Sprawl: What's in a Name?

BY TIMOTHY SCHILLER

What lies behind concerns about the way metropolitan areas have been spreading out over the past several decades? This spreading out, commonly known as sprawl, is reflected in lower density and centralization in metropolitan areas. In this article, Tim Schiller looks at some recent trends toward lower population and employment density in metro areas and discusses some of the underlying forces propelling these trends.

In the elections of 2003, voters in 16 states passed measures to use public funds to preserve undeveloped land. One such measure was passed in Montgomery County, Pennsylvania, a suburban county neighboring the city of Philadelphia. These political proposals, often referred to as anti-sprawl initiatives, reflect a public desire to slow or halt the extension of urban land uses for housing, stores, factories, and office buildings.

The use of the word sprawl to describe the growth of metropolitan areas first became common in the later half of the 20th century.[1] By then, there was a public perception that growth in metropolitan areas was not only more extensive and less orderly than in the past but also economically inefficient.

Sprawl has been described in a number of ways: the lack of continuity in development, sometimes called leapfrogging (Marion Clawson); awkward or poorly planned spreading out (Charles Abrams); fragmented, incomplete, ad hoc, and uncentered development (Robert Geddes); consuming land for urbanization at a faster rate than the growth of population (William Fulton et al.); and low-density, automobile-dependent urban growth (Gregory Squires).[2] The common elements in all of these definitions are low density and less centralization.

Critics of sprawl argue that lower density and decentralization result in less efficient land use and other negative consequences.[3] Issues such as whether there are inefficiencies resulting from lower density, and how large they might be, are not settled (see *What Is the Efficient Level of Density?*). That debate is beyond the scope of this article. Here we describe the trends in metropolitan development with respect to density and centralization.

Is it really the case that metropolitan areas began to grow in a less orderly way about the middle of the 20th century? Has density taken a sudden turn down? Measures of density and concentration reveal both continuity and change in the way metropolitan areas have grown. The trend toward lower population density is a long-standing one, and it continues today. A more recent trend is an acceleration in the decline of employment density, as employers and the jobs they provide have spread out. Some of the forces leading to less dense development, such as improvements in transportation technology, are old and familiar; others, such as changes in business activity that require less concentration of firms, are new and challenging.

TRENDS IN DISTRIBUTION OF POPULATION IN METRO AREAS

Land development — converting land to urban uses (built-up

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[1] See, for example, the article by Marion Clawson, the article by David Mills, and the publication from the Real Estate Research Corporation.

[2] These definitions are representative, not a complete list, and are confined to those with measurable attributes.

[3] Readers interested in the arguments and counter-arguments on the effects of recent development will find many of them summarized in the article by Anthony Downs and in the 2000 article by Peter Gordon and Harry Richardson.

What Is the Efficient Level of Density?

When economists analyze metropolitan structure, they focus on the efficiency of the spatial distribution of employment and population. Is the density of an area greater or less than it would be if employers and residents considered the social costs of concentrating or spreading out when deciding where to set up their businesses or buy their homes? Researchers have cited several factors as evidence that residential density would be higher if homeowners took into account all the costs of spreading out.[a] These factors are failure to account for the amenity value of open space, the social cost of road congestion, and the infrastructure cost of new development. Counter-arguments point out that density can be inefficiently high, imposing social costs on the population and raising the cost of living.[b]

Open Space. It can be argued that people who live near open space benefit from it, but the owner of the space is not compensated for providing this benefit. Its value as open space is not explicitly recognized, so the loss of this value is not considered when the space is developed. This leads to more development than is socially desirable. One solution to this problem is to tax the development of open land. However, calculating the appropriate amount of such a tax is difficult.[c] Furthermore, such a tax imposes all of the cost on the property's owner, and property-rights issues also limit the use of this approach. As an alternative, outright purchase of open space for preservation by local, state, and federal governments and private groups has become increasingly popular. But any policy that preserves open space raises the price of other land and therefore the cost of any economic activity that takes place on it.

