

TRANSCENDENT METROS TACKLE OFFICE MARKET HEADWINDS

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Space utilization densification, technological advances, and demographic changes are creating headwinds in the path of office space demand. Certain metro areas have advantages that may transcend those challenges.

The number of Office Using Jobs (OUJ) is growing at a faster rate than the average for all jobs and as a corollary; OUJ is a growing share of all jobs. This trend is not evenly distributed and is most pronounced in technology concentrated markets, low cost markets, and in certain major markets.

Office Using Jobs grew almost three times as fast as office inventory growth since 2009. Nevertheless, the level of new construction is near a 20-year low point. The national office occupancy rate has not yet recovered to its pre-Global Financial Crisis (GFC) level, and certainly not to the levels experienced in 2000. In the major markets of New York, Los Angeles, and Washington, the vacancy rates are higher than they were 10 years ago.

The mismatch between job growth and space use for office can be explained by a confluence of factors working against office demand including densification¹, teleworking, and technological advances. Going forward, we expect that the slow growth rate in working age population nationally and a declining working age population in certain major, secondary and suburban markets will impact demand for office space. This trend is exacerbated by the decline in the office using employable working age population caused by the exit of the long term unemployed from the labor pool and low education attainment rates in certain population centers.

These demographic and social waves will add to the technological challenges facing office demand growth. Perhaps the greatest threat generated by technological advance, the elimination of certain cognitive office jobs, is only beginning to be experienced. Its full manifestation in the coming decades may have a considerable impact on office demand.

Nevertheless, certain markets may transcend these trends including those that are technology focused, are low cost, have a concentration of machinery²- resistant jobs; have a growing working age population, and high education attainment rates. Technology, cost, and demographics are driving office job migration patterns.

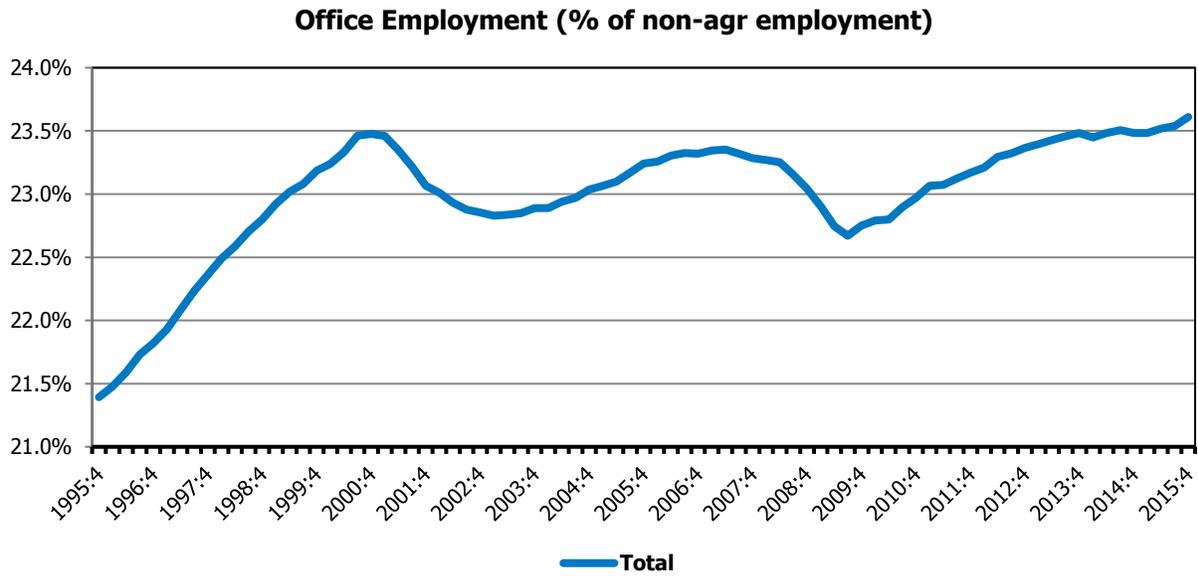
OFFICE USING JOBS GROWING

Office Using Jobs as a share of Total Jobs has increased from 21.4% in 1995 to 23.6% in 2015. It had been 18.1% in 1982. The distribution of this improvement is uneven and certain metros benefitted disproportionately while others experienced a decline.

¹ Densification refers to reducing the space per employee in office buildings.

² The term machinery is being used as an all encompassing reference to automation and technological advance that may jeopardize certain jobs (office using jobs in the context of this paper). It was first used in the early 19th century to refer to the mechanization of production processes that resulted in the loss of jobs. Early 19th century usages included "the machinery question" referring to questioning whether the impact of machines would result in massive job losses.

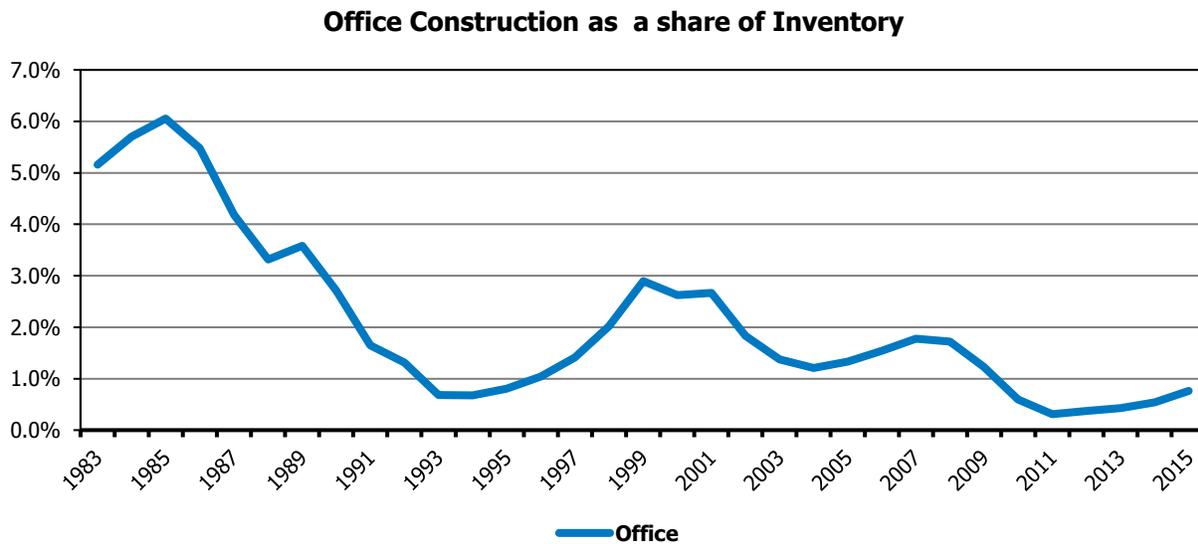
Table 1



Source: CoStar, US Census

Office Construction as a share of existing inventory is at its lowest level since 1996.

