

Do Metropolitan Areas With Rich Central Cities Experience Less Sprawl?

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This study explores the extent to which richer central cities are associated with slower suburban sprawl. The authors use a unique approach to categorizing municipalities in urbanized areas based on their relative densities. Richness is measured in terms of the central city's relative share of high-income households. The central finding (both for the decade from 1990 to 2000 and for 2000 to 2004) is that although metropolitan areas with rich central cities sprawl somewhat less, the pace of suburban sprawl is primarily driven by metropolitan growth.

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In the 1990s, a somewhat curious political coalition of city advocates and suburban planners emerged to champion central cities and challenge suburban sprawl.¹ Key to this coalition was the conviction that urbanized areas with central cities capable of attracting substantial middle- and upper-middle-class populations would experience slower sprawl than those urbanized areas with poorer central cities. The purpose of this study is to explore the extent to which this premise is supported by recent data. Our basic finding is that although richer central cities have somewhat lower levels of sprawl, perhaps not surprisingly, the pace of suburban sprawl is still primarily driven by metropolitan growth.

In the United States, urban sprawl, or decentralization of residences and employment, is ubiquitous and has been expanding for at least the past 50 years (Glaeser & Kahn, 2004; Mieszkowski & Mills, 1993). Historically, federal housing subsidies, consumer preferences, cheaper land in the suburbs, increased automobile use and highway construction, and decentralization of employment have been blamed for the growth of sprawl as middle- and high-income (mostly White) households have located in new low-density suburbs. Suburbs have traditionally been richer than central cities, which continue to disproportionately house the poor. The prevailing explanations for central city–suburban income differences emphasize the income elasticity of the demand for land, the availability of public transportation in central cities, and pro-poor central-city governments (Glaeser, Kahn, & Rappaport, 2000). In recent years, the expansion of gentrification in a number of central cities has received considerable attention, although the extent of these developments remains to be fully explored (Vigdor, 2002).

Procity forces have long argued for rebuilding the economic base of central cities (Persky, Sclar, & Wiewel, 1992). In that view, increasing the number of city jobs can directly address the job mismatch problem that has befuddled the employment prospects of African American, Hispanic, and immigrant populations. These advocates have also emphasized the benefits of attracting middle- and upper-middle-class households to the central city.

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When environmental groups and suburban activists began to seriously question the continued expansion of loosely planned suburban job sprawl and residential development, a coalition between progressives in cities and suburbs seemed a natural outcome. Smart-growth initiatives aimed at slowing sprawl emphasized traditional growth controls but also increasingly endorsed the rebuilding of central cities. A key assumption of such efforts was that metropolitan areas that were successful in maintaining or attracting middle- and upper-middle-class households in their central cities would inevitably experience less sprawl (Katz, 2000; Wiewel & Persky, 2002). Such an assertion is essentially an empirical question: Are richer central cities associated with less sprawl?

METHOD AND DATA

We used data from the U.S. Department of Housing and Urban Development's HUDUSER—States of Cities data set (U.S. Department of Housing and Urban Development, 2005). Using the new definition, that is, core-based statistical areas (CBSAs), we compiled demographic, education, geographic, and regional variables for 361 urban areas, although our analysis includes only 83 large areas (greater than 250,000 people) with 25 or more suburban places.

We aggregated places, both incorporated places and unincorporated census-designated places, by their population densities. We defined four rings for the urbanized part of each CBSA, three suburban rings and the primary (largest) city.² The suburban rings are defined in terms of relative density levels from low density (Suburban Ring 1), through mid-density (Suburban Ring 2), to high density (Suburban Ring 3). Membership in one of the three suburban rings is based on each suburb's density compared to the density distribution of all suburban places in its own CBSA.³ Those suburbs with less density than the density of a suburban place in the 33rd percentile of their own CBSA are grouped as Ring 1, those with density greater than the 33rd percentile and less than the 66th percentile are grouped as Ring 2, and the remaining suburbs are grouped as the higher density or Ring 3 suburbs.⁴

After places are assigned to one of the four rings in their urbanized areas, the average annual population growth (for both 1990 to 2000 and 2000 to 2004) for all rings can be calculated. These growth rates are labeled G_{ij} in Equation 1 below, where j takes values of 1 to 4 to denote low density, mid-density, high density, and central city, respectively. Any given equation is estimated for 83 rings (or 82 rings in 2000 to 2004) for a single period. In effect, we identify sprawl with the rapid growth of low-density places in the metropolitan area.