Road Congestion. The social cost of road congestion is the cost that each driver imposes on other drivers by increasing their drive time. Drivers do not take this cost into account when they plan their commute. One solution to this problem is to impose peak-time tolls that provide incentives for drivers to reduce their use of roads at busy times by changing their schedules, car pooling, or using public transportation. Kenneth Small argues that peak-time tolls can be computed fairly accurately. Although road congestion can cause inefficiency, studies indicate that commuting time has not been increasing rapidly, and survey data indicate that in a significant number of large metropolitan areas, commuting times are lower in the suburbs than in the city.[d]

Infrastructure Cost. The infrastructure cost of new development usually involves a one-time expense for such things as extending roads and utility systems to the new areas. Typically, these costs are shared among current residents and residents of the newly settled areas. Under this arrangement, the new residents are not paying the full costs of the new infrastructure they require, and demand for new development is higher than it would be if the new residents paid the full cost. One solution is to impose "impact fees" on new homeowners to cover the one-time cost of extending infrastructure. A number of municipalities have implemented these fees. Note that infrastructure cost is not always higher in low-density areas. There appears to be a density level above which infrastructure costs stop falling and begin to rise.[e]

Employment Concentration. Besides the costs of spreading out that residents do not take into account, there are benefits to greater concentration and density that business firms do not take into account. When there are spillover benefits from firms' locating close to one another but the firms are not compensated for providing these benefits, they are less likely to locate as close to each other as would be mutually beneficial. Zoning laws are one way of inducing firms to locate closer together; subsidies or tax abatements are other ways. However, a practical way to determine exactly the level of concentration that maximizes spillover benefits net of congestion costs in a given area has yet to be achieved; so policymakers should approach this issue cautiously.[f]

Clearly, there are factors that might lead to less density and concentration, at a given point in time and in a given area, than is most economically efficient. Public policies should address these factors, but policymakers should proceed carefully in order to avoid imposing costs in excess of benefits. Regardless of the efficiency of metropolitan structure at any given time and place, history suggests that the economically efficient level of density and concentration has been declining over time because of changes in transportation and communications technology and the rising demand for more residential space.

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[a] See Jan Brueckner's 2001 article.

[b] See the 2000 article by Gordon and Richardson and the one by Pietro Nivola.

[c] See the article by Glenn Blomquist and John Whitehead.

[d] See the article by Gordon and Richardson and the publication by the U.S. Census Bureau.

[e] For more on demand for new infrastructure and its costs, see Brueckner's 1997 article. The article by Alan Altshuler and Jose Gomez-Ibanez talks about impact fees. Helen Ladd's article discusses the relationship between infrastructure cost and density.

[f] For more on concentration, density, and business firms, see the article by Antonio Ciccone and Robert Hall. See the articles by Esteban Rossi-Hansberg and Robert Lucas and Rossi-Hansberg for more about spillovers and compensation to firms. For more about optimal concentration and spillover benefits, see Glaeser and Kahn's 2003 article.

residential, commercial, industrial, and public uses) from nonurban ones (agriculture, forest, wetlands, or simply vacant land) — has taken place throughout history.

Cities Spread Out. Urban areas have been spreading out for more than two centuries, and economic activity has been dispersing geographically.[4] Large-scale development of suburban land became more common in the post-World War II years, and many people point to the creation of Levittown, New York, as the beginning of large-project development on a scale hitherto unknown. Indeed, Levittown was the largest single housing project undertaken to that time.[5] Nevertheless, metropolitan areas have been expanding and their density declining for many years.

The primary reason for this spreading out has been changes in transportation technology that enabled people to travel and goods to be shipped more quickly, less expensively, over longer distances, and with less regard to the physical features of the landscape.[6] When waterborne commerce was the most efficient means of transportation, cities developed close to oceans, lakes, and rivers. As railroads replaced rivers, cities developed at rail hubs. Within metropolitan areas, the railroad allowed people to live farther from their place of employment — to move to the suburbs and work in the central city. With the invention of the automobile, the road system became the network on which cities depend to bring people to work and to ship the products they use or produce. Besides extending the distance over which daily commuting was feasible — by bus or car — the road network allowed lower residential density because it was more extensive than the railroad network and did not require people to live near a limited number of railroad stations. The road network permitted metropolitan areas to increase in population and area with less need for concentration of population and employment, thus enabling a decline in density.[7]

The most recent U.S. census data indicate that this trend toward lower density and less centralization of population has continued as metropolitan areas have grown. As more land area has been converted to urban uses, the density of development on that land has been less than that in older urbanized areas. [8] From 1982 to 1997, the U.S. population increased 17 percent, while urbanized land increased 47 percent, or about 2.75 times as much.[9] Consequently, population per acre of urbanized land declined, hence, the term sprawl.

