THE SPATIAL CONCENTRATION OF SUBSIDIZED HOUSING

by

Rosalind Kotz

A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Urban Affairs and Public Policy

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ABSTRACT

Subsidized housing has been criticized for concentrating poor households and contributing to neighborhood decline by acting as a barrier to redevelopment of central cities (Goering & Feins, 2008; Schill & Wachter, 1995). The research has identified significant negative neighborhood effects from living in neighborhoods with concentrated poverty (Ellen and Turner, 1997; Sampson, Morenoff and Gannon-Rowley, 2002) and there is some evidence that the greater number of subsidized units in a neighborhood the greater the negative effect (Santiago et al 2001, Lee 2008, Lyons and Loveridge 1993, Rosenthal 2008, and Galster et al 1999). Housing and poverty deconcentration policies implemented in the 1990's such as HOPE VI and voucher mobility programs may have resulted in changes in the location of subsidized housing contributing to positive changes in the lowest income neighborhoods (Dawkins, 2007; Ellen & O'Regan, 2008). This study uses data from "A Picture of Subsidized Housing 2000" (HUD, 2008) to investigate the relationship between the concentration, mix of subsidized housing types, and poverty at the census tract level in metropolitan areas. Results indicate that the distribution of subsidized housing occurs at multiple scales, subsidy types and levels of poverty. At the metropolitan level subsidized housing segregation is higher than race, ethnicity and poverty. At the census tract level the highest concentration is due to multiple types of subsidized housing co-located in the

same census tract. On the other hand subsidized housing reaches low poverty census tracts at rates higher than expected. The cluster analysis supports a nuanced view of subsidized housing that lends itself to development of specific strategies to address over-concentration. More definitive research is needed on thresholds above which additional units of subsidized housing could be detrimental and below which subsidized housing should be encouraged through incentives.

Chapter 1

INTRODUCTION

Public housing has been criticized for concentrating poor households and contributing to neighborhood decline by acting as a barrier to private redevelopment of central cities (Goering & Feins, 2008; Schill & Wachter, 1995). The research has identified significant negative neighborhood effects from living in neighborhoods with concentrated poverty (Ellen and Turner, 1997; Sampson, Morenoff and Gannon-Rowley, 2002). After a twenty year increase in concentrated poverty there was an unexpected decrease in concentrated poverty from 1990-2000 which brought the levels of concentration back to where they were in 1980 (Ellen & O'Regan, 2008; Jargowsky, 2005b; Kingsley & Pettit, 2003). The reasons underlying this turnaround are not yet fully clear but changes in the location of subsidized housing has been raised as a possible explanation. Housing and poverty deconcentration policies implemented in the 1990's may have resulted in changes in the location of subsidized housing contributing to positive changes in the lowest income neighborhoods (Dawkins, 2007a; Ellen & O'Regan, 2008). A literature search identified 65 studies on subsidized housing concentration and neighborhood impact which are presented in Chapter 2 and a summary matrix is included in the Appendix B.

This study investigates multiple types of subsidized housing at the census tract level and the relationship between subsidized housing and poverty in 2000. Specifically the study asks the following research questions:

1. To what extent is subsidized housing geographically concentrated at the census tract level in U.S. metropolitan areas?
2. What is the relationship between the concentration and mix of subsidized housing types and distress at the census tract level?

The study consists of three analyses, each of which contributes to measuring and explaining different aspects of the geographic concentration of subsidized housing. The full methodology is described in Chapter 3.

1. Descriptive Statistics – Census tract level subsidized housing frequency, cross-tab, and correlation analysis. (Chapter 4)
2. Segregation Index – Concentration of subsidized housing measured as the total number of subsidized units as a percent of total housing units in the census tract. Segregation measured at the Metropolitan Statistical Area (MSA) level for subsidized housing with comparisons to segregation measures for race, ethnicity and poverty. (Chapter 5)
3. Cluster Analysis – Non-spatial cluster analysis of the concentration and mix of subsidized housing types and mapping of results. (Chapter 6)

Data on subsidized housing prior to 2000 is considered unreliable so a study that considers change in the subsidized housing inventory over time is not possible. The lack of baseline data precludes a neighborhood impact study which requires the change in subsidized housing units over time; therefore a cross-sectional analysis is conducted. The 2000 data is more reliable and is now widely available due to compilation of HUD databases on an annual basis. The LIHTC database for 2000 in particular is of high quality and corrections to prior year inventories are regularly made. This study takes advantage of the greater availability and quality of data. The data for this study is downloaded from HUD (2000) *A Picture of Subsidized Housing*. The following describes the four types of subsidized housing included in the study.

Public housing is the first federal housing subsidy program authorized in 1937. The program is administered on the federal level by the Office of Public and Indian Housing but are constructed and managed by a Local Public Housing Authority (LPHA) using federal funds. The public housing program serves the lowest income residents. Residents pay a portion of their income (typically 30 percent) toward rent and LPHA's also receive federal funds for operating and modernization. The HOPE VI program authorized in 1936 provides federal funds to a limited number of Housing Authorities for deconcentration plans including demolition, tenant relocation, and rebuilding at lower density. Data on public housing units and tenants has been relatively easy to access because most projects are large scale site-based buildings with

clear addresses. Data on LPHA units can be accessed either locally or through HUD. There are an extensive number of studies that focus exclusively on public housing.

Three site-based programs including Multi-Family, Section 236, and Section 8 project-based units are administered in the Office of Multi-Family Housing at HUD (hereafter referred to in this study as "other site-based" units). These programs were initiated at various times in the 1970's and 1980's and continued to be active in the 1990's. The use of multiple local developers and administrators resulted in a complex decentralized mix of public, private-non-profit and private-for-profit owners. Some programs target the elderly or disabled while others are family-oriented. Residents pay a portion of their income (typically 30 percent) towards rent and are very low income. There are relatively few studies of non-public housing site-based units. Those that do exist are restricted to a small number of metropolitan areas in order to collect and verify the data locally.

The Low Income Housing Tax Credit (LIHTC) is a site-based program authorized in the late 1980's which started producing units in the 1990's. States receive an allocation of tax credits on a per capita basis and allocate the tax credits to projects in Qualified Allocation Plan (QAP). Because it is a tax credit rather than a direct grant or loan, the program is administered by the Treasury Department rather than HUD. Studies indicate that LIHTC residents have higher incomes than the other subsidy types but are still low income. Rents in this program differ significantly from the other

subsidy programs in that rents are set based on a percentage of the area median income regardless of the individual household's actual income. Data on this program has been limited until recently because Treasury has not collected data on the program participants. HUD subsequently contracted for data collection on this program starting in the 2000's which retroactively included projects constructed since the early 1990's. The data available is extensive and has been made publicly available on the HUD website in a searchable database. It includes the number and geographic location of these units. Data on resident characteristics in LIHTC units however is still not available except for a small sample study conducted by the General Accounting Office (GAO) (1997).

Tenant-based rental assistance (Section 8 certificates or vouchers, hereafter referred to in this study as "vouchers") began in the 1970's but did not become a primary form of subsidy until the 1990's. These programs are administered by HUD in the Office of Public and Indian Housing. Although HUD collects data on these units the data on geographic location is not made publicly available in order to preserve the confidentiality of the residents. A limited number of researchers are offered access to the restricted data. Aggregated data was sporadically compiled and made public between 1993 and 2000 with the most recent compilation being "*A*

Picture of Subsidized Households – 2000 "[1]. Restricted access has resulted in a limited number of studies on the geographic location of tenant-based assistance.

[1]A more recent compilation *A Picture of Subsidized Households - 2008* was posted to the HUD website on 02/04/2010. Although too late to be used for this study it will provide data for future studies.

Chapter 2

LITERATURE REVIEW

A comprehensive literature review was conducted on the geographic concentration of subsidized housing which identified 65 studies from the 1970's to 2008. A summary matrix of the studies is included in Appendix B. These studies attempt to explain the impacts of public housing on various outcomes including property values, racial segregation, crime, and concentrated poverty. The interaction between race and poverty concentration has also been extensively studied (L. Freeman, 2006).

Only one study compiled data from public housing, other site-based housing, LIHTC and tenant-based units. Newman and Schnare (1997) studied these four types of federal programs as well as rural and non-federal programs. This study covers the period 1992 – 1994. There have been a few other studies limited to multiple types of site-based units but no other studies were located that included both multiple site-based units as well as vouchers.

Subsidized Housing Impact on Property Values

A considerable literature investigates the linkage between subsidized housing and property values including three review articles on this topic (Nguyen, 2005; Freeman and Botein, 2002; Galster and Zobel, 1998).

Nguyen (2005) reviewed seventeen studies conducted from 1963 to 2001 that assessed the changes in property values in areas surrounding subsidized housing. Early studies use matched neighborhoods and later ones use hedonic price regression to control for factors other than the location of the subsidized housing. The literature can be summarized as follows: 1) if there are negative effects (and this is not always the case), the effects are small; 2) design and management are important factors in property value impacts; 3) negative impacts are more likely when the housing is clustered in neighborhoods with high poverty rates; and 4) there are a limited number of methodologically sound studies so more are needed (p. 24). She provides recommendations for future studies including the need for qualitative studies to understand property owner motivations and that data on housing trends be incorporated into the analysis in order to better understand the impact of the subsidized housing (p. 24).

Freeman and Botein (2002) reviewed twenty-six studies on property value impacts conducted between 1974 and 2001 concluding that severe methodological problems limit the usefulness of the findings. The authors find insufficient evidence

from the nine matched neighborhood property value studies to draw conclusions and only four of seventeen hedonic price studies were found to be methodologically sound (p. 368). They identify only one study (Freeman 2001) that used a sound methodology with appropriate controls and contrary to previous studies found no effect on property values. The authors conclude that earlier study results which ranged from slightly negative to large positive effects were not reliable. The authors suggest that future studies use appropriate multi-level models, include household level controls, controls for variation between different types of neighborhoods and include information on the design of the subsidized housing.

Galster and Zobel (1998) conducted a theoretical and meta-analysis of existing studies including 1) case studies of participants in dispersion programs; 2) statistical studies on the impact on property values; and 3) statistical studies on neighborhoods and behavior. The authors conclude that there will be benefits to the overall system if people move out of high poverty areas into the lowest poverty areas but there was little empirical evidence in support of housing dispersal on neighborhood poverty or social behaviors.

Many of the earlier studies on site-based subsidized housing have been criticized for improper research designs which did not control for household level data (Freeman and Botein, 2000; Nguyen, 2000). One study that did control for household level effects was conducted by Freeman (2003) which linked geocoded Panel Study of Income Dynamics (PSID) longitudinal household level data with 1997 site-based

subsidized housing data and census neighborhood characteristics. The study tested the effect of the presence or absence of subsidized housing (dichotomous variable) as well as the number of assisted units (density). Propensity scores were used to match neighborhoods with and without subsidized housing. Controls were added for moving behavior by age and race. In addition, various interaction effects were studied. Results indicated that the relationship between assisted housing and neighborhood out-migration was a spurious one, "Once the relevant control variables are added to the models, typically no relationship can be discerned" (p. 126). The author concludes that the non-poor are likely to avoid neighborhoods with assisted housing developments but that this is perhaps caused by other characteristics of the neighborhood and not the subsidized housing (p. 130).

Three studies looked at the issue of "crowding out" which is the potential reduction in unsubsidized units due to the construction of new units of subsidized housing. Murray (1999) studied public housing and other site-based housing and found that there was no reduction with the construction of low-income housing but there was a reduction with the construction of moderate-income housing. Sinai and Waldfogel (2005) found less "crowd out" in lower-income and high population areas. And Eriksen and Rosenthal (2007) studying LIHTC also found a difference between low income and higher income areas with reductions in the higher income areas and actual increases in construction in lower-income areas as well as increased property values.

Overall, it is clear that there are differential effects on the housing market depending on the location of the subsidized housing construction. Results have been mixed, finding both positive and negative effects, and the effects are usually small. Unfortunately many of these studies use flawed methodologies which make the results unreliable. The focus is typically on only one housing market and each study looks at different housing programs which make the results difficult to compare and generalize.

The negative effect of public housing on property values may be limited to the older and larger project-based public housing. A recent study by Bair and Fitzgerald (2005) indicates that the negative impacts of public housing may be overcome through HOPE VI revitalization. An evaluation of six HOPE VI projects in Atlanta, Charlotte, Kansas City, Boston, Denver and Philadelphia found a statistically significant and large positive increase in property values of 8-10 percent per quarter mile from the site.

Subsidized Housing Impact on Racial Segregation

Early studies tended to focus on the impact of public housing on racial segregation and whether subsidized housing was causing "white flight". Gray and Tursky (1986) found that families receiving rental assistance were highly concentrated in a small number of minority-concentrated neighborhoods. Between 50 and 85 percent of family units were located in only 5 percent of the census tracts in each MSA (p. 249). Bickford and Massey (1991) found that projects for the elderly were

primarily white while family projects were predominantly minority. "Patterns for specific SMSA's suggest that black-white segregation is very high and is determined primarily by the rate of black population growth (p. 1011).

Studies of Public Housing Authorities (PHA's) by Goering, Kamely and Richardson (1997) and Coulibaly, Green and James (1998) support this conclusion by identifying PHA-level practices that segregated races at the building level within larger public housing projects. Black projects were located in the lowest-income areas and when projects consisted of more than one race, they were segregated by building. Coulibaly et al (1998) in a study of public housing from 1932 to 1992 found consistent siting policies and funding cutbacks in every era, with the net result that public housing by 1992 was primarily located in central city neighborhoods that were highly segregated by both race and income. The authors note that the earliest public housing (1932-41) was built in low-income areas where the land was cheap. Funding was provided for demolition of existing units in low-income areas (slum clearance) and there was no effort to deconcentrate by race or income. Segregation index scores were at their maximum. Individual buildings (within projects) were completely segregated. Temporary housing during the war was constructed in locations near war industries and transportation but units were demolished after the war if they were located in non-low-income areas. Over 80 percent of urban renewal units (1953-60) were located in low-income areas. The index score was lower because some public housing was constructed for white elderly in suburban areas. Data limitations in 1977 and 1992

limited the study to city vs. suburbs. In 1977, 71% of all public housing units in MSA's were located in the central cities. This number had increased to only 74% by 1992.

Massey and Kanaiaupuni (1993) found that poverty increased in all Chicago neighborhoods but the largest increases were in predominantly black neighborhoods. Due to the high rate of racial segregation in the Chicago MSA in 1970, most blacks lived in tracts that were 90 percent black and were relatively more likely to live in tracts with public housing compared to whites. Poverty was an average of 16 percent in the absence of public housing to 26 percent in neighborhoods with public housing (p. 118). The authors conclude that public housing caused concentrated poverty through three processes: 1) concentrating poor families by virtue of the public housing income restrictions; 2) the continuing effects over time of earlier public housing construction; and 3) an indirect effect on migration rates (p. 118). A study by Schill and Wachter (1995) confirmed these results in the City of Philadelphia. Massey and Kanaiaupuni (1993) sum up their findings, "Public housing thus represents a key institutional mechanism for concentrating large numbers of poor people within a small geographic space, often within dense, high-rise buildings. Because low-income projects were systematically targeted to black neighborhoods in a discriminatory fashion (Hirsch, 1983; Goldstein and Yancey, 1986; Bauman, 1987), this institutional mechanism greatly exacerbated the degree of poverty concentration for one group in particular – blacks" (Massey and Kanaiaupuni, 1993, p. 120).

Several studies have been conducted to look at racial turnover in neighborhoods to determine if blacks were moving in or whether whites were moving out, either way increasing racial concentration. The results are mixed. Goldstein and Yancey (1986), Freeman and Rohe (2000) and Briggs, Darden and Aidala (1999) found no relationship between public housing and increased racial concentration or "white flight". Galster and Keeney (1993) on the other hand found a significant increase in percent black in the neighborhoods where public housing was constructed in the prior decade controlling for other factors.

Subsidized Housing Impact on Crime

A limited number of studies looked at the impact of public housing on crime rates. Crime effects are reduced with distance from the public housing and there are mixed results on whether public housing itself causes the crime or whether the public housing is located in a wider area that has higher rates of crime. Resident fear of crime is often attributed to the public housing and objections to siting public housing are often made on the basis of increased crime.

Roncek, Bell and Franck (1981) compared blocks with public housing to blocks without public housing. Correlation and regression analysis on the number of public housing units on a block and distance to public housing sites and 13 other factors. Blocks with public housing have significantly more violent and property crimes. However, after controlling for SES and housing stock characteristics adjacent

to the public housing, location adjacent to public housing has the least importance in predicting violent crime and had no importance in predicting property crime.

McNulty and Holloway (2000) found that being located close to subsidized housing in the city has a significant effect on several types of crime holding all other variables such as race and income constant.

Two studies looked at crime and scattered site public housing. Galster, Pettit, Santiago and Tatian (1999) found a threshold effect on crime in their study of small scale scattered site public housing in Denver, CO. Project scale (exceeding 53 units) had a significant effect on crime in the surrounding neighborhood. The authors conclude that the results support the public housing siting ordinance in Denver which restricts projects over 40 units. Focus group findings show that the public is afraid of increased crime from subsidized housing which in many cases may not be justified. Joice (2007) also found that the presence of public housing in Louisville, KY was related to increased crime, but that additional units added to the area did not increase crime. Scattered sites did not appear to be related to increased crime except that when the density of scattered site units in a census tract exceeded 48 units per square mile there was an increase in crime.

A recent study shows that crime may be reduced through the revitalization of the public housing but may cause increases in violent crime in smaller pockets throughout the city (Bacon, 2007). However there was no consistency in the areas

inhabited by HOPE VI relocatees with respect to crime rates. The author concludes that due to the small numbers of relocatees in any given area it is not likely that they were the cause of increased (or decreased) crime.

In spite of the lack of studies that involve crime and subsidized housing there continues to be a fear that subsidized housing will bring crime to an area. A recent article by Rosin (2008) in the magazine Atlantic Monthly entitled *American Murder Mystery* is indicative of this concern. The author links newspaper headlines about an epidemic in rising crime rates in the city, statements by the police in certain suburban neighborhoods that tie the increase to subsidized housing residents, and maps produced by a local academic that showed the increased crime in relation to subsidized housing. Until we have more studies that both show the decentralization of subsidized housing and link this to crime, articles such as this one will continue to fuel the fear.

Subsidized Housing Impact on Concentrated Poverty

Studies on poverty concentration focus on whether public housing is concentrated in high-poverty areas and whether the concentration causes increased poverty in the future.

Holloway, Bryan, Chabot, Rogers and Rulli (1998) found that public housing in Columbus, OH ranged from 21 to 58 percent of the neighborhood rental stock. The authors identified two mechanisms that contributed to the concentration of poverty including 1) public housing attracting individuals most vulnerable to economic

hardship; and 2) public housing weakening the neighborhood housing market. The "propensity of the population to fall into poverty" explained a significant amount of the change in poverty over a decade. Distance from the subsidized housing also had a strong effect. Public housing had an effect on blacks that was double that of whites (p. 12). Older public housing concentrated more than more recent construction, but all were found to concentrate poverty (p. 779). Since this study was confined to only one MSA the results cannot be generalized.

Rosenthal (2008) studied the impact of subsidized housing on concentration of poverty in 270 MSA's nationwide with data from 1970 to 2000 as well as a preliminary study of 35 MSA's and case study of Philadelphia (Rosenthal, 2007). The study includes two site-based subsidized housing programs (public housing and LIHTC) in the multivariate analysis as potential predictors of change in neighborhood poverty. The study found the persistence of low- poverty and very high poverty census tracts over a thirty year period from 1970 to 2000 (p. 65). The author identified multiple processes leading to concentrated poverty including 1) aging housing stock; 2) access to public transit; 3) Socio-economic status (SES) spillover effects (defined as poverty attracting more poverty and the effect of racial segregation on poverty concentration); and 4) the location of site based subsidized housing. All four processes contribute to the total result. Public housing and the LIHTC were both found to increase the poverty rate in the subsequent decade. Also, high density housing was found to consistently increase the poverty rate (p. 85). "While MSA-wide

factors are important, tract-specific attributes account for the great majority of the change in census-tract poverty rates between decades" (p. 81). This study is very important in our understanding of the continued negative impact of site-based housing, but given that vouchers have become the primary subsidy type, it would be important to know more about their impacts on neighborhoods as well as the mix of site-based and tenant-based assistance.

Concentration of Public Housing

Coulibaly, Green and James (1998) study the concentration of public housing from 1932-1992. The earliest public housing (1932-41) was built in low-income areas where the land was cheap which was necessitated due to recisions in funding. The program funded demolition of existing units in low-income areas (slum clearance) to create the land for the public housing so there was no effort to deconcentrate by siting public housing in non-racially or income segregated areas. Temporary housing during the war (1941-1953) was constructed in locations near war industries and transportation but units were unevenly demolished after the war primarily if they were located in non-low-income areas leaving temporary constructed houses in high-poverty areas. Over 80 percent of urban renewal units (1953-60) were located in low-income areas. Some public housing was constructed during this period for white elderly households in suburban areas which improved the income concentration but not the racial concentration in public housing. One indicator of whether public housing had

deconcentrated over time is whether the housing was sited outside central cities. In 1977, 71% of all public housing units in MSA's were located in the central cities. This number had increased to only 74% by 1992 (Couibaly et al, 1998, p. 101).

Concentration of Low Income Housing Tax Credits (LIHTC)

The Low Income Housing Tax Credit (LIHTC) became a significant source of new subsidized housing in the 1990's increasing from 8 percent to 20 percent of the federally subsidized housing stock and also becoming a significant and growing percentage of all site-based housing (29 percent). Geocoding of these projects in the late 1990's enabled greater study of their location and concentration. Subsequently there has been a relatively large literature on the geographic location of LIHTC units. Many studies are exclusively of LIHTC units but some compare the LIHTC to either public housing or vouchers.

According to Freeman (2004) slightly less than half of LIHTC units are located in the suburbs which is higher than other federally funded site-based projects (24 percent). LIHTC neighborhoods are racially concentrated but experienced larger declines in poverty during the 1990's than other neighborhoods. An Abt Associates (2006) study of LIHTC units placed into service between 1995 and 2003 found that 33 percent were located in census tracts with poverty rates under 10 percent and another 28 percent were located in tracts with poverty rates between 10-20 percent. The percentage of units constructed in low poverty areas has increased over time (p. 6).

Khadduri, Buron and Climaco (Abt Associates) (2006) studied 182 MSA's with populations over 250,000 between 1995 and 2003 and found the percentage of units constructed in low poverty areas has increased over time. The study also found differences between states in the location of LIHTC units.

Oakley (2008) studied the geographic location of LIHTC units in four MSA's using multivariate analysis and found that poverty and unemployment were not significant indicators. Except for Los Angeles, race/ethnicity was not a significant predictor. The strongest predictor was the presence of the project in a qualified census tract (QCT), which indicates that this incentive was effective at bringing LIHTC's to areas that needed redevelopment, but this may also have limited the decentralization of units. Units were also more likely to be sited in tracts that also had other LIHTC projects nearby (p. 26). The author concludes that the spatial distribution of LIHTC is geographically more dispersed than previous site-based housing projects but the trend is toward clustering of the LIHTC units over time.

Deng (2007) compared the impacts of vouchers and LIHTC units in Miami-Dade County. The study found a strong similarity between the voucher and LIHTC neighborhoods. Most LIHTC units were located in very low and low income neighborhoods, with only a small proportion in middle-income neighborhoods (p. 32). Most voucher and LIHTC units were located in areas with schools that perform under state averages, regardless of subsidy type. As for the tightness of the housing market, the author did not find evidence that a balanced market led to greater income or racial

deconcentration. In fact, a higher percentage of voucher holders lived in middle-income neighborhoods in tight markets than in balanced ones (p. 33).

Van Zandt and Mhatre (2009) found a significant spatial clustering of LIHTC units in the Dallas metropolitan region. Increased spatial clustering was associated with higher minority populations (r =.483), higher poverty levels (r=.359), lower household incomes (r =.202), lower safety levels (r =.350) and lower educational quality (r =.263). Overall about half the units were highly clustered, mostly in urban areas. The other half are not clustered and located in areas with social and economic variables comparable to regional averages. This study is limited to only one MSA and is therefore not generalizable.

O'Neill (2008) studied the LIHTC in 25 of the largest central cities and found extensive clustering. The clustering varied by city and was associated with high poverty in some but not all cities.

Two studies compared the location of LIHTC units and vouchers. McClure (2006) compared the location of LIHTC units and vouchers in a nationwide study. A larger proportion of LIHTC units were located in low poverty suburban neighborhoods than the vouchers. The impact of the LIHTC on suburban tract poverty was minimal. Deng (2007) looked at income, racial segregation and school quality in six MSA's and found that most vouchers and LIHTC units are located in areas with schools that perform under state averages, regardless of subsidy type.

Concentration of Other Site-Based Subsidized Housing[2]

Very few studies investigate site-based subsidized housing other than public housing or LIHTC and therefore we know very little about levels of concentration or how they interact with other types of subsidized housing.[3]

Two studies of housing created under the New York City Ten Year Housing Plan that included both federal and local funding, found that subsidized housing units were associated with increased sale prices of nearby properties. Ellen, Schwartz, Voicu and Schill (2007) used a hedonic price method to study site-based subsidized housing in New York City from 1974 to 2000. The regression included building and neighborhood variables for two distances including the immediate neighbors (within 2,000 feet of subsidized housing) and the wider neighborhood (outside 2,000 feet but

[2] Other Site-Based Subsidized Housing includes Scattered Site Public Housing, Section 8 Project-Based, Section 202 (elderly), Section 811 (disabled), and locally funded programs.

[3] Data comparing demographic characteristics of residents in different types of subsidized housing is available but geographic coding for concentration studies was limited prior to the late 1990's. The average income of households in public housing ($12,715), Vouchers ($12,411), and private subsidized ($11,056) were quite similar. Racial composition varied considerably by type: public housing (29% white), vouchers (36% white) and private subsidized (50% white) (Turner and Kingsley, 2008, p. 5).

in the same neighborhood). On average, subsidized housing was located in areas that were slightly more depressed than the distressed neighborhoods in which they were located (p. 272). The LIHTC and Section 202 (housing for the elderly) programs had positive effects in housing values at all project sizes and this effect persisted over time (p. 278). Public housing for families had a negative effect for average size projects but the negative effect declined over time. The type of project did not matter and there were no statistically significant differences between rental and homeowner units, between new construction and rehab units or type of structure (1-4 units vs. multi-family building). Positive spillover effects were large compared to other city programs.

Schwartz (1999) found that most investments were made in the city's poorest districts which continue to have high poverty rates. A relationship was found between investments in gut-rehab and a sharp reduction in vacant buildings. Correlations between housing starts and changes in welfare rolls and felony complaints were statistically significant but weaker than the vacant properties. The author notes that the scale of community districts (which are multi-census-tract areas larger than some cities) may be too large to see the full effects on welfare and crime.

Santiago, Galster and Tatian (2001) evaluated a scattered site public housing program which acquired and rehabilitated 167 homes in middle-class neighborhoods during the first phase of a 400-unit program. Hedonic price regression measured the change in sale prices over a decade while focus groups with homeowners at 6 sites

elicited personal opinions about the neighborhood. Properties in close proximity to the subsidized units saw values rise. This effect was most likely due to the fact that many of the properties acquired were vacant and underwent considerable rehabilitation. This small scale impact was insufficient to change neighborhood dynamics at a larger scale. Focus groups were aware of and concerned about other subsidized housing in their neighborhoods besides the scattered sites and in general were concerned with the quality of rental maintenance, both subsidized and unsubsidized, in their neighborhoods. The authors conclude that post-occupancy property management is crucial and that a negative effect of more units in vulnerable neighborhoods suggests there may be a maximum threshold which triggers neighborhood decline regardless of distance.

Lee (2008) studied the change in property values surrounding multiple site based housing including public housing, other HUD site-based housing and the LIHTC in five MSA's and found that results varied by type of housing, proximity, and concentration. Public housing reduced home values while LIHTC results were mixed. Positive effects depended on the number of units.

Lyons and Loveridge (1993) studied the impact on property values of various types of subsidized housing in Ramsey County, MN and found that the number of units had a small but statistically significant negative effect which diminished with distance from the subsidized housing. Larger projects had more of an impact than individual units being added to neighborhoods.

Concentration of Tenant-Based Subsidized Housing (Vouchers)

Housing vouchers have increasingly become a significant percentage of all federally subsidized housing units increasing from 1.35 million units to 1.50 million units (11 percent increase) from 1993 to 2000 at a time when public housing units declined by 22 percent. Housing vouchers were also used during this period for various mobility programs and HOPE VI relocations. A number of studies of vouchers were conducted to determine if vouchers were indeed effective at deconcentrating housing and poverty. Since these studies typically track recipients of subsidized housing they are also useful in geographic concentration studies because they capture the geographic clustering of units. These studies have used the most recent data available to study patterns of dispersion and concentration of subsidized housing. Results indicate greater movement to lower poverty neighborhoods but the movement was minimal given the size of the subsidized housing stock and there was virtually no lessening of racial and ethnic segregation.

Kingsley, Johnson and Pettit (2003) studied relocation in the HOPE VI program in 31 MSA's. They found that the number of HOPE VI relocation vouchers was small enough not to impact the location pattern of the overall voucher program (p. 441). Clustering was found in some cases but was not the predominant pattern. Clusters were more likely in tracts with middle to high poverty rates and high minority concentration (p.443). The authors conclude that "the numbers alone cannot tell us whether the degree of clustering we have observed in a particular city is problematic or

not. Accordingly, more fact-finding will be needed in most cities to devise an appropriate strategy" (p. 445).

Pendall (2000) studied the concentration of vouchers in high poverty neighborhoods. Distressed neighborhoods were defined as high poverty, joblessness, public assistance receipt, households headed by single parent, and dropout rates (the same criteria used in research of the "underclass"). Neighborhoods were classified on the indicators of distress as severe, mild or none. The study also compared the location of vouchers with the location of rentals and low-income renter households. A small percentage (2.3 percent) was located in severely distressed tracts while 17 percent were located in mildly distressed tracts. This was compared to poor renters in severely distressed tracts (4.5 percent) and 22.6 percent in mildly distress tracts (p. 904-05). In the multivariate analysis which controlled for housing market factors, rental units were not found to be a significant predictor of vouchers in distressed tracts. The location of rentals was significant in predicting where the poor lived in general, but there does not appear to be additional concentration effects due to the status of having a housing subsidy (p. 903-4). The author concludes that on a national basis the vouchers may be succeeding in dispersing to better neighborhoods more than expected from previous studies. Households with vouchers may not be moving to higher rent census tracts, but they appear to be able to avoid the lowest rent neighborhoods (p. 905).

Wang, Varady and Wang (2008) studied voucher density in eight MSA's. In five of eight MSA's the proportion of vouchers declined in high poverty neighborhoods but there were wide variations in the scope of the change. In spite of the decline, the overall level of clustering remained high. The authors conclude that there was no evidence of decentralization from cities to the suburbs.

Kingsley and Pettit (2008) studied moves in the Moving to Opportunity (MTO) program and found that the scale of vouchers for relocation is small enough not to impact the location pattern of the overall voucher program. Clustering was not the predominant pattern but was significant in a few neighborhoods in most cities. Two-thirds of the initial movers had made one or more subsequent moves. The average neighborhood poverty rate for MTO participants was 24 percent up from 13 percent in the initial move and the average minority share was 79 percent up from 68 percent. Regular Section 8 movers did not experience this change in neighborhood characteristics. Four percent of MTO movers moved to "worsening" neighborhoods and almost none (1 percent) moved to "improving" neighborhoods. Kataria and Johnson (2004) in their study of MTO in Chicago found geographic clustering and that most residents relocated to tracts close to their origin. Non-public housing residents relocated to more advantaged neighborhoods. Public housing residents who were more like MTO participants were more likely to use the voucher and moved farther.

Reed (2007) studied relocation in the HOPE VI program. Use of vouchers in HOPE VI relocation did not result in moves to less racially or economically segregated

areas, however, they also did not move to areas of greater concentration or cause greater concentration through their moves. The existing pattern of racial and economic segregation in the housing market was the dominant factor.

Devine, Gray, Rubin and Taghavi (2003) compared vouchers and other types of subsidized housing and found that vouchers are more widely dispersed than site based subsidized housing. Vouchers were less dispersed in the suburbs than in the cities when location is compared to the number of census tracts with affordable housing.

Two studies looked at voucher concentration over time. Carlson, Haveman, Kaplan and Wolfe (2008) in a study in Wisconsin which used locally collected information, found that voucher holders did not experience neighborhood quality increases initially, but over the longer term moved to better neighborhoods. Hartung and Henig (1997) concluded that in Washington, DC the economic factors appear to be more potent predictors than race. McClure (2004) found no change in destination neighborhoods before and after welfare reform.

Other studies focused on whether vouchers had an impact on the neighborhoods. Galster, Tatian and Smith (1999) found negative spillover effects when there were clusters of Section 8 vouchers in small vulnerable neighborhoods. Guhathakurta and Mushkatel (2002) found small negative spillover effects at .5 miles

from the vouchers. However, there was a positive spillover if the household was headed by a female, all other factors held constant.

Gillen (2005) in a study in Philadelphia found higher turnover rates than the average in areas that have higher voucher rate. The higher turnover rate is also associated with price declines. Low and high Section 8 neighborhoods had mean incomes that were similar and were half that of "no-Section 8" neighborhoods. Low-Section 8 neighborhoods had half the percentage non-white than high-Section 8 neighborhoods.

Concentration of Multiple Types of Subsidized Housing[4]

A search of the literature identified only six studies (out of 65) that included three or more types of housing subsidies including both site-based and tenant-based type subsidies. Until 1996 there was a lack of national comprehensive data on subsidized housing and the data available at that time was for the early 1990's. Researchers have been driven to look for creative ways to resolve the lack of standardized data at the census tract level in order to study the concentration of

[4] Multiple is defined as three or more types of subsidized housing programs with both site-based and tenant-based subsidies in the same study.

subsidized housing. One method has been to focus on a single geographic area which means that the results are not necessarily generalizable.

Van Ryzin and Kamber (2002) used a special vacant property study conducted by the U.S. Census Bureau for NYC which allowed the authors to compare an extensive list of eleven types of subsidized housing in New York City. They conclude that there are tradeoffs between housing quality, cost, and location in the different program types. The LIHTC provides higher quality but also high rent burdens for poor households. Project-based programs reduce the rents but at lower quality and neighborhood conditions. Vouchers appear to offer affordable rents in decent housing with fairly good neighborhood conditions.

Joassert-Marcelli (2007) studied access to employment by subsidized housing residents in Southern California. The percent poor and minority in the census tract were insignificant controlling for other neighborhood distress factors and subsidized housing in the tract. Access to jobs was significantly related to subsidized housing resident income.

Koschinsky (2009) conducted a geospatial hedonic price analysis of subsidized and unsubsidized rental property sales in Seattle, WA. Larger concentrations of vouchers were the only rentals with negative spillover effects in both low income and high income areas. Negative spillover effects were found only in very specific areas

consisting of single family zones, near wealthier neighborhoods and having specific racial characteristics. Negative spillover effects were not found in multi-family zones.

Unfortunately all three studies relied on data that is not likely to be available for a wide variety of MSA's. Due to unique characteristics of these MSA's in particular (New York City, Los Angeles, and Seattle) they are not likely to be generalizable to other MSA's. We would need results of a wider sample of MSA's in order to draw stronger conclusions about nationwide trends.

