Metro Monitor

An index of inclusive economic growth in the 100 largest U.S. metropolitan areas

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BROOKINGS

Summary

As 2017 begins, the economy is, by most conventional measures, in remarkable condition. After years of slow but steady recovery following the Great Recession, the United States is currently poised to continue one of its longest economic expansions on record. The nation has added jobs and output faster than most advanced economies since the recession, the unemployment rate has fallen to near its pre-recession level, and middle-class wage growth is gaining momentum.

So why do so many Americans seem anxious about the direction of the economy? Last year's election laid bare the frustration of millions of voters who seem to feel left behind by the quickening pace of economic change. Though the forces of trade and technological innovation continue to propel the economy forward, they have also led to tectonic shifts that make it harder for communities large and small to produce inclusive growth and prosperity that delivers economic security and opportunity for all.

Today, leaders at the national and local levels are responding to these economic and social challenges with renewed urgency. In metropolitan areas—the engines of the U.S. economy—coalitions of political, civic, and business leaders are implementing policies and strategies that support the ability of firms and industries to compete and grow in a global economy. At the same time, these leaders are investing in new strategies to ensure that growth delivers tangible results for workers, families, and communities.

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The Metro Monitor aims to inform the efforts of these leaders by tracking economic progress in the nation's 100 largest metropolitan areas along three dimensions: growth, prosperity, and inclusion. This year's edition of the Metro Monitor focuses on trends from 2010 to 2015, a period of hastening recovery from the Great Recession. It reveals considerable variation in how different metro areas fared. Specifically:

1. **Growth was widespread among large metropolitan areas from 2010 to 2015.** Metro areas in Florida, California, and the Carolinas ranked among the fastest-growing job markets, as the Sunbelt made a strong comeback from the recession. Many Sunbelt metro areas also saw large increases in employment at young firms. Research- and technology-intensive advanced industries powered growth in gross metropolitan product (GMP) during this portion of the recovery, benefiting places like San Jose, Austin, Houston, Seattle, and Nashville. Post-industrial metro economies around the Great Lakes saw far more modest growth, however. These trends may indicate that large metro areas are returning to their pre-recession growth trajectories, for better and worse.

2. **Large metropolitan areas and the country as a whole made uneven progress on prosperity from 2010 to 2015.** Productivity, or total economic output per job, rose in only 45 of the 100 largest metro areas. Productivity grew fastest in regions that specialize in research- and technology-intensive industries, but declined in metro areas where the retail and hospitality sectors drove growth. Meanwhile, average wages grew in most large metro areas from 2010 to 2015 as unemployment rates dropped. Average wage growth outpaced productivity growth in most large metro areas, including those in which productivity declined. Standards of living also rose in most large metro areas as GMP growth outpaced population growth.

3. **Inclusion outcomes improved in many metropolitan areas from 2010 to 2015 as hiring accelerated.** However, outcomes remained below their pre-recession levels in most large metro areas. Employment rates improved in 95 metro areas as faster hiring created job opportunities for more people. Rates of relative income poverty fell in 72 large metro areas as wages in the bottom half of the income distribution improved. Median wages rose in only a little more than half of large metro areas, however, mostly because of dramatic increases from 2014 to 2015. These outcomes also varied considerably for workers with different levels of education and racial/ethnic backgrounds, both across and within metro areas.

4. **Only 14 of the 100 largest metropolitan areas did better than the average of their peers on growth, prosperity, and inclusion from 2010 to 2015.** Knowledge- and research-intensive advanced services industries played a big role in the success of these consistently high-performing metro areas, suggesting innovation and technology can help generate inclusive growth and prosperity. A smaller number of metro areas posted modest gains in these categories despite not achieving consistent above-average performance. Meanwhile, 23 of the 100 largest metro areas performed worse than the average of their peers across growth, prosperity, and inclusion. They included places in the Northeast, Midwest, and South with slower-growing industries, and Sunbelt places hit especially hard by the housing bust of the late 2000s.

Despite improving economic conditions during the 2010 to 2015 period, most metro areas still face gaps between headline growth and bottom-line prosperity and inclusion. For many, a full recovery from the Great Recession remained out of reach. The economic trends of this period suggest that if leaders wish to sustain support for policies that support growth, those policies must incorporate deliberate efforts to ensure that more people, businesses, and communities are able to share in the benefits of economic growth and prosperity.

Introduction

As the Trump administration takes office at the start of 2017, it inherits an economy that is, by most conventional measures, in remarkable condition. After years of slow but steady recovery following the Great Recession, the United States is currently poised to continue one of its longest economic expansions on record. The nation has added jobs and output faster than most advanced economies since the recession,[1] the unemployment rate has fallen to near its pre-recession level, and middle-class wage growth is gaining momentum.

So why do so many Americans seem anxious about the direction of the economy? Last year's election laid bare the frustration of millions of voters who seem to feel left behind by the quickening pace of economic change. Though the forces of trade and technological innovation continue to propel the economy forward, they have also led to tectonic shifts that make it harder for communities large and small to produce *inclusive* growth and prosperity that delivers economic security and opportunity for all.

Although economic indicators are moving in the right direction, a full recovery from the Great Recession remains out of reach for many people and communities. The nation's employment rate has not returned to its pre-recession level despite a full jobs recovery in 2014. The median wage also remains below its 2007 level, reflecting the meager gains the middle class has made these last nine years. And growth trends vary greatly from one community to the next: some are booming while others struggle.

Today, leaders at the national and local levels are responding to these economic and social challenges with renewed urgency. In metropolitan areas—the engines of the U.S.

economy—coalitions of political, civic, and business leaders are implementing policies and strategies that support the ability of firms and industries to compete and grow in a global economy. At the same time, these leaders are investing resources in new strategies to ensure that growth delivers tangible results for workers, families, and communities. Sustaining and channeling that investment in the most productive directions, however, remains challenging in times of political and fiscal turmoil.

To help inform these leaders' efforts to shape an advanced economy that works for all, the Metro Monitor series—including this annual summary report—charts the performance of the nation's 100 largest metropolitan areas across economic indicators in three broad categories: growth, prosperity, and inclusion. Throughout the coming year, the Metro Monitor series will feature in-depth analyses of the trends revealed here, including how industry and demographic dynamics shape outcomes on these and other areas of metropolitan areas' economic performance. Maps, charts, and data from the Metro Monitor are available through a web interactive that allows users to explore these trends across metropolitan areas and over time.

The Inclusive Growth Index

The Metro Monitor's Inclusive Growth Index tracks the economic performance of the nation's 100 largest metropolitan areas along three dimensions critical to successful economic development: growth, prosperity, and inclusion.[2] Economic development should put a metropolitan economy on a higher trajectory of long-run growth (*growth*) by improving the productivity of individuals and firms in order to raise local standards of living (*prosperity*) for all people (*inclusion*).[3] This Metro Monitor includes indicators within each of these categories that track a metropolitan area's progress toward shaping an advanced economy that works for all. The index measures the rate of change in these indicators over three periods—one year, five years, and 10 years—in order to capture short-, medium-, and long-term progress.[4]

Measuring growth

Growth indicators measure change in the size of a metropolitan area economy and the economy's level of entrepreneurial activity. Growth creates new opportunities for individuals and can help a metropolitan economy become more efficient. Entrepreneurship plays a critical role in growth. New businesses create new jobs and new output. Entrepreneurial activity can indicate investors' confidence in prospects for future growth and prosperity.[5] The economic dynamism associated with entrepreneurship contributes to productivity and wage growth.[6] The Metro Monitor measures growth in gross metropolitan product, number of jobs, and number of jobs at young firms.

- **Change in gross metropolitan product (GMP)**—Like gross domestic product, GMP measures the total value of goods and services produced in a metropolitan area, including wages and profits.

- **Change in the number of jobs**— Jobs measure the total number of occupied full- and part-time wage, and salaried employment positions in a metropolitan economy.

- **Change in the number of jobs at young firms**—Change in the total number of full- and part-time wage, and salaried jobs at young, private-sector firms age five years or less measures the employment impact of entrepreneurship in a metropolitan area.

Changes in these indicators are measured as the percent change in values from the initial to final year of analysis. Change in GMP is measured in inflation-adjusted terms. Data on GMP and jobs are from Moody's Analytics, and data on jobs at young firms are from the U.S. Census Bureau's Longitudinal Employer-Household Dynamics program.

Measuring prosperity

Prosperity captures changes in the average wealth and income produced by an economy. When a metropolitan area grows by increasing the productivity of its workers, through innovation or by upgrading workers' skills, for example, the value of those workers' labor rises. As the value of labor rises, so can wages. Increases in productivity and wages are what ultimately improve living standards for workers and families and the competitiveness of metropolitan economies.

