



ANNE T. AND ROBERT M. BASS CENTER FOR
TRANSFORMATIVE PLACEMAKING



Where jobs are concentrating
and why it matters to
cities and regions

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BROOKINGS

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Introduction

The relationship between place and economy is constantly evolving, and continually shaping the growth, development, and decay of our communities. Indeed, from the rise of industrial cities during the 19th century to the spread of auto-centric suburbs during the 20th, this changing relationship helped produce the varied patterns of concentration, dispersion, and racial and economic segregation that still largely characterize our cities, towns, and regions today.

These patterns are not static, however. As in the past, new ideas and innovations are fostering the creation of products and services that increase productivity, improve our health and the environment, and raise overall standards of living. But today's digital economy is also benefiting some industries, workers, and communities over others.

In the first place, the digital economy is rewarding large global centers that are attracting innovative companies and educated workers, while many older industrial cities and Heartland areas—particularly small and mid-sized cities and rural

towns—struggle to keep pace.¹ These same “winner take all” trends are playing out within many regions, with some areas experiencing dramatic new growth while others remain stagnant or in decline.

The prevailing narrative is that city cores and other urban enclaves are “back,” propelled by the growing desire of educated workers for transit access, walkability, and dense constellations of services and amenities. Numerous studies support what observation and anecdote already tell us: that innovative companies are increasingly eschewing sprawling suburban office parks in favor of mixed-use downtowns, waterfront areas, and innovation districts where research institutions, advanced industry firms, and entrepreneurs cluster and connect.² Research by Chris Leinberger and his colleagues has demonstrated a pent-up demand for walkable, amenity-rich concentrations in suburban areas, too, finding that office, retail, and housing rents are significantly higher and growing faster in many of these areas than those in more auto-dependent areas.³

“These findings suggest a need for leaders to embrace policies and investment strategies that advance more concentrated growth patterns, while also supporting transformative placemaking solutions that help such dense places become vibrant communities where businesses and workers thrive.”

But we also know that preferences for urbanism are not universal, nor are the revitalization benefits such preferences generate equally shared. Indeed, suburban sprawl—and the associated problems of fiscal waste, environmental degradation, and spatial mismatch between workers and jobs—remains pervasive. At the same time, many of the areas that are dense with businesses and jobs are falling short of their potential. Some—like the “edge” and “edgeless” cities described by Joel Garreau and Robert Lang—have wide streets, large setbacks, surface parking, and other design elements that stifle walkability, transit efficiency, and human interaction.⁴ Others may be suffering from decades of disinvestment and decline, with human capital, physical, and economic assets that are undervalued by both the private and public sectors. Meanwhile, rapidly rising rents in some very strong market areas threaten the ability of existing businesses and residents to remain in—and help shape the trajectory of—the communities they helped to build.

These trends are providing an urgency, and an opportunity, for local and regional leaders nationwide to embrace and advance new approaches for supporting concentrations of economic activity that produce better outcomes for more people in more places. Strengthened by policies that encourage investment in existing development areas rather than low density locales and greenfield sites, such concentrations do not equate to economically dynamic communities—but they seem increasingly requisite for creating them. When coupled with good design and programming driven by the vision and values of local stakeholders,

density not only promotes economic and social benefits but also addresses urgent fiscal and environmental challenges facing many U.S. cities and metropolitan regions today.

Hence this report, which aims to help leaders understand how, and how much, changing demands for place are influencing the clustering of jobs both across and within metropolitan areas. The findings suggest a need for them to embrace policies and investment strategies that advance more concentrated growth patterns, while also supporting transformative placemaking solutions that help such dense places become vibrant communities where businesses and workers thrive.

The report proceeds by first exploring density’s important role in the economic growth, civic health and participation, and environmental sustainability of metropolitan areas. It then defines the methods used to explore job density trends in metropolitan America before describing how they played out over the period from 2004 to 2015, a decade of dramatic economic change. To this end, it traces the shifting distribution of jobs in America’s large metro areas during this time, examines the influence of various industry sectors on those patterns, and explores the different types of communities within regions where the clustering of employment increased or declined. In doing so, this analysis provides greater insight into how the relationship between place and economy continues to evolve, and what this might mean for cities and regions seeking to harness these trends to drive more equitable and sustainable economic growth in the digital age.



The importance of density

Numerous studies and analyses have demonstrated the important role that density plays in fostering economic growth, social capital and civic engagement, and healthier, more sustainable communities. Density, of course, is not the sole factor that leads to these outcomes. A wide range of other market and policy factors impact each. And density absent of

investments in placemaking may yield few if any benefits at all. Indeed, a relatively compact but poorly designed neighborhood can discourage social interaction, make walking dangerous, and worsen traffic congestion and localized pollution. Nonetheless, mounting evidence—only some of which is referenced here—reveals that the benefits of density are sizable and significant.

An economic driver

Density helps drive economic growth by enabling more frequent and productive interactions among firms and workers. It encourages more sharing and trading among firms, better matching of workers to firms, and faster learning—helping to lower costs, increase industrial diversity, spur innovation, and ultimately raise the productivity of local firms and workers.⁵

Density increases firms' proximity to one another, permitting them to *share* more inputs and more easily trade their products and services. In denser areas, more intermediate inputs are more readily available.⁶ Similar firms will have access to larger pools of specialized labor and suppliers. Proximity also helps lower the cost of transporting goods and providing services, leading to more trade. For example, research by Stuart Rosenthal and William Strange found that firms purchase more from local suppliers in areas where employees in the same industry are more geographically concentrated.⁷ Density also demands that similar firms compete with one another to offer the best products and services in their local market, or to differentiate their products or services through specialization. As a result, density leads to more competitive and diverse local markets.

Density also enables more frequent and effective *matching* of workers and firms. In denser areas, there are more job opportunities within a given distance of a worker, making it more likely that people find more—and more attractive—job opportunities more often.⁸ In this way, density plays a particularly important role in the employment and upward mobility of low-income people, enabling them to more easily find work and become financially independent compared to counterparts in less-dense areas.⁹ The increased job mobility that density permits also increases personal and firm productivity by improving the quality of worker-firm matches and by fostering knowledge spillovers as workers move between firms.¹⁰

Density also therefore encourages workers and firms to *learn* knowledge and skills from each other and to collaborate on the creation of new ideas and technologies. Numerous studies have found that research and development labs and technology-intensive firms tend to locate close to one another, perhaps because the face-to-face interaction that innovation requires is easier in denser areas.¹¹ Research by Gerald Carlino and others has found that across metro areas, the per capita output of patents increases by 22% for every 100% increase in job density. The same study found that the effects of density on innovative activity are greater than the effects of metro areas' total population or employment, implying that a metro area's density matters more than its overall size when it comes to creativity and inventiveness.¹²

A civic enabler

Density improves local governance and public sector effectiveness by strengthening social capital, thus promoting civic participation and reducing fiscal stress.

Density increases social capital by increasing the proximity of individuals to one another, making them more likely to *engage in community* activities that address public concerns. Studies have found that density increases the frequency of people's spontaneous social interactions, perhaps through the use of the shared public spaces density creates.¹³ People in denser localities are also more active in civic institutions, including through more frequent voting and contact with municipal officials.¹⁴ This increased civic participation enhances social capital directly and can heighten one's feeling of social connection.¹⁵ For example, a psychologist found that residents of Greenbelt, Maryland, a densely-developed town, tend to have a higher sense of community than the residents in nearby Hyattsville, Maryland, a low-density town, despite the demographic similarities of the two towns.¹⁶

Density also improves governance by easing *fiscal* pressures on municipalities and improving the quality of local services. Extensive studies on the costs of different types of development patterns have found that denser and more compact development can reduce the fiscal burden of providing and maintaining infrastructure and public services while improving revenue streams.¹⁷ More concentrated economic activity encourages more intensive use of existing infrastructure such as transit, roads, and water lines and sewer lines, and also lowers the fixed and variable costs of new infrastructure and public services when they are required.¹⁸ In fact, research has found that denser development is associated with 38% less upfront cost for infrastructure than low-density sprawl on average.¹⁹ Furthermore, police and ambulance response times are not only faster in high-density towns compared to low-density areas, but also cheaper, shaving costs by about 10% on average.²⁰

A promoter of environmental and physical health

Finally, more concentrated land use is vital to combatting the consumption of land and burning of fossil fuels associated with climate change, while yielding concomitant benefits to humans' overall health and wellbeing.

Density mitigates the harmful environmental impacts of economic activity by conserving energy, reducing air pollution, and preserving the ecosystem and natural resources.²¹ Densely developed neighborhoods tend to consume less energy than low-density neighborhoods because people travel less by car, reducing demand for fuel, and live and work in larger, more energy efficient buildings.²² As a result, denser

metro areas tend to experience lower levels of air pollution.²³ Denser urban development also tends to consume less land, preserving wetlands, forests, and open spaces that help control flooding, purify wastewater, and regulate climate.²⁴

Density promotes better human health outcomes for some of the same reasons it is better for the environment. Because densely developed places are better at mitigating air pollution, they tend to be better for people with cardiovascular or respiratory illnesses.²⁵ Density also creates safer development patterns that promote more everyday physical activity than sprawling car-centric development patterns. Living in a denser place can encourage people to spend more time walking, bicycling, jogging, and running—activities that lower the risks of obesity, high blood pressure, and diabetes.²⁶ People in denser areas also tend to have lower risk of dying in a car crash than those living or working in more sprawling areas due to reduced driving and lower speed limits.²⁷

Many policymakers and practitioners have recognized and embraced density's role in shaping dynamic and inclusive communities. For decades, planners, community development groups, and other place-focused organizations have promoted policies and practices that foster more concentrated patterns of economic and residential development. Yet for all their positive impacts, the findings here indicate that cities and regions could be doing more to advance such patterns—while doubling down on placemaking investments that can transform dense areas into social, sustainable places that spur creativity, job creation, and widespread prosperity.

Sources and methods

To better understand the changing role of density during the first wave of the digital revolution, this report tracks trends in the spatial concentration of jobs in large U.S. metropolitan areas from 2004 to 2015. It builds on the works of other scholars who have examined the proximity of jobs to the urban core and uses similar data and concepts.²⁸ But this report also departs from these earlier works in its focus on job density rather than proximity. Using sensitive measures of density and counterfactual analysis, this report describes recent trends in the density of most private-sector wage-and-salary jobs among and within 94 of the nation's 100 largest metro areas and the local and sectoral dynamics behind the trends. Together, these 94 metro areas contained 66% of the nation's private-sector jobs in 2015.

About the data

The U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics program (or LODES) is the primary source of local-area employment data in this analysis.²⁹ The Census Bureau creates the public-use LEHD data by combining state-supplied administrative records on workers and employers with census and survey data.³⁰ The LODES component of LEHD provides annual employment data linking home and work locations at the Census block level for most U.S. states for the years 2002 through 2015. (Census has not yet released LODES data for more recent years.)

This analysis uses LODES block group-level work location data for the years 2004 to 2015.³¹ LODES block group-level data are more accurate than LODES block-level data and more geographically precise than Census tract-level data.³² The LODES block-group level data are continuous, complete, and comprehensive for most U.S. states and areas for the post-2003 period, with some exceptions noted below. The authors supplement the LODES data with similar data from a related Census Bureau data program called Quarterly Workforce Indicators (QWI) for parts of this analysis.³³

Coverage and exclusions

LODES's geographic and jobs coverage is comparable to most major federal employment data sources. The LODES data cover all civilian wage-and-salary employment covered by unemployment insurance in every industry sector. (LODES reports data for sectors defined at the two-digit NAICS level).³⁴ LODES excludes self-employment and some types of contract, informal, and "gig" employment. Altogether, this means LODES covers 96% of all U.S. employment.³⁵

LODES data are unavailable or unreliable for some sectors, jurisdictions, and time periods, however. The Census Bureau depends on states' participation in the LEHD program to produce LEHD-related data products, including LODES. The District of Columbia and Massachusetts did not join the LEHD program until 2010.