Table 2

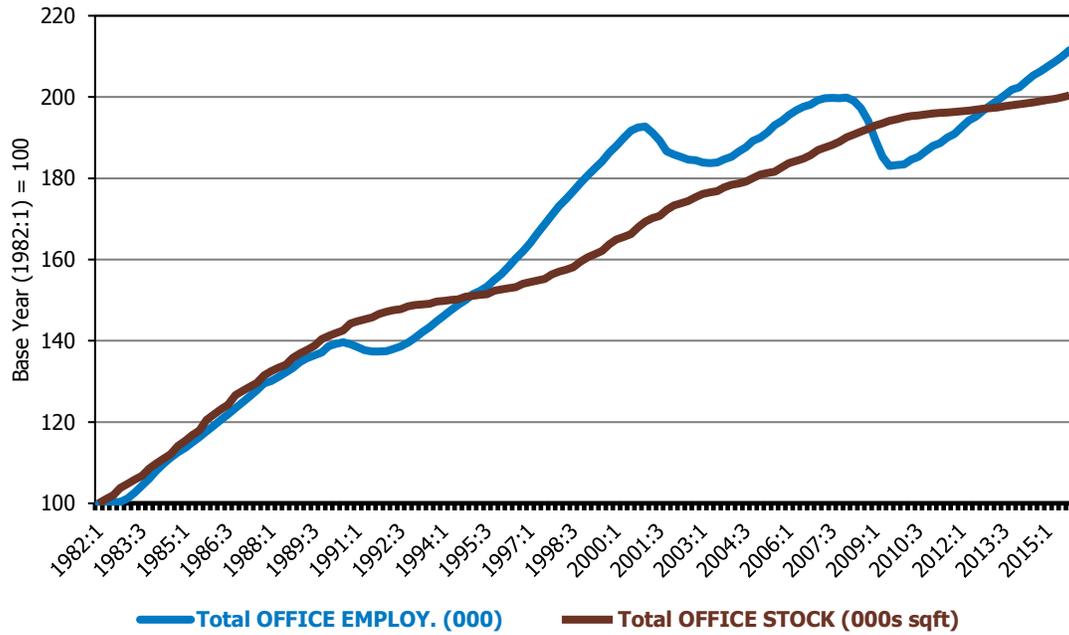


Source: CoStar

Since the Global Financial Crisis (GFC) in Q2 2009, office employment has grown 14.2% while office stock has grown 3.5% over the same time period. Since 1994 office employment has grown 45% while office stock has grown 34%.

Table 3A

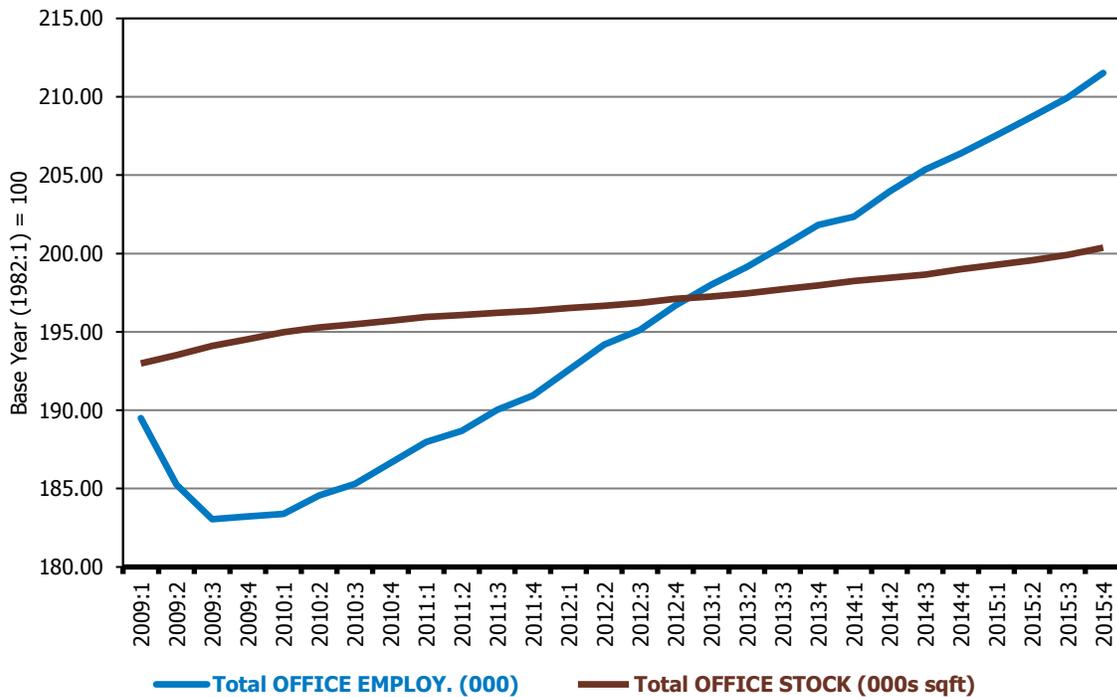
Growth of Office Employment vs Office Stock 1982-2015



Source: CoStar

Table 3B

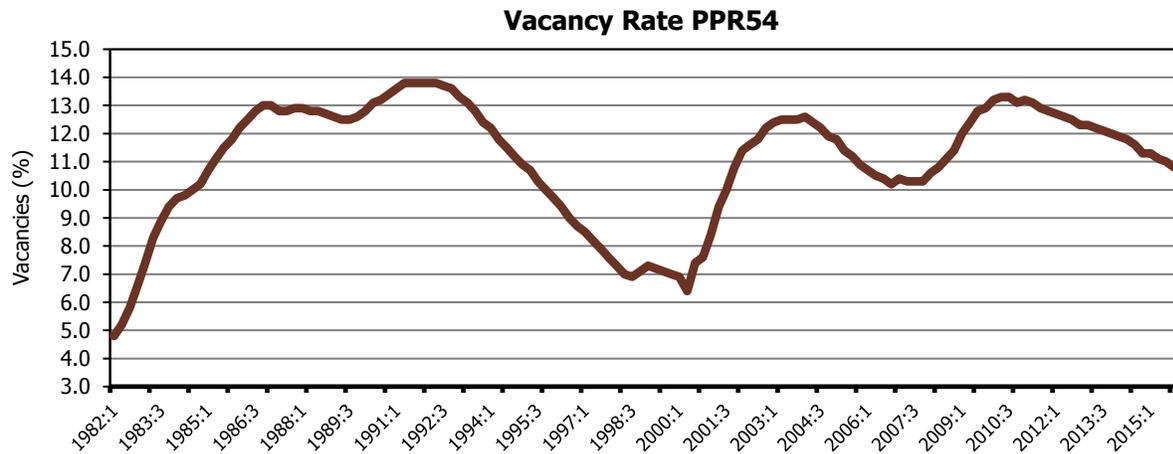
Growth of Office Employment vs Office Stock 2009-2015



Source: CoStar

Despite very little new construction over the past 10 years, the vacancy rate for CoStar’s top 54 markets (PPR54) has only declined from its post-GFC high of 13.3% to its current level of 10.8%, but still has not rebounded back to the 6.4% experienced in 2000.

Table 4



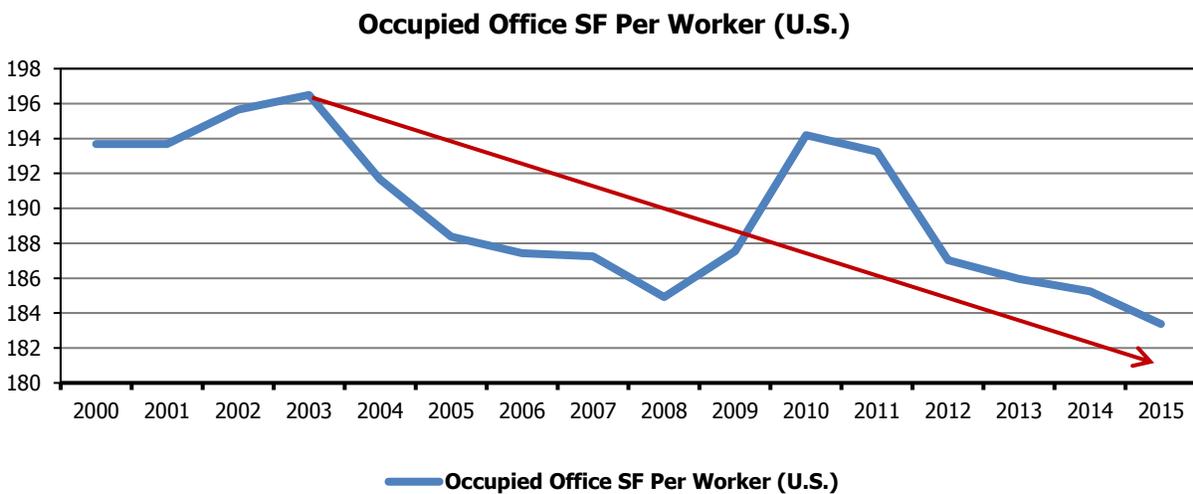
Source: CoStar

According to Costar, Nashville, San Jose, San Francisco, Austin, Pittsburgh, Raleigh, Columbus, Portland, and Denver top the list of those showing the largest decline in vacancy over the past 10 years³.