Only three studies (out of 65) were both comprehensive and national in scope. James (2008) used a special sample from the American Housing Survey (AHS) which provides data on the geographic location of subsidized housing at the census tract level. The AHS is a sample survey and therefore the results are typically only available at the national and state level but a sample of census tract level data is available. The survey suffers from being a self-report instrument where the resident reports whether they have a housing subsidy and from which source which can lead to inaccuracies. This is in contrast to administrative databases which use data provided by the local housing providers (such as Public Housing Authorities). There are discrepancies in total numbers between the two types of data. In particular, the AHS covers more types of subsidies than the HUD database and so is not directly

comparable.[5] In spite of these drawbacks, the data was useful in this study in teasing out resident perceptions of their subsidized housing. But due to the lack of comprehensive data at a small geographic level this study was not able to discuss concentration effects.

Rohe and Freeman (2001) studied race and poverty concentration using a national sample of MSA's that was limited to areas that were tracted in 1980 which significantly reduced the number and type of MSA's included. The strongest predictor of location for all subsidized housing types except elderly housing was the housing value of owner-occupied units in 1980. Other significant variables included percentage African Americans and percent poor, with African Americans particularly strong in predicting the location of LIHTC units.

The most comprehensive national study was conducted by Newman and Schnare (1997) with data they compiled on 6 million subsidized housing units in the

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[5] Coulibaly (1998, p. 46) and Shlay & King (1995, p. 499) have noted the inaccuracies of self-report in the AHS and the inability to break out data by subsidy type. AHS also has limited use for small area (census tract level) analysis due to confidentiality rules. The AHS reports a total of 5,368,000 units in 1999 while the number of federally subsidized units reported in HUD administrative databases in 2000 totaled 4,975,157 units. The difference between the two estimates in 1999/2000 was 392,843 units. The difference between the two sources in 1993 was only 77,161.

early-mid 1990's consisting of public housing, Section 202, Section 236, Rural Rental (515), LIHTC, State programs, and vouchers. The goal of this study was to compare the spatial distribution of various types of subsidized housing programs and to assess the concentration in high poverty and "highly impacted underclass" tracts. The study found that approximately 6 percent of all housing units and 20 percent of all rental units were subsidized in the early 1990's (p. 708).

Most, but not all subsidized housing units were located in poor-quality neighborhoods. Public housing was highly concentrated in high poverty areas while vouchers were more decentralized; however there was little evidence that the voucher program encouraged moves to middle and upper income neighborhoods (p. 728). Elderly housing was much more decentralized than family projects. Multivariate analysis with controls for housing market factors confirmed the results of the descriptive analysis. The authors concluded that project-based assistance appears to do little to improve the quality of the neighborhood and that public housing in particular made things worse (p. 726). As with all correlations, the authors caution that association does not necessarily mean causation. "Theoretically it is possible that public housing is the cause of a neighborhood's decline" but that it wasn't likely to be responsible for bringing about the decline of the whole tract due to the low number of units and that it was more likely that the neighborhood decline was already in progress" (p. 727).

Housing Policy Changes in the 1990's

There were several changes in federal housing policy during the 1990's that encouraged greater deconcentration of poverty and as a result there could be changes in the spatial distribution of subsidized housing between 1990 and 2000. Housing vouchers became a major component of housing policy with an increase of 11 percent during the 1990's. Although the problem of distressed public housing was well known during the 1980's, it wasn't until the 1990's that a serious effort was made to address the problems through the HOPE VI program with a reduction in 22 percent of that stock. The LIHTC program became the primary production program in the 1990's increasing by 167 percent during the 1990's bringing the program from 8 percent of units in 1993 to 20 percent of federally subsidized rental units in 2000.

"In 1992, the Commission on Severely Distressed Pubic Housing reported that approximately 86,000, or 6 percent of the nation's public housing units were severely distressed – characterized by physical deterioration and uninhabitable living conditions; high levels of poverty; inadequate and fragmented services; institutional abandonment; and location in neighborhoods often as blighted as the sites themselves" (GAO, 2003, p. 1). As a result there were a number of poverty deconcentration efforts implemented in the 1990's that included Moving to Opportunity (MTO) and HOPE VI. Overall there was a housing policy shift from site-based to tenant-based housing subsidies which were believed to provide tenants with greater opportunity to move to lower poverty and more integrated neighborhoods.

Recent studies of individual housing programs indicate that decentralization has occurred, but that perhaps the extent is limited. The mobility literature indicates that there has been geographic dispersal to lower poverty and more racially diverse neighborhoods but that this differs by subsidy type, by race/ethnicity of the neighborhood and by metropolitan area. Other studies find clustering to be the primary pattern. Since studies often focus on only one or two subsidized housing programs at a time it is not clear the extent that subsidized housing "as a whole" has dispersed and it is difficult to generalize the findings.

Mobility programs which provide vouchers to residents of high poverty public housing residents to move to lower poverty neighborhoods have been relatively small scale demonstrations representing only 3 percent of vouchers nationwide in 1997. One of the most widely known, Moving to Opportunity (MTO), had less than 2,000 units in the experimental group that moved to low-poverty neighborhoods. Results from the controlled experiment did not find economic or educational benefits while housing quality, neighborhood quality and mental health impacts were found. Barriers to relocation into low poverty areas included the lack of affordable rentals available which restricted mobility but also personal preferences for living close to family and familiar surroundings contributed to a movement back to higher poverty neighborhoods.

The main public housing redevelopment program in the 1990's, HOPE VI, has been fairly successful in terms of the physical redesign of the site and somewhat

successful in attracting moderate income homebuyers, although the developments were not found to be less racially segregated (Turbov & Piper 2005). Neighborhood spillover effects to surrounding areas were found but it was unclear if this was due to the good economy in the 1990's (Popkin et al., 2004; Zielenbach, 2003). Creating mixed income neighborhoods is one of the purposes of the HOPE VI program. There is limited evidence on whether mixed income housing developments have been successful and most researchers say that more time is needed and more research on the human effects of these developments before conclusions can be drawn. "Thus far, research indicates that mixed-income public housing developments can be successful in creating well-managed communities that attract higher income tenants" (S. J. Popkin et al., 2004, p. 22).

HOPE VI relocatees report substantial improvements in their neighborhood conditions including less crime, more neighborhood services and amenities, as well as better housing conditions and better mental health. The relocatees do find difficulties finding housing in the private market with the voucher and still report problems in being able to afford the private market rent even at 30 percent of their income (S. J. Popkin et al., 2004, p. 30). There also were reports of loss of social ties and coping strategies that were built up over time in the public housing development. Other researchers have found that relocatees report high levels of satisfaction, including that they were happy to leave behind dysfunctional relationships (S. Popkin, Harris, & Cunningham, 2002).

One of the criticisms of the HOPE VI program has been the limited choices for relocation. Critics point to the fact that half of all HOPE VI residents in early rounds relocated to other public housing sites. Kleit and Manzo (2006) conclude from their study of HOPE VI relocations that "the choice to move away does not necessarily mean having a real choice to move outside the public housing inventory" (p. 274). A group of "hard to house" households have been identified that either had difficulty using housing vouchers to relocate or they moved to other public housing sites. These families often cannot meet the criteria for the new HOPE VI sites. They may have had difficulty with the voucher program, including problems meeting the screening criteria of private landlords and adhering to private-market lease requirements and so ended up back in public housing. These families have multiple barriers including households with custodial grandparents, physical disabilities, large families, mental health and substance use problems, chronic health problems and family members with criminal records. They are in need of intensive housing counseling, transitional housing, permanent supportive housing, independent living SRO units, large units, and counseling to "cure" the one-strike policy problems (S. J. Popkin, Cunningham, & Burt, 2005).

The 1990 census showed a significant increase in the concentration of poverty in urban areas which fueled considerable interest and concern for the long term effects of poverty concentration. After a twenty year increase in concentrated poverty from 1970 to 1990 an unexpected decrease in concentrated poverty occurred from 1990-

2000 which brought the levels of concentration back to where they were in 1980 (Jargowsky, 2005b; Kingsley & Pettit, 2003). There was significant variation between metropolitan statistical areas with approximately one-fourth experiencing increased poverty concentration during the decade. The reasons underlying this turnaround are not yet fully clear. There is substantial evidence that concentrated poverty declined in the 1990's but due to the wide variation between MSA's we do not yet have a clear understanding about the micro-level spatial distribution of economic changes or explanations for why some poor neighborhoods experienced a decline in poverty and others did not. Changes in housing policy have been raised as a possible explanation.

Summary of Literature Review

Almost all studies look at the impact of site-based public housing projects and have found them to increase neighborhood poverty. There is some evidence that the greater number of subsidized units in a neighborhood has a negative effect (Santiago et al 2001, Lee 2008, Lyons and Loveridge 1993, Rosenthal 2008, and Galster et al 1999).

However, it has been noted that large scale and dense projects have not been funded since 1984 and public housing units have been demolished as part of the HOPE VI program. Newer site-based programs such as LIHTC and HOME show slightly more geographic decentralization and little negative impact on the neighborhoods in which they are located. Reasons given for lack of impact from more recent projects is

that they are smaller scale, better designed, and better managed than prior public housing which may have had a positive impact on neighborhoods.

Although there has been a significant increase in studies on vouchers due to the availability of national data through special arrangement with HUD, there has not been a recent study on the cumulative concentration of multiple housing programs in neighborhoods.

There was an unexpected decrease in concentrated poverty during the 1990's (Ellen & O'Regan, 2008; Jargowsky, 2005; Kingsley & Pettit, 2003) which was a change from the preceding two decades. At the same time there were policy changes in the 1990's consisting of poverty deconcentration through the use of tenant-based vouchers, small programs such as MTO and other mobility programs, demolition of highly concentrated public housing projects through the HOPE VI program, and the initiation of the LIHTC program in which the private-sector selected the site and policies encouraged greater income diversification (Dawkins, 2007; Ellen & O'Regan, 2008). Changes in the location and concentration of poverty as well as housing policy changes could impact the concentration of subsidized housing.

TABLE 2.1
Literature Review Summary

Concentrated Poverty	•Negative neighborhood effects of poverty concentration (Ellen and Turner, 1997; Sampson, Morenoff and Gannon-Rowley, 2002; Deitz, 2002) •Unexpected decrease in concentrated poverty from 1990-2000 (Ellen & O'Regan, 2008; Jargowsky, 2005; Kingsley & Pettit, 2003)
Concentrated Subsidized Housing	•Negative effects of more units in vulnerable neighborhoods suggests possible threshold effects (Santiago et al 2001, Galster et al 1999) •High density site-based housing increased poverty rate in subsequent decade (Rosenthal 2008) •Scale of subsidized housing impacts property values (Lee 2008, Lyons and Loveridge 1993)
Housing Policy Changes in 1990's	•Change in housing and poverty deconcentration policies in the 1990's - Vouchers, MTO, HOPE VI, LIHTC (Dawkins, 2007; Ellen & O'Regan, 2008)
Public Housing	•Concentrates by poverty and race •Most but not all studies find negative impacts •HOPE VI could lead to possible changes
Other Site-Based	•Concentrates less than Public Housing •Different program types result in differential impacts •Relatively fewer studies of other site-based subsidized housing
LIHTC	•Concentrates less than Public Housing. •QCT's concentrate in higher poverty areas in central cities •Better design and mixed income leads to lower impacts
Vouchers	•Concentrates less than Public Housing •Tends to cluster in affordable neighborhoods due to rents •Lack of impact studies •Few mobility programs reduces likelihood of change
Comprehensive	•Lack of recent comprehensive concentration studies. Most recent is Newman and Schnare, 1997 •Lack of impact studies that take into account multiple subsidy types

Chapter 3

METHODOLOGY

While the concept of concentration can be measured in several ways it is unclear where to draw the line between low, moderate, and high concentration. Most of the studies report results as the relationship between subsidy types, for example, that public housing concentrates more than vouchers. A more precise level of subsidized housing concentration would be helpful. This study attempts to quantify subsidized housing concentration and then compare it with poverty rates in the neighborhood.

The study consists of three analyses, each of which contributes to measuring and explaining different aspects of the geographic concentration of subsidized housing. The results using these methods are compared. Each of the methodologies and results are further described in following sections.

1. Descriptive Statistics – Describes and quantifies the location and concentration of subsidized housing at the census tract level through frequency tables, cross-tab tables, charts, and correlations.

2. Segregation Index – Explores subsidized housing concentration at the metropolitan (MSA) level. Concentration of subsidized housing is measured as the total number of subsidized units as a percent of total housing units in the

census tract. Segregation is measured at the MSA level for subsidized housing with comparisons to race, ethnicity, and poverty.

3. Cluster Analysis – Is used to identify patterns of subsidized housing at the census tract level based on the extent and relative mix of various types of subsidized housing. The results are mapped.

TABLE 3.1
Methodologies

Descriptive Analysis	Location of subsidized housing at U.S., Region, MSA, and census tract levels, correlation with other variables
Index of Concentration (D)	Compare subsidized housing concentration with poverty and racial concentration
Neighborhood Classification (Cluster Analysis)	Determine if there are patterns of subsidized housing at the census tract level based on the extent and relative mix of various types of subsidized housing

Data Availability

A limitation in the study of subsidized housing in the past has been the lack of data on the geographic location of subsidized housing. The American Housing Survey (AHS) has very detailed demographic data on subsidized housing units but due to the sample size it is only available at the national and regional level. HUD uses this data to produce a series on *Characteristics of Subsidized Housing Residents*. AHS data is based on self-report from the resident whether they received any rent subsidy or rent reduction which makes it difficult to directly compare with administrative databases used to produce other reports. Some researchers have been given access to geographically coded household level data in the Panel Study of Income Dynamics (PSID) or AHS which could be used to control for household characteristics but this data is restricted due to confidentiality issues. Since these longitudinal studies were not designed to provide geographic coverage there may be only a small number of households in any given census tract which reduces its value for analysis of concentration. Only one longitudinal study, the Los Angeles Family and Neighborhood Survey (LAFANS), was specifically designed to include sufficient sampling of households at the neighborhood level to enable both a household and geographic level analysis using the same data source.

This study will rely on the most comprehensive data available which is "*A Picture of Subsidized Housing 2000*" produced by HUD with data on vouchers, public housing, other-site-based subsidized housing and LIHTC. The database was produced

from 1996 to 2000 after which this database was no longer maintained. Although there is more recent data on specific housing programs, 2000 is the most recent compilation of multiple types with comparable data available at the census tract level. HUD also contracted with Abt, Associates to produce and update a database on the LIHTC which is useful as a supplement to "*A Picture of Subsidized Housing 2000*".

Local and State subsidized housing units that do not also have federal funding are not included in the database and therefore will not be included in this study. While not anticipated to be a significant problem, it could impact the results in certain cities where non-federal units are more prevalent. New York City, for example, could vary considerably. Wyly and DeFillipis (2010) indicate that in 2005 there were 58,944 occupied "Mitchell Lama" units in New York City which were subsidized by the State of New York and these units are not necessarily located in the same pattern as other subsidized housing (p.80).

Change in Inventory of Subsidized Units

Table 3.2 presents the inventory of subsidized housing units from 1993 to 2000. In 2000 there were 5.575 million federally subsidized housing units consisting of 1.220 million public housing units, 1.630 million other site-based units, .938 million LIHTC units and 1.787 million vouchers. From 1993 to 2000 there was a loss of approximately 15.5 percent of the public housing stock, an increase of 12.5 percent in the other site-based stock, an increase of 152.5 percent in LIHTC units (which were

just coming on line in the 1990's), and an increase in housing vouchers of 34.4 percent.

The total number of subsidized units reported for 2000 is overstated due to lack of data on duplication in the LIHTC and voucher programs.[6] LIHTC and "Other" units are unduplicated using address matching by HUD and as a part of the data processing for this study. The LIHTC and voucher units however cannot be unduplicated due to limitations of the database. A complete explanation of data preparation procedures is included in this chapter.

It is possible to conclude that there has been growth in the subsidized housing inventory from 1993 to 2000. Public housing units experienced a significant decline during the 1990's while there were increases in other site-based units, the LIHTC and vouchers.[7]

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[6]For example, if there is a 25 percent overlap between the programs then the overlap would be 234,429 units. The 2000 total would be 5,340,710 units and the increase in the inventory would be 604,871 units or 12.7 percent instead of 22.6 percent. The percent change for each subsidy type would remain the same.

[7] Table 3.2 should be considered an approximation as to the extent, relative scale, and rate of change for each subsidy type due to the difficulty in getting accurate data prior to 2000.

TABLE 3.2
Inventory of Subsidized Housing Units United States 1993 to 2000

	1993	Percent of Total	2000	Percent of Total	1993-2000	Percent Change
Public Housing	1,443,546	30.4	1,220,170	21.9	-223,376	-15.5
Other Site Based	1,583,440	33.3	1,629,735	29.2	198,448	12.5
LIHTC	374,403	7.9	937,716	16.8	570,994	152.5
Subtotal: Site-Based	3,401,389	71.6	3,787,621	67.9	546,016	16.1
Vouchers	1,352,450	28.4	1,787,518	32.1	464,910	34.4
Total	4,753,839	100.0	5,575,139	100.0	1,072,855	22.6

Source: 1993: HUD (n.d.), *The Geographic Distribution of Federally Assisted Housing*, 1993. 2000: HUD, *A Picture of Subsidized Housing 2000 downloaded October 8, 2009*). LIHTC and "Other" units are unduplicated. LIHTC and vouchers are not unduplicated. Data includes P.R. and U.S.V.I.

Geographic Unit of Analysis

The census tract will be used in this study as a proxy for neighborhood as is true in most other studies. Reasons include the wide availability of data at this scale; a perception that the census tract geographically approximates the size of a neighborhood; that census tracts were designed to be relatively homogeneous areas; and were defined by local officials so they represent appropriate boundaries.

Census tracts are not without drawbacks. Lee, Reardon, Firebaugh, Farrell, Matthews and O'Sullivan (forthcoming) identify several problems with the use of census tracts as proxy for neighborhoods. They criticize this choice of unit of analysis on the basis of differences in density (area) and boundaries. Census tracts are defined by the census as areas with population size roughly 4,000 considered the optimum size

with 1,500 to 12,000 the minimum and maximum allowed without exemption from the Census Bureau (p. 7). While controlling somewhat for population size, the tract area actually varies considerably between metropolitan areas due to differences in density and housing stock. The authors note that the median tract size in Little Rock is 16.6 km^2 which is nearly 80 times the size of NYC/White Plains at .21 km^2 (p. 7). "An obvious consequence of linking tract boundaries to population is that the overall density of a metropolitan area will be negatively related to tract spatial size" (p. 7). By relying almost entirely on the census tract to define the scale the authors note that "little has been learned about what predicts segregation at scales different from that of the tract (whatever size of a tract happens to be), and especially about whether the predictors of micro- and macro-segregation are distinct or the same" (p. 13).

Related to geographic scale is the issue of density. Housing density is an important concept which is often overlooked in studies of concentrated poverty but which can alter the results. Cooke and Marchant (2006) distinguished between central cities, inner and outer suburbs based on density and age of housing rather than using census defined places. Using this method they did not find increased poverty in the inner suburbs in the 1990's as did other researchers. Grengs (2007) developed a methodology that accounted for open space in calculating neighborhood density. He applied this method in Detroit and found an increase in the spatial concentration of poverty in the 1990's that was counter to the results of other studies of the city during

that period. However, this study required extensive local data on land use patterns which could make wider studies using this method prohibitive.

Missing Data

A thorough analysis of the HUD database was conducted in order to determine if there was sufficient reliable data for further analysis at the census tract level. The first step in this analysis was to determine an accurate baseline estimate of subsidized housing units in 2000 on a national level so as to compare this with the data to determine an approximate level of missing data. See Appendix Table A-4 for data on missing units and Table A-5 for missing vouchers by state.

The HUD voucher database is aggregated at the census tract level in order to maintain the confidentiality of individual residents. The database consists of 1,472,715 voucher units. This number is 314,803 less than the 1,787,518 vouchers reported by HUD in 2000 as allocated to local public housing authorities. The difference is the number of vouchers allocated but not yet occupied.[8] Data on the difference between allocated and occupied was only available at the national and state level and was not useful for estimating the number at the census tract level. Although these units are considered part of the overall inventory, for purposes of this study the

[8] Personal communication with David Chase, HUD Office of Policy Development and Research, 11/16/09.

exclusion of these units is not problematic because they are not "occupied" and would not result in a change in the measure of concentration at the census tract level (unlike project-based units which are physically located in the tract whether or not they are vacant and may be indistinguishable when mixed with occupied units). In addition to the unoccupied units, 5.6 percent of vouchers (82,239) are missing due to HUD's inability to geocode the units due to incomplete address information.

The HUD database on projects at the census tract level includes units in public housing, multi-family, Section 236, Section 8 projects-based, and LIHTC. Data on the moderate rehab (MR) program (111,392 units) was only available at the MSA or State level. It was determined that the lack of census tract level data on the moderate rehab program did not represent a loss to the analysis of subsidized units due to the small number of units.

Projects were listed by address and needed to be aggregated to the census tract for purposes of comparison with vouchers that were already compiled by census tract. ArcGIS was used to geocode the projects from geographic coordinates (latitude and longitude) provided in the database. There was sufficient geographic coordinate data to geocode 95 percent of project-based units at the census tract level.

A separate database on LIHTC units (also maintained by HUD) was used to supplement the project database. The LIHTC database was used to validate the number of units aggregated at the MSA level and to modify the data when there was

updated LIHTC data. Although HUD had updated the database since 2000 with more recent LIHTC data, in some cases the LIHTC database was more up to date, particularly early 1990 projects which were sometimes reported in the 1990's but not completed during the 1990's. This resulted in the removal of 3,894 projects with 179,824 units.

Subsidized Housing Unit Characteristics

The study calculates a total number of subsidized housing units as well as the relative ratio of units of subsidized housing by type at the census tract level. Therefore it is appropriate to ask if these types of units are comparable.

All subsidized housing programs in this study serve very low and extremely low income households. However, LIHTC units serve relatively higher income households ($13,300 compared to about $9,500 for other types). Other site-based units on average house smaller households (1.9 persons per household compared to about 2.5 for other types). Public housing projects are significantly larger in size than other site-based housing types (40 percent of public housing units were in projects with over 200 units compared to about 15 percent of units in projects of other types). The use of number of units (rather than number of projects) in this study should reduce this bias. Data is not available at the census tract level for all subsidized housing types. See Appendix A-6 for subsidized housing tenant characteristics.

Unduplication of Subsidized Units

Due to the fact that subsidized housing projects often contain multiple sources of financing it was necessary to unduplicate the data order to determine the total number of subsidized units in a given geographic area. Since each program is reported separately there is a possibility that duplicates were still in the database. The actual number of these units was small due to prior effort by HUD to remove duplicate units.[9]

[9]The HUD website documentation for *A Picture of Subsidized Housing, 2000* retrieved from www.hud.gov on 9/10/09 and dated 9/15/08 notes that HUD categorized sub-programs and decreased the number of units when they overlapped. "This table [Housing Sub-programs] shows how we have categorized the subsidy records at HUD, matching on FHA and Section 8 project numbers to avoid double-counting. There is still a limited amount of double-counting in the figures, since Vouchers may be used in Section 236 projects, and Section 8 may be used in Tax Credit projects, and we do not yet subtract out the overlap." (n.p.)

For this study a match was made if the project met all of the following criteria:

- Same housing program
- Same project name
- Same census tract
- Same number units
- Same state
- Same MSA
- Same place

The matching process allowed for some flexibility when projects met the geographic criteria but the name and number of units was close (off by up to 5 units) but not exact. Project matching resulted in the reduction of 43,946 units. See Appendix A-5 for results of the unduplication process.

McClure (2006) used proprietary data from HUD for voucher units and LIHTC projects and found about 10 percent of the projects and 16 percent of the units were missing due to inability to match the addresses. So even if address data was to be available there would be substantial missing data which could be non-randomly distributed at the census tract level.

Duplication also occurs when vouchers are used by the residents in project-based subsidized housing. It has been shown in a sample of early LIHTC projects that 39 percent of LIHTC units had other federal subsidies, most in the form of Section 8 (GAO, 1997). Abt, Associates (2003, 2004 and 2009) found vouchers being used in

projects between 35.2 and 46.6 percent at the project level but the data does not report the number of units. A more recent statewide study in Florida found an average of 9.5 percent of LIHTC units also had vouchers (Williamson et al, 2009). Individual MSA's ranged from a low of 1.1% to a high of 24.5%. This study is limited to one state at the MSA level and therefore cannot be generalized to the census tract level. It was not possible to conduct a matching process for vouchers in this study because voucher addresses were not available. Estimates could not be made because prior studies showed such a dramatic difference between MSA's and there were no estimates at the census tract level.

Data Accuracy

An analysis of the accuracy of the data was conducted by comparing the number of subsidized housing units in the census tract with the number of units and number of rental units in the tract. It was found that in 142 census tracts the number of subsidized units exceeded the total number of housing units and in 436 census tracts the number of subsidized units exceeded the number of rental occupied units. Most were off by only a few units but in a few tracts the number of subsidized units was up to 12 times the total number of units in the tract. These were clearly errors in the data, perhaps due to the geocoding process.

A review of the data for these tracts found that the total number of housing units in the tract was often very small and that 70 percent of the subsidized units in

question were public housing. It is possible that these units were reported in the 1990's but were subsequently demolished but not removed from the database. To check whether this was the case data on was located on the HUD website on public housing demolitions under HOPE VI from 1996 to 2003 which was used to match the projects in the HUD database. Based on this analysis it is estimated that public housing units in 17 out of 436 census tracts were likely to have been demolished in the 1990's and these were removed. No similar data source was found for demolitions of other types of subsidized units.

The HOPE VI demolition data resolved only a small part of the issue. Three options were considered to deal with the remaining 130 census tracts that exceeded the total number of housing units and 419 census tracts where subsidized units exceeded the number of rental occupied units. A preponderance of tracts were located in two MSA's (Chicago and New York City). A judgment was made that even if most of the units in the tract had been demolished that any remaining rental units reported in the census were likely to be 100 percent subsidized. A decision was made to make the number of subsidized housing units equal to the number of rental occupied units. Combined with the HOPE VI demolition data, this resulted in the reduction of 78,779 units in 151 census tracts.

Non-residential Census Tracts

A frequency analysis identified 291 census tracts with zero (0) housing units representing 0.57 percent of all census tracts. These tracts were excluded from percent and ratio calculations. Less clear was what to do about census tracts with small numbers of housing units. An additional 255 census tracts were identified with between 1 and 50 housing units (representing .50 percent of all census tracts). No relationship was found between these census tracts and density. Further analysis also showed that these tracts do not contain subsidized housing. It was not possible to categorize these census tracts as non-residential, so a determination was made that there was no basis for excluding these tracts.

Weighting Data

Since tracts other than those with zero units were not removed from the analysis it was necessary to address the fact that tracts with very small numbers of housing units could result in skewing of the percentage calculations. To reduce the impact it was determined that the data would be weighted. The data is weighted by the number of housing units in the census tract which gives the larger census tracts (by total number of housing units) more significance in the results.

Resulting Data for Analysis

As a result of restricting the study to metropolitan areas, as well as reductions for lack of geographic coding, unduplication, and accuracy, the total number of subsidized units was reduced from 5,575,139 in the original HUD database to 4,026,787 units for this study. These units are located in 51,118 census tracts in 331 MSA's. Public housing comprises 872,810 of the units (21.7 percent of total); other site-based units comprise 1,254,505 units (31.2 percent); LIHTC comprise 716,915 units (17.8 percent); and vouchers comprise 1,182,557 units (29.4 percent). Due to the reduction in units included in this study the percentage of other site-based units increased slightly (from 29.2 to 31.2 percent), LIHTC units increased from 16.8 to 17.8 percent; while vouchers decreased slightly (from 32.1 to 29.4 percent) as a percentage of the total. Public housing remained stable at 21.9 compared to 21.7 percent. See Table 3.3 for a summary of data modifications.

TABLE 3.3
Data Preparation Summary

Data Source	• HUD, *A Picture of Subsidized Housing, 2000*
Elimination of Units	• 848,751 units located outside the continental U.S., Alaska and Hawaii or in rural areas • 111,392 Moderate Rehab (MR) units • 314,803 allocated but unused vouchers*

Missing Census Tract Geography	• 262,073 units
	  • 179,842 project units
	  • 82,249 vouchers

Unduplication	• 43,946 project units • Project and voucher overlap unknown
Data Accuracy	• 78,779 units in 151 census tracts
*Personal communication with HUD. Unused voucher units are not a concern for this study because there is no geographic concentration to measure. Whereas vacant site-based units are included in the study because these units are still present even if unoccupied.	

Contribution to the Literature

There are four contributions of this study to the literature. The first is the use of 2000 data, although now a decade old, is relatively recent and significantly more accurate than in the past; secondly, the inclusion of three different site-based subsidized housing types in combination with vouchers presents a more comprehensive coverage of housing types than previously studied; thirdly, given the inclusion of all MSA's results in greater confidence in the results due to the large sample size; and lastly, the cluster analysis methodology is useful in combining multiple variables to better describe both the concentration and mix of housing subsidies at the neighborhood level.

Limitations of the Study Design

The use of census tracts as the geographic units of analysis could have an impact on the results. The census tract may not represent the level at which subsidized housing impacts concentration. Each MSA is likely to be idiosyncratic requiring further study to more fully understand the differences but analysis of MSA level data beyond calculation of a segregation index score is beyond the scope of this study.

Lack of longitudinal data will restrict analysis on change over time and lack of baseline controls will limit conclusions on impact. Therefore this will not be an impact study and will be restricted to a cross-sectional analysis of concentration.

Lack of household level data will limit conclusions. Future studies should disaggregate units by elderly and family housing type which will require household level data. Although elderly and family type could have been identified for public housing, comparable data on household type for LIHTC and vouchers by census tract was not available for this study. In addition, data on housing style, quality, and management will not be available and will need to be treated as missing variables.

Chapter 4

DESCRIPTIVE STATISTICS

Number and Location of Subsidized Housing Units by Type

Data for this study consists of 4,027,742 subsidized housing units located in 51,118 census tracts in 331 MSA's. Public housing comprises 872,810 of the units (21.7 percent); other site-based comprise 1,255,460 units (31.2 percent); LIHTC 716,915 units (17.8 percent); and vouchers 1,182,557 (29.4 percent). The mean number of subsidized units per census tract is 79 including 17 public housing units, 25 other site-based units, 14 LIHTC units, and 23 vouchers. However, virtually no census tract is found with the mean distribution. Tables 4.1 and 4.2 present data on the total number of subsidized units and the mean number of subsidized units per tract by type.

TABLE 4.1
Subsidized Housing Units by Type 2000

Subsidized Housing Type	Units	% of Total
Public Housing (PH)	872,810	21.7
Other Subtotal (MS/S236/S8)	1,254,601	31.2
Low Income Housing Tax Credits (LIHTC)	716,915	17.8
Vouchers (VO)	1,182,557	29.4
TOTAL	4,026,883	100.0

TABLE 4.2
Mean Subsidized Housing Units in Census Tract 2000

	Census Tract Mean
Subsidized Units	79
Public Housing Units	17
Other Site-Based (S236/S8/MF) Units	25
LIHTC Units	14
Vouchers	23
Subsidized as Percent of Total Units	5.0
Subsidized as Percent of Rental Units	10.8

MSA's with population under 250,000 make up almost half of all MSA's (150) but represent only 20.5 percent of all subsidized units. Almost two-thirds of all subsidized units (64.6 percent) are located in MSA's with over 1,000,000 people. A subset of large population MSA's with over 5,000,000 people (4 MSA's) have 17.1 percent of all subsidized units. See Table 4.3 for subsidized units by MSA population.

TABLE 4.3
Subsidized Units by MSA Population 2000

MSA Population	Number MSA's	%	Number Subsidized Units	%
Under 100,000	20	6.0	39,764	1.0
100,000 – 249,999	130	39.3	381,417	9.5
250,000 – 499,999	78	23.6	470,192	11.7
500,000 – 999,999	42	12.7	534,303	13.3
1,000,000 – 4,999,999	57	17.2	1,913,402	47.5
Over 5,000,000	4	1.2	687,805	17.1
All MSA's (331)	331	100.0	4,026,883	100.0

Subsidized housing is also not evenly distributed across regions. There are three major differences between the regions. Public housing is significantly under-represented in the West (region 4) and over-represented in the Northeast (region 1) which is a product of the program's history and changes in regional growth patterns since construction of these units. The LIHTC is under-represented in the Northeast (region 1) and over-represented in the South (region 3). It is also possible that the LIHTC with its focus on new construction would be high in the South and lower in the built-up Northeast, but this would not explain the somewhat higher use of the LIHTC in the Midwest (region 2). Subsidized units by region are presented in Table 4.4.

TABLE 4.4
Subsidized Units by Region 2000

	Region	Total Subsidized Units	%	Public Housing	%	Other Subsidized	%	LIHTC	%	Vouchers	%
1	Northeast	1,086,897	27.0	316,556	36.3	370,744	29.6	102,745	14.3	295,250	25.0
2	Midwest	895,945	22.2	164,326	18.8	328,781	26.2	180,550	25.2	222,309	18.8
3	South	1,294,261	32.1	302,242	34.6	355,246	28.3	280,253	39.1	356,520	30.1
4	West	751,439	18.7	89,686	10.3	199,830	15.9	153,367	21.4	308,478	26.1
Total		4,026,883	100.0	872,810	100.0	1,254,601	100.0	716,915	100.0	1,182,557	100.0

Measures of Concentration

Three measures of concentration are calculated including 1) the absolute number of subsidized units per tract; 2) the number of subsidized units as a percentage of all units in the tract: and 3) the number of subsidized units as a percentage of rental units in the tract.

The number of subsidized units per tract that exceeds the mean for all tracts could indicate a high concentration and if it considerably exceeds the mean it could indicate a very high concentration. The same method could be used to identify very low and low concentration, with the remainder considered moderate concentration. These measures are then used to classify the extent of concentration from very low to very high concentration.

Number of Subsidized Units in Census Tract

The mean number of subsidized housing units per census tract is 79. Close to half (45.0 percent) of census tracts have under 10 subsidized units per tract which can be classified as very low concentration. In 8,253 of these tracts (16.1 percent) there are no subsidized housing units.

About one-third (31.9 percent) of tracts are moderately concentrated with between 11 and 100 subsidized housing units per census tract. Another 7,205 census tracts (14.1 percent) are highly concentrated with between 101 and 250 units per tract.

A significant number of tracts (4,632 census tracts, 9.1 percent) have over 250 subsidized units per tract which can be considered very highly concentrated. The range of subsidized units per tract can be found in Table 4.5.

TABLE 4.5
Range of Subsidized Housing Units in Census Tract 2000

Number Subsidized Units	Number Census Tracts	Percent Census Tracts	Cumulative Percent
0 Units	8,253	16.1	16.1
1-10 Units	14,736	28.8	45.0
11-100 Units	16,292	31.9	76.8
101-250 Units	7,205	14.1	90.9
Over 250 Units	4,632	9.1	100.0
Total	51,118	100.0	

Subsidized Units as Percent of Total Units in Census Tract

The mean number of subsidized housing as a percentage of all housing units in census tracts is 5.0 percent. Three-quarters (74.3 percent) of all census tracts are under the mean and can be considered low or very low concentration. A high concentration could be considered over 25 percent of all units which is the case is 2,194 census tracts (4.3 percent). A subset of these with over 50 percent of all units in the tract are very highly concentrated but make up only a small percentage of all tracts (617 or 1.2 percent of all tracts). Table 4.6 presents subsidized units as a percent of total units in the census tract.

TABLE 4.6
Subsidized Units as a Percent of Total Units in Census Tract 2000

Subsidized Units as Percent of Total Housing Units	Number Census Tracts	Percent Census Tracts	Cumulative Percent
0%	8,253	16.1	16.1
1-5%	29,748	58.2	74.3
6-10%	5,751	11.3	85.6
11-25%	5,172	10.1	95.7
26-50%	1,577	3.1	98.8
Above 50%	617	1.2	100.0
Total	51,118	100.0	

Subsidized Units as Percent of Rental Units in Census Tract

The number of subsidized housing units as a percentage of rental units is 10.8 percent. Two-thirds of census tracts (68.1 percent) have rental percentages under the mean and can be considered low or very low concentration. There are 7,710 census tracts (15.1 percent) where subsidized housing makes up over 25 percent of the rental stock. These census tracts could be considered highly concentrated. A subset of these tracts, 2,748 census tracts (5.4 percent) are very highly concentrated with subsidized units comprising over 50 percent of all rental units in these tracts.