- **Change in productivity**—GMP, from above, divided by the total number of jobs, from above, yields average GMP per job, a crude measure of a metropolitan economy's productivity.

- **Change in the average annual wage**—Aggregate annual wages paid to workers divided by the total number of jobs yields the average annual wage per job in a metropolitan economy.

- **Change in the standard of living**—GMP, from above, divided by total metropolitan population yields GMP per capita, which reflects a metropolitan economy's average standard of living.

As the value of labor rises, so can wages.

Changes in these indicators are measured as the percent change in inflation-adjusted values from the initial to final year of analysis. Data on GMP, jobs, and aggregate wages are from Moody's Analytics, and data on population are from the U.S. Census Bureau's Population Estimates program.

Measuring inclusion

Inclusion indicators measure how the benefits of growth and prosperity in a metropolitan economy—specifically, changes in employment and income—are distributed among individuals. Inclusive growth enables more people to invest in their skills and to purchase more goods and services. Thus, inclusive growth can increase human capital and raise aggregate demand, boosting prosperity and growth. Ensuring that all people can contribute to and benefit from growth and prosperity also helps sustain widespread support for the policies on which growth and prosperity depend.

- **Change in the median wage**—Median wage measures the annual wage earned by the person in the middle of a metropolitan area's income distribution (among people at least 16 years old).

- **Change in the relative income poverty rate**—Commonly used to measure poverty in other countries, relative income poverty measures the share of people earning less than half of the local median wage (among people at least 16 years old).

- **Change in the employment rate**—The employment-to-population ratio measures the share of individuals age 18 to 64 who are currently employed.[7]

Change in the median wage is measured as the percent change in inflation-adjusted values from the initial to final year of analysis. Changes in relative income poverty and employment rates are measured as the percent change in those rates from the initial to final year of analysis. Data for inclusion indicators are from the Census Public-Use Microdata Series (PUMS) for the 2000 Decennial Census and the 2006 to 2015 American Community Survey (ACS) 1-year

estimates. Estimates derived from survey data come with estimates of survey error, which are reported on the Metro Monitor website. Inclusion indicators are ranked on 16 years of change from 1999 to 2015 rather than 10 due to data availability.

These same inclusion indicators, data sources, and methods are also used to estimate differences in inclusion outcomes by education and by race and ethnicity. The values of each of the three inclusion indicators are estimated for people with different levels of educational attainment and people of different races and ethnicities. The educational attainment categories include high school diploma or equivalent, some college or associate degree, and baccalaureate degree or higher. Race and ethnicity categories include non-Hispanic whites, non-Hispanic blacks, non-Hispanic Asians, Hispanics, and people of other races or two or more races. Estimates are also provided for people of color, a designation that includes these latter four racial and ethnic groups. Detailed metro-level estimates of inclusion by educational attainment and race and ethnicity are available on the Metro Monitor website. Inclusion by educational attainment and race and ethnicity are not included in composite ranks.

Composite ranks for growth, prosperity, and inclusion

Metropolitan areas are assigned composite ranks in each of the three categories of the index: growth, prosperity, and inclusion. A metropolitan area's composite rank in a category is determined by the sum of its standard scores for each indicator in that category. A standard score measures how a metropolitan area's value on a particular indicator varies from the values of all large metropolitan areas. The rank of a metropolitan area's summed standard scores in a category is its composite rank for the category. Composite ranks for each category are provided for three periods of time: one year (2014-2015), five years (2010-2015), and 10 years (2005-2015 for growth and prosperity; 1999-2015 for inclusion due to data availability).

Trends in growth, prosperity, and inclusion

This 2017 edition of the Metro Monitor examines the economic performance of large metropolitan areas from 2010 to 2015, the most recent year for which complete data are available. By the beginning of this period, the worst part of the Great Recession was over and recovery had begun. Gross domestic product (GDP) began to recover in mid-2009; jobs bottomed out in February 2010 and started their slow recovery that spring. GDP grew faster than jobs at first, but as unemployment fell and the labor market tightened, the benefits of the recovery started to spread to more people, particularly between 2014 and 2015.

These dynamics in the timing of the nation's recession and recovery color many of the trends in growth, prosperity, and inclusion among large metropolitan areas from 2010 to 2015. Growth was widespread among large metro areas during this period, as hiring at young firms accelerated in many places. Increases in prosperity were more uneven, however; productivity growth stalled in several sectors, while average wages grew. Outcomes on inclusion remained stubbornly unchanged for much of this period, but by 2015 underlying growth and prosperity trends had at last created the conditions for improvements in economic inclusion in most large metropolitan areas.

Growth

Economic growth was robust and widespread among the nation's 100 largest metropolitan areas from 2010 to 2015. Every large metro area added jobs during this period, and 98 posted increases in GMP. Entrepreneurship also expanded as the number of jobs at young firms grew in 63 large metro areas. Overall, 63 large metro areas posted positive changes on all three of the Metro Monitor's growth measures of total jobs, GMP, and jobs at young firms. That list contains 19 of the 20 top performing metro areas on the Metro Monitor's composite growth measure (Table 1 and Map 1). Among the 20 weakest-performing metro areas on growth, only once saw these across-the-board improvements on growth indicators. Those rankings reveal the considerable variation in performance on each of these measures during this period.

Map 1. Composite growth rankings among the largest 100 U.S. metropolitan areas, 2010-2015

Legend:
- Top 20
- Upper 20
- Middle 20
- Lower 20
- Bottom 20
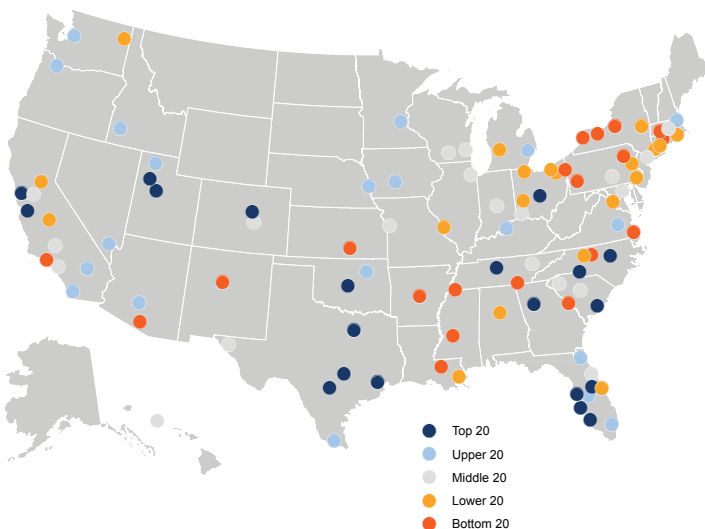
Source: Brookings analysis of Moody's Analytics estimates

Large metro areas that were hit hardest by the recession were among those that saw the fastest rates of job growth from 2010 to 2015. Sunbelt metro areas in Florida, California, and the Carolinas that were hit especially hard by the housing bust ranked among the top 20 fastest-growing local job markets during this period. Their jobs recoveries largely depended on hiring in hospitality, retail, and construction. Austin, Denver, San Jose, San Francisco, and Salt Lake City—metro areas with high concentrations of jobs in research- and technology-intensive advanced industries—also ranked highly on job growth, along with energy and trade centers in Oklahoma and Texas. Mid-Atlantic and New England metro areas fared among the worst on job growth from 2010 to 2015. They typically did not see large job losses during the recession, in part because many of them specialize in education and health care industries that proved more resistant to job losses.[8] These metro areas thus had less headroom for jobs recovery relative to their peers in the Sunbelt, and they also lacked the strong in-migration that fueled job growth in local-serving industries in the Sunbelt.