The approach taken here consists of a system of four equations (one for each density ring, $j = 1$ to 4) for each of two periods ($t = 1990$ to 2000 and 2000 to 2004),

$$G_{ij} = \delta_i + a PG_i + b CHR_i + c CB_i + d CHISP_i + e CPS_i, \quad (1)$$

where G_{ij} denotes the average annual growth rate of density ring j in the urbanized area i during the period t . PG (PlaceGrowth) is the annual urbanized area growth rate, CHR (City High-Income Relative) denotes the central-city relative share of high-income households at the beginning of the period, CB (City % Black) is the central-city Black population share at the beginning of the period, CHISP (City % Hispanic) is the central-city Hispanic population share at the beginning of the period, and CPS (City Population Share) is the central city's share of urbanized area population at the beginning of the period.

The variables on the right-hand side of all four equations are exactly the same. The first equation, that for low-density places, is of central interest. Estimating all four equations allows us to explore the influence of the independent variables on growth in the central city and more-dense suburbs.

The central-city, high-income variable is constructed from data in HUDUSER on the number of households in each place with income that is above the national 80th percentile. First, we take this number for the central city in 1990 (or 2000 for the 2000 to 2004 equations) as a share of all households in the central city. This central-city high-income share is then scaled by the same figure for

TABLE 1
Population Growth in Large Metro Area Rings

<i>Annual Population Growth Rate</i>	<i>1990-2000 (%)</i>		<i>2000-2004 (%)</i>	
	M	SD	M	SD
All urban places	1.17	0.0116	0.85	0.0110
Central city	0.55	0.0118	0.26	0.0113
All suburbs	1.66	0.0143	1.39	0.0141
High-density suburbs	0.82	0.0119	0.59	0.0150
Mid-density suburbs	1.46	0.0153	1.00	0.0116
Low-density suburbs	2.38	0.0176	2.06	0.0196

NOTE: There are 83 areas included in the 1990 to 2000 period and 82 in the 2000 to 2004 period. The 2000 to 2004 suburban data exclude census-designated places for which no 2004 data are available.

households in all urban places (including the central city) in the CBSA. Thus, the measure indicates the affluence of the central city relative to all urban places in the CBSA.⁵

Our measures of Black and Hispanic presence in the central-city shares are simply the Black share of central-city population and the Hispanic share of central-city population. These are unadjusted for the corresponding CBSA shares. We expect a positive effect of both minority populations on sprawl in line with the “White flight” hypothesis. Finally the city population share variable is simply the 1990 share (or 2000 share for the 2000 to 2004 equations) of all urban area population accounted for by the central city.

RESULTS

Table 1 shows the average annual population growth rates for our suburban rings and central cities. Not surprisingly, central cities have the slowest growth rates (about 0.5% per year for 1990 to 2000, down to 0.25% per year for 2000 to 2004), whereas low-density suburbs average considerably higher (2.4% for 1990 to 2000, and 2.1% for 2000 to 2004).

Of course, most central cities have remained poorer than their suburbs. As of 1990, only 11 central cities (columns 1 and 2 of Table 2) had a high-income relative greater than 1.0. The list presented here does not suggest the gentrified neighborhoods of Manhattan, Washington, and San Francisco. For the most part, these are central cities surrounded by relatively poor suburbs in relatively poor regions.

In 1990, the average central city had a relative share (in comparison to its urbanized area) of high-income households of 0.82. In 2000, the average central city still had a relative share of high-income households of 0.82.⁶ Gentrification, although much commented on in a few large metropolitan areas, appears to not have significantly affected these averages. For that matter, several of the most gentrified central cities, including Boston, Chicago, and Washington, were among the poorest in 1990 when compared to all urban places in their CBSAs (see columns 3 and 4 of Table 2).

Although several of these relative measures moved up between 1990 and 2000, the changes are modest given the low 1990 level. Thus, Chicago moved up from 0.64 to 0.69. The largest change is for San Francisco, which moved up by 0.09. Table 3 presents the basic regression results for population growth from 1990 to 2000 in each of the three suburban rings and the central cities. The most striking result across all four equations is the strong influence of overall urban growth (PlaceGrowth) on each ring. Not surprisingly, the coefficient on this key variable is larger for the low-density suburban ring, Ring 1, smaller for Ring 2, and much smaller for high-density suburbs and the central city. It is difficult to avoid the observation that across all urbanized areas, a key force encouraging low-density sprawl is the overall growth of the area. For every percentage growth in

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TABLE 2
Core-Based Statistical Areas (CBSAs) with Largest and Smallest Central-City High-Income Relatives: 1990