Additionally, in some cases the Census Bureau has incomplete data or cannot determine the location of jobs for multi-establishment firms.³⁶ This issue is especially prevalent in the government, public administration, and administrative services sectors and for the entire state of Wisconsin.³⁷

Due to these data limitations, this analysis covers only private, non-administrative sectors of the economy for areas outside of the District of Columbia, Massachusetts, and Wisconsin. This means the analysis excludes six of the nation’s largest 100 metropolitan areas: Boston; Madison, Wis.; Milwaukee; Springfield, Mass.; Washington; and Worcester, Mass. Additionally, the Massachusetts portion of the Providence, R.I. metro area and the Wisconsin portions of the Chicago and Minneapolis-St. Paul metro areas are excluded from the analysis.

Measuring job density

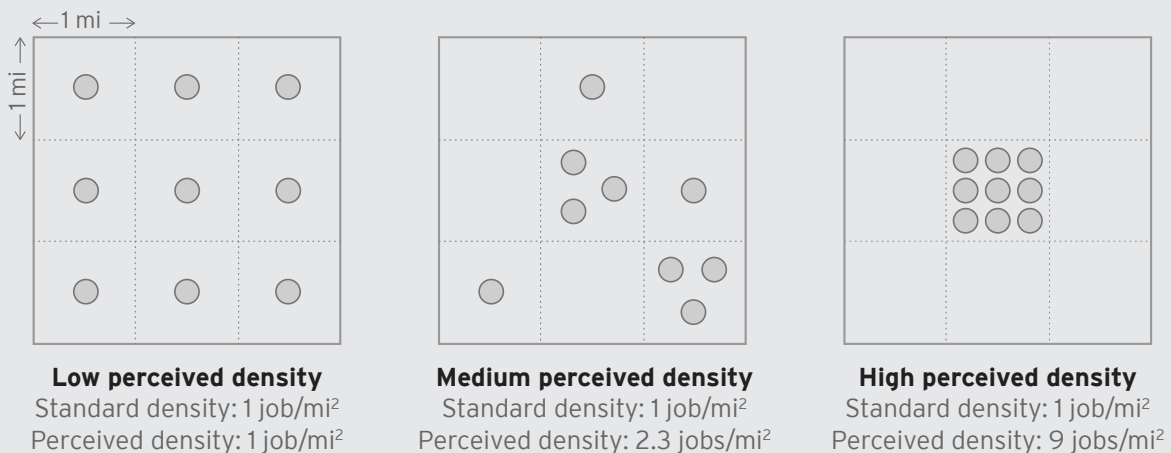
All the findings on job density in the report refer to the weighted or “perceived” density

of jobs in metro areas. Perceived density is different from the standard measure of density. Standard job density is calculated by dividing the total number of jobs by the total land area of a metro area, revealing the average amount of land around each job. Perceived job density instead measures the job density of the place in which the average job is located, revealing the average number of jobs in the vicinity of each job. Therefore, perceived job density provides a better approximation of how dense a metro area feels and how compactly its jobs are concentrated.

To see how these two measures can lead to different indications of job density in a metro area, consider the three examples in Figure 1. Each of these hypothetical metro areas is nine square miles and each contains nine jobs. Therefore, all three have the same standard job density of one job per square mile. Jobs are concentrated differently in each example, however. In the first example, jobs are spread evenly, giving this metro area the same standard and perceived job density. In the second example, some parts of the metro area contain more

Figure 1. Perceived job density indicates the number of jobs around a typical job

Three examples of standard versus perceived job density in a metro area



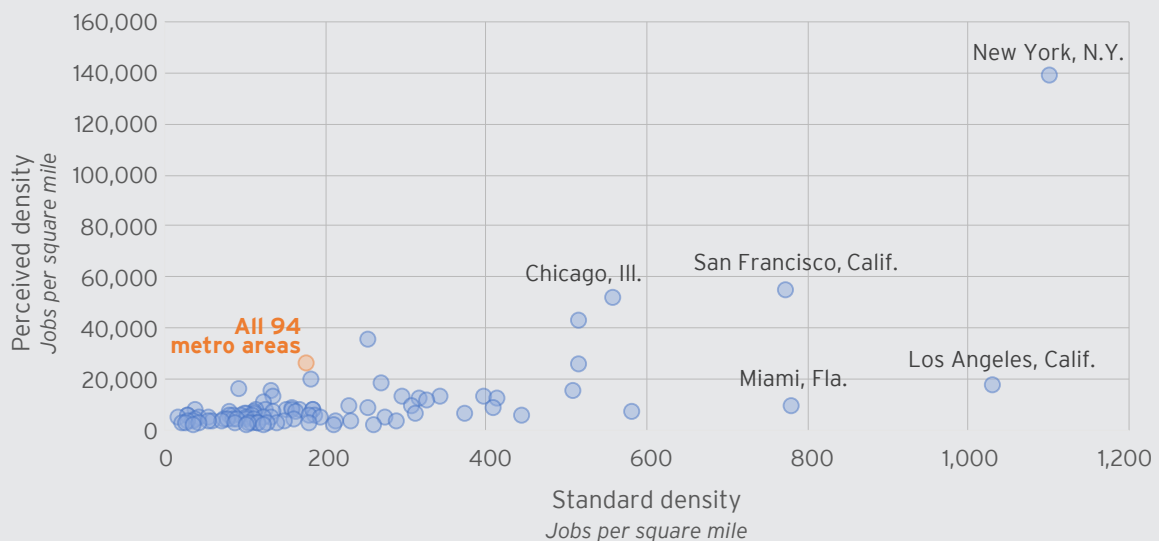
Source: The Brookings Institution

Sidebar 1: Job density levels in large U.S. metropolitan areas

Metro areas' perceived density tends to be quite a bit greater than their standard density, and better reflects the concentration of their jobs across space. Taken together, the 94 metro areas in this study had a perceived density of 25,994 jobs per square mile in 2015, which is 147 times greater than their collective standard density of 177 jobs per square mile. Among individual metro areas, this ratio was largest in Boise, Idaho, where perceived density of 4,743 jobs per square mile was nearly 240 times greater than its standard density of 20 jobs per square mile. The ratio was lowest in Cape Coral, Fla., where perceived density of 1,694 jobs per square mile was only about six-and-a-half times greater than its standard density of 262 jobs per square mile. These ratios indicate that the mountainous Boise metro area covers a lot of land but that its jobs are relatively concentrated, whereas Cape Coral's jobs are spread more evenly across its land area.

Comparing metro areas' perceived density also reveals more about the relative concentration of their jobs than standard density does. For example, Figure 2 shows that the New York metro area has a standard density of 1,103 jobs per square mile—the highest of any metro area and about 7% greater than the metro area with the next highest standard density: Los Angeles. However, New York's perceived density of 138,541 jobs per square mile is almost 700% greater than Los Angeles metro area's perceived density of 17,386 jobs per square mile. This difference in perceived density is a truer reflection of how jobs are concentrated in each of these metro areas: New York's jobs are highly concentrated. The Los Angeles has a similar number of jobs per square mile as New York, but its jobs are more spread out across its land area. Similarly, San Francisco and Miami have similar standard job densities, but San Francisco's perceived job density is 600% greater than Miami's.

Figure 2. Every metro area's perceived density is greater than its standard density
Standard versus perceived density of large metro areas, 2015



Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

jobs than others, which makes its perceived job density greater than its standard job density. In the third example, all the jobs are concentrated in just one part of the metro area, giving it a perceived job density nine-times greater than its standard job density.

In this analysis, perceived job density is measured for all the Census block groups in each metro area using the LODES jobs data described above and the authors' calculations of block-group land area.³⁸ The perceived job density of a metro area is found by (1) calculating the standard job density of each block group, (2) weighting the block group by its share of the metro area's jobs, (3) multiplying each block group's standard job density by its job weight, and (4) summing the weighted job density of all block areas in the metro area. The same formula can be used to find the perceived job density of any given industry sector or sub-area (e.g., a county). A similar formula will yield the sector's contribution to a metro area's total perceived job density. In the findings that follow, the perceived job density of metropolitan America—that is, all 94 metro areas together—is found by weighting each block group's job density with its share of total jobs in all 94 metro areas' jobs (instead of its share of its metro area's jobs) and then summing the weighted job density of all block groups. This same approach is used to find the collective perceived density of other groups of metro areas.

Calculating expected trends

This report explores *whether* metro areas' job density is increasing or decreasing, by *how much*, and *why*. A metro area's job density can change because of job growth, changes in the distribution of its jobs across sectors, and because of shifts in the distribution of sectors' jobs across space. Among the reasons why job density can change, shifts in the distribution of jobs across space are most interesting because they reveal where economic activity is gravitating: toward more- or less-dense parts of a metro area. Local policymakers have considerable influence on these spatial shifts and should have an interest in ensuring that spatial shifts increase density given its inherent benefits.³⁹

We can measure spatial shifts in the distribution of jobs across a metro area and analyze their effects on its job density by comparing the "actual" trend in job density to a counterfactual or "expected" trend. The actual trend in job density refers to observed changes in a metro area's perceived job density.⁴⁰ The expected trend refers to how a metro area's job density *would have* changed if job growth in each industry sector had been distributed according to each block group's starting share of the metro area's jobs in that sector.⁴¹ In other words, the expected change reveals how a metro area's job density would have changed due to job growth

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alone, independent of shifts in the distribution of jobs across space.

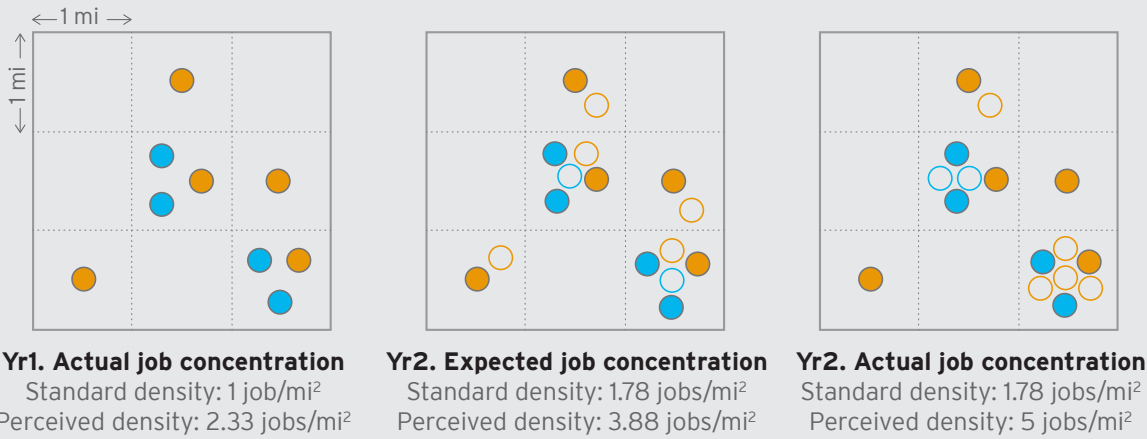
To see how a comparison of expected and actual job density trends can reveal the effects of spatial shifts in the distribution of jobs, consider the example in Figure 3. This hypothetical metro area called Metropolis X started off with five jobs in the manufacturing sector and four jobs in the services sector for a total of nine jobs in year one. From year one to year two, Metropolis X doubled its number of manufacturing jobs and added 50% more services jobs, adding seven new jobs

altogether for an overall job growth rate of 78%. If these new manufacturing and services jobs were distributed across Metropolis X according to each subarea's share of total jobs in each sector in year one, Metropolis X could have *expected* to see its perceived job density increase by 66%. In the example, however, new jobs are *actually* more concentrated than expected: New manufacturing jobs located in just two subareas instead of five and new services jobs located in just one subarea instead of two. As a result, Metropolis X's perceived job density actually increased by 115%.⁴²

Figure 3. Comparing expected and actual trends reveals why job density has changed

An example of expected and actual changes in job density in a metro area

● Existing service job ○ New service job ● Existing manufacturing job ○ New manufacturing job



Source: The Brookings Institution



Findings

This analysis reveals that jobs in metropolitan America grew both up and out from 2004 to 2015. It shows a large and greater-than-expected increase in the density of jobs in metropolitan America as a whole, which strongly suggests that the overall demand for density has risen. It also finds that this increase was driven in large part by a select group of industry sectors in the core urban counties of a small set of especially large

and dense metro areas. In fact, overall increases in job density occurred in just under half of the metro areas studied. The story is complex, however: Indeed, our look within metros revealed that almost every large metro area exhibited both job densification and job sprawl across its counties, yielding a polycentric pattern of development not described in previous studies.