DENSIFICATION/SPACE PER EMPLOYEE

According to the CoStar Group, space per employee has been declining. In 2010 there was 194 square feet per employee compared to 183 in 2015, a 5.6% decline. This follows an overall densification pattern that began in 2004 and was interrupted by the great recession. During that economic downturn, there were significant job losses which resulted in a greater amount of office space per employee. Carving out the layoff driven increase in space per employee, the longer trend of 2003 to 2015 is observed to represent a 6.7% decline in space per employee.

Table 5



Source: CoStar

³ New Orleans is fifth on the list, but that includes mostly recovery after Hurricane Katrina. Honolulu is another exception.

Space per employee has declined by 7.7% over the past five years and CoStar forecasts it to decline by an additional 4.8% over the next five years. This is not evenly distributed amongst metro areas. In general, the markets with high growth rates in terms of both rent and jobs have experienced greater densification. Densification is being used as a tool to keep costs low in accelerating and presently expensive markets. In their 2016 Workplace Report: TMA by the Numbers, Ted Moudis and Associates (TMA) maintains that the average space per worker for newly leased space is now 142 and ranges from a high of 220 to a low of 95.

Demand for office space can be further reduced by utilizing a leveraged seating ratio. According to TMA, most offices could leverage seats at a ratio of 1.3 persons for every 1 seat and still have enough seats for everyone who physically works in an office on any given day. Some employers may be able to use an even higher ratio. Densification does have limits and may be curbed by elevator, bathroom and parking capacity, particularly in older buildings. In addition, not all work can be efficiently done in close quarters and certain types of cognitive effort require more privacy and quiet.

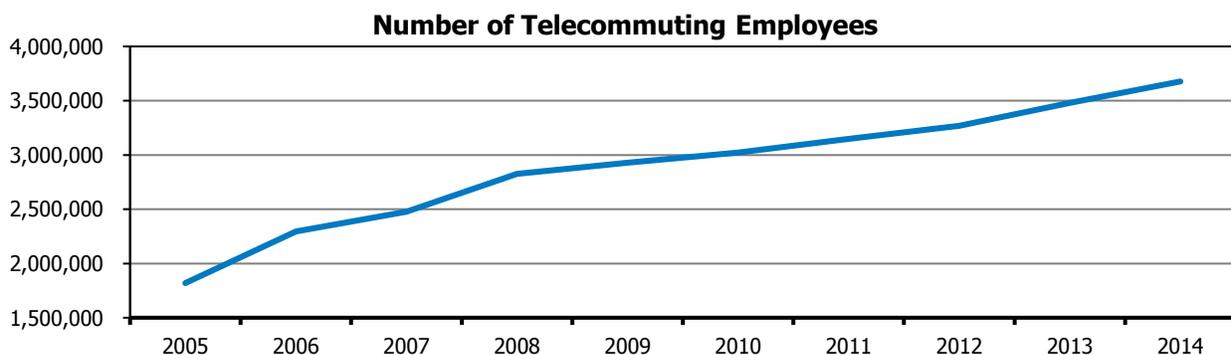
However, densification of employee workspace is not the only cause of reduced office use, digitization of files and cloud computing are also lessening the need for office space. Historically offices of large insurance companies, law firms, lending institutions, and financial services firms utilized thousands of square feet of office space for the storage of paper files. Now files can be digitized and stored electronically. Files can also be stored and accessed in the cloud. The aforementioned TMA report stated that paper-light offices are reducing file drawer space to one for every 1.7 workers.

TELEWORKING

Telework, as defined by the U.S. Office of Personnel Management, is a work flexibility arrangement under which an employee performs the duties and responsibilities of such employee's position, and other authorized activities, from an approved worksite other than the location from which the employee would otherwise work (e.g. home or telework center). This does not mean that they work exclusively from home.

According to Global Workplace Analytics⁴, the number of employee teleworkers who regularly work-at-home has more than doubled between 2005 and 2014, increasing from 1,819,000 in 2005 to 3,700,000 in 2014⁵. These 3.7 million employees representing 2.8% of the workforce now work from home at least half the time⁶.

Table 6



Source: Global Work Place Analytics

⁴ Global Workplace Analytics helps organizations and communities understand and communicate the business case for emerging workplace strategies such as telecommuting, hoteling, desk sharing, agile work, open office, and flexible work

⁵ <http://globalworkplaceanalytics.com/telecommuting-statistics>

⁶ The noted numbers are for employee telecommuters. There is a divergence between self-employed and employee telework patterns. "About 22% of the self-employed population work primarily from home. That population (self-employed and home-based) declined by 3.4% since between 2005 and 2014. The loss was entirely attributable to non-incorporated home-based businesses (which declined by 9.8%). The self-employed incorporated home-based business population grew by 18.7%".

Gallup polls have documented a steady rise in those that have telecommuted⁷ rising from 9% in 1995 to 32% in 2006 to 37% in 2015. The 2015 Gallup poll found that 55 percent of college-educated respondents had telecommuted, compared to only 26 percent of non-college-graduates⁸. This has direct implications for office using jobs.

NEED FOR WORKERS MAY DECREASE: TECHNOLOGICAL ADVANCES AND GLOBALIZATION

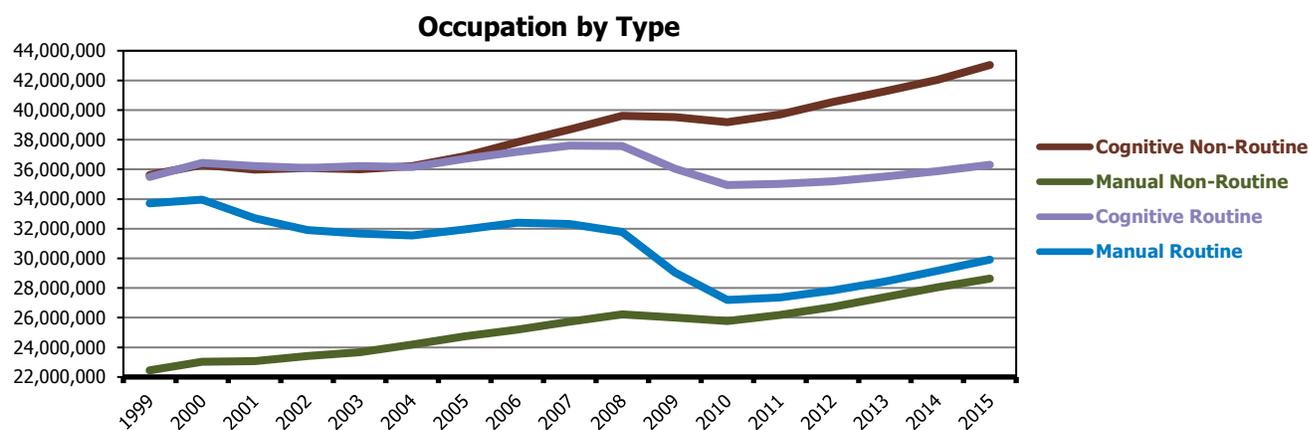
Technology has been a net job creator as evidenced by the growth in cognitive jobs and the success of technology focused metros. Nevertheless, technological advances and globalization have reduced the need for workers in various job sectors in the United States. Technology has also enabled the offshoring of cognitive jobs that would have not been possible in previous generations. The ability to offshore jobs once done in American offices to India, Philippines, and other lower cost locations has reduced the need for US office workers.

The St. Louis Federal Reserve Bank divided certain types of jobs in to four categories; 1) Cognitive Non-Routine, 2) Manual Non-Routine⁹, 3) Cognitive Routine, 4) Manual Routine¹⁰.