TABLE 4.7
Subsidized Units as a Percent of Rental Units in Census Tract 2000

Subsidized Units as Percent of Rental Units	Number Census Tracts	Percent Census Tracts	Cumulative Percent
0%	8,253	16.1	16.1
1-5%	20,146	39.4	55.5
6-10%	6,507	12.7	68.1
11-25%	8,502	16.6	84.8
26-50%	4,962	9.7	94.6
Above 50%	2,748	5.4	100.0
Total	51,118	100.0	

The three measures of concentration indicate that a large majority of census tracts are not concentrated and that a significant percentage of all tracts have no subsidized housing units. Depending on the measure (absolute, percent of all units, or percent of rental units) between two-thirds and three-quarters of all census tracts can be considered not concentrated. Another ten to twenty percent can be considered moderately concentrated. Between five and fifteen percent of all census tracts can be considered highly concentrated. Table 4.7 presents the number of subsidized units as a percent of rental units in the census tract.

Subsidized Housing and Poverty Concentration

One of the primary concerns regarding subsidized housing has been the location in areas of concentrated poverty. Therefore it is important to consider the relationship between subsidized housing and neighborhood poverty rate. Although there is no standard for how high the level of subsidized housing in a neighborhood

would have to be to be considered too high what can be reported is the level of concentration in relation to the poverty rate.

On this relative measure, tracts with poverty rates between 20 and 30 percent poverty can be considered to have high concentrations of subsidized housing with 9.6 percent of all units (twice the mean) and 17.4 percent (almost twice the mean) of rental units subsidized. These numbers increase to 14.2 percent of all units and 22.0 percent of rental units in tracts with poverty rates between 30 and 40 percent and can be considered very high concentrations.

Subsidized housing in tracts with poverty rates above 40 percent is very highly concentrated with 22.9 percent of all units and 28.7 percent of rental units subsidized. However, this level of concentration is actually lower than expected given the poverty level incomes in subsidized housing. This finding indicates that even the highest poverty neighborhoods are not completely subsidized and indicates that there is a more complex picture of these neighborhoods.

Table 4.8 presents the number of subsidized units by the poverty rate in the census tract. What is immediately evident from looking at this table is that subsidized housing is located at all poverty levels and is not concentrated at the upper levels (over 30 percent poverty) as might have been expected.

On the very low end there are 897,952 subsidized units (22.3 percent of all subsidized units) located in census tracts with poverty rates under 10 percent.

Subsidized units in these tracts consist of 108,535 public housing units, 302,601 other site-based units, 222,518 LIHTC units and 264,813 vouchers.

TABLE 4.8
Subsidized Units by Poverty Rate in Census Tract 2000

Census Tract Poverty Rate	Total Subsidized Units	%	Mean Subsidized Housing Units per Tract	Number Census Tracts	%	Subsidized Units as Percent of Total Housing Units in Tract	Subsidized Units as Percent of Rental Units in Tract
Under 5%	269,029	6.7	18	14,602	28.6	0.97	5.11
5 – 9.9%	628,923	15.6	47	13,494	26.4	2.36	7.78
10 – 14.9%	607,404	15.1	82	7,451	14.6	4.30	10.97
15 – 19.9%	527,896	13.1	111	4,767	9.3	6.43	13.78
20 – 29.9%	843,950	21.0	152	5,563	10.9	9.64	17.41
30 – 39.9%	584,031	14.5	193	3,019	5.9	14.22	22.01
Over 40%	565,650	14.0	255	2,222	4.3	22.89	28.70
Total	4,026,883	100.0	79	51,118	100.0%	5.01	10.84

Neighborhoods with between 15 and 20 percent poverty have been raised as potential transitional zones which need to be monitored for further poverty increases. Threshold effects could result in neighborhood decline greater than would be normally expected from a small increase in the poverty rate (Galster and Quercia, 2000).

Figures 4.1 and 4.2 present the number of subsidized units by census tract poverty rate. There are 527,896 subsidized units located in tracts with moderate poverty rates between 15 and 20 percent (13.1 percent of all subsidized units) with a

mean of 82 subsidized units per tract. Unit types include 89,059 public housing units, 165,200 other site-based units, 165,200 LIHTC units, and 185,642 vouchers.

There does not appear to be a threshold point at which the number of subsidized units per tract rises exponentially with increasing poverty. The mean number of subsidized units in tracts with poverty rates under 5 percent is 18 units, from 5-10 percent it is 47 units, between 10 and 15 percent poverty the mean is 82 units, between 15 and 20 percent it is 111 units, between 20 and 30 percent it is 152 units, between 30 and 40 percent it is 193 units and over 40 percent poverty the mean is 255 units per tract. Although there is no threshold, the absolute number of subsidized units does increase with the poverty rate in a linear manner resulting in a greater concentration of subsidized housing as the poverty rate increases.

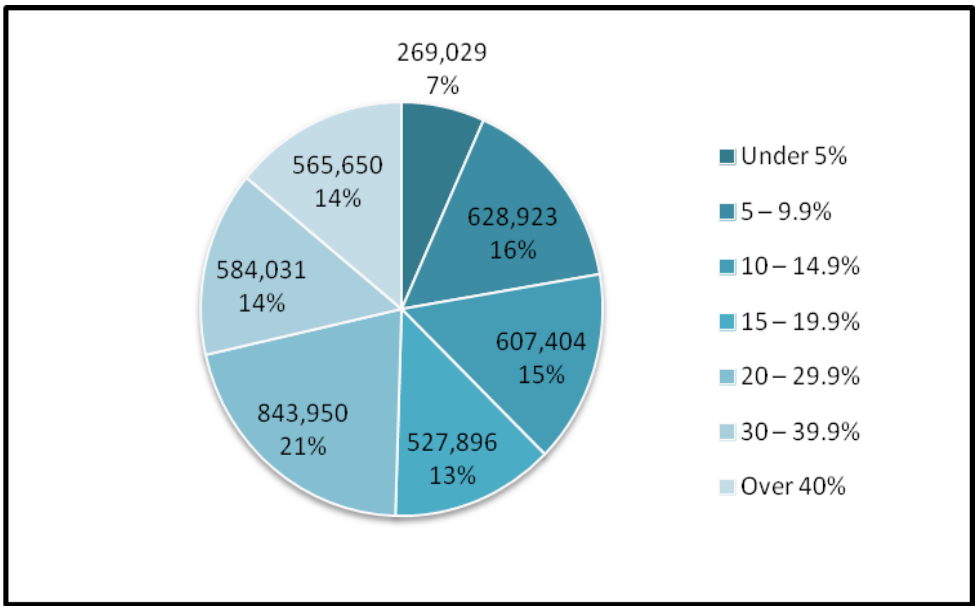

FIGURE 4.1
Total Number Subsidized Units by Tract Poverty Rate 2000

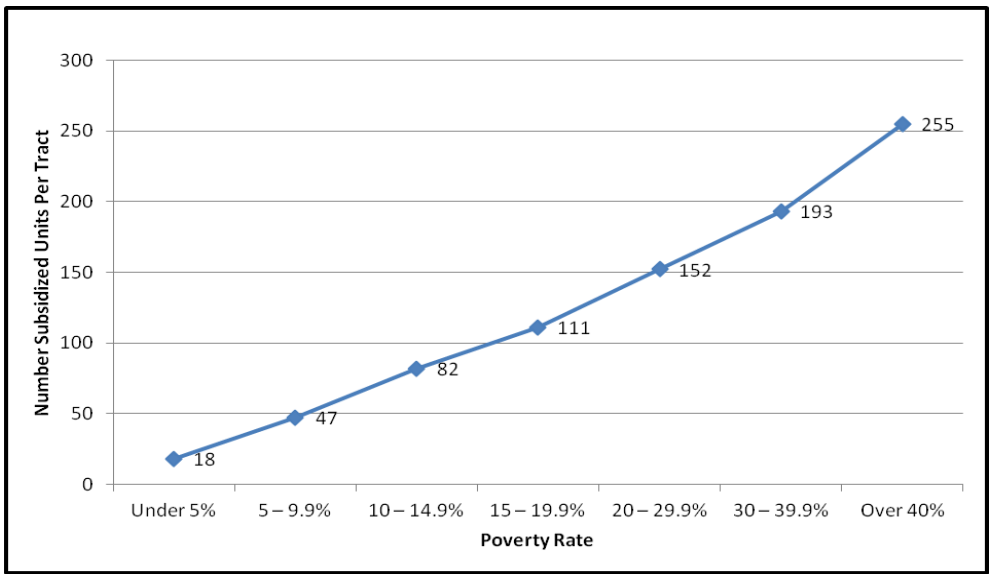

FIGURE 4.2
Mean Number Subsidized Housing Units by Tract Poverty Rate 2000

Subsidized Housing by Type and Poverty

Subsidized housing by type and level of poverty are presented in Table 4.9. On average about one-third of all subsidized units (37.4 percent) are located in neighborhoods with poverty rates under 15 percent. Compared to this average the distribution of subsidized units by neighborhood poverty rate shows considerable consistency between subsidy types. The only major difference is with public housing units which are much more likely to be located in higher poverty neighborhoods and much less likely to be located in low poverty neighborhoods. An interesting finding is that both LIHTC and other subsidized units are very similar to the distribution for vouchers.

On the high end of the poverty scale, above 30 percent poverty, public housing, as expected is highly concentrated with almost half (46.1 percent) located in neighborhoods with over 30 percent poverty. The comparable percentage for vouchers is only 21.3 percent, with LIHTC 22.3 percent, and 26.8 percent for other subsidized housing units.

On the lower end of the poverty scale, LIHTC units are notable with almost half (47.4 percent) of the units located in neighborhoods under 15 percent poverty. This exceeds the percentage for vouchers (39.6 percent) and other subsidized units (39.7). Only one-quarter of public housing units (22.9 percent) are located in these lower poverty neighborhoods.

At the very low end of the poverty scale, a higher percentage of LIHTC units (31.0 percent) are located in neighborhoods with under 10 percent poverty than are vouchers (22.4 percent) making LIHTC units the subsidy type that is least concentrated in poverty neighborhoods.[10] The other site-based subsidized units have approximately the same poverty distribution as vouchers.

Whether one considers these concentrations high depends on what level of poverty one considers problematic. When looking at the data with a relative eye public housing is highly concentrated with two-thirds of public housing units (66.9 percent) in neighborhoods over 20 percent poverty, while LIHTC (40.3 percent), other site-based subsidized housing (47.1 percent) and vouchers (44.7 percent) are only moderately concentrated. Except for vouchers, none of the subsidy types could be considered to have low or very low levels of concentration, although the distribution for the LIHTC indicates that it has been more successful than the other types at extending down to the lowest poverty tracts.

[10] Results of this study are consistent with Abt Associates (2006) study of LIHTC units placed in service from 1995 to 2005 which found 33 percent located in census tracts under 10 percent poverty.

TABLE 4.9
Subsidized Units by Subsidy Type by Poverty Rate 2000

Census Tract Poverty Rate	Total Subsidized Units	%	Public Housing	%	Other Subsidized	%	LIHTC	%	Vouchers	%
Under 5%	269,029	6.7	28,346	3.2	89,066	7.1	80,758	11.3	70,927	6.0
5 – 9.9%	628,923	15.6	80,189	9.2	213,166	17.0	141,760	19.8	193,886	16.4
10 – 14.9%	607,404	15.1	91,454	10.5	195,693	15.6	117,296	16.4	202,961	17.2
15 – 19.9%	527,896	13.1	89,059	10.2	165,200	13.2	87,995	12.3	185,642	15.7
20 – 29.9%	843,950	21.0	180,998	20.7	256,172	20.4	129,055	18.0	277,725	23.5
30 – 39.9%	584,031	14.5	154,453	17.7	178,977	14.3	92,690	12.9	158,713	13.4
Over 40%	565,650	14.0	248,311	28.4	157,186	12.5	67,361	9.4	92,703	7.8
Total	4,026,883	100.0	872,810	100.0	1,254,601	100.0	716,915	100.0	1,182,557	100.0
Subtotal Under 10%	897,952	22.3	108,535	12.4	302,601	24.1	222,518	31.0	264,813	22.4
Subtotal Under 15%	1,505,356	37.4	199,989	22.9	497,779	39.7	339,814	47.4	467,774	39.6
Subtotal Over 20%	1,993,631	49.5	583,762	66.9	591,622	47.1	289,106	40.3	529,141	44.7

Change Over Time in Subsidized Housing Types and Poverty

A comparison of results from this study with a similar one conducted by Newman and Schnare (1997) raises the possibility that there has been a change in the proportion of public housing units by poverty. No other changes were observed.[11] Since public housing units (unlike vouchers) cannot change location, this is likely an

[11] Newman and Schnare (1997) included the total number of subsidized units including rural housing and non-federal subsidies, while this study includes only federally funded units located in MSA's. There could be other differences in methodologies.

indicator of the demolition of units in very high poverty areas during the 1990's with little new construction of public housing. The fact that public housing units are still at the highest concentration and in the highest poverty areas indicates the extent of the continuing problem. The comparison of the relative percentage of subsidized housing by type can be found in Table 4.10.

TABLE 4.10
Change in Subsidized Units by Poverty Rate in Census Tract

	Public Housing		Other Site-Based		Vouchers		LIHTC		Total	
Tract Poverty Rate	Early – Mid 1990's	2000	Early – Mid 1990's	2000	Early – Mid 1990's	2000	Early – Mid 1990's	2000	Early – Mid 1990's	2000
< 10	7.5	12.4	27.4	24.1	27.5	22.4	NA	31.0	NA	22.3
10 – 29	38.9	41.4	50.7	49.2	57.8	56.4	NA	46.7	NA	49.2
30 – 39	17.1	17.7	11.5	14.3	9.5	13.4	NA	12.9	NA	14.5
> 40	36.5	28.4	10.4	12.5	5.3	7.8	NA	9.4	NA	14.0

Source: Newman and Schnare (1997), p. 712; HUD, *A Picture of Subsidized Housing* 200

Correlation Analysis

The Pearson r correlation was calculated for subsidized units as percent of total units in tract, demographic, housing, and geographic variables. Results can be found in Tables 4.11 and 4.12. The largest correlations were households with public assistance (.550), poverty (.540) and percent rental (.535). These results make sense given the population that lives in subsidized housing are poor and the nature of subsidized housing is rental. Other variables are also correlated including

unemployment rate (.427), less than high school education (.418), percent black (.383), median gross rent (-.361) and density (.278).

A significant number of variables were not significantly correlated with subsidized housing concentration (correlations under .200). These include foreign born, percent Hispanic, elderly, older housing stock, vacant units, and State, region, and MSA level segregation indices.

TABLE 4.11
Correlation Coefficients for Selected Variables with Subsidized Units as Percent of Total Housing Units in Census Tract 2000

	Correlation (Pearson r)
Percent Households with Public Assistance Income	.550
Poverty Rate	.540
Percent Rent Occupied Units	.535
Civilian Unemployment Rate	.427
Percent Less Than High School Education	.418
Percent Black	.383
Median Gross Rent	-.361
Density of Housing Units per Square Mile	.278
Percent Units Built Before 1940	.199
Percent Hispanic	.155
MSA Segregation Index (D) Subsidized/Non-Subsidized	-.137
Percent Vacant Units	.120
Percent Foreign Born	.067
Region	-.034
Percent Elderly	-.027
State	.022
MSA Segregation Index (D) Hispanic/Non-Hispanic	.014
MSA Segregation Index (D) Poor/Non-Poor	.014
MSA	.008
MSA Segregation Index (D) Black/Non-Black	.002

TABLE 4.12
Correlation Matrix (page 1 of 4)

	Subsidized as Percent of Total	Poverty Rate	Percent Less Than H.S.	Civilian Unemployment Rate	Percent on Public Assistance	Percent Black	Percent Hispanic	Percent Foreign Born	Percent Elderly	Percent Rental Units	Percent Vacant Units	Percent Units Built Before 1939	Median Rent	Housing Density
Subsidized as Percent of Total Units	1.000	.540	.418	.427	.550	.383	.155	.067	-.027	.535	.120	.199	-.361	.278
Poverty Rate		1.000	.700	.715	.743	.449	.342	.131	-.044	.670	.439	.248	-.558	.265
Percent Less Than H.S.			1.000	.631	.756	.312	.327	.071	.066	.384	.280	.232	-.562	.077
Civilian Unemployment Rate				1.000	.686	.413	.319	.127	-.059	.465	.319	.213	-.421	.237
Percent on Public Assistance					1.000	.382	.286	.082	.058	.464	.283	.287	-.507	.216
Percent Black						1.000	.161	.107	-.205	.409	.173	.009	-.187	.315
Percent Hispanic							1.000	.730	-.249	.362	-.042	-.094	.125	.365
Percent Foreign Born								1.000	-.153	.316	-.190	-.097	.404	.530
Percent Elderly									1.000	-.082	.178	.130	-.111	.010
Percent Rental Units										1.000	.274	.238	-.289	.513
Percent Vacant Units											1.000	.110	-.402	-.114
Percent Units Built Before 1939												1.000	-.245	.153
Median Rent													1.000	.177
Housing Density														1.000

All correlations are significant at the 0.01 level (2-tailed).

TABLE 4.12
Correlation Matrix (page 2 of 4)

	State	Region	MSA	MSA Black-Non-Black (D)	MSA Hispanic-Non-Hispanic (D)	MSA Poor-Non-Poor (D)	MSA Subsidized-Non-Subsidized (D)
Subsidized as Percent of Total Units	.022	-.034	.008	.002	.014	.014	-.137
Poverty Rate	-.028	.100	.017	-.073	-.060	-.160	-.100
Percent Less Than H.S.	-.017	-.010	-.007	.044	.059	-.115	-.008
Civilian Unemployment Rate	-.042	.055	.016	-.019	.000	-.095	-.081
Percent Households on Public Assistance	-.073	.032	.043	-.020	.002	-.112	-.119
Percent Black	.002	.020	-.037	.134	-.022	.092	.162
Percent Hispanic	-.204	.326	.117	-.247	.181	-.106	-.018
Percent Foreign Born	-.210	.167	.117	-.096	.270	.022	.094
Percent Elderly	-.032	-.158	.070	.097	-.022	-.084	.044
Percent Rental Units	-.009	.045	.028	-.047	.038	-.030	-.084
Percent Vacant Units	.028	.035	-.012	-.029	-.189	-.204	.066
Percent Units Built Before 1939	.142	-.431	-.027	.254	.211	.139	-.043
Median Rent	-.182	.102	.101	-.055	.170	.126	.141
Housing Density	-.069	-.072	.058	.163	.250	.177	.159
State	1.000	-.345	-.031	.115	-.039	.018	.014
Region		1.000	.129	-.565	-.339	-.346	-.243
MSA			1.000	-.199	-.056	-.130	-.080
MSA Black-Non-Black (D)				1.000	.371	.465	.495
MSA Hispanic-Non-Hispanic (D)					1.000	.421	.253
MSA Poor-Non-Poor (D)						1.000	.332
MSA Subsidized-Non-Subsidized (D)						.	1.000

All correlations are significant at the 0.01 level (2-tailed).

TABLE 4.12
Correlation Matrix (page 3 of 4)

	Poverty Rate	Percent Less Than H.S. Diploma	Civilian Unemployment Rate	Percent with Public Assistance	Percent Rent Occupied Housing Units	Percent Black Population	Total Subsidized Housing Units	Subsidized Units as Percent of Total Units	Subsidized Units as Percent of Rent Occupied Units	Voucher Units	Public Housing Units	Other Site Based Units	LIHTC Units
Poverty Rate	1.000	0.723	0.752	0.794	0.633	0.502	0.420	0.526	0.346	0.423	0.296	0.218	0.143
Percent Less Than H.S. Diploma		1.000	0.629	0.731	0.388	0.342	0.281	0.366	0.268	0.345	0.201	0.128	0.079
Civilian Unemployment Rate			1.000	0.732	0.455	0.512	0.325	0.436	0.289	0.340	0.252	0.157	0.090
Percent with Public Assistance				1.000	0.479	0.506	0.430	0.544	0.387	0.454	0.315	0.231	0.106
Percent Rent Occupied Units					1.000	0.321	0.421	0.446	0.206	0.420	0.216	0.263	0.187
Percent Black Population						1.000	0.308	0.392	0.323	0.344	0.195	0.157	0.120
Total Subsidized Housing Units							1.000	0.847	0.717	0.495	0.612	0.722	0.501
Subsidized Units as Percent of Total								1.000	0.827	0.410	0.598	0.546	0.425
Subsidized Units as Percent of Rent									1.000	0.349	0.459	0.455	0.435
Voucher Units										1.000	0.111	0.190	0.262
Public Housing Units											1.000	0.147	0.041
Other Site Based Units												1.000	0.120
LIHTC Units													1.000

All correlations are significant at the 0.01 level (2-tailed).

TABLE 4.12
Correlation Matrix (page 4 of 4)

	Voucher Units as Percent of Total Housing Units	Public Housing Units as Percent of Total Housing Units	Other Site-Based Units as Percent of Total Housing Units	LIHTC Units as Percent of Total Housing Units	Voucher Units as Percent of Rent Occupied Units	Public Housing Units as Percent of Rent Occupied Units	Other Site-Based Units as Percent of Rent Occupied Units	LIHTC Units as Percent of Rent Occupied Units
Poverty Rate	0.510	0.338	0.295	0.191	0.309	0.264	0.166	-0.019
Percent Less Than H.S. Diploma	0.433	0.227	0.188	0.119	0.316	0.190	0.112	-0.010
Civilian Unemployment Rate	0.427	0.297	0.235	0.143	0.283	0.226	0.130	-0.016
Percent of Households with Public Assistance	0.554	0.355	0.311	0.161	0.382	0.280	0.195	-0.015
Percent Rent Occupied Housing Units	0.436	0.222	0.295	0.199	0.131	0.133	0.143	-0.052
Percent Black Population	0.424	0.229	0.213	0.158	0.367	0.197	0.147	-0.007
Total Subsidized Housing Units	0.418	0.512	0.609	0.441	0.273	0.432	0.477	0.046
Subsidized Units as Percent of Total Units	0.477	0.665	0.671	0.503	0.316	0.556	0.523	0.061
Subsidized Units as Percent of Rent Occupied Units	0.405	0.504	0.558	0.480	0.427	0.565	0.619	0.222
Voucher Units	0.877	0.077	0.166	0.217	0.703	0.060	0.104	-0.008
Public Housing Units	0.103	0.879	0.132	0.044	0.041	0.777	0.070	-0.020
Other Site Based Units (MF, S236, S8)	0.148	0.097	0.827	0.107	0.058	0.061	0.699	-0.021
LIHTC Units	0.205	0.029	0.112	0.879	0.146	0.014	0.073	0.200
Voucher Units as Percent of Total Units	1.000	0.109	0.190	0.240	0.812	0.089	0.118	0.000
Public Housing Units as Percent of Total Units		1.000	0.122	0.051	0.044	0.866	0.063	-0.019
Other Site-Based Units as Percent of Total Units			1.000	0.143	0.082	0.079	0.843	-0.019
LIHTC Units as Percent of Total Housing Units				1.000	0.166	0.031	0.091	0.236
Voucher Units as Percent of Rent Occupied Units					1.000	0.061	0.072	0.047
Public Housing Units as Percent of Rent Occupied						1.000	0.045	-0.020
Other Site-Based Units as Percent of Rent Occupied							1.000	-0.014
LIHTC Units as Percent of Rent Occupied Units								1.000

All correlations are significant at the 0.01 level (2-tailed).

Chapter 5

SEGREGATION ANALYSIS

Index of Dissimilarity

Although the primary focus of this study is on tract level concentration, a separate analysis is conducted of subsidized housing segregation at the MSA level in order to understand the relationship between the larger regional scale geography and the small scale of the neighborhood.

An index of segregation is used to compare the level of segregation of subsidized housing segregation with that of other types of segregation (race, ethnicity and poverty) at the MSA level to give some sense of the relative level of subsidized housing concentration. Secondly, it is used to compare individual MSA's on the level of subsidized housing segregation; and lastly, the segregation index is included in the regression analysis to see if the MSA-level segregation is related to the concentration of subsidized housing at the census tract level.

Many studies of poverty concentration apply segregation indices. Iceland and Steinmetz (2003) identified nineteen segregation indices covering five dimensions including evenness, exposure, concentration, centralization and clustering. The Index of Dissimilarity is a widely used measure but it has been criticized for its lack of a

spatial sensitivity because many different spatial distributions can result in the same score on the index. Fischer, Stockmayer, Stiles and Hout (2004) employed the Theil Index (also called the entropy index) which is useful because it allows for decomposition into regional, metropolitan, center-city, suburban, and tract level effects. Dawkins (2007a; Dawkins, 2007b) developed and applied a "Spatial Ordering Index" in his study of racial segregation that includes both a measure of concentration (clustering) and centralization (distance) within metropolitan statistical areas. Jargowsky (1997) used a Neighborhood Sorting Index (NSA) in his study of concentrated poverty and more recently developed a modified version, the Generalized Neighborhood Sorting Index (SNSI), which takes into consideration spatial attributes (Jargowsky & Kim, 2005).

Despite the wide variety of measures available they all produce a global statistic on the overall level of concentration within an area so they do not indicate where the concentrations are located geographically or how large they are within an area. Therefore indices are more useful for comparing concentration between geographic areas than studying spatial configurations. The scales do not determine whether a score (for example a score of 60 on a scale of 0-100) represents an "excessive" concentration. This determination must still be made by the researcher.

The Index of Dissimilarity (D) was selected as the segregation index after careful consideration of non-spatial and spatial indices. This index measures the evenness of the distribution of subsidized housing units over the MSA. If all census

tracts were at the MSA mean for percent subsidized, the index would be 0.00 (pure evenness). On the other extreme, if all subsidized housing units were located in only a few census tracts with lack of subsidized units in the other census tracts, D would increase up to 1.00 (pure segregation).

$$\mathbf{D} = 100 * 0.5 * \Sigma \mid \mathbf{P}_{xi}/\mathbf{P}_{x} - \mathbf{P}_{yi}/\mathbf{P}_{y} \mid$$

Where:

$\mathbf{P}_{xi}$ = the population of group x in census tract i

$\mathbf{P}_{x}$ = the total population of group x in the overall geographic area

$\mathbf{P}_{yi}$ = the population of group y in census tract i

$\mathbf{P}_{y}$ = the total population of group y in the overall geographic area

FIGURE 5.1

Formula for the Index of Dissimilarity (D)

It is possible that these census tracts could form a pattern like that of a checkerboard which would look deconcentrated at the MSA level, or they could form large contiguous areas in which case subsidized housing would look clustered. This is usually considered a drawback to the D statistic and is one reason why spatial measures are recommended. The main purpose of this study was not to determine if census tracts within MSA's formed contiguous clusters but whether segregation of subsidized housing differed between MSA's and whether subsidized housing segregation differed from racial, ethnic and income segregation within MSA's. Therefore it is appropriate to select a single non-geographic statistic that is comparable.

Segregation Index Analysis

Results of the segregation analysis are presented in Table 5.1. The mean subsidized housing index score for the 331 MSA's is .56. This indicates that over half of subsidized housing units (2,255,054 units) would have to change location in order to be distributed evenly within MSA's.

TABLE 5.1

Mean MSA Segregation Index (D)
for Subsidized Housing, Race, Ethnicity, and Poverty 2000

	Black-Non-Black	Hispanic-Non-Hispanic	Poor-Non-Poor	Subsidized-Non-Subsidized
Mean	.4836	.3747	.3280	.5600
Minimum	.2219	.1159	.1642	.2993
Maximum	.8352	.7460	.5266	.7876
Standard Deviation	.1311	.0988	.0732	.0822
2 Standard Deviations Below Mean	.2214	.1772	.1816	.3957
2 Standard Deviations Above Mean	.7458	.5723	.4745	.7244

Source: Population by Race, Ethnicity and Income: U.S. Census, 2000. Subsidized Housing: HUD, *A Picture of Subsidized Housing* 2000. Segregation Index calculated using the Index of Dissimilarity (D)

Segregation of subsidized housing units exceeds racial, ethnic, and income segregation within MSA's. The rate of subsidized housing segregation is considerably higher than for Black/Non-Black (.48), Hispanic/Non-Hispanic (.37) and Poor/Non-poor (.33). In prior studies poverty segregation has been found to be lower than racial concentration. The considerably higher segregation rate for subsidized housing was unexpected given the potential close relationship between poverty, segregation, and subsidized housing. The location of subsidized housing appears to be different from (and therefore more concentrated) than poverty and racial segregation in some manner.

In order to determine what might be the reason, several variables were cross-tabbed with the segregation index. The segregation index does not vary much around mean of 79 subsidized units in census tracts. The only exception was a higher number of subsidized units per tract in MSA's with index scores under .40 (of which there are

only 8 MSA's). The segregation index also does not vary much by MSA population size with one exception; MSA's under 100,000 have a lower segregation score. See Tables 5.2 - 5.4 for descriptive statistics for subsidized housing segregation.

TABLE 5.2

Range of MSA Segregation Index (D)
Subsidized Housing, Race, Ethnicity, and Poverty 2000

Segregation Index (D)	Subsidized-Non-Subsidized	Percent	Black-Non-Black	Percent	Hispanic-Non-Hispanic	Percent	Poor-Non-Poor	Percent
0 - .39	8	2.4	95	28.7	205	61.9	270	81.6
.40 - .49	75	22.7	87	26.3	89	26.9	55	16.6
.50 - .59	141	42.6	83	25.1	33	10.0	6	1.8
.60 - .69	95	28.7	53	16.0	3	.9	0	0
.70 - .79	12	3.6	11	3.3	1	.3	0	0
.80 and Above	0	0	2	.6	0	0	0	0
Total	331	100.0	331	100.0	331	100.0	331	100.0
.50 and Above	248	74.9	149	45.0	37	11.2	6	1.8
.60 and Above	107	32.3	66	19.9	4	1.2	0	0.0

Source: Population by Race, Ethnicity and Income: U.S. Census, 2000. Subsidized Housing: HUD, *A Picture of Subsidized Housing* 2000. Segregation Index calculated using the Index of Dissimilarity (D).

TABLE 5.3
Number of Subsidized Housing Units by MSA Segregation Index 2000

MSA Subsidized Housing Segregation Index (D)	# Census Tracts	Percent	Total Number Subsidized Units	Percent	Mean Subsidized Units in Census Tract	Subsidized as Percent of Total Units	Subsidized as Percent of Rental Units
0 - .39	244	0.4	24,747	0.6	101	.0535	.1415
.40 - .49	3,533	6.9	301,281	7.5	85	.0506	.1185
.50 - .59	20,896	40.9	1,654,394	41.1	79	.0497	.1125
.60 - .69	25,166	49.2	1,978,413	49.1	79	.0512	.1048
.70 - .79	1,279	2.5	68,048	1.7	53	.0326	.0791
.80 and Above	0	0	0	0	--	--	--
All Census Tracts	51,118	100.0	4,026,883	100.0	79	.0501	.1084

TABLE 5.4
Subsidized Housing Segregation by MSA Population 2000

MSA Population	Black-Non-Black	Hispanic-Non-Hispanic	Poor-Non-Poor	Subsidized-Non-Subsidized
Under 100,000	0.3599	0.3069	0.2856	0.4570
100,000 - 249,999	0.4382	0.3477	0.3043	0.5379
250,000 - 499,999	0.4925	0.3796	0.3311	0.5708
500,000 - 999,999	0.5409	0.3989	0.3532	0.5846
1,000,000 - 4,999,999	0.5632	0.4243	0.3693	0.6092
Over 5,000,000	0.6694	0.5390	0.4013	0.6276
All MSA's (331)	0.4836	0.3747	0.3280	0.5600

The correlation between the subsidized housing index score for the MSA and other demographic and housing variables at the census tract level did not identify any significant census tract level relationships. See Table 5.5 for correlations between subsidized housing segregation and selected census tract level variables.

These results indicate that the MSA distribution of subsidized housing appears to be independent of metropolitan scale, neighborhood concentration, or other census tract level indicators.

TABLE 5.5

Correlations for Selected Variables with MSA Subsidized Housing Segregation Index (D) 2000

Correlation with Subsidized Housing Segregation Index (D)	Correlation (Pearson)
Black-Non-Black Segregation Index (D)	.495
Hispanic-Non-Hispanic Segregation Index (D)	.253
Poor-Non-Poor Segregation Index (D)	.332
Subsidized As Percent of Total Housing Units	-.137
Poverty Rate	-.100
Percent Less Than HS	-.008
Civilian Unemployment Rate	-.081
Percent Households With Public Assistance	-.119
Percent Black	.162
Percent Hispanic	-.018
Percent Foreign Born	.094
Percent Elderly	.044
Percent Rent Occupied Units	-.084
Percent Vacant Units	.066
Percent Units Built Before 1939	-.043
Median Rent	.141
Density of Total Housing Units Per Square Mile	.159
State	.014
Region	-.243

Segregation Index and Poverty

Subsidized housing concentration at the MSA level is found to be higher than racial segregation while poverty concentration on average is lower than subsidized housing segregation. It could be that individual MSA's do not follow the average relationship masking differences that could be important in directing appropriate strategies.

To test this the MSA's were split into three equal groups based on subsidized housing segregation scores and labeled high, medium and low. Racial and income segregation scores were also distributed in the same manner. As expected, most MSA's fit the general average and direction of the relationship between the segregation indices. However, in a significant minority of 67 MSA's (20.2 percent) the pattern is reversed.

There are 16 MSA's (4.8 percent) with relatively low subsidized housing segregation and high poverty concentration. An additional 22 MSA's (6.6 percent) have relatively high subsidized housing segregation but low poverty concentration.

There are 12 MSA's (3.6%) with relatively low subsidized housing and high racial concentration scores. In addition, there are 17 MSA's (5.1 percent) where the subsidized housing segregation is in the top third of the distribution while the racial segregation is in the bottom third. While the total number of these MSA's is relatively small, further study about what makes these MSA's different could be useful in

developing strategies to deconcentrate subsidized housing. Segregation index scores for the 331 MSA's are presented in the Appendix Table A-11.

Chapter 6

CLUSTER ANALYSIS

Introduction to Cluster Analysis

A cluster analysis is conducted to provide a more detailed analysis of subsidized housing concentration. The question being asked here is not whether one type of subsidized housing concentrates more than another but how that concentration relates to other types of subsidized housing located in the same neighborhood. The cluster analysis categorizes census tracts on the basis of concentration of subsidized housing units and the mix of subsidized housing types within the tract.

Five variables with the same unit of analysis (subsidized housing units) are used to specify the model:

- Number subsidized units in the census tract
- Number public housing units in the census tract
- Number other site-based (MF/S236/S8) units in the census tract
- Number LIHTC units in the census tract
- Number vouchers in the census tract

The absolute number of units for each type was selected because it is easier to interpret the results than the percentage of units in the tract or the relative percentages

by subsidy type. The correlation between the absolute number and percent of total units is .96 at the census tract level, so it is possible to use the absolute number rather than the percent as a measure of concentration without significantly changing the results. All variables were entered at equal weight.

Only one case was excluded because the number of subsidized units in this tract (6,002 units) exceeded by two times the number in the next highest census tract. This one tract was causing the cluster analysis not to converge on a parsimonious solution and was therefore excluded.