“Our look within metros revealed that almost every large metro area exhibited both job densification and job sprawl across its counties, yielding a polycentric pattern of development not described in previous studies.”

1. Overall job density within metro areas increased from 2004 to 2015, driven primarily by four metro areas

A worker in the average job in metropolitan America would perceive the area around her place of work to have many more jobs in 2015 than in 2004. In fact, the job density of the 94 large metropolitan areas increased from an average of 20,068 jobs per square mile in 2004 to 25,994 jobs per square mile in 2015—an increase of 5,926 jobs per square mile, or nearly 30%. This increase in job density outpaced overall job growth during this period, indicating that not only did most metro areas have more jobs in 2015 than in 2004 but also that jobs became more concentrated in denser parts of metro areas.

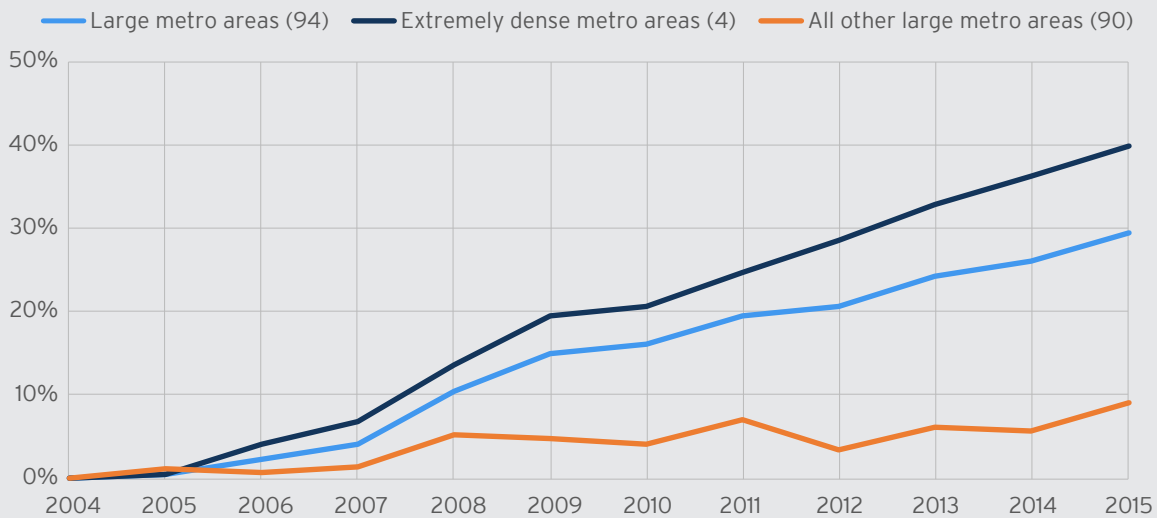
Figure 4 shows that job density among all 94 metro areas taken together increased modestly in the early part of this period (from 2004 through 2007) as low-density suburban and exurban areas added jobs faster than denser urban areas.

Suburban and exurban areas then shed their jobs faster than denser urban areas over the course of the Great Recession from 2007 to 2009, which caused the average job density of the largest metro areas to increase more than 10% over those two years. Job density increased steadily over the course of the economic recovery from 2009 to 2015 as denser urban areas added jobs faster than their less-dense counterparts.

These overall job density trends are heavily influenced by just a few of the nation’s largest and densest metro areas, however. The metro areas of New York, Chicago, San Francisco, and Seattle account for almost 90% of the increase in job density seen among all 94 large metro areas from 2004 to 2015. The outsized influence of these four metro areas stems from their size, density, and growth. Together, they comprise about 20% of private, non-administrative jobs in metropolitan America and a slightly larger share of its job growth during this period. Their job density increased from an average of 65,813 to 92,000 jobs per square mile, or by 40%.

Figure 4. Metropolitan America’s job density increased due to trends in extremely dense metro areas

Change in the job density of large metro areas since 2004



Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

Job density trends in the rest of metropolitan America were more modest on average. Excluding these four extremely dense metro areas, the other 90 large metro areas saw a collective increase in job density of about 9%, building from an average of 8,917 jobs per square mile in 2004 to 9,735 jobs per square mile in 2015. However, these metro areas also show considerable variation in the direction and extent of changes in job density during this period, as the following findings show.

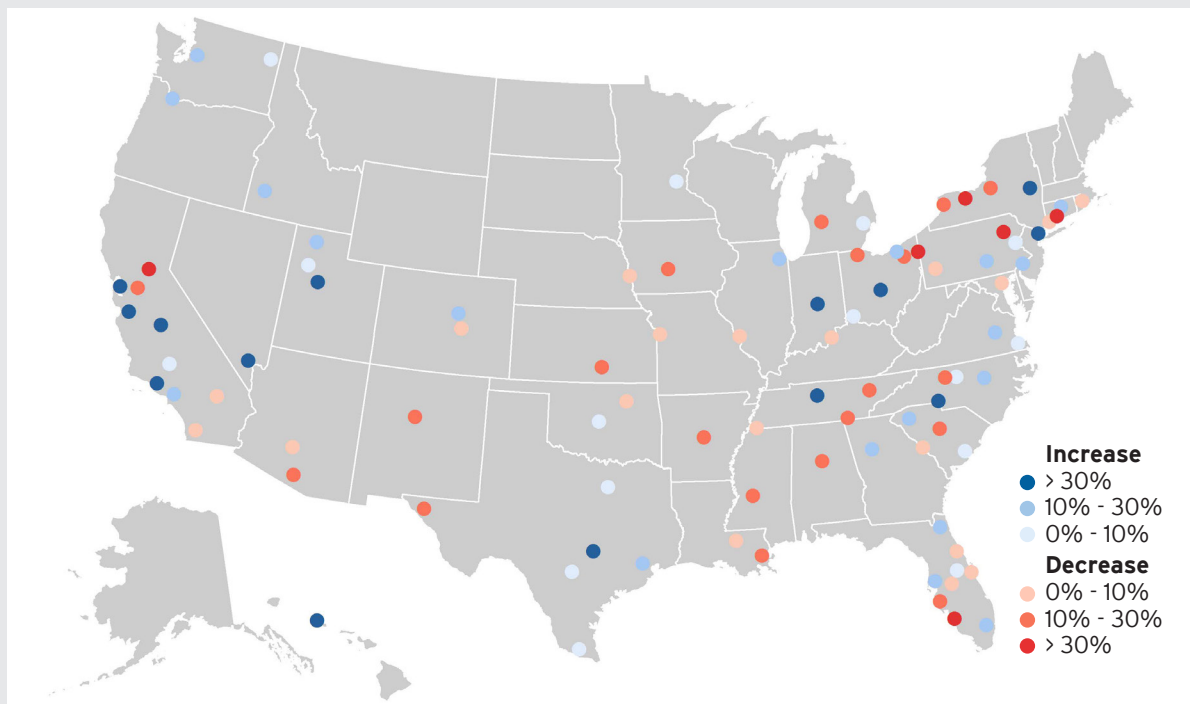
2. Only half of large metro areas experienced an increase in job density, while the others sprawled

Despite the notable increase in job density in metropolitan America as a whole from 2004

to 2015, trends varied greatly among individual metro areas. Only 48 of 94 large metro areas posted increases in job density, but most of those gains were fairly large. Fourteen (14) metro areas posted increases in job density that exceeded the 94-metro area average, led by San Francisco, Honolulu, Oxnard, Calif., San Jose, Calif., Charlotte, N.C., Albany, N.Y., New York, and Nashville.⁴³ Another 20 metro areas saw job density increases of 10 to 30%, including large metro areas such as Seattle, Philadelphia, Chicago, and Atlanta as well as smaller metro areas such as Greenville, S.C., Boise, Idaho, and Richmond, Va.

In the other 46 metro areas, most declines in job density were relatively modest: 20 metro areas saw declines of less than 10% and another

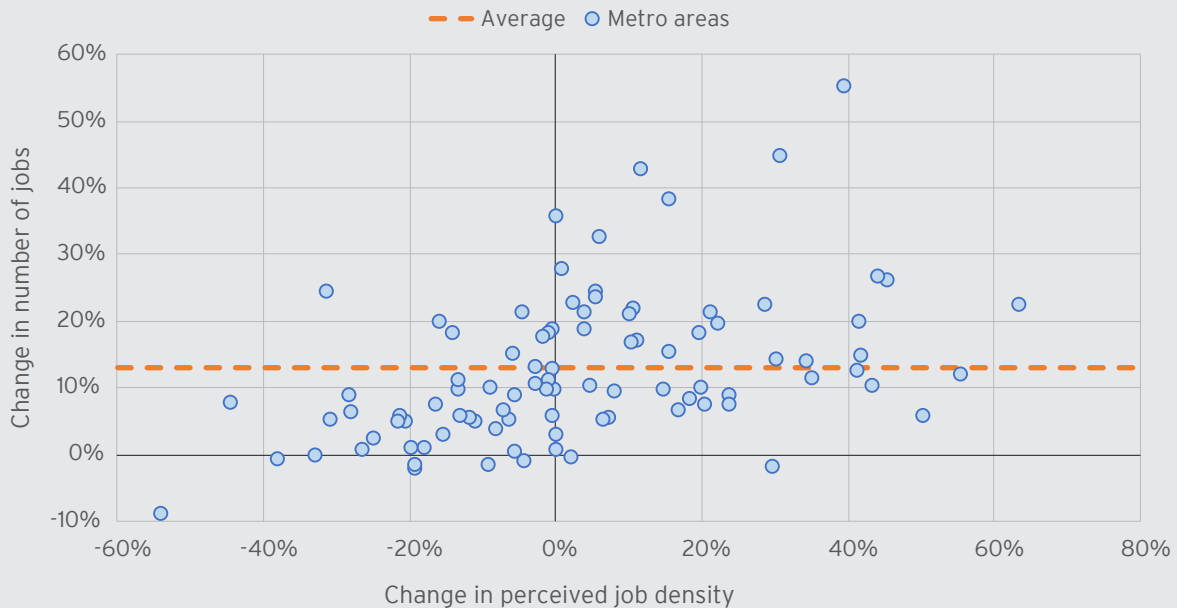
Figure 5. Faster-growing metro areas tended to see larger increases in job density
Change in job density across 94 of the nation's largest metro areas, 2004 to 2015



Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

Figure 6. Faster job growth was associated with larger increases in job density

Relationship between change in jobs and job density among 94 large metro areas from 2004 to 2015



Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

13 saw declines of 10% to 20%. However, six metro areas saw declines ranging from 30% to 54%: Scranton, Pa., Cape Coral, Fla., New Haven, Conn., Rochester, N.Y., Sacramento, Calif., and Youngstown, Ohio.

Metro areas that achieved faster job growth tended to see larger increases in perceived job density. This would not necessarily be assumed: While job growth would naturally lead to an increase in *standard* density (more jobs, same land area) it would not necessarily increase *perceived* density if, for instance, new jobs locate in low-density areas. But in fact, of the 36 metros that saw above-average job growth, 28 (78%) also saw their perceived job density increase. On the other hand, 38 (66%) of the 58 metro areas that saw below-average job growth saw job density decline. In short, faster job growth was associated with increasing job concentration

while slower job growth was associated with job sprawl.

There are notable exceptions to these trends, however. For example, Cape Coral increased its number of private, non-administrative jobs by 24% from 2004 to 2015—the 10th fastest rate of job growth of these 94 metro areas during this period—but its job density actually declined 31% as new and existing jobs spread out to less-dense and undeveloped parts of the metro area. Cleveland, on the other hand, saw a 2% decline, on net, in its number of private, non-administrative jobs but a 30% increase in its job density because its health care jobs became more concentrated in already-dense parts of the metro area. Similarly, Oxnard, Calif. saw job growth of just 6% but increased its job density by 51% due in large part to the increasing concentration of its manufacturing and wholesale jobs.

