has declined. While HUD's main responsibility is to provide decent, safe, and affordable housing for low-income households, assisted housing policy was seen as an opportunity for policy-makers to combat income segregation, particularly the concentration of poverty, and to facilitate income mix and economic integration of low-income families. HUD policies and programs address this goal through a patchwork of programs that focuses on the dispersal of assisted renters to many more neighborhoods than traditional public housing allows for. These programs have succeeded in geographically deconcentrating assisted housing units, and a greater number of assisted units exist today than in the mid-1970s. That said, assisted

housing still accounts for the location of only about 3 percent of households, tempering expectations for a large impact on income integration. However, assisted housing is the main policy promoting the mobility of lower-income families to higher-income neighborhoods, so assessing whether it has made an impact on income segregation is critical.

This article examined whether the geographic deconcentration of assisted housing units has been enough to foster economic integration among neighborhoods in the metropolitan United States. The results indicate that the declining segregation of assisted housing fostered a small amount of economic integration among neighborhoods, mainly for very low-income families and in MSAs where there is a greater prevalence of assisted housing. I also found indirect effects: high-income families in metropolitan areas with lower concentrations of assisted housing have become even more segregated, potentially offsetting the economic integration gains and ensuring that very low-income families are living in neighborhoods with only slightly higher-income neighbors.

Overall, then, assisted housing has made some progress in slowing the growth in income segregation among neighborhoods in an era when income segregation has increased. How can the effect be greater? Given the constellation of housing programs in place today, the location of assisted housing largely depends on the decisions of private market landlords and developers. On one hand, the private market has not prevented assisted housing from becoming geographically deconcentrated over the past 40 years, with at least one unit of assisted housing now located in nearly every neighborhood. On the other hand, assisted housing is still not predominantly located in higher-income neighborhoods, which may be necessary to achieve more income integration. Changes to the voucher program, such as landlord outreach, higher voucher values in high-cost areas, property tax rebates for landlords who accept vouchers, and more information about high-income areas for voucher users, may facilitate voucher holders' residence in higher-income areas (Khadduri and Wilkins 2008). When siting project-based assisted housing, local policy-makers should work closely with developers to target stably mixed or higher-income neighborhoods. However, investment in very low-income neighborhoods is also important, and LIHTC developments, which tend to house higher-income residents than other types of assisted housing, may reduce poverty rates in the poorest neighborhoods (Ellen, O'Regan, and Voicu 2009). To avoid reactive moves by high-income residents when assisted housing is built in their neighborhood, more research must be done on the architectural features, development size, income mix, and place-based investments that can retain high-income residents in mixed-income neighborhoods.

The magnitude of the effect of assisted housing policy on income integration may be limited by the fact that assisted housing serves only a minority of residents. My results show that assisted housing has larger effects on income segregation when more residents live in assisted housing, but it is unlikely that assisted housing will ever be expanded to a majority of households, given the political and economic climate in the United States. Therefore, other national and local policies in the urban, antipoverty, and education arenas must also be aimed at promoting income integration. Rent control, zoning policy, and property taxes are all

tools that can be adjusted to limit income segregation and maintain mixed-income neighborhoods. School quality also shapes where families choose to live, and economic integration may be difficult to achieve if school resources and attendance are linked to real estate prices. The poverty deconcentration and mixed-income paradigms have been part of assisted housing policy for several decades, but without other economic, urban, and educational policies, assisted housing's effect on income segregation among neighborhoods will be limited.

Notes

1. I use the term *assisted housing* to refer to means-tested federally funded programs supported by both project- and tenant-based subsidies.

2. Nationally, about 1.1 percent of housing units were assisted units in 1977, 3.1 percent in 2000, and 3.3 percent in 2008 (author's calculations based on HUD and census/ACS data).

3. The Neighborhood Change Database provides 1980 data on family income in 2000 tract boundaries (GeoLytics 2003). I followed past research and use family income to estimate income segregation between tracts (Reardon and Bischoff 2011; Watson 2009). I also predicted household income segregation in 2000 and 2005–9 from AHU segregation from 2000 to 2008, and results are substantively identical to those presented here (data on 1980 household income are not available in 2000 boundaries).

4. Other research on income segregation focuses only on the 100 largest metropolitan areas. Results limited to this sample are presented in the online appendix, Table A1. See http://ann.sagepub.com/supplemental.

5. The *Picture of Subsidized Housing* includes 1993 data on public housing but excludes other housing programs that include millions of units (see http://www.huduser.org/portal/datasets/picture/yearlydata.html). Therefore, I cannot estimate a relationship between assisted housing and income segregation in the 1990s.

6. I replicated analyses on the 100 largest MSAs for which missing data have been reduced to less than 10 percent (see Table A1 in online appendix).

7. Data included mortgage subsidy programs (Section 236 and 221(d)3) and housing for disabled (Section 202) and elderly residents (Section 811). Data excluded the U.S. Department of Agriculture's rural housing program (Section 515) as well as Indian Housing, and the HOME and Community Development Block Grant programs.

8. I found a higher average dissimilarity index in 2005–9 than 2000, in contrast to research showing declining racial segregation in the 2000s (Logan and Stults 2011). This may be because Logan and Stults use census rather than ACS data, document trends through 2010 rather than 2005–9, use 2010 tract and metropolitan area boundaries rather than 2000 or 1999, count multiracial black individuals as blacks, and present averages weighted by group members rather than unweighted averages.

References

Bischoff, Kendra, and Sean F. Reardon. 2014. Residential segregation by income, 1970–2009. In *Diversity and disparities*, ed. John R. Logan, 208–33. New York, NY: Russell Sage Foundation.

