

The Impact of Regional Government Structure on the Concentration and Supply of Affordable Housing

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Abstract

Public choice theory provides a basis for predicting that a fragmented regional government structure encourages municipalities to limit affordable housing for low-income households, an action that in turn has consequences for the region's overall supply and distribution of such units. This research tests two hypotheses: First, greater fragmentation in a metropolitan region is expected to be associated with increased segregation of affordable rental housing. Second, greater fragmentation is expected to be associated with a smaller supply of affordable rental units relative to the need.

Contrary to these hypotheses, the results show that greater fragmentation is associated with a greater relative supply of affordable housing for extremely low and very low income households, but does not affect its distribution. These findings suggest that a unified government structure may reduce the supply of, rather than the barriers to, affordable housing for low-income households.

Keywords: Affordability; Low-income housing; Urban policy

Introduction

Affordable housing for low-income households consistently faces two challenges. First, there are not enough affordable units to meet the needs of the lowest-income households. The U.S. Department of Housing and Urban Development (HUD) estimated in 2005 that almost 5.18 million very low income households—those whose income is less than half of their area's median—either spend more than half of their income on housing or live in inadequate housing in terms of physical conditions. HUD considers these 5.18 million households, which represent more than 45 percent of the 11.40 million very low income renter households in the United States, to have “worst-case housing needs” (2005, 11). Meanwhile, the National Low

Income Housing Coalition reports that, nationally, there are only 72 affordable and available rental units for every 100 very low income renter households (Pelletiere 2006).

Second, affordable housing for low-income households tends to be concentrated in neighborhoods experiencing economic decline and having a predominantly older housing stock. Historically, more affluent households have migrated to the newer suburbs, leaving the inner city and the older inner-ring suburbs with smaller populations, a declining tax base, cheaper housing stock, and more poverty (Downs 1997; Orfield 1997). As this migration occurs, these concentrations of affordable units tend to be located in the central city, making accessibility to new suburban jobs difficult for low-income households (Bogdon and Can 1997; Coulton, Leete, and Bania 1999).

The primary purpose of this article is to examine the impact of metropolitan governance structures on the supply and geographic distribution of housing affordable to low-income households. A growing number of researchers and activists argue that the fragmented nature of government in metropolitan regions increases the economic and social ills in U.S. cities and suburbs. These problems include concentrated poverty, racial segregation, and limited economic development (Downs 1997; Hart et al. 1998; Lewis 1996; Miller 2002; Orfield 1997, 2002; Rusk 1993).

Public choice theory provides a framework from which to hypothesize that these problems occur as fragmented local municipalities compete with one another for economic growth and financial stability. Municipalities are more concerned with addressing the fears and needs of their local constituents, protecting or improving their tax base, and keeping the cost of public services to a minimum than with considering the consequences of their individual policies on the metropolitan region as a whole (Downs 1994; Lewis 1996). The assumptions drawn from this framework provide a foundation from which we can hypothesize that fragmentation among the governments in a metropolitan area will affect the distribution and supply of affordable housing units throughout the region.¹ As municipalities compete for growth, they may discourage the development and availability of affordable housing that would attract low-income households.

Using 2000 census data (U.S. Bureau of the Census 2000) and three measures of fragmentation, I will test two hypotheses concerning affordable housing units at the regional level: The first is that there is a positive relation-

¹Throughout this article, I use the term “fragmentation” to refer to the degree to which the metropolitan government structure is not unified under a single authority. “Competition,” “intercity competition,” and “power diffusion” are terms frequently used to refer to similar concepts.

ship between government fragmentation within metropolitan regions and the geographic concentration of affordable rental housing units for low-income households. Fragmented municipalities compete to attract middle- and upper-income residents to improve their tax base while discouraging affordable housing for low-income households. As middle- and upper-income residents move up and out to newer units typically found in smaller suburban jurisdictions, older units concentrated in older, weaker jurisdictions may become more affordable (Bier 2001; Downs 1994).

The second hypothesis is that there is a negative relationship between fragmentation and the supply of affordable rental units relative to the number of low-income households. On the one hand, we would expect competing municipalities to discourage affordable housing by using exclusionary zoning practices, as well as by spending less on affordable housing, both of which could decrease the region's overall supply. On the other hand, a more fragmented government structure may indicate a region in which households moving into new, wealthier communities have opened up housing opportunities for lower-income households in older jurisdictions with cheaper housing stock. In this case, the affordable housing supply could increase relative to need.

Theoretical background

Public choice theorists argue that local municipalities will discourage redistributive policies such as affordable housing programs (Basolo 1999). In his seminal article, Tiebout (1956) laid out the argument that people choose a municipality in which to reside based on which local government is best able to satisfy their personal preferences. People vote with their feet by choosing a municipality that offers a preferable mix of public goods and services.

Hamilton's (1975) addition of a pricing mechanism to Tiebout's model has specific implications for the distribution of low-income housing throughout a region. Given that there is a system of property taxes to fund local public services, low-income households have an incentive to occupy low-cost housing in a jurisdiction with a high tax base and a sufficient level of public services. Within a jurisdiction, households consuming units that have a lower-than-average value pay less than their fair share for consumption of public goods. To combat this form of "free-riding" among low-income households, residents have an incentive to use zoning to prohibit housing that is of less value than their own. Households can choose to reside in a jurisdiction whose minimum housing requirements are equal to the type of home they desire and can afford. In terms of the housing stock, this process

will segregate housing units on the basis of their value and affordability.

Using public choice theory as a starting point, Peterson (1981) argues that local decision makers consider their taxing and spending decisions in light of consumers' mobility. He classifies all municipal expenditures as developmental, redistributive, or allocational. He argues that in a fragmented, competitive environment, cities and municipalities give priority to economic productivity or to developmental policies that provide residents with a benefit-to-tax ratio in excess of 1. Redistributive policies that are intended to help lower-income households shift the benefit-to-tax ratio to less than 1 for middle- and upper-income residents because some of their taxes are spent for services they will not receive. Therefore, local governments balk at implementing redistributive services or limit the number of households receiving them.

Peterson (1981) explains his model clearly with regard to expenditures on education, which are typically local. In smaller, homogeneous communities in which most households have a similar economic status, each household is paying an equal share for children's education. In cities with an economically heterogeneous population, education is equitably distributed to all residents, but the taxes that pay for it are not. Higher-income households pay a larger share of education costs yet receive the same benefit as those who pay a lower share. Peterson (1981) argues that through exclusionary zoning policies, a municipality can maintain a relatively homogeneous population in which everyone receives roughly the same share of tax burdens and public services. We would expect to find less affordable housing in a region if a large percentage of municipalities are attempting to limit the number of low-income households within their jurisdictions. In addition, the incentive to form homogeneous communities will increase the concentration of affordable housing.

Downs (1994) argues that a large number of local governments allow for a wider selection for citizens. However, differentiation among municipalities is self-reinforcing. People who move to a municipality for its favorable policies, such as low tax rates, will strengthen those policies politically. To alleviate fears of lower home values, larger expenditures for public services, higher tax burdens, and a weakening tax base, middle- and upper-income households use local jurisdictions to establish control over zoning and other regulations that exclude housing for low-income households. Households have moved increasingly greater distances from the central city to live in smaller jurisdictions with newer, more expensive housing. These jurisdictions make it easier to exclude low-income households. This upward movement among mobile households leaves older units closer to the urban core more readily available to lower-income households. Therefore, units affordable to

low-income households will be limited to the inner cities and older suburbs.

Weiher (1991) provides a different perspective on the population sorting that takes place when there are competing municipalities within regions. He proposes an information-based model whereby households looking for a residence are driven by their preferences and the information that is available to them. He argues that political boundaries provide an easily available source of information on which households base their decisions. This information comes from the identity and specific attributes that each municipality or political unit develops over time. It is these identities from which people choose. The presence of numerous places, each with an identity, allows for a method by which populations are segregated. Weiher (1991) asserts that the numerous local government units in the United States can be seen as “anti-government” in that they are often more concerned with protecting parochial interests and their own identities than with the larger consequences of their policies. He writes that “the result of anti-government is to produce ‘theme-park’ suburbs on the one hand, and slums and ghettos on the other” (Weiher 1991, 166).

Lewis (1996) argues that highly fragmented municipal power will reinforce existing development and social patterns. Multiple decision points, in the form of municipal governments, make it easier to block a regional proposal for reform. Therefore, the status quo is easier to preserve. Multiple local-oriented government units will give higher priority to maintaining local stability and satisfying residents’ preferences than to regional needs, such as affordable housing for low-income households.

Empirical evidence

Rusk (1993) provides evidence that “elastic” cities are better able to address segregation and economic growth. Elastic central cities are those that are growing along with the regional population rather than allowing outlying municipalities to capture a greater share of the growth. Regions in which the central city captures population and economic growth either through an increase in residential density or an expansion of borders experience a more equitable distribution of public services and less segregation than regions in which outlying municipalities have siphoned off growth. Hart et al. (1998) reaffirm Rusk’s (1993) argument that elastic cities are associated with less segregation.

In one of the few direct tests of the relationship between government fragmentation and the distribution of housing units within metropolitan regions, Harris (1999) used a dissimilarity index to measure the segregation

of affordable rental units from unaffordable units in the 100 largest metropolitan areas. Using the number of places in a metropolitan statistical area (MSA) as a measure of fragmentation and HUD's fair market rents as a measure of affordability, she found a positive association between an increase in fragmentation and an increase in the segregation of affordable rental units.

Other empirical tests of the applicability of public choice theory to affordable housing have focused on municipal expenditures. Testing Peterson's (1981) viewpoint, Schneider (1989) examined the relationship between competition among suburban municipalities and their expenditures on developmental and redistributive policies. Measuring competition in various dimensions, including the number of bordering municipalities and the standard deviations for property taxes and expenditures among communities, Schneider (1989) found that competition tended to decrease municipal spending on redistributive policies such as health, welfare, and housing/community development programs at the local level. He also found that competition decreased spending on developmental programs such as streets and highways, sewers, sanitation, transit, and utilities as well. Schneider's (1989) findings support Peterson's (1981) argument that competition inhibits local spending on redistributive programs. But Schneider (1989) found that competition inhibited all types of local municipal expenditures.