The number of subsidized units at the census tract is highly skewed. There are 8,253 census tracts with zero subsidized units and 14,732 tracts with under 10 subsidized units. In order to incorporate this scale effect, the cluster analysis was conducted using several cut-off points along the distribution of subsidized housing units. Cut-points at 100 and 200 subsidized units in the census tract resulted in a 9-cluster solution that captured the detail of low (under 50 units), medium (50- 200 units) and high (over 200 units) subsidized census tracts.

A two-step cluster method was selected because this method is able to identify the number of clusters that best fit the data rather than setting the number of clusters ahead of time as in the k-means cluster method. Based on this a 9-cluster solution was arrived at. A sensitivity analysis was conducted to test for the validity of the 9-cluster solution using greater or fewer clusters by varying the cut-off points. A 6-cluster

solution, although parsimonious, led to too much diversity within voucher tracts and obscured the difference between tracts that also had site-based units from those that did not. Larger number of clusters (11, 15 and 17-cluster solutions) broke the data too finely resulting in too few units while not changing the basic interpretation.

Description of Clusters

The 9-cluster solution indicates the complexity of geographic distribution of subsidized housing types. The clusters are described here followed by an analysis by subsidy type. Supporting data for this analysis can be found in Tables 6.1 – 6.4, Figures 6.1 – 6.6, and Appendix Table A.9. Policy recommendations for each cluster are described here and summarized in Table 6.5.

Cluster 1: Vouchers/No Subsidized Housing – Very Low Concentration – Very Low Poverty

The first cluster (cluster 1) consists of the largest number of census tracts and contains very few units of subsidized housing with an average of seven subsidized units per census tract. On the basis of number of neighborhoods this cluster is the largest with 30,792 census tracts (60.2 percent). A subset of this cluster consisting of 8,253 tracts (16.1 percent) has no subsidized housing units. Only one cluster type has a mean poverty rate under the MSA-wide mean of 11.8 percent and that is cluster 1

with a poverty rate of 9.2 percent. These neighborhoods present an opportunity for siting new subsidized housing, for voucher use and for targeting in relocation programs. Further data on the geographic accessibility of these neighborhoods and availability and affordability of rental properties would be helpful in attempting to assist voucher holders in seeking housing in these areas.

Cluster 2: Vouchers - Low Concentration – Low Poverty

Cluster 2 is the second largest cluster in number of census tracts consisting of 8,490 census tracts (16.6 percent of all census tracts). The level of concentration is low with only 61 subsidized housing units per tract of which 34 are vouchers and the remainder are site-based units. The poverty rate in these tracts is relatively low at 15.9 percent but this is higher than expected for voucher-only tracts. It is apparent that not all low level voucher neighborhoods are the same. The addition of only a few site-based units (27 units) in cluster 2 distinguishes these tracts from cluster 1 and the poverty increases from 9.2 percent to 15.9 percent. Due to the relatively higher poverty rates, these neighborhoods should be monitored so they do not attract additional subsidized housing.

Cluster 3: Vouchers – Moderate Concentration – Moderate Poverty

Cluster 3 is also a voucher type cluster at a slightly higher rate of subsidization. There are 1,366 tracts comprising 2.7 percent of all census tracts in MSA's. The average number of subsidized units in this cluster is 135 with 111 vouchers and the remainder site-based units. Although this represents a small percentage of neighborhoods they are distinct in having a relatively high rate of poverty for voucher-type tracts. The poverty rate in these neighborhoods averages 22.2 percent which exceeds the rate for small scale site-based subsidized housing (15-20 percent) and places it at the level of large scale site-based projects (22-23 percent). This cluster type was unexpected given the fact that there are relatively few site-based subsidized units in these tracts. This indicates a concentration effect even at a moderate scale (135 subsidized units per tract). These neighborhoods are at risk of being over-concentrated and the current poverty rate is at the threshold for potential negative impacts. These neighborhoods should be avoided when building new subsidized housing or when using vouchers. They should be further studied to identify why there is a larger concentration of vouchers and how to address this problem.

Cluster 4: Public Housing - Moderate Concentration – Moderate Poverty

Cluster 4 is a public housing cluster having relatively low numbers of public housing and lower rates of poverty than the other public housing cluster (cluster 9).

The cluster is relatively small consisting of 1,158 census tracts (2.3 percent of all census tracts). The average number of subsidized units in these tracts is only 144 units with 105 public housing units, 7 other site-based units, 5 LIHTC and 27 vouchers. Cluster 4 has a poverty rate of 19.1 percent which is not much lower than the higher concentration site-based subsidized housing clusters (22-23 percent). The existing neighborhoods in this category are already at the potential threshold for poverty concentration impacts and should therefore be avoided when building new subsidized housing or when using vouchers.

Clusters 5: Other Site-Based - Moderate Concentration – Moderate Poverty

Cluster 5 has 2,051 tracts (4.0 percent) and 294,973 subsidized units (7.3 percent of all subsidized units). Cluster 5 has a poverty rate of 15.8 percent which is lower than expected for site-based subsidized housing. This cluster offers a viable model for new construction of subsidized units in lower poverty neighborhoods. However, the existing neighborhoods in this category are already at the potential threshold for poverty concentration impacts and should therefore be avoided when building new subsidized housing or when using vouchers.

Clusters 6: LIHTC - Moderate Concentration – Moderate Poverty

Cluster 6 consists of 997 census tracts classified as having moderate concentrations of subsidized housing units. The total number of subsidized units in these tracts is 147,249 making this the second smallest cluster for number of neighborhoods and the smallest for number of units. There is an average of 148 subsidized units per tract including 106 LIHTC units and 31 vouchers.[12] Cluster 6 has a poverty rate of 14.6 percent which is lower than expected for site-based subsidized housing. This cluster represents a relatively lower concentration model for siting of LIHTC projects and should be studied further for possible replication. However, given the level of concentration and the poverty rate in the existing neighborhoods these tracts should be monitored to limit additional units of subsidized housing.

[12] It is possible that the total number of units and the number of vouchers in cluster 6 have been overstated. This is due to the fact that the database did not allow for unduplication of LIHTC and voucher units. Estimating a 25 percent overlap would reduce the number of voucher units from 31 to 5 and the total number of subsidized units per tract from 148 to 122. The number of units classified as LIHTC would remain the same at 106 units per tract. The analysis would remain the same with cluster 6 classified as moderately concentrated and LIHTC as the primary subsidy type.

Cluster 7: Other Site-Based Units – High Concentration – High Poverty

Cluster 7 is primarily made up of other subsidized units. There are 3,700 census tracts (7.2 percent of all census tracts) and 1,129,529 subsidized units (28.0 percent of all subsidized units) which makes this type of neighborhood the third largest in terms of neighborhoods and the largest in terms of number of subsidized housing units. This cluster is highly concentrated in terms of number of subsidized units per tract (305 units). Cluster 7 has a poverty rate of 23.0 percent which is lower than expected for high concentration site-based subsidy neighborhoods but which is still relatively high for the cluster types and already exceeds the threshold at which negative effects may occur. Efforts should be taken to reduce the level of poverty by avoiding siting of any new subsidized units or use of vouchers. In addition, active deconcentration efforts for existing units should be conducted to encourage relocation to lower poverty neighborhoods.

Cluster 8: LIHTC and Vouchers – High Concentration – High Poverty

Cluster 8 consists of 1,833 census tracts (3.6 percent of all census tracts) with a high concentration of subsidized units (410 subsidized units per tract) including 208 LIHTC units and 119 vouchers.[13] There are site-based units in these tracts as well

[13] It is possible that the total number of units and the number of vouchers in cluster 8 have been overstated. This is due to the fact that the database did not allow for

including an average of 59 other site based units and 24 public housing units. These neighborhoods make up 3.8 percent of tracts and 750,961 subsidized units (18.6 percent of units). By the LIHTC units co-locating with an equal number of other types of subsidized housing these tracts become highly concentrated.

Cluster 8 has a moderate poverty rate of 21.7 percent which is lower than expected for high concentration of site-based units but still at a level where threshold effects could occur. The poverty rate is sufficiently high to recommend efforts to reduce the level of poverty by avoiding siting of any new subsidized units or use of vouchers. Future LIHTC projects should be reviewed for the existing level of subsidized housing in the neighborhood as well as the poverty rate.

This study cannot determine whether the LIHTC projects are built in high poverty areas that already have high rates of vouchers, or whether vouchers are attracted to the neighborhood after construction of the LIHTC units. Further studies with longitudinal data would shed light on the dynamics involved. In addition, this is

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unduplication of LIHTC and voucher units. Estimating a 25 percent overlap would reduce the number of voucher units from 119 to 67 and the total number of subsidized units per tract from 410 to 358. The number of units classified as LIHTC would remain the same at 208 units per tract. The analysis would remain the same with cluster 8 classified as highly concentrated and LIHTC and vouchers as the primary subsidy types.

the only cluster that had a significant number of vouchers co-located with LIHTC units. Further study of the duplication between LIHTC and vouchers in these high poverty tracts would be useful.

Cluster 9: Public Housing and Other-Site Based Units – Very High Concentration - Very High Poverty

The one cluster that fits the stereotype of public housing is cluster 9. There are 731 tracts (1.4 percent) in this cluster with 625,627 subsidized units (15.5 percent of subsidized units). On average there are 411 public housing units co-located with 345 other site-based units, 48 LIHTC units and 53 vouchers for an average of 856 subsidized units per tract. These tracts have the highest level of concentration of all cluster types with subsidized units averaging 49.0 percent of all units in the tract and 65.4 percent of all rental units.

The very high concentration is due to the absolute number of public housing units and other site-based units which would concentrate if only a single subsidy type were located there. In this cluster both public housing and other site based units are numerous and co-located in the same neighborhoods. In addition there are LIHTC and vouchers also located in these neighborhoods further raising the concentration.

Cluster 9 has the highest poverty rate of 34.6 percent which significantly exceeds the poverty rate in the other clusters. Efforts are needed to restrict siting of

new subsidized projects in these neighborhoods as well as to deconcentrate existing developments through scale reduction and relocation. Given that there are other site-based units in these same neighborhoods, transformation efforts should extend beyond public housing to include other-site based projects for a more comprehensive result. The non-subsidized households in these neighborhoods are also very poor so efforts to address the needs of these residents should also be considered in plans.

Clusters by Subsidy Type

The clusters are further described below by subsidy type:

Public Housing

The perception of public housing is that these units are located in high rise buildings and highly concentrated in poor urban areas. Indeed that is the case in cluster 9 which is made up of 731 census tracts (1.4 percent of all census tracts). This perception may be enhanced by the co-location of other site-based subsidized housing in these tracts. At the same time that the heavy concentration of public housing is confirmed in cluster 9, other clusters indicate that public housing may be more deconcentrated than is commonly perceived. Cluster 4 is also a public housing cluster having relatively low levels of public housing and lower rates of poverty. Public housing in these tracts does not concentrate with other types of subsidized housing. They make up a relatively small number of 1,158 census tracts (2.3 percent of all census tracts) but are more prevalent than cluster 9. These findings indicate a need to

alter the perception of public housing as only urban and highly concentrated. It could be helpful to study these small scale site-based public housing developments for possible replication purposes.

Other Site-Based Subsidized Housing

Other site-based subsidized housing is a subsidy type that has not been extensively studied in the past. As with public housing clusters, these tracts are either moderately or highly concentrated and the difference between the types depends on the co-location with public housing. The results show that there are three clusters in which these units primarily occur. In two clusters the other-site based units are the primary subsidy type (clusters 5 and 7) and in cluster 9 other site-based units are co-located with public housing units creating the highest level of concentration of all cluster types and comprising two-thirds of all subsidized housing units in MSA's.

The picture for other site-based units is mixed. For the most part other subsidized housing units are deconcentrated in small scale projects without co-location of other subsidy types. At the same time, a significant number of these units are co-located with public housing in some of the most concentrated census tracts. The concern over concentration that has been focused on public housing should be extended to the other subsidized housing located in the same census tracts as public housing.

Low Income Housing Tax Credits (LIHTC)

As with public housing and other-site based housing there are two different models of development in the LIHTC program. One is moderately concentrated and is not co-located with other subsidized units. The other is a highly concentrated version with a significant number of other subsidized housing types.

In the moderate version (cluster 6) there are very few site-based units other than the LIHTC units and the poverty rate is moderate at 14.0 percent, the lowest of the site-based clusters. Although these tracts make up a small percentage of all tracts (2.0 percent) they represent a lower concentration model of siting subsidized housing that does not appear to concentrate alongside other types of subsidized housing.

The other LIHTC cluster (cluster 8) is a combination of LIHTC and vouchers. This type of LIHTC census tract is in twice as many tracts as the lower concentration LIHTC cluster. This development model is large scale and concentrated and it is the combination of the two types of subsidies that is causing the very high concentration, not necessarily the LIHTC units.

The LIHTC has the opportunity to be only moderately concentrated when sited without other subsidized housing. Therefore LIHTC projects should be reviewed for existing subsidized housing in the neighborhood. Since many of the LIHTC units have already been constructed, efforts to decrease concentration would need to consider voucher mobility directed away from high concentration LIHTC neighborhoods.

Vouchers

Voucher type tracts are dominant with three clusters (cluster 1, 2 and 3) making up 40,648 census tracts or 79.5 percent of all census tracts in MSA's. There are 911,814 subsidized housing units in these three clusters (22.6 percent of all subsidized units). Vouchers are also present in site-based clusters but they do so at relatively low levels ranging from an average of 27 to 53 vouchers per census tract depending on the other subsidy type. For the most part the data support the contention that vouchers are highly decentralized, tend not to co-locate with site-based units and reach a large number of neighborhoods. Cluster 2 includes a few more site-based units indicating that this type of small-scale site-based development is possible resulting in low levels of concentration. It would be interesting to study these neighborhoods further as potential low-concentration, low-poverty development models.

Cluster 3 which is also a voucher type cluster was unexpected with a fairly high rate of poverty that is more like the highly concentrated site-based clusters. This indicates a concentration effect that takes place at even a moderate scale (135 subsidized units per tract).

Vouchers are also present in cluster 8 where the tracts have become highly concentrated with LIHTC units, vouchers and other site-based units. It is not clear from the data whether LIHTC projects are located in areas that already have a high

number of vouchers present or whether vouchers are attracted somehow to these neighborhoods after a LIHTC project is sited. Longitudinal data would help sort out the possibilities. But in either case, these census tracts are cause for concern due to the high level of concentration of subsidized units of any type.

Summary of Cluster Analysis Results

The cluster analysis helps to understand why we get so many moderate concentration results in the descriptive analysis. This is due to the fact that subsidy types form at least two distinct types of concentration. The relationship between poverty and the clusters is also lower than expected but is more apparent in the cluster analysis. This detail is useful in identifying tracts that have both concentrations of subsidized housing along with high poverty rates. The level of detail provided in the cluster analysis allows for more nuanced policy recommendations.

TABLE 6.1

Subsidized Units by Cluster 2000

Cluster - Concentration	# Census Tracts	Percent of Census Tracts	Total Subsidized Units	Percent of Total Units
Cluster 1: Voucher/No Subsidized Units - Very Low	30,792	60.2	212,623	5.3
Cluster 2: Voucher - Low	8,490	16.6	514,133	12.8
Cluster 3: Voucher - Moderate	1,366	2.7	185,058	4.6
Cluster 4: Public Housing - Moderate	1,158	2.3	166,819	4.1
Cluster 5: Other Site Based - Moderate	2,051	4.0	294,973	7.3
Cluster 6: LIHTC - Moderate	997	2.0	147,249	3.7
Cluster 7: Other Site Based - High	3,700	7.2	1,129,529	28.0
Cluster 8: LIHTC/Voucher - High	1,833	3.6	750,961	18.6
Cluster 9: Public Housing/Other Site Based - Very High	731	1.4	625,627	15.5
All Census Tracts	51,118	100.0	4,026,883	100.0

TABLE 6.2

Mean Number Subsidized Units in Census Tract by Type by Cluster 2000

Cluster - Concentration	Public Housing	Other Site Based	LIHTC	Vouchers	Total
Cluster 1: Voucher/No Subsidized Units - Very Low	0	0	0	6	7
Cluster 2: Voucher - Low	6	12	8	34	61
Cluster 3: Voucher - Moderate	4	12	8	111	135
Cluster 4: Public Housing - Moderate	105	7	5	27	144
Cluster 5: Other Site Based - Moderate	2	114	5	23	144
Cluster 6: LIHTC - Moderate	2	8	106	31	148
Cluster 7: Other Site Based - High	92	141	26	46	305
Cluster 8: LIHTC/Voucher - High	24	59	208	119	410
Cluster 9: Public Housing/Other Site Based - Very High	411	345	48	53	856
All Census Tracts	17	25	14	23	79

TABLE 6.3

Subsidized Units by Type by Cluster 2000

Cluster - Concentration	Public Housing	%	Other Subsidized	%	LIHTC	%	Vouchers	%
Cluster 1: Voucher/No Subsidized Units - Very Low	2,403	0.3	7,940	0.6	2,846	0.4	199,434	16.9
Cluster 2: Voucher - Low	53,558	6.1	99,090	7.9	69,000	9.6	292,485	24.7
Cluster 3: Voucher - Moderate	5,189	0.6	16,715	1.3	11,058	1.5	152,096	12.9
Cluster 4: Public Housing - Moderate	121,597	13.9	8,291	0.7	6,005	0.8	30,926	2.6
Cluster 5: Other Site Based - Moderate	3,715	0.4	232,940	18.6	10,155	1.4	48,163	4.1
Cluster 6: LIHTC - Moderate	2,184	0.3	7,979	0.6	106,086	14.8	31,000	2.6
Cluster 7: Other Site Based - High	340,609	39.0	522,165	41.6	96,211	13.4	170,455	14.4
Cluster 8: LIHTC/Voucher - High	43,237	5.0	108,307	8.6	380,488	53.1	218,929	18.5
Cluster 9: Public Housing/Other Site Based - Very High	300,318	34.4	251,174	20.0	35,066	4.9	39,069	3.3
All Census Tracts	872,810	100.0	1,255,460	100.0	716,915	100.0	1,182,557	100.0

TABLE 6.4

Concentration of Subsidized Units by Cluster 2000

Cluster - Concentration	Subsidized as Percent of Total Units	Subsidized as Percent of Rental Units	Census Tract Poverty Rate	Percent Black	Percent Rent Occupied	Density Units Per Square Mile
Cluster 1: Voucher/No Subsidized Units - Very Low	.5	2.0	9.2	0.10	.28	2,128
Cluster 2: Voucher - Low	4.3	12.4	15.9	0.20	.42	2,903
Cluster 3: Voucher - Moderate	7.8	15.4	22.2	0.34	.56	4,776
Cluster 4: Public Housing - Moderate	11.1	27.4	19.1	0.22	.45	2,639
Cluster 5: Other Site Based - Moderate	9.8	24.2	15.8	0.19	.46	2,773
Cluster 6: LIHTC - Moderate	9.3	26.6	14.6	0.19	.42	2,116
Cluster 7: Other Site Based - High	20.0	37.8	23.0	0.31	.57	3,927
Cluster 8: LIHTC/Voucher - High	21.3	38.4	21.7	0.31	.59	4,866
Cluster 9: Public Housing/Other Site Based - Very High	49.0	65.4	34.6	0.48	.75	10,035
All Census Tracts	5.0	10.8	11.8	0.14	.36	3,026

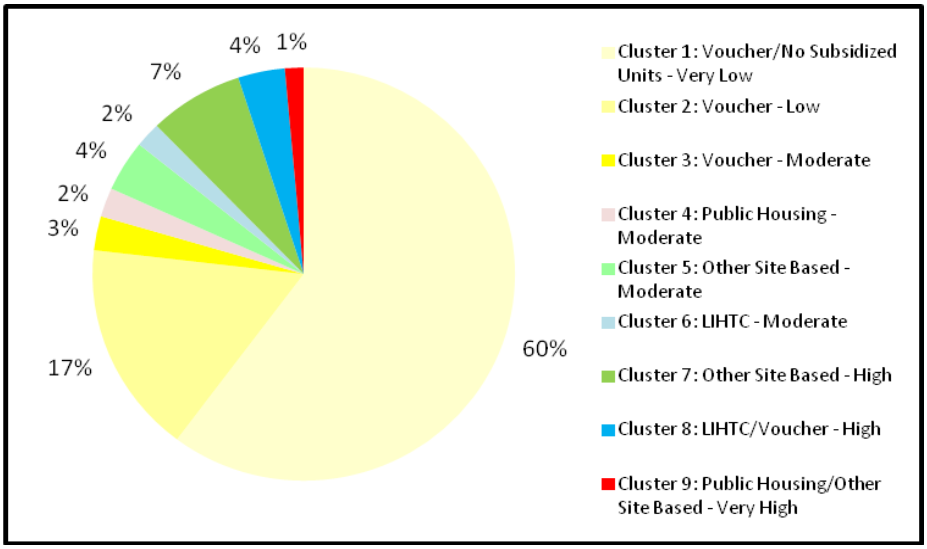


FIGURE 6.1
Percent Census Tracts by Cluster 2000
N = 51, 228

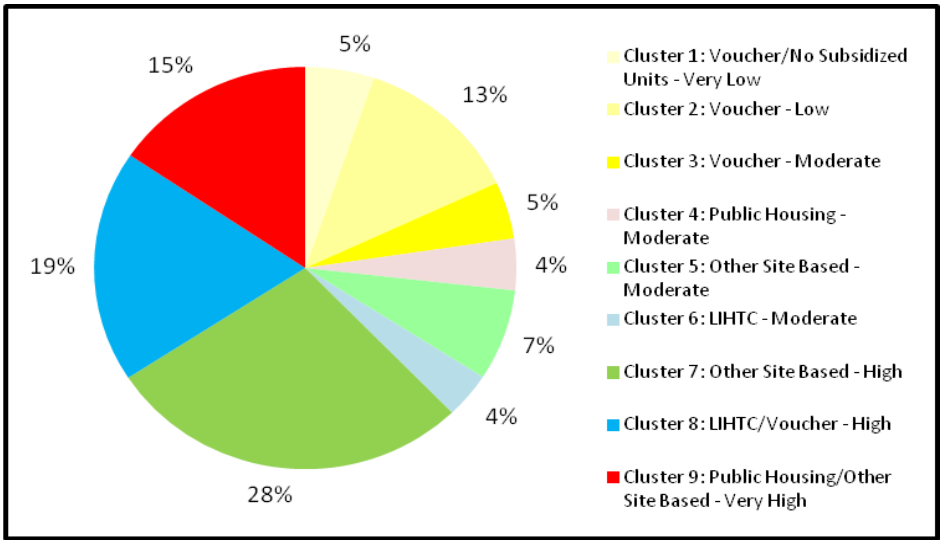


FIGURE 6.2
Percent Subsidized Units by Cluster 2000
N = 4,026,883

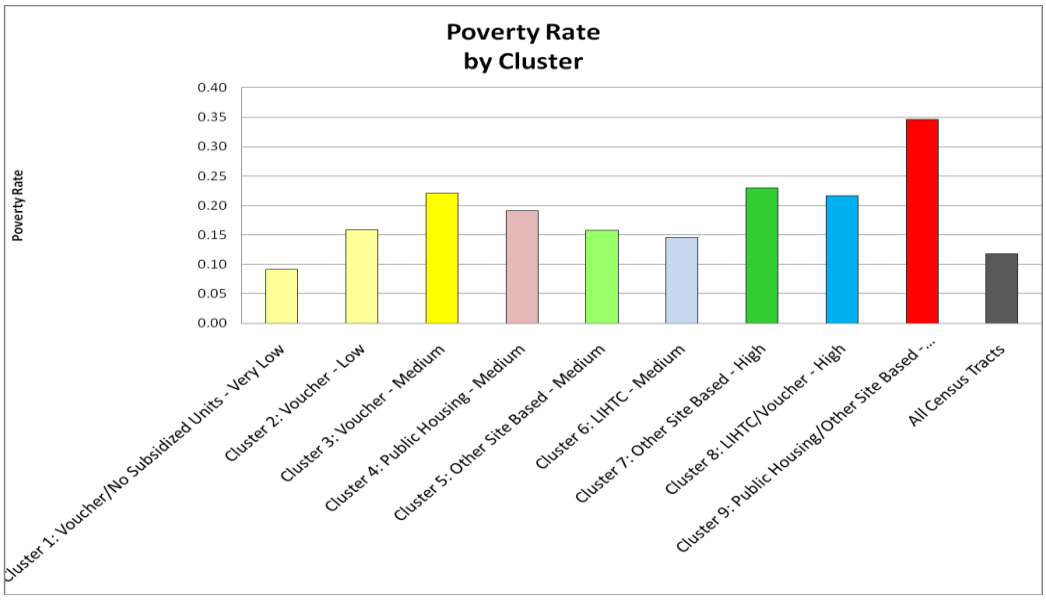


FIGURE 6.3
Census Tract Poverty by Cluster 2000

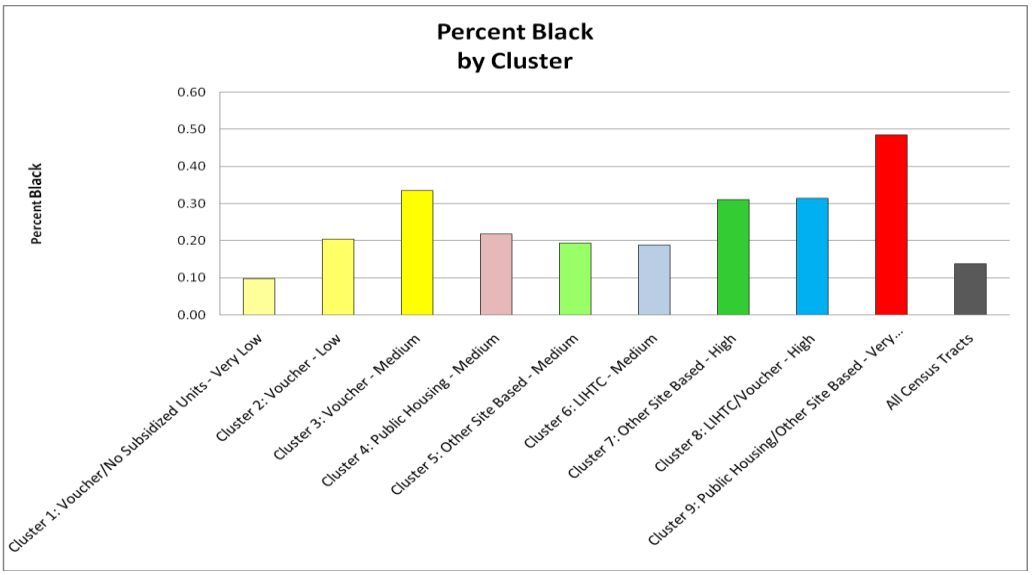


FIGURE 6.4
Census Tract Percent Black by Cluster 2000

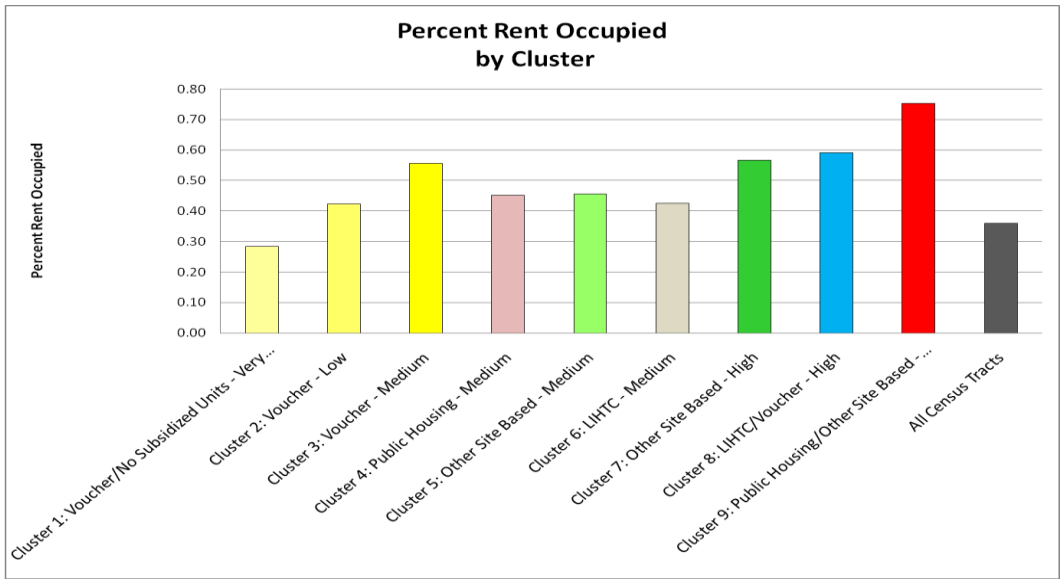


FIGURE 6.5
Census Tract Percent Rental by Cluster 2000

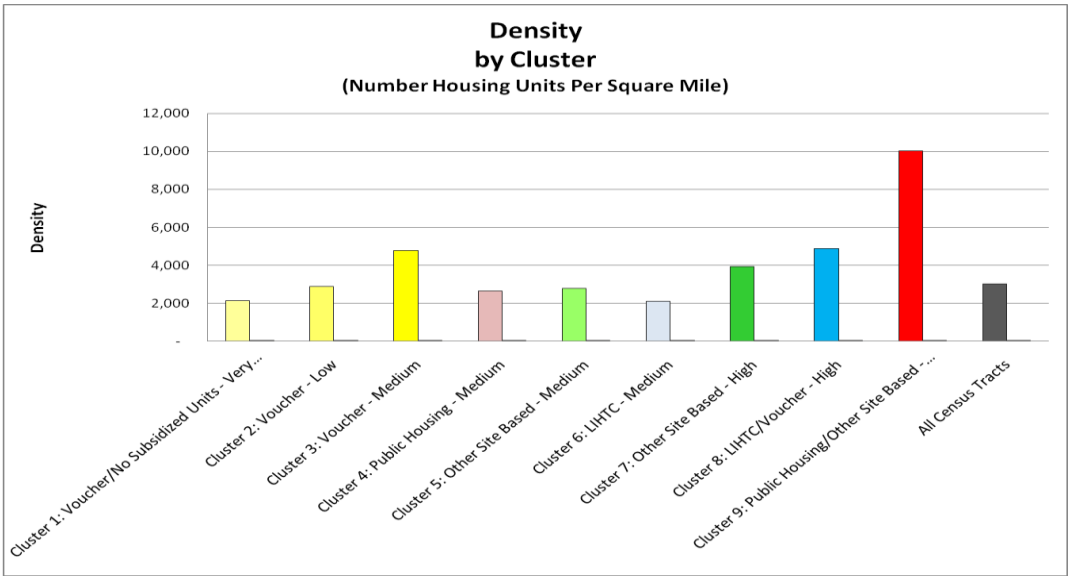


FIGURE 6.6
Census Tract Density by Cluster 2000

TABLE 6.5
Policy Recommendations by Cluster

Cluster – Concentration - Poverty	Census Tracts	Subsidized Units per Tract	Poverty Rate	Policy Recommendations
Cluster 1: Voucher/No Subsidized Units - Very Low Concentration – Very Low Poverty	30,792	7	9.2	These neighborhoods present an opportunity for siting new subsidized housing and targeting vouchers.
Cluster 2: Voucher – Low Concentration – Low Poverty	8,490	61	15.9	Because these neighborhoods contain some site-based subsidized units it would be interesting to study these neighborhood further as potential low-concentration, low-poverty development models. However, the existing neighborhoods should be monitored so they do not attract too many additional units of subsidized housing.
Cluster 3: Voucher – Moderate Concentration – Moderate Poverty	1,366	135	22.2	These neighborhoods are at risk of being over-concentrated and should be avoided when building new subsidized housing or when using vouchers. They should be further studied to identify why there is a larger concentration of vouchers and how to address this problem.
Cluster 4: Public Housing – Moderate Concentration – Moderate Poverty	1,158	144	19.1	These neighborhoods are at risk of being over-concentrated and should be avoided when building new subsidized housing or when using vouchers. Small scale deconcentration and relocation efforts could be helpful as well to reduce the existing concentration.
Cluster 5: Other Site Based – Moderate Concentration – Moderate Poverty	2,051	144	15.8	These neighborhoods are at risk of being over-concentrated and should be avoided when building new subsidized housing or when using vouchers. Small scale deconcentration and relocation efforts could be helpful as well to reduce the existing concentration.
Cluster 6: LIHTC – Moderate Concentration – Moderate Poverty	997	148	14.6	These neighborhoods are at risk of being over-concentrated and should be avoided when building new subsidized housing or when using vouchers. However, these neighborhoods represent a lower concentration model for siting of LIHTC projects and should be further studied for possible replication.

Cluster – Concentration - Poverty	Census Tracts	Subsidized Units per Tract	Poverty Rate	Policy Recommendations
Cluster 7: Other Site Based – High Concentration – High Poverty	3,700	305	23.0	These neighborhoods are already over-concentrated. Efforts should be made to reduce the level of concentration by avoiding siting of any new subsidized units and redirecting new voucher holders to lower poverty neighborhoods. In addition, active deconcentration efforts for existing units should be conducted to encourage relocation to lower poverty neighborhoods. These neighborhoods should be studied further to guide decisions on deconcentration.
Cluster 8: LIHTC/Voucher – High Concentration – High Poverty	1,833	410	21.7	Efforts should be made to reduce the level of poverty by avoiding siting of any new subsidized units and redirecting voucher holders to lower poverty neighborhoods. Future LIHTC projects should be reviewed for the existing level of subsidized housing in the neighborhood as well as the poverty rate.
Cluster 9: Public Housing/Other Site Based - Very High Concentration – Very High Poverty	731	856	34.6	Efforts are needed to deconcentrate existing developments through massive scale reduction and relocation. Given that there are other site-based units in addition to public housing, any transformation efforts should extend beyond public housing to include other-site based projects for a more comprehensive result. The non-subsidized units in these neighborhoods are also very poor so efforts to address the needs of these residents should also be considered in plans.
All Census Tracts	51,118	79	11.8	

Visualizing Clusters

One of the challenges in a cluster analysis is that a lot of information is combined which can make the result not as intuitive as pure descriptive statistics. Mapping the clusters could be a potentially useful tool to reduce the data and visualize the complexity in a single MSA. Maps for the city of Philadelphia were created including four maps for each type of subsidized housing; two maps of the indicators of concentration; and one map of the 9 clusters (see Figures 6.7 – 6.13).

The individual maps of subsidized units are useful when discussing specific subsidy types but are confusing if all types are to be considered at the same time. The two indicator maps are comparable and either one is useful in visually identifying areas of subsidized housing concentration but lack poverty rate information, which if added could be confusing.

The cluster map combines three pieces of information including 1) subsidized housing concentration; 2) subsidy type; and 3) poverty rate. It is not necessarily intuitive and requires attention to understand its meaning.

The diversity of types of subsidized housing concentration is clearly visible in the 9 colors used to map the 9 clusters. What was unexpected was that the overall spatial pattern was significantly scattered. Large swaths of similar cluster types do not form. From a policy perspective it would be easier if there were larger contiguous clusters for policy interventions rather than neighborhood or sub-neighborhood

strategies. The cluster map shows that a more nuanced and detailed type of intervention that considers subsidized housing in the neighborhood could possibly be useful in targeting redevelopment efforts.