From 1982 to 1997, this decline was smaller in the West than in the rest of the nation (Table 1). That's because, in the West, geographic barriers, such as deserts and mountains, make it more difficult for development to spread out. Urbanized land increased only one and a half times faster than population in the West, but in other regions, it grew two to six times faster than population. For the metropolitan areas in the three states of the Third Federal Reserve District (Pennsylvania, New Jersey, and Delaware), population per acre of urbanized land decreased most in areas that had slow population growth or population losses and decreased least in those areas that had relatively rapid population growth. Thus, while sprawl issues tend to arise in growing areas, the decline in population per acre of urbanized land is not confined to areas with rapid population growth.

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A Model of City Growth. Cities typically grow at their edges, and population density is typically lower at the edges than in the center of the city. This pattern of density has led economists to formulate a model of metropolitan spatial structure known as the monocentric city model. In this model, employment is concentrated at the center of the metropolitan area, and the population is spread out around that center as determined by the transportation system. Land is cheaper further from the center because transportation costs are higher, leading to lower demand for land that is further out. This model has explained the data from many

[4] See the article by Alex Anas et al.

[5] See the book by Peter Hall.

[6] It has also been argued that subsidies to transportation have promoted less dense development. See the 2003 article by Jan Brueckner.

[7] See the article by Robert Fishman and the one by Alex Marshall.

[8] The definition of urbanized land used in the studies reported in this article is based on the National Resources Inventory conducted by the U.S. Department of Agriculture. The inventory surveys all land in the country and divides it in into small-area units. Within each area unit the land use is similar. Those areas in which at least 30 percent of the land is covered by man-made features, such as buildings and roads, are classified as urban.

[9] See the article by William Fulton et al.

TABLE 1

Change in Population vs. Change in Urbanized Land in U.S. Regions and Third District States*

	Change in Urbanized Land 1982-1997 Percent	Change in Population 1982-1997 Percent	Change in Population per Acre of Urbanized Land 1982-1997 Percent
United States	47.1	17.0	-20.5
Census Region			
South	59.6	22.2	-23.4
Northeast	39.1	6.9	-23.1
Midwest	32.2	7.1	-19.0
West	48.9	32.2	-11.2
Metro Areas in Third District States**			
Johnstown, PA	53.0	-9.4	-40.8
Sharon, PA	52.5	-5.2	-37.9
Pittsburgh-Beaver Valley, PA	42.6	-8.0	-35.5
Erie, PA	49.9	-0.7	-33.8
Williamsport, PA	53.2	2.0	-33.5
York, PA	77.7	18.1	-33.5
Scranton-Wilkes-Barre, PA	55.0	4.1	-32.8
Altoona, PA	42.0	-4.5	-32.7
Harrisburg-Lebanon-Carlisle, PA	62.4	9.9	-32.4
Allentown-Bethlehem, PA	61.2	13.0	-29.9
Atlantic City, NJ	66.5	22.2	-26.6
State College, PA	55.1	15.2	-25.7
Reading, PA	50.4	15.2	-23.4
Philadelphia-Wilmington-Trenton, PA-NJ-DE	35.6	7.0	-21.1
Lancaster, PA	45.9	23.0	-15.7
New York-Northern New Jersey-Long Island, NY-NJ	20.5	6.1	-15.4

* Using National Resources Inventory urbanized area definition.
** Consolidated and primary metropolitan statistical areas.
Source: Fulton et al.

cities around the world for at least the past two centuries.[10] The model implies that population density declines as the distance from the metropolitan center increases because land is cheaper farther away from the center, and this entices people to consume relatively more land.

Lower density in newly urbanized areas compared with previously urbanized areas is an implication of the monocentric city model because these new areas are farther from the metropolitan center. This type of sprawl is nothing new. As a metropolitan area grows, two things happen. First, population increases, so that the population density of the area within its fixed boundary increases.[11] Second, as the metropolitan area grows, the amount of urbanized land within the area expands, and population density within the newly urbanized land area is lower than the density in the older urbanized land area. The maps (on page 33) show the Philadelphia metropolitan area in 1950 and 2000.[12] As population has risen in the past 50 years, overall density in the metropolitan area has increased, and the urbanized portion of the MSA (shaded areas) has expanded. The urbanized area furthest from the city center remains less dense than the center or the close-in suburbs.

Growth Is Uneven. As metro areas expand, their growth is often uneven. This unevenness — often called leapfrogging, and cited as evidence of sprawl — can occur in the course of development, but it usually does not persist. Newly developing areas tend to be less dense when they first come to public notice, than when they are fully built-up. The observed lack of even growth at a point in time might be simply a failure to account for eventual in-fill development.[13] Much of the land that appears to have been bypassed is eventually developed.