Basolo (1999) tested intercity competition and its impact on housing expenditures at the city level. Examining cities that had a population in excess of 25,000, she presented two analyses. First, she provided a logistic regression of the likelihood of a municipality's spending local dollars on affordable housing programs. The analysis revealed that stronger competition among municipalities, as measured by the number of local and county governments within each city's MSA, made municipalities less likely to spend their money on affordable housing.

Her second analysis involved only those municipalities that had local housing expenditures. She used multivariate regression to test the relationship between competition and the amount municipalities spent on housing. She found that no relationship existed and concluded that competition was significant in explaining whether a local municipality spent its own money on housing programs, but not significant in terms of explaining the actual amount that was spent.

Wong (1990) provided a political choice model of urban policy making to complement the economic constraint model proposed by Peterson (1981) and found that development policies received stronger support than redistributive policies such as Section 8 in Baltimore and Milwaukee. However, Wong (1990) argued that Peterson's (1981) model in which local govern-

ments are constrained to economic considerations in decision making does not fully explain the variation of outcomes in development and redistributive policies found among localities. While Wong (1990) does not disregard the economic constraint or public choice model, he found significant political influences. Redistributive policies were more successfully implemented when professional staff, and not elected officials, were responsible for them.

Basolo (2000) examined the influence of both politics and intercity competition on economic development and affordable housing programs. As expected, she found that cities in areas with greater competition, as measured by the number of governments in the metropolitan region (or county if the city was not in a metropolitan region), were more likely to spend more local money on development than on redistributive programs. She also found that elected officials' support of developmental programs was a significant factor in the likelihood of spending more local money on development than on redistributive programs. She concluded that political factors are as important as, if not more important than, competition in understanding local spending on economic development and affordable housing programs.

Schneider (1989), Wong (1990), and Basolo (1999, 2000) all provide an important examination of the relationship between intercity competition and affordable housing by focusing on redistributive expenditures and politics at the local level. While Schneider (1989) looked at redistributive policies in broad terms, Wong (1990) examined local support for Section 8 and Basolo (1999, 2000) measured local expenditures for affordable housing programs. The research I present here adds to the literature on affordable housing and public choice by examining the extent to which fragmentation influences the actual supply of units and their distribution throughout the metropolitan region rather than expenditure patterns at the local level.

Some argue that in addition to influencing local expenditures on housing for low-income households, fragmentation is a cause, or at least a trait, of sprawl because higher-income households move to newer communities farther from the metropolitan center to satisfy their preference for a better living environment and lower taxes for public services. This movement away from the regional center allows housing opportunities to "trickle down" to an affordable level for lower-income households in older communities with an older housing stock (Downs 1998). If this assertion is accurate, we would expect to find that fragmentation is associated with a greater concentration of affordable units, but a greater relative supply of affordable units as well.

There is little empirical evidence on the relationships among fragmentation, the filtering process, and affordable housing for low-income households. Carruthers and Ulfarsson (2002) found that while fragmentation, as

measured by the number of municipal governments per capita, was associated with more sprawling development (lower density), it was also associated with higher property values.

Method

Two hypotheses are derived from the literature on public choice. The first predicts a positive association between fragmentation among municipalities and the segregation of affordable rental housing units in an MSA.² The second is that greater fragmentation is expected to be associated with a smaller supply of affordable rental units relative to the need.

Hypothesis 1

In the first hypothesis, the dependent variable is a dissimilarity index (a measure of distributional evenness) of rental housing units affordable to low-income households among all housing units in the MSA. Recognizing various designations of low income, I use three dependent variables to represent the dissimilarity of affordable rental units for extremely low, very low, and low-income households whose income is less than 30 percent, 50 percent, and 80 percent of the area's median income (AMI), respectively. Rental units defined as affordable cost no more than 30 percent of these income limits. Therefore, units identified as affordable to extremely low income households are those units that cost less than 30 percent of 30 percent of the AMI. Rental units affordable to very low income households cost no more than 30 percent of 50 percent of the AMI.³

There is a long history of attempts to measure the segregation of race and class within metropolitan areas. This research extends those measures to housing units. Massey and Denton (1988) provide a detailed discussion of the multiple measures of segregation. They divide 20 measures into five different primary dimensions of segregation—evenness, exposure, concentration, centralization, and clustering. Duncan and Duncan (1955) provided early evidence that the dissimilarity index was an appropriate tool for mea-

²This research uses the MSA as the level of observation for the metropolitan region. For purposes of this article, MSA and region refer to the MSA or, in Consolidated Metropolitan Statistical Areas, the primary MSA (PMSA).

³Rental units affordable to low-income households are often occupied by households with higher incomes. An alternative definition of the affordable supply is units that are affordable and available. These are affordable units that are not occupied by higher-income households, but rather are currently occupied by a low-income household or are vacant. The supply in this research refers to the number of units affordable to low-income households regardless of the income of the household currently occupying them.

suring segregation. Ever since then, despite its methodological challenges, the index has been the dominant measure of segregation in the literature (James and Tauber 1985).

The dissimilarity index produces a measure of the distributional evenness of a particular minority group within an area. In most cases, the index is used to determine the distribution of a minority population among census tracts in a metropolitan area (Massey and Denton 1988; Iceland, Weinberg, and Steinmetz 2002). In my research, the index measures the distribution of affordable rental units among local jurisdictions.⁴ The formula for the index is as follows:

$$D = \sum t_i |p_i - P| / 2TP(1-P) \quad (1)$$

where t_i = total housing units in jurisdiction i , p_i = affordable rentals as a proportion of the total housing units in jurisdiction i , P = affordable rentals as a proportion of all housing units in the MSA, and T = the total number of housing units in the MSA.

The dissimilarity index ranges from 0 to 1, with 0 being a metropolitan area in which all municipalities have the same proportion of affordable rental units. It is equal to 1 where affordable units are completely segregated. A dissimilarity score of 0.50 would illustrate a metropolitan area in which 50 percent of the affordable units would have to move from a municipality where there is overrepresentation to a municipality where there is underrepresentation to achieve perfect distributional evenness. Clearly, a housing unit cannot move to a different municipality, but the dissimilarity score is meant only as a measure of the distribution.

⁴Local jurisdictions were used as the basis for dissimilarity since the theoretical discussion focuses on fragmentation among municipalities and its impact on municipal behavior. There are two methodological issues relating to dissimilarity at the municipal level. First, unlike census tracts, local jurisdictions vary widely in size. Small social units are more homogenous than larger ones. Also, the measure of dissimilarity among larger social units covers up segregation that occurs within those units. Therefore, the dissimilarity index of an MSA with many small jurisdictions will by its very nature indicate greater segregation than the index of an MSA dominated by fewer and larger jurisdictions (Ostrom 1983). The analyses control for this issue by including the proportion of units in the central city as a control variable indicating the dominance of the central city (which is typically the largest jurisdiction). The results of the following regressions are interpreted as the relationship between fragmentation and segregation of affordable units, keeping the proportion of units in the central city constant.

The second methodological issue is the definition of a municipality. To measure the dissimilarity index for each MSA, each county was divided into places that had expenditures in the Census of Governments (U.S. Bureau of the Census 1997) and the remainder of the county, which was treated as a municipality.

The dissimilarity index measures the segregation of affordable rental units from all other units, regardless of tenure type. Therefore, the index is influenced by the segregation of all rental units in general, regardless of their affordability. Metropolitan regions with more segregation between renter and owner-occupied units will score higher on the dissimilarity index, regardless of the distribution of affordable rental units among all rental units in general.

An alternative dissimilarity index measures the segregation of affordable rental units from unaffordable ones. I did not choose to use this measure for two reasons. First, a dissimilarity index comparing affordable and unaffordable rental units could understate the segregation of affordable units in terms of the region's housing market in general. An admittedly extreme example would be a region with multiple municipalities where only two of them contain rental units. If the same proportion of those rental units was affordable in each of the two municipalities, the dissimilarity score would be very low, even though none of the remaining municipalities had any affordable rental units.

The second reason for measuring the segregation of affordable rental units from all units is based on the argument that fragmentation may encourage municipalities to promote the development of owner-occupied homes that will attract higher-income households and limit the number of rental units, some of which may attract low-income households. If municipalities do successfully "zone out" rental units, a dissimilarity index measuring only the segregation of affordable rental units from all rental units would not capture this effect.

There have been a number of theoretical and methodological arguments against the use of the dissimilarity index as a measure of segregation. One such complaint is that the index is not affected by moves by the minority population from one municipality with overrepresentation to another. The only moves that improve the index score are moves by the minority population from an area with overrepresentation to one with underrepresentation (James and Tauber 1985). In addition, the benefit of having a minority move from a census tract with overrepresentation to one with underrepresentation is the same whether the move involves tracts that are close to evenness or far from it (Winship 1977). Despite these criticisms, the dissimilarity index has remained popular.

The literature on the use of segregation indexes to measure the distribution of certain types of housing units is extremely limited. Foster (2000) used a dissimilarity index to examine the distributional evenness of rental and owner-occupied units in MSAs and its relationship to racial segregation. Har-

ris (1999) used a dissimilarity index to measure the distribution of affordable rental units in MSAs. Both authors used census tracts as their basis.

I use three alternative measures of fragmentation—the primary independent variable—in separate models. The reason for including multiple measures is that each provides a slightly different definition of fragmentation and captures a somewhat different concept. In addition, each measure has its own disadvantages.