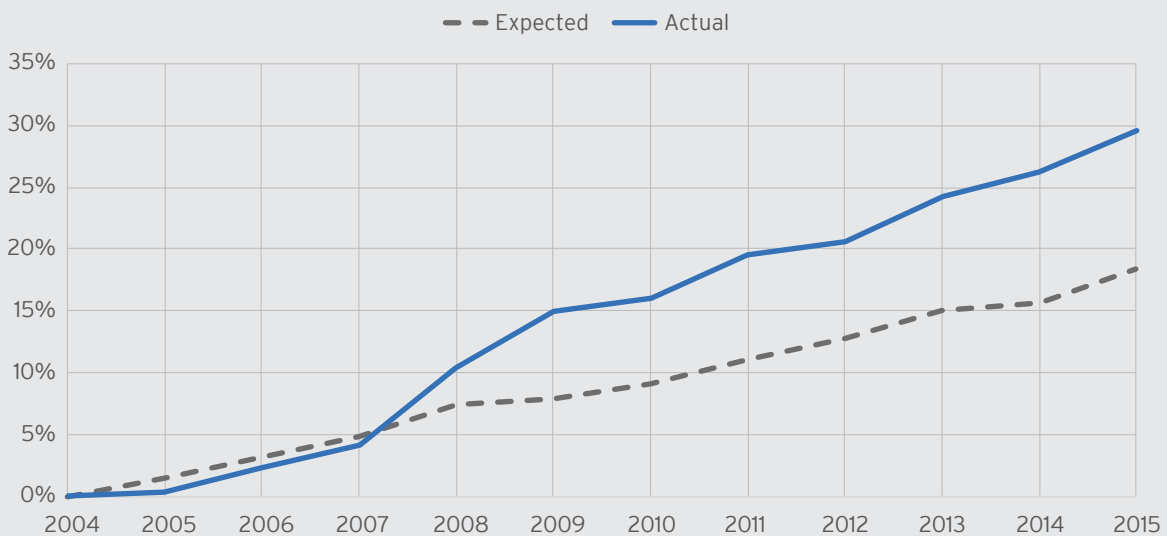
3. Jobs in dense metro areas grew far denser than expected, while most metro areas fell short of their potential job density increase

Across metropolitan America as a whole, job density increased more from 2004 to 2015 than job growth alone would have predicted. If each metro area’s annual job growth had been distributed according to the spatial distribution of its jobs in the prior year for the whole of this period, metropolitan America could have expected its job density to increase 18% from 2004 to 2015, as shown in Figure 7. Instead, metropolitan America actually saw an increase in job density of 30%—an increase that is more than 50% greater-than-expected. That metropolitan America’s actual job density trends outpaced those expected from job growth alone indicates that job growth disproportionately favored already-dense parts of metro areas during this period.

This gap between expected and actual job density trends began to grow after the Great Recession began in late 2007. Up until 2007, jobs in metropolitan America had been growing denser but slightly less-dense-than-expected because the nation’s pre-recession boom disproportionately favored less-dense suburban and exurban parts of metro areas. But these less-dense parts then shed jobs faster than the rest of metropolitan America over the course of the recession from 2007 to 2009. Meanwhile, denser urban areas were more resilient, retaining or even adding more jobs. This shift in the balance of the distribution of jobs from less-dense to denser parts of metro areas created a gap between expected and actual job density trends starting in 2008 that grew even larger in 2009. As the economic recovery set in and less-dense suburban areas began to add jobs in 2010, that gap shrank slightly. But once the nation’s economic expansion strengthened in 2013, job

Figure 7. Metropolitan America’s job density increased more than its job growth trends would predict

Expected versus actual change in job density of large metro areas since 2004



Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

“Across metropolitan America as a whole, job density increased more from 2004 to 2015 than job growth alone would have predicted. If each metro area’s annual job growth had been distributed according to the spatial distribution of its jobs in the prior year for the whole of this period, metropolitan America could have expected its job density to increase 18% from 2004 to 2015, as shown in Figure 7.”

density again increased more than job growth alone would predict and continued to grow through at least 2015.

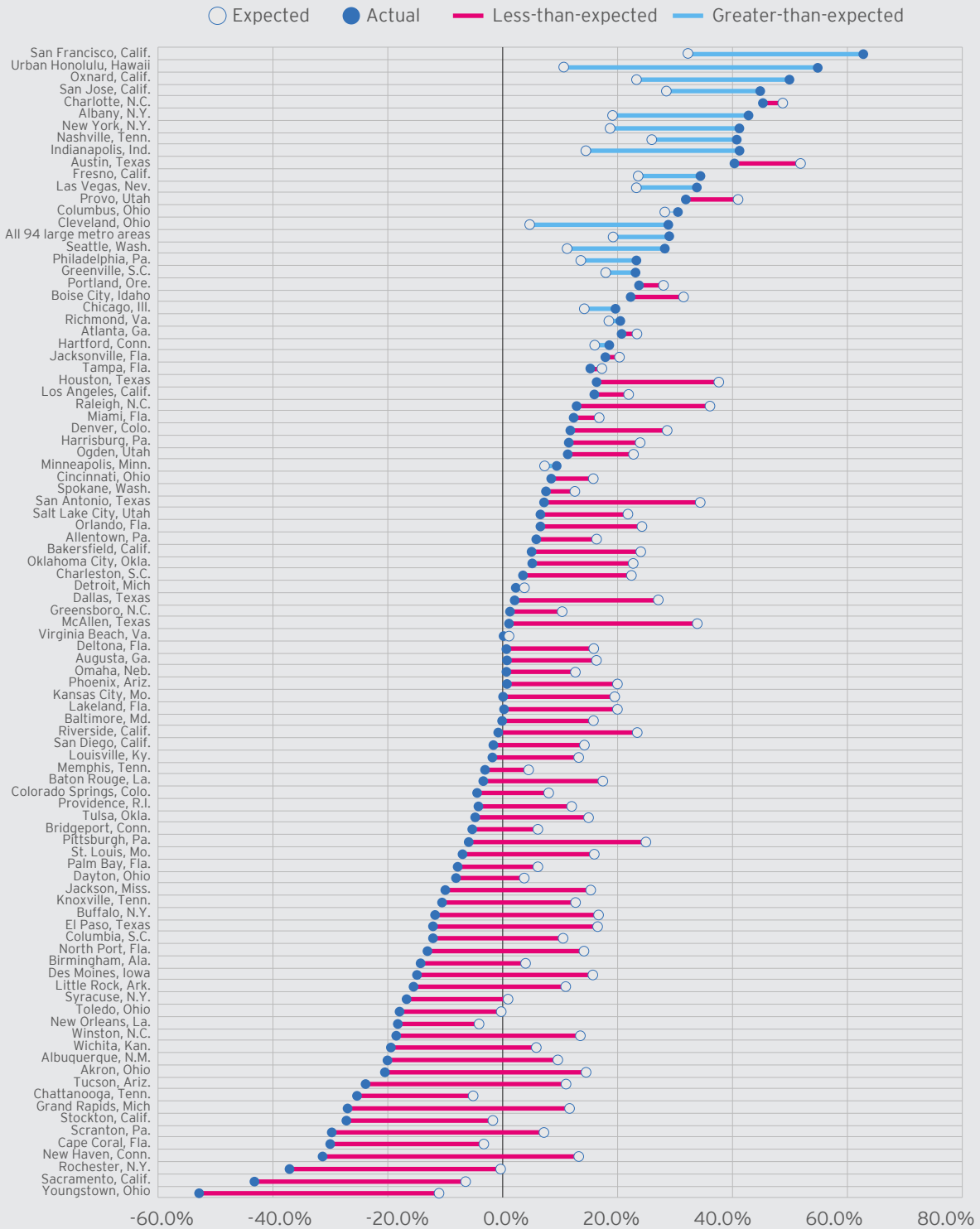
Once again, though, these trends were influenced by a relatively small group of metro areas. Indeed, only 19 of 94 large metro areas posted actual increases in job density that were greater than those expected from job growth alone, as shown in Figure 8. Some of these 19 metro areas are the nation’s largest and densest metro areas, such as New York, Chicago, San Francisco, and Seattle, which had an outsized impact on both expected and actual change in job density. Job growth in the downtowns and central urban counties of these metro areas accounted for almost all their greater-than-expected increases in job density, patterns that will be further explored in the following findings. These 19 metro areas also include smaller and less-dense but relatively fast-growing metro areas, such as Nashville, Indianapolis, and Las Vegas.

In the other 75 large metro areas, actual changes in job density fell short of expected changes, suggesting new jobs generally spread to less-dense parts of these regions. For example, private, non-administrative jobs in Tucson, Ariz. and Grand Rapids, Mich. grew by 2% and 6%, respectively. Yet if these modest job gains had accrued in proportion to where jobs were already located in each metro area, each could have expected to see increases in job density of 12%. Instead, new and existing jobs migrated to less dense parts of each metro area, which lowered Tucson’s job density by 25% and Grand Rapid’s by 28%. Other metro areas such as Austin, Charlotte, and Provo, Utah saw faster-than-average job growth but still saw job density increase less than expected as their jobs spread out. In Austin, for example, private, non-administrative jobs grew by 55%. If these new jobs had accrued according to where Austin’s existing jobs were located, Austin could have expected its job density to increase 54%. Instead, Austin’s job density increased just 40%.

Findings

Figure 8. Most large metro areas' job density increased less than their job growth would predict

Expected versus actual change in job density, 2004 to 2015



Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

4. Most sectors of the economy saw large but not widespread increases in job density

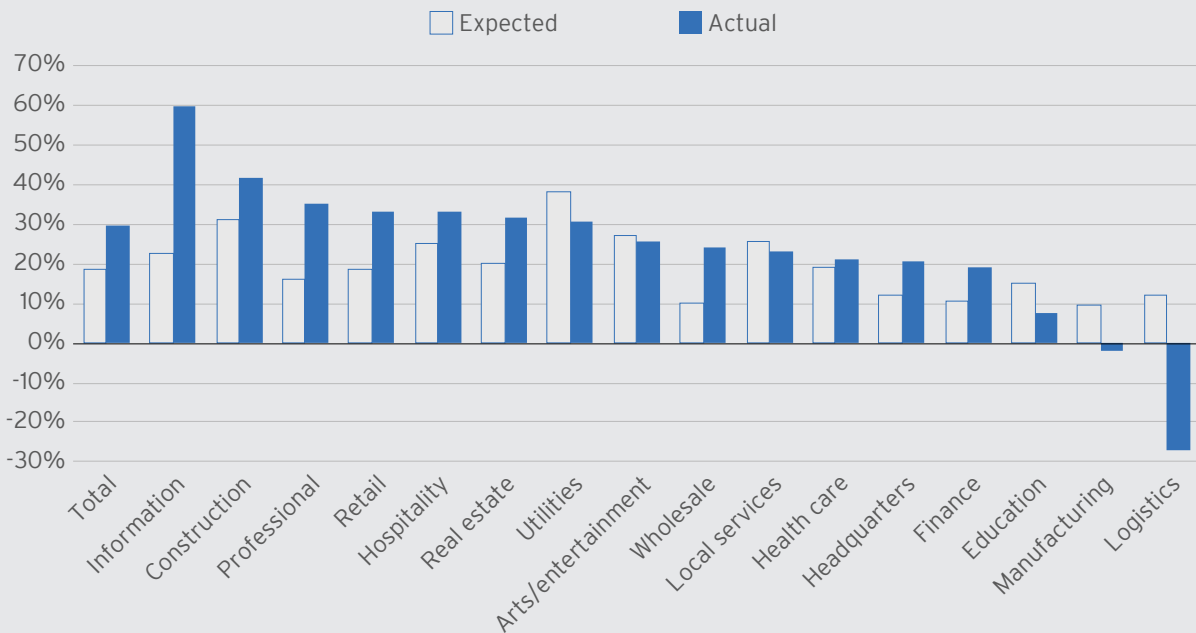
The growth and changing distribution of jobs in individual industry sectors played a significant role in the job density trends in metropolitan America as a whole and in individual metro areas. In the 94 metro areas as a whole, density around the average job increased from 2004 to 2015 in every sector except manufacturing and logistics. Moreover, most sectors' job density increased by more than would be expected from job growth alone, as shown in Figure 10. These large and greater-than-expected increases in job density indicate that new jobs in most sectors disproportionately located in denser areas during this period, which could suggest an increasing preference for density throughout most of the economy.