Cognitive Non-Routine jobs include Management, Business and Financial Operations, Computer and Mathematical, Architecture and Engineering, Life, Physical, and Social Science, Community and Social Service Occupations, Legal, Education, Training, and Library, Arts, Design, Entertainment, Sports, and Media, and Healthcare Practitioners and Technical Occupations. These types of jobs have exhibited the most growth over the past 30 years.

Cognitive Routine jobs include Sales and Related and Office and Administrative Support Occupations.

Table 7



Source: US Census, Bureau of Labor Statistics, St. Louis Federal Reserve, New York Life RE Investors

The relevant categories for office space include the Cognitive Routine and Cognitive Non-Routine categories. Technological advances have had a profound impact on routine cognitive jobs. In the eight years ending 12/2015 the number of cognitive routine jobs declined by 3.4%. An example of cognitive routine office work that was eliminated by technology includes secretarial typing pools. The losses in the Cognitive Routine category have been more than offset by increases in the Cognitive Non-Routine category which grew 11.2% during the same time period. This may not be the case going forward.

⁷ Defined as " worked from home using a computer to communicate for your job"

⁸ Justin Fox "Earn Your Living at Home and Spend It From Home ", Bloomberg, August 29, 2016.

⁹ Manual Non-Routine jobs included Healthcare Support, Protective Service, Food Preparation and Serving Related, Building and Grounds Cleaning and Maintenance, and Personal Care and Service Occupations.

¹⁰ Manual Routine jobs included Farming, Fishing, and Forestry, Construction and Extraction, Installation, Maintenance, and Repair, Production, and Transportation and Material Moving Occupations.

According to a 2013 study by Carl Benedikt Frey and Michael Osborne of Oxford University, about 47 percent¹¹ of total US employment is at risk¹². Although the magnitude of such job losses may be overstated, the direction is clear. This would not be the first time new technology has reduced demand for labor. Indeed from the very inception of technological innovation concerns were raised. Reconsidering his original view, the economist David Ricardo wrote in the third edition of his "*Principles*"¹³ in 1821 that the employment of machinery is frequently detrimental to the laboring class. What is new is that it is now affecting jobs that require an advanced degree. Deep neural networks (or "deep learning" systems) are making rapid progress in areas such as speech recognition, image classification and language translation¹⁴. Law, Brokerage, Insurance Claims and Policy Processing, Bookkeeping, Accounting, and Auditing Clerks as well as Library Technicians, Tax Preparers, Insurance Underwriters, Mathematical Technicians, Title Examiners, Abstractors, Telemarketers, Loan Officers, and legal secretaries are exposed to this 21st century machinery risk. There are numerous other cognitive jobs that may be impacted in the law, computer, insurance, mathematical and finance sectors. As more job functions get automated by artificial intelligence additional job types will move to Cognitive Routine from Cognitive Non-Routine and ultimately to a fully automated or offshored job category.

Exposure to this type of machinery risk is greatest in certain smaller low cost metros that have attracted potentially vulnerable jobs. These areas include Tampa, Orlando, Phoenix, and Jacksonville and other locations that have attracted back office jobs and call centers. This risk is lower in metros with a greater share of office using jobs that are not exposed. For example Fintech¹⁵, which remains concentrated in New York and Boston, is essential. The technology of automation must be maintained and therefore the need for those types of jobs as mechanization expands. State capitals are also more secure because of government jobs that are not easily automated. Areas with high advanced technology job location quotients and strong education attainment rates are also more resistant to machinery risk.

Technological advance may reduce the need for workers while at the same time demographic change is signaling that fewer workers will be available.

FEWER WORKERS AVAILABLE

One of the conundrums of the economic recovery is the decline in the number of employed persons. Despite the fact that the unemployment rate has declined from 10.0% in 2009 to 4.9% in 2016, the labor force participation rate has declined from 65.8% in 2009 to 62.8% in 2016 (it had been 67.3% in 2000).

The employment to population ratio declined from 64.7% in April 2000 to 59.6% in 2016. It declined from 65.6% in April 2000 to 61.5% in 2016 for those aged 25-64. For the more narrow prime working years of 25-54 years of age it declined from 81.9% in April 2000 to 77.7% in 2016.

¹¹ There is a 70% or greater probability that 47% of jobs could be eliminated

¹² Carl Benedikt Frey and Michael A. Osborne "The Future of Employment: How Susceptible are Jobs to Computerisation ?", Oxford University Engineering Sciences Department and the Oxford Martin Programme on the Impacts of Future Technology, September 17, 2013

¹³ His Third edition of "*Principles*", Chapter 31, "On Machinery"

¹⁴ "Artificial Intelligence - The return of the machinery question", *The Economist*, June 25, 2016.

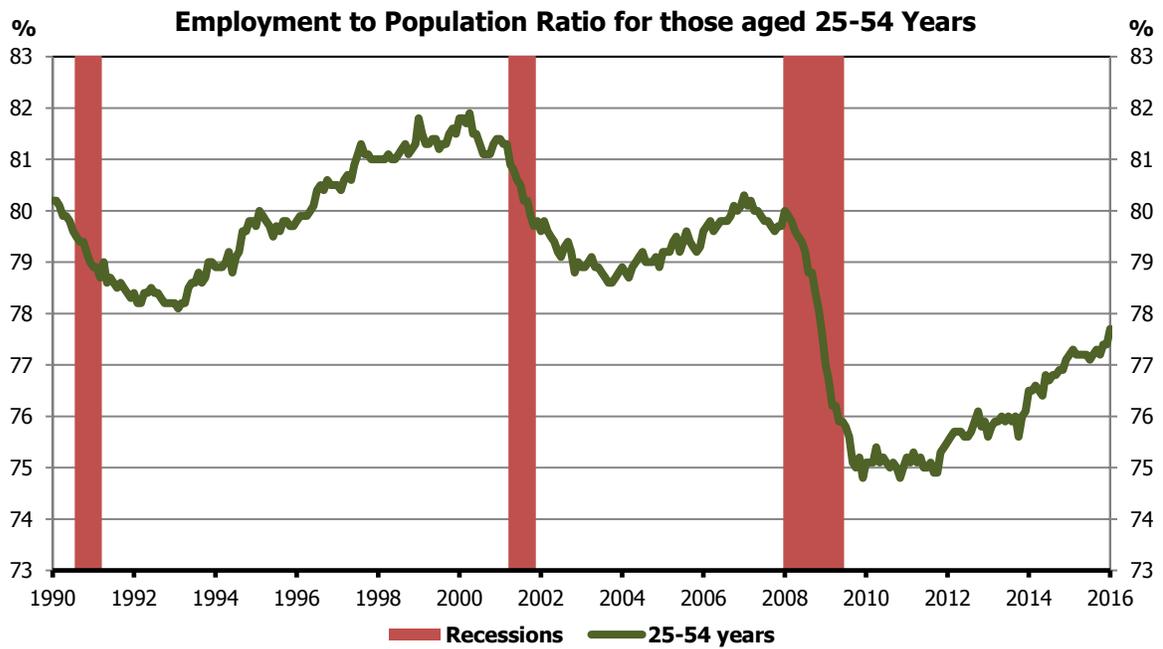
¹⁵ Financial services industry technology