The most popular and straightforward measure of fragmentation is a count of the number of government bodies or governments per capita in a geographic region (Basolo 1999, 2000; Bollens 1986; Carruthers and Ulfarsson 2002; Dolan 1990; Hill 1974; Logan and Schneider 1982). The first measure therefore is the number of local governments per 100,000 residents. Each unit of government is assumed to increase a region's political fragmentation since each is assumed to have equal political influence. While this measure captures a primary concept of fragmentation (the presence of a significant number of local governments), it does not capture the different distribution of power that may exist among municipalities within different regions (Dolan 1990; Lewis 1996; Miller 2002).

A second measure of fragmentation determines the extent to which power is distributed among municipalities in a region. The Herfindahl Index (HI), a common measure of market share in the business sector, is used to measure the concentration of total local powers within the largest municipalities of the region. This measure is based on the sum of the squares of each local government's share of total local government expenditures in the MSA. The formula for the HI is as follows:

$$HI = 1 - \sum (x_i / X)^2 \quad (2)$$

where x_i is the total current expenditures of government unit i and X is the total current local government expenditures in the MSA. The HI is a measure of concentration and ranges from 0 to 1, with 0 representing the complete concentration of power within one municipality. A higher HI signifies less concentration of government power. While a simple count of governments does not account for the variance in size and power among them, the HI gives greater weight to large municipalities and is not greatly influenced by the number of small units that could be functioning in the MSA (Miller 2002).

The concept captured by the HI is the extent to which local government is a monopoly within a region. At the extreme, a score of 0 indicates that there is no municipal competition. This concept of fragmentation is much different from a simple count since it includes the extent to which power is concentrated among local municipalities.

A similar index has been used to measure the distribution of population, rather than public expenditures, among jurisdictions within regions (Dawkins 2005). The HI in my research, however, measures the distribution of public expenditures. Following Lewis (1996), public expenditures are a decent measure of local ability to affect zoning and land use decisions. Planning boards and commissions, zoning officers, and consultants all require expenditures. Therefore, the distribution of local public expenditures may provide a better measure of the distribution of power, particularly power over land use decisions, than the distribution of the population.

The third measure of fragmentation is the Metropolitan Power Diffusion Index (MPDI) proposed by Miller (2002). Within an MSA, the MPDI is the sum of the square root of each local government's proportion of total expenditures by all local governments in the MSA. The formula for the MPDI is as follows:

$$\text{MPDI} = \sum (x_i / X)^{1/2} \quad (3)$$

where x_i is the total current expenditures of local government unit i and X is the total local government current expenditures in the MSA. The MPDI is influenced by both the number of governments in an MSA and the distribution of expenditures among them. As is the case with the HI, including government expenditures in the MPDI helps control for varying levels of power among local municipalities. At the same time, taking the sum of the square roots of the contribution of each municipality gives weight to the smaller rather than to the largest governments in the region. It creates an index that ranges from 1 to infinity, with 1 representing complete concentration of power.

The MPDI combines aspects of both the HI and the count of local governments per capita as a measure of fragmentation. In addition to the number of local jurisdictions, the MPDI recognizes that the size and power of municipalities are also important to the concept of fragmentation. As a useful explanation of their differences, Miller (2002) illustrates how these three different measures of fragmentation provide three different comparisons of the same two regions. Consider two regions of equal size, both with total expenditures of \$1 million, with the largest municipality accounting for 90 percent of the total. The only difference is that region A has 6 governments, while region B has 12. The smaller governments share the remaining 10 percent of expenditures in each region equally. A simple count, or count per capita, will show that region A is half as fragmented as region B. The HI will show no difference between the two regions, with A being equal to 0.188 and B being equal to 0.189 because the largest municipality has the same market share regard-

less of the number of smaller municipalities. The MPDI will show that region B is more fragmented than region A but not to the same extent as a count of the governments, with A being equal to 1.656 and B being equal to 1.997. This result arises because the number of smaller governments is greater in region B, but one municipality has the same power in both regions.

These three measures of fragmentation include only the number and current expenditures of local jurisdictions, including local cities and townships. Municipalities are the local form of government that would most likely find it in their economic interest to keep housing for low-income households segregated in areas outside of their jurisdictions. Municipalities have the power to make taxation, spending, zoning, and other localized policy decisions.

The correlations among these three measures are reported in table 1. While they are all significantly correlated with one another, it is clear that the measures consider different aspects of fragmentation. The high correlation between the HI and the MPDI (0.713) illustrates that they are measuring a similar concept of fragmentation. Both try to capture the distribution of power among government units, but the HI gives more importance to the concentration of power within the largest jurisdictions. The number of units per 100,000 residents assumes that all municipal governments have equal power and is less correlated with both the HI (0.240) and MPDI (0.338) than the correlation between the latter two measures.

Other independent variables are included in the model to control for the housing and economic conditions in the regions. In terms of population, the size of the MSA has been shown to be positively correlated with the level of fragmentation (Miller 2002) as well as with indexes of segregation (Cortese, Falk, and Cohen 1976; Glaeser and Vigdor 2001; Massey and Denton 1987). Because the model is examining affordable housing units, the number of units serves as a measure of the region's size.

Other independent variables that have historically affected affordable housing have also been added to the model. An older housing stock is often

Table 1. Correlations of Measures of Fragmentation

	Local Governments per 100,000 residents	HI	MPDI
Local governments per 100,000 residents	1	0.240***	0.338***
HI	0.240***	1	0.713***
MPDI	0.338***	0.713***	1

* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$ (two-tailed tests) (N = 276).

a source of affordable housing for low-income households. Older housing tends to be concentrated in the central city and in older areas within the inner suburban ring. Therefore, we would expect a positive association between the percentage of units that are more than 20 years old and the concentration of affordable rental units.

The percentage of rental units is expected to be negatively associated with the segregation of affordable units. Rental units are more likely to be affordable, particularly for the lowest-income households. Therefore, a housing market with a larger percentage of rental units may allow for a wider distribution of these units throughout the MSA and, in turn, provide a wider distribution of affordable units.

We would expect a positive association between the percentage of housing units that are in structures with two or more units and the segregation of affordable housing. Typically, multiple-unit structures are more likely to provide affordable rental units than single-unit structures and are more concentrated than single-family units simply by their nature.

A higher vacancy rate is predicted to be negatively associated with segregation. Higher vacancy rates could indicate a weak housing market and a greater supply of housing compared with demand. A weak housing market would likely provide a larger and wider distribution of affordable rental units, since rents decline in a weaker market.

Finally, subsidized housing units are an important source of affordable housing, particularly for households with incomes of less than 50 percent of the AMI. The activity of public housing authorities (PHAs) in the MSA is represented by the number of public housing units and Section 8/Housing Choice Voucher, moderate rehabilitation, and Indian Housing program units administered by PHAs as a proportion of the MSA's total number of units. This variable is referred to as "assisted units" throughout the analysis and is included to capture the impact of these programs on the overall segregation of affordable rental units. While vouchers can allow for a better distribution of low-income households, the other units represented by the variable are likely to be highly concentrated because the assistance is unit based or located on Indian tribal lands. Therefore, we would expect a greater proportion of assisted units to be associated with greater segregation of units affordable to households at 30 percent and 50 percent of the AMI.

Two nonhousing variables are added to the model to control for the population composition and the economy of the MSA. Segregation is often discussed in terms of race, not housing units. We would expect that metropolitan areas with a larger nonwhite population might have a higher segregation of affordable rental units. Historically, racial discrimination has

been pervasive in all segments of the housing market. White households have attempted to move out of areas with a high percentage of minorities and have been unwilling to move into neighborhoods that are more than 25 to 33 percent minority (Downs 1999). This fact may make housing in high-minority neighborhoods more affordable. Therefore, we might expect that a metropolitan area with a greater proportion of minorities would have more segregated affordable housing.

Finally, the economy of the metropolitan area strongly affects the local housing market. We would expect that a weak economy, indicated by a higher unemployment rate, could lower the cost of housing and provide a larger supply and wider distribution of affordable rental units within a metropolitan area. However, it would take some time before a high unemployment rate would affect the cost of housing in this manner. Because these analyses are using a snapshot of data from a single point in time, the relationship between unemployment and the distribution of affordable housing is tenuous.

Hypothesis 2

The second hypothesis is that greater fragmentation in an MSA is associated with a smaller relative supply of rental units affordable to low-income households. Less competitive pressure among municipalities would remove some of the barriers to affordable housing. To test this hypothesis, I use the ratio of affordable rental units in an MSA to the number of low-income renter households as the dependent variable. Once again, three dependent variables are used to represent extremely low, very low, and low-income groups. Affordable units are defined as those that cost less than 30 percent of the income limit for each income group. The ratio represents the percentage of low-income renter households that would be able to occupy affordable rental units if all of these units were occupied by low-income households. A value equal to 1 means that there is one affordable rental unit for every low-income renter household. A ratio of 0.5 means that there are two low-income renter households for every affordable unit or that 50 percent of the households could theoretically find a rental unit they could afford.

The primary independent variable is once again represented by three measures of fragmentation. If municipal competition creates incentives for local jurisdictions to discourage affordable housing, we would expect to see a negative relationship between the relative supply of affordable units and fragmentation. While not all municipalities will have the financial and political strength to keep low-income housing outside their borders, if enough of them can compete, the supply of affordable units would be reduced.

The proportion of housing units in the central city, the proportion that are rentals, the proportion that are in structures with two or more units, and the proportion that were built before 1980 are expected to be positively associated with the ratio or positively associated with the supply of affordable rental units relative to the number of low-income renter households. We would also expect that a higher vacancy rate would provide a greater number of affordable housing opportunities by lowering housing costs in a weak market. Therefore, we would expect a higher vacancy rate to be associated with a higher ratio. We would expect the proportion of assisted units to be associated with a higher relative supply of affordable rental units for households with less than 30 percent and 50 percent of the AML.