Table 1. Best- and worst-performing metropolitan areas by change in growth, 2010-2015

Change in:					Change in:			
Rank	Metropolitan statistical area	Gross metro-politan product	Hiring by firms 0-5 years old	Number of jobs	Rank	Metropolitan statistical area	Gross metro-politan product	Hiring by firms 0-5 years old	Number of jobs
Top 20					Bottom 20				
1	Provo-Orem, UT	25.0%	23.6%	26.2%	81	Pittsburgh, PA	13.0%	-10.6%	3.2%
2	Austin-Round Rock, TX	27.3%	22.6%	22.8%	82	Baton Rouge, LA	3.2%	-12.7%	10.7%
3	Cape Coral-Fort Myers, FL	16.3%	30.1%	24.6%	83	Springfield, MA	1.1%	11.9%	2.0%
4	Nashville-David-son--Murfrees-boro--Franklin, TN	23.5%	24.0%	19.2%	84	Chattanooga, TN-GA	6.6%	-12.3%	7.6%
5	Houston-The Wood-lands-Sugar Land, TX	28.5%	11.3%	16.7%	85	Memphis, TN-MS-AR	2.8%	-4.5%	5.8%
6	San Jose-Sunny-vale-Santa Clara, CA	36.0%	-12.0%	20.1%	86	Little Rock-North Little Rock-Conway, AR	8.4%	-12.5%	3.7%
7	North Port-Saraso-ta-Bradenton, FL	12.5%	26.8%	19.1%	87	Jackson, MS	4.4%	-11.9%	5.9%
8	San Antonio-New Braunfels, TX	21.3%	15.8%	14.9%	88	Wichita, KS	2.3%	-2.5%	1.7%
9	Orlando-Kissim-mee-Sanford, FL	12.1%	28.0%	16.4%	89	Virginia Beach-Nor-folk-Newport News, VA-NC	1.1%	-1.2%	1.7%
10	Denver-Auro-ra-Lakewood, CO	17.2%	14.5%	16.9%	90	Oxnard-Thousand Oaks-Ventura, CA	5.4%	-20.1%	1.7%
11	Dallas-Fort Worth-Arlington, TX	20.3%	9.8%	16.3%	91	Hartford-West Hart-ford-East Hartford, CT	1.1%	-6.8%	1.7%
12	San Francisco-Oak-land-Hayward, CA	18.8%	11.1%	15.8%	92	Buffalo-Cheektowa-ga-Niagara Falls, NY	4.4%	-11.6%	1.7%
13	Salt Lake City, UT	11.8%	25.9%	15.0%	93	Rochester, NY	0.4%	-5.9%	1.7%
14	Charleston-North Charleston, SC	17.6%	9.8%	15.7%	94	Tucson, AZ	2.7%	-13.4%	1.7%
15	Charlotte-Con-cord-Gastonia, NC-SC	16.2%	8.9%	15.7%	95	Scranton--Wilkes-Barre--Hazleton, PA	2.4%	-9.1%	1.7%
16	Columbus, OH	15.9%	12.9%	13.0%	96	Youngstown-War-ren-Boardman, OH-PA	5.4%	-18.5%	1.7%
17	Oklahoma City, OK	23.1%	3.9%	10.8%	97	Albuquerque, NM	-1.3%	-5.0%	1.7%
18	Tampa-St. Peters-burg-Clearwater, FL	13.0%	17.0%	13.0%	98	Greensboro-High Point, NC	1.1%	-18.1%	1.7%
19	Raleigh, NC	15.1%	4.8%	16.2%	99	Augusta-Richmond County, GA-SC	1.5%	-24.7%	1.7%
20	Atlanta-Sandy Springs-Roswell, GA	12.6%	12.9%	13.5%	100	Syracuse, NY	-0.3%	-12.2%	1.7%

Source: Brookings Analysis of Moody's Analytics estimates.

Large metro areas that specialize in research- and technology-intensive advanced industries like information, energy, professional services, and manufacturing saw the fastest growth in GMP. San Jose's GMP grew by nearly 36 percent from 2010 to 2015, fastest among the 100 largest metro areas, powered by growth in its information and professional services sectors, along with local services. Houston posted the second-fastest GMP growth at over 28 percent, fueled by its energy, wholesale trade, and hospitality sectors as well as significant in-migration.[9] Similar dynamics explain the strong GMP growth of metro areas like Austin, Oklahoma City, Dallas, Seattle, and San Francisco. Several manufacturing-intensive metro economies also ranked highly on GMP growth, including Toledo, Nashville, and Detroit. Meanwhile, GMP declined in two metro areas, Albuquerque and Syracuse, from 2010 to 2015, and grew just 0.4 percent in Rochester. Many of the metro areas that ranked low on GMP growth also ranked low on job growth, reflecting their return to the slow growth trajectories they exhibited prior to the Great Recession.

Large metro areas with strong job growth, especially in hospitality, construction, and professional services, saw the greatest increases in hiring by young firms. While job and GMP growth were widespread among large metro areas, trends in entrepreneurship between 2010 and 2015 were much more mixed. The number of jobs at young firms declined nearly 37 percent in Grand Rapids but increased more than 26 percent in the Florida metro areas of Cape Coral, Orlando, and North Port. Strong overall job growth in the rebounding hospitality and construction sectors may have driven hiring by young firms in several Eastern Sunbelt metro areas.

Metro areas with strong professional and technical service sectors such as Provo, Austin, Portland (Ore.), and Denver also clocked large increases, with young firms in Austin and Provo increasing hiring by more than 20 percent. However, the maturation of firms in other strong information economies, such as San Jose and Seattle, may have contributed to declines in the number of jobs at young firms in those metro areas, despite robust overall growth. Metro areas with low job growth overall or high concentrations of jobs in legacy manufacturing or energy industries also showed declines in jobs at young firms. Overall job growth and entrepreneurial job growth did not always move in tandem; Grand Rapids and Bakersfield posted among the largest declines in jobs at young firms, yet also ranked in the top quintile for overall job growth.

The factors behind metro areas' performance on each of these indicators also explain their composite growth rankings during this period. Top-performing metro areas were those in the Sunbelt that appear to have bounced back from their relatively deep recessions or those that have seen especially fast job growth in advanced industries. These top performers tended to see big gains on each of the three growth indicators. The weakest-performing metro areas generally saw more modest GMP and job growth. However, the shrinking number of jobs at young firms often compromised the otherwise average performance of these weak performers.

Divergent growth among large metro areas is nothing new, but that divergence shifted during the economic recovery. During the recession and early part of the recovery, patterns of economic contraction and growth depended on location and industry specializations. Metro areas located in the Sunbelt were typically among those hit hardest by the housing bust

and recession. Metro areas closely tied to automotive manufacturing throughout Michigan and Ohio also suffered big declines in jobs and GMP. Meanwhile, metro areas that specialized in certain industry sectors (like education and health care), advanced industries, or energy saw only modest contractions.

Metro areas with high concentrations of employment in education and health care, particularly those around the Great Lakes, now rank low on overall growth.

Some of these patterns reversed themselves as the recovery accelerated from 2010 to 2015. Hubs for advanced industries and energy continued to rank near the top on growth measures, just as they had during the recession. But the list of the 20 fastest-growing large metro areas from 2010 to 2015 now includes several Sunbelt places that were hammered by the housing bust, like Florida's Cape Coral, North Port, Orlando, and Tampa. In Ohio and

Michigan, Columbus makes the top 20 list and Detroit ranks as the 25th fastest-growing metro area. Metro areas with high concentrations of employment in education and health care, particularly those around the Great Lakes, now rank low on overall growth.

These shifts in growth performance from the recession to the recovery may signal that many metro areas are returning to their pre-recession economic trajectories, for better and worse. The same factors that sustained or savaged large metro economies during the recession seem to explain why they floundered or flourished in the recovery. As housing markets and households regained their footing from 2010 to 2015, consumer spending on local services, like retail and hospitality, also recovered,[10] which supported hiring in those sectors. Meanwhile, as housing prices recovered, the construction and real estate sectors also made comebacks. The growth of these sectors explains much of the improved performance of Sunbelt metro areas from 2010 to 2015. Meanwhile, the slow and steady growth of education, health care, and legacy manufacturing industries explains the more modest growth performance among metro economies around the Great Lakes.

Prosperity

The 100 largest U.S. metropolitan areas made uneven progress on prosperity from 2010 to 2015. The average wage increased in 93 metro areas, as labor markets grew tighter. The standard of living improved in 84 metro areas. But productivity rose in just 46 metro areas amid meager improvement nationwide. As a result, just 45 large metro areas saw improvements in all three of the Metro Monitor's prosperity measures. Of the 20 top-performing metro areas on the Metro Monitor's composite measure of prosperity, 19 saw across the board improvements on these three measures. (Table 2 and   2). None of the 20 weakest performing metro areas saw across-the board-improvements in prosperity, however, and 4 saw across-the-board declines: New Orleans, Bridgeport, Palm Bay, and Washington. These trends in overall performance show that, in many cases, prosperity measures diverged not only among large metro areas during this period, but also within them.