Table 8A



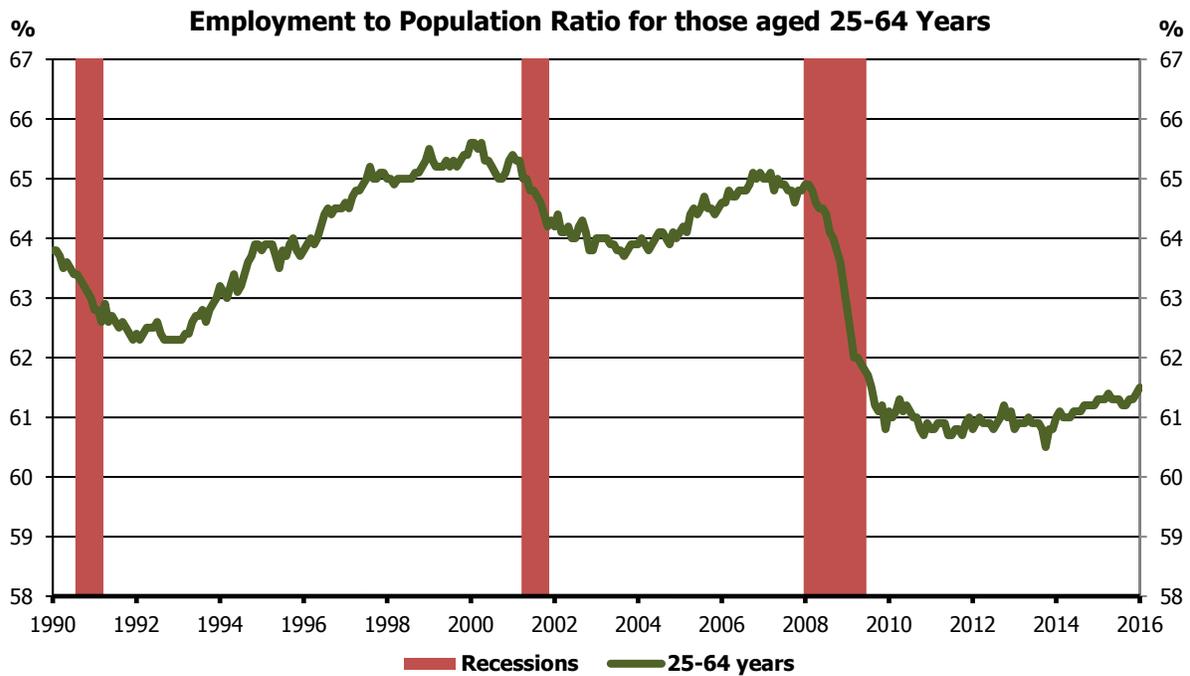
Source: BLS, DB Global Market Research

Table 8B



Source: BLS, DB Global Market Research

Table 8C



Source: BLS, DB Global Market Research

An analysis by the White House Council of Economic Advisers (CEA)¹⁶ in 2014 estimated that about half of the decline in labor force participation since 2009 was due to the aging of the US population. Labor force participation rates decline as workers enter their sixth decade of life.

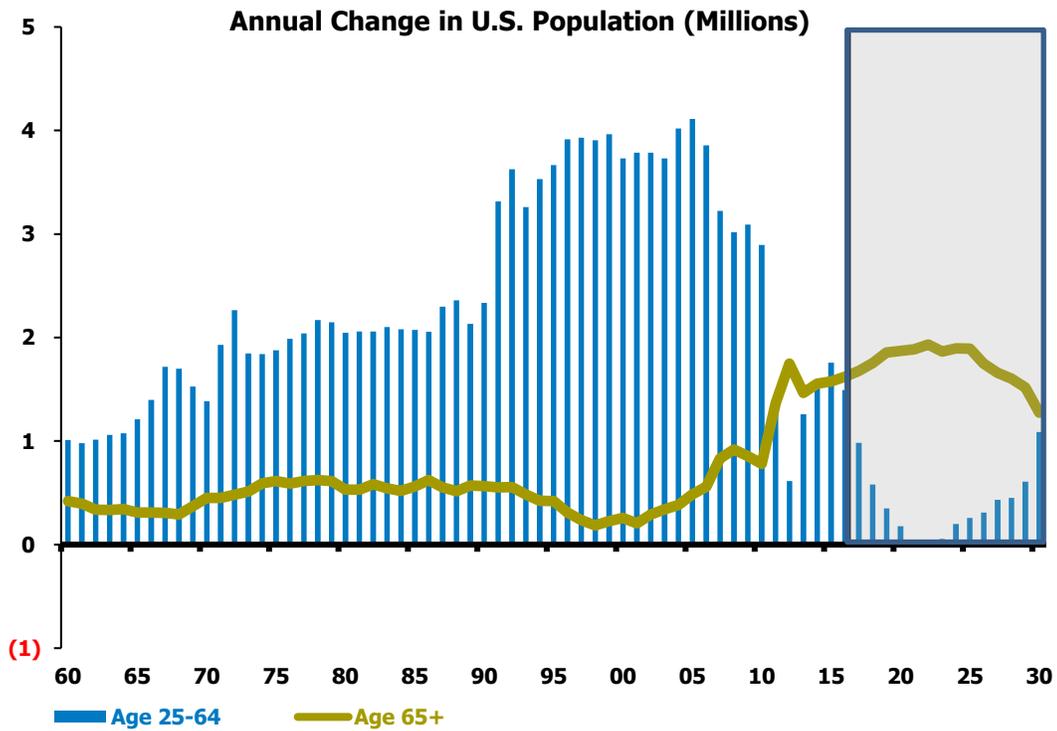
The CEA further estimated that about 17 percent of the decline was the result of a cyclical decline consistent with historical patterns in previous recessions. The CEA estimated that the remaining third of the decline was the result of long term unemployment amongst a wide range of age groups including younger people. There are those that have dropped out of the labor force because their skills have atrophied. It also may be the result of a lack of good paying jobs and/or contact with the criminal justice system.

AGING POPULATION

The growth rate of the US working age population is expected to slow to nearly a halt. In 2022 the actual number of working age adults is projected to actually decrease. The decrease is anticipated to be most pronounced in the 45-64 years of age bracket.

¹⁶ "The Labor Force Participation Rate Since 2007: Causes and Policy Implications", White House Council of Economic Advisors, July 2014.