Population Becomes Less Centralized. The growth of metropolitan areas has been accompanied by a trend toward a more even spatial distribution of population. This means that population becomes less concentrated near the center of a metro area as the area expands; in other words, it becomes less centralized, and the decline in centralization is often cited as evidence of sprawl. Centralization is measured by the rate at which population density decreases as distance from an area's center increases — the density gradient. Lack of centralization, which is indicated by a density gradient with a low numerical value, is a measure of sprawl.

The density gradient can reveal the extent to which the spatial structure envisioned by the monocentric city model actually prevails in a given metropolitan area, and changes in the density gradient can reveal how centralization has changed in a given area over time. Estimates of density gradients of metropolitan areas around the world show that centralization has been declining for the past 200 years.[14] There were rapid declines in the decades near the end of the 19th century as railroads were developed. In the 20th century, there was a relatively large decline in the 1920s, a period in which automobile ownership grew substantially, and from the mid-1940s to the mid-1950s, during the post-World War II housing expansion.[15] In more recent years, the decline has continued at a slower, fairly steady rate.[16] Among the 10 largest areas, Philadelphia ranks second, below New York, in centralization, and it is about in line with the large metro areas near it (Table 2).

The history of density gradients indicates that metropolitan area populations have been spreading out and becoming less centralized for a long time. The density gradient will decline if the suburban area's boundary remains fixed and its population grows more rapidly than the population of the central city. This reduces the difference in density between the center and the suburbs. In the more usual case, the suburban area's boundary expands, and the older suburban area becomes more densely populated. (This is illustrated in the Philadelphia area map.) As the suburban area expands, the most recently developed areas are less dense than the previously urbanized area. However, the drop in density between the farthest-out areas and the closer-in areas is not as great

[10] See the articles by William Alonso; Richard Muth; and the 1967 article and 1972 book by Edwin Mills.

[11] The definition of metropolitan area referred to here is the one used by the U.S. Census Bureau in delineating metropolitan statistical areas (MSAs). MSAs are defined along county boundaries, and they do not expand unless the Census Bureau redefines them.

[12] The map uses the Philadelphia MSA definition in effect in 2000. Under that definition the MSA includes the Pennsylvania counties Philadelphia, Bucks, Chester, Delaware, Montgomery, and Philadelphia, and the New Jersey counties Burlington, Camden, Gloucester, and Salem. A new definition was issued in 2003.

[13] See the article by Paul Longley and Victor Mesev. The research reported in the article by Burchfield et al. indicates that most of the development that occurred between 1976 and 1992 took place in areas that were already urbanized in 1976, thus increasing density in areas after they first met the criterion for being considered urbanized.

[14] See the book by Colin Clark.

[15] See Mills's 1972 article.

[16] See the articles by Peter Mieszkowski and Edwin Mills; and Stacy Jordan et al.

TABLE 2

Density Gradients of 10 Largest U.S. Metro Areas (1990)

Ten Largest Metro Areas	Density Gradient*
New York	0.136
Los Angeles	0.067
Chicago	0.095
Philadelphia	**0.117**
Dallas	0.108
Miami	0.109
Washington, DC	0.099
Houston	0.097
Atlanta	0.099
Detroit	0.078
Other Large Metro Areas Near Philadelphia	
Baltimore	0.141
Newark	0.112
Pittsburgh	0.091

*Percent decline in population per square mile for each mile of distance from metropolitan area center.

Source: Jordan et al.

as it was prior to the new development, so the density gradient is lower. As the historical data indicate, this case has been the predominant trend for a long time.

TRENDS IN DISTRIBUTION OF EMPLOYMENT IN METRO AREAS

The monocentric city model is based on the location of business activity at the center of the metro area surrounded by a decreasingly dense residential population. Although the decline in population density from the center outward is an implication of the model, the model does not necessarily imply a decline in the population density gradient over time. One reason for the declining population density gradient is a decrease in the centralization of business activity. The diffusion of employment throughout an area can lead to a loss of orientation toward the center that is represented in the monocentric city model.

Business Activity Spreads Out. Recent data indicate that business establishments, and consequently employment, have been spreading out. Technology has made the distance between business establishments a less important factor in where to locate. Furthermore, congestion costs have risen for businesses operating in densely developed areas, encouraging them to relocate to less dense areas. As part of this spreading out process, employment has grown more rapidly in less dense metropolitan areas — and even in some rural areas — than in denser metropolitan areas.[17] This trend has been especially important for manufacturing and has therefore had more of an effect on reducing employment density in older, more manufacturing-oriented metropolitan areas. Retail and service employment has similarly spread out, but to a lesser degree.[18]

Along with the shift in the share of employment toward less dense metropolitan areas, there has been an increase in the share of employment in farther-out locations within metropolitan areas, and this trend appears to have accelerated in the later decades of the past century.[19] This spreading out has reduced centralization of employment within metropolitan areas. Changes in employment in the city of Philadelphia versus the Philadelphia metropolitan area illustrate this. From 1970 to 2000, the city's share of the area's total employment fell by almost half: from 52 percent to 29 percent.