Once again, a variable for the racial composition as well as the unemployment rate of the metropolitan area was added to the model. On the one hand, we would expect more affordable housing units to be available in a weak economy. On the other, we could also expect more low-income renter households in a weak economy. Because housing prices adjust more slowly than other economic indicators, we would expect higher unemployment to be associated with a smaller supply/demand ratio since there would be a greater number of low-income households.

Data

With the exception of the fragmentation measures and the assisted housing variable, data come from *Summary File 3* of the 2000 census (U.S. Bureau of the Census 2000). The MPDI, HI, and local governments per 100,000 residents are based on data as reported in the 1997 Census of Governments (U.S. Bureau of the Census 1997).⁵ Every five years, the Census of Governments provides detailed revenue and expenditure data from all reporting units. The proportion of housing units assisted by PHA programs is calculated from the HUD's *A Picture of Subsidized Households, 1998*.

Table 2 provides descriptive statistics by census region for the dependent and independent variables. These statistics are presented by census regions to examine the differences among them. As expected, both the MPDI and

⁵Miller's (2002) initial MPDI scores were based on the 1992 Census of Governments and 1990 MSA boundaries. I updated the MPDI using 1997 data, but maintained the 1990 MSA boundaries. Therefore, all variables in this analysis are based on 1990 boundaries. I dropped from the analysis regions that had been merged with another region during the 1990s. I also dropped (P)MSAs that do not have housing units in a central city. Finally, I dropped New England MSAs that are not county based. The removal of these observations means that the sample is not representative of all MSAs, although it is representative of most MSAs with the exception of those in New England.

the HI illustrate higher fragmentation in metropolitan areas of the Northeast than in other census regions. On average, the MPDI was 6.06 and the HI was 0.79 in the Northeast. The differences between the Northeast and the other three regions were statistically significant. Meanwhile, both indexes indicate that the South and West were the least fragmented, with average MPDI scores of 2.39 and 2.53 and average HI scores of 0.43 and 0.52, respectively. The differences in MPDI and HI scores between the South and West were not statistically significant.

However, the number of local governments per 100,000 residents provides a slightly different ranking of regions in terms of fragmentation. Metropolitan regions in the Midwest have, on average, 18.56 local governments per 100,000 residents, compared with 17.39 in the Northeast, 4.53 in the South, and 2.73 in the West. The differences in municipalities per capita among metropolitan areas of the Northeast and Midwest are not statistically significant. These measures illustrate that despite having, on average, a similar number of local governments per capita, there is a more even distribution of power among municipalities in metropolitan areas of the Northeast.⁶

On average, the oldest housing stock is found in the metropolitan areas of the Northeast, where 79 percent of the units are more than 20 years old, compared with 73 percent in the Midwest, 63 percent in the West, and 59 percent in the South. At the same time, the metropolitan areas of the Northeast have the lowest percentage of housing units that are within the borders of the central city. On average, 27 percent of the units there are in the central city, compared with 45 percent in the South, 47 percent in the West, and 49 percent in the Midwest. The Northeast, with a higher fragmentation and a lower percentage of units in the central city, also has the highest dissimilarity score of affordable rental units for extremely low income households, at 0.42 versus 0.30 in the Midwest and South and 0.26 in the West. With the exception of the Midwest and South, the difference between each pair of regions was statistically significant. The dissimilarity index decreased in all regions as the definition of low income was broadened to include very low income and low-income rental units. However, there was a regional difference in the extent to which the segregation of affordable units declined as the low-income cut-off was increased. In the Northeast, the dissimilarity index declined to 0.38 and 0.34 for very low income and low-income cut-offs, respectively. In the West, the change was from 0.24 to 0.23 for very

⁶If metropolitan region A has the same number of municipalities as metropolitan region B, and A has an equal distribution of expenditures across municipalities while B has an uneven distribution, A will have higher MPDI and HI scores.

Table 2. Descriptive Statistics by Region (N = 276)

	Census Region														
	Northeast			Midwest			South			West			All Regions		
	Mean	Standard Deviation		Mean	Standard Deviation		Mean	Standard Deviation		Mean	Standard Deviation		Mean	Standard Deviation	
Ratio of supply to need below 30 percent of the AMI	0.55	0.13		0.63	0.15		0.53	0.14		0.41	0.13		0.53	0.16	
Ratio of supply to need below 50 percent the AMI	1.09	0.22		1.34	0.25		1.08	0.23		0.91	0.22		1.12	0.28	
Ratio of supply to need below 80 percent the AMI	1.41	0.08		1.46	0.09		1.44	0.12		1.32	0.10		1.42	0.12	
Dissimilarity of extremely low income rental units	0.42	0.10		0.30	0.11		0.30	0.11		0.26	0.08		0.31	0.11	
Dissimilarity of very low income rental units	0.38	0.09		0.28	0.09		0.26	0.09		0.24	0.08		0.28	0.10	
Dissimilarity of low-income rental units	0.34	0.07		0.28	0.07		0.27	0.07		0.23	0.06		0.27	0.07	
MPDI (local government)	6.06	2.41		3.93	1.96		2.39	1.05		2.53	1.16		3.24	1.94	
HI (local government)	0.79	0.18		0.56	0.24		0.43	0.27		0.52	0.26		0.52	0.27	
Local governments per 100,000 residents	17.39	12.05		18.56	13.51		4.53	3.60		2.73	2.38		9.49	11.03	
Total housing units (in tens of thousands)	42.01	73.79		23.07	39.65		24.96	32.26		35.17	51.93		28.25	44.65	
Proportion of units in the central city	0.27	0.18		0.49	0.18		0.45	0.21		0.47	0.17		0.45	0.20	
Proportion of rental units	0.32	0.10		0.32	0.06		0.33	0.06		0.36	0.05		0.33	0.07	
Proportion of vacant units	0.09	0.06		0.06	0.02		0.10	0.04		0.06	0.02		0.08	0.04	
Proportion of units built before 1980	0.79	0.07		0.73	0.08		0.59	0.10		0.63	0.10		0.66	0.12	
Proportion of units in multiple-unit structures	0.29	0.16		0.25	0.07		0.22	0.07		0.24	0.07		0.24	0.09	
Proportion of assisted units	0.03	0.02		0.03	0.01		0.03	0.01		0.02	0.01		0.03	0.01	
Proportion of minority population	0.15	0.13		0.13	0.07		0.26	0.11		0.25	0.13		0.21	0.12	
Unemployment rate	0.06	0.02		0.05	0.01		0.06	0.02		0.07	0.03		0.06	0.02	

low income and low-income units, respectively. By contrast, in the Midwest, the dissimilarity index was 0.28 for both very low income and low-income affordable units, and in the South it was 0.26 for very low income units and 0.27 for low-income units.

Metropolitan areas in the West, on average, have the worst relative supply of affordable units for extremely low income renter households, with a supply-to-need ratio of 0.41 versus 0.53 in the South, 0.55 in the Northeast, and 0.63 in the Midwest. The differences between each pair of census regions are statistically significant, with the exception of the South and Northeast.

Hypothesis 1

Using the dissimilarity index as the dependent variable, I used regression with robust standard errors to test the first hypothesis.⁷ Using the Mahalanobis Distance procedure to identify outliers, I removed seven observations from the analysis. Three of these are the largest metropolitan regions in the nation, the PMSAs of New York City; Los Angeles–Long Beach, CA; and Chicago. Two of the other PMSAs that were removed are components of the largest consolidated regions of the country, Jersey City, NJ, and Atlantic City–Cape May, NJ. The two other outliers that were removed are the Naples (FL) MSA and the McAllen–Edinburg–Mission (TX) MSA. Naples has the newest housing stock of all of the metropolitan regions as measured by the proportion of units built after 1980. At the same time, it has the second highest vacancy rate behind Atlantic City–Cape May. The McAllen–Edinburg–Mission MSA has the third newest housing stock and ranks seventh in terms of vacancy rates. Combining the results of the Mahalanobis Distance procedure with the ability to identify the reasons for which the MSAs were likely outliers, it seemed reasonable to remove them from the

⁷The ordinary least squares method was initially used to test the segregation hypothesis. However, the white test indicated the presence of heteroskedasticity in the models, which put the results into question. Heteroskedasticity implies that the initial model is not necessarily efficient and that the levels of significance may be incorrect since the error term varies across observations. The variables presenting heteroskedasticity in the models were the proportion of units in multiple-unit structures, the proportion of assisted units, and the proportion of units that were more than 20 years old. All three were not heteroskedastic in every model. Also, the proportion of rental units was heteroskedastic in the analysis of the second hypothesis. These variables were identified by first regressing the squared residuals on each independent variable. The suspected heteroskedastic variables and their squares were then included in the white test, which was accomplished by regressing the squared residuals of the ordinary least squares model on the combination of suspected heteroskedastic variables and their squares. With multiple variables presenting heteroskedasticity problems, it was difficult to identify the exact relationship between the independent variables and the error term of the regressions.

analysis. Results for each analysis with the outliers included can be found in tables A.1 and A.2. With only one exception, there is little difference in outcomes with the outliers included.⁸

Table 3 provides the correlations for the primary variables of interest in the analyses. The results indicate that the size of the metropolitan region is positively correlated with fragmentation, as shown by the correlation between the number of housing units and the MPDI (0.442) and HI (0.192). However, size is negatively correlated with fragmentation as measured by the number of local governments per 100,000 (-0.228). These different results make sense if larger metropolitan areas have a smaller number of municipalities per capita, but at the same time have a more even distribution of power among them. We might expect that large metropolitan regions have a number of fairly large municipalities in addition to the central city, which would fragment power over a smaller number of localities.

Not surprisingly, the proportion of housing units in the central city was negatively correlated with fragmentation. Its correlation with the MPDI (-0.495) and HI (-0.596) was statistically significant, indicating that a larger central city relative to the region is correlated with a more concentrated distribution of local public expenditures among municipalities. The correlation between the central city and the number of local governments per capita was not significant. These correlations suggest that the central-city variable is a different concept than the one captured by my measures of fragmentation. This variable is discussed further after the regression results.