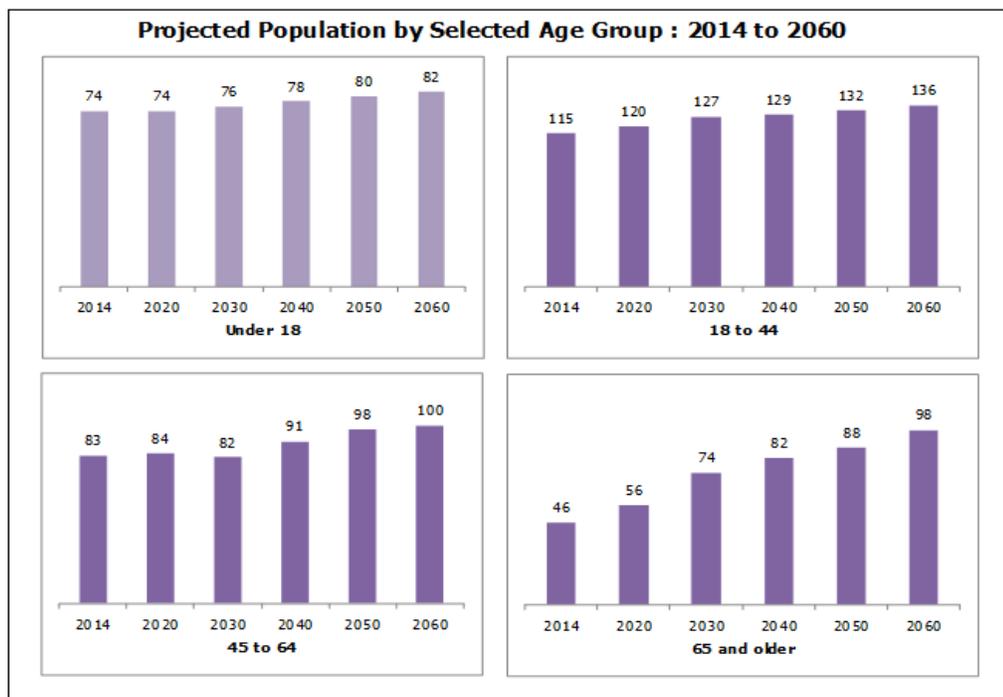
Table 9



Sources: Moody's Analytics; U.S. Census; CoStar Portfolio Strategy

As of 16Q2

Table 10



Source: US Census

LONG TERM UNEMPLOYED

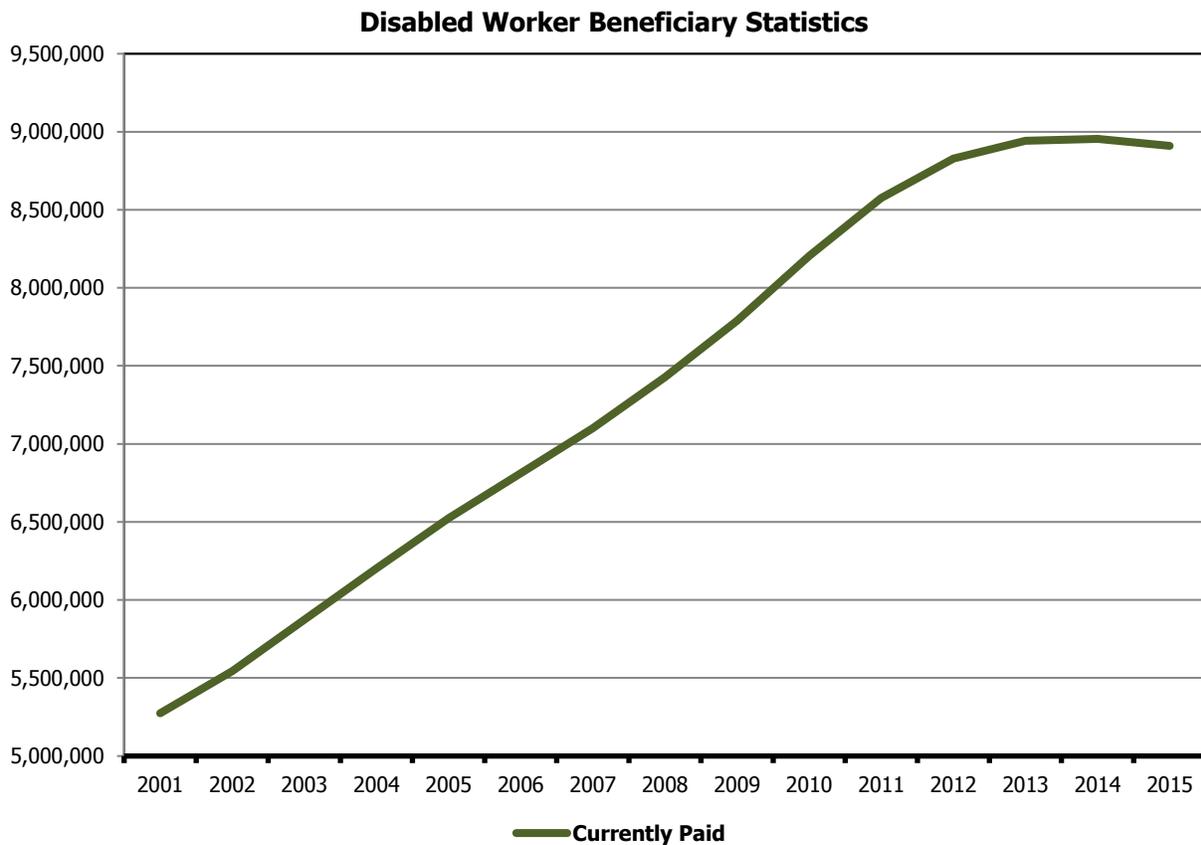
Out of work two years

Unemployment has become a chronic condition for many Americans. In a Harris Poll conducted in May 2016, 59% of those who have been out of work for two years or longer say they have stopped looking for a new job. Overall, 43 percent of the jobless said they have given up. Revealingly, 66 percent say they don't apply for minimum-wage jobs because the pay is too low. More than half — 51 percent — say they haven't had a job interview since 2014.

Some have gone on disability

There has been a 69% and 37% increase in the number of those receiving disability payments since 2001 and 2005 respectively. Although the pace of growth slowed significantly over the past five years and even declined slightly in the past year, it is at historically elevated levels. As employment opportunities dried up, more Americans applied for and received disability benefits. Once someone is on disability for a two year time period, their chances of reentering the work force are greatly diminished.

Table 11



Source: Social Security Administration

An extended period of time unemployed or on disability may cause skills and contacts to atrophy. Long term unemployment can result in a permanent exit from the labor force. Although primarily impacting older workers, long term joblessness is increasingly prevalent amongst younger workers as well. The number of Americans who are no longer in the labor force is at nearly 95 million, close to an all-time high.

Table 12



Contact with the Criminal Justice System

Another factor lowering the potential office using job population is contact with the criminal justice system. According to the "Sentencing Project" and based on data from the US Bureau of Justice statistics, the number of Americans under the control of the US corrections system has soared between 1980 and 2013. As of 2013, there were over seven million Americans or 2.9% of the adult population in prison, jail, on parole, or probation¹⁷. This compares to 1.2% of the total population in 1980. Once these individuals leave the corrections system (after parole and probation are completed), they still have a criminal record. About 8.6% of the US adult population has a felony conviction¹⁸. The vast majority of people that spent time under the corrections system would likely be precluded from office using jobs.

One need not be convicted of a crime in order to have their employment prospects impacted by the criminal justice system. An arrest, even if it results in no charges being filed, can negatively impact employment chances. As of 2015 more than 70 million Americans or 29% of all US adults had an arrest record¹⁹. The result of said arrest ranges from no charges being filed to a full felony conviction. As reported in the Wall Street Journal "Even if charges were dropped, a lingering arrest record can ruin employment chances"²⁰. According to a recent New York Times/CBS News/Kaiser Family Foundation poll, men with criminal records account for about 34 percent of all nonworking men ages 25 to 54²¹. This has resulted in a large class of unemployable or difficult to employ people. Indeed, the labor force participation rate for men ages 25-54 was 97.9% in 1954 and has headed lower since then and was 88.4% in July 2016. Unless there are changes, the outsized share of US adults with an arrest record will continue to represent a large class of people that would probably be precluded from office work.

Workers Not Returning

Non-employed workers tend to be those who have been left behind by generational economic changes. Their jobs have been replaced by technology or have gone overseas, and they can no longer find work that pays as well. Although, this has historically been applicable to manual workers, it is increasingly

¹⁷ The United States has less than 5 percent of the world's population, yet has almost 25 percent of the world's total prison population. The US incarceration rate is by far the highest in the Organization for Economic Cooperation and Development (OECD) and is over six times higher than the average OECD nation.

¹⁸ Michael Suede, "What Percentage of The US Adult Population Has a Felony Conviction? ", Libertarian News, June 2014

¹⁹ Matthew Friedman "As Many Americans Have Criminal Records As College Diplomas", Brennan Center for Justice at New York University Law School, November 17, 2015.

²⁰ Gary Fields and John Emshwiller "As Arrest Records Rise, Americans Find Consequences Can Last a Lifetime - Even if Charges Were Dropped, a Lingering Arrest Record Can Ruin Chances of a Job", The Wall Street Journal, August 18, 2014.

²¹ See also Nicholas Eberstadt "Men Without Work: Americas invisible Crisis", Templeton Press, September, 2016

applicable to cognitive and office workers. The number of workers on disability has increased significantly over the past 15 years. Although slowing recently, its rise has been a significant contributor to the declining labor force. Recent Federal Reserve research indicates that those who left the work force are not coming back²².

Table 13



Source: Aaronson et al. "Labor Force Participation: Recent Developments and Future Prospects" (<http://www.federalreserve.gov/pubs/feds/2014/201464/201464pap.pdf>), BLS, Haver Analytics, DB Global Markets Research

Impact on the National Office Market

The abovementioned limit the universe of potential future office workers. Older Americans are less likely to be in the labor force as baby boomers continue to transition to retirement. Many baby boomers were forced to leave the work force earlier than they anticipated. Others are on long term disability or amongst the otherwise long term unemployed. Included among these are those whose skills and professional associations that have atrophied. Criminal justice system contact may preclude many people from gainful employment. The cumulative effect of all of the above and the political pressure to limit future immigration should result in fewer Americans available to work in office buildings. The possibility of positions lost to technological advances in the future may slow down office demand.