Map 2. Composite prosperity rankings among the largest 100 U.S. metropolitan areas, 2010-2015

Top 20
Upper 20
Middle 20
Lower 20
Bottom 20
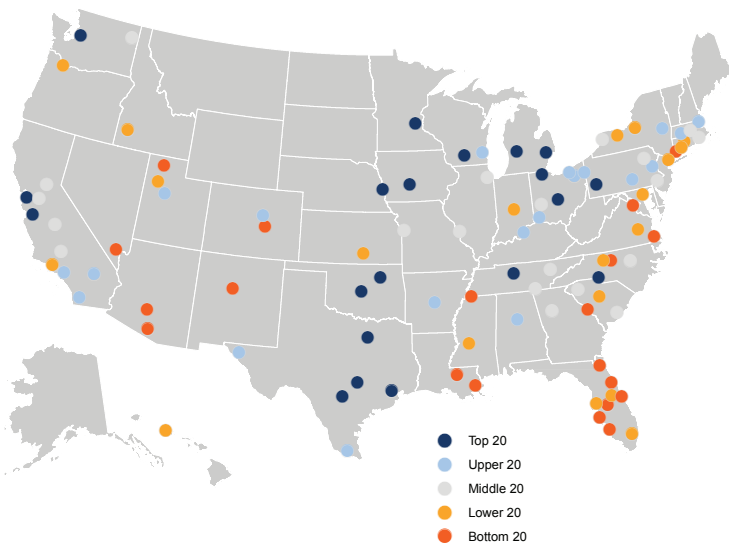
Source: Brookings analysis of Moody's Analytics and Census population estimates

Productivity grew fastest in metro areas that specialize in research-, technology-, and capital-intensive advanced industries, but declined in metro areas where growth depended on retail, hospitality, or health care. San Jose, Oklahoma City, Houston, Pittsburgh, and Toledo posted the fastest productivity growth from 2010 to 2015. Their advanced industries such as information, professional services, manufacturing, and energy powered local job and GMP growth. By contrast, productivity declined in 54 of the 100 largest metro areas, where job growth outpaced GMP growth. These declines were largest in Sunbelt metro areas in Florida, Georgia, and South Carolina, as well as throughout the Intermountain West. In these metro areas, job growth in some of the least-productive sectors such as hospitality, health care, and education outpaced GMP growth, dragging down overall productivity.

Table 2. Best- and worst-performing metropolitan areas by change in prosperity, 2010-2015

Rank	Metropolitan statistical area	Change in: Productivity	Change in: Avg. annual wage	Change in: Standard of living
		Top 20		
1	San Jose-Sunnyvale-Santa Clara, CA	13.2%	19.0%	26.8%
2	Houston-The Woodlands-Sugar Land, TX	10.1%	8.4%	14.9%
3	XPittsburgh, PA	9.5%	8.7%	13.1%
4	Oklahoma City, OK	11.0%	6.0%	13.9%
5	San Francisco-Oakland-Hayward, CA	2.6%	14.4%	10.9%
6	Toledo, OH	7.0%	3.6%	16.3%
7	Madison, WI	5.4%	10.1%	7.5%
8	Tulsa, OK	6.3%	6.3%	9.6%
9	Nashville-Davidson--Murfreesboro--Franklin, TN	3.6%	4.5%	13.1%
10	San Antonio-New Braunfels, TX	5.6%	4.3%	9.6%
11	Omaha-Council Bluffs, NE-IA	5.0%	6.6%	6.6%
12	Austin-Round Rock, TX	3.7%	5.6%	10.0%
13	Des Moines-West Des Moines, IA	5.8%	4.9%	7.1%
14	Seattle-Tacoma-Bellevue, WA	1.0%	9.7%	5.7%
15	Dallas-Fort Worth-Arlington, TX	3.5%	5.0%	9.4%
16	Grand Rapids-Wyoming, MI	-1.3%	8.9%	9.0%
17	Detroit-Warren-Dearborn, MI	1.0%	4.9%	12.4%
18	Columbus, OH	2.5%	5.2%	9.3%
19	Minneapolis-St. Paul-Bloomington, MN-WI	2.9%	5.7%	7.8%
20	Charlotte-Concord-Gastonia, NC-SC	0.4%	8.2%	6.5%

Rank	Metropolitan statistical area	Change in: Productivity	Change in: Avg. annual wage	Change in: Standard of living
		Bottom 20		
81	Memphis, TN-MS-AR	-2.8%	1.7%	1.5%
82	Phoenix-Mesa-Scottsdale, AZ	-4.0%	3.3%	0.0%
83	Greensboro-High Point, NC	-4.1%	4.9%	-2.5%
84	Deltona-Daytona Beach-Ormond Beach, FL	-3.3%	2.5%	-0.2%
85	Tucson, AZ	-1.1%	0.2%	-0.1%
86	Virginia Beach-Norfolk-Newport News, VA-NC	-2.6%	2.3%	-1.5%
87	Jacksonville, FL	-3.5%	1.7%	0.4%
88	Baton Rouge, LA	-6.8%	4.4%	-0.0%
89	Ogden-Clearfield, UT	-4.4%	1.5%	1.3%
90	Cape Coral-Fort Myers, FL	-6.7%	2.3%	2.7%
91	North Port-Sarasota-Bradenton, FL	-5.5%	0.3%	2.9%
92	Colorado Springs, CO	-2.9%	-1.0%	-0.3%
93	Washington-Arlington-Alexandria, DC-VA-MD-WV	-2.3%	-0.0%	-3.6%
94	Las Vegas-Henderson-Paradise, NV	-4.5%	-0.9%	0.6%
95	Augusta-Richmond County, GA-SC	-3.9%	0.5%	-2.5%
96	Palm Bay-Melbourne-Titusville, FL	-1.5%	-2.6%	-2.0%
97	Albuquerque, NM	-3.3%	-0.4%	-3.2%
98	Bridgeport-Stamford-Norwalk, CT	-4.6%	-0.6%	-1.9%
99	Lakeland-Winter Haven, FL	-5.8%	2.6%	-5.6%
100	New Orleans-Metairie, LA	-4.9%	-2.1%	-3.2%

Source: Brookings Analysis of Moody's Analytics and Census population estimates.

Average wage growth was widespread among large metro areas from 2010 to 2015. Sectoral patterns explain metro areas' performance on average wage growth better than overall job or GMP growth. Metro areas that specialize in high-wage advanced industries like information and professional services that attract skilled workers, such as San Jose, San Francisco, Madison, and Seattle, posted strong average wage growth. Metro areas where low-paying sectors like hospitality and retail drove job growth, such as Las Vegas, North Port, Boise, Ogden, and McAllen, experienced much more modest growth—or even declines—in average wages.
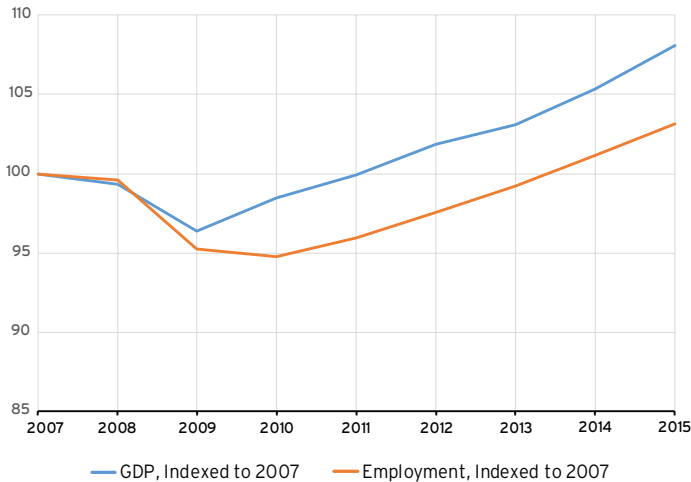
Large metro areas' progress on prosperity varied across the three different measures from 2010 to 2015. For example, Portland saw a decline in productivity of 7.3 percent during this period, ranking it last on that measure.