As expected, there is a positive correlation between fragmentation and the segregation of affordable rental units. The correlations between the MPDI and the dissimilarity index for affordable units for extremely low income (0.503), very low income (0.550), and low-income (0.460) renters are statistically significant. The correlations between the HI and the dissimilarity index are significant as well, with a correlation of 0.488 for extremely low income, 0.468 for very low income, and 0.371 for low-income units. Governments per capita is not as significantly correlated with the segregation of affordable units. The correlation was not statistically significant with the dissimilarity of affordable units for extremely low income households, but was significant for affordable units for very low income (0.145) and low-income (0.255) renters. The regression analyses, however, will show that other fac-

⁸The MPDI's association with the supply of rental units for extremely low income households is statistically significant without outliers, but is not significant in the model with outliers included.

Table 3. Correlations

	Ratio of Supply to Need for Renters with Income below 30 Percent of the AMI	Ratio of Supply to Need for Renters with Income below 50 Percent of the AMI	Ratio of Supply to Need for Renters with Income below 80 Percent of the AMI	Dissimilarity of Extremely Low Income Rental Units	Dissimilarity of Very Low Income Rental Units	Dissimilarity of Low-Income Rental Units	MPDI	HI	Local Governments per 100,000 Residents	Total Housing Units in the Central City (in tens of Thousands)	Percentage of Units in the Central City
Ratio of supply to need for renters with income below 30 percent of the AMI	1	0.803***	0.563***	0.123**	0.110*	0.118**	0.169***	0.013	0.432***	-0.169***	0.022
Ratio of supply to need for renters with income below 50 percent of the AMI	0.80***	1	0.772***	0.057	0.099	0.112*	0.210***	0.030	0.410***	-0.130**	0.055
Ratio of supply to need for renters with income below 80 percent of the AMI	0.563***	0.772***	1	0.065	0.048	0.046	0.120**	0.016	0.152**	-0.046	-0.010
Dissimilarity of extremely low income rental units	0.123**	0.057	0.065	1	0.897***	0.732***	0.503***	0.488***	0.090	0.172***	-0.774***
Dissimilarity of very low income rental units	0.110*	0.099	0.048	0.897***	1	0.872***	0.550***	0.468**	0.145**	0.234***	-0.676***
Dissimilarity of low-income rental units	0.118**	0.112*	0.046	0.732***	0.872***	1	0.460***	0.371***	0.255***	0.091	-0.597***
MPDI	0.169***	0.210***	0.120**	0.503***	0.550***	0.460***	1	0.713***	0.338***	0.442***	-0.495***
HI	0.013	0.030	0.016	0.488***	0.468***	0.371***	0.713***	1	0.240***	0.192***	-0.596***
Local governments per 100,000 residents	0.432***	0.410***	0.152**	0.090	0.145**	0.255***	0.338***	0.240***	1	-0.228***	-0.064
Total housing units (in tens of thousands)	-0.169***	-0.130**	-0.046	0.172***	0.234**	0.091	0.442***	0.192***	-0.228***	1	-0.108*
Percentage of units in the central city	0.022	0.055	-0.010	-0.774***	-0.676***	-0.597***	-0.495***	-0.596***	-0.064	-0.108*	1

*p < 0.10. **p < 0.05. ***p < 0.01 (two-tailed tests).

tors are more important in explaining the distribution of affordable units than fragmentation.

The analyses testing the relationship between government fragmentation and the segregation of affordable rental units, while controlling for other factors, include nine models as shown in table 4. The first three models have as the dependent variable the segregation of affordable rental units for extremely low income households. Each measure of fragmentation is included in a separate model. Models 3 through 6 examine the segregation of affordable rental units for very low income households whose income is less than 50 percent of the AMI. The final three models (7 through 9) perform the same analyses for rental units affordable to low-income households whose income is less than 80 percent of the AMI.

The analyses provide practically no evidence supporting the hypothesis that greater fragmentation of local government is associated with greater segregation of affordable rental units. Only one of the nine models indicates a positive and statistically significant relationship below the 0.05 level of significance. An increase in the number of local governments per capita is associated with greater segregation of rental units affordable to households whose income is less than 80 percent of the AMI. The MPDI and HI measures of fragmentation are not significant in any model.

Three control variables performed in the expected manner. The proportion of rental housing is statistically significant across models 1 through 6. A higher proportion of rental units is associated with a more even distribution of affordable units across the region for extremely low and very low income households. By contrast, a greater proportion of units in multiple-unit structures is associated with greater segregation for all low-income categories. Not surprisingly, a greater proportion of units assisted by PHAs is associated with greater segregation of rental units affordable to extremely low income households.

A greater proportion of housing located in the central city is associated with less segregation of affordable units for all three income levels.⁹ Some regionalists may argue that a larger central city relative to its region is a strong indicator of lower fragmentation. However, multicollinearity did not affect the regressions with both the central-city variable and the measure of

⁹See footnote 4. It is worth repeating that since the research measures dissimilarity across municipalities, the dissimilarity index could show less segregation simply by an increase in the size of the central city, without any actual changes in the distribution of affordable housing.

Table 4. Regression Coefficients for Dissimilarity (among Local Governments) of Affordable Rental Units

	(1) 30% of the AMI	(2) 30% of the AMI	(3) 30% of the AMI	(4) 50% of the AMI	(5) 50% of the AMI	(6) 50% of the AMI	(7) 80% of the AMI	(8) 80% of the AMI	(9) 80% of the AMI
Measures of fragmentation									
MPDI	-0.001	-0.001	-0.001*	0.002	-0.009	-0.000	0.004	-0.021	0.001**
HI									
Local governments per 100,000 residents									
Other variables									
Northeast	0.045*	0.041**	0.052***	0.029	0.037**	0.037**	0.049***	0.064***	0.052***
Midwest	0.010	0.008	0.019	-0.004	0.000	0.001	0.023	0.031***	0.019
South	0.031**	0.031**	0.033***	0.014	0.013	0.014	0.035***	0.033***	0.034***
Housing units per 10,000 residents	0.000	0.000	0.000	0.000	0.000	0.000	-0.000**	-0.000	-0.000
Proportion									
In the central city	-0.386***	-0.394***	-0.386***	-0.269***	-0.282***	-0.275***	-0.206***	-0.233***	-0.215***
Rental	-0.444***	-0.445***	-0.430***	-0.483***	-0.487***	-0.482***	-0.123	-0.132	-0.136
Vacant	-0.182	-0.182	-0.162	-0.210	-0.211	-0.209	-0.207	-0.208	-0.226
Built before 1980	0.076	0.075	0.080	0.114**	0.114**	0.116**	-0.005	-0.004	-0.006
In multiple-unit buildings	0.312**	0.314**	0.307**	0.467***	0.468***	0.463***	0.168*	0.172*	0.168*
Assisted	1.043**	1.032***	1.123**	0.698	0.735*	0.732*	0.386	0.458	0.348
Proportion of minority population	-0.011	-0.009	-0.031	0.043	0.039	0.038	-0.007	-0.014	0.007
Unemployment rate	-0.004	-0.005	-0.008	-0.216	-0.201	-0.211	-0.285	-0.252	-0.275
Constant	0.468***	0.466***	0.465***	0.357***	0.371***	0.363***	0.359***	0.388***	0.370***
Observations	269	269	269	269	269	269	269	269	269
Adjusted R ²	0.67	0.67	0.67	0.60	0.60	0.60	0.47	0.47	0.47

Note: Units are affordable to households whose income is 30 percent, 50 percent, or 80 percent of the area median. *p < 0.10. **p < 0.05. ***p < 0.01 (two-tailed tests).

fragmentation included in the models.¹⁰ The results are interpreted as the relationship between fragmentation and segregation of affordable rental units, keeping the proportion of units in the central city constant.

The central-city variable is included in the model for two reasons. First, it is clear from the correlations and the variance inflation factors that this variable and the fragmentation measures are not capturing the same thing. Second, the model explains a much higher percentage of the variability in the segregation of affordable units when the central-city variable is included. Table 4 indicates that the models explain 67 percent of the variation of dissimilarity for extremely low income rental units, 60 percent for very low income units, and 47 percent for low-income units. By contrast, the models without the central-city variable explain from 44 percent of the variation in dissimilarity for extremely low income rental units to 26 percent for low-income units. (See table A.3.) It is interesting to note that removing the proportion of units in the central city from the analysis makes the MPDI and HI measures of fragmentation become statistically significant and indicates a positive relationship between fragmentation and the segregation of affordable units for all three income categories.

Hypothesis 2

My second hypothesis is that greater fragmentation within a metropolitan region's government structure is associated with a lower relative supply of affordable rental units. If local jurisdictions feel the need to protect or improve their tax base, they will have an incentive to discourage affordable housing units within their borders. If enough jurisdictions can do this successfully, we would expect a decrease in the relative supply of affordable units. To test this hypothesis, I use as the dependent variable the ratio of affordable rental units to the number of low-income renter households. Once again, I use regressions with robust standard errors as the method of analysis.

The regression results presented in table 5 do not support the hypothesis that greater fragmentation is associated with a lower relative supply of affordable rental units. In fact, the findings show just the opposite. Greater fragmentation is associated with a greater supply relative to need. For households with an income of less than 30 percent or less than 50 percent of the

¹⁰The mean of variance inflation factors (VIFs) was highest (2.49) in the analyses using the MPDI as the measure of fragmentation. The values ranged from 3.88 for MPDI and 3.26 for the proportion of rental units to 1.42 for the proportion of units in public housing units. The VIF for the central-city variable was 1.89 when the MPDI was used as the measure of fragmentation. The VIF for the central-city variable was highest in the analyses using HI as the measure of fragmentation, with a factor of 2.10.