A major factor in this shift has been a recent trend toward more dispersed service employment and office development. Most new office space built in the last 20 years has been outside downtown central business districts.[20] The spatial distribution of office development is important for two reasons. First, it is associated with service employment, the largest and fastest growing sector of employment. Second, in recent years, it has displayed a sharp difference from the monocentric pattern that characterized metropolitan areas for most of the past 200 years. The recent pattern of office development might be an indication of the future shape of metropolitan areas.[21]

The Rise and Decline of Sub-Centers. The early history of metropolitan expansion, from roughly 1850 to 1950, was characterized by the growth of the downtown business core and a spreading out of residential areas as changes in transportation made commuting feasible over longer distances. In the later half of the 20th

[17] See the article by Gerald Carlino and Satyajit Chatterjee and the 1998 article by Gerald Carlino.

[18] See Carlino's 1983 article, the article by Theodore Crone, and the article by Lawrence Thurston and Anthony Yezer.

[19] In their 2001 article, Edward Glaeser and Matthew Kahn found that the share of employment in the major county of metropolitan areas declined more rapidly from 1970 to 1993 than from 1950 to 1970.

[20] This is a factor in the excess of land development over population growth in some metropolitan areas. See the articles by Robert Lang and Jennifer LeFurgy; and Marcy Burchfield et al.

[21] See Mills's 1988 article.

century, however, alternative centers of employment began to form within a single metropolitan area. This polycentric development became characteristic of growth in all rapidly growing metropolitan areas, leading to the development of city-like areas (so-called edge cities) of office and retail buildings that developed around major freeway intersections in formerly suburban areas.[22] (See *Where's the Edge?*)

The development of sub-centers within the farther reaches of metropolitan areas appears to be a consequence of the increased suburbanization of the residential population. Their location represents a balance between the benefits of a large population from which to draw workers and the need to avoid the congestion cost in the denser, more central portions of a metropolitan area.[23]

While at first glance sub-centers appear to be smaller versions of the traditional monocentric city, there are important differences, and these differences suggest that the agglomeration economies that have historically explained the growth of cities are weakening.[24] Sub-centers or edge cities are primarily employment centers, with more jobs than residents; the jobs are primarily office-based service jobs (especially business services). Sub-centers generally do not have the mix of industries, such as manufacturing, trade, health services, and personal services, historically present in traditional monocentric cities. Consequently, there isn't much, if any, inter-industry agglomeration.

However, the grouping of office buildings in sub-centers does suggest that there might be agglomeration economies for the type of economic activity that takes place in office buildings. In this respect, sub-centers of service industry employment are smaller scale versions of industry clusters: the contiguous location of firms with frequent, mutually beneficial interaction. Studies of employment by industry show that service industries have tended to retain more of a centralized pattern than manufacturing. The location of sub-centers of service employment in suburban areas reflects the joint influence of workers' preferences for lower residential density

Where's the Edge?

In his book, Joel Garreau listed the following edge cities in the three states of the Third District:

- In the New Jersey portion of the New York area: Fort Lee, Paramus-Montvale, Mahwah, the Meadowlands, Whippany-Parsippany-Troy Hills, Bridgewater, Woodbridge, Metropark, and Princeton.
- In the New Jersey portion of the Philadelphia area: Cherry Hill.
- In the Pennsylvania portion of the Philadelphia area: King of Prussia and Willow Grove.
- In the Pittsburgh area: Penn Lincoln Parkway-Airport area.

Of course, the existence and number of edge cities — more commonly called sub-centers — outside the downtown area depend on the definition and size criteria used to identify them. Although there are no definite objective criteria for identifying sub-centers, a variety of measures with varying degrees of complexity have been used to enumerate them in major metropolitan areas. Most definitions of sub-centers no longer include retail development (although such development was included in Garreau's definition) because centers with only office buildings have been increasingly observed.*

Garreau allowed the possibility that some of the edge cities he defined were so dispersed as to lack sufficient centralization on their own to qualify as identifiable places. This lack of centralization has been noted in office development in the years after the concept of the edge city was introduced, and some of Garreau's incipient edge cities are now considered to be areas of dispersed office development. Cherry Hill, NJ, in the Philadelphia metropolitan area, is an instance of this.