Impact on Individual Markets is Uneven

The above notwithstanding, the impact on various office markets will be uneven. Established office markets such as San Francisco, Boston, New York, Washington, Chicago, Los Angeles, and Seattle should continue to be upper-tier. Other markets that outperform will have several of the following characteristics; (1) above average growth in office using jobs, (2) office using jobs growing at a faster rate than office inventory, (3) fast growing working age population, (4) above average education attainment rate, (5) high tech job location quotients and/or fast growing number of tech jobs, and (6) lower cost commercial and residential real estate. Metros that include several of these characteristics are markets that should be on the winning side despite the negative trends detailed above.

²² Stephanie Aaronson, Tomaz Cajner, Bruce Fallick, Felix Galbis-Reig, Christopher L. Smith, and William Wascher "Labor Force Participation: Recent Developments and Future Prospects", Finance and Economics Discussion Series Divisions of Research & Statistics and Monetary Affairs Federal Reserve Board, Washington, D.C., September, 2014.

In addition to top-tier metros, two types of office markets are experiencing above average demand growth; tech hubs and lower cost office markets. One should not be distracted by the headlines of headquarter transfers as it frequently involves relatively few employees with the majority of workers located in low cost cities, suburbs in the US and abroad.

Office Using Jobs as a Share of Total Jobs

The weighted average office employment as a share of total employment (OUJ/TJ) was 24.7% as of year-end 2015 for metro areas with population over 750,000. There are 30 markets that exceeded that ratio. The metros with the greatest share of OUJ/TJ are detailed in Table 14. Metros with less than 50,000,000 square feet of office space are excluded.

The most concentrated are San Francisco, San Jose, Washington, DC, and southwestern Connecticut. The top four correspond to the areas of the US with the highest education attainment rates. The balance of the list includes lower cost large metros and regional capitals such as Atlanta and Dallas. Other low cost metro areas such as Phoenix, Kansas City, Jacksonville, and Tampa are prominent as well. Ascendant metro areas with tech job concentration such as Denver, Raleigh and Salt Lake City have relatively high positions as well. The major markets of New York and Boston are on the list, however, Los Angeles is not included and indeed the Los Angeles OUJ/TJ ratio declined from 25.0% in 2005 to 23.8% in 2015.

Table 14

Metros with the Highest Ratio of Office Using Jobs to Total Jobs

MSA Name	As of 2015:4
	OFFICE EMPLOYMENT(%)
San Francisco-San Mateo-Redwood City CA	37.9%
San Jose-Sunnyvale-Santa Clara CA	31.9%
Washington-Arlington-Alexandria DC-VA-MD-WV	30.0%
Bridgeport-Stamford-Norwalk CT	29.4%
Atlanta-Sandy Springs-Marietta GA	28.7%
New York-White Plains-Wayne NY-NJ	28.5%
Raleigh-Cary NC	28.2%
Salt Lake City UT	28.1%
Boston-Cambridge-Quincy MA-NH	27.6%
Denver-Aurora-Broomfield CO	27.6%
Phoenix-Mesa-Glendale AZ	27.6%
Santa Ana-Anaheim-Irvine CA	27.5%
Fort Lauderdale-Pompano Beach-Deerfield Beach FL	27.3%
West Palm Beach-Boca Raton-Boynton Beach FL	27.3%
Dallas-Fort Worth-Arlington TX	27.2%
Kansas City MO-KS	27.0%
Tampa-St. Petersburg-Clearwater FL	27.0%
Newark-Union NJ-PA	26.7%
Detroit-Warren-Livonia MI	26.6%
Jacksonville FL	26.5%

Source: CoStar

There are 80 US metro areas with a population over 750,000. The weighted average growth in office employment over the past 10 years has been 9.8%. There are 33 markets that exceeded that growth rate. Metros with less than 50,000,000 square feet of office space are excluded. The metros with the greatest growth in office employment over the past ten years are detailed in Table 15A. The theme is technology and lower cost markets and in many cases both. It also includes ascendant cities with growing working age populations.

Table 15A

Metros with the Greatest Growth in Office Using Jobs over the Past Ten Years

MSA Name	Past 10 years growth (%)
	OFFICE EMPLOY. (000)
Austin-Round Rock-San Marcos TX	47.6%
San Francisco-San Mateo-Redwood City CA	42.5%
San Jose-Sunnyvale-Santa Clara CA	42.3%
Raleigh-Cary NC	34.0%
Nashville-Davidson-Murfreesboro-Franklin TN	30.4%
Charlotte-Gastonia-Rock Hill NC-SC	27.0%
San Antonio-New Braunfels TX	26.1%
Dallas-Fort Worth-Arlington TX	25.9%
Salt Lake City UT	22.9%
Houston-Sugar Land-Baytown TX	22.2%
Louisville-Jefferson County KY-IN	19.9%
Columbus OH	17.9%
Indianapolis-Carmel IN	17.6%
Seattle-Tacoma-Bellevue WA	17.1%
Atlanta-Sandy Springs-Marietta GA	15.6%
Portland-Vancouver-Hillsboro OR-WA	15.3%
Orlando-Kissimmee-Sanford FL	13.9%
Pittsburgh PA	13.4%
Kansas City MO-KS	11.4%
Boston-Cambridge-Quincy MA-NH	11.2%

Source: CoStar

The metros with the greatest forecast growth in office employment over the next five years are detailed in Table 15B. The theme is lower cost primarily Sunbelt markets. It also includes ascendant cities with growing working age populations.

Table 15B

Metros with the Greatest Forecast Growth in Office Using Jobs Next Five Years

MSA Name	Forecast 5 year growth (%)
Orlando-Kissimmee-Sanford FL	23.3%
Raleigh-Cary NC	20.9%
Tampa-St. Petersburg-Clearwater FL	20.6%
West Palm Beach-Boca Raton-Boynton Beach FL	19.2%
Jacksonville FL	18.1%
Dallas-Fort Worth-Arlington TX	17.9%
Phoenix-Mesa-Glendale AZ	17.8%
Austin-Round Rock-San Marcos TX	17.0%
Santa Ana-Anaheim-Irvine CA	16.9%
Sacramento-Arden-Arcade-Roseville CA	16.2%
Riverside-San Bernardino-Ontario CA	16.1%
Indianapolis-Carmel IN	15.4%
Fort Lauderdale-Pompano Beach-Deerfield Beach FL	15.4%
Oakland-Fremont-Hayward CA	14.9%
San Antonio-New Braunfels TX	14.7%
San Jose-Sunnyvale-Santa Clara CA	14.5%
Las Vegas-Paradise NV	14.3%
Nashville-Davidson-Murfreesboro-Franklin TN	14.2%
Houston-Sugar Land-Baytown TX	14.2%
Miami-Miami Beach-Kendall FL	14.1%

Source: CoStar

The weighted average growth in office employment share as a percentage of total job growth from 2005 to 2015 has been 1.23%. There are 40 markets that exceeded that growth rate. The top markets that are in effect transforming their job base include the technology heavy metros. Many areas on the list offer low cost office space as well as an affordable cost of living and are particularly attractive to young families. The following chart illustrates the metros with the greatest increase in OJJ/TJ over the past ten years. Metros with less than 50,000,000 square feet of office space or less than 750,000 people are excluded.