In most sectors, the job density increases seen across metropolitan America as a whole were

driven by a rather narrow set of metro areas, as shown in Figure 11. For example, jobs in the knowledge-intensive information sector saw a 60% increase in density across all 94 metros taken together, but this was driven largely by the increasing concentration of information jobs in the especially large and dense metro areas of San Francisco, New York, and Seattle. Indeed, the information sector's job density increased in just 33 (35%) of metro areas, a group which also included fast-growing tech hot spots such as Austin, Greenville, S.C., Indianapolis, and Nashville, Tenn. Moreover, in almost all these metro areas those increases were greater-than-expected, indicating that in the metro areas where the information sector is adding jobs, it is disproportionately adding them to already-dense parts of the metro area. Retail is another sector where greater-than-expected increases in density across all metro areas taken together were in fact driven by increases in only a few individual metro areas, such as New York, Seattle, and Honolulu.

Figure 9. The job density of most sectors increased more than their growth alone would predict

Expected versus actual change in job density around jobs by sector, 2004 to 2015



Note: Agriculture and mining are not shown due to their small number of jobs but count toward the total. Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

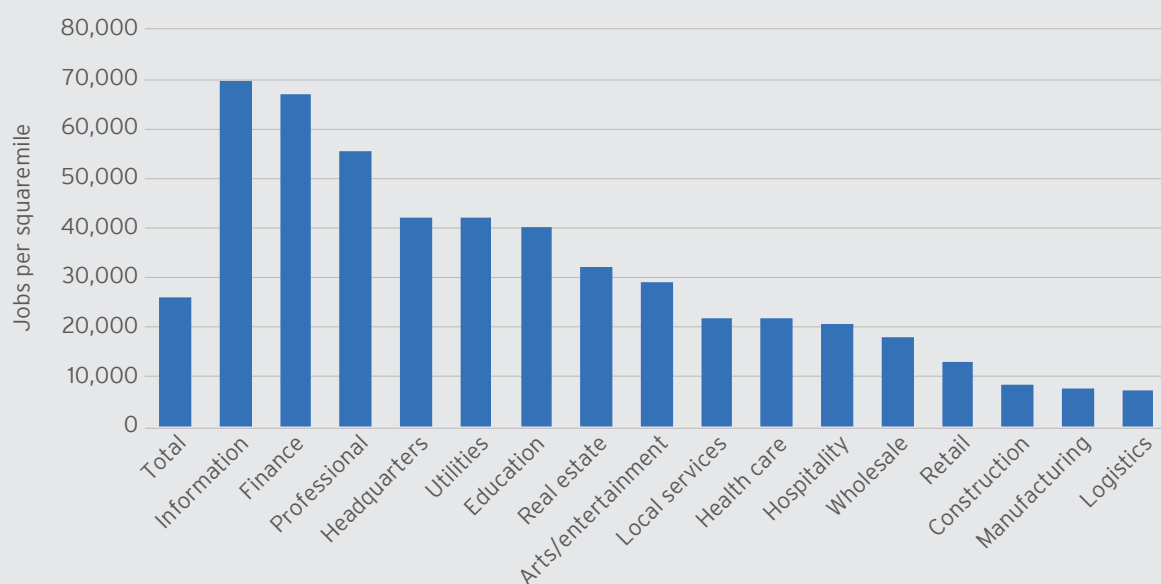
Sidebar 2. Job density of major industry sectors in metropolitan America

So how dense had these sectors grown by 2015? As shown in Figure 9, sectors that provide or depend on advanced businesses services, such as financial services, information, professional services, and corporate headquarters, were the densest sectors in 2015. These sectors, along with the education sector, all employ larger numbers of highly educated workers. In this analysis, a sector's level of job density is determined by two factors: The first is the spatial concentration of jobs in that sector, and the second is the nearby concentrations of other sectors' jobs. These advanced business service sectors have high job density not only because jobs in each sector are highly concentrated together, but also because they tend to locate close to lots of jobs in other sectors. For example, information jobs by themselves had a density of 19,529 jobs per square mile in 2015, but the perceived density around information jobs was 69,497 jobs per square mile including co-located jobs in other sectors. In other words, information jobs are themselves responsible for just 28% of their perceived job density. Corporate headquarters jobs are responsible for just 16% of job density in that sector.

In contrast, sectors that tend to cater to consumers, or that consist of facilities that need large tracts of land, tend to have lower job densities. For example, the health care, local services, hospitality, and retail sectors have among the lowest job densities, in part because these sectors locate closer to households in less-dense neighborhoods and suburbs. Like the denser sectors discussed above, much of these sectors' perceived density comes not from their own jobs but from nearby jobs in other sectors, with the exception of health care. Health care jobs are responsible for nearly 60% of that sector's job density, indicating that health care jobs—at hospitals or large health complexes, for example—represent the majority of the jobs in the areas where they are located. Wholesale, logistics, and manufacturing jobs have lower job densities because they tend to comprise large one-story facilities such as warehouses, airports, and factories that often require lots of land and separation from other land uses.

Figure 10. Jobs in advanced services sectors are located in the densest parts of metro areas on average

Job density by sector in 2015



Note: Agriculture and mining are not shown due to their small number of jobs but count toward the total. Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

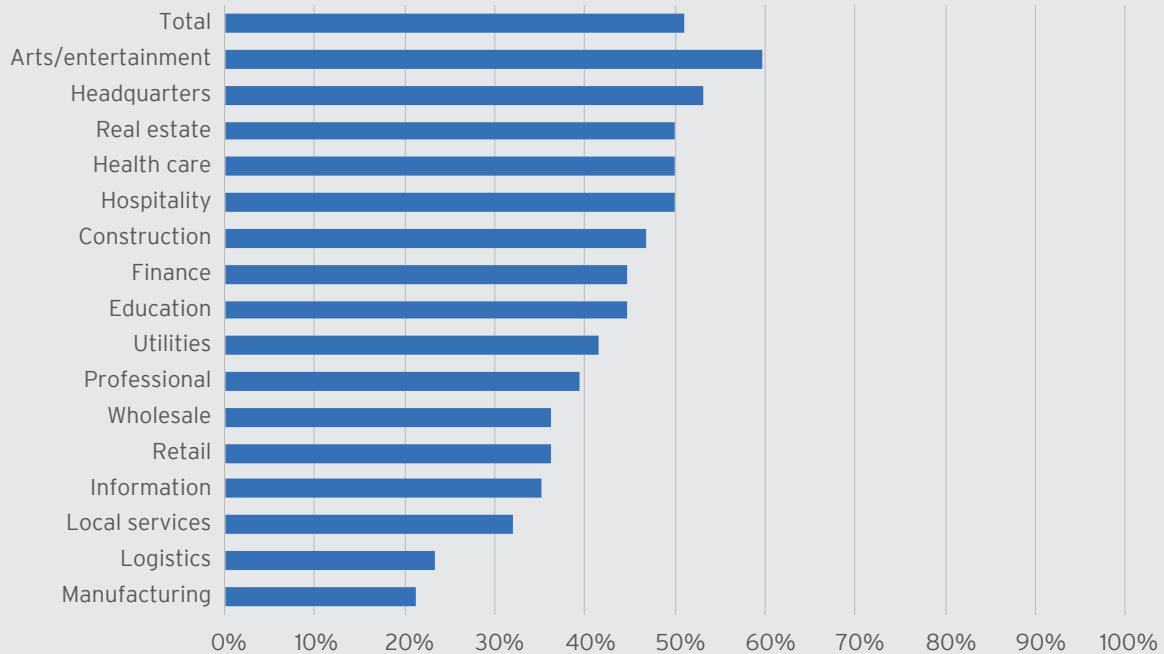
Findings

Notably, a few sectors did post job density increases across about half of individual metro areas. The density around jobs in the arts and entertainment sector rose in 56 of 94 large metro areas (60%). The density around corporate headquarters jobs rose in 50 (53%) of large metro areas.⁴⁴ Additionally, half of large metro areas also saw increases in the density of jobs in hospitality, which comprises

the food service and hotel industries. These trends appear to confirm findings by the International Downtown Association and others that concentration and proximity are playing an important role in the location decisions of firms in these sectors.⁴⁵ Additionally, health care, real estate, construction, finance, and education all saw increasing job density in close to half of large metro areas.

Figure 11. Most sectors' job density increases were driven by a minority of metro areas

Share of large metro areas that saw an increase in job density by sector from 2004 to 2015



Note: Agriculture and mining are not shown due to their small number of jobs but count toward the total.
Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

5. Core urban counties experienced large increases in job density, while suburban counties saw more modest gains

Job density trends not only varied among individual metro areas, but also *within* them. The highly urbanized “core” counties within individual metro areas tended to see much larger increases in job density from 2004 to 2015 than less-urbanized—and, typically, less-dense—suburban or exurban counties.⁴⁶ As with the preceding findings, increases in job density in individual counties were not widespread, suggesting, again, that many of metropolitan America’s job densification trends during this period were driven in large part by a small set of metro areas.

Within metropolitan America as a whole, core urban counties—defined as counties where at least 95% of residents lived in an urbanized area in 2000—collectively saw job density increase from an average of 35,388 jobs per square mile in 2004 to 41,879 jobs per square mile in 2015, or by 35% (Figure 12). These core urban counties’ increase in job density was considerably greater-than-expected, suggesting that job growth in these core counties tended to concentrate in already-dense areas—including downtowns—within them. This aligns with findings by Smart Growth America and others that growing numbers of business leaders are starting, expanding, or moving their firms to downtown locations in order to attract and retain educated workers, to be closer to their customers, and to collaborate with other firms and institutions.⁴⁷ Christopher Leinberger, Michael Rodriguez, Tracy Loh and others, have also documented the rapid rise of dense and walkable communities in these areas.⁴⁸

Meanwhile, less-urbanized counties posted more modest increases in job density. Mature suburban counties and emerging suburban counties

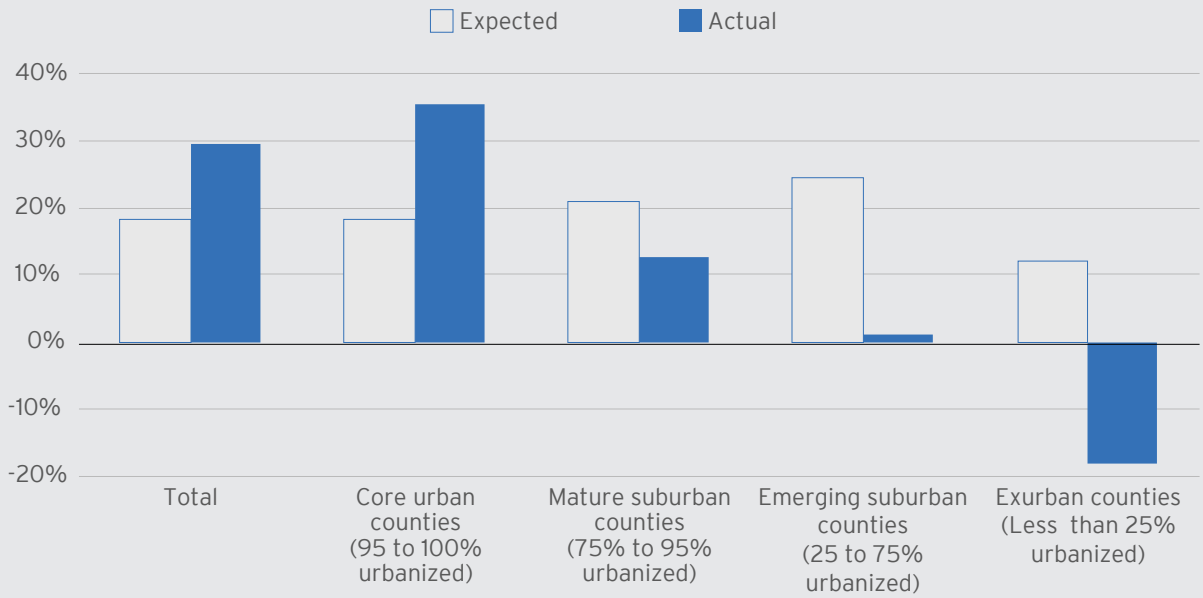
saw increases in job density of 13% and 1%, respectively. Exurban counties collectively saw job density decline by 18%. Actual job trends fell short of expected trends in these suburban and exurban counties, suggesting that job growth in suburban and exurban counties spread out to less-dense parts of these areas.