Booza, Jason C., Jackie Cutsinger, and George Galster. 2006. *Where did they go? The decline of middle-income neighborhoods in metropolitan America*. Washington, DC: The Brookings Institution. Available from www.brookings.edu.

Devine, Deborah J., Robert W. Gray, Lester Rubin, and Lydia B. Taghavi. 2003. *Housing choice voucher location patterns: Implications for participants and neighborhood welfare*. Washington, DC: U.S. Department of Housing and Urban Development. Available from www.huduser.org.

Ellen, Ingrid Gould, Katherine M. O'Regan, and Ioan Voicu. 2009. Siting, spillovers, and segregation: A reexamination of the low income housing tax credit program. In *Housing markets and the economy: Risk, regulation, and policy,* eds. Edward L. Glaeser and John M Quigley, 233–67. Cambridge, MA: Lincoln Institute of Land Policy.

Freeman, Lance. 2003. The impact of assisted housing developments on concentrated poverty. *Housing Policy Debate* 14 (1–2): 103–41.

Galster, George. 2013. U.S. assisted housing programs and poverty deconcentration: A critical geographic review. In *Neighbourhood effects or neighbourhood based problems? A policy context*, eds. David Manley, Maarten van Ham, Nick Bailey, Ludi Simpson, and Duncan Maclennan, 215–49. Dordrecht: Springer Netherlands.

GeoLytics. 2003. CensusCD neighborhood change database. East Brunswick, NJ: GeoLytics, Inc.

Goetz, Edward G. 2003. *Clearing the way: Deconcentrating the poor in urban America*. Washington, DC: The Urban Institute Press.

Hirsch, Arnold R. 1983. *Making the second ghetto: Race and housing in Chicago, 1940–1960*. Chicago, IL: University of Chicago Press.

Holin, Mary Joel, Larry Buron, Gretchen Locke, and Alvaro Cortes. 2003. *Interim assessment of the HOPE VI program cross-site report*. Washington, DC: U.S. Department of Housing and Urban Development. Available from www.huduser.org.

Jargowsky, Paul A. 1996. Take the money and run: Economic segregation in U.S. metropolitan areas. *American Sociological Review* 61 (6): 984–98.

Khadduri, Jill. 2001. Deconcentration: What do we mean? What do we want? *Cityscape* 5 (2): 69–84.

Khadduri, Jill, and Charles Wilkins. 2008. Designing subsidized rental housing programs: What have we learned. In *Revisiting rental housing: Policies, programs, and priorities,* eds. Nicholas P. Retsinas and Edward S. Belsky, 161–91. Washington, DC: Brookings Institution Press.

Kingsley, G. Thomas, Jennifer Johnson, and Kathryn L. S. Pettit. 2003. Patterns of Section 8 relocation in the HOPE VI program. *Journal of Urban Affairs* 25 (4): 427–47.

Kucheva, Yana Andreeva. 2011. Subsidized housing and the concentration of poverty: 1977–2008: A comparison between eight U.S. cities. CCPR Online Working Paper Series PWP-CCCR-2011-008. Los Angeles, CA: California Center for Population Research.

Logan, John R., and Brian J. Stults. 2011. *The persistence of segregation in the metropolis: New findings from the 2010 Census*. US2010 Project. New York, NY, and Providence, RI: Russell Sage Foundation and Brown University. Available from www.s4.brown.edu/us2010.

Massey, Douglas S., and Nancy A. Denton. 1988. The dimensions of residential segregation. *Social Forces* 67 (2): 281–315.

Massey, Douglas S., and Nancy A. Denton. 1993. *American apartheid: Segregation and the making of the underclass*. Cambridge, MA: Harvard University Press.

Newman, Sandra J., and Ann B. Schnare. 1997. "… And a suitable living environment": The failure of housing programs to deliver on neighborhood quality. *Housing Policy Debate* 8 (4): 703–41.

Oakley, Deirdre, and Keri Burchfield. 2009. Out of the projects, still in the hood: The spatial constraints on public housing residents' relocation in Chicago. *Journal of Urban Affairs* 31 (5): 589–614.

Owens, Ann. 2012. The new geography of subsidized housing: Implications for urban poverty. PhD diss., Harvard University.

Owens, Ann. Forthcoming. Assisted housing and neighborhood poverty dynamics, 1977 to 2008. *Urban Affairs Review*.

Pendall, Rolf. 2000a. Local land-use regulation and the chain of exclusion. *Journal of the American Planning Association* 66 (2): 125–42.

Pendall, Rolf. 2000b. Why voucher and certificate users live in distressed neighborhoods. *Housing Policy Debate* 11 (4): 881–910.

Quillian, Lincoln. 2005. Public housing and the spatial concentration of poverty. Paper presented at the annual meeting of the Population Association of America, 31 March–2 April 2005. Philadelphia, PA.

Reardon, Sean F. 2009. Measures of ordinal segregation. *Research on Economic Inequality* 17:129–55.

Reardon, Sean F., and Kendra Bischoff. 2011. Income inequality and income segregation. *American Journal of Sociology* 116 (4): 1092–153.

Reardon, Sean F., and Glenn Firebaugh. 2002. Measures of multigroup segregation. *Sociological Methodology* 32 (1): 33–67.

Rothwell, Jonathan T, and Douglas S. Massey. 2010. Density zoning and class segregation in U.S. metropolitan areas. *Social Science Quarterly* 91 (5): 1123–43.

Schwartz, Alex F. 2010. *Housing policy in the United States*. 2nd ed. New York, NY: Routledge.

Watson, Tara. 2009. Inequality and the measurement of residential segregation by income in American neighborhoods. *Review of Income and Wealth* 3:820–44.

Wilson, William Julius. 1987. *The truly disadvantaged: The inner city, the underclass, and public policy*. Chicago, IL: University of Chicago Press.