Standards of living rose in most large metro areas as GMP growth outpaced population growth. As with productivity, metro areas that specialize in advanced industries (San Jose, Houston, Pittsburgh, Oklahoma City, San Francisco) saw among the largest increases in the average standard of living thanks to the GMP growth those industries generated. Most metro areas in the automotive corridor that runs through Michigan, Ohio, Kentucky, and Tennessee also ranked among those with fast-growing standards of living. In other metro areas, like Bakersfield and Riverside-San Bernardino in California, GMP growth was more modest but greatly outpaced population growth, increasing standards of living. Standards of living declined in several metro areas that have among the highest average GMP per capita, including Washington, DC; New Orleans; Portland; Bridgeport; and Virginia Beach.
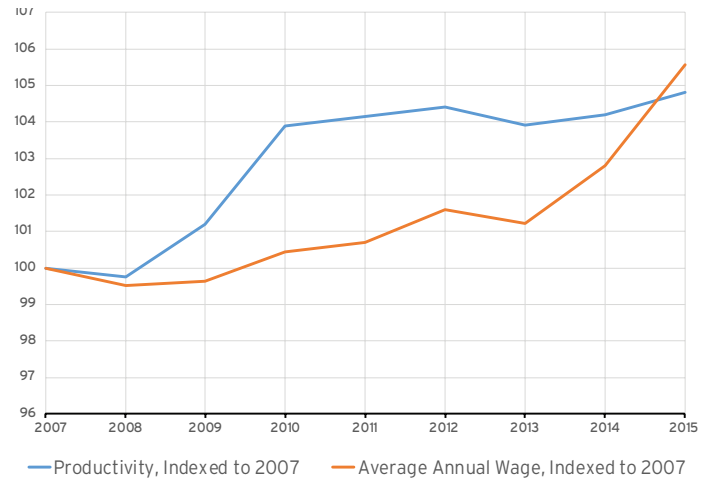
Large metro areas' progress on prosperity varied across the three different measures from 2010 to 2015. For example, Portland saw a decline in productivity of 7.3 percent during this period, ranking it last on that measure. But the metro area also saw the eighth-fastest increase in average wages, at 8.5 percent. Portland represents an extreme version of a widespread trend over this five-year period: average wages grew in 48 of the 55 metro areas where productivity declined, and average wages grew faster than productivity in 36 of the 45 places that had positive productivity growth.

This sort of divergence between productivity and average wage growth is atypical. Economists generally assert that productivity growth is necessary to permit wage growth, at least over the long term. In recent decades, productivity growth has outpaced wage growth, creating a much-studied gap between the two measures and concern over workers' well-being. But during these five years of the economic recovery, the gap narrowed as growth in average wages outpaced growth in productivity nationwide and in a majority of large metro areas.

**Figure 1. U.S. GDP and employment, 2007-2015**

Source: Brookings analysis of Moody's Analytics estimates.

Figure 2. U.S. productivity and average annual wages, 2007-2015

Source: Brookings analysis of Moody's Analytics and Census population estimates.

Two factors help explain this reversal in the relationship between productivity and wage growth during this five-year period. The first has to do with the timing of the GDP and jobs recoveries. The second has to do with the sectoral sources of growth during the early and latter parts of the recovery. In the early years of the recovery, up until 2011, jobs growth was slow despite the GDP recovery (Figure 1). This may have been because many firms were reluctant to hire given the economic conditions or outlook. Later, as business confidence improved and hiring resumed, job growth caught up with GMP growth and in some years outpaced it. Productivity growth began to stall as the growth rates of GMP and jobs converged (Figure 2). Average wage growth was modest during most of this period but took off in 2014 as wages increased in all sectors, led by high-paying white collar sectors like finance, real estate, and professional services. This was true nationwide and in many of the 55 large metro areas where productivity declined.

This dynamic of catch-up job growth creating a drag on productivity growth played out in most sectors of the economy (Figure 3). Nationally, productivity declined in 10 out of 20 major sectors from 2010 to 2015: government,

Figure 3. U.S. productivity by industry, 2010-2015

Percent Change from 2010-2015
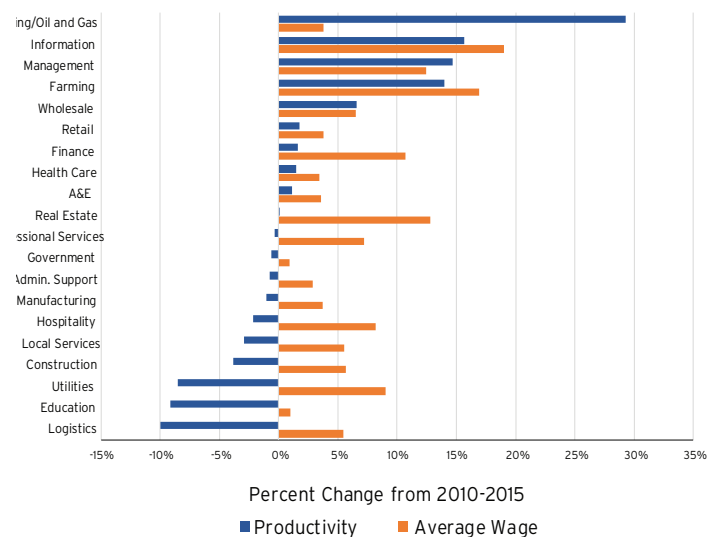
Source: Brookings analysis of Moody's Analytics estimates.

hospitality, manufacturing, administrative and support services, professional services, construction, other services, logistics, educational services, and utilities. These 10 sectors represented 59 percent of U.S. jobs in 2015. Meanwhile, average wages grew in all 10 of the sectors in which productivity declined. Average wage growth also outpaced productivity growth in seven of the other 10 sectors in which productivity grew.

The second factor behind the productivity/average wage growth reversal was the uneven pace of job growth *among* major sectors within large metro areas. Sectors that added jobs at the fastest pace from 2010 to 2015–retail, hospitality, and health care–are among the least productive and lowest paid, and this pattern held back progress on prosperity in many large metro areas that relied on those sectors for growth. Metro areas in the Sunbelt areas of the South and West where these sectors accounted for large portions of job growth typically saw the least amount of progress on prosperity measures.

Inclusion

The benefits of economic growth and prosperity spread increasingly widely from 2010 to 2015. Job growth during this period lifted employment rates in 95 of the 100 largest metropolitan areas. Tightening local labor markets may have helped lift earnings in the bottom half of the income distribution, since relative poverty fell in 72 metro areas. Median wages, however, increased in only 53 metro areas. As a result, only 37 large metro areas made improvements on all three of the Metro Monitor's topline inclusion measures. Many metro areas are thus falling somewhat short of achieving inclusive growth. That is true of both strong and weak performers on the Metro Monitor's composite inclusion rankings (Table 3 and Map 3). Of the 20 top performers, 18 saw across-the-board improvements on inclusion measures, indicating broad-based imrpovements for workers. However, none of the 20 weakest performing metro areas saw across-the-board improvements and one—Spokane—saw across-the-board declines.

Map 3. Composite inclusion rankings among the largest 100 U.S. metropolitan areas, 2010-2015

Legend:
- Top 20
- Upper 20
- Middle 20
- Lower 20
- Bottom 20
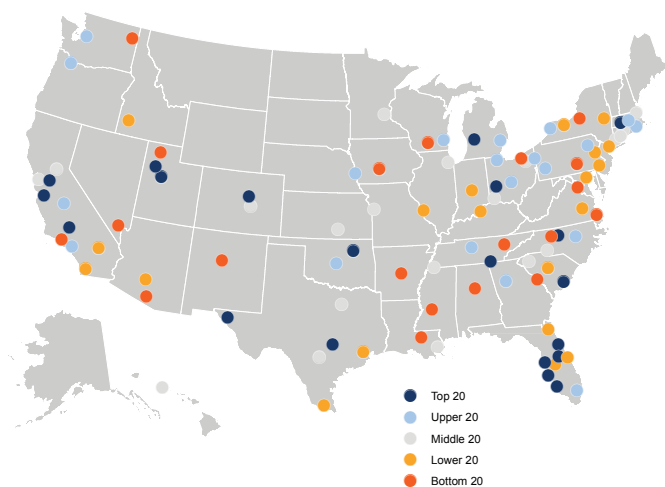
Source: Brookings analysis of Moody's Analytics estimates.

Employment rates improved in nearly all large metropolitan areas as accelerated hiring created job opportunities for more people. The employment rate tended to improve the most in large metro areas where it had declined the most during the Great Recession. That includes metro areas hit hard by the housing bust, like Cape Coral and Bakersfield, as well as those that saw big layoffs in manufacturing as a result of the automotive industry crisis, like Detroit, Grand Rapids, and Toledo. Metro areas that specialize in advanced industries also saw among the largest improvements in employment rates. Many of the metro areas that experienced only modest improvements—such as Madison, Honolulu, Ogden, and Washington—already had very high rates of employment, which may have left little room for increases. That may also explain why employment rates hardly changed or declined in several metro areas throughout the Great Plains and parts of the South, including Texas.[11] However, metro areas like McAllen, Syracuse, Spokane, and Tucson that had low employment rates and low median wages in 2010 also posted little improvement in employment rates from 2010 to 2015.