Once again, these job densification trends do not play out the same way in every metro area. For instance, although core urban counties posted a large increase in job density when all large metro areas are taken together, only 73% of large metro areas that contain core urban counties saw the job density of those counties increase during the study period, as shown in Figure 13.⁴⁹ Only about half of metro areas that host suburban counties saw job density increase in those counties while just 21% of metro areas saw job density increase in their exurban counties. In short, the direction and extent of job density trends varied greatly within metro areas and among similarly urbanized counties across metro areas.

This analysis therefore reveals a more nuanced pattern of job growth in metro areas than previous job sprawl studies have found. From 2004 to 2015, jobs in most large metro areas both densified *and* sprawled: Almost every metro area in this study had at least one county where jobs grew denser and almost every metro area also had at least one county in which job density declined. Moreover, the pattern of job growth *within* different counties in the same metro area mattered just as much—if not more—to a metro area’s overall job density trends than the distribution of its job growth between core urban counties, peripheral suburban, and exurban counties.

Figure 12. Metropolitan America’s more-urbanized counties posted larger increases in job density

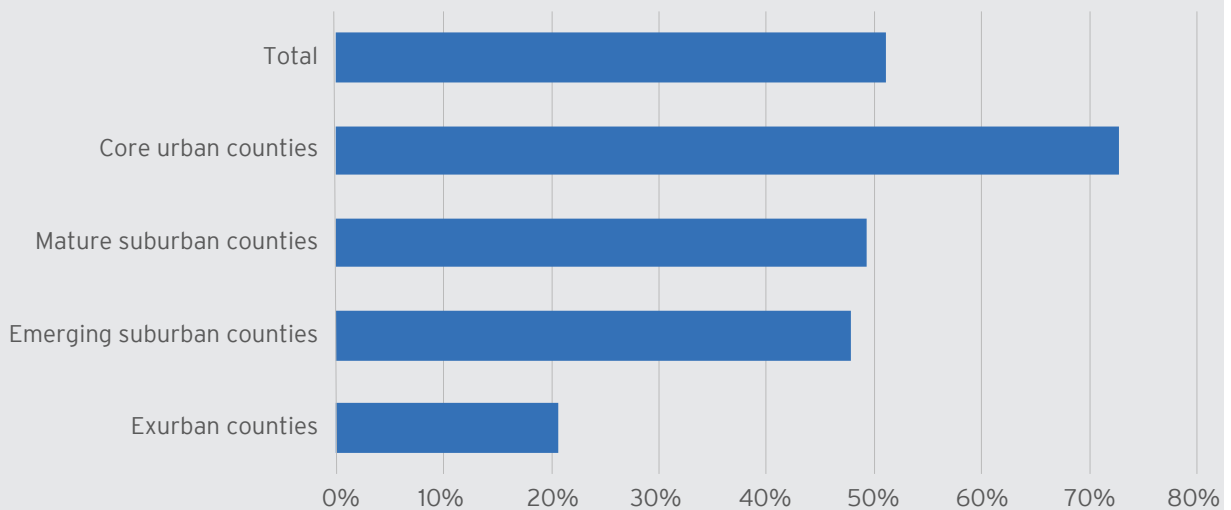
Expected versus actual change in job density by county urbanization rate from 2004 to 2015



Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

Figure 13. Job density trends varied even among similar types of counties in large metro areas

Share of metro areas that saw an increase in job density from 2004 to 2015

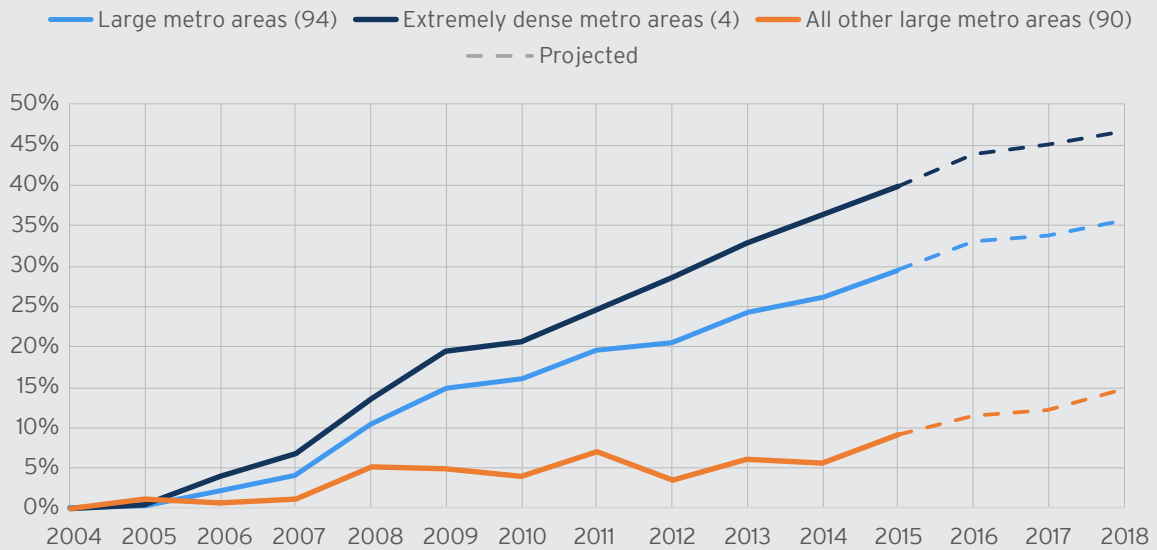


Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

Sidebar 3. Metropolitan America’s job density trends in more recent years

Job density appears to have continued to rise in metropolitan America in more recent years, as shown in Figure 14. Although historical employment data for Census block groups are available only through 2015, county-level job growth trends suggest that job density increased more than 4 percent across all 94 metro areas taken together from 2015 to 2018.⁵⁰ Although the four especially large and extremely dense metro areas of New York, Chicago, San Francisco, and Seattle continued to fuel a large part of these increases, job density actually increased at a faster rate among the other 90 metro areas. Furthermore, increases in more recent years appear far more pervasive than in earlier years: Eighty-seven (87) of 94 metro areas (or 93%) would have seen an increase in job density from 2015 to 2018 based on their county-level job growth trends. Core urban counties were again responsible for much of the overall rise in metropolitan America’s job density, although job growth in suburban and exurban counties outpaced job growth in urban counties during this period.

Figure 14. County-level job growth trends suggest job density has continued to rise
 Projected job density trends for more recent years



Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics and Census Quarterly Workforce Indicators



Case studies

These findings reveal considerable differences in job density trends between metro areas from 2004 to 2015. Not only are some metro areas far denser than others, but the direction, extent, and forces behind their job density trends vary greatly.

The following case studies of the Indianapolis and Baltimore metro areas demonstrate how contrasting characteristics can animate job density trends in different metro areas. Additionally, these case studies reveal that gains in overall metropolitan job density are not

always necessarily good, and declines are not always bad. Metro Indianapolis saw among the largest increases in job density of large metro areas from 2004 to 2015, in which job losses in its manufacturing sector played a large part. Metro Baltimore's job density declined as its job growth spread from its downtown and along its waterfront to former industrial neighborhoods where investment and jobs had been scarce. The case studies suggest that each metro area faces distinct circumstances and opportunities for transformative placemaking.

Indianapolis

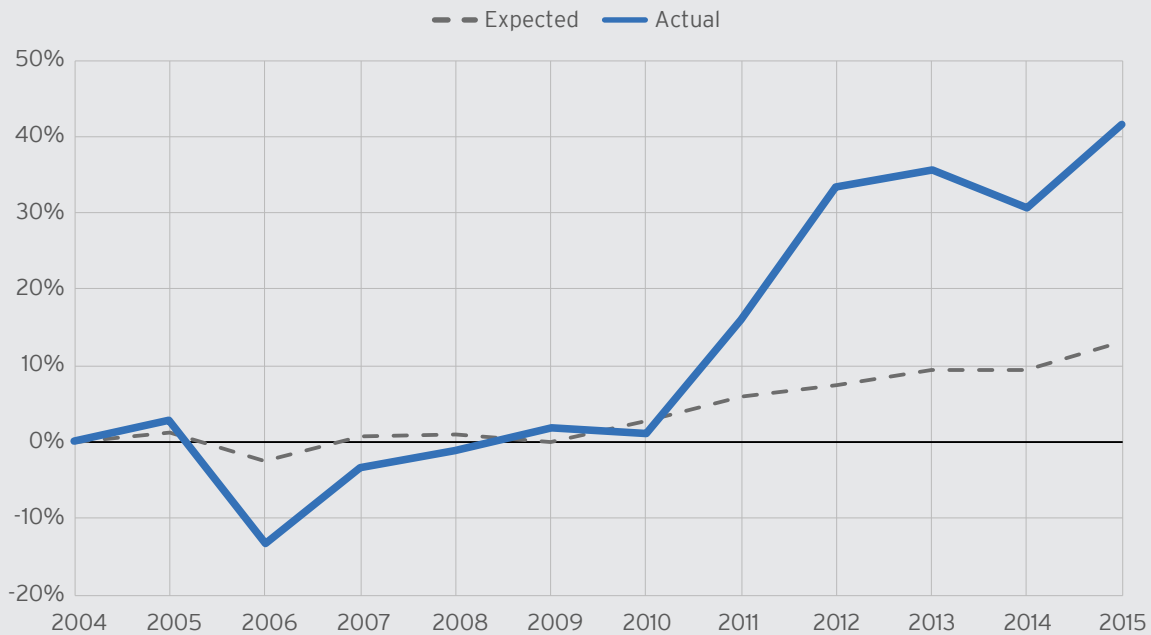
The Indianapolis metro area's job density increased substantially during the study period. This rapid rise would have hardly been expected based on its starting distribution of jobs and its overall pace of job growth. In 2004, Indianapolis's job density of 5,075 jobs per square mile ranked 50th out of the 94 large U.S. metro areas in this analysis. From 2004 to 2015, its job density increased by a stunning 42%, to 7,181 jobs per square mile—the 33rd highest out of 94 metro areas. This was a far greater increase in the metro area's job density than would be expected. If the jobs Indianapolis gained during this period had spread according to the starting distribution of jobs each year, job density would have increased by about 13% (Figure 15).

Most of Indianapolis's increase in job density was driven by the unexpected concentration of jobs in several industry sectors. During the immediate aftermath of the Great Recession, especially fast job growth in the health care and hospitality sectors occurred in or near Indianapolis's downtown. Indianapolis's fast-growing professional services sector also disproportionately concentrated its new jobs in the metro area's downtown, which contributed to the increasing density of jobs in this sector (Figure 16). New jobs at corporate headquarters, too, located in the downtown and other already-dense parts of Indianapolis.