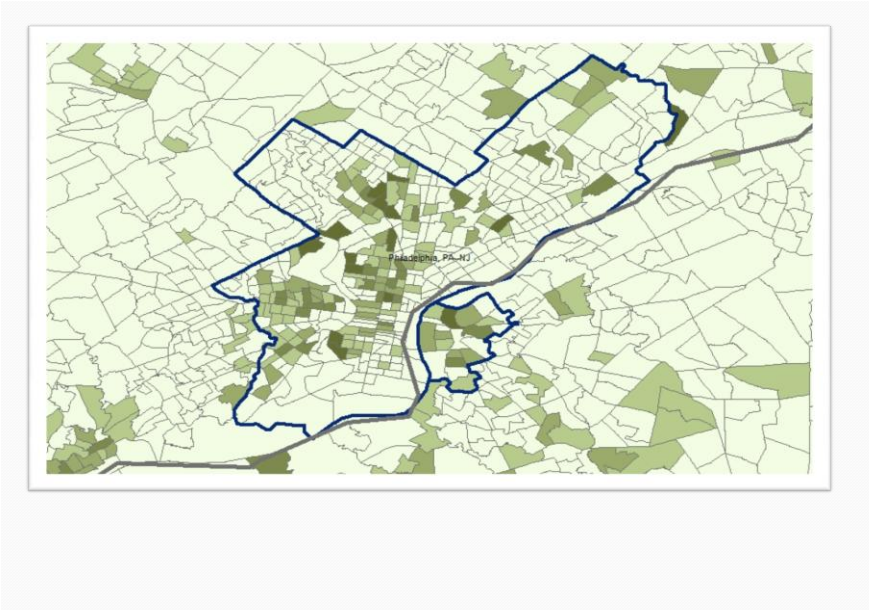


FIGURE 6.7
Map of Number of Subsidized Units in Census Tract - Philadelphia 2000

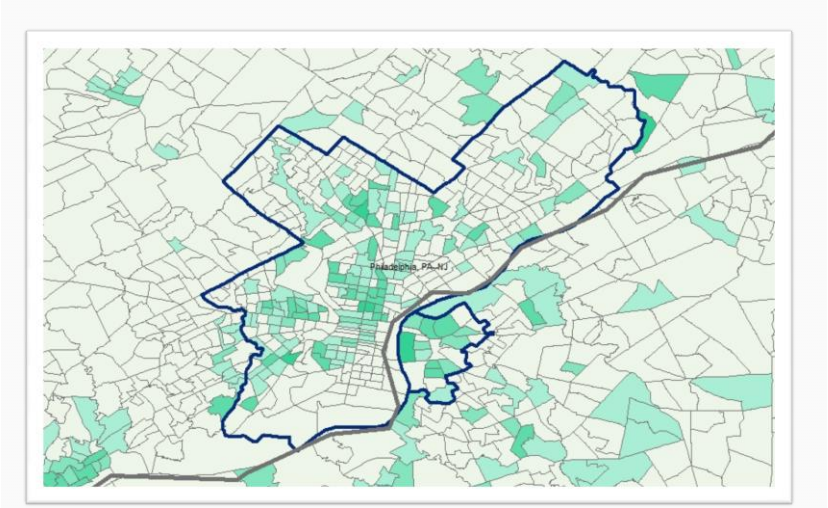


FIGURE 6.8
Map of Percent Subsidized Units in Census Tract - Philadelphia 2000

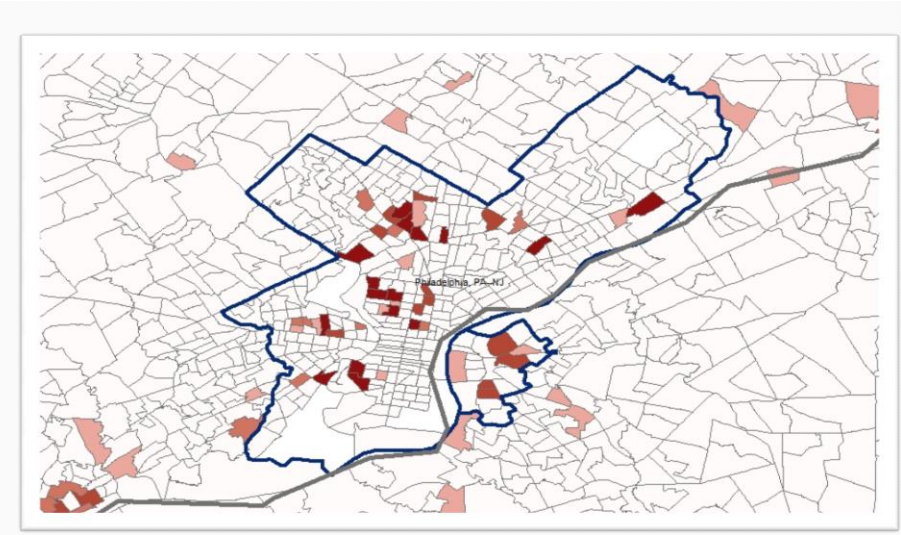


FIGURE 6.9
Map of Public Housing Units in Census Tract - Philadelphia 2000

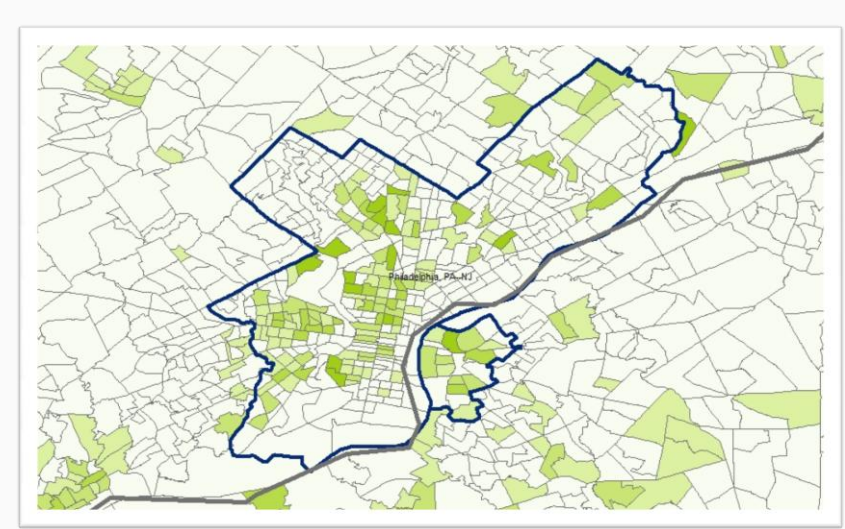


FIGURE 6.10
Map of Other Subsidized Housing Units in Census Tract - Philadelphia 2000

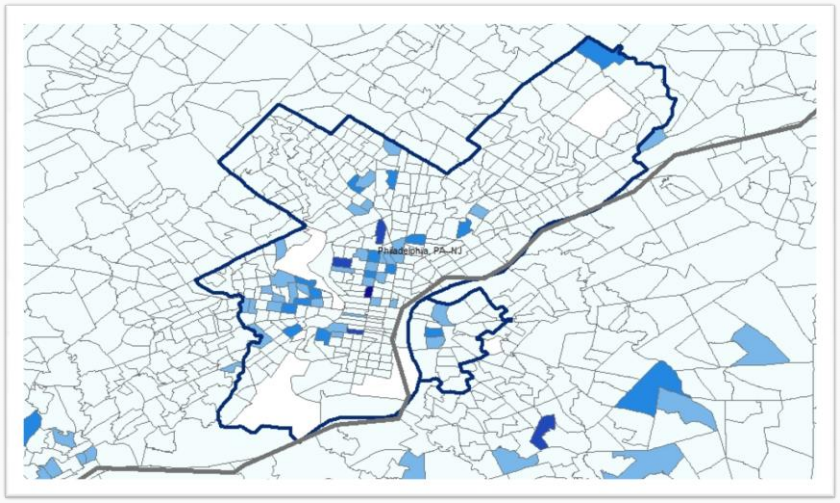


FIGURE 6.11
Map of LIHTC Units in Census Tract - Philadelphia 2000

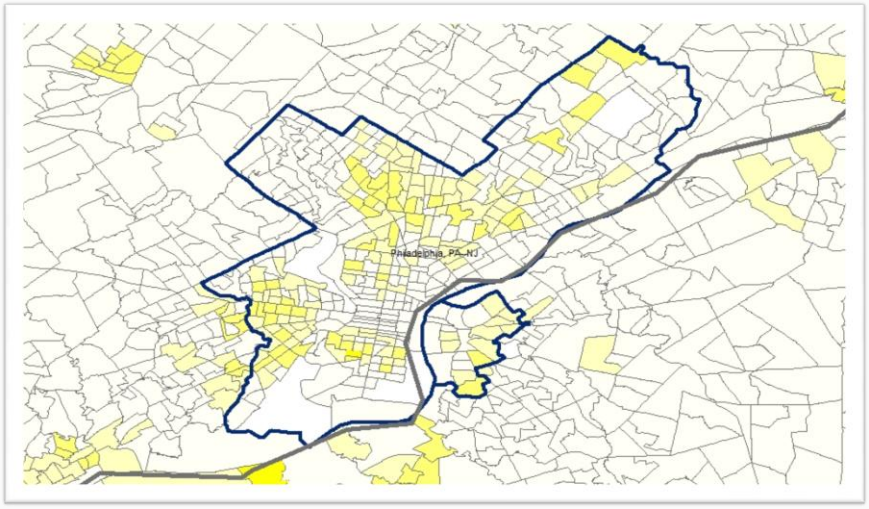
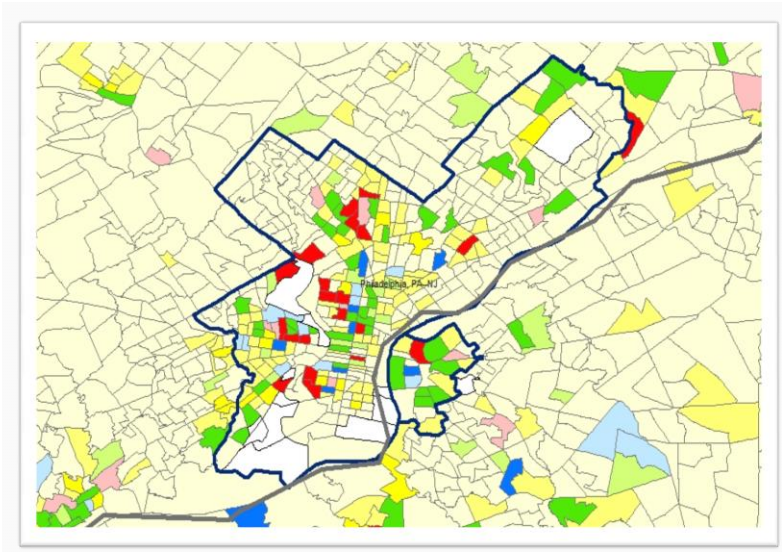


FIGURE 6.12
Map of Voucher Units in Census Tract – Philadelphia 2000



Cluster 1: Voucher/No Subsidized Units – Very Low

Cluster 2: Voucher – Low

Cluster 3: Voucher – Medium

Cluster 4: Public Housing – Medium

Cluster 5: Other Site Based – Medium

Cluster 6: LIHTC – Medium

Cluster 7: Other Site Based – High

Cluster 8: LIHTC/Voucher – High

Cluster 9: Public Housing/Other Site Based – Very High

FIGURE 6.13
Map of Subsidized Housing Clusters – Philadelphia 2000

Chapter 7

CONCLUSION AND POLICY IMPLICATIONS

At the census tract level subsidized housing is primarily concentrated in a few high poverty census tracts. At the metropolitan level subsidized housing segregation is higher than race, ethnicity and poverty. The distribution of subsidized housing occurs at multiple scales, subsidy types, and levels of poverty. The highest levels of concentration are primarily due to multiple types of subsidized housing co-located in the same census tract. On the other hand, subsidized housing of all types reaches even the lowest poverty census tracts at rates higher than expected. Results support a nuanced view of subsidized housing that lends itself to development of specific strategies to address over-concentration of subsidized housing.

Descriptive Analysis Results

The three measures of concentration (absolute, percent of all units, or percent of rental units) all indicate that a large majority of census tracts are not concentrated. A significant subset of these tracts (16.3 percent) have no subsidized housing units. Therefore, depending on the measure, between two-thirds and three-quarters of all census tracts can be considered not concentrated. Another ten to twenty percent can be

considered moderately concentrated and between five and fifteen percent of census tracts can be considered highly concentrated.

Whether one considers the level of concentration of subsidized housing problematic depends in part on the level of distress in the neighborhood. This study used census tract poverty as the indicator of distress taking into account that a poverty rate exceeding 15 to 20 percent is a potential threshold for increased neighborhood distress and negative outcomes for residents.

On this criteria public housing is highly concentrated with two-thirds of public housing units (66.9 percent) in neighborhoods over 20 percent poverty, while LIHTC (40.3 percent), other site-based subsidized housing (47.1 percent) and vouchers (44.7 percent) are only moderately concentrated. None of the subsidy types can be considered to have low or very low levels of concentration, although the distribution for the LIHTC indicates that it has been more successful than the other types at extending down to the lowest poverty tracts. These findings are consistent with prior studies. This study provides the evidence that other site-based units and vouchers are concentrated in poverty areas at about the same level as LIHTC units.

There does not appear to be a threshold point at which the number of subsidized units per tract rises exponentially with increasing poverty. The absolute number of subsidized units does increase with the poverty rate in a linear manner resulting in a greater concentration of subsidized housing as the poverty rate increases.

Segregation Analysis Results

Although the primary focus of this study was on concentration at the census tract level, a separate analysis was conducted of subsidized housing segregation at the MSA level in order to understand the relationship between the larger regional scale geography and the small scale of the neighborhood.

Results of this analysis show that subsidized housing segregation is very high at the MSA level. Subsidized housing segregation is even higher than racial, ethnic and income segregation within MSA's. The rate of subsidized housing segregation (.56) is considerably higher than for Black/Non-Black (.48), Hispanic/Non-Hispanic (.37) and Poor/Non-poor (.33). The considerably higher segregation rate for subsidized housing was unexpected given the potentially close relationship between poverty, segregation, and subsidized housing. The distribution of subsidized housing at the MSA level was found to be independent of metropolitan scale (population size) or census tract level indicators. The location of subsidized housing appears to be different from (and therefore more concentrated) than poverty and racial segregation in some manner.

In a number of MSA's (67 out of 331) the relationship between subsidized housing, race, and poverty is reversed. While the total number of these MSA's is small, further study about what makes these MSA's different could be useful in developing strategies to deconcentrate subsidized housing.

Cluster Analysis Results

The cluster analysis helps to understand why we get moderate concentration results in the descriptive analysis. This is due to the fact that subsidy types form at least two distinct forms of concentration with one at a low or moderate scale and the other at a high or very high concentration. The poverty rates vary depending on the scale and type of subsidy. The level of detail provided in the cluster analysis allows for more nuanced policy recommendations based on these differences.

Public housing has the highest concentration of the four subsidy types and is located in the highest poverty areas. This finding is consistent with prior studies on the location of public housing (Coulibaly et al 1998, Rosenthal 2008). Results are unsurprising given the long history of this large-scale site-based construction program. Demographic and employment changes over time, racial segregation, and urban renewal actions led to a concentration of the poorest residents in public housing which is still current today.

But the cluster analysis finds that there are actually two different scales of public housing development which may explain the mixed results in prior studies. The first is small scale development in lower poverty tracts and the other has a very high concentration of subsidized housing and is located in very high poverty tracts. This study concludes that there are two different models of public housing construction resulting in very different concentrations of neighborhood poverty.

This finding is consistent with prior studies that find that older public housing projects concentrated poverty more than more recent construction (Holloway et al 1998). Public housing concentrates by poverty but has become less concentrated over time. A comparison of results of this study with a similar study conducted in the early-mid 1990's (Newman and Schnare 1997) indicates that there may have been a decrease in public housing units in the highest poverty tracts. This would be consistent with HOPE VI and local demolition program goals and could indicate some success in deconcentration of poverty in the highest poverty neighborhoods. It could help to explain why some studies find a decrease in concentrated poverty in the 1990's (Jargowsky 2005b).

The cluster analysis also finds two distinct LIHTC clusters, one with moderate poverty and the other higher poverty. The high poverty type is co-located with vouchers. This finding is evident in the descriptive statistics but is made clearer in the cluster analysis. This indicates there are two different development patterns and potentially two separate neighborhood impacts.

The findings of this study are consistent with prior studies that find LIHTC units are relatively less concentrated than other subsidy types (Abt Associates 2006[14], Freeman 2004, and McClure 2006). Although LIHTC may reach into lower poverty

[14] Abt Associate (2006) found 33 percent of LIHTC units in census tracts under 10 percent which is almost exactly the same as this study (31.0 percent).

tracts than other subsidy types it is still fairly concentrated in higher poverty tracts. This too is consistent with LIHTC finding which also find larger scale clustering effects (O'Neill 2008, Van Zandt and Mhatre 2009) and high poverty rates (Deng 2007).

Given the concentration of site-based units in the high concentration version of LIHTC tracts the poverty rates are actually lower than expected. But further subsidized housing development or voucher use should be restricted in order not to over-concentrate and increase the level of poverty above the current level.

Other site-based subsidized housing is a subsidy type that has not been extensively studied in the past. These neighborhoods make up a significant number of all neighborhoods but are rarely studied in the literature. They should be studied further to guide decisions on deconcentration.

As with public housing clusters, these tracts are either moderately or highly concentrated and the difference between the types depends on the co-location with public housing. The moderate version has poverty rates lower than expected but is still sufficiently high to undertake efforts to reduce the level of poverty by avoiding siting of any new subsidized units or use of vouchers.

The second type has over one million subsidized housing units, primarily other-site-based units, and is at a high level of concentration. Given the location of site-based projects in these census tracts this rate of poverty is lower than expected but

is sufficiently high to undertake efforts to reduce the level of poverty by avoiding siting of any new subsidized units or use of vouchers.

The highest concentration version is co-located with public housing and the combination of two subsidy types that create the extensive concentration and very high rate of poverty. These neighborhoods need extensive deconcentration and relocation efforts that take into account the multiple subsidy types in the neighborhoods as well as to restrict any additional subsidized housing construction or use of vouchers.

Voucher-type tracts account for two-thirds of all census tracts in MSA's. Very few site-based units are located in these neighborhoods and the result is that they are at very low or low levels of concentration and poverty. Vouchers are also present in site-based clusters but they do so at relatively low levels. For the most part the data support the contention that vouchers are highly decentralized and reach a significant number of census tracts. There are two exceptions.

The first is that a voucher cluster was identified that has a only a moderate concentration of vouchers but a relatively high rate of poverty at a rate that is more like site-based housing clusters. These neighborhoods should be studied further to identify why they are concentrated and how to avoid further concentration.

A second exception is the neighborhood type where LIHTC and vouchers are co-located in about equal numbers. Given the high level of site-based projects in these census tracts the rate of poverty is lower than expected but is sufficiently high to

recommend efforts to reduce the level of poverty by avoiding siting of any new subsidized units or use of vouchers. Future LIHTC projects should be reviewed for the existing level of subsidized housing in the neighborhood as well as the poverty rate.

Policy Implications

Due to the high level of concentration at the metropolitan level there is clearly a need for government policy to encourage and even direct deconcentration efforts. This deconcentration potential applies to both site-based subsidized housing as well as tenant-based subsidized housing. Efforts to deconcentrate should not be restricted to tenant-based assistance which has been viewed as the more adaptable.

Subsidized housing has the potential to be developed at lower concentrations and sited in lower poverty areas but it will not happen under current federal housing policy which devolves most decisions to the local and state levels without providing clear regulations regarding what is meant by deconcentration.

The highest concentration census tracts consisted of multiple types of subsidized units that were co-located in high poverty neighborhoods. This indicates a need for government policy prior to the siting of additional units of subsidized housing in areas where there are already a substantial number of these units. Since they are site-based these units will impact the areas for a considerable period of time and

cannot be altered quickly. Therefore it could be argued that all site-based subsidized housing, regardless of the specific program, should be required to assess the impact to the proposed location taking into consideration the existing subsidized housing, the existing poverty rate, and the increases that would be brought about by the proposed project.

Deconcentration policy could consist of incentives such as greater funding for projects in lower poverty areas or development of effective relocation assistance programs for households using vouchers to move to lower poverty areas. Regulatory changes could be implemented that include restrictions on siting in areas with existing high concentrations of subsidized housing and poverty concentrations. New rental housing construction in lower poverty areas, voucher deconcentration, and regulatory restrictions on siting of new projects are complementary interventions and could be implemented at the same time for greatest effect.

An important next step in setting housing policy regarding the geographic concentration of subsidized housing is to define just what we mean by concentration. At this point in time we have empirical data from this study and others that indicate that some areas have substantially more subsidized housing than others and that subsidized housing in metropolitan areas is highly concentrated. This study adds to that knowledge by clarifying that there are multiple types of subsidized housing located in these areas of concentration, however we still lack specificity as to what is meant by concentration. Additional work is needed in determining 1) the geographic

scale at which the impacts occur; 2) the level of subsidized housing that constitutes over-concentration; and 3) the level of poverty that constitutes over-concentration.

The first is the definition of the geographic areas of concentration. Most studies (including this one) use the census tract based primarily on both the availability of data at this scale but also the presumption that this is the scale at which neighborhood impacts occur. Perhaps an impact area is one that includes multiple census tracts, or it could be an area smaller than a census tract such as a block group or even a street. Impacts may not be aligned with census tracts at all. We do know from prior impact studies that different impacts have different scales so it is important to distinguish the impacts that are significant to the policy decisions being made. In this case, spatial statistics could be helpful in measuring the scale of impact areas specifically for the joint impacts of concentration of subsidized housing and poverty.

The second aspect of concentration that needs attention is the definition of what constitutes "too high" a level of poverty. Research studies often use 40 percent or 30 percent poverty but these have been set by the researcher to categorize the data rather than developed as a result of the study. It is possible that the actual threshold could be as low as 20 percent for potential negative threshold effects. This study relied on evidence in Galster and Quercia (2000) that there was a potential negative impact above 20% poverty in order to develop policy guidance on limiting additional subsidized housing units. This level of poverty may not be the appropriate one. A substantial number of subsidized units are located in census tracts with between 20

and 30 percent poverty so it is important to know whether we need to deconcentrate at this level of poverty. HOPE VI and other demolition and relocation programs primarily were located in areas over 30 percent poverty. There are currently no policies in place to deconcentrate lower poverty areas and in fact these are often the areas identified for additional subsidized housing development.

At the other end of the scale it is unclear what constitutes "areas of opportunity" in terms of the benefits of low-poverty neighborhoods. Are "areas of opportunity" below 10 percent? Or is it some other level? This study found that there were more subsidized units than expected in census tracts below 10 percent poverty and that these included both site-based and tenant-based assistance. The differential between census tracts at various lower levels of poverty with and without subsidized housing could be exploited to study what distinguishes these two areas and might identify useful information in targeting these areas for policy purposes.

Given the lack of rental units in low poverty areas, use of tenant-based assistance is limited by the availability of rental units at rents that are within federal policy guidelines for tenant-based assistance. Can we determine the additional financial and regulatory incentives necessary to encourage additional affordable housing in low-poverty census tracts? What incentives would work best? Possible interventions could include construction of market rate rentals that could house a resident with tenant-based assistance in some of the units, the use of tenant-based assistance in existing units, or the siting of mixed income new subsidized housing

units. Given the high cost of these options, local objections, and exclusionary zoning limiting the siting of subsidized housing, it would be important to understand the extent of the benefits of living in low poverty areas and at which poverty level these benefits decline significantly thereby creating a defensible point at which to offer costly incentives.

To guide policy decisions regarding the concentration of subsidized housing data should be produced on a regular basis like that already produced by HUD in the *Picture of Subsidized Housing*. The current administration has supported this effort and improved the quality of the data. The prior administration did not support the data collection and the process was halted for several years. To bring data back to validity is very difficult when there have been periods of inactivity. This effort needs to be sustained.

In summary, additional funding and regulations to promote deconcentration of subsidized housing are needed to reduce the current level of concentration that exists and to promote deconcentration in future projects under current programs. Any new programs that are developed should also be concerned with the potential to create areas of concentration and should have regulations regarding siting. However, more definitive research is needed to provide specific guidance on thresholds above which new units of subsidized housing should be restricted and below which subsidized housing should be encouraged through incentives. This study provided a baseline for information on the geographic location of subsidized housing in 2000. The

availability of recent data (HUD, *Picture of Subsidized Housing* 2008) will allow for the necessary impact research which can be used to define appropriate thresholds.

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APPENDIX

APPENDIX A.1

Downloadable Databases and on-line Query 2000

	Units from Online Query	Units from Database	Difference	% Difference
Public Housing (PH)**	1,282,099	1,281,669	430	0.0%
Moderate Rehab (MR)***	111,392	0	111,392	100.0%
Section 236 Projects (S. 236)	440,329	440,329	0	0.0%
Section 8 Projects (S8 NC/SR)	877,830	877,830	0	0.0%
Multifamily Other Projects (MF/Other)**	352,337	352,547	-210	-0.1%
Other Subtotal	1,781,888	1,670,706	111,182	6.2%
Other Subtotal w/o MR	1,670,496	1,670,706	-210	0.0%
Low Income Housing Tax Credits (LIHTC)	945,347	945,347	0	0.0%
Site-Based Subtotal	4,009,334	3,897,722	111,612	2.8%
Vouchers (VO)****	1,817,360	1,497,037	320,323	17.6%
TOTAL	5,826,694	5,394,759	431,935	7.4%

*Downloadable Database has census tracts geocoded for aggregation by program type. The query function does not allow for this level of detail and so it is necessary to use the downloaded database for part of the analysis in this study.

**Public Housing and Multifamily/Other will be analyzed using either the query data or downloaded databases because the differences are not significant.

**Moderate Rehab (MR) units (111,392) are not available in the downloadable database at the census tract level so these units will be excluded from further analysis of "Other".

****Vouchers: The query identifies 1,817,360 total voucher units. The database only includes the number reported (1,497,040) which are geocoded for census tract aggregation. The remaining 320,320 units are allocated but not occupied.

Source: HUD, *A Picture of Subsidized Housing* 2000

APPENDIX A.2
"Total Units" and "Reported Units" in on-line Query 2000

	Total Units (Query)	Number Reported	Difference	% Difference
Public Housing (PH)	1,282,099	1,056,174	225,925	17.6%
Moderate Rehab (MR)	111,392	57,367	54,025	48.5%
Section 236 Projects (S. 236)	440,329	276,799	163,530	37.1%
Section 8 Projects (S8 NC/SR)	877,830	724,129	153,701	17.5%
Multifamily Other Projects (MF/Other)	352,337	291,997	60,340	17.1%
Other Site-Based Subtotal*	1,781,888	1,350,292	431,596	24.2%
Low Income Housing Tax Credits (LIHTC)*	945,347	0	945,347	100.0%
Site-Based Subtotal	4,009,334	2,406,466	1,602,868	40.0%
Vouchers (VO)**	1,817,360	1,497,037	320,323	17.6%
TOTAL	5,826,694	3,903,503	1,923,191	33.0%

*100% of LIHTC units and some portion of other types are missing resident data. Since this is a geographic study the lack of resident data does not preclude using these units.
**Vouchers: The query identifies 1,817,360 total voucher units. The database only includes the number reported (1,497,040) which are geocoded for census tract aggregation. The remaining 320,320 units need to be considered missing in addition to any other missing data in the database itself (such as units reported but missing geographic data).
Source: HUD, *A Picture of Subsidized Housing* 2000

APPENDIX A.3
Exclusions from Further Analysis 2000

	# Units from Query	# Units Excluded	Net Units
Public Housing (PH)	1,282,099	61,929	1,220,170
Moderate Rehab (MR)**	111,392	111,392	0
Section 236 Projects (S. 236)***	440,329	11,926	428,403
Section 8 Projects (S8 NC/SR)***	877,830	22,863	854,967
Multifamily Other Projects (MF/Other)***	352,337	5,972	346,365
Other Subtotal	1,781,888	152,153	1,629,735
Low Income Housing Tax Credits (LIHTC)*** and ****	945,347	7,631	937,716
Site-Based Subtotal	4,009,334	221,713	3,787,621
Vouchers (VO)****	1,817,360	397,052	1,472,715
TOTAL	5,826,694	618,765	5,260,336

*Puerto Rico and U.S. Islands are excluded from further analysis.
**Moderate Rehab (MR) units (111,392) are not available in the downloadable database at the census tract level so these units are excluded from further analysis.
***Units in projects with both LIHTC and "Other Site-Based" have been unduplicated and excluded from further analysis
****Although there is duplication between LIHTC and Vouchers, sufficient data does not exist to make an estimate.
Source: HUD, *A Picture of Subsidized Housing* 2000

APPENDIX A.4
Missing Data

	Public Housing	Section 236	Section 8 Site Based	Multi-Family	Other Subtotal *	LIHTC	Site-Based Subtotal **	Vouchers	Total
Known Census Tracts									
# Projects	13,478	3,192	12,739	5,206	21,137	17,434	52,049	NA	NA
# Units	1,188,312	383,309	808,739	309,794	1,501,842	873,697	3,563,851	1,390,466	4,954,317
Ave. # Units per Project	88.2	120.1	63.5	59.5	71.1	50.1	68.5	NA	NA
Unknown Census Tracts									
# Projects	366	193	1,122	615	1,930	1,597	3,893	NA	NA
# Units	31,858	20,930	45,958	27,726	94,614	53,352	179,824	82,249***	262,073
Ave. # Units per Project	87.0	108.4	41.0	45.1	49.0	33.4	46.2	NA	NA
Percent Unknown Projects	2.6%	5.7%	8.1%	10.6%	8.4%	8.4%	7.0%	NA	NA
Percent Unknown Units	2.6%	5.2%	5.4%	8.2%	5.9%	5.8%	4.8%	5.6%	5.0%
All Census Tracts									
# Projects	13,844	3,385	13,861	5,821	23,067	19,031	55,942	NA	NA
# Units	1,220,170	404,239	854,697	337,520	1,596,456	927,049	3,743,675	1,472,715	5,216,390
Ave. # Units per Project	88.1	119.4	61.7	58.0	69.2	48.7	66.9	NA	NA

Excluding PR, VI and other Islands
*Other Subtotal: MR/S236/S8
**Site-Based Subtotal: PH/OS/LI
*** An additional 314,803 vouchers are allocated but not occupied, not included here because not missing census tract
HUD, *A Picture of Subsidized Housing 2000*

APPENDIX A.5

Missing Vouchers by State 2000

State	State Name	Missing Census Tract ID	Total Vouchers	Percent Missing
AL	Alabama	1,938	19,742	9.8%
AK	Alaska	159	2,919	5.4%
AZ	Arizona	432	16,268	2.7%
AR	Arkansas	1,671	18,702	8.9%
CA	California	4,400	214,874	2.0%
CO	Colorado	1,026	21,352	4.8%
CT	Connecticut	625	19,749	3.2%
DE	Delaware	117	2,614	4.5%
DC	District of Columbia	73	5,339	1.4%
FL	Florida	2,838	64,024	4.4%
GA	Georgia	2,397	36,371	6.6%
HI	Hawaii	2,559	8,488	30.1%
ID	Idaho	286	5,520	5.2%
IL	Illinois	3,649	58,531	6.2%
IN	Indiana	1,008	25,654	3.9%
IA	Iowa	705	17,686	4.0%
KS	Kansas	294	7,897	3.7%
KY	Kentucky	2,215	26,486	8.4%
LA	Louisiana	1,175	25,452	4.6%
ME	Maine	996	9,547	10.4%
MD	Maryland	1,339	25,135	5.3%
MA	Massachusetts	1,666	52,549	3.2%
MI	Michigan	909	31,527	2.9%
MN	Minnesota	986	23,544	4.2%
MS	Mississippi	1,156	14,691	7.9%
MO	Missouri	1,511	28,975	5.2%
MT	Montana	386	4,358	8.9%
NE	Nebraska	189	7,214	2.6%
NV	Nevada	284	8,687	3.3%
NH	New Hampshire	460	6,911	6.7%
NJ	New Jersey	2,620	43,106	6.1%
NM	New Mexico	1,289	10,869	11.9%
NY	New York	13,648	149,522	9.1%
NC	North Carolina	4,157	38,740	10.7%
ND	North Dakota	323	5,817	5.6%
OH	Ohio	2,213	61,121	3.6%
OK	Oklahoma	736	17,347	4.2%
OR	Oregon	1,341	25,128	5.3%
PA	Pennsylvania	3,985	54,213	7.4%
RI	Rhode Island	112	6,280	1.8%
SC	South Carolina	1,173	17,905	6.6%
SD	South Dakota	116	4,277	2.7%
TN	Tennessee	928	22,472	4.1%
TX	Texas	5,325	100,673	5.3%
UT	Utah	392	7,718	5.1%
VT	Vermont	317	4,924	6.4%
VA	Virginia	2,629	29,706	8.9%
WA	Washington	1,340	28,247	4.7%
WV	West Virginia	1,301	11,725	11.1%
WI	Wisconsin	801	20,275	4.0%
WY	Wyoming	54	1,844	2.9%
	US Total	397,052	1,787,518	22.2%
	Allocated but Not Occupied	314,803	314,803	100.0%
	Missing Census Tract	82,249	1,472,715	5.6%

Source: HUD, *A Picture of Subsidized Housing* 2000, (PR, VI and other Islands excluded)

APPENDIX A.6
Subsidized Housing Unit Characteristics

Federal Subsidized Housing 2000	Public Housing*	Other Site-Based**	LIHTC	Vouchers	Total
Housing Units					
Total Housing Units	1,373,378	1,741,989	332,085	1,391,526	4,838,978
Percent of Units by Type	29%	35%	7%	29%	100%
Persons					
Total Persons in Households	3,433,445	3,309,779	730,587	3,757,120	11,230,931
Percent of Persons by Type	31%	29%	7%	33%	100%
Average Persons Per Household	2.5	1.9	2.2	2.7	2.3
Income					
Average Household Income	$9,500	$9,700	$13,300	$9,600	$9,500
Percent More Than $20,000/yr.	7%	15%	17%	6%	6%
Household Head Age					
Percent Less than Age 62	69%	56%	NA	83%	68%
Percent Age 62 and Above	31%	44%	NA	17%	32%
Household Type					
Percent No Spouse with Children	39%	30%	NA	56%	41%
Race/Ethnicity					
Percent Minority	70%	49%	47%	58%	58%
Percent Black	45%	33%	33%	40%	39%
Percent Hispanic	18%	12%	11%	15%	15%
Unit Size					
0-1 Bedrooms	48%	56%	44%	25%	44%
2 Bedrooms	29%	15%	42%	41%	32%
3 or More Bedrooms	23%	30%	14%	34%	24%
Size of Projects					
1-49 units	54%	46%	83%	NA	55%
50-99 units	23%	28%	10%	NA	23%
100-199 units	15%	20%	5%	NA	16%
200-499 units	7%	5%	2%	NA	5%
Over 500 units	2%	<1%	<1%	NA	<1%
Units in Projects by Size of Projects					
1-49 units	15%	16%	4%	NA	18%
50-99 units	18%	27%	19%	NA	23%
100-199 units	23%	38%	22%	NA	30%
200-499 units	23%	18%	14%	NA	20%
Over 500 units	20%	2%	2%	NA	9%

* Public Housing includes Public Housing and Indian Housing.
**Other Site-Based includes S8NC/SR, S236, Moderate Rehab, and Multi-Family/Other
Source: HUD, A Picture of Subsidized Housing 2000 Report (last revised 9/15/08, retrieved from www.hud.gov 9/10/09)

APPENDIX A.7
Unduplication of Subsidized Housing Units 2000

Type of Subsidized Housing	Number Units	Percent of Total	Unduplicated*	Percent of Total	Duplicates Removed	Percent Reduction
Public Housing	1,220,170	23.2%	1,220,170	23.4%		0.0%
S 236	428,403	8.1%	404,239	7.7%	(24,164)	-5.6%
S 8 Site-Based	854,967	16.3%	854,697	16.4%	(270)	0.0%
Multi-Family	346,365	6.6%	337,520	6.5%	(8,845)	-2.6%
Other Site Based Subtotal	1,629,735	31.0%	1,596,456	30.6%	(33,279)	-2.0%
LIHTC	937,716	17.8%	927,049	17.8%	(10,667)	-1.1%
Vouchers (Net)**	1,472,715	28.0%	1,472,715	28.2%		0.0%
Total	5,260,336	100.0%	5,216,390	100.0%	(43,946)	-0.8%

APPENDIX A.8
Subsidized Housing Units by Type by State 2000

State	State Name	Vouchers	Public Housing	Other Site Based	LIHTC	Total
AL	Alabama	44,832	22725	11,763	19,742	99,062
AK	Alaska	1,371	2352	1,314	2,919	7,956
AZ	Arizona	7,027	11366	12,105	16,268	46,766
AR	Arkansas	15,307	15011	8,569	18,702	57,589
CA	California	45,323	143074	86,246	214,874	489,517
CO	Colorado	9,175	20530	12,537	21,352	63,594
CT	Connecticut	17,817	36054	8,319	19,749	81,939
DE	Delaware	3,168	5565	3,502	2,614	14,849
DC	District of Columbia	10,599	13288	3,776	5,339	33,002
FL	Florida	44,133	59644	60,817	64,024	228,618
GA	Georgia	52,473	36175	28,676	36,371	153,695
HI	Hawaii	5,628	6497	1,937	8,488	22,550
ID	Idaho	831	4760	4,847	5,520	15,958
IL	Illinois	75,509	73014	32,076	58,531	239,130
IN	Indiana	17,895	44978	23,549	25,654	112,076
IA	Iowa	4,742	16838	11,970	17,686	51,236
KS	Kansas	9,463	15971	13,833	7,897	47,164
KY	Kentucky	24,782	28656	9,212	26,486	89,136
LA	Louisiana	32,666	21763	20,851	25,452	100,732
ME	Maine	4,144	10057	4,858	9,547	28,606
MD	Maryland	24,278	40967	22,740	25,135	113,120
MA	Massachusetts	34,189	74601	27,507	52,549	188,846
MI	Michigan	25,927	74897	41,889	31,527	174,240
MN	Minnesota	21,504	39683	15,048	23,544	99,779
MS	Mississippi	15,746	19417	13,737	14,691	63,591
MO	Missouri	20,071	35331	28,022	28,975	112,399
MT	Montana	2,096	6015	2,514	4,358	14,983
NE	Nebraska	7,465	8728	7,585	7,214	30,992
NV	Nevada	4,917	4915	6,904	8,687	25,423
NH	New Hampshire	4,331	7634	3,249	6,911	22,125
NJ	New Jersey	43,139	54640	11,057	43,106	151,942
NM	New Mexico	4,864	6751	7,047	10,869	29,531
NY	New York	196,793	161382	37,771	149,522	545,468
NC	North Carolina	39,739	31774	25,498	38,740	135,751
ND	North Dakota	1,898	4248	2,664	5,817	14,627
OH	Ohio	54,410	90615	49,238	61,121	255,384
OK	Oklahoma	13,225	14850	15,077	17,347	60,499
OR	Oregon	6,244	12779	17,780	25,128	61,931
PA	Pennsylvania	76,659	74475	25,650	54,213	230,997
RI	Rhode Island	10,095	18007	3,636	6,280	38,018
SC	South Carolina	16,727	22390	12,322	17,905	69,344
SD	South Dakota	1,777	6280	3,733	4,277	16,067
TN	Tennessee	41,630	37937	19,364	22,472	121,403
TX	Texas	60,610	69804	75,984	100,673	307,071
UT	Utah	2,265	4554	6,003	7,718	20,540
VT	Vermont	1,834	3870	3,917	4,924	14,545
VA	Virginia	22,145	40306	38,096	29,706	130,253
WA	Washington	16,790	21628	26,214	28,247	92,879
WV	West Virginia	7,251	12190	4,482	11,725	35,648
WI	Wisconsin	13,880	36984	20,775	20,275	91,914
WY	Wyoming	786	2670	1,456	1,844	6,756
XX	State Unknown	-	1095	-	314,803	315,898
	U.S. Total	1,220,170	1,628,640	937,716	1,472,715	5,259,241

Source: HUD, *A Picture of Subsidized Housing* 2000

APPENDIX A.9

Demographics by Cluster 2000

Cluster - Concentration	Percent Black	Percent Hispanic	Percent Children	Percent Elderly
Cluster 1: Voucher/No Subsidized Units - Very Low	0.10	0.11	0.25	0.13
Cluster 2: Voucher - Low	0.20	0.16	0.27	0.12
Cluster 3: Voucher - Moderate	0.34	0.22	0.29	0.10
Cluster 4: Public Housing - Moderate	0.22	0.14	0.25	0.14
Cluster 5: Other Site Based - Moderate	0.19	0.13	0.24	0.14
Cluster 6: LIHTC - Moderate	0.19	0.14	0.26	0.11
Cluster 7: Other Site Based - High	0.31	0.16	0.26	0.14
Cluster 8: LIHTC/Voucher - High	0.31	0.21	0.28	0.10
Cluster 9: Public Housing/Other Site Based - Very High	0.48	0.18	0.28	0.13
All Census Tracts	0.14	0.13	0.25	0.13

APPENDIX A.9

Demographics by Cluster 2000 (cont.)