Table 3. Best- and worst-performing metropolitan areas by change in inclusion, 2010-2015

		Change in:					Change in:		
Rank	Metropolitan statistical area	Median wage	Relative income poverty rate	Employment-to-population ratio	Rank	Metropolitan statistical area	Median wage	Relative income poverty rate	Employment-to-population ratio
		Top 20					Bottom 20		
1	El Paso, TX	15.8%	-4.3%	8.3%	81	Birmingham-Hoover, AL	-1.9%	1.6%	3.9%
2	Grand Rapids-Wyoming. MI	10.9%	-7.4%	9.1%	82	Oxnard-Thousand Oaks-Ventura, CA	-4.4%	-7.2%	0.5%
3	Bakersfield, CA	5.8%	-10.5%	8.3%	83	Syracuse, NY	-3.0%	-4.2%	1.3%
4	Tulsa, OK	14.8%	-5.4%	5.7%	84	Las Vegas-Henderson-Paradise, NV	-7.7%	-2.9%	3.5%
5	Springfield, MA	7.0%	-8.5%	7.2%	85	Winston-Salem, NC	-0.7%	2.1%	2.7%
6	Cape Coral-Fort Myers, FL	0.1%	-10.4%	9.3%	86	Washington-Arlington-Alexandria, DC-VA-MD-WV	-3.2%	-0.5%	2.1%
7	North Port-Sarasota-Bradenton, FL	10.1%	-9.3%	4.8%	87	Ogden-Clearfield, UT	-5.8%	-3.4%	1.8%
8	Charleston-North Charleston, SC	5.9%	-7.9%	7.3%	88	Baton Rouge, LA	-0.1%	2.3%	1.8%
9	Salt Lake City, UT	3.2%	-10.7%	5.7%	89	Tucson, AZ	-0.0%	2.2%	1.6%
10	Stockton-Lodi, CA	7.7%	-8.8%	4.4%	90	Cleveland-Elyria, OH	-4.5%	-0.6%	2.3%
11	Provo-Orem, UT	8.9%	2.4%	9.6%	91	Madison, WI	-0.4%	2.8%	1.8%
12	Austin-Round Rock, TX	7.6%	-7.5%	4.6%	92	Augusta-Richmond County, GA-SC	-3.3%	4.9%	2.8%
13	Chattanooga, TN-GA	7.4%	-11.2%	2.7%	93	Jackson, MS	-4.9%	-3.8%	-1.1%
14	Greensboro-High Point, NC	7.5%	-2.5%	7.0%	94	Knoxville, TN	-3.0%	5.2%	2.6%
15	San Jose-Sunnyvale-Santa Clara, CA	5.3%	-4.2%	7.1%	95	Little Rock-North Little Rock-Conway, AR	-7.7%	-4.4%	-0.4%
16	Orlando-Kissimmee-Sanford, FL	7.3%	-6.9%	4.5%	96	Virginia Beach-Norfolk-Newport News, VA-NC	-4.7%	-0.4%	0.1%
17	Tampa-St. Petersburg-Clearwater, FL	-0.0%	-11.7%	5.6%	97	Harrisburg-Carlisle, PA	-1.6%	5.3%	1.4%
18	Denver-Aurora-Lakewood, CO	4.0%	-6.2%	6.5%	98	Des Moines-West Des Moines, IA	7.7%	12.7%	0.5%
19	Deltona-Daytona Beach-Ormond Beach, FL	-4.1%	-14.4%	5.8%	99	Albuquerque, NM	-9.6%	-4.8%	-1.0%
20	Dayton, OH	10.9%	-2.3%	4.2%	100	Spokane-Spokane Valley, WA	-1.9%	1.0%	-6.6%

Source: Brookings analysis of American Community Survey microdata.

Rates of relative income poverty fell in a majority of large metropolitan areas as wages in the bottom half of the income distribution improved. The relative income poverty rate—the share of individuals earning less than half the median wage—fell fastest in metro areas where job growth concentrated in sectors like retail, hospitality, and construction. That was the case in many large metro areas in South Florida and California: Daytona Beach, Los Angeles, Tampa, Bakersfield, Fresno, Cape Coral, Stockton, Northport, and Oxnard all saw their relative poverty rate fall at least 2 percentage points. Several large metro areas that had among the highest rates of relative poverty in 2010 experienced the largest declines from 2010 to 2015, including Springfield, Stockton, Grand Rapids, and Rochester. Meanwhile, Des Moines, San Diego, Louisville, San Francisco, and Houston saw the largest increases in relative poverty, as improvements in their median wages did not appear to extend to workers in the bottom half of the income distribution.

Median wages rose in a little more than half of large metropolitan areas thanks to dramatic growth from 2014 to 2015. Hiring in highly paid research- and technology-intensive advanced industries like information, professional services, manufacturing, and energy contributed to rising median incomes in metro areas that specialize in those sectors, such as Tulsa, Dayton, Grand Rapids, Provo, Austin, and Houston. Median wages remained well below their 2010 levels in coastal Mid-Atlantic metro areas and in Western metro areas, including Albuquerque, Las Vegas, Los Angeles, Riverside-San Bernardino, and Oxnard. Like the nation as a whole, most metro areas' median wage growth accelerated in 2015; 84

of the 100 largest experienced growth that year, and four (Springfield, Orlando, Augusta, GA-SC, and Buffalo) achieved double-digit increases. In fact, out of the 53 large metro areas that saw their median wage grow from 2010 to 2015, 27 did not enter positive territory until 2015.

Sectoral sources of job growth, and the supply of and demand for skills, influenced metropolitan areas' composite performance on inclusion outcomes, and their performance on each measure of inclusion. These factors also drove differences in inclusion outcomes among whites and people of color, and changes in disparities between them.

Strong job growth in sectors with less specialized skill requirements, such as retail, hospitality, and construction, created employment opportunities for less highly educated workers between 2010 and 2015.

Strong job growth in sectors with less specialized skill requirements, such as retail, hospitality, and construction, created employment opportunities for less highly educated workers between 2010 and 2015. This trend helped lift employment rates for individuals with only a high school diploma or equivalent in 90 of the 100 largest metro areas. Employment rates improved for individuals with some college, an associate degree, or a baccalaureate degree in 73 large metro areas. The same dynamic appears to have benefited people of color as well, whose employment rates rose in 91 large metro areas compared to 87

for whites. Overall, employment rates improved for both whites and people of color in 81 large metro areas.

Although improvements in local labor markets created new employment opportunities for most types of people, wage gains were less widespread. Median wages increased for workers with only a high school diploma or equivalent in 50 large metro areas, for workers with some college or an associate's degree in 31 metro areas, and for baccalaureate degree holders in 31 metro areas. Median wages increased for people in all three educational attainment categories in only seven of the 100 largest metro areas: Omaha, Pittsburgh, Tulsa, Austin, Charleston, Salt Lake City, and Wichita.

If so few metro areas saw consistent wage growth for workers of different levels of educational attainment, how did more than half of them achieve overall growth in median wages? The likely answer is that baccalaureate degree holders comprised a larger share of the workforce in 2015 compared to 2010. Even if their wages didn't rise in many places, their higher average levels of pay may have pushed up the overall median wage in those markets.

Trends in median wage growth among people of different races and ethnicities also exhibited some unevenness. Median wages improved for whites in 69 large metro areas and for people of color in 58. But in only 40 metro areas did median wages increase for both whites and people of color.

These trends in employment rates and median wages may also help explain trends in relative income poverty among people of different races and ethnicities. Among the 72 large metro areas where the rate of relative poverty fell among all people, 62 saw the rate fall for whites and 58 saw it fall for people of color. Relative income poverty rates fell for both whites and people of color in 48 metro areas.

Connections between growth, prosperity, and inclusion

Many of the 100 largest metropolitan areas performed well on at least one of the composite ranks for the three dimensions of growth, prosperity, or inclusion. But only a few managed above-average performance in all three areas, reflecting uneven economic progress within and among the nation's largest metro areas.

From 2010 to 2015, only 14 of the 100 largest metro areas outperformed the average of their peers on composite scores for growth, prosperity, and inclusion: Austin, Charleston, Charlotte, Columbus, Denver, Detroit, Nashville, Oklahoma City, Omaha, Provo, Raleigh, San Jose, Seattle, and Tulsa (Table 4A). Knowledge- and research-intensive advanced services industries, such as information and professional services, and technology-intensive advanced manufacturing industries appear to have played a big role in the success of these consistently high-performing metro areas. Tulsa and

Oklahoma City also benefited from the shale energy boom.