<i>CBSAs With Largest High-Income Relatives</i>	<i>City High-Income Relative</i>	<i>CBSAs With Smallest High-Income Relatives</i>	<i>City High-Income Relative</i>
Bakersfield, CA	1.24	Boston-Cambridge-Quincy, MA-NH	0.65
McAllen-Edinburg-Pharr, TX	1.23	Chicago-Naperville-Joliet, IL-IN-WI	0.64
Peoria, IL	1.12	Cincinnati-Middletown, OH-KY-IN	0.64
Charlotte-Gastonia-Concord, NC-SC	1.10	Washington-Arlington-Alexandria, DC-VA-MD-WV	0.64
Tulsa, OK	1.09	Minneapolis-St. Paul-Bloomington, MN-WI	0.59
Little Rock-North Little Rock, AR	1.08	Baltimore-Towson, MD	0.54
Omaha-Council Bluffs, NE-IA	1.08	Milwaukee-Waukesha-West Allis, WI	0.53
Riverside-San Bernardino-Ontario, CA	1.07	Birmingham-Hoover, AL	0.53
Albuquerque, NM	1.07	St. Louis, MO-IL	0.48
Provo-Orem, UT	1.06	Dayton, OH	0.47
Madison, WI	1.01	Detroit-Warren-Livonia, MI	0.45

NOTE: The central-city high-income relative is defined as the share of central-city households with incomes in the top 20% of all households nationally relative to the share of all urban-place households in the CBSA with incomes in the top 20% of all households nationally.

TABLE 3
Urban Population Growth by Density Ring, 1990 to 2000

	<i>Low-Density Suburban Population Growth</i>		<i>Mid-Density Suburban Population Growth</i>		<i>High-Density Suburban Population Growth</i>		<i>Central-City Population Growth</i>	
	<i>Coefficient</i>	<i>SE</i>	<i>Coefficient</i>	<i>SE</i>	<i>Coefficient</i>	<i>SE</i>	<i>Coefficient</i>	<i>SE</i>
Constant	0.015***	0.005	0.002	0.005	-0.014***	0.005	-0.015***	0.003
PlaceGrowth	1.470***	0.090	1.235***	0.082	0.690***	0.081	0.739***	0.042
City population share	0.022***	0.007	0.005	0.006	0.007	0.006	0.007**	0.003
City high-income relative	-0.026***	0.007	-0.001	0.007	0.012*	0.007	0.011***	0.003
City % Black	0.011**	0.006	-0.001	0.005	0.003	0.005	-0.007***	0.003
City % Hispanic	-0.002	0.007	-0.032***	0.007	0.004	0.006	0.010***	0.003
Adjusted R ²	.80		.78		.64		.90	

*significant at the 10% level. **significant at the 5% level. ***significant at the 1% level

the population of all urban places in an area, there is about 1.5% growth in the least-dense sector. The corresponding coefficients for the high-density suburban group and central cities are about half the size of those for low-density suburbs. The coefficient for low-density suburbs suggests that 1 standard deviation in CBSA urban place growth is associated with an annual rate of low-density place growth of 1.7% greater than the mean, or 4.1% total. This is a substantial impact.

But what effect do rich central cities have on low-density suburban population growth? The same set of equations shows a significant negative impact of the central-city high-income relative on low-density growth, with a coefficient of -0.026. High central-city incomes, at least as defined here, are associated with slower sprawl. The central-city coefficient is 0.011. The standard deviation of the income relative variable is 0.17. Thus, an increase of 1 standard deviation in this variable reduces annual low-density growth by 0.4% while raising central-city growth by 0.2%. The effect on our sprawl variable, although highly significant, has a standardized effect of one fourth of that of PlaceGrowth. The high-income variable is unrelated to mid-density suburban growth but loosely connected (significant at the 10% level) with high-density suburban growth. The implication is that central cities with high-income relatives grow somewhat faster than do their high-density suburbs. The latter observation is consistent with the notion that gentrification may push some lower income households into inner-ring, high-density suburbs.

TABLE 4
Urban Population Growth by Density Ring, 2000 to 2004

	<i>Low-Density Suburban Population Growth</i>		<i>Mid-Density Suburban Population Growth</i>		<i>High-Density Suburban Population Growth</i>		<i>City Population Growth</i>	
	<i>Coefficient</i>	<i>SE</i>	<i>Coefficient</i>	<i>SE</i>	<i>Coefficient</i>	<i>SE</i>	<i>Coefficient</i>	<i>SE</i>
Constant	0.021***	0.008	0.003	0.005	-0.009	0.008	-0.017***	0.003
PlaceGrowth	1.703***	0.145	0.850***	0.097	0.779***	0.151	0.721***	0.062
City population share	0.010	0.010	0.010	0.006	0.021**	0.010	0.006	0.004
City high-income relative	-0.025**	0.011	-0.004	0.007	0.003	0.011	0.011**	0.004
City % Black	0.011	0.08	-0.002	0.005	-0.010	0.008	-0.002	0.003
City % Hispanic	-0.017*	0.010	-0.008	0.007	-0.017	0.017	0.013***	0.004
Adjusted R ²	.66		.57		.37		.81	

*significant at the 10% level. **significant at the 5% level. ***significant at the 1% level.