Cluster - Concentration	Percent Foreign Born	Less Than H.S. Diploma	Unemployment Rate	Public Assistance
Cluster 1: Voucher/No Subsidized Units - Very Low	0.11	0.16	0.05	0.06
Cluster 2: Voucher - Low	0.13	0.24	0.08	0.11
Cluster 3: Voucher - Moderate	0.17	0.30	0.10	0.16
Cluster 4: Public Housing - Moderate	0.11	0.27	0.08	0.12
Cluster 5: Other Site Based - Moderate	0.12	0.22	0.07	0.11
Cluster 6: LIHTC - Moderate	0.11	0.22	0.07	0.09
Cluster 7: Other Site Based - High	0.13	0.29	0.10	0.15
Cluster 8: LIHTC/Voucher - High	0.16	0.27	0.09	0.14
Cluster 9: Public Housing/Other Site Based - Very High	0.15	0.36	0.15	0.24
All Census Tracts	0.12	0.19	0.06	0.08

APPENDIX A.9
Demographics by Cluster 2000 (cont.)

Cluster - Concentration	Percent Rent Occupied	Median Rent	Percent Housing Units Built 1939 or Earlier	Density Units Per Square Mile
Cluster 1: Voucher/No Subsidized Units - Very Low	.28	749	0.14	2,128
Cluster 2: Voucher - Low	.42	614	0.20	2,903
Cluster 3: Voucher - Medium	.56	603	0.23	4,776
Cluster 4: Public Housing - Medium	.45	540	0.23	2,639
Cluster 5: Other Site Based - Medium	.46	576	0.18	2,773
Cluster 6: LIHTC - Medium	.42	623	0.14	2,116
Cluster 7: Other Site Based - High	.57	518	0.22	3,927
Cluster 8: LIHTC/Voucher - High	.59	609	0.14	4,866
Cluster 9: Public Housing/Other Site Based - Very High	.75	436	0.23	10,035
All Census Tracts	.36	694	0.14	3,026

APPENDIX A.10
Subsidized Housing Units by Type by MSA 2000

MSA FIPS	MSA Name	Population	Vouchers	Public Housing	Other Site Based (MF/S236/S8)	LIHTC	Total
40	Abilene, TX MSA	125,062	539	237	420	484	1,680
80	Akron, OH PMSA	694,960	3,548	5,157	6,190	2,269	17,164
120	Albany, GA MSA	120,822	1,553	997	492	598	3,640
160	Albany-Schenectady-Troy, NY MSA	874,183	5,734	4,819	5,245	1,336	17,134
200	Albuquerque, NM MSA	712,738	4,650	1,081	2,500	2,663	10,894
220	Alexandria, LA MSA	126,337	821	1,084	577	391	2,873
240	Allentown-Bethlehem-Easton, PA MSA	637,958	3,631	4,023	3,175	1,540	12,369
280	Altoona, PA MSA	129,144	972	643	1,123	481	3,219
320	Amarillo, TX MSA	217,858	1,578	44	543	454	2,619
380	Anchorage, AK MSA	260,283	1,662	588	804	550	3,604
440	Ann Arbor, MI PMSA	578,736	1,776	382	4,677	2,680	9,515
450	Anniston, AL MSA	112,249	345	1,194	347	42	1,928
460	Appleton-Oshkosh-Neenah, WI MSA	358,365	714	844	1,550	1,213	4,321
480	Asheville, NC MSA	225,965	994	1,709	1,175	439	4,317
500	Athens, GA MSA	153,444	687	1,347	905	201	3,140
520	Atlanta, GA MSA	4,112,198	18,485	15,077	16,173	14,881	64,616
560	Atlantic-Cape May, NJ PMSA	354,878	1,521	2,324	2,762	318	6,925
580	Auburn-Opelika, AL MSA	115,092	522	895	305	200	1,922
600	Augusta-Aiken, GA-SC MSA	477,441	2,474	3,487	2,215	891	9,067
640	Austin-San Marcos, TX MSA	1,247,329	2,991	3,138	3,128	4,654	13,911
680	Bakersfield, CA MSA	651,083	2,623	1,022	1,477	2,287	7,409
720	Baltimore, MD PMSA	2,543,268	13,222	14,639	20,783	9,506	58,150
730	Bangor, ME MSA	83,033	647	807	905	126	2,485
740	Barnstable-Yarmouth, MA MSA	162,571	1,083	69	596	177	1,925
760	Baton Rouge, LA MSA	602,894	1,810	1,538	1,852	3,963	9,163
840	Beaumont-Port Arthur, TX MSA	380,080	2,959	1,494	2,682	660	7,795
860	Bellingham, WA MSA	166,814	924	591	267	1,286	3,068
870	Benton Harbor, MI MSA	162,453	396	957	1,104	544	3,001
875	Bergen-Passaic, NJ PMSA	1,372,791	8,031	4,425	4,430	479	17,365
880	Billings, MT MSA	129,352	819	274	1,082	247	2,422
920	Biloxi-Gulfport-Pascagoula, MS MSA	363,988	2,326	2,506	1,768	587	7,187

MSA FIPS	MSA Name	Population	Vouchers	Public Housing	Other Site Based (MF/S236/S8)	LIHTC	Total
960	Binghamton, NY MSA	252,320	987	641	894	74	2,596
1000	Birmingham, AL MSA	921,106	3,961	8,524	4,140	1,989	18,614
1010	Bismarck, ND MSA	94,719	1,407	325	430	493	2,655
1020	Bloomington, IN MSA	120,563	1,053	312	685	934	2,984
1040	Bloomington-Normal, IL MSA	150,433	400	640	774	993	2,807
1080	Boise City, ID MSA	432,345	2,184	324	1,224	1,787	5,519
1120	Boston, MA-NH PMSA	3,405,347	27,586	17,641	37,480	14,780	97,487
1125	Boulder-Longmont, CO PMSA	291,288	1,785	462	920	946	4,113
1145	Brazoria, TX PMSA	241,767	477	-	566	450	1,493
1150	Bremerton, WA PMSA	231,969	1,268	739	837	502	3,346
1160	Bridgeport, CT PMSA	459,479	2,961	3,069	2,283	706	9,019
1200	Brockton, MA PMSA	253,210	1,735	1,261	278	449	3,723
1240	Brownsville-Harlingen-San Benito, TX MSA	335,227	2,849	2,487	1,168	533	7,037
1260	Bryan-College Station, TX MSA	152,415	1,432	300	438	652	2,822
1280	Buffalo-Niagara Falls, NY MSA	1,162,903	8,919	5,981	7,227	1,337	23,464
1305	Burlington, VT MSA	170,570	1,903	584	1,251	1,724	5,462
1320	Canton-Massillon, OH MSA	406,934	1,112	2,468	2,080	326	5,986
1350	Casper, WY MSA	66,533	496	75	411	355	1,337
1360	Cedar Rapids, IA MSA	191,701	886	-	1,090	968	2,944
1400	Champaign-Urbana, IL MSA	179,669	941	606	835	278	2,660
1440	Charleston-North Charleston, SC MSA	549,033	3,387	2,538	2,909	1,191	10,025
1480	Charleston, WV MSA	251,662	2,081	1,745	1,900	191	5,917
1520	Charlotte-Gastonia-Rock Hill, NC-SC MSA	1,499,293	5,200	5,918	4,006	4,632	19,756
1540	Charlottesville, VA MSA	159,576	747	376	377	750	2,250
1560	Chattanooga, TN-GA MSA	465,161	1,585	4,298	2,477	563	8,923
1580	Cheyenne, WY MSA	81,607	733	266	309	485	1,793
1600	Chicago, IL PMSA	8,272,255	40,954	32,094	45,508	21,656	140,212
1620	Chico-Paradise, CA MSA	203,171	1,425	335	812	445	3,017
1640	Cincinnati, OH-KY-IN PMSA	1,645,474	10,745	8,346	14,746	5,529	39,366
1660	Clarksville-Hopkinsville, TN-KY MSA	207,033	955	969	782	234	2,940
1680	Cleveland-Lorain-Elyria, OH PMSA	2,250,287	13,934	10,935	17,648	6,565	49,082
1720	Colorado Springs, CO MSA	516,929	2,147	747	1,194	649	4,737
1740	Columbia, MO MSA	135,454	977	721	323	346	2,367
1760	Columbia, SC MSA	531,912	2,883	1,697	3,236	2,287	10,103
1800	Columbus, GA-AL MSA	272,985	1,754	3,155	1,148	481	6,538

MSA FIPS	MSA Name	Population	Vouchers	Public Housing	Other Site Based (MF/S236/S8)	LIHTC	Total
1840	Columbus, OH MSA	1,540,157	7,902	3,553	13,544	10,408	35,407
1880	Corpus Christi, TX MSA	380,783	1,019	2,614	2,406	368	6,407
1890	Corvallis, OR MSA	78,153	551	-	169	50	770
1900	Cumberland, MD-WV MSA	102,008	647	801	728	344	2,520
1920	Dallas, TX PMSA	3,519,176	17,490	4,363	12,464	23,529	57,846
1930	Danbury, CT PMSA	217,980	337	417	932	95	1,781
1950	Danville, VA MSA	110,156	677	593	1,026	247	2,543
1960	Davenport-Moline-Rock Island, IA-IL MSA	359,062	1,223	2,002	3,374	847	7,446
2000	Dayton-Springfield, OH MSA	950,558	4,619	5,498	7,169	6,100	23,386
2020	Daytona Beach, FL MSA	493,175	1,625	1,599	1,662	1,064	5,950
2030	Decatur, AL MSA	145,867	536	1,090	737	453	2,816
2040	Decatur, IL MSA	114,706	817	842	1,009	322	2,990
2080	Denver, CO PMSA	2,106,735	9,655	4,598	11,113	6,516	31,882
2120	Des Moines, IA MSA	456,022	2,511	977	2,413	3,438	9,339
2160	Detroit, MI PMSA	4,439,627	14,033	9,593	35,215	15,608	74,449
2180	Dothan, AL MSA	137,916	891	1,345	684	178	3,098
2190	Dover, DE MSA	126,697	317	636	786	545	2,284
2200	Dubuque, IA MSA	89,143	966	43	541	169	1,719
2240	Duluth-Superior, MN-WI MSA	243,815	1,519	2,660	3,431	771	8,381
2281	Dutchess County, NY PMSA	280,150	1,271	605	1,082	238	3,196
2290	Eau Claire, WI MSA	148,337	828	218	1,055	610	2,711
2320	El Paso, TX MSA	679,622	3,880	5,846	2,232	1,333	13,291
2330	Elkhart-Goshen, IN MSA	182,791	792	672	1,079	279	2,822
2335	Elmira, NY MSA	91,070	554	499	660	30	1,743
2340	Enid, OK MSA	57,813	164	-	279	64	507
2360	Erie, PA MSA	280,843	938	1,901	2,122	558	5,519
2400	Eugene-Springfield, OR MSA	322,959	2,255	708	1,431	898	5,292
2440	Evansville-Henderson, IN-KY MSA	296,195	2,337	1,540	2,340	1,102	7,319
2520	Fargo-Moorhead, ND-MN MSA	174,367	1,289	1,089	842	979	4,199
2560	Fayetteville, NC MSA	302,963	1,344	1,045	868	208	3,465
2580	Fayetteville-Springdale-Rogers, AR MSA	311,121	949	483	1,152	2,044	4,628
2600	Fitchburg-Leominster, MA PMSA	140,448	709	226	1,309	668	2,912
2620	Flagstaff, AZ-UT MSA	122,366	334	30	118	452	934
2640	Flint, MI PMSA	436,141	1,280	1,239	2,823	3,565	8,907
2650	Florence, AL MSA	142,950	846	1,318	917	191	3,272

MSA FIPS	MSA Name	Population	Vouchers	Public Housing	Other Site Based (MF/S236/S8)	LIHTC	Total
2655	Florence, SC MSA	125,761	619	1,122	363	160	2,264
2670	Fort Collins-Loveland, CO MSA	251,494	1,221	276	789	1,326	3,612
2680	Fort Lauderdale, FL PMSA	1,623,018	6,269	2,087	2,681	2,750	13,787
2700	Fort Myers-Cape Coral, FL MSA	440,888	1,399	1,063	1,352	1,561	5,375
2710	Fort Pierce-Port St. Lucie, FL MSA	319,426	783	899	350	1,268	3,300
2720	Fort Smith, AR-OK MSA	207,290	1,428	778	1,112	923	4,241
2750	Fort Walton Beach, FL MSA	170,498	503	558	143	136	1,340
2760	Fort Wayne, IN MSA	501,733	1,495	703	3,275	1,000	6,473
2800	Fort Worth-Arlington, TX PMSA	1,702,625	6,980	1,770	3,728	9,161	21,639
2840	Fresno, CA MSA	921,646	8,191	2,355	3,521	4,815	18,882
2880	Gadsden, AL MSA	103,459	138	1,204	715	200	2,257
2900	Gainesville, FL MSA	217,955	1,110	911	1,490	842	4,353
2920	Galveston-Texas City, TX PMSA	250,158	1,409	1,325	624	1,203	4,561
2960	Gary, IN PMSA	631,362	2,313	3,543	4,428	3,081	13,365
2975	Glens Falls, NY MSA	124,345	656	175	502	217	1,550
2980	Goldsboro, NC MSA	113,329	189	1,421	713	138	2,461
2985	Grand Forks, ND-MN MSA	97,478	1,406	199	1,016	488	3,109
2995	Grand Junction, CO MSA	116,255	778	30	927	90	1,825
3000	Grand Rapids-Muskegon-Holland, MI MSA	1,088,514	3,687	1,245	6,070	3,403	14,405
3040	Great Falls, MT MSA	80,357	588	490	873	188	2,139
3060	Greeley, CO PMSA	178,717	849	176	1,043	275	2,343
3080	Green Bay, WI MSA	224,842	1,799	324	1,180	388	3,691
3120	Greensboro--Winston-Salem--High Point, N	1,251,509	6,194	7,160	5,871	3,471	22,696
3150	Greenville, NC MSA	133,798	831	1,063	541	262	2,697
3160	Greenville-Spartanburg-Anderson, SC MSA	962,441	3,742	3,839	5,460	2,617	15,658
3180	Hagerstown, MD PMSA	125,071	958	1,260	641	195	3,054
3200	Hamilton-Middletown, OH PMSA	332,807	1,641	1,298	1,636	1,459	6,034
3240	Harrisburg-Lebanon-Carlisle, PA MSA	629,401	2,102	3,180	4,022	1,508	10,812
3280	Hartford, CT MSA	1,182,888	8,619	5,245	12,877	2,440	29,181
3285	Hattiesburg, MS MSA	111,674	828	386	648	267	2,129
3290	Hickory-Morganton-Lenoir, NC MSA	341,851	980	840	897	579	3,296
3320	Honolulu, HI MSA	876,132	3,754	4,181	4,835	1,048	13,818
3350	Houma, LA MSA	194,477	718	1,164	23	431	2,336
3360	Houston, TX PMSA	4,175,473	12,702	3,335	10,746	16,041	42,824
3400	Huntington-Ashland, WV-KY-OH MSA	315,538	2,107	1,777	2,140	534	6,558

MSA FIPS	MSA Name	Population	Vouchers	Public Housing	Other Site Based (MF/S236/S8)	LIHTC	Total
3440	Huntsville, AL MSA	342,376	737	1,867	1,369	897	4,870
3480	Indianapolis, IN MSA	1,607,486	6,085	2,102	11,336	7,750	27,273
3500	Iowa City, IA MSA	111,006	1,066	121	675	326	2,188
3520	Jackson, MI MSA	155,428	590	553	1,029	517	2,689
3560	Jackson, MS MSA	440,801	3,523	756	4,016	3,418	11,713
3580	Jackson, TN MSA	107,377	814	1,027	810	397	3,048
3600	Jacksonville, FL MSA	1,100,491	5,672	2,922	7,832	5,302	21,728
3605	Jacksonville, NC MSA	150,355	338	21	400	779	1,538
3610	Jamestown, NY MSA	139,750	778	450	880	98	2,206
3620	Janesville-Beloit, WI MSA	152,307	940	235	866	769	2,810
3640	Jersey City, NJ PMSA	608,975	5,933	8,953	6,750	577	22,213
3660	Johnson City-Kingsport-Bristol, TN-VA MS	480,091	1,803	2,861	3,043	751	8,458
3680	Johnstown, PA MSA	232,621	544	1,868	1,316	256	3,984
3700	Jonesboro, AR MSA	82,148	1,194	290	570	264	2,318
3710	Joplin, MO MSA	157,322	705	462	811	1,320	3,298
3720	Kalamazoo-Battle Creek, MI MSA	452,851	1,112	932	4,037	2,543	8,624
3740	Kankakee, IL PMSA	103,833	505	326	467	203	1,501
3760	Kansas City, MO-KS MSA	1,775,751	8,846	4,718	15,873	12,321	41,758
3800	Kenosha, WI PMSA	149,577	934	-	1,182	690	2,806
3810	Killeen-Temple, TX MSA	312,952	1,945	916	576	768	4,205
3840	Knoxville, TN MSA	687,017	3,505	5,112	4,811	839	14,267
3850	Kokomo, IN MSA	101,541	554	560	621	421	2,156
3870	La Crosse, WI-MN MSA	126,838	217	735	662	374	1,988
3880	Lafayette, LA MSA	385,647	2,166	2,742	1,740	1,492	8,140
3920	Lafayette, IN MSA	176,004	844	-	2,043	662	3,549
3960	Lake Charles, LA MSA	183,577	1,725	1,201	867	464	4,257
3980	Lakeland-Winter Haven, FL MSA	483,924	1,286	1,327	1,879	829	5,321
4000	Lancaster, PA MSA	470,658	1,397	564	1,595	847	4,403
4040	Lansing-East Lansing, MI MSA	447,728	1,268	1,022	3,534	1,770	7,594
4080	Laredo, TX MSA	193,117	1,159	962	602	127	2,850
4100	Las Cruces, NM MSA	174,682	611	415	633	445	2,104
4120	Las Vegas, NV-AZ MSA	1,563,282	6,211	3,251	2,699	5,563	17,724
4150	Lawrence, KS MSA	99,962	429	369	436	398	1,632
4160	Lawrence, MA-NH PMSA	396,230	2,506	1,341	3,685	1,298	8,830
4200	Lawton, OK MSA	114,996	957	387	454	16	1,814

MSA FIPS	MSA Name	Population	Vouchers	Public Housing	Other Site Based (MF/S236/S8)	LIHTC	Total
4240	Lewiston-Auburn, ME MSA	93,078	1,269	638	1,419	340	3,666
4280	Lexington, KY MSA	478,755	3,628	3,040	3,387	813	10,868
4320	Lima, OH MSA	155,084	629	257	1,389	814	3,089
4360	Lincoln, NE MSA	249,829	897	320	1,200	1,206	3,623
4400	Little Rock-North Little Rock, AR MSA	583,845	3,698	2,575	4,167	1,551	11,991
4420	Longview-Marshall, TX MSA	208,780	1,038	356	1,282	286	2,962
4480	Los Angeles-Long Beach, CA PMSA	9,512,635	61,909	10,011	44,749	17,889	134,558
4520	Louisville, KY-IN MSA	1,025,598	8,144	6,380	7,736	2,650	24,910
4560	Lowell, MA-NH PMSA	301,686	1,658	1,732	1,857	1,233	6,480
4600	Lubbock, TX MSA	242,628	656	649	941	530	2,776
4640	Lynchburg, VA MSA	214,911	703	327	1,544	389	2,963
4680	Macon, GA MSA	322,549	2,821	2,931	2,676	696	9,124
4720	Madison, WI MSA	426,526	1,540	881	2,316	2,785	7,522
4760	Manchester, NH PMSA	198,378	1,583	1,169	820	769	4,341
4800	Mansfield, OH MSA	175,818	1,466	-	1,201	485	3,152
4880	McAllen-Edinburg-Mission, TX MSA	569,463	3,197	2,217	1,623	673	7,710
4890	Medford-Ashland, OR MSA	181,269	1,140	130	920	746	2,936
4900	Melbourne-Titusville-Palm Bay, FL MSA	476,230	994	1,483	1,486	728	4,691
4920	Memphis, TN-AR-MS MSA	1,135,614	4,771	5,726	9,684	5,398	25,579
4940	Merced, CA MSA	210,554	1,610	544	444	796	3,394
5000	Miami, FL PMSA	2,252,979	13,308	11,314	11,620	10,698	46,940
5015	Middlesex-Somerset-Hunterdon, NJ PMSA	1,169,641	3,610	2,253	3,153	932	9,948
5080	Milwaukee-Waukesha, WI PMSA	1,499,979	6,907	4,899	12,211	4,802	28,819
5120	Minneapolis-St. Paul, MN-WI MSA	2,966,620	14,191	11,179	20,528	8,799	54,697
5140	Missoula, MT MSA	95,802	716	210	484	598	2,008
5160	Mobile, AL MSA	540,258	3,176	4,107	3,232	725	11,240
5170	Modesto, CA MSA	446,997	2,981	737	1,146	860	5,724
5190	Monmouth-Ocean, NJ PMSA	1,126,200	5,852	2,632	3,621	637	12,742
5200	Monroe, LA MSA	147,250	1,962	1,522	948	1,005	5,437
5240	Montgomery, AL MSA	333,055	1,084	2,996	1,815	966	6,861
5280	Muncie, IN MSA	118,769	812	802	560	353	2,527
5330	Myrtle Beach, SC MSA	196,629	795	332	361	420	1,908
5345	Naples, FL MSA	251,377	393	-	474	2,274	3,141
5350	Nashua, NH PMSA	190,572	931	662	987	561	3,141
5360	Nashville, TN MSA	1,231,311	5,606	6,962	8,273	6,086	26,927

MSA FIPS	MSA Name	Population	Vouchers	Public Housing	Other Site Based (MF/S236/S8)	LIHTC	Total
5380	Nassau-Suffolk, NY PMSA	2,753,724	7,416	4,275	7,218	1,472	20,381
5400	New Bedford, MA PMSA	175,198	1,476	1,512	1,878	517	5,383
5480	New Haven-Meriden, CT PMSA	541,963	4,001	4,142	5,061	2,117	15,321
5520	New London-Norwich, CT-RI MSA	293,566	839	526	2,744	759	4,868
5560	New Orleans, LA MSA	1,337,669	7,689	10,829	6,741	4,627	29,886
5600	New York, NY PMSA	9,297,558	86,157	31,793	99,259	24,225	341,434
5640	Newark, NJ PMSA	2,032,989	9,334	13,217	17,594	2,864	43,009
5660	Newburgh, NY-PA PMSA	387,669	1,738	270	1,448	969	4,425
5720	Norfolk-Virginia Beach-Newport News, VA-	1,569,392	8,747	8,815	9,930	10,636	38,128
5775	Oakland, CA PMSA	2,392,557	23,097	5,833	11,080	7,788	47,798
5790	Ocala, FL MSA	258,916	904	187	910	775	2,776
5800	Odessa-Midland, TX MSA	237,132	1,147	296	796	285	2,524
5880	Oklahoma City, OK MSA	1,083,051	7,967	3,966	2,717	5,362	20,012
5910	Olympia, WA PMSA	207,355	1,339	70	510	1,209	3,128
5920	Omaha, NE-IA MSA	716,998	4,142	3,318	3,243	4,360	15,063
5945	Orange County, CA PMSA	2,846,289	14,690	-	4,722	4,966	24,378
5960	Orlando, FL MSA	1,644,561	4,301	2,224	3,785	15,042	25,352
5990	Owensboro, KY MSA	91,545	513	576	1,048	-	2,137
6015	Panama City, FL MSA	148,217	770	490	812	61	2,133
6020	Parkersburg-Marietta, WV-OH MSA	151,237	866	144	1,400	341	2,751
6080	Pensacola, FL MSA	412,153	2,019	692	1,825	573	5,109
6120	Peoria-Pekin, IL MSA	347,387	1,498	1,595	2,998	847	6,938
6160	Philadelphia, PA-NJ PMSA	5,097,403	18,929	20,781	23,015	8,976	71,701
6200	Phoenix-Mesa, AZ MSA	3,251,591	9,724	4,233	7,309	4,842	26,108
6240	Pine Bluff, AR MSA	84,278	653	284	899	145	1,981
6280	Pittsburgh, PA MSA	2,358,695	11,315	16,477	21,477	3,468	52,737
6320	Pittsfield, MA MSA	83,099	800	341	943	172	2,256
6340	Pocatello, ID MSA	75,565	549	75	433	128	1,185
6400	Portland, ME MSA	243,544	2,492	1,449	2,193	1,516	7,650
6440	Portland-Vancouver, OR-WA PMSA	1,918,009	10,275	4,309	6,642	11,355	32,581
6450	Portsmouth-Rochester, NH-ME PMSA	241,542	1,372	1,437	1,157	898	4,864
6480	Providence-Fall River-Warwick, RI-MA MSA	1,188,613	8,063	10,297	17,587	3,595	39,542
6520	Provo-Orem, UT MSA	367,969	1,316	356	140	611	2,423
6560	Pueblo, CO MSA	139,724	1,353	889	789	405	3,436
6580	Punta Gorda, FL MSA	141,627	92	184	420	220	916

MSA FIPS	MSA Name	Population	Vouchers	Public Housing	Other Site Based (MF/S236/S8)	LIHTC	Total
6600	Racine, WI PMSA	188,831	1,083	22	1,093	552	2,750
6640	Raleigh-Durham-Chapel Hill, NC MSA	1,187,941	4,581	5,026	3,210	6,019	18,836
6660	Rapid City, SD MSA	88,565	974	500	1,029	437	2,940
6680	Reading, PA MSA	373,638	848	1,847	1,327	586	4,608
6690	Redding, CA MSA	163,256	1,873	-	383	352	2,608
6720	Reno, NV MSA	339,486	1,582	764	1,540	1,426	5,312
6740	Richland-Kennewick-Pasco, WA MSA	191,822	1,049	470	573	824	2,916
6760	Richmond-Petersburg, VA MSA	996,512	3,000	4,957	7,802	5,929	21,688
6780	Riverside-San Bernardino, CA PMSA	3,253,357	14,081	2,373	7,053	6,160	29,667
6800	Roanoke, VA MSA	235,543	1,136	1,455	2,018	1,130	5,739
6820	Rochester, MN MSA	124,013	301	110	1,054	402	1,867
6840	Rochester, NY MSA	1,094,746	6,538	3,034	8,996	2,353	20,921
6880	Rockford, IL MSA	371,236	1,687	2,445	1,993	890	7,015
6895	Rocky Mount, NC MSA	143,026	575	911	829	291	2,606
6920	Sacramento, CA PMSA	1,628,197	7,309	3,198	7,532	5,689	23,728
6960	Saginaw-Bay City-Midland, MI MSA	403,070	1,440	1,264	3,183	1,308	7,195
6980	St. Cloud, MN MSA	167,392	564	341	1,087	609	2,601
7000	St. Joseph, MO MSA	102,490	725	180	926	351	2,182
7040	St. Louis, MO-IL MSA	2,603,607	12,902	9,291	14,656	6,788	43,637
7080	Salem, OR PMSA	347,214	3,741	764	861	1,025	6,391
7120	Salinas, CA MSA	401,762	2,146	720	1,179	766	4,811
7160	Salt Lake City-Ogden, UT MSA	1,333,914	4,941	1,609	3,712	3,192	13,454
7200	San Angelo, TX MSA	104,010	491	174	1,012	-	1,677
7240	San Antonio, TX MSA	1,592,383	12,158	5,954	6,111	1,730	25,953
7320	San Diego, CA MSA	2,805,418	18,270	1,447	11,505	4,423	35,645
7360	San Francisco, CA PMSA	1,731,183	6,285	6,137	12,153	4,126	28,701
7400	San Jose, CA PMSA	1,682,585	11,209	555	6,829	6,197	24,790
7460	San Luis Obispo-Atascadero-Paso Robles,	246,681	1,376	320	446	136	2,278
7480	Santa Barbara-Santa Maria-Lompoc, CA MSA	399,347	3,867	999	564	898	6,328
7485	Santa Cruz-Watsonville, CA PMSA	255,602	2,383	234	1,342	605	4,564
7490	Santa Fe, NM MSA	147,635	613	582	518	1,539	3,252
7500	Santa Rosa, CA PMSA	458,614	3,200	-	1,792	2,451	7,443
7510	Sarasota-Bradenton, FL MSA	589,959	1,699	959	1,541	664	4,863
7520	Savannah, GA MSA	293,000	1,023	2,383	2,038	496	5,940
7560	Scranton--Wilkes-Barre--Hazleton, PA MSA	624,776	3,478	6,251	4,851	572	15,152

MSA FIPS	MSA Name	Population	Vouchers	Public Housing	Other Site Based (MF/S236/S8)	LIHTC	Total
7600	Seattle-Bellevue-Everett, WA PMSA	2,414,616	12,171	10,711	7,769	13,155	43,806
7610	Sharon, PA MSA	120,293	206	685	1,246	161	2,298
7620	Sheboygan, WI MSA	112,646	191	290	605	675	1,761
7640	Sherman-Denison, TX MSA	110,595	533	711	473	216	1,933
7680	Shreveport-Bossier City, LA MSA	392,302	2,758	1,652	3,592	1,940	9,942
7720	Sioux City, IA-NE MSA	124,130	1,396	39	1,120	713	3,268
7760	Sioux Falls, SD MSA	172,412	1,284	75	1,147	1,480	3,986
7800	South Bend, IN MSA	265,559	1,644	850	2,686	647	5,827
7840	Spokane, WA MSA	417,939	1,523	125	2,861	1,061	5,570
7880	Springfield, IL MSA	201,437	889	1,191	998	651	3,729
7920	Springfield, MO MSA	325,721	869	821	1,097	2,072	4,859
8000	Springfield, MA MSA	586,593	6,751	2,429	8,161	3,308	20,649
8040	Stamford-Norwalk, CT PMSA	353,556	1,241	2,009	2,316	1,305	6,871
8050	State College, PA MSA	135,758	401	20	395	290	1,106
8080	Steubenville-Weirton, OH-WV MSA	132,008	789	903	1,065	162	2,919
8120	Stockton-Lodi, CA MSA	563,598	3,099	1,081	1,725	1,169	7,074
8140	Sumter, SC MSA	104,646	512	327	710	128	1,677
8160	Syracuse, NY MSA	730,409	5,520	2,586	6,712	840	15,658
8200	Tacoma, WA PMSA	700,820	3,247	1,557	2,048	1,607	8,459
8240	Tallahassee, FL MSA	281,989	1,040	655	1,770	1,023	4,488
8280	Tampa-St. Petersburg-Clearwater, FL MSA	2,395,997	10,345	5,673	10,367	4,729	31,114
8320	Terre Haute, IN MSA	149,192	842	1,169	863	326	3,200
8360	Texarkana, TX-Texarkana, AR MSA	129,749	954	1,346	632	88	3,020
8400	Toledo, OH MSA	618,203	2,664	2,948	5,994	2,461	14,067
8440	Topeka, KS MSA	169,871	729	634	1,637	1,713	4,713
8480	Trenton, NJ PMSA	350,761	1,014	2,165	2,922	1,269	7,370
8520	Tucson, AZ MSA	843,746	3,788	1,590	1,970	2,963	10,311
8560	Tulsa, OK MSA	803,235	3,650	3,116	4,985	3,261	15,012
8600	Tuscaloosa, AL MSA	164,875	772	1,395	1,180	279	3,626
8640	Tyler, TX MSA	174,706	697	-	537	208	1,442
8680	Utica-Rome, NY MSA	299,896	1,780	1,573	2,571	109	6,033
8720	Vallejo-Fairfield-Napa, CA PMSA	515,461	4,526	75	1,767	1,766	8,134
8735	Ventura, CA PMSA	753,197	4,899	1,942	883	1,841	9,565
8750	Victoria, TX MSA	84,088	347	321	195	521	1,384
8760	Vineland-Millville-Bridgeton, NJ PMSA	146,438	1,065	1,589	640	116	3,410