Table 16

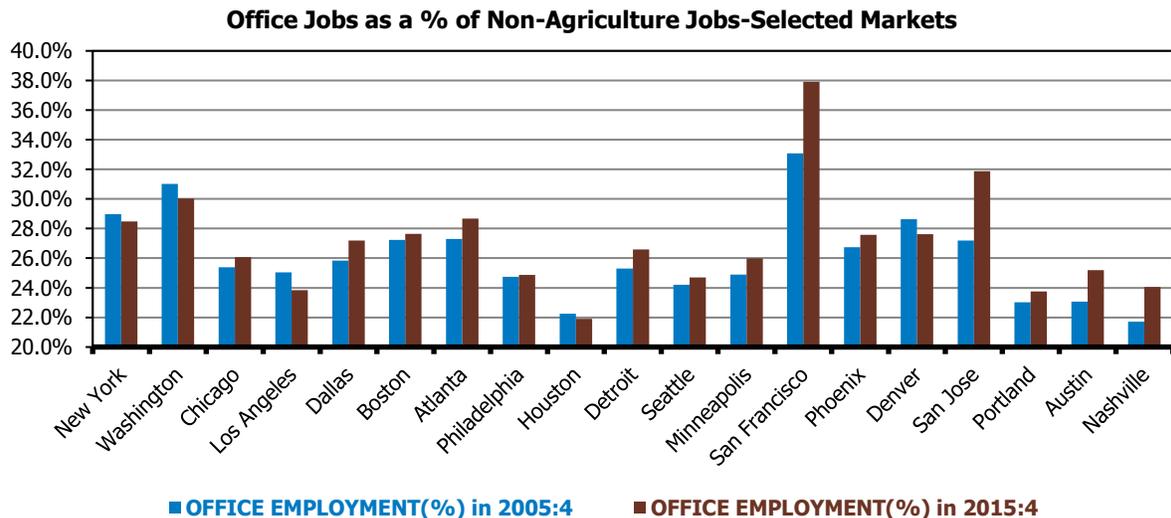
Metros with the Greatest Growth in Share of Office Using Jobs to Total Jobs over the Past Ten Years

MSA Name	Past 10 years growth (%) OFFICE EMPLOYMENT(%)
San Jose-Sunnyvale-Santa Clara CA	17.2%
San Francisco-San Mateo-Redwood City CA	14.6%
Memphis TN-MS-AR	11.2%
Nashville-Davidson-Murfreesboro-Franklin TN	10.8%
Louisville-Jefferson County KY-IN	10.5%
Raleigh-Cary NC	9.3%
Austin-Round Rock-San Marcos TX	9.3%
Charlotte-Gastonia-Rock Hill NC-SC	9.1%
St. Louis MO-IL	8.7%
Pittsburgh PA	8.0%
Cincinnati-Middletown OH-KY-IN	6.7%
Columbus OH	6.6%
Providence-New Bedford-Fall River RI-MA	6.3%
Indianapolis-Carmel IN	5.9%
Dallas-Fort Worth-Arlington TX	5.2%
Detroit-Warren-Livonia MI	5.1%
Atlanta-Sandy Springs-Marietta GA	5.1%
Milwaukee-Waukesha-West Allis WI	4.8%
Kansas City MO-KS	4.5%
Minneapolis-St. Paul-Bloomington MN-WI	4.4%

Source: CoStar

The following chart illustrates how certain major markets are outperforming others in terms of the growth of the OJ/TJ ratio.

Table 17



Source: CoStar

Office Employment and Office Inventory Growth

Since the trough of the GFC in 2009, office employment has grown 14.2% compared to office inventory growth of 3.5%. Nationally office employment has grown 9.0% over the past ten years compared to office inventory growth of 9.7%. However, the PPR 54 experienced office employment growth of 10.1% compared to office inventory growth of 9.7%. Table 18A illustrates the metro areas with the fastest growing office using job growth relative to office inventory growth over the past 10 years. San Francisco, San Jose, and Austin stand out.

Table 18A

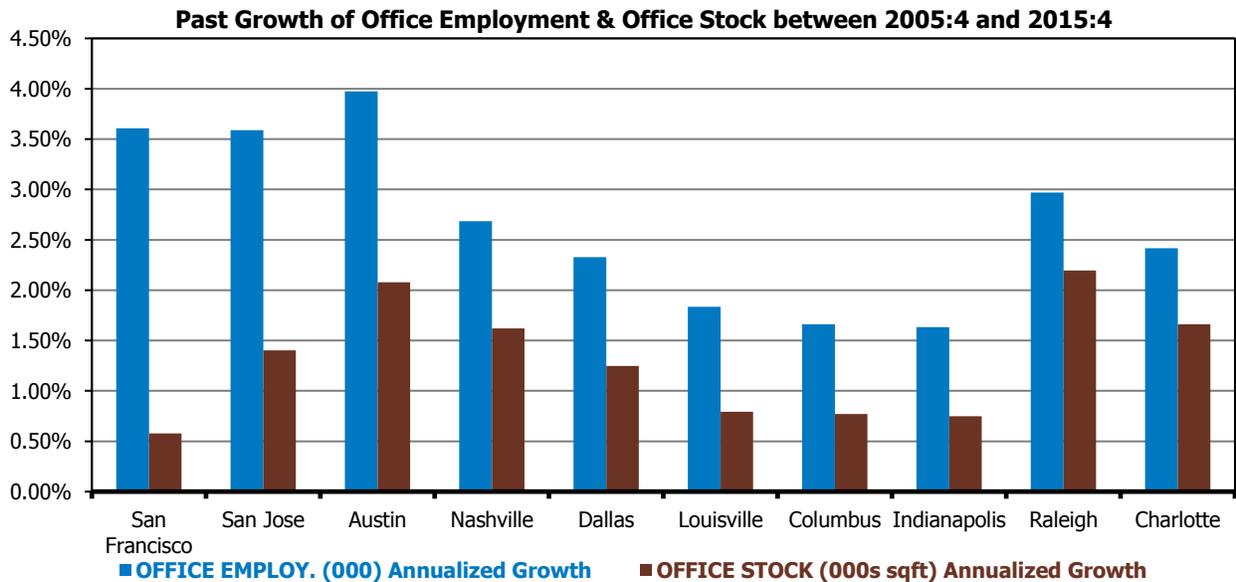
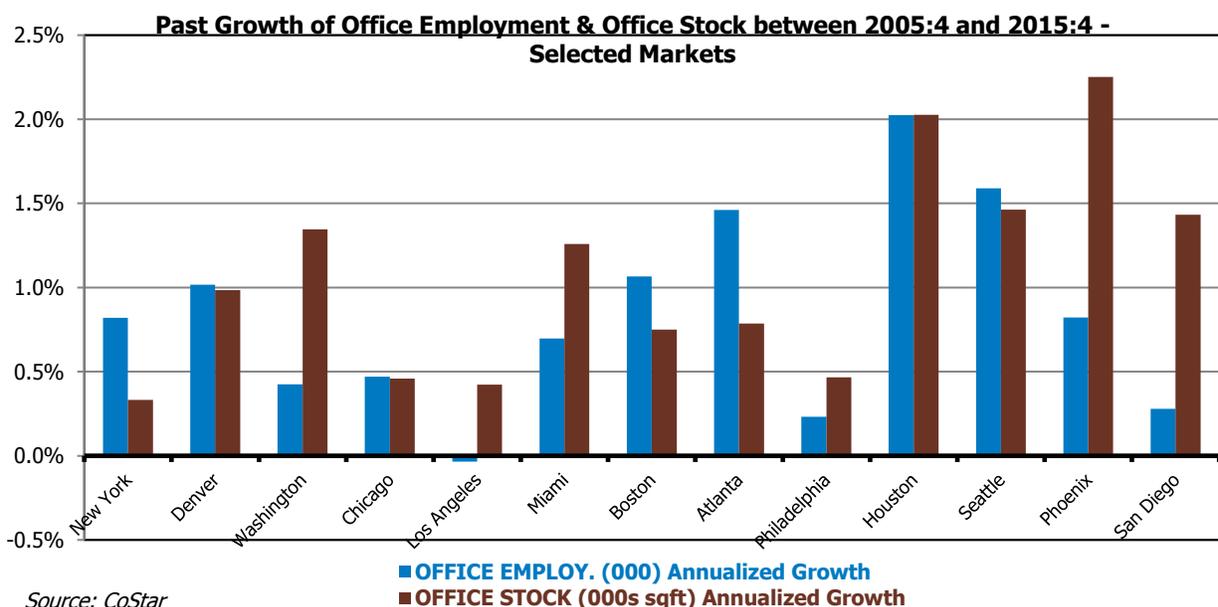