* See the references in Daniel McMillen's article.

[22] For more about alternative centers of employment, see Anas et al. For more about edge cities, see the book by Joel Garreau.

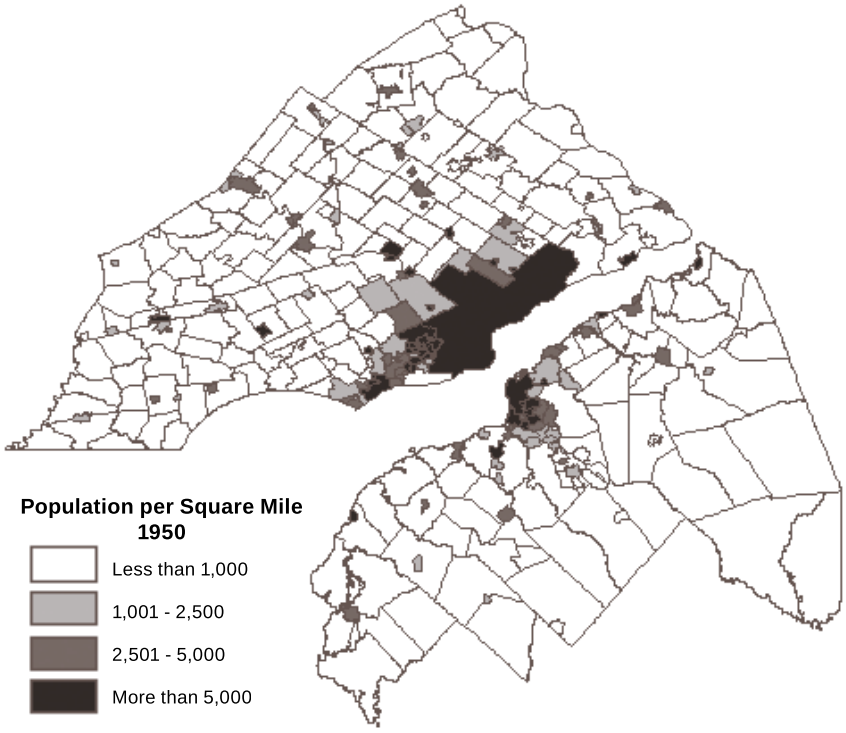
[23] See the articles by Daniel McMillen and Stefani Smith; and Vernon Henderson and Arindam Mitra.

[24] Agglomeration economies are the cost savings of economic activity that result from different activities locating close to one another. For example, a supplier locating close to a major customer may benefit from lower communication and transportation costs, reduction in delivery time and required inventories, and closer collaboration on product design. In the case of consumption activity, agglomeration economies result from retailers locating close to one another, allowing customers to do comparison shopping in less time and at a lower cost and to purchase multiple items in a single shopping trip.

[25] For more on sub-centers and their potential benefits, see the article by Wayne Archer and Marc Smith; the one by Michael Porter; and the 2001 article by Edward Glaeser and Matthew Kahn.