MSA FIPS	MSA Name	Population	Vouchers	Public Housing	Other Site Based (MF/S236/S8)	LIHTC	Total
8780	Visalia-Tulare-Porterville, CA MSA	367,137	1,510	704	588	1,361	4,163
8800	Waco, TX MSA	213,517	1,660	1,066	1,171	560	4,457
8840	Washington, DC-MD-VA-WV PMSA	4,922,060	19,366	14,782	32,020	27,782	93,950
8880	Waterbury, CT PMSA	229,064	934	820	4,257	414	6,425
8920	Waterloo-Cedar Falls, IA MSA	128,012	1,137	91	1,132	217	2,577
8940	Wausau, WI MSA	125,834	273	189	488	368	1,318
8960	West Palm Beach-Boca Raton, FL MSA	1,128,748	4,303	2,326	1,967	4,334	12,930
9000	Wheeling, WV-OH MSA	153,172	596	2,018	1,235	290	4,139
9040	Wichita, KS MSA	545,220	2,024	912	2,361	2,705	8,002
9080	Wichita Falls, TX MSA	140,518	739	774	912	322	2,747
9140	Williamsport, PA MSA	120,044	457	672	469	286	1,884
9160	Wilmington-Newark, DE-MD PMSA	586,216	2,568	1,899	3,697	1,985	10,149
9200	Wilmington, NC MSA	233,450	1,662	1,416	711	897	4,686
9240	Worcester, MA-CT PMSA	508,982	3,000	2,502	6,176	1,960	13,638
9260	Yakima, WA MSA	222,581	425	290	796	832	2,343
9270	Yolo, CA PMSA	168,660	1,237	421	1,104	969	3,731
9280	York, PA MSA	381,751	1,128	1,060	893	799	3,880
9320	Youngstown-Warren, OH MSA	594,746	2,425	3,513	3,608	1,619	11,165
9340	Yuba City, CA MSA	139,149	666	213	733	192	1,804
9360	Yuma, AZ MSA	160,026	1,049	394	248	581	2,272
	Total	225,666,050	1,182,557	772,810	1,254,601	716,915	4,026,883

APPENDIX A.11
Segregation Index (D) by MSA 2000

MSA / PMSA Code	MSA / PMSA Name	Population	Black-Non-Black	Hispanic-Non-Hispanic	Poor-Non-Poor	Subsidized-Non-Subsidized
40	Abilene, TX MSA	125,062	0.3505	0.3778	0.3261	0.6068
80	Akron, OH PMSA	694,960	0.6429	0.3422	0.4221	0.6031
120	Albany, GA MSA	120,822	0.5960	0.3479	0.3971	0.5292
160	Albany-Schenectady-Troy, NY MSA	874,183	0.5979	0.3885	0.3914	0.5691
200	Albuquerque, NM MSA	712,738	0.2843	0.3859	0.3284	0.5054
220	Alexandria, LA MSA	126,337	0.5962	0.3890	0.3120	0.5074
240	Allentown-Bethlehem-Easton, PA MSA	637,958	0.4967	0.6047	0.3945	0.5803
280	Altoona, PA MSA	129,144	0.4567	0.4704	0.2698	0.5725
320	Amarillo, TX MSA	217,858	0.5687	0.4236	0.3286	0.4570
380	Anchorage, AK MSA	260,283	0.3203	0.2041	0.2943	0.4861
440	Ann Arbor, MI PMSA	578,736	0.6052	0.3756	0.5029	0.6910
450	Anniston, AL MSA	112,249	0.4987	0.3171	0.2755	0.6293
460	Appleton-Oshkosh-Neenah, WI MSA	358,365	0.4883	0.3214	0.2887	0.5273
480	Asheville, NC MSA	225,965	0.5650	0.3378	0.2278	0.6205
500	Athens, GA MSA	153,444	0.4437	0.4293	0.3933	0.6338
520	Atlanta, GA MSA	4,112,198	0.6129	0.4618	0.3614	0.6678
560	Atlantic-Cape May, NJ PMSA	354,878	0.5880	0.4423	0.3145	0.6898
580	Auburn-Opelika, AL MSA	115,092	0.3756	0.2447	0.4407	0.5413
600	Augusta-Aiken, GA-SC MSA	477,441	0.4428	0.2613	0.3016	0.5312
640	Austin-San Marcos, TX MSA	1,247,329	0.4146	0.4068	0.4158	0.6783
680	Bakersfield, CA MSA	651,083	0.4165	0.4886	0.3160	0.5335
720	Baltimore, MD PMSA	2,543,268	0.6637	0.3459	0.4380	0.6212
730	Bangor, ME MSA	83,033	0.3985	0.3858	0.3175	0.4529
740	Barnstable-Yarmouth, MA MSA	162,571	0.3852	0.3624	0.2498	0.5100
760	Baton Rouge, LA MSA	602,894	0.6430	0.3162	0.3926	0.6377
840	Beaumont-Port Arthur, TX MSA	380,080	0.6493	0.3856	0.3315	0.5801
860	Bellingham, WA MSA	166,814	0.2952	0.2149	0.2939	0.4214
870	Benton Harbor, MI MSA	162,453	0.7250	0.4102	0.3729	0.6347
875	Bergen-Passaic, NJ PMSA	1,372,791	0.6253	0.5049	0.3916	0.5429
880	Billings, MT MSA	129,352	0.3126	0.2650	0.2720	0.4282

MSA / PMSA Code	MSA / PMSA Name	Population	Black-Non-Black	Hispanic-Non-Hispanic	Poor-Non-Poor	Subsidized-Non-Subsidized
920	Biloxi-Gulfport-Pascagoula, MS MSA	363,988	0.4989	0.2625	0.2295	0.5006
960	Binghamton, NY MSA	252,320	0.4730	0.3604	0.3054	0.5957
1000	Birmingham, AL MSA	921,106	0.6979	0.4507	0.3846	0.6251
1010	Bismarck, ND MSA	94,719	0.2901	0.2556	0.1925	0.3011
1020	Bloomington, IN MSA	120,563	0.2958	0.2891	0.4756	0.5940
1040	Bloomington-Normal, IL MSA	150,433	0.3431	0.2952	0.5095	0.6784
1080	Boise City, ID MSA	432,345	0.3011	0.3916	0.2700	0.4821
1120	Boston, MA-NH PMSA	3,405,347	0.6215	0.5319	0.3864	0.5593
1125	Boulder-Longmont, CO PMSA	291,288	0.2730	0.3789	0.3791	0.4970
1145	Brazoria, TX PMSA	241,767	0.3557	0.2535	0.2339	0.6468
1150	Bremerton, WA PMSA	231,969	0.3992	0.1897	0.2682	0.5050
1160	Bridgeport, CT PMSA	459,479	0.6347	0.5601	0.4402	0.5975
1200	Brockton, MA PMSA	253,210	0.5883	0.4690	0.3914	0.5572
1240	Brownsville-Harlingen-San Benito, TX MSA	335,227	0.4379	0.4177	0.2299	0.5089
1260	Bryan-College Station, TX MSA	152,415	0.4177	0.3772	0.4066	0.4510
1280	Buffalo-Niagara Falls, NY MSA	1,162,903	0.7502	0.5187	0.4387	0.5527
1305	Burlington, VT MSA	170,570	0.2894	0.2930	0.3811	0.5290
1320	Canton-Massillon, OH MSA	406,934	0.5669	0.2999	0.3567	0.5988
1350	Casper, WY MSA	66,533	0.3047	0.1801	0.2044	0.4632
1360	Cedar Rapids, IA MSA	191,701	0.4278	0.3145	0.3023	0.5612
1400	Champaign-Urbana, IL MSA	179,669	0.4388	0.2945	0.5078	0.5852
1440	Charleston-North Charleston, SC MSA	549,033	0.4341	0.3191	0.3163	0.6108
1480	Charleston, WV MSA	251,662	0.5422	0.3843	0.2358	0.5151
1520	Charlotte-Gastonia-Rock Hill, NC-SC MSA	1,499,293	0.5023	0.4274	0.3017	0.6137
1540	Charlottesville, VA MSA	159,576	0.3376	0.2494	0.4061	0.6444
1560	Chattanooga, TN-GA MSA	465,161	0.6852	0.3443	0.3101	0.6877
1580	Cheyenne, WY MSA	81,607	0.3010	0.2432	0.2188	0.3906
1600	Chicago, IL PMSA	8,272,255	0.7706	0.5964	0.4388	0.6474
1620	Chico-Paradise, CA MSA	203,171	0.3486	0.2673	0.3284	0.4656
1640	Cincinnati, OH-KY-IN PMSA	1,645,474	0.7354	0.3469	0.3958	0.5935
1660	Clarksville-Hopkinsville, TN-KY MSA	207,033	0.3523	0.3610	0.2709	0.5937
1680	Cleveland-Lorain-Elyria, OH PMSA	2,250,287	0.7605	0.5649	0.4511	0.6487
1720	Colorado Springs, CO MSA	516,929	0.3688	0.2710	0.2958	0.5798
1740	Columbia, MO MSA	135,454	0.3673	0.2648	0.4127	0.4574
1760	Columbia, SC MSA	531,912	0.4985	0.3125	0.3584	0.5615

MSA / PMSA Code	MSA / PMSA Name	Population	Black-Non-Black	Hispanic-Non-Hispanic	Poor-Non-Poor	Subsidized-Non-Subsidized
1800	Columbus, GA-AL MSA	272,985	0.5589	0.3747	0.3800	0.6169
1840	Columbus, OH MSA	1,540,157	0.6064	0.3625	0.4133	0.6040
1880	Corpus Christi, TX MSA	380,783	0.3529	0.4280	0.3105	0.5668
1890	Corvallis, OR MSA	78,153	0.2690	0.2489	0.4175	0.4200
1900	Cumberland, MD-WV MSA	102,008	0.4824	0.3738	0.2344	0.4717
1920	Dallas, TX PMSA	3,519,176	0.5310	0.4858	0.3715	0.6526
1930	Danbury, CT PMSA	217,980	0.4564	0.5024	0.3389	0.7070
1950	Danville, VA MSA	110,156	0.3374	0.3948	0.2366	0.5591
1960	Davenport-Moline-Rock Island, IA-IL MSA	359,062	0.5074	0.3654	0.3220	0.5316
2000	Dayton-Springfield, OH MSA	950,558	0.6933	0.3087	0.4044	0.5155
2020	Daytona Beach, FL MSA	493,175	0.5412	0.4077	0.2622	0.6529
2030	Decatur, AL MSA	145,867	0.5579	0.5268	0.2500	0.5537
2040	Decatur, IL MSA	114,706	0.5386	0.3576	0.4249	0.5427
2080	Denver, CO PMSA	2,106,735	0.5787	0.4693	0.3909	0.6147
2120	Des Moines, IA MSA	456,022	0.5288	0.4422	0.3362	0.5498
2160	Detroit, MI PMSA	4,439,627	0.8352	0.4517	0.4478	0.6789
2180	Dothan, AL MSA	137,916	0.4056	0.3876	0.2156	0.4406
2190	Dover, DE MSA	126,697	0.3228	0.1983	0.1728	0.5984
2200	Dubuque, IA MSA	89,143	0.4453	0.4439	0.2710	0.4739
2240	Duluth-Superior, MN-WI MSA	243,815	0.4965	0.3245	0.2860	0.5471
2281	Dutchess County, NY PMSA	280,150	0.5110	0.2969	0.3438	0.6610
2290	Eau Claire, WI MSA	148,337	0.3759	0.2907	0.3325	0.4186
2320	El Paso, TX MSA	679,622	0.4233	0.4489	0.2952	0.5426
2330	Elkhart-Goshen, IN MSA	182,791	0.5414	0.4254	0.2226	0.5754
2335	Elmira, NY MSA	91,070	0.4935	0.4281	0.3252	0.6182
2340	Enid, OK MSA	57,813	0.2744	0.4080	0.2642	0.4998
2360	Erie, PA MSA	280,843	0.6315	0.4903	0.3758	0.5431
2400	Eugene-Springfield, OR MSA	322,959	0.2802	0.2330	0.2754	0.4638
2440	Evansville-Henderson, IN-KY MSA	296,195	0.5716	0.3363	0.3594	0.5619
2520	Fargo-Moorhead, ND-MN MSA	174,367	0.4024	0.3298	0.2978	0.4246
2560	Fayetteville, NC MSA	302,963	0.2991	0.2468	0.2406	0.5069
2580	Fayetteville-Springdale-Rogers, AR MSA	311,121	0.4870	0.4412	0.2430	0.5296
2600	Fitchburg-Leominster, MA PMSA	140,448	0.3027	0.4088	0.2782	0.5376
2620	Flagstaff, AZ-UT MSA	122,366	0.3633	0.3781	0.3423	0.6295
2640	Flint, MI PMSA	436,141	0.7591	0.2855	0.4217	0.6270

MSA / PMSA Code	MSA / PMSA Name	Population	Black-Non-Black	Hispanic-Non-Hispanic	Poor-Non-Poor	Subsidized-Non-Subsidized
2650	Florence, AL MSA	142,950	0.4200	0.2968	0.2440	0.5762
2655	Florence, SC MSA	125,761	0.4216	0.3191	0.2751	0.5606
2670	Fort Collins-Loveland, CO MSA	251,494	0.3415	0.2051	0.4017	0.5006
2680	Fort Lauderdale, FL PMSA	1,623,018	0.5754	0.2817	0.3100	0.6947
2700	Fort Myers-Cape Coral, FL MSA	440,888	0.6513	0.3715	0.3100	0.7820
2710	Fort Pierce-Port St. Lucie, FL MSA	319,426	0.5670	0.3713	0.3394	0.7876
2720	Fort Smith, AR-OK MSA	207,290	0.5071	0.4712	0.2314	0.4137
2750	Fort Walton Beach, FL MSA	170,498	0.2782	0.2527	0.2227	0.5729
2760	Fort Wayne, IN MSA	501,733	0.6996	0.4119	0.3669	0.6243
2800	Fort Worth-Arlington, TX PMSA	1,702,625	0.5412	0.4284	0.3601	0.6319
2840	Fresno, CA MSA	921,646	0.4166	0.4085	0.3324	0.4707
2880	Gadsden, AL MSA	103,459	0.6866	0.3597	0.2754	0.6278
2900	Gainesville, FL MSA	217,955	0.4140	0.2281	0.4248	0.5987
2920	Galveston-Texas City, TX PMSA	250,158	0.5374	0.2618	0.3255	0.5788
2960	Gary, IN PMSA	631,362	0.8022	0.4283	0.4175	0.7084
2975	Glens Falls, NY MSA	124,345	0.6284	0.4602	0.2078	0.5707
2980	Goldsboro, NC MSA	113,329	0.4005	0.3740	0.2713	0.6717
2985	Grand Forks, ND-MN MSA	97,478	0.4043	0.3792	0.2676	0.3992
2995	Grand Junction, CO MSA	116,255	0.3721	0.2260	0.2405	0.4495
3000	Grand Rapids-Muskegon-Holland, MI MSA	1,088,514	0.6427	0.4696	0.3335	0.6114
3040	Great Falls, MT MSA	80,357	0.3666	0.3106	0.2708	0.5476
3060	Greeley, CO PMSA	178,717	0.3148	0.3357	0.3290	0.4793
3080	Green Bay, WI MSA	224,842	0.3234	0.4988	0.3399	0.4986
3120	Greensboro--Winston-Salem--High Point, NC MSA	1,251,509	0.5478	0.4043	0.3059	0.6068
3150	Greenville, NC MSA	133,798	0.3237	0.2592	0.2468	0.4802
3160	Greenville-Spartanburg-Anderson, SC MSA	962,441	0.4356	0.3868	0.2726	0.5919
3180	Hagerstown, MD PMSA	125,071	0.4663	0.3878	0.3273	0.5006
3200	Hamilton-Middletown, OH PMSA	332,807	0.4450	0.3889	0.4778	0.6039
3240	Harrisburg-Lebanon-Carlisle, PA MSA	629,401	0.6901	0.4903	0.3319	0.6133
3280	Hartford, CT MSA	1,182,888	0.5811	0.5825	0.4710	0.5868
3285	Hattiesburg, MS MSA	111,674	0.5310	0.3119	0.2874	0.5007
3290	Hickory-Morganton-Lenoir, NC MSA	341,851	0.4429	0.4078	0.1683	0.5920
3320	Honolulu, HI MSA	876,132	0.4352	0.2215	0.3432	0.6341
3350	Houma, LA MSA	194,477	0.4466	0.3041	0.2186	0.5186
3360	Houston, TX PMSA	4,175,473	0.5654	0.4641	0.3584	0.6929

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3400	Huntington-Ashland, WV-KY-OH MSA	315,538	0.5590	0.4644	0.2256	0.5177
3440	Huntsville, AL MSA	342,376	0.5303	0.2970	0.3264	0.6059
3480	Indianapolis, IN MSA	1,607,486	0.6934	0.4232	0.3746	0.5758
3500	Iowa City, IA MSA	111,006	0.3458	0.2158	0.4318	0.4034
3520	Jackson, MI MSA	155,428	0.6557	0.2636	0.3369	0.6328
3560	Jackson, MS MSA	440,801	0.6109	0.3652	0.3787	0.6091
3580	Jackson, TN MSA	107,377	0.5515	0.4061	0.3197	0.6566
3600	Jacksonville, FL MSA	1,100,491	0.5247	0.2517	0.3185	0.6063
3605	Jacksonville, NC MSA	150,355	0.2402	0.2383	0.2472	0.7211
3610	Jamestown, NY MSA	139,750	0.5017	0.5091	0.2282	0.5190
3620	Janesville-Beloit, WI MSA	152,307	0.5757	0.3688	0.2906	0.4667
3640	Jersey City, NJ PMSA	608,975	0.5568	0.4431	0.2303	0.4879
3660	Johnson City-Kingsport-Bristol, TN-VA MSA	480,091	0.4959	0.3636	0.1916	0.6142
3680	Johnstown, PA MSA	232,621	0.6815	0.4513	0.2067	0.6148
3700	Jonesboro, AR MSA	82,148	0.4083	0.3146	0.2579	0.2993
3710	Joplin, MO MSA	157,322	0.4108	0.3260	0.1642	0.5016
3720	Kalamazoo-Battle Creek, MI MSA	452,851	0.5148	0.3398	0.3543	0.5797
3740	Kankakee, IL PMSA	103,833	0.6896	0.3268	0.3530	0.6474
3760	Kansas City, MO-KS MSA	1,775,751	0.6727	0.4295	0.3927	0.6191
3800	Kenosha, WI PMSA	149,577	0.4365	0.3943	0.2974	0.4678
3810	Killeen-Temple, TX MSA	312,952	0.3472	0.1561	0.2289	0.4600
3840	Knoxville, TN MSA	687,017	0.5722	0.3334	0.3306	0.5941
3850	Kokomo, IN MSA	101,541	0.4805	0.2225	0.3336	0.5778
3870	La Crosse, WI-MN MSA	126,838	0.4278	0.3193	0.4042	0.4572
3880	Lafayette, LA MSA	385,647	0.4855	0.3189	0.2549	0.4787
3920	Lafayette, IN MSA	176,004	0.3729	0.4082	0.4622	0.5402
3960	Lake Charles, LA MSA	183,577	0.6136	0.2494	0.2736	0.5307
3980	Lakeland-Winter Haven, FL MSA	483,924	0.5124	0.3399	0.2832	0.7075
4000	Lancaster, PA MSA	470,658	0.5738	0.5969	0.3289	0.6704
4040	Lansing-East Lansing, MI MSA	447,728	0.5324	0.3321	0.4497	0.5770
4080	Laredo, TX MSA	193,117	0.3107	0.3191	0.2746	0.4707
4100	Las Cruces, NM MSA	174,682	0.2805	0.3569	0.2647	0.5069
4120	Las Vegas, NV-AZ MSA	1,563,282	0.3599	0.3846	0.3258	0.6501
4150	Lawrence, KS MSA	99,962	0.2351	0.1725	0.3653	0.4745
4160	Lawrence, MA-NH PMSA	396,230	0.5139	0.7460	0.4579	0.5934

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4200	Lawton, OK MSA	114,996	0.3059	0.1671	0.2553	0.3880
4240	Lewiston-Auburn, ME MSA	93,078	0.2872	0.4183	0.3261	0.4483
4280	Lexington, KY MSA	478,755	0.4688	0.4015	0.3170	0.4885
4320	Lima, OH MSA	155,084	0.6324	0.3175	0.3597	0.5545
4360	Lincoln, NE MSA	249,829	0.3377	0.3276	0.3978	0.5478
4400	Little Rock-North Little Rock, AR MSA	583,845	0.5936	0.3268	0.3142	0.5634
4420	Longview-Marshall, TX MSA	208,780	0.4070	0.3440	0.2072	0.4760
4480	Los Angeles-Long Beach, CA PMSA	9,512,635	0.5551	0.5107	0.3378	0.5417
4520	Louisville, KY-IN MSA	1,025,598	0.6306	0.3533	0.4000	0.6149
4560	Lowell, MA-NH PMSA	301,686	0.4340	0.5435	0.4469	0.6918
4600	Lubbock, TX MSA	242,628	0.4460	0.3879	0.2663	0.6399
4640	Lynchburg, VA MSA	214,911	0.3882	0.3602	0.2703	0.6680
4680	Macon, GA MSA	322,549	0.5107	0.3710	0.3843	0.5404
4720	Madison, WI MSA	426,526	0.4487	0.3500	0.5266	0.4313
4760	Manchester, NH PMSA	198,378	0.3994	0.4458	0.3658	0.5136
4800	Mansfield, OH MSA	175,818	0.6693	0.3311	0.2919	0.4954
4880	McAllen-Edinburg-Mission, TX MSA	569,463	0.4679	0.3995	0.2352	0.4914
4890	Medford-Ashland, OR MSA	181,269	0.2768	0.2996	0.2431	0.3946
4900	Melbourne-Titusville-Palm Bay, FL MSA	476,230	0.4805	0.2096	0.2803	0.6937
4920	Memphis, TN-AR-MS MSA	1,135,614	0.6621	0.4401	0.4130	0.6206
4940	Merced, CA MSA	210,554	0.3179	0.2753	0.2420	0.5166
5000	Miami, FL PMSA	2,252,979	0.6863	0.5016	0.3004	0.5944
5015	Middlesex-Somerset-Hunterdon, NJ PMSA	1,169,641	0.4413	0.4893	0.4004	0.6456
5080	Milwaukee-Waukesha, WI PMSA	1,499,979	0.7963	0.5649	0.5093	0.5598
5120	Minneapolis-St. Paul, MN-WI MSA	2,966,620	0.5419	0.4278	0.4168	0.5611
5140	Missoula, MT MSA	95,802	0.2219	0.1899	0.3513	0.4492
5160	Mobile, AL MSA	540,258	0.6092	0.3261	0.3391	0.6248
5170	Modesto, CA MSA	446,997	0.2953	0.3328	0.2689	0.4115
5190	Monmouth-Ocean, NJ PMSA	1,126,200	0.5968	0.3468	0.3372	0.7036
5200	Monroe, LA MSA	147,250	0.6894	0.3002	0.3905	0.4907
5240	Montgomery, AL MSA	333,055	0.5465	0.3348	0.3780	0.5923
5280	Muncie, IN MSA	118,769	0.5137	0.3491	0.4324	0.5689
5330	Myrtle Beach, SC MSA	196,629	0.4372	0.3055	0.2284	0.5629
5345	Naples, FL MSA	251,377	0.5429	0.4992	0.3876	0.7330
5350	Nashua, NH PMSA	190,572	0.3497	0.5154	0.3258	0.5455

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5360	Nashville, TN MSA	1,231,311	0.5502	0.4394	0.3513	0.6135
5380	Nassau-Suffolk, NY PMSA	2,753,724	0.6818	0.4016	0.2982	0.6738
5400	New Bedford, MA PMSA	175,198	0.4464	0.5385	0.4049	0.5643
5480	New Haven-Meriden, CT PMSA	541,963	0.6188	0.5136	0.4497	0.6331
5520	New London-Norwich, CT-RI MSA	293,566	0.5132	0.4287	0.2995	0.6307
5560	New Orleans, LA MSA	1,337,669	0.6677	0.3359	0.3716	0.6646
5600	New York, NY PMSA	9,297,558	0.6669	0.5081	0.3640	0.6589
5640	Newark, NJ PMSA	2,032,989	0.7372	0.5456	0.4620	0.6330
5660	Newburgh, NY-PA PMSA	387,669	0.4534	0.3367	0.4222	0.6397
5720	Norfolk-Virginia Beach-Newport News, VA-NC MSA	1,569,392	0.4497	0.2943	0.3699	0.6110
5775	Oakland, CA PMSA	2,392,557	0.5202	0.3698	0.3829	0.5538
5790	Ocala, FL MSA	258,916	0.4690	0.2784	0.2253	0.7032
5800	Odessa-Midland, TX MSA	237,132	0.4113	0.4006	0.2733	0.4979
5880	Oklahoma City, OK MSA	1,083,051	0.5150	0.4238	0.3460	0.5689
5910	Olympia, WA PMSA	207,355	0.3119	0.1904	0.2065	0.5219
5920	Omaha, NE-IA MSA	716,998	0.6311	0.4669	0.4052	0.5721
5945	Orange County, CA PMSA	2,846,289	0.2943	0.5097	0.3562	0.5638
5960	Orlando, FL MSA	1,644,561	0.5100	0.3572	0.2931	0.6949
5990	Owensboro, KY MSA	91,545	0.5185	0.3404	0.3196	0.4852
6015	Panama City, FL MSA	148,217	0.4710	0.1942	0.2597	0.5891
6020	Parkersburg-Marietta, WV-OH MSA	151,237	0.3895	0.4272	0.1980	0.5378
6080	Pensacola, FL MSA	412,153	0.4851	0.2221	0.2759	0.5712
6120	Peoria-Pekin, IL MSA	347,387	0.6847	0.3256	0.4100	0.5805
6160	Philadelphia, PA-NJ PMSA	5,097,403	0.6850	0.5407	0.4646	0.6625
6200	Phoenix-Mesa, AZ MSA	3,251,591	0.3402	0.4935	0.3967	0.6366
6240	Pine Bluff, AR MSA	84,278	0.5944	0.3337	0.3062	0.4354
6280	Pittsburgh, PA MSA	2,358,695	0.6666	0.3942	0.3402	0.5860
6320	Pittsfield, MA MSA	83,099	0.4404	0.3490	0.2440	0.5257
6340	Pocatello, ID MSA	75,565	0.3729	0.1655	0.2403	0.4426
6400	Portland, ME MSA	243,544	0.3754	0.3423	0.3069	0.5516
6440	Portland-Vancouver, OR-WA PMSA	1,918,009	0.4768	0.3324	0.2728	0.5320
6450	Portsmouth-Rochester, NH-ME PMSA	241,542	0.3086	0.2689	0.2753	0.4865
6480	Providence-Fall River-Warwick, RI-MA MSA	1,188,613	0.5241	0.6354	0.4061	0.5136
6520	Provo-Orem, UT MSA	367,969	0.3086	0.3478	0.4664	0.5071
6560	Pueblo, CO MSA	139,724	0.3282	0.3104	0.3283	0.4438

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6580	Punta Gorda, FL MSA	141,627	0.3597	0.2263	0.1880	0.7016
6600	Racine, WI PMSA	188,831	0.5260	0.4062	0.3551	0.4696
6640	Raleigh-Durham-Chapel Hill, NC MSA	1,187,941	0.4245	0.3444	0.3702	0.5540
6660	Rapid City, SD MSA	88,565	0.2970	0.2184	0.2958	0.4192
6680	Reading, PA MSA	373,638	0.5322	0.6954	0.4630	0.6688
6690	Redding, CA MSA	163,256	0.2488	0.1159	0.2061	0.4533
6720	Reno, NV MSA	339,486	0.2924	0.3844	0.3257	0.5709
6740	Richland-Kennewick-Pasco, WA MSA	191,822	0.2970	0.5175	0.3372	0.4869
6760	Richmond-Petersburg, VA MSA	996,512	0.5494	0.3709	0.4166	0.6469
6780	Riverside-San Bernardino, CA PMSA	3,253,357	0.3607	0.3726	0.3091	0.5432
6800	Roanoke, VA MSA	235,543	0.6283	0.3559	0.3705	0.5827
6820	Rochester, MN MSA	124,013	0.4924	0.3301	0.3184	0.5969
6840	Rochester, NY MSA	1,094,746	0.6423	0.4890	0.4229	0.5844
6880	Rockford, IL MSA	371,236	0.5998	0.4065	0.3785	0.6136
6895	Rocky Mount, NC MSA	143,026	0.4030	0.4336	0.2378	0.5104
6920	Sacramento, CA PMSA	1,628,197	0.4547	0.3012	0.3700	0.5653
6960	Saginaw-Bay City-Midland, MI MSA	403,070	0.7147	0.3751	0.3489	0.5917
6980	St. Cloud, MN MSA	167,392	0.4029	0.2969	0.3224	0.4190
7000	St. Joseph, MO MSA	102,490	0.4299	0.1699	0.2141	0.4920
7040	St. Louis, MO-IL MSA	2,603,607	0.7265	0.3079	0.4027	0.5979
7080	Salem, OR PMSA	347,214	0.3194	0.4023	0.2764	0.3904
7120	Salinas, CA MSA	401,762	0.4815	0.5609	0.2861	0.4920
7160	Salt Lake City-Ogden, UT MSA	1,333,914	0.3567	0.4081	0.3450	0.5469
7200	San Angelo, TX MSA	104,010	0.2859	0.3685	0.2557	0.4749
7240	San Antonio, TX MSA	1,592,383	0.4532	0.4780	0.3545	0.5480
7320	San Diego, CA MSA	2,805,418	0.4214	0.4405	0.3485	0.5791
7360	San Francisco, CA PMSA	1,731,183	0.5112	0.4495	0.3005	0.6420
7400	San Jose, CA PMSA	1,682,585	0.2699	0.4462	0.3008	0.5296
7460	San Luis Obispo-Atascadero-Paso Robles, CA MSA	246,681	0.4427	0.2785	0.3141	0.4294
7480	Santa Barbara-Santa Maria-Lompoc, CA MSA	399,347	0.3472	0.4426	0.3731	0.4759
7485	Santa Cruz-Watsonville, CA PMSA	255,602	0.2316	0.5560	0.2544	0.4561
7490	Santa Fe, NM MSA	147,635	0.2993	0.4304	0.2927	0.6349
7500	Santa Rosa, CA PMSA	458,614	0.3157	0.3317	0.2213	0.4829
7510	Sarasota-Bradenton, FL MSA	589,959	0.6308	0.4346	0.3301	0.7688
7520	Savannah, GA MSA	293,000	0.5456	0.3836	0.3507	0.5823

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7560	Scranton--Wilkes-Barre--Hazleton, PA MSA	624,776	0.5908	0.4343	0.2435	0.5279
7600	Seattle-Bellevue-Everett, WA PMSA	2,414,616	0.4529	0.2705	0.2994	0.5570
7610	Sharon, PA MSA	120,293	0.6574	0.4021	0.2586	0.6317
7620	Sheboygan, WI MSA	112,646	0.4853	0.3384	0.3161	0.4971
7640	Sherman-Denison, TX MSA	110,595	0.4233	0.3621	0.1964	0.4533
7680	Shreveport-Bossier City, LA MSA	392,302	0.5582	0.3418	0.3494	0.4922
7720	Sioux City, IA-NE MSA	124,130	0.4250	0.5087	0.2766	0.4816
7760	Sioux Falls, SD MSA	172,412	0.3830	0.3870	0.3154	0.4097
7800	South Bend, IN MSA	265,559	0.5675	0.4582	0.3522	0.4915
7840	Spokane, WA MSA	417,939	0.3730	0.2266	0.3330	0.5492
7880	Springfield, IL MSA	201,437	0.5740	0.3326	0.3787	0.6194
7920	Springfield, MO MSA	325,721	0.4697	0.2866	0.3146	0.5339
8000	Springfield, MA MSA	586,593	0.5591	0.5817	0.3899	0.5764
8040	Stamford-Norwalk, CT PMSA	353,556	0.5685	0.4784	0.3307	0.6357
8050	State College, PA MSA	135,758	0.4904	0.3622	0.5212	0.6408
8080	Steubenville-Weirton, OH-WV MSA	132,008	0.5988	0.4094	0.1949	0.5688
8120	Stockton-Lodi, CA MSA	563,598	0.3901	0.2864	0.3482	0.5692
8140	Sumter, SC MSA	104,646	0.3937	0.3669	0.2868	0.5074
8160	Syracuse, NY MSA	730,409	0.6737	0.4237	0.3823	0.6268
8200	Tacoma, WA PMSA	700,820	0.4132	0.2584	0.3051	0.5835
8240	Tallahassee, FL MSA	281,989	0.4342	0.2409	0.4185	0.5398
8280	Tampa-St. Petersburg-Clearwater, FL MSA	2,395,997	0.5971	0.4074	0.3032	0.6718
8320	Terre Haute, IN MSA	149,192	0.5865	0.3261	0.3341	0.5894
8360	Texarkana, TX-Texarkana, AR MSA	129,749	0.4235	0.3840	0.2688	0.4934
8400	Toledo, OH MSA	618,203	0.6752	0.3348	0.4277	0.5704
8440	Topeka, KS MSA	169,871	0.4533	0.3553	0.4043	0.5358
8480	Trenton, NJ PMSA	350,761	0.5964	0.4482	0.4067	0.6430
8520	Tucson, AZ MSA	843,746	0.3301	0.4653	0.3819	0.6306
8560	Tulsa, OK MSA	803,235	0.5583	0.3877	0.3234	0.6090
8600	Tuscaloosa, AL MSA	164,875	0.5357	0.3724	0.3613	0.5421
8640	Tyler, TX MSA	174,706	0.4464	0.5363	0.2593	0.6315
8680	Utica-Rome, NY MSA	299,896	0.6106	0.5189	0.3160	0.5615
8720	Vallejo-Fairfield-Napa, CA PMSA	515,461	0.4167	0.2542	0.2700	0.4507
8735	Ventura, CA PMSA	753,197	0.3267	0.5318	0.3219	0.5318
8750	Victoria, TX MSA	84,088	0.2756	0.3522	0.2551	0.5947

MSA / PMSA Code	MSA / PMSA Name	Population	Black-Non-Black	Hispanic-Non-Hispanic	Poor-Non-Poor	Subsidized-Non-Subsidized
8760	Vineland-Millville-Bridgeton, NJ PMSA	146,438	0.3425	0.4340	0.2538	0.4243
8780	Visalia-Tulare-Porterville, CA MSA	367,137	0.3872	0.3804	0.2591	0.4238
8800	Waco, TX MSA	213,517	0.4521	0.3919	0.4550	0.5834
8840	Washington, DC-MD-VA-WV PMSA	4,922,060	0.5892	0.4332	0.3777	0.6150
8880	Waterbury, CT PMSA	229,064	0.5498	0.5513	0.4191	0.5949
8920	Waterloo-Cedar Falls, IA MSA	128,012	0.6658	0.3991	0.3084	0.4784
8940	Wausau, WI MSA	125,834	0.3931	0.3355	0.2820	0.6675
8960	West Palm Beach-Boca Raton, FL MSA	1,128,748	0.6091	0.3814	0.3652	0.7420
9000	Wheeling, WV-OH MSA	153,172	0.5425	0.3503	0.1834	0.4995
9040	Wichita, KS MSA	545,220	0.5345	0.4077	0.3629	0.5153
9080	Wichita Falls, TX MSA	140,518	0.4929	0.3194	0.2546	0.5500
9140	Williamsport, PA MSA	120,044	0.6104	0.4200	0.2662	0.6304
9160	Wilmington-Newark, DE-MD PMSA	586,216	0.5165	0.3951	0.4047	0.6043
9200	Wilmington, NC MSA	233,450	0.4697	0.2508	0.2842	0.6790
9240	Worcester, MA-CT PMSA	508,982	0.5043	0.5703	0.4175	0.6050
9260	Yakima, WA MSA	222,581	0.3626	0.4799	0.3269	0.4725
9270	Yolo, CA PMSA	168,660	0.2633	0.3802	0.3216	0.3677
9280	York, PA MSA	381,751	0.6507	0.5525	0.3291	0.6850
9320	Youngstown-Warren, OH MSA	594,746	0.7155	0.4494	0.3361	0.5719
9340	Yuba City, CA MSA	139,149	0.3304	0.2649	0.2815	0.4861
9360	Yuma, AZ MSA	160,026	0.3456	0.4491	0.2807	0.5409
	All MSA's (331)	225,666,050	0.4836	0.3747	0.3280	0.5600

Source: Population by Race, Ethnicity and Income: U.S. Census, 2000. Subsidized Housing: HUD, *A Picture of Subsidized Housing* 2000. Segregation Index calculated using the Index of Dissimilarity (D).