The racial variable in the equations also performs as expected. Where Blacks account for a higher share of the central city, central-city growth is significantly slower, and low-density growth is significantly faster. Interestingly, the Hispanic ethnic variable shows the reverse effect, slowing the growth of low-density places and speeding the growth of the central city.

Table 4 presents similar—indeed surprisingly similar—results for the period 2000 to 2004 using place-based population estimates of the U.S. Bureau of the Census (2004). The equations are virtually identical, although the racial composition variables are not significant. Although central-city high-income relatives have improved modestly, the underlying logic of the system remains unchanged. At least, at this level, it is difficult to discern any underlying structural change.

City population share in CBSA is positively related to the population growth in the low-density suburbs. The metropolitan areas with higher city population share experienced more sprawl in low-density suburbs, which is consistent with the lower density urban growth patterns during the past four decades, as documented in the urban literature (Mieszkowski & Mills, 1993).

The implicit assumption made in the model requires high incomes in the suburbs to be associated with low density. When we correlate high-income share with density across the non-central-city places of each metropolitan area, the overall pattern is mixed. At one extreme, a group of metropolitan areas (including New York, Los Angeles, Philadelphia, Detroit, and Washington) shows the expected negative correlation, but a group almost as large (including Houston, Atlanta, and Seattle) shows the unexpected positive correlation.

Although these findings are still tentative, they suggest a caution to the smart-growth strategy for reducing sprawl. In metropolitan areas where richer suburbs are less dense, that is, a negative correlation between income and density, the traditional smart-growth approach may be quite effective. However, where richer suburbs are in fact more dense, that is, a positive correlation between high income and density, then the impact of revitalizing central cities with high-income neighborhoods is less clear.

CONCLUSIONS

Two major observations stand out. First, sprawl is likely to expand faster in rapidly growing urbanized areas. Second, higher central-city income relatives are associated with slower growth rates in (presumably peripheral) low-density rings.

Our results provide tentative support for one of the implications of the smart-growth initiatives: Cities that were successful in maintaining or attracting middle- and upper-middle-class households experienced less sprawl. We found a negative relationship between the relative concentration of the upper-income population in the central cities and the growth rates of the less-dense outer suburbs.

Our results provide tentative support for one of the implications of the smart-growth initiatives: Cities that were successful in maintaining or attracting middle- and upper-middle-class households experienced less sprawl.

The relations explored here are surprisingly consistent between the 1990 to 2000 period and the 2000 to 2004 period. Despite the considerable attention paid to gentrification in the second of these periods, the underlying structural relations seem not to have changed.

The basic result is consistent with the position of the antisprawl coalition that has linked central-city prosperity and reduced sprawl. The effect is especially noteworthy because the land absorption per person in low-density suburbs is far higher than in the rest of the urbanized area. Still, we should not overstate the case. Based on our equations, it would take very high levels of central-city income to bring population growth of low-density suburbs in line with the urbanized area as a whole. Moreover, there is no guarantee that the experience of metropolitan areas with currently high central-city incomes and perhaps a range of attractive amenities will necessarily be replicated in other cities as they increase their average incomes. And, of course, we should emphasize that the connection between overall growth and sprawl remains the much stronger and more fundamental effect.

NOTES

1. The general thematic of this coalition has been well expressed in the research encouraged by the Brookings Institution's Metropolitan Policy Program, including the recent volume edited by Pack (2005). See the Brookings Institution Web site for a list of other publications.

2. Although we use the term *central city* throughout this article, we have excluded officially designated central cities that are less than one third the size of the largest central city. Thus, in the Chicago area, Evanston is not included in our central-city designation, although it is counted as such by the Census Bureau.

3. Density for each place is the 1990 ratio of population to land area reported in the 1990 Gazetteer (<http://www.census.gov/geo/www/gazetteer/gazette.html>).

4. Our data set is based on 5,870 observations or places for which the population growths and other demographic variables are reported by the Census Bureau in both the 1990 to 2000 and 2000 to 2004 periods. We aggregated these variables to one of the four rings based on the population densities of the places in each urbanized area.

5. A similar measure is constructed for college graduates. We take the share of the central-city population with a college degree and compare it to the share of the population in all urban places in the core-based statistical area with a college degree. Because this measure is highly correlated with the city high-income relative variable ($r = .82$ in both 1990 and 2000) and behaves similarly in all equations, we present results for just the city relative high-income share.

6. That is, the share of the high-income households among central-city households equaled 0.82 times the share of the high-income households among all households in the urbanized area.

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