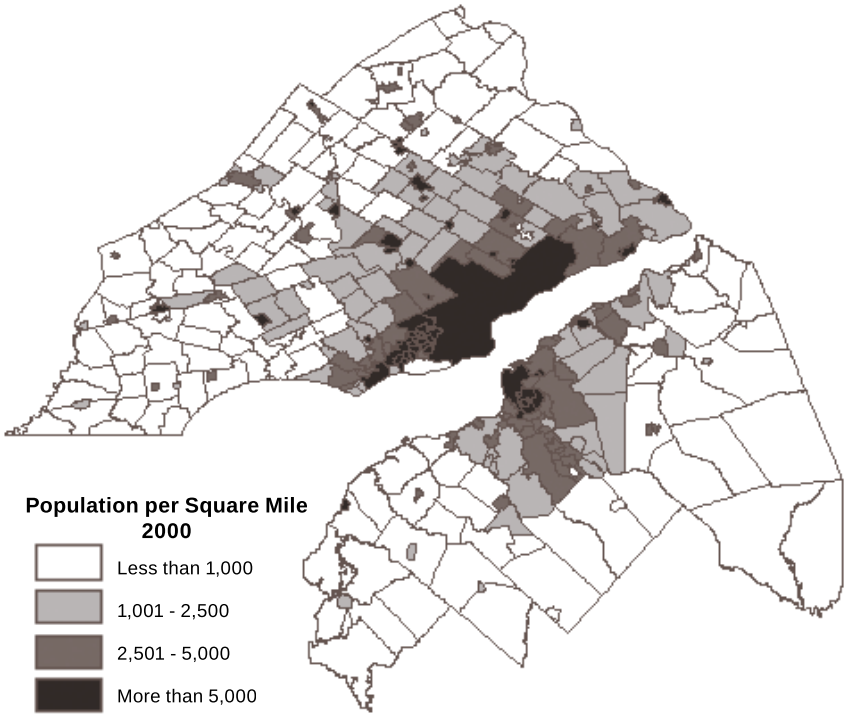
PHILADELPHIA METROPOLITAN AREA

Population Density 1950



PHILADELPHIA METROPOLITAN AREA

Population Density 2000



and service industry needs for close interaction among firms.[25]

Soon after sub-centers or edge cities emerged as the locations of new office development, even more far-flung construction of offices began. In his 2003 study, Robert Lang examined 13 large metropolitan areas and found that more office space was added in smaller, less concentrated office buildings, which he called "edgeless cities," during the 1980s and 1990s than in either central business districts or edge cities. As a result, by 1999, of the total office space in the metropolitan areas that Lang studied, there was very nearly as much space in the edgeless cities as in the primary downtown or central business district (Table 3). In 11 of the 13 areas studied, including Philadelphia, there was more office space in the edgeless cities than in the primary downtown. Edgeless cities accounted for a greater share of total office space in the Philadelphia metropolitan area than in any other area studied with the sole exception of Miami. The data compiled by Lang indicate that 70 percent of the office space built in the Philadelphia area during the 1990s was in edgeless cities, well above the average of 40 percent of 1990s' construction for all 13 cities. Edgeless cities are, by their nature, not identified with specific locations, but encompass areas such as southern New Jersey.[26] In total, edgeless cities in the Philadelphia area account for approximately 54 percent of the area's office space.

Typically, the office buildings in edgeless cities are low rise and include parking lots, two factors that also

[26] The edge cities in the Philadelphia area — King of Prussia and Malvern-Paoli-Wayne in Pennsylvania — together account for approximately 9 percent of the area's office space. Lang classifies all of the office space in the New Jersey portion of the Philadelphia area as edgeless. In contrast to Garreau, who expected Cherry Hill to develop into an edge city, Lang argues that it has not reached the size to qualify for that designation.

contribute to the greater use of space per person in more recent development. Researchers who have examined recent development of dispersed office space believe such development will probably not expand to reach the size of edge cities, nor will major retail space be developed in close proximity to it, because congestion costs set in at a relatively low level of density in low-rise office complexes, where nearly all workers arrive by car.[27]

THE FUTURE STRUCTURE OF METROPOLITAN AREAS: IS THE PAST PROLOGUE?

What about the future? Do the decentralizing tendencies described in this article portend a landscape with lower density and little or no centralized features? Some of the forces that have influenced the spreading out of residential populations and employment and the decentralization of economic activity will continue in the future, particularly declining transportation and communication costs, and increased road mileage.[28]

Forces for Decentralization. Declining transportation and telecommunication costs effectively bring more remote land into the market for urbanization, thus widening the feasible area for the location of jobs and housing. Urban analysts rank the interstate highway system as the main influence on the changes in metropolitan structure since the system was authorized in 1956. Further development of the road system is likely to extend this influence. In particular, the building of beltways around central cities gave rise to the edge cities and less centralized employment and residential development. Further construction of beltways and connectors in the system will extend its decentralizing effect. Increasing telecommunication capabilities (for example, mobile phones, camera phones, and the interconnectivity of voice and data communications equipment) and falling telecommunication costs will likely continue to reduce the need for centralization of work.

Forces for Centralization. Some other influences are working toward increasing, or at least stabilizing, density and centralization: increasing service employment and the rising importance of the intellectual content of work; the aging of the population; and the increasing emphasis on amenities of place. These trends favor continuing centralization and concentration of the residential population and employment in various ways.

Service company activity and the increasing intellectual content of work in such areas as research and development, patenting, and computer applications tend to require more face-to-face contact. This favors the concentrated locations of establishments where this type of work is done.[29] Research indicates that service and high-tech industries currently have a greater tendency toward centralization than other industries. The need for face-to-face contact might account for their relatively greater geographical concentration now, but it is not out of the question that technological advances could reduce this need.[30]

An older population is less mobile and requires more personal services, and serving this population requires frequent person-to-person contact.[31] The aging of the baby boomer generation has already brought about a major change in housing: the development of senior citizen housing and assisted living communities. These types of residential developments typically have greater density than the usual suburban communities, and therefore, they represent a countertrend to declining density. Although these housing arrangements have already begun to influence the newer parts of some growing metropolitan areas, the extent of their effect on development remains to be seen.