Table 5. Regression Coefficients of the Supply Ratio of Affordable Rental Units to the Number of Low-Income Renter Households

	(1) 30% of the AMI	(2) 30% of the AMI	(3) 30% of the AMI	(4) 50% of the AMI	(5) 50% of the AMI	(6) 50% of the AMI	(7) 80% of the AMI	(8) 80% of the AMI	(9) 80% of the AMI
Measures of fragmentation									
MPDI	0.017***			0.032***			0.007		
HI		0.021			0.057			0.049	
Local governments per 100,000 residents			0.003***			0.004***			0.000
Other variables									
Northeast	-0.020	0.027	-0.009	0.042	0.130**	0.091	0.065*	0.081**	0.083**
Midwest	0.054**	0.077***	0.038	0.227***	0.270***	0.226***	0.109***	0.117***	0.116***
South	0.052***	0.054***	0.048**	0.146***	0.151***	0.141***	0.096***	0.100***	0.095***
Housing units per 10,000 residents	-0.001*	-0.000	0.000	-0.000	0.000	0.001	0.000	0.000*	0.001**
Proportion									
In the central city	0.186***	0.156***	0.152***	0.318***	0.273***	0.245***	0.107***	0.122***	0.088**
Rental	-1.108***	-1.097***	-1.158***	-0.869**	-0.840**	-0.927**	-0.071	-0.048	-0.076
Vacant	-0.303	-0.304	-0.377	-1.106**	-1.109**	-1.195**	0.472*	0.472*	0.464*
Built before 1980	0.364**	0.376**	0.358**	0.605**	0.630***	0.606**	0.222***	0.230***	0.225**
In Multiple-unit	-0.432***	-0.467***	-0.432***	-1.077***	-1.152	-1.094**	-0.556**	-0.591**	-0.564**
Assisted	3.977**	4.138***	3.825**	-1.905	-1.615	-1.953	-1.842***	-1.813***	-1.794***
Proportion Minority population	0.188**	0.167**	0.243***	0.188	0.150	0.238	0.204**	0.197**	0.202**
Unemployment rate	-2.764***	-2.754***	-2.726***	-5.272***	-5.273***	-5.201***	-2.216***	-2.258***	-2.200***
Constant	0.633***	0.661***	0.677***	1.309***	1.348***	1.394***	1.373***	1.353***	1.394***
Observations	269	269	269	269	269	269	269	269	269
Adjusted R ²	0.63	0.62	0.64	0.54	0.53	0.54	0.37	0.37	0.37

Note: The dependent variable is the number of affordable rental units to the number of renter households at the specified income level. *p < 0.10. **p < 0.05. ***p < 0.01 (two-tailed tests).

AMI, the MPDI and local governments per 100,000 residents have a positive association with the supply of affordable rental units. The HI is not significant in explaining the supply in these two income categories.

A greater proportion of housing units in the central city is associated with a greater supply of affordable units relative to need for all three income levels. This is an interesting finding in that it indicates that both a greater proportion of units in the central city (while controlling for fragmentation) and a greater fragmentation (while controlling for the central city) are associated with a greater relative supply of affordable units for extremely low and very low income households.¹¹

There was an unexpected negative and significant relationship between the proportion of rental units and the relative supply of affordable rental units for households whose incomes are 30 percent and 50 percent of the AMI. The same unexpected relationship was found for the proportion of units in multiple-unit structures, but for all income groups. Regions with a larger percentage of units that are rentals or are in structures with two or more units are associated with a smaller relative supply of affordable rental units. These results contradict the initial prediction based on the widely accepted conventional wisdom that affordable units for the poorest households are often rentals and are in multiple-unit structures. Quite possibly, expensive housing markets have a higher percentage of rentals and multiple-unit structures because of the high cost of homeownership and single-family dwellings. And while often thought of as more likely to be affordable, rental units and multiple-unit structures in these strong markets are out of the price range for low-income households, particularly extremely and very low income households.

Coefficients for the other independent variables were as expected. A higher proportion of the housing built more than 20 years ago is associated with a higher relative supply of affordable rental units for all income groups. The proportion of PHA-assisted units is associated with a greater relative supply of rental units for households whose income is less than 30 percent of the AMI. However, assisted units are associated with a lower relative supply of rental units for households whose income is less than 80 percent of the AMI. Assisted units are not significant in the analysis of affordable rental units for households whose income is less than 50 percent of the AMI.

A higher unemployment rate is associated with a smaller relative sup-

¹¹Table A.4 provides regression results when the central-city variable is removed from the analysis. While the MPDI becomes statistically insignificant, the number of local governments per capita remains statistically significant.

ply of affordable rental units at all income levels. While a slower economy may not immediately affect the price of housing and therefore the number of affordable units, it likely increases the number of low-income households. This increase in low-income households decreases the supply of affordable units relative to need.

Discussion

These findings suggest that the concentration and supply of affordable housing cannot be adequately explained by public choice theory. Contrary to the initial hypotheses, fragmentation among municipalities does not appear to segregate affordable rental housing units at the municipal level. The second analyses find that fragmentation, as measured by the number of local governments per capita or the MPDI, is associated with a better relative supply of affordable rental units for extremely low and very low income renters.

These three measures capture different aspects of fragmentation and, therefore, build stronger support for the findings than a single measure. The findings suggest that the presence of small municipalities is more significant in explaining the relative supply of affordable rental units for households with incomes below 30 percent and 50 percent of the AMI than the concentration of power within the largest jurisdictions. The results indicate a positive relationship between a more dispersed distribution of power among small municipalities and the supply of affordable housing.

The implications of these findings put into question the popular argument that a more unified government structure provides positive consequences for a metropolitan area's social equity with regard to housing. The results serve as a word of caution for those expecting such a structure to improve the supply and distribution of affordable housing for low-income households. However, these results should not lead to the conclusion that encouraging a more fragmented metropolitan government structure is an effective affordable housing policy. First, reducing fragmentation may have other regional nonhousing benefits, such as a reduction in tax-base disparities, improved comprehensive planning, and a more efficient coordination of services. Second, given that this research focuses on data from a single point in time, no causal inferences can be drawn. Greater fragmentation does not necessarily *cause* an increase in the supply of affordable units. This is a point that will be discussed in the suggestions for future research.

There are at least three potential reasons why less fragmentation among municipalities does not automatically create an environment in which affordable housing is readily accepted. Each of them suggests that affordable housing

policy needs greater attention in regions with a less fragmented government structure, particularly with regard to the supply of affordable units.

First, Hamilton (1978) found limited evidence that the concentration of government decision making in regions actually increased the cost of housing. Homeowner households have an economic incentive to limit the supply of housing in order to increase the value of their homes. He argued that if land use power is concentrated within a small number of municipalities, there is a stronger monopoly over land use restrictions that will be employed to increase house prices. If we compare an MSA that has only a few large municipalities with an MSA that has many small jurisdictions, we may find that the former municipalities have monopoly-type land use powers that make it easier to keep prices inflated in the region.

Evidence supporting Hamilton's (1978) monopoly hypothesis, however, is mixed. Fischel (1980) reexamined the monopoly hypothesis that unified government will increase housing prices. Comparing monopoly urban areas with fragmented urban areas, he claimed that the hypothesis was not proved. However, more recently, Thorson (1996) examined 10 urbanized areas in the Northeast. Measuring monopolistic zoning power as the proportion of suburban land controlled by the four largest suburbs, he found evidence that a greater concentration of zoning power was associated with higher housing prices.

Second, predictions of municipal behavior derived from public choice theory assume rational decision making grounded in economics. However, it has been established that affordable housing suffers from the NIMBY ("not in my backyard") syndrome (Basolo and Hastings 2003; HUD, Advisory Commission on Regulatory Barriers to Affordable Housing 1991). NIMBYism may nor may not stem from economic reasoning and may result from sociological factors. If middle- and high-income residents do not wish to live close to extremely low income residents because of prejudices or do not wish to provide affordable housing because of ideological reasons, government structure may have little relevance. If NIMBYism is strong and not grounded in economics, residents would still prefer to provide a limited amount of low-income housing located somewhere other than in close proximity to their own homes regardless of a fragmented or concentrated government structure.¹²

¹²Measuring the dissimilarity of affordable units among census tracts allows for an analysis of segregation among neighborhoods. That analysis is not the focus of this article. However, an analysis of dissimilarity among census tracts provided no support for the public choice theory that less fragmentation is associated with a more even distribution of affordable units. Instead, it provided tentative, though not definitive, evidence that greater fragmentation is associated with a more even distribution among census tracts of rental units affordable to extremely low income households.

Third, little is known about the relationship among fragmentation, sprawl, and the supply of affordable housing. As development on the urban/rural fringe increases, the increase in the supply of residential land may make housing more affordable. In addition, as mobile households move outward from the urban core to newer units, older inner-core units become more readily available to lower-income households. If sprawl is partially a result of fragmentation, it helps explain the finding that greater fragmentation is associated with a better relative supply of affordable rental units for households with incomes below 50 percent of the AMI.

However, there is little rigorous empirical evidence in support of the common notion that fragmentation and decentralized planning cause sprawl-type development. In a study of metropolitan regions in the United States and Canada, Razin and Rosentraub (2000) found evidence that the impact of sprawl on fragmentation is significant, but not the reverse. These findings suggest that the positive relationship between fragmentation and the supply of affordable units may be partially the result of sprawl, rather than fragmentation per se.

Limitations of the current study and suggestions for future research

At least three limitations to this analysis should be explored in future research if we are to more fully understand the relationship between the structure of local governments within a region and the supply of affordable housing for low-income households. Given these limitations, further research is needed to strengthen the results presented here.

First, this research has tested the relationship between fragmentation among municipalities and affordable housing at only one point in time. It does not provide a definitive test of causal explanations. Without testing causal relationships over time, we have no evidence of how changes in fragmentation would affect the distribution and supply of affordable housing. In addition to using a longitudinal large-scale data set to examine these changes, another future avenue of research is to examine the change in the location and supply of affordable housing in a particular region as it implements reform to reduce fragmentation.