APPENDIX B

Literature Review on Subsidized Housing

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
PUBLIC HOUSING							
Roncek, Bell and Francik	1981	1970	Cleveland, OH	Public Housing (17 projects)	Violent and property crime on blocks surrounding public housing sites.	Comparison of blocks with public housing to blocks without public housing. Correlation and regression analysis on the number of public housing units on a block and distance to public housing sites and 13 other factors.	Blocks with public housing have significantly more violent and property crimes. However, after controlling for SES and housing stock characteristics adjacent to the public housing, location adjacent to public housing has the least importance in predicting violent crime and had no importance in predicting property crime.
Goldstein and Yancey	1986	1950-1980	Philadelphia, PA	Public Housing	Racial change at the census tract level	Regression on changes in racial composition from 1950 to 1980 in one city controlling for other ecological characteristics of the census tract. No data on residents of the public housing or on the beginning racial composition of the neighborhood.	No association was found between pre-1950 public housing and increased black racial concentration. Post-1950 public housing was placed in neighborhoods with higher black populations and areas where the black population was increasing. The authors conclude that racial change in census tracts was related to the ecological history of the neighborhood and not related to the siting of public housing.
Massey and Kanaiaupuni	1993	1950-1990	Chicago MSA	Public Housing	Change in neighborhood poverty rate	A four stage regression that looks at the effect of public housing built in the 1950's and 1960's on neighborhoods in 1980 and 1990.	Public housing causes concentrated poverty through three processes: 1) structural effect of concentrating poor families by virtue of the public housing income restrictions; 2) the continuing effects over time of earlier construction; and 3) migration rates (although this last effect is small)

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
Galster and Keeney	1993	1970-1980	Yonkers, NY	Public Housing (scattered site only)	Racial change at the census tract level	Regression analysis on racial change from 1970 to 1980 in areas where scattered site public housing projects were constructed.	A significant increase in percentage black is associated with the existence of public housing at baseline and the construction of public housing over the decade even when controlling for other factors.
Schill and Wachter	1995	1970-1990	City of Philadelphia	Public Housing	Change in the ratio of families with incomes below 50% of median family income at the census tract to same group at MSA level	Logit regression predicting change in poverty concentration from the presence of public housing controlling for other neighborhood characteristics.	Negative spillover effects are consistent with Massey and Kanaiapuni findings for Chicago. Predicted poverty rates for the lowest concentration was 13%, 32% in neighborhoods with an average proportion of public housing and 52% for those with the highest quintile of public housing (calculated for neighborhoods that had public housing).
Goering, Kamely and Richardson	1997	1977-1993	Sample of public housing units in 10 large Public Housing Authorities	Public housing	Racial and income segregation at the PHA level	Regression analysis using the dissimilarity index and the isolation index. Regressions includes several PHA and MSA level variables. Comparison with results from a prior 1977 study of the 15 largest Public Housing Authorities (Bickford and Massey, 1991).	Black families living in family projects lived in racially segregated projects located in extremely poor neighborhoods. The most important explanatory variable was the black-white index for the MSA, followed by the segregation level of the PHA and the size of the PHA (larger PHA's had larger projects).

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
Coulibaly, Green, and James	1998	1932-1992	Area data differed by years of study	Public housing	Racial and income segregation within MSA's, Housing Authorities and Buildings	Descriptive historical study of public housing units built and demolished during the Public Works Administration (1932-38), Urban Housing Authority (1938-41), War Housing (1941-45), Urban Renewal (1953-60), 1977 and 1992. Dissimilarity index calculations for race and sometimes income when data was available.	Earliest public housing (1932-41) was built in low-income areas where the land was cheap. Funding was provided for demolition of existing units in low-income areas (slum clearance) and there was no effort to deconcentrate by race or income. Segregation index scores were at their maximum. Individual buildings (within projects) were completely segregated. Temporary housing during the war was constructed in locations near war industries and transportation but units were demolished after the war if they were located in non-low-income areas. Over 80 percent of urban renewal units (1953-60) were located in low-income areas. The index score was lower because some public housing was constructed for white elderly in suburban areas. Data limitations in 1977 and 1992 limited the study to city vs. suburbs. In 1977, 71% of all public housing units in MSA's were located in the central cities. This number had increased to only 74% by 1992.
Carter, Schill and Wachter	1998	1950-1990	Four central cities: Boston, Detroit, Cleveland and Philadelphia	Public housing (family only)	Family poverty rate in census tract	Multivariate linear regression and logit model on the change of public housing units in the decade prior. Analysis of neighborhood poverty and the distance to the central business district.	Public housing is associated with negative spillover effects in urban neighborhoods. Density (percent of units that are subsidized) was significant in only two of the four MSA's.

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
Holloway, Bryan, Chabot, Rogers and Rulli	1998	1980-1990	Columbus, OH MSA	Public housing	Change in neighborhood poverty	OLS regression analysis includes housing market indicators including density of public housing and net migration.	Public housing concentrated poverty by attracting individuals most vulnerable to economic hardship and weakening the neighborhood housing market. Distance from subsidized housing also had a strong effect. Public housing had an effect on blacks that is double that of whites. (p. 12) Older public housing concentrates more than more than recent construction.
Briggs, Darden and Aidala	1999	1985-1996	Yonkers, NY	Public Housing (scattered site only)	Property values adjacent to public housing sites, homeowner plans to move	Hedonic price regression measured by change in sale prices over a decade adjacent to the public housing sites. Phone survey of homeowners near scattered site public housing. Heuristic model of neighborhood change that links financial and socio-psychological investments by residents on neighborhood vitality.	Sale prices were sensitive to specific neighborhoods and not whether there was scattered site public housing. There was no evidence of "white flight" or neighborhood tipping. Homeowners surrounding the public housing sites were comparable to homeowners not located near the sites. They were just as likely to be satisfied with their residential environment and just as likely to be unhappy about other factors, such as high taxes.
McNulty and Holloway	2000	1990	City of Atlanta	Public housing	Crime rates	Weighted least squares regression conducted separately for different types of crime including the distance to public housing sites.	Being located close to subsidized housing in the city has a significant effect on several types of crime holding all other variables such as race and income constant.

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
Santiago, Galster and Tatian	2001	1987-1997	Denver, CO	Public Housing (scattered site only)	Property values at various distances from subsidized housing units	Evaluation of scattered site public housing program which acquired and rehabilitated 167 homes in middle-class neighborhoods during the first phase of a 400-unit program. Hedonic price regression measured by change in sale prices over a decade. Focus groups with homeowners at 6 sites.	Properties in close proximity to the subsidized units saw values rise. This effect was most likely due to the fact that many of the properties acquired were vacant and underwent considerable rehabilitation. This small scale impact was insufficient to change neighborhood dynamics at a larger scale. Focus groups were aware of and concerned about other subsidized housing in their neighborhoods besides the scattered sites and in general were concerned with the quality of rental maintenance, both subsidized and unsubsidized, in their neighborhoods. The authors conclude that property management post-occupancy is crucial and that negative effects of more units in vulnerable neighborhoods suggests there may be a maximum threshold which triggers neighborhood decline regardless of distance.
Bair and Fitzgerald	2005	2000	Six projects in Atlanta, Charlotte, Kansas City, Boston, Denver and Philadelphia	Public Housing (HOPE VI)	Property values surrounding the subsidized housing	Hedonic regression with block group level controls for micro-neighborhood effects.	Statistically significant and large positive effect on property values of 8-10% per quarter mile from the site.
Bacon	2006	2002-2005	Durham, NC	Public housing (HOPE VI)	Crime rates at project site and relocation sites at the census tract and block group level	Geospatial analysis using Gi* and Local Moran's I of crime rates in HOPE VI public housing site that was demolished and neighborhoods where residents relocated.	Sharp reduction in crime at HOPE VI site and increases in violent crime in smaller pockets throughout the city. However there was no consistency in the areas inhabited by HOPE VI relocatees, with some increasing and others decreasing crime rates. Due to the small numbers of relocatees in any given area it is not likely that they were the cause of increased (or decreased) crime.

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
Joice	2007	2006	Louisville, KY	Public Housing (including scattered site)	Crime rates (all types of crime) at the census tract level	Regression analysis of density of public housing on crime rate controlling for other factors such as poverty, age, rate, tenure and vacancy rate. Threshold analysis to determine what level of scattered site housing is too dense (increases crime significantly).	The presence of public housing (tract has or does not have public housing) is related to increased crime, but additional units does not increase crime. Scattered sites do not appear to be related to increased crime except that when the density of scattered site units in a census tract exceeded 48 units per square mile there was an increase in crime.
OTHER SITE-BASED							
Schwartz	1999	1986-1997	New York City	Local funding for new construction and gut rehab	Impact of investment on housing stock, welfare rolls, crime and economic impact at the community district level (population 120,000).	Correlations between investments and vacant properties, welfare use and crime (felonies). Descriptive information on commercial and retail development pre and post investment.	Most investments were made in the city's poorest districts which continue to have high poverty rates. A relationship was found between investments in gut-rehab and a sharp reduction in vacant buildings. Correlations between housing starts and changes in welfare rolls and felony complaints were statistically significant but weaker than the vacant properties. The author notes that the large scale of community districts may be too large to see the full effects on welfare and crime.

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
Galster, Pettit, Santiago and Tatian	2002	1992-1995	Denver	14 special needs supportive housing projects	Crime rates	Weighted least squares regression weighted by proportion of population in the neighborhood controlling for pre and post crime rates, citywide crime rates and geographic distance from supportive housing sites. GIS used to develop distance bands around housing sites and results used to control for spatial autocorrelation. Qualitative analysis included focus groups.	Project scale (exceeding 53 units) was found to have a significant effect on crime in the surrounding neighborhood. The exact unit threshold is unknown; however the results support the Denver siting ordinance which restricts projects over 40 units. Focus group findings show that the public is afraid of increased crime from subsidized housing which in many cases may not be justified.
Ellen, Schill, Schwartz, Amy Ellen, and Voicu	2003	1986-1997	New York City	Local funding for new construction and gut rehab	Property values within 500 feet surrounding the subsidized housing	Difference-in-difference model comparing sale prices of properties within 500-foot rings compared to prices of comparable properties in the same census tracts but outside the rings. Fixed effects hedonic price model controlling for neighborhood specific changes.	Consistently found that new housing units were associated with increased sale prices of nearby properties. The type of project did not matter and there were no statistically significant differences between rental and homeowner units, between new construction and rehab units or type of structure (1-4 unit vs. multi-family building). Positive spillover effects were large compared to other city programs.
MULTIPLE SITE-BASED (PUBLIC HOUSING, OTHER and LIHTC)							
Bickford and Massey	1991	1977	60 MSA's with details for 15	Public Housing, other HUD-funded privately owned site-based	Racial segregation at PHA and MSA level	Calculates isolation indices for elderly and family projects by ownership (public or private). Descriptive statistics and multiple regression.	Elderly projects were found to be primarily white while family projects were predominantly minority. Black-white segregation was very high and was correlated with the rate of increase in the black population and leveled off after construction.

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
Murray	1999	1935-1987	Census Place and MSA	Public housing, other site-based (Section 235 and 236)	Change in housing market production	Studies whether subsidized housing increases or reduces the overall number of affordable units in the housing market ("crowding out" effect).	Low-income subsidized housing did not have a "crowd out" effect. New moderate income subsidized units resulted in only one third to one half a unit increase which indicates that subsidizing moderate income housing will reduce private sector activity in this income range.
Freeman and Rohe	2000	1997	National, limited to areas that were tracted in 1980 (A Picture of Subsidized Housing 1997)	Public housing, other HUD site-based, and LIHTC	Racial change at the census tract level	Used propensity methods to create statistically equivalent "treatment group" (with public housing) and "control group"(without). Multiple regression on the probability of a neighborhood receiving public housing between 1980 and 1990.	Assisted housing developed during the 1980's did not appear to foster neighborhood racial transition.
Freeman	2003	1997	19,159 Households Nationwide (PSID)	Public housing, other HUD site-based, and LIHTC	In and out-migration from census tracts with and without assisted housing	Logistic regression on the effects of subsidized housing on neighborhood poverty through analysis of migration patterns. Links geocoded PSID longitudinal data with subsidized housing data and census neighborhood characteristics. Propensity scores were used to match neighborhoods with and without subsidized housing. Controls for moving behavior by age and race and various interaction effects. Nonlinear effects on number of units per project studied for out-migration, sample sizes too small to study thresholds for in-migration.	Neighborhoods with assisted housing were more likely to have non-poor outmigration and poor in-migration. Once the control variables are added the relationship between assisted housing and neighborhood out-migration is a spurious one. In-migration was found to be sensitive to the presence of assisted housing. Threshold effects on the number of units in projects exist for out-migration for some categories for blacks and Latinos but not for whites or as a whole. Although the results indicate that class specific migration is not necessarily caused by the presence of assisted housing, it is a concern that this is the trend. Greater attention should be paid to the neighborhood surrounding the assisted housing.

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
Sinai and Waldfogel	2005	1935-1987	Nationwide	Public housing, other site-based (Section 235 and 236)	Change in housing market production	Studies whether subsidized housing increases or reduces the overall number of affordable units in the housing market ("crowding out" effect). Regression controls for housing demand.	There is less "crowd-out" in areas with greater population and lower demand markets. Tenant-based subsidies may be more effective by directing their benefits directly to the households in need.
Ellen, Schwartz, Voicu and Schill	2007	1974-2000	New York City	Public housing, Section 8 site-based, Section 202 and LIHTC	Property values surrounding the subsidized housing	Hedonic regression including building and neighborhood variables within 2,000 feet of subsidized housing and outside 2,000 feet but in the same neighborhood.	The LIHTC and Section 202 programs had positive effects at all project sizes and this effect persists over time. Public housing for families has a negative effect for average size projects but the negative effect declines over time.
Rosenthal	2007	1950-2000	35 MSA's, Case study of Philadelphia	Public Housing, LIHTC	Change in economic status of neighborhood defined as census tracts for MSA study and voting wards for Philadelphia study	OLS regression analysis from 1900 to 2000 of changes in neighborhood economic status controlling for age of the housing stock and neighborhood SES composition. Public housing included as possible externality at baseline date.	Neighborhood change takes place over both long periods of time (filtering) and short periods of time (externalities). Density has a negative impact on future economic status of the neighborhood while homeownership also has a positive impact. Middle-age housing tends to deteriorate, not improve over time. Public housing impact not significant.
Rosenthal	2008	1970-2000	All MSA's	Public Housing, LIHTC	Change in tract poverty rate	Multivariate regression on the causes of change in neighborhood poverty over 30 years. Site-based public housing is included as one of the potential explanatory variables.	Neighborhood poverty is caused by multiple processes including aging housing stock, public transit, SES spillover effects (poverty attracting more poverty, racial segregation effect on poverty concentration) and the location of site based subsidized housing. Public Housing and the LIHTC were both found to increase the poverty rate in the subsequent decade. Also, high density housing was found to consistently increase the poverty rate.

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
Lee	2008	1996-2002	Five MSA's	Public housing, other HUD site-based, and LIHTC	Property values surrounding the subsidized housing	Hedonic regression using difference-in-difference specification on properties within 2,500 feet of subsidized housing that were either added or removed during the study period.	Results varied by type of housing, proximity and concentration. Public housing additions reduced home values while LIHTC results are mixed. The number of units added or removed was very important with positive effects depending on the number of units.
LIHTC							
Buron, Nolden, Heintz and Stewart (Abt Associates)	2000	1992-1994	39 Projects in 5 MSA'S: Boston, Kansas City, Miami Milwaukee and Oakland	LIHTC	Extent of concentration of subsidized housing	Descriptive statistics on geographic location of LIHTC units.	LIHTC projects are serving low income households (74%) but have a significant level of section 8 assistance (37%) most in the form of site-based subsidies. Projects varied as to economic diversity with half having more than 50% under 30% MFI. Neighborhoods were income diverse but had high minority rates. Half of developments were located in Qualified Census Tracts (QCT's). Recommendations for further study include comparison of where LIHTC and Section 8 residents live and more in depth study of the impact of LIHTC properties on their neighborhoods.
Freeman	2004	2000	All MSA's	LIHTC	Extent of concentration of subsidized housing	Descriptive statistics on geographic location of LIHTC units.	Slightly less than half of LIHTC units are located in the suburbs which is higher than other federally funded site-based projects (24%). LIHTC neighborhoods are racially concentrated but experienced larger declines in poverty during the 1990's than other neighborhoods. Policy recommendation to site more family units outside high poverty and high minority city neighborhoods.

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
Khadduri, Buron and Climaco (Abt Associates)	2006	1995-2003	182 MSA's with populations over 250,000	LIHTC	Poverty and race at the census tract level	Descriptive statistics of family units in low-poverty census tracts.	The percentage of units constructed in low poverty areas has increased over time. There are differences in the location of LIHTC units between the states.
Eriksen and Rosenthal	2007	1987-2000	National	LIHTC	Changes in housing market production (new units over time)	OLS and GMM regression analysis controlling for MSA level factors calculated at various distance neighborhood scales. LIHTC units increases or reduces the overall number of affordable units in the housing market ("crowding out" effect) and whether it shifts demand within the neighborhood. Regression controls for housing demand. Measures neighborhood at various distance rings from census tract centroid. Dataset includes public housing demolitions and date of introduction of LIHTC units which is not included in many other studies.	Results vary considerable by neighborhood income. In higher income neighborhoods the addition of 100 LIHTC units is associated with 80 fewer unsubsidized rental construction units and a 6% decrease in owner-occupied units. In the lowest income neighborhoods the same 100 LIHTC units is associated with an increase of 17 rental construction units and a 1 percent increase in property values.
O'Neill	2008	2000	25 most populous cities	LIHTC	Extent of concentration of subsidized housing	"Hot Spot" cluster analysis of the spatial distribution of LIHTC units. An index was developed on the extent of clustering at the city level and cities were ranked by their index score in order to compare levels of concentration between cities.	There was extensive clustering of LIHTC units in the study cities with the clustering considered extreme in some cases. The clustering varied by city and was associated with poverty in some but not all cities.

Author	Date	Data	Geography	Type of Program	Outcome Measures	Method	Findings
Oakley	2008	1987-2000	Four MSA's: Atlanta, Los Angeles, Chicago, and New York City	LIHTC	Percent poverty in the census tract	Descriptive statistics on the location of LIHTC units. Spatial cluster analysis (EDSA) using the Local Moran statistic which identifies multi-census tract contiguous areas with similar concentrations. A series of OLS multiple regressions for each geographic area as well as spatial regression.	Most neighborhood predictors including poverty and unemployment were not significant. The strongest predictors were the location in a Qualified Census Tract (QCT) and other LIHTC projects nearby. The spatial distribution of LIHTC is geographically more dispersed and not as highly disadvantaged than previous site-based housing projects but the trend is toward clustering of the LIHTC units over time.
Van Zandt and Mhatre	2009	1987-2007	Dallas MSA	LIHTC	Extent of concentration of subsidized housing and association with race, poverty, education and crime at the zip code level	Case study of one metropolitan region, cluster analysis of LIHTC units using Local Indicators of Spatial Association (LISA), Moran's I and Gi* to indicate the extent of clustering. Analysis of exposure to social and educational conditions.	There is significant spatial clustering of LIHTC units in the region. Increased spatial clustering is associated with higher minority populations (r=.483), higher poverty levels (r=.359), lower household incomes (r-.202), lower safety levels (r=.350) and lower educational quality (r=.263). Overall about half the units are highly clustered, mostly in urban areas. The other half are not clustered and located in areas with social and economic variables comparable to regional averages.
Deng	2009	1990-2000	Miami-Dade County	LIHTC	Neighborhood change on eight housing and economic indicators	Compares matched pairs of neighborhoods with and without LIHTC projects in low-poverty, moderate-poverty and high-poverty neighborhoods. Case studies of three neighborhoods.	LIHTC neighborhoods have more positive changes than matched pair neighborhoods without LIHTC. Low income neighborhoods were most likely to have positive impacts.

VOUCHERS							
Galster, Tatian and Smith	1999	1991-1995	Baltimore County, MD	Vouchers	Property values surrounding subsidized housing at various distances	Regression analysis of changes in property values of houses surrounding MTO and regular Section 8 movers locations prior to move and after move at various distances. Policy analysis of negative community reaction to MTO using focus groups of homeowners at four sites.	Negative spillover effects found when there were clusters of Section 8 in small, vulnerable neighborhoods. Policy recommendation to encourage or require spatial deconcentration, possibly through payment of exception rents (exceed FMR) in non-impacted areas.
Pendall	2000	1998	Nationwide	Vouchers	Percent of vouchers in distressed census tracts	Comparison of the location of vouchers with the location of rentals and low-income renter households. Regressions used to predict the location in distressed areas.	The location of rentals is significant in predicting where the poor will live in general, but there does not appear to be additional concentration effects due to the status of having a housing subsidy.
Guhathakurta and Mushkatel	2002	1980-1994	Phoenix, AZ	Vouchers	Change in housing quality over 14 year period at various distance rings from subsidized housing	Used Housing Condition Evaluation surveys conducted in 1980 and 1994 to calculate the change in housing quality within .25 and .5 miles of subsidized housing. Regression analysis controls for neighborhood change and household characteristics of subsidized housing.	Small negative spillover effect at .5 miles from subsidized housing. However, there was a positive spillover if households was female holding other factors constant.
Kingsley, Johnson and Pettit	2003	1993-2000	31 MSA's where HOPE VI projects were located	Vouchers	Poverty and race at the census tract level	Descriptive statistics on the spatial pattern of vouchers. Measures geographic clustering of poverty and race using the Index of Dissimilarity. Measures the change in tract poverty over time due to household moves.	The scale of vouchers for relocation is small enough not to impact the location pattern of the overall voucher program. Clustering was not the predominant pattern but was significant in a few neighborhoods in most cities.

Devine, Gray, Rubin and Taghavi (HUD)	2003	2000	50 Largest MSA's	Vouchers	Extent of concentration of subsidized housing	Descriptive statistics on geographic location of vouchers and resident characteristics. Calculation of a proportionate share measure which compares location of vouchers with available affordable housing.	Vouchers are more widely dispersed than site based subsidized housing. Vouchers are less dispersed in the suburbs than in the cities when location is compared to the number of census tracts with affordable housing.
McClure	2004	1997-2002	Kansas City,MO	Vouchers	Employment and poverty rate in the census tract	Compares two samples of voucher recipients before and after welfare reform. Asks if voucher recipients move to areas with greater opportunities for employment. Multivariate regression.	No statistically significant changes were found in tract employment characteristics for either the 1997 or 2002 voucher groups.
Kataria and Johnson	2004	2000	Chicago, IL	Vouchers	Moving distance and concentration of subsidized housing at the census tract level.	Logit model which looks at pre and post location in a section 8 lottery and relocation program. Comparison of households who resided in public housing, those not in public housing and MTO participants. Clustering identified by mapping, geographic clustering, distance moved and dispersion from central business district.	Most residents relocate to tracts close to their origin. There were demographic differences between these two groups and between the public housing residents in this program and in the MTO also being administered by the same agency. Non-public housing residents relocated to more advantaged neighborhoods. Public housing residents who were more like MTO participants were more likely to use the voucher and moved farther. There was geographic clustering.
Feins and Patterson	2005	1995-2002	U.S.	Vouchers	Poverty and race at the census tract level	Longitudinal study of moving behavior of family housing voucher recipients. Multivariate regression including neighborhood and household variables.	Small but consistent tendency for subsequent moves to lower poverty neighborhoods but the change in poverty was small (from 19.8% to 18.6%).

Gillen	2005	1990-2000	Philadelphia, PA	Vouchers	Property values, turnover rate, and change of tenure at the census tract level	Analyzed data on 30,000 vouchers and 300,000 private property transactions over a twenty year period in one city. Classified section 8 into three categories: none, low and high rates for each census tract. Estimated turnover rates. Conducted regression analysis including a marginal analysis of additional section 8 units and a threshold analysis which distinguishes regression results between low and high section 8 census tracts.	Turnover rates in areas that have higher voucher rates are significantly higher than the average and the higher turnover rate is associated with price declines. Low and High section 8 neighborhoods had mean incomes that were similar and were half that of no-section 8 neighborhoods. Low-section 8 neighborhoods had half the percentage non-white than high-section 8 neighborhoods.
Reed	2007	1998	Chicago, IL	Vouchers	Number of HOPE VI and regular voucher holders at the census tract level	Regression analysis on HOPE VI relocation households and regular voucher-holders controlling for household level characteristics. Data include which public housing project they moved out of.	Use of vouchers in HOPE VI relocation did not result in moves to less racially or economically segregated areas, however, they also did not move to areas of greater concentration or cause greater concentration through their moves. The existing pattern of racial and economic segregation in the housing market was the dominant factor.
Wang and Varady	2008	2000-2005	8 MSA's: New York, Baltimore, Chicago, Cincinnati, Miami, Houston, Los Angeles and Phoenix	Vouchers	Extent of concentration of subsidized housing	"Hot Spot" geographic cluster analysis of the spatial distribution of housing vouchers and the changing nature of these clusters over time. Clusters were classified into four types including ongoing, disappearing, emerging, and non-hot spot areas.	There was no evidence of decentralization of vouchers to the suburbs, vouchers are clustered and that these clusters are for the most part growing. There were differences in voucher density and racial and ethnic makeup of clusters in different MSA's.

Carlson, Haveman, Kaplan and Wolfe	2008	2000-2003	State of Wisconsin	Vouchers	Neighborhood quality at the block group level	Uses a quasi-experimental research design with propensity score matching which compares voucher users with matched pairs of households that did not receive vouchers. Measures the impact on employment and earnings, and neighborhood quality.	Voucher receipt was found to have no effect on neighborhood quality initially, but over the longer term resulted in moves to better neighborhood. Initial reduction in earnings also were found to dissipate over time.
Kingsley and Pettit	2008	1994-2002	5 MSA's: Baltimore, Boston, Chicago, Los Angeles, and New York	Vouchers	Poverty, race, and violent crime at the census tract level	Descriptive statistics on neighborhood poverty, race, crime and change in neighborhood poverty rate over time (improved, stable, worsened).	Two-thirds of the initial movers had made a one or more subsequent moves. The average neighborhood poverty rate for MTO participants was 24% up from 13% in the initial move and the average minority share was 79% up from 68%. Regular Section 8 movers did not experience this change in neighborhood characteristics. 43% of MTO movers moved to "worsening" neighborhoods and almost none (1%) moved to "improving" neighborhoods.
VOUCHERS and SITE-BASED							
Gray and Tursky	1986	1977-1978	10 MSA's	Public Housing, Section 8 site-based, Section 236, Vouchers	Race and Income concentration	Descriptive statistics on the ratio of subsidized housing in central cities and suburbs as well as location and extent in high minority census tracts.	The Section 8 certificate program was just beginning implementation and not all areas were covered. Where they were operational, they were much more widely dispersed than public housing and with relatively fewer concentrated in minority areas.
Lyons and Loveridge	1993	early 1990's	Ramsey County, MN	Public housing, other HUD site-based, and vouchers	Property values surrounding subsidized housing at various distances	Hedonic price regression analysis for different types of subsidized housing at various distances.	The number of units has a small but statistically significant negative effect which diminishes with distance from the subsidized housing. Larger increases in the number of subsidized units (larger projects) have more of an impact that individual units being added to neighborhoods.

Hartung and Henig	1997	1994	Washington DC MSA	Public housing (only 25+ unit projects), Section 236, 221(d)(3), 201(d), Section 8 site-based, vouchers, and locally funded projects.	Number of vouchers per tract	Descriptive comparison of voucher and site-based subsidized housing locations in order to assess the outcomes of housing mobility policies. Bi-variate correlations and stepwise regression.	Although there has been some decentralization, voucher holders tend to cluster in racially and economically defined areas. Economic factors appear to be more potent predictors than race.
McClure	2006	2002	U.S.	LIHTC and vouchers	Location in suburban vs. central city location and poverty	Descriptive statistics on location of LIHTC and voucher units by geographic area and neighborhood poverty level. Also compares results of subsidized units to all renters and poor renters.	A larger proportion of LIHTC units are located in low poverty suburban neighborhoods than the HCV. The impact of the LIHTC on suburban tract poverty is minimal.
Deng	2007	1998	6 MSA's: San Jose, New York, Boston, Miami, Cleveland, and Atlanta	LIHTC and vouchers	Income, racial integration and school quality	Descriptive statistics comparing LIHTC to vouchers on neighborhood quality, geographic location, racial concentration and school quality. A GIS is used to create "proximate zones" around each elementary school for purposes of calculating the service area of the school.	Most voucher and LIHTC units are located in areas with schools that perform under state averages, regardless of subsidy type. There was no evidence that a balanced market led to greater income or racial deconcentration.

COMPREHENSIVE (VOUCHERS, PUBLIC HOUSING, OTHER SITE BASED, and LIHTC)							
Newman and Schnare	1997	1990-1994	All MSA's	Public housing, Section 202, Section 236, Section 515 (rural), LIHTC, vouchers, local programs	Poverty, neighborhood distress and race at the census tract level	Descriptive statistics on the spatial distribution of various types of subsidized housing programs in high poverty and "highly impacted underclass" tracts. Multivariate analysis that controls for neighborhood quality and housing market	Most, but not all subsidized housing is located in poor-quality neighborhoods. Public housing (site-based units) are highly concentrated in high poverty and multi-symptom neighborhoods while certificates are more decentralized. The impact from vouchers, however, is considered small. Elderly housing is much more decentralized than family projects.
Rohe and Freeman	2001	1997	National, limited to areas that were tracted in 1980	Public housing, other HUD site-based, LIHTC and vouchers	Poverty and race at the census tract level	Bi-variate analysis and multivariate analysis of subsidized housing programs by elderly and family categories. Separate regressions for each type.	The strongest predictor of location for all types except elderly was the housing value of owner-occupied units in 1980. Other significant variables included percentage African Americans and percent poor, with African Americans particularly strong in predicting the location of LIHTC units.
Van Ryzin and Kamber	2002	1996	New York City Vacancy Study	Public housing, other HUD site-based, LIHTC, vouchers, welfare shelter allowances, rent regulation, tax incentives	Housing quality, crowding, affordability, stability and neighborhood quality (measured by poverty, physical conditions and crime)	Regression analysis for 11 types of housing subsidies controlling for household characteristics, housing stock characteristics and location.	There are tradeoffs between housing quality, cost and location in the different program types. The LIHTC provides higher quality but also high rent burdens for poor households. Project-based programs reduce the rents but at lower quality and neighborhood conditions. Vouchers appear to offer affordable rents, in decent housing with fairly good neighborhood conditions.

Joassart-Marcelli	2007	1998	Southern California	Public housing, other HUD site-based, LIHTC and vouchers	Job access and neighborhood distress	Bi-variate analysis of tract level concentration of subsidized housing with a set of "neighborhood distress" indicators. Regression analysis of location of subsidized housing and work locations controlling for neighborhood distress.	Access to jobs was significantly related to subsidized housing resident income. The percent poor and minority in the census tract were insignificant controlling for other neighborhood distress factors and subsidized housing in the tract.
James	2008	1985-2004	Nationwide and AHS sample of MSA's	Self-reported as receiving a housing subsidy	Housing and neighborhood satisfaction	Descriptive statistics on subsidized housing units. Logit multiple regression on satisfaction controlling for building and resident characteristics.	Residents of subsidized housing report higher satisfaction than non-subsidized renters. There were positive spillover effect which were due to the decreased size and age of the buildings and not from the increased number of total units.
Koschinsky	2009	1987-1997	Seattle, WA	Public housing, other HUD site-based, LIHTC and vouchers	Rental property values in single family and multi-family zones	Geospatial hedonic price analysis of subsidized and unsubsidized rental property sales. Comparison of results using adjusted interrupted time series and difference-in-difference methods.	Larger concentrations of vouchers are the only rentals with negative spillover effects in both low income and high income areas. Negative spillover effects found only in very specific areas consisting of single family zones, near wealthier neighborhoods and having specific racial characteristics. Negative spillover effects not found in multi-family zones.

LITERATURE REVIEWS							
Galster and Zobel	1998	Studies from 1987-1997	Each study is different	Each study is different, primarily site-based	Dispersion, property values, behavior change	Theoretical and meta-analysis of existing studies. Three types of studies are included: 1) case studies of participants in dispersion programs; 2) statistical studies on the impact on property values; and 3) statistical studies on neighborhoods and behavior.	There will be benefits to the overall system if people move out of high poverty areas into the lowest poverty areas but there is little empirical evidence in support of housing dispersal on neighborhood poverty or social behaviors.
Freeman and Botein	2002	Studies from 1974-2001	Each study is different	Each study is different, primarily site-based	Property values, racial transition, poverty concentration and crime	Literature review of neighborhood effects of subsidized housing including impacts on 1) property values; 2) racial transition; 3) poverty concentration and 4) crime. Discussion of methodological problems in designing research to answer these questions.	Studies using hedonic price models were mixed with slight negative, no impact or large positive impacts on property values. Studies of impacts of vouchers were mixed as to positive and negative impacts. Two studies on the impact on racial change found no impact or a small impact not characterized as "white flight". There are serious methodological problems with almost all the studies so that findings are not reliable. Future studies should use proper methodologies and more studies are needed on vouchers.
Nguyen	2005	Studies from 1963-2001	Each study covers one city or county	Each study is different, primarily site-based	Property values surrounding the subsidized housing	Literature review on impacts to property values in areas surrounding subsidized housing. Early studies use matched neighborhoods and later ones use hedonic price regression to control for factors other than the location of the subsidized housing.	Four findings: 1) negative effects (if they were found) were small; 2) design and management are important factors; 3) negative impacts are more likely if clustered in high poverty neighborhoods; and 4) there were a limited number of methodologically sound studies. Qualitative studies are needed to understand property owner motivation. Housing market factors should be considered in quantitative studies.