The Brookings Institution Center on Urban and Metropolitan Policy

Who Sprawls Most? How Growth Patterns Differ Across the U.S.

By William Fulton, Rolf Pendall, Mai Nguyen, and Alicia Harrison

July 2001

Case Studies: Density change in five large regions
Why L.A. is not Atlanta

Tables W1 and W2 show how varying factors affect five metropolitan areas with large amounts of urbanized land: Los Angeles, Houston, Atlanta, Washington, and Detroit. In all five cases, we multiply the significant characteristics of each region against the predictive coefficient we obtained in the statistical analysis to yield the density change expected based on each characteristic alone. We then added the characteristics together and subtracted a constant term; according to the statistical analysis, every region starts out with a 57% decline in density, but most of the characteristics counteract the decline.

Table W1. Regional characteristics influencing density change, Five large metropolitan areas

	L.A.	Detroit	Houston	Atlanta	D.C.
Persons/acre 1982	9.2	5.4	4.2	3.2	6.7
Urban acres, 1982 (natural log)	9	9	8.9	8.9	8.5
Percent change in population, 1982-97	20	4.1	26.6	60.8	29.7
Percent of residents 65+, 1990	9.7	11.8	7.1	7.9	8.6
Percent of persons foreign born, 1990	32.7	5.4	13.3	4.1	12.3
Percent black, 1990	11.2	21.5	18.5	26	26.7
Percent Hispanic, 1990	37.8	1.9	21.4	2	5.8
Persons per local gov't, 1997 (natural log)	11.6	9.9	10.8	10.4	10.8
Growth management required (yes=1)	0	0	0	1	1
Percent of houses on sewers 1990	96.7	88.4	92.1	74.6	91.3
Percent of houses on public water 1990	99.6	89.7	94.3	94.2	93
Percent of non-federal land prime ag 1982	2.2	30.4	32.4	14.5	15.1

Table** W2**. Expected effect of regional characteristics on density change, 1982-1997

	L.A.	Detroit	Houston	Atlanta	D.C.
Persons/acre, 1982	-17.90%	-10.50%	-8.20%	-6.20%	-12.90%
Urban acreage, 1982	12	11.9	11.8	11.7	11.3
Percent change in population, 1982-97	4.9	1	6.6	15	7.3
Percent of residents 65+	3.8	4.6	2.8	3.1	3.3
Percent of residents foreign born	42.5	7.1	17.3	5.4	16.1
Percent black	-2.7	-5.2	-4.5	-6.3	-6.5
Percent Hispanic	-14.7	-0.8	-8.3	-0.8	-2.3
Persons per government unit	24.2	20.6	22.6	21.7	22.6
Growth management required	0	0	0	-4.5	-4.5
Percent on sewers	32	29.3	30.5	24.7	30.2
Percent on public water	-20	-18	-18.9	-18.9	-18.6
Percent of land prime ag (1982)	0.2	2.5	2.6	1.2	1.2
Expected density change, cumulative effects*	6.80%	-15.20%	-3.40%	-11.50%	-10.40%
Observed density change	8.10%	-18.90%	-8.60%	-11.40%	-11.80%

*This figure sums the effects of the regional characteristics and adds it to a constant term (-57.6).

Many of Los Angeles's characteristics promote density. About a third of its residents in 1990 were foreign born, and it had the highest proportion of houses on sewers of any of these five regions. It had the largest total amount of urbanized land of any region, and a moderately high growth rate (20%). Although Los Angeles has 88 municipal governments and one county government for unincorporated areas, the region's large population gives it a higher number of persons per government unit than the other four regions, providing another boost to density. Its high Hispanic population, and its high percent of houses on public water, would dampen density increase somewhat. But overall, one would expect—given all these factors, and according to the statistical process we used—that density in Los Angeles would have grown by 6.8%. In reality, Los Angeles's density grew by over 8% between 1982 and 1997.

Detroit, with the second-highest amount of urbanized land in 1982, was at the bottom of the ranking for population change and near the bottom of the group in its foreign born population (5.4%). It is the most highly fragmented metropolitan area of these four, and fewer than 90% of its dwellings are on public sewers. Over 20% of its residents in 1990 were black. All these factors would lead us to expect substantial declines in density between 1982 and 1992, but Detroit had some compensating factors as well. It began with lower density than did Los Angeles or Washington. It had a very small Hispanic population, and about 30% of its non-federal land was prime farmland. Almost 12% of its residents were 65 years old or over in 1990. Together, these factors lead us to expect a 15.2% decline in Detroit's density; in reality, its density declined by 18.9%.

Why does Houston sprawl more than Los Angeles? According to this analysis, the single most important factor is that only 13.3% of Houston's residents were foreign born in 1990. Based on many other factors, one would predict that Houston's density would be higher. It had lower density than Los Angeles in 1982, providing more opportunities for infill development. It had faster population growth and a lower share of Hispanic residents. It had the highest share of prime agricultural land of any of these five regions. Fewer residents were on both public sewer and public water than in L.A., resulting in about the same net effect on density as Los Angeles's infrastructure endowment. Other factors that limited Houston's density compared to Los Angeles included its lower urban acreage, smaller percent of seniors (lowest of any of these five metropolitan areas), and higher black population.

Atlanta strikes many observers as the capital of sprawl in the U.S., and to an extent this is true; the amount of urbanized land in metropolitan Atlanta grew from 700,000 acres to nearly 1.3 million acres between 1982 and 1997. But Atlanta's population and economy have also boomed over that period, so that its density has declined by 11.5%: much less than Detroit's and even a little less than Washington's. Its rapid population growth, in fact, offers the most substantial and somewhat counterintuitive explanation for why it doesn't sprawl more than it does; if Atlanta had not grown by over 60% between 1982 and 1997, its demographic characteristics and infrastructure endowment would make it a prime candidate for much more substantial density loss. For instance, Atlanta had the lowest share of foreign-born residents and the second-lowest share of seniors in 1990, and the second highest percent of black residents. White flight is a fact of life in metropolitan Atlanta. Its local governments are moderately fragmented, even though

counties make decisions for large swaths of land. Atlanta also has the most houses on septic systems of any region—about one-quarter of all dwellings—but substantially more households are served with public water. Only about 15% of its non-federal land is prime farmland.

Washington, DC lost density at the same rate as Atlanta between 1982 and 1997. Many of its regional characteristics resembled Atlanta's, in fact: about the same amount of urban acreage, nearly identical percent senior and black residents, percent of houses on public water, and percent of prime agricultural land. The main differences were in growth rates, where Atlanta exceeded Washington, and in foreign-born residents and percent of houses on sewers, where Washington surpassed Atlanta. Washington's initial density was also high—second only to Los Angeles—leaving less room for infill development than in Atlanta. Washington also has slightly larger local governments than Atlanta, especially on the Maryland side of the metropolitan area, where county governments act as the main regulators of development. Both Maryland and Georgia have relatively recent growth management requirements; both are arguably responses to the difficulties posed by declining density and rising population, rather than causes of density change.

While these factors provide fairly good estimates of how density should change for these five metropolitan areas, they were not as good at explaining change in some other metropolitan areas. In the end, the equation we developed explained a little more than 50% of the variation across metropolitan areas. If we were closer to 100% explanation, the differences between predicted and actual density change would be more and more slight for more and more regions. Six metropolitan areas were extreme outliers, either because of sampling errors in the NRI or because of other unobserved factors that made their densities change in unpredicted ways.