The second limitation is the potential endogeneity between the distribution of affordable housing and fragmentation. Racial or class biases among the population of a metropolitan area may result in the segregation of affordable housing units for low-income households. Once segregation occurs, it could then be reinforced by the designation of municipal borders and zoning

arrangements.¹³ This explanation asserts that there is a two-way relationship between fragmentation and the distribution of affordable units rather than the unidirectional relationship that was tested in the analyses. Future research should test for this possibility.

The third limitation is that the current research does not address the relationship among fragmentation, sprawl, and affordable housing. Future research that examines the relationships among these three variables simultaneously would be useful in the ongoing discussion of metropolitan governance, sprawl, and growth management and their impact on housing. Given the results of the current analyses on the association between fragmentation and the relative supply of affordable rental units for extremely low and very low income households, future research should explore the process by which the fragmentation of government increases the supply of housing for low-income households. This future research would provide an important contribution to the ongoing debate on growth management policies, particularly with regard to managing sprawl through concentrated regional planning, and their impact on housing.

Finally, further discussion of the meaning and appropriate measure of fragmentation itself would improve the dialogue between both sides of the decentralization versus centralization debate on local government structure within metropolitan regions. The current analyses use three separate measures of fragmentation in separate models. A discussion of the differences among these three measures is provided as a way to explain the importance of using all of them, since each one captures a slightly different concept of fragmentation. I would argue that the HI defines fragmentation as competition because it assumes that small municipalities are insignificant if they are overshadowed by relatively larger jurisdictions that capture the market-share of local government. Within this measure, small municipalities are not as pertinent to fragmentation as the lack of large municipalities relative to the size of the region. By contrast, the MPDI and local governments per capita define fragmentation as multiple municipal boundaries and put less emphasis on the relative size of municipalities. This is less true of the MPDI since it attempts to include both the number of municipalities and their relative size. This article makes no attempt to assess which measure of fragmentation is more appropriate than the others. This important question is left to future research.

¹³This point was made by an anonymous reviewer.

Appendix

Table A.1. Regression Coefficients for Dissimilarity (among Local Governments) of Affordable Rental Units

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	30%	30%	30%	50%	50%	50%	80%	80%	80%
	of the	of the	of the	of the	of the	of the	of the	of the	of the
	AMI	AMI	AM	AMI	AMI	AMI	AMI	AMI	AMI
Measures of fragmentation									
MPDI	0.001			0.005			0.003		
HI		-0.005			-0.002			-0.013	
Local governments per 100,000 residents			-0.001*			0.000			0.001**
Other variables									
Northeast	0.037*	0.039**	0.047**	0.018	0.034**	0.032*	0.056***	0.067***	0.054***
Midwest	0.008	0.010	0.019	-0.005	0.003	0.002	0.028**	0.034***	0.021*
South	0.027**	0.027*	0.028**	0.012	0.012	0.012	0.036***	0.035***	0.035***
Housing units per 10,000 residents	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	0.000	0.000
Proportion									
In the central city	-0.372***	-0.378***	-0.377***	-0.253***	-0.272***	-0.270***	-0.199***	-0.220***	0.207***
Rental	-0.473***	-0.475***	-0.457***	-0.457***	-0.466***	-0.467***	-0.024	-0.032	-0.050
Vacant	-0.092	-0.097	-0.080	-0.222	-0.241*	-0.242*	-0.245*	-0.263*	-0.274*
Built before 1980	0.082	0.082	0.087	0.119**	0.120**	0.120**	0.020	0.019	0.015
In multiple-unit buildings	0.225	0.224*	0.210	0.295**	0.281**	0.283**	0.015	0.008	0.023
Assisted	0.610	0.614	0.677	0.212	0.219	0.208	0.255	0.269	0.174
Proportion of minority population	0.008	0.008	-0.012	0.047	0.045	0.048	-0.027	-0.029	-0.003
Unemployment rate	-0.253	-0.248	-0.257	-0.447	-0.453	-0.455	-0.358	-0.348	-0.358
Constant	0.501***	0.508***	0.504***	0.396***	0.424***	0.422***	0.350***	0.379***	0.365***
Observations	276	276	276	276	276	276	276	276	276
Adjusted R ²	0.66	0.66	0.67	0.57	0.57	0.57	0.44	0.44	0.45

Note: Units are affordable to households whose income is 30 percent, 50 percent, or 80 percent of the area median.

* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$ (two-tailed tests).

Table A.2. Regression Coefficients of the Supply Ratio of Affordable Units to the Number of Low-Income Renter Households

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	30%	30%	30%	50%	50%	50%	80%	80%	80%
	of the	of the	of the	of the	of the	of the	of the	of the	of the
	AMI	AMI	AM	AMI	AMI	AMI	AMI	AMI	AMI
Measures of fragmentation									
MPDI	0.008			0.020**			0.005		
HI		0.003			0.039			0.038	
Local governments per 100,000 residents			0.003***			0.003**			0.000
Other variables									
Northeast	0.011	0.033	0.001	0.088	0.141**	0.109*	0.071**	0.082***	0.086***
Midwest	0.063**	0.075***	0.039	0.239***	0.268***	0.231***	0.105***	0.111***	0.113***
South	0.047**	0.047**	0.043**	0.143***	0.146***	0.139***	0.099***	0.102**	0.099***
Housing units per 10,000 residents	-0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000
Proportion									
In the central city	0.172***	0.149***	0.155***	0.296***	0.259***	0.238***	0.090**	0.101**	0.072**
Rental	-1.184***	-1.195***	-1.257***	-0.993**	-1.012**	-1.091**	-0.127	-0.125	-0.136
Vacant	-0.022	-0.047	-0.102	-0.841**	-0.889**	-0.970**	0.403**	0.405**	0.384*
Built before 1980	0.360***	0.362***	0.344***	0.588***	0.597***	0.573***	0.240***	0.246***	0.241***
In multiple-unit buildings	-0.181	-0.203	-0.153	-0.685**	-0.747**	-0.685**	-0.331**	-0.352**	-0.346**
Assisted	4.680***	4.685***	4.438***	-0.761	-0.770	-1.020	-1.475**	-1.498**	-1.473**
Proportion of minority population	0.183**	0.180**	0.254***	0.185	0.178	0.261	0.225***	0.224***	0.224***
Unemployment rate	-2.469***	-2.485***	-2.468***	-4.833***	-4.909***	-4.850***	-2.221***	-2.271***	-2.229***
Constant	0.571***	0.606***	0.606***	1.228***	1.290***	1.324***	1.337***	1.328***	1.364***
Observations	276	276	276	276	276	276	276	276	276
Adjusted R^2	0.60	0.60	0.62	0.54	0.53	0.54	0.35	0.35	0.35

Note: The dependent variable is the number of affordable rental units to the number of renter households at the specified income level.

* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$ (two-tailed tests).

Table A.3. Regression Coefficients for Dissimilarity (among Local Governments) of Affordable Rental Units (Central-City Variable Omitted)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	30%	30%	30%	50%	50%	50%	80%	80%	80%
	of the	of the	of the	of the	of the	of the	of the	of the	of the
	AMI	AMI	AMI	AMI	AMI	AMI	AMI	AMI	AMI
Measures of fragmentation									
MPDI	0.022***			0.018***			0.017***		
HI		0.133***			0.089***			0.061***	
Local governments per 100,000 residents			-0.000			0.000			0.001**
Other variables									
Northeast	0.021	0.066***	0.098***	0.012	0.055***	0.070***	0.037*	0.080***	0.078***
Midwest	-0.036*	-0.010	-0.002	-0.036**	-0.013	-0.014	-0.002	0.019	0.007
South	0.018	0.032*	0.016	0.005	0.013	0.002	0.028**	0.033**	0.024*
Housing units per 10,000 residents	-0.000	0.000**	0.001***	-0.000	0.000**	0.000***	-0.000***	-0.000	0.000
Proportion									
Rental	-1.010***	-0.886***	-1.109***	-0.877***	-0.811***	-0.966***	-0.425***	-0.399***	-0.514***
Vacant	0.022	0.000	0.066	-0.068	-0.076	-0.046	-0.098	-0.097	-0.099
Built before 1980	0.037	0.064	0.047	0.086	0.106	0.092	-0.026	-0.011	-0.024
In multiple-unit buildings	0.438***	0.328**	0.420***	0.555***	0.479***	0.544***	0.235***	0.181**	0.231***
Assisted	0.501	0.631	0.727	0.320	0.441	0.450	0.097	0.215	0.128
Proportion of minority population	0.081	0.052	0.055	0.107	0.084	0.099	0.041	0.023	0.055
Unemployment rate	-0.042	-0.154	0.005	-0.243	-0.310	-0.203	-0.306	-0.342	-0.268
Constant	0.416***	0.365***	0.478***	0.321***	0.297***	0.372***	0.331***	0.327***	0.377***
Observations	269	269	269	269	269	269	269	269	269
Adjusted R^2	0.41	0.44	0.37	0.43	0.43	0.39	0.30	0.28	0.26

Note: Units are affordable to households whose income is 30 percent, 50 percent, or 80 percent of the area median.

* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$ (two-tailed tests).