Job losses in manufacturing also played a role in the steep increase in job density, however. Like most metro areas, Indianapolis

Figure 15. Indianapolis increased its job density more than its job growth alone would predict

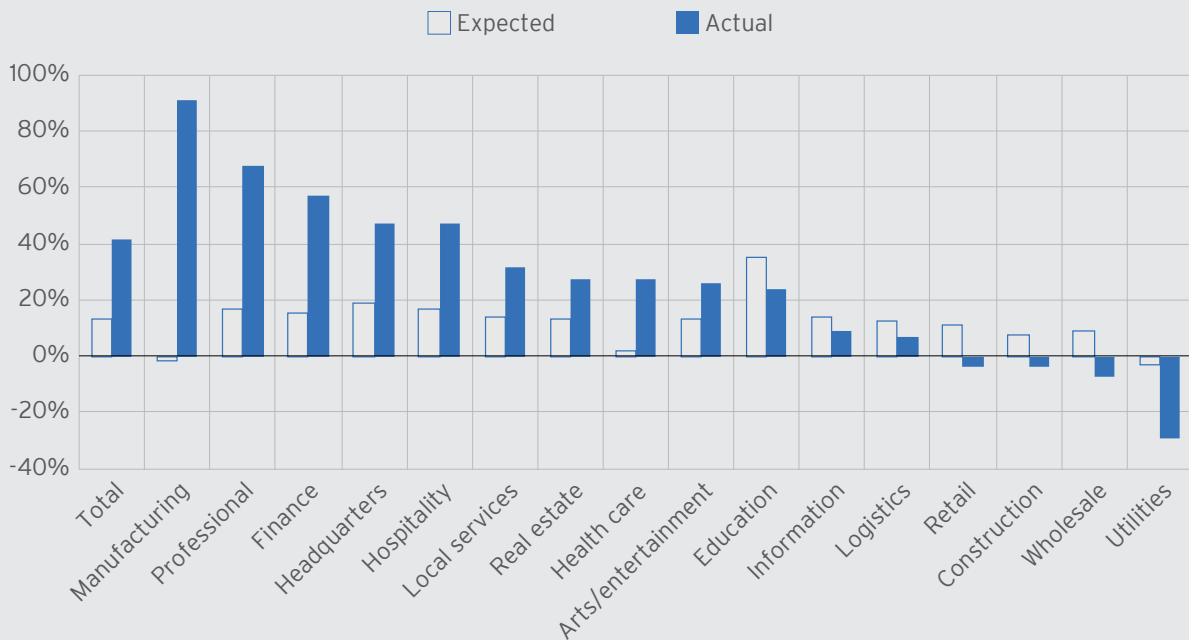
Change in Indianapolis's job density since 2004



Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

Figure 16. Most of Indianapolis's sectors increased their job density substantially

Change in job density of Indianapolis by sector, 2004 to 2015



Note: Agriculture and mining are not shown due to their small number of jobs but count toward the total. Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

shed manufacturing jobs during and after the recession. The metro area sustained a disproportionate share of its manufacturing job losses in less-dense parts of the metro area, which effectively increased the density of the manufacturing jobs that remained in parts of the metro area that were already dense.

Job growth patterns in Marion County played a major role in the metro area's densification during this period. The county is Indianapolis's only core urban county and hosts about two-thirds of the metro area's private, non-administrative jobs. Although Marion County's

share of job growth from 2004 to 2015 was in line with its share of jobs, its job growth disproportionately concentrated in the downtown and other dense parts of the county. This increased its job density by 46%, accounting for 97% of the region's increase in job density during this period. The rest of the increase came from the metro area's two mature suburban counties, Hamilton—driven by the densification of jobs in the city of Carmel—and Johnson. Together, these two mature suburban counties increased their job density by 32%. Job density declined in Indianapolis's emerging suburban and exurban counties.

Figure 17. Indianapolis’s largest job density increases were in its downtown and nearby suburbs

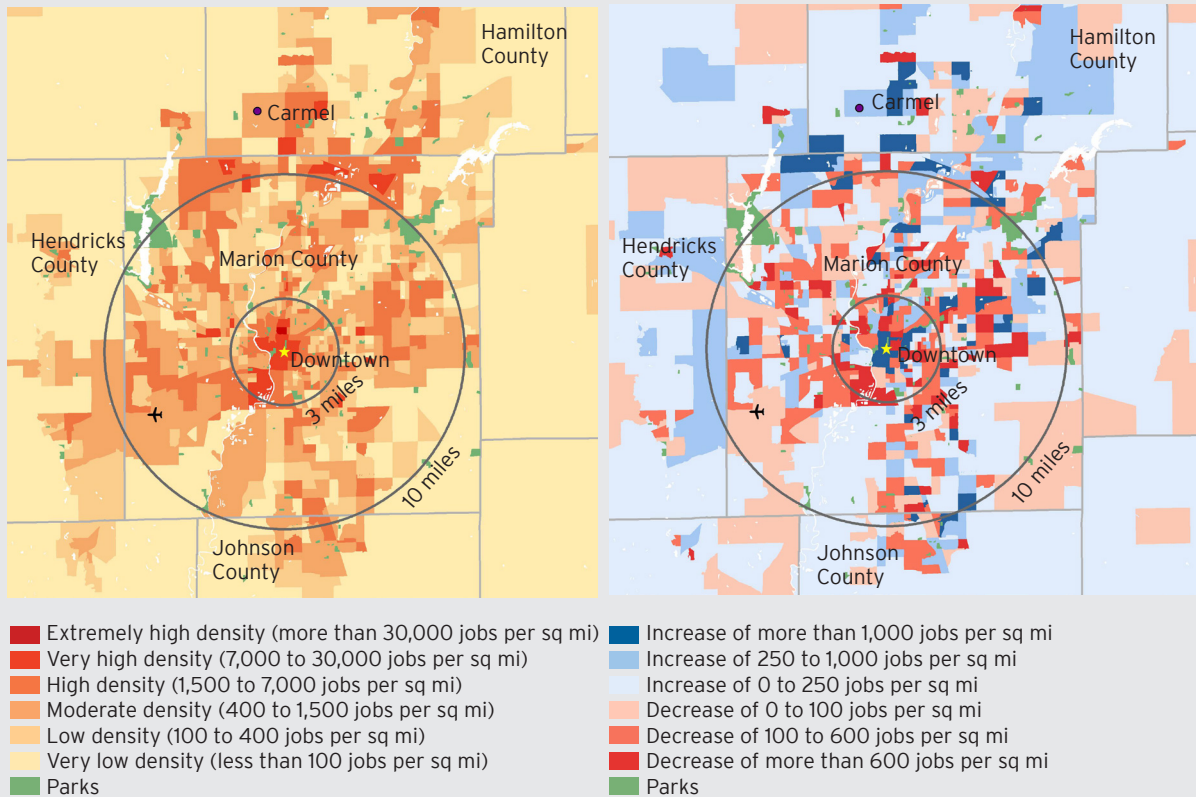


Figure 17A. In 2004, Indianapolis’s densest areas were its downtown and the areas just north and southwest of downtown. There were some pockets of high job density along the Indianapolis Beltway (I-465), such as the northern part of Marion County and the city of Carmel in the southwestern part of the Hamilton County.

Figure 17B. Indianapolis’s largest increases in density from 2004 to 2015 were in and around its downtown. Other areas that saw increases in job density included the southern part of Hamilton County around the city of Carmel and the eastern portion of Hendricks County. The largest decreases in density are actually just outside the downtown area, especially in West Indianapolis.

Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

Baltimore

The Baltimore metro area saw its job density decline slightly from 2004 to 2015. In 2004 Baltimore’s job density of 12,524 jobs per square mile ranked 13th highest out of the 94 large U.S. metro areas in this analysis. From 2004 to 2015, Baltimore’s job density declined by about 1%, to 12,397 jobs per square mile—dropping its rank to 16th. The metro area’s job growth from 2004 to 2015 was a few percentage points less than the large metro area average and, if spread according to the region’s starting distribution of jobs, would have increased job density by 17%, as shown in Figure 18.

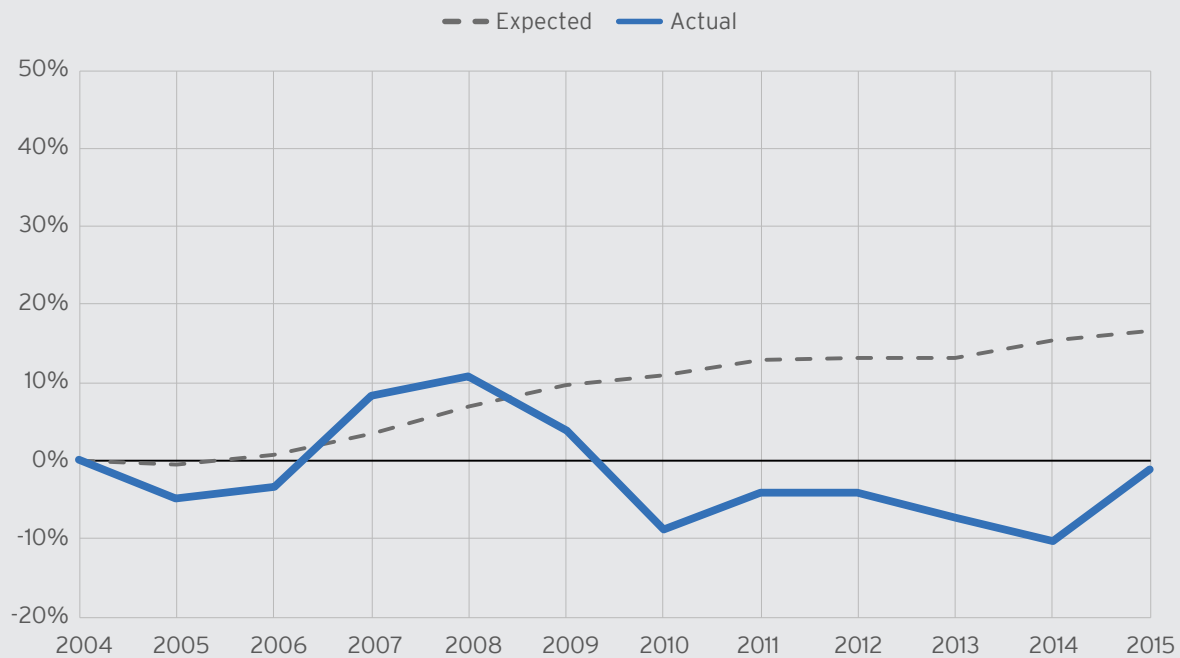
Several major sectors shifted the distribution of their jobs to less-dense parts of Baltimore during

this period. Hospitality and professional services each would have increased their job density from 2004 to 2015 had their job growth accumulated where jobs in these sectors were already located, particularly in the city’s downtown. Instead, jobs in these sectors spread out around Baltimore’s Inner Harbor and further east and south along its long waterfront. As a result, the density of jobs in each sector declined, as shown in Figure 19. The density of information jobs declined, counter to expectations, due to job losses in this sector and because the distribution of information jobs shifted from denser parts of the metro area to less-dense parts, such as Seton Business Park, Jessup, and Milford Mill.

Other sectors posted changes in job density that are notable for either their size or role in Baltimore’s overall job density trends. Health

Figure 18. Baltimore’s job density declined slightly despite an expected increase

Change in Baltimore’s perceived job density since 2004



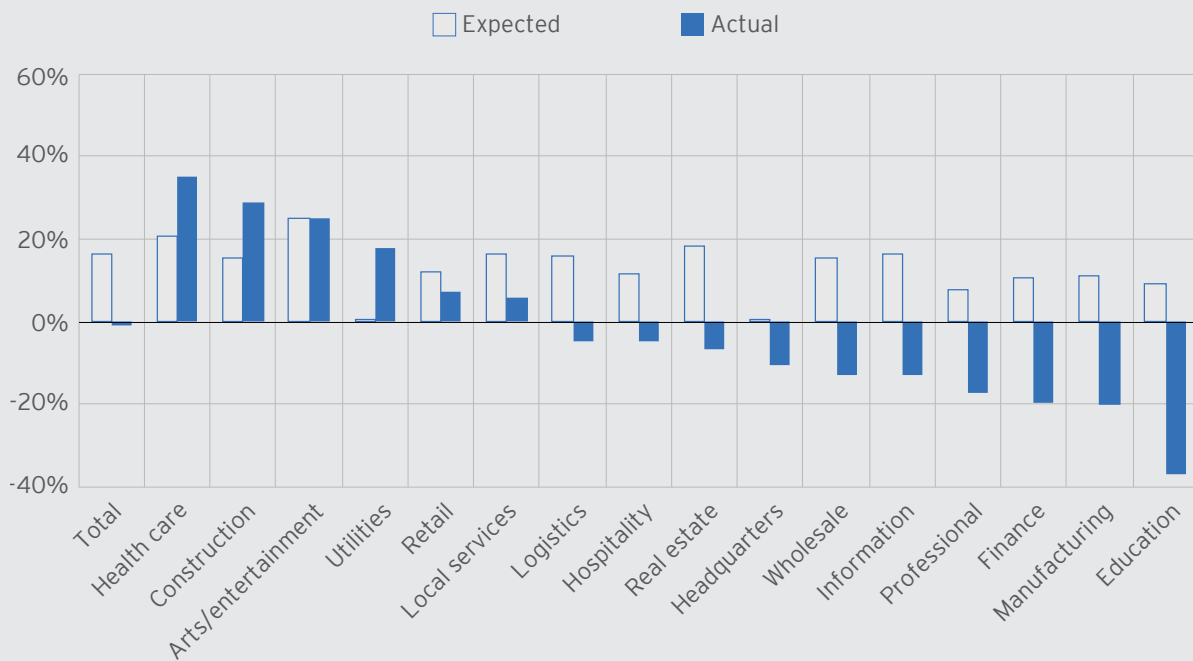
Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

care jobs grew denser during this period, thanks in large part to the growth of health care institutions in Baltimore’s urban core, such as Johns Hopkins Hospital. However, the education sector—Baltimore’s densest sector in 2004—saw its density decline despite an expected increase, as private schools and colleges in less-dense suburban areas added jobs faster than those in the core. These trends also heavily influenced the metro area’s overall job density trends.