Eleven of the largest 100 metro areas made improvements on all nine core measures under economic growth, prosperity, and inclusion. This list includes half of the 14 metro areas that performed above average on composite scores in each category: Austin, Denver, Charleston, Columbus, Oklahoma City, Omaha, and Tulsa. In addition to these seven, the four metro areas of Albany, Dayton, San Antonio, and Worcester also improved on all nine of the measures the

Table 4A. Metropolitan areas that performed above the large metro average across every composite category, 2010-2015

Rankings			
Metropolitan statistical area	Growth	Prosperity	Inclusion
Austin-Round Rock, TX	2	12	12
Charleston-North Charleston, SC	14	45	8
Charlotte-Concord-Gastonia, NC-SC	15	20	46
Columbus, OH	16	18	31
Denver-Aurora-Lakewood, CO	10	36	18
Detroit-Warren-Dearborn, MI	25	17	28
Nashville-Davidson-Murfreesboro-Franklin, TN	4	9	25
Oklahoma City, OK	17	4	33
Omaha-Council Bluffs, NE-IA	24	11	34
Provo-Orem, UT	1	22	11
Raleigh, NC	19	42	38
San Jose-Sunnyvale-Santa Clara, CA	6	1	15
Seattle-Tacoma-Bellevue, WA	33	14	21
Tulsa, OK	28	8	4

Source: Brookings Analysis of Moody's Analytics, Census population, and American Community Survey data.

Metro Monitor tracks. Growth and prosperity gains were relatively modest in Albany, Dayton, and Worcester, while San Antonio made more modest gains on inclusion measures. The experience of these 11 metro areas suggests that although inclusive growth is uncommon, it is possible—and it is possible for all types of metro areas, regardless of their location or economic starting point.

Meanwhile, 23 of the 100 largest metro areas performed below the average of their peers' composite scores across all three categories

of growth, prosperity, and inclusion (Table 4B). This list includes metropolitan areas of two types: the first are located throughout the Northeast, Midwest, and South and specialize in slower-growing legacy manufacturing industries, government, finance, and education and health care. Some of these, like Philadelphia, Washington, and Baltimore, are already among the largest and wealthiest metro areas in the country. The second type are Sunbelt metro areas such as Palm Bay, Tucson, and Oxnard that were hit hard by the housing bust, and have yet to regain their footing.

Table 4B. Metropolitan areas that performed below the large metro average across every composite category, 2010-2015

Rankings			
Metropolitan statistical area	Growth	Prosperity	Inclusion
Albuquerque, NM	97	97	99
Augusta-Richmond County, GA-SC	99	95	92
Baltimore-Columbia-Towson, MD	48	63	70
Baton Rouge, LA	82	88	88
Bridgeport-Stamford-Norwalk, CT	74	98	52
Columbia, SC	55	67	71
Hartford-West Hartford-East Hartford, CT	91	68	49
Indianapolis-Carmel-Anderson, IN	45	79	79
Jackson, MS	87	74	93
Knoxville, TN	58	53	94
Memphis, TN-MS-AR	85	81	50
New Haven-Milford, CT	80	64	54
New Orleans-Metairie, LA	69	100	56
Oxnard-Thousand Oaks-Ventura, CA	90	66	82
Palm Bay-Melbourne-Titusville, FL	62	96	76
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	75	54	74
Rochester, NY	93	78	69
Spokane-Spokane Valley, WA	77	58	100
Syracuse, NY	100	80	83
Tucson, AZ	94	85	89
Virginia Beach-Norfolk-Newport News, VA-NC	89	86	96
Washington-Arlington-Alexandria, DC-VA-MD-WV	65	93	86
Winston-Salem, NC	79	73	85

Source: Brookings Analysis of Moody's Analytics, Census population, and American Community Survey data.

Conclusion

The five years from 2010 to 2015 that preceded the election of 2016 illustrate the challenge that national and local leaders face in building a more advanced economy that works for all. Economic growth that improves standards of living for all people is possible, but not as common as one might hope. This edition of the Metro Monitor finds that only 14 of the nation's 100 largest metropolitan areas performed better than the average of their peers on each of the three dimensions of growth, prosperity, and inclusion during this five-year period. And only 11 large metro areas improved on all nine core indicators of the Metro Monitor.

These results suggest that economic growth alone, even growth that produces rising living standards, does not reliably assure better outcomes for all groups in a metropolitan area. Every one of the 100 largest metropolitan areas achieved job growth, and 98 achieved GMP growth, from 2010 to 2015. Yet only 53 saw median wages rise. Factors such as a lack of entrepreneurial dynamism or growth in less-productive sectors of the economy may explain the gap between economic growth and inclusion in some local markets. Although metropolitan economies *can* simultaneously achieve a higher trajectory of growth, improve the productivity of individuals and firms, and raise local standards of living, doing so all at once is far from assured. However, several metropolitan areas show that it is possible to improve economic inclusion outcomes in the absence of robust growth or gains in prosperity.

The Metro Monitor aims to advance new ways of measuring economic success in metropolitan America, and its interactive website offers new tools for helping leaders chart their progress. Over the next several months, the Brookings Metropolitan Policy Program will publish additional analyses as part of the *Metro Monitor* series to help metropolitan leaders explore whether they are improving the trajectory of their local economies. These analyses will seek to help these leaders understand in greater depth the factors and trends that contribute to or hinder progress toward continuously increasing growth, prosperity, and inclusion in metropolitan America, and how new models of economic development can help deliver an advanced economy that works for all.

Appendix

This Metro Monitor draws on data from Moody's Analytics and the U.S. Census Bureau to produce estimates in the indicators that make up the Inclusive Growth Index. Moody's Analytics provides proprietary estimates of jobs, wages, and gross product by industry that are based upon official statistics published by the U.S. Bureau of Labor Statistics and the U.S. Bureau of Economic Analysis. The Metro Monitor uses data from two U.S. Census Bureau programs: the Longitudinal Employer-Household Dynamics (LEHD) program and American Community Survey (ACS) Public Use Microdata Series (PUMS). These two Census Bureau sources and the methods of their use are described in more detail here.

Census LEHD

The Metro Monitor uses Quarterly Workforce Indicators (QWI) data from the Census Bureau's LEHD program to examine the number of jobs at firms by the firms' age by county.[12] (The authors aggregated county-level QWI data into metropolitan areas.) Though illuminating, using the LEHD's QWI data requires some care. First, states' participation in the LEHD is optional. As a result, time coverage varies across states. Notably, data for the District of Columbia first appear in the QWI series in the second quarter of 2005; Massachusetts first appears in the first quarter of 2010; data from Florida and Michigan last appear in the second quarter of 2015. The second challenge is that these data are seasonally unadjusted. Finally, the data have a one-quarter lag between data release and adjustment of the firm age series. To account for these facets of the data, the authors use the period from the first quarter of 2005 to the first quarter of 2015 to examine 10-year differences in hiring by young firms for most metro areas.[13] The authors take the period from the first quarter of 2006 to the first quarter of 2015 for the District of Columbia as a proxy for this 10-year measure. Because there are only five years of complete data for Massachusetts, a 10-year indicator for the four metropolitan areas with portions within Massachusetts (Boston, Springfield, Providence, and Worcester) are not reported. Similarly, no indicator is reported for the United States as a whole, due to the lack of complete data for all states in 2015.

Census ACS

The Metro Monitor uses Census Bureau microdata to examine inclusion outcomes in metropolitan areas, including by race and education. The authors use microdata from the 2000 Decennial Census from the University of Minnesota's Integrated Public Use Microdata Series (IPUMS).[14] Data from the 2000 Decennial Census were collected in 1999 and all estimates refer to that year. For later years, the authors use microdata from the 2006 to 2015 ACS, which come from the Census Bureau's PUMS files.[15] Data from the ACS one-year estimates were collected throughout the course of the year in question but refer to the survey respondent's employment status and wages during the last 12 months.

The authors used several techniques for analyzing the microdata that merit description:

Each observation in the microdata from the Decennial Census and ACS is assigned to a unit of geography called a Public Use Microdata Area (PUMA). PUMAs represent the smallest, most detailed

level of geography available in the public use files, with each PUMA covering an area of at least 100,000 people to preserve survey respondents' anonymity. PUMAs do not overlap; they fully partition each state into contiguous areas. Depending on the population in a region, PUMAs can encompass entire counties and groups of counties or cover part of a county.[16] As such, PUMAs can be grouped into near (but not always perfect) approximations of metropolitan areas. This can be achieved by assigning PUMAs to counties, and counties to metro areas. PUMAs were assigned to metropolitan areas for this study using the Office of Management and Budget's 2013 metropolitan area definitions. The Census Bureau permits changes to PUMA definitions every few years. For each year of data, the authors assigned PUMAs to metropolitan areas using the Office of Management and Budget's 2013 metropolitan area definitions.