Table A.4. Regression Coefficients of the Supply Ratio of Affordable Units to the Number of Low-Income Renter Households (Central-City Variable Omitted)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	30%	30%	30%	50%	50%	50%	80%	80%	80%
	of the	of the	of the	of the	of the	of the	of the	of the	of the
	AMI	AMI	AMI	AMI	AMI	AMI	AMI	AMI	AMI
Measures of fragmentation									
MPDI	0.005			0.013			0.001		
HI		-0.034			-0.038			0.006	
Local governments per 100,000 resident			0.003***			0.004***	0.000		
Other variables									
Northeast	-0.009	0.016	-0.028	0.062	0.112*	0.061	0.071**	0.073**	0.072**
Midwest	0.076***	0.084***	0.046*	0.265***	0.283***	0.239***	0.122***	0.123***	0.120***
South	0.058***	0.054***	0.055***	0.157***	0.150***	0.152***	0.100***	0.100***	0.099***
Housing units per 10,000 residents	-0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000	0.000*	0.000*
Proportion									
Rental	-0.835***	-0.918***	-0.890***	-0.403	-0.527	-0.497	0.086	0.092	0.079
Vacant	-0.402	-0.379	-0.467*	-1.275***	-1.238**	-1.340***	0.415*	0.414*	0.412*
Built before 1980	0.383***	0.381***	0.371***	0.638***	0.638***	0.626***	0.233***	0.234***	0.232***
In multiple-unit buildings	-0.493***	-0.473***	-0.477***	-1.181***	-1.162***	-1.166***	-0.591***	-0.596***	-0.590***
Assisted	4.239***	4.301***	3.981***	-1.458	-1.331	-1.702	-1.692***	-1.686***	-1.703***
Proportion of minority population	0.144*	0.143*	0.209**	0.113	0.106	0.184	0.179**	0.177**	0.183**
Unemployment rate	-2.746***	-2.694***	-2.731***	-5.240***	-5.167***	-5.208***	-2.205***	-2.210***	-2.203***
Constant	0.659***	0.702***	0.672***	1.352***	1.420***	1.386***	1.388***	1.385***	1.391***
Observations	269	269	269	269	269	269	269	269	269
Adjusted R^2	0.60	0.60	0.62	0.51	0.51	0.52	0.35	0.35	0.35

Note: The dependent variable is the number of affordable rental units to the number of renter households at the specified income level.

* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$ (two-tailed tests).

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The author thanks Sabina Deitrick, Angela Foster, Mickey Lauria, and anonymous reviewers for their helpful comments on earlier drafts, as well as Christopher Briem for his suggestions on the Census of Governments and measures of fragmentation.

This article was prepared under grant number H-21369SG from the U.S. Department of Housing and Urban Development, Office of University Partnerships. The views or opinions expressed in this document are those of the author and do not necessarily represent the department's official position or policies.

References

Basolo, Victoria. 1999. The Impacts of Intercity Competition and Intergovernmental Factors on Local Affordable Housing Expenditures. *Housing Policy Debate* 10(3):659-88.

Basolo, Victoria. 2000. City Spending on Economic Development versus Affordable Housing: Does Inter-City Competition or Local Politics Drive Decisions? *Journal of Urban Affairs* 22(3):317-32.

Basolo, Victoria, and Dorian Hastings. 2003. Obstacles to Regional Housing Solutions: A Comparison of Four Metropolitan Areas. *Journal of Urban Affairs* 25(2):449-72.

Bier, Thomas. 2001. *Moving Up, Filtering Down: Metropolitan Housing Dynamics and Public Policy*. Washington, DC: Brookings Institution.

Bogdon, Amy, and Ayse Can. 1997. Indicators of Local Housing Affordability: Comparative and Spatial Approaches. *Real Estate Economics* 25(1):43-81.

Bollens, Scott. 1986. A Political-Ecological Analysis of Income Inequality in the Metropolitan Area. *Urban Affairs Quarterly* 22:221-41.

Carruthers, John I., and Gudmundur F. Ulfarsson. 2002. Fragmentation and Sprawl: Evidence from Interregional Analysis. *Growth and Change* 33(3):312-40.

Cortese, Charles F., R. Frank Falk, and Jack K. Cohen. 1976. Further Considerations on the Methodological Analysis of Segregation Indices. *American Sociological Review* 41(4):630-37.

Coulton, Claudia, Laura Leete, and Neil Bania. 1999. Housing, Transportation, and Access to Suburban Jobs by Welfare Recipients in the Cleveland Area. In *The Home Front: Implications of Welfare Reform for Housing Policy*, ed. Sandra J. Newman, 123-48. Washington, DC: Urban Institute Press.

- Dawkins, Casey. 2005. Tiebout Choice and Residential Segregation by Race in U.S. Metropolitan Areas, 1980–2000. *Regional Science and Urban Economics* 35:734–55.
- Dolan, Drew A. 1990. Local Government Fragmentation: Does It Drive Up the Cost of Government? *Urban Affairs Quarterly* 26:28–45.
- Downs, Anthony. 1994. *New Visions for Metropolitan America*. Washington, DC: Brookings Institution.
- Downs, Anthony. 1997. The Challenge of Our Declining Big Cities. *Housing Policy Debate* 8(2):359–408.
- Downs, Anthony. 1998. How America's Cities Are Growing. *Brookings Review* 16(4):8–12.
- Downs, Anthony. 1999. Some Realities about Sprawl and Urban Decline. *Housing Policy Debate* 10(4):955–74.
- Duncan, Otis Dudley, and Beverly Duncan. 1955. A Methodological Analysis of Segregation Indexes. *American Sociological Review* 20(2):210–17.
- Fischel, William A. 1980. Zoning and the Exercise of Monopoly Power: A Reevaluation. *Journal of Urban Economics* 8:283–93.
- Foster, Angela Williams. 2000. Patterns in Racial Residential and Housing Type Concentration across Metropolitan Statistical Areas. *Housing and Sustainable Community Development* 1:84–98.
- Glaeser, Edward L., and Jacob L. Vigdor. 2001. *Racial Segregation in the 2000 Census: Promising News*. Washington, DC: Brookings Institution.
- Hamilton, Bruce. 1975. Zoning and Property Taxes in a System of Local Governments. *Urban Studies* 12(2):205–11.
- Hamilton, Bruce. 1978. Zoning and the Exercise of Monopoly Power. *Journal of Urban Economics* 5(1):116–30.
- Harris, Laura. 1999. A Home Is More Than Just a House: A Spatial Analysis of Housing for the Poor in Metropolitan America. Ph.D. diss. State University of New York at Albany, Department of Sociology.
- Hart, Kevin D., Stephen J. Kunitz, Ralph R. Sell, and Dana B. Mukamel. 1998. Metropolitan Governance, Residential Segregation, and Mortality among African Americans. *American Journal of Public Health* 88(3):434–44.
- Hill, Richard Child. 1974. Separate and Unequal: Government Inequality in the Metropolis. *American Political Science Review* 68(4):1557–68.
- Iceland, John, Daniel H. Weinberg, and Erika Steinmetz. 2002. *Racial and Ethnic Residential Segregation in the United States: 1980–2000*. Washington, DC: U.S. Government Printing Office.

- James, David R., and Karl E. Tauber. 1985. Measures of Segregation. *Sociological Methodology* 15:1–32.
- Lewis, Paul. 1996. *Shaping Suburbia: How Political Institutions Organize Urban Development*. Pittsburgh: University of Pittsburgh Press.
- Logan, John R., and Mark Schneider. 1982. Governmental Organization and City/Suburb Income Inequality, 1960–1970. *Urban Affairs Quarterly* 17(3):303–18.
- Massey, Douglas S., and Nancy A. Denton. 1987. Trends in Residential Segregation of Blacks, Hispanics, and Asians: 1970–1980. *American Sociological Review* 52(6):802–25.
- Massey, Douglas S., and Nancy A. Denton. 1988. The Dimensions of Residential Segregation. *Social Forces* 67(2):281–315.
- Miller, David Y. 2002. *The Regional Governing of Metropolitan America*. Cambridge, MA: Westview.
- Orfield, Myron. 1997. *Metropolitics: A Regional Agenda for Community and Stability*. Washington, DC: Brookings Institution Press.
- Orfield, Myron. 2002. *American Metropolitics: The New Suburban Reality*. Washington, DC: Brookings Institution Press.
- Ostrom, Elinor. 1983. The Social Stratification-Government Inequality Thesis Explored. *Urban Affairs Quarterly* 19(1):91–112.
- Pelletiere, Danilo. 2006. *The Rental Housing Affordability Gap: Comparison of 2001 and 2003 American Housing Surveys*. Washington, DC: National Low Income Housing Coalition.
- Peterson, Paul. 1981. *City Limits*. Chicago: University of Chicago Press.
- Razin, Eran, and Mark Rosentraub. 2000. Are Fragmentation and Sprawl Interlinked? North American Evidence. *Urban Affairs Review* 35(6):821–36.
- Rusk, David. 1993. *Cities without Suburbs*. Washington, DC: Woodrow Wilson.
- Schneider, Mark. 1989. *The Competitive City: The Political Economy of Suburbia*. Pittsburgh: University of Pittsburgh Press.
- Thorson, James A. 1996. An Examination of the Monopoly Zoning Hypothesis. *Land Economics* 72(1):43–55.
- Tiebout, Charles. 1956. A Pure Theory of Local Expenditures. *Journal of Political Economy* 64(5):416–24.
- U.S. Bureau of the Census. 1997. *Census of Governments, 1997*. Washington, DC.
- U.S. Bureau of the Census. 2000. *Census 2000, Summary File 3*. Washington, DC.

U.S. Department of Housing and Urban Development, Advisory Commission on Regulatory Barriers to Affordable Housing. 1991. *"Not in My Backyard": Removing Barriers to Affordable Housing*. Washington, DC.

U.S. Department of Housing and Urban Development. 1998. *A Picture of Subsidized Households, 1998*. Washington, DC.

U.S. Department of Housing and Urban Development. 2005. *Affordable Housing Needs: A Report to Congress on the Significant Need for Housing*. Washington, DC.

Weihner, Gregory R. 1991. *The Fractured Metropolis: Political Fragmentation and Metropolitan Segregation*. Albany, NY: State University of New York Press.

Winship, Christopher. 1977. A Revaluation of Indexes of Residential Segregation. *Social Forces* 55(4):1058–66.

Wong, Kenneth K. 1990. *City Choices: Education and Housing*. Albany, NY: State University of New York Press.