Baltimore’s changing job density from 2004 to 2015 is different from most other large metro areas in two ways. First, the density of its core urban area, Baltimore City, declined and was the largest contributor to the decline seen across the metro area overall.⁵¹ Second, Baltimore City’s declining job density was not driven purely by the recession or by job losses. Instead, the declines are a result of job growth spreading out from Baltimore’s highly dense downtown to less-dense adjacent districts along its waterfront during the Great Recession and early years of the economic recovery.

Figure 19. Most of Baltimore’s industry sectors saw their job density decline

Change in job density of Baltimore by sector, 2004 to 2015



Note: Agriculture and mining are not shown due to their small number of jobs but count toward the total.
 Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

Figure 20. Baltimore’s jobs spread along its waterfront and to its north and southwest suburbs

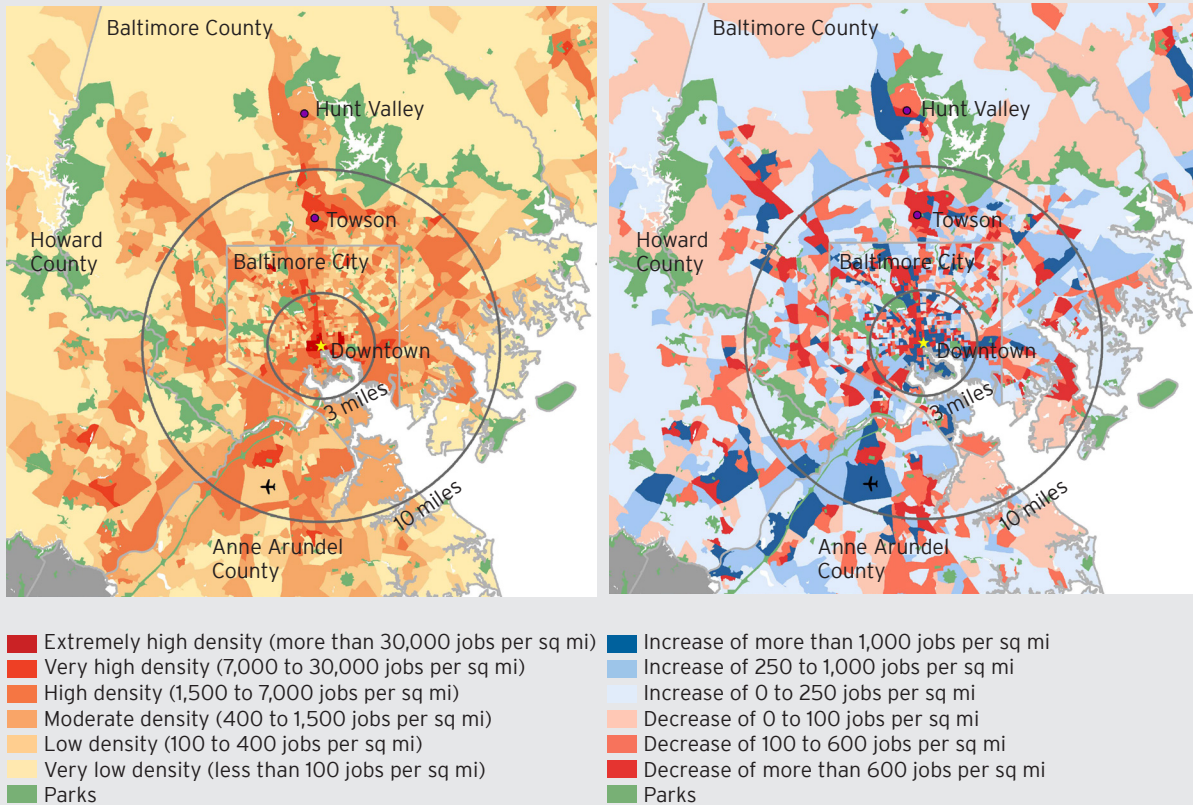


Figure 20A. Baltimore’s extremely dense areas, as of 2004, were its downtown and the areas just east of downtown, where the Johns Hopkins University School of Medicine and hospital complex is located. There were some pockets of high job density along the Baltimore Outer Beltway (I-695), such as the suburb of Towson, the county seat of Baltimore County, and areas around the suburb of Columbia in the southeastern part of the Howard County.

Figure 20B. Harbor East and the waterfront areas in the city of Baltimore have seen some of the metro’s largest increases in job density from 2004 to 2015. However, areas just west and north of Downtown Baltimore have seen some of the metro area’s greatest decreases in density. Other areas that saw large increases in density were the areas along I-95 to the south and around BWI airport as well as the suburb of Hunt Valley, north of Towson, in Baltimore County.

Source: Brookings analysis of Census LEHD Origin-Destination Employment Statistics

Conclusion

The digital revolution is transforming what people and businesses need and want from the communities where they live and work. This transformation has advantaged hyper-connected economic hubs within global cities at the same time it has put other places at risk of becoming further marginalized, or in some cases obsolete—threatening to exacerbate long-standing economic and social divides. Local and regional leaders have an opportunity to harness new trends and demands in ways that produce more widespread economic and social benefits. But first, leaders need a clear-eyed understanding of how those demands are changing the distribution of economic activity, and why.

This report sheds light on shifts in the density of jobs—one measure of economic activity—within and among America’s large metro areas. By analyzing job density rather than jobs’ proximity to the core, we have been able to provide a nuanced look at not just where jobs are locating but also how they are concentrating—not only in downtown or other central city communities, but also in suburban and exurban areas.

In all, this report provides evidence that, on the whole, jobs in metropolitan America—and particularly jobs in certain sectors—are densifying. But it also shows that individual metro areas could be doing far more to prioritize and support such trends by investing in existing areas of concentrated development. This represents a missed opportunity: Density offers

a means to increase productivity and economic growth, improve social and environmental outcomes, increase civic engagement, and reduce municipalities’ fiscal liabilities. When coupled with investments in people and the public realm, dense places can become inclusive communities where firms and workers flourish.

So where do we go from here?

Moving forward, researchers and policymakers need to be far more attentive to the strategies and policies that are shaping their communities, the ways in which they align with the changing needs of economic actors, and how they can be reformed and reimagined to work better and harder for more people and places. If density is as increasingly important as it seems—to workers, businesses, and the broader economy—why have so few places succeeded in promoting it? What is the nature of firms that increasingly prize concentration? What are the attributes of the places where they are choosing to locate—or not—and how should this influence future policy and investment decisions?

Exploring such questions can begin to tell us whether the design and development of our communities are keeping pace with the changing needs of firms and workers, help us better understand the positive outcomes that smarter growth can yield, and point to the kinds of transformative placemaking efforts that can help to achieve them.

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31. The LODES data are reported for 2010 Census block level for all years. Data are summarized at the Census block-group level from block-level estimates.

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37. Authors' analysis of LODES data. Robert Manduca and Daniel Hertz have previously documented similar issues. See: Robert Manduca, "The US Census Longitudinal Employer-Household Dynamics datasets" (2018); Daniel Hertz, "City center job growth continues strength" (2016).

38. Metro areas are defined using the Office of Management and Budget's September 2018 metropolitan statistical area delineations. The metro area definitions are the same for all years of the analysis. To find the land area of each block group, the authors started with Census Bureau TIGER/Line and ESRI shapefiles for block groups, counties, hydrology, and other features. Using geographic information system (GIS) software, the authors removed hydrology from block groups' shape and then recalculated block groups' land area.

39. See: Edward Glaeser and Matthew Kahn, "Decentralized employment and the transformation of the American city" (2001); Jennifer Vey, "Why we need to invest in transformative placemaking," Brookings (2018).

40. In this analysis, all observed changes in perceived job density are due solely to job growth or decline in individual block groups. An advantage of using analyzing block groups as the unit of analysis is that their area does not change. The LODES data are reported for 2010 Census block groups for all years, even those prior to 2010. Therefore, block groups' land area is constant over the entire period of analysis.

41. These expected trends are calculated using a shift-share technique in which the rate of change in the number of jobs in a block group are held to the equivalent rate of change for the metro area in each year. In a dynamic shift-share analysis, changes in metro area job levels are measured over each year rather than across all years in the period of analysis, making these findings less sensitive to the choice of start and end years. The analysis is done using two-digit NAICS sectors, which is the most granular disaggregation of employment by industry available from LODES.

42. Note that the rate of change in the number of jobs and the rate of change in standard job density will always match. However, the rate of change in perceived job density can be greater or less than the rate of job growth. In this example,

the rate of job growth is 78% and perceived job density actually increases by 115%. This is possible because Metropolis X's new jobs concentrated in a smaller number of already-dense subareas. It is also possible for perceived density to decline despite job growth, however. If Metropolis's seven new jobs had located evenly across its least-dense subareas, including those that contained no jobs in year one, its perceived job density would have actually declined by over 8% as new jobs spread out.

43. As noted in Finding 1, metro areas that host a large number of jobs at greater densities, such as New York or San Francisco, have an outsized impact on the average trends, which is how it is possible for so few metro areas to outperform the weighted average of all 94 metro areas.

44. The prevalence of increases in the density of health care and education jobs stems in part from the fixed, urban footprint of many the large institutions that comprise these sectors and their especially fast job growth during this period. TK Yet increases in the perceived density of jobs in these sectors also fell short of what we would have expected from their job growth alone, indicating that jobs in these sectors are spreading out to less dense parts of metro areas. This could be due to the faster growth or emergence of new health care facilities in suburban or exurban areas where hospitals and schools have room to spread out or may not be as proximate to jobs in other sectors.

45. See: Paul Levy and Lauren Gilchrist, "Downtown rebirth: documenting the live-work dynamic in 21st Century U.S. cities," International Downtown Association (2014); Bruce Katz and Julie Wagner, "The rise of innovation districts" (2014); Richard Florida, "Startup city" (2014); Smart Growth America, "Core values" (2015); J.B. Wogan, "Why companies are moving back downtown," *Governing* (2016).

46. Finding 5 uses a county typology developed by Brookings expert Bill Frey that has been

used in many research studies by the Brookings Metropolitan Policy Program. Counties in metro areas are assigned a type according to the share of their population that lives in urban areas, which are defined by the U.S. Census Bureau.

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49. Not every metro area has each type of county listed above, nor do they have them in the same number. For example, of the New York metro area’s 23 counties, 16 are “core urban” counties where more than 95% of the county’s population lives in an urbanized area, and just one is an “exurban” county: Pike County, Penn. In contrast, the Phoenix metro area comprises just two counties, Maricopa and Pinal, and neither qualifies as a core urban county; Maricopa is a “mature suburban” county and Pinal is an “emerging suburban” county.

50. This analysis uses the same shift-share technique described above to project job growth and trends at the block-group level for the years 2016, 2017, and 2018. We use QWI data on county-level job growth by sector and apply each sector’s annual job growth rate in each county to counties’ constituent block-groups. This assumes that job growth has not shifted to block-groups within counties where that sector did not have jobs in 2015, and that job growth rates were consistent across block groups within each county. These projected job density trends are therefore speculative and certainly vary from actual trends.

51. Baltimore City is an independent city that is not in the territory of any [county](#). The [U.S. Census Bureau](#) uses counties as its base unit for presentation of statistical information, and treats independent cities as [county equivalents](#) for those purposes.

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