Natural amenities, such as ocean views and warm, dry climates, can be provided only by a limited number of places. The growth of metropolitan areas in coastal regions and in warmer, drier parts of the country is a

> Edgeless cities accounted for a greater share of total office space in the Philadelphia metropolitan area than in any other area studied with the sole exception of Miami.

[27] See the 1994 article by Lang and the article by Gary Pivo.

[28] See the articles by Robert Fishman; Jess Gaspar and Edward Glaeser; and Glaeser and Janet Kohlhase.

[29] See Gaspar and Glaeser; and Glaeser and Albert Saiz.

[30] The growth of telecommuting, perhaps the ultimate separation of workers from each other, would seem to be counter to any centralizing influence. But telecommuting seems to be most prevalent in the very industries that are more centralized and does not appear to be affecting residential location patterns yet. However, changes in managerial methods have the potential to reduce the need for face-to-face communication among workers and supervisors. See the articles by Ingrid Ellen and Katherine Hempstead; and Edward Potter.

[31] See Fishman.

TABLE 3

A: Distribution of Office Space in Major Metro Areas (1999)

Metro Area	Primary Downtown	Percent of Office Space Secondary Downtown*	Edge City	Edgeless Cities**
Miami	13.1	4.5	16.6	65.8
Philadelphia	34.2	3.2	8.9	53.6
San Francisco	33.9	8.8	13.9	43.4
Atlanta	23.6	9.9	25.3	41.2
Boston	37.4	4.6	18.8	39.2
Detroit	21.3	N/A	39.5	39.2
Houston	23.0	N/A	37.9	39.1
Los Angeles	29.8	7.8	25.4	37.0
Denver	30.4	4.2	29.4	35.9
Dallas	20.5	4.5	40.3	34.6
Washington	28.6	12.5	27.1	31.8
New York	56.7	7.2	6.2	29.9
Chicago	53.9	N/A	19.5	26.6
Total	37.7	6	19.8	36.5

B: Philadelphia Office Areas

	Percent of Office Space
Downtown	**37.5**
Philadelphia (primary downtown)	34.2
Wilmington (secondary downtown)	3.3
Edge City	**8.9**
King of Prussia	3.9
Malvern-Paoli-Wayne	5.0
Edgeless Cities**	**53.6**

* Office clusters in same city as primary downtown or in smaller cities within same metropolitan area.
** Unconcentrated office development within metropolitan area.
Source: Lang.

feature of post-World War II development. The number of locations suitable for urbanization in these parts of the country is fixed. Consequently, as they become more populated, they will become denser, tending to some extent to offset the general decline in density among metropolitan areas. They will also be subject to more in-fill development, which might reverse or retard the flattening out of their density gradients. Indeed, between 1980 and 1990, density gradients steepened in several drier and warmer cities, such as Oklahoma City, Corpus Christi, Fresno, and San Francisco, but in only two cities without such a climate, Columbus and Madison.[32]

Cultural amenities, such as high-quality museums, live theater, and orchestras, can be supported only in relatively densely populated areas. Among cities nationwide, there appears to be new interest in living closer to city centers where cultural amenities are located. Thus, both physical and cultural place amenities are likely to promote centralization and concentration.[33] If this trend strengthens, it could limit or reverse the decline in centralization of metropolitan areas, although its effect might be operative only in very close-in areas while decentralizing influences retain their force farther away from the center.

SUMMARY

Sprawl, when used to describe the spreading out of the residential population around central cities, is not a new phenomenon. It is the same suburbanization process that has been going on for centuries. Applying the term to the decentralization of employment, though, does seem to describe a more recent phase of metropolitan growth, with a significantly lower centralizing tendency or none at all compared with past development.

Will this trend continue? Although there are both centralizing and decentralizing forces affecting the location of jobs and housing, the influence of the falling costs of transportation and communication currently appears to be dominant, providing impetus to the decentralization trend. As long as that remains the case, it seems likely that we will not see a return to the centralization of population that was prevalent in the past. ER

[32] See the article by Stacy Jordan et al.

[33] See Glaeser's 1999 article and the articles by Glaeser and Jesse Shapiro; and Glaeser, Jed Kolko, and Albert Saiz.

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