To protect the anonymity of survey respondents, the Census Bureau masks wages of some individuals in the published microdata. This masking creates certain inconsistencies. To address this, the authors calculated median wages from the microdata by interpolating between author-defined earnings bins by comparing the cumulative frequencies between bins immediately less than and greater than the 50th percentile for each metro area (and by each race and education category, where reported). This interpolation method is analogous to one used by the Bureau of Labor Statistics to calculate quarterly median wages from the Community Population Survey.[17] Within each metro, incomes of residents are adjusted to 2009 dollars using the Bureau of Economic Analysis's Personal Consumption Expenditure (PCE) index and grouped into $500 bins.[18] The proportion of metro residents whose incomes fall into each income bin and those below it is summed to find the cumulative frequency associated with each bin. Using linear interpolation, the authors find the midpoint between the maximum income in the greatest income bin whose cumulative frequency is less than 50 percent, and the maximum income in the least income bin whose cumulative frequency is greater than 50 percent.

The above measure of the median wage is used to calculate the relative income poverty rate, which is defined as the proportion of residents with incomes less than half of a metro's median income among all workers.

As a survey of a sample of the U.S. population, the ACS is subject to sampling error. Moreover, to avoid disclosing the identities of survey respondents, the Census Bureau releases a subset of the full ACS sample for public use. This means that the PUMS-based estimates are subject to sampling error. Measures of this error were computed as part of this study to assess statistical significance of estimates.

For median earnings, the employment-to-population ratio, and the relative income poverty rate, standard errors were calculated using Census-provided replicate weights. Each observation in the ACS microdata stand in for a variable number of people, depending on demographic characteristics of the individuals sampled. Weights are assigned to each respondent that represent the number of people for whom he or she stands in. The ACS microdata files come with 80 sets of these weights, each of which is an alternative weight. These replicate weight estimates often differ from estimates computed using the main weights. To calculate standard errors, the authors computed estimates for each replicate weight, in addition to the reported estimate calculated using the main set of weights. The variability between the reported estimate and the 80 replicate estimates were used to compute a standard error for each metric.[19]

Notes

1   Organization for Economic Cooperation and Development, "2016 Economic Survey of the United States," http://www.oecd.org/unitedstates/economic-survey-united-states.htm.

2   The Metro Monitor uses the U.S. Office of Management and Budget's 2013 metropolitan statistical area definitions for the entire period of analysis and identifies the top 100 largest U.S. metropolitan areas based on their population in 2010 as reported in the 2010 Decennial Census. In the text of this report we have omitted state names for metro areas because metro areas can fall in two or more states.

3   This definition of "successful economic development" is adapted from arguments put forward in a 2015 report to the U.S. Economic Development Administration authored by Maryann Feldman and others titled, "Economic Development: A Definition and Model for Investment." It is also influenced by Michael Spence's discussion of the economic and political dynamics of growth and development in his book, "The Next Convergence: The Future of Economic Growth in a Multispeed World" (New York: Farrar, Straus, and Giroux, 11). The definition used here, however, is the authors' own.

4   As with any analysis of change over time, this Metro Monitor analysis is sensitive to the choice of the start and end dates. Our choice of 2015 as the end year for the analysis reflects availability of the most recent, complete data for most of the indicators used here. Our choice of start years was influenced by a desire to assess progress not from one month or one quarter to the next, but over the longer periods of time that capture broader economic transformation. However, using fixed 10-, five-, and one-year increments does not capture the different timing and impact of business cycles upon metropolitan economies' performance. The Metro Monitor series website contains detailed data on metropolitan areas' economic progress within and across time periods.

5   Theories about the importance of entrepreneurship to economic growth emerged from the writings of Adam Smith and David Ricardo in the 18th century. Each saw investment in new ventures as both a precursor to and outcome of wealth creation. As Smith and Ricardo's theories have become more formalized over the past 250 years empirical evidence on the positive role of new businesses in economic growth has also emerged. For example, Jed Kolko found that new firms accounted for 56 percent of gross job gains nationwide from 1992 to 2006 in his study, "Business Relocation and Homegrown Jobs, 1992–2006" (San Francisco, CA: Public Policy Institute of California, 2010). Kolko's study also finds that young firms also account for a majority of job losses due to their high failure rate relative to mature firms, which grow more slowly. Their net effect is still positive in the long run, however. Steven Davis and others found that firms aged less than five years saw average annual net job growth of 20 percent while mature firms had modestly negative net job growth rates between 1981 and 2001 (see Davis, Steven J., John Haltiwanger, Ron Jarmin, and Javier Miranda, "Volatility and Dispersion in Business Growth Rates: Publicly Traded vs. Privately Held Firms," (NBER Working Paper 12354, 2006)).

6   A number of studies suggest that the recent decline in business dynamism, measured as the ratio of firm births plus deaths to the number of all firms, is directly related to declining labor market mobility and aggregate wage stagnation. The studies show that the remarkable volatility of young firms in terms of hires, layoffs, and job gains and losses associated with firm births and deaths are important to workers' job and occupational mobility. This is because without the business dynamism associated with entrepreneurship, there are fewer opportunities for workers to take new jobs. Studies have also shown that the job and occupational mobility associated with this sort of labor market churn is a crucial channel for individual

and aggregate wage growth. For more information, see: Mike Konczal and Marshall Steinbaum, "Declining Entrepreneurship, Labor Mobility, and Business Dynamism: A Demand-Side Approach," (New York, NY: Roosevelt Institute, 2016); Economic Innovation Group, "Dynamism in Retreat: Consequences for Regions, Markets, and Workers," (Washington, 2017); Daly, Mary, Bart Hobijn, and Theodore Wiles, "Dissecting Aggregate Real Wage Fluctuations: Individual Wage Growth and the Composition Effect," (Working Paper no. 2011-23, Federal Reserve Bank of San Francisco, 2012).

7   We refer to this indicator—the employment-to-population ratio—as the "employment rate" in the text, for narrative ease. In labor market economics, the term "employment rate" is typically used to indicate the share of the labor force in work.

8   YiLi Chien and Paul Morris, "Unemployment by Industry: Duration Must Be Considered, Too" (Federal Reserve Bank of St. Louis, 2016), https://www.stlouisfed.org/publications/regional-economist/january-2016/unemployment-by-industry-duration-must-be-considered-too

9   William Frey, "Sun Belt Migration Reviving, New Census Data Show" (Washington: Brookings, 2016), https://www.brookings.edu/blog/the-avenue/2016/01/04/sun-belt-migration-reviving-new-census-data-show/.

10   Bureau of Economic Analysis, "NIPA Table 2.3.6: Real Personal Consumption Expenditures by Major Type of Product." https://www.bea.gov/iTable/iTable.cfm?reqid=9&step=1&acrdn=2#reqid=9&step=3&isuri=1&904=2000&903=66&906=q&905=2016&910=x&911=0.

11   Inclusion measures like change in the employment rate are generated from survey data that have sampling error. In the five large metro

areas where survey data suggest the employment rate declined from 2010 to 2015, the decline was statistically significant at the 90 percent confidence level in only one: Spokane, Wash., where the rate declined 4.6 percentage points, from 69.2 percent to 64.6 percent.

12   Quarterly Workforce Indicators Data provided by the LED Program of the Census Bureau, https://ledextract.ces.census.gov/static/data (accessed January 2017).

13   For more information, see "Data Availability" in https://lehd.ces.census.gov/doc/QWI_101.pdf.

14   Integrated Public-Use Microdata Series provided by the Minnesota Population Center at the University of Minnesota, https://www.ipums.org (accessed December 2016).

15   U.S. Census Bureau American Community Survey Public Use Microdata Sample, https://www.census.gov/programs-surveys/acs/data/pums.html (accessed December 2016).

16   For more information, see https://www.census.gov/programs-surveys/acs/technical-documentation/pums/about.html and https://usa.ipums.org/usa-action/variables/PUMA#description_section.

17   For more information, see "Median Earnings" in https://www.bls.gov/cps/eetech_methods.pdf.

18   Personal Consumption Expenditure Index provided by the Bureau of Economic Analysis, http://www.bea.gov/iTable/iTableHtml.cfm?reqid=9&step=3&isuri=1&903=68 (accessed December 2016).

19   For a detailed description of the replicate weights methodology, see pp. 12-14 in http://www2.census.gov/programs-surveys/acs/tech_docs/pums/accuracy/2015AccuracyPUMS.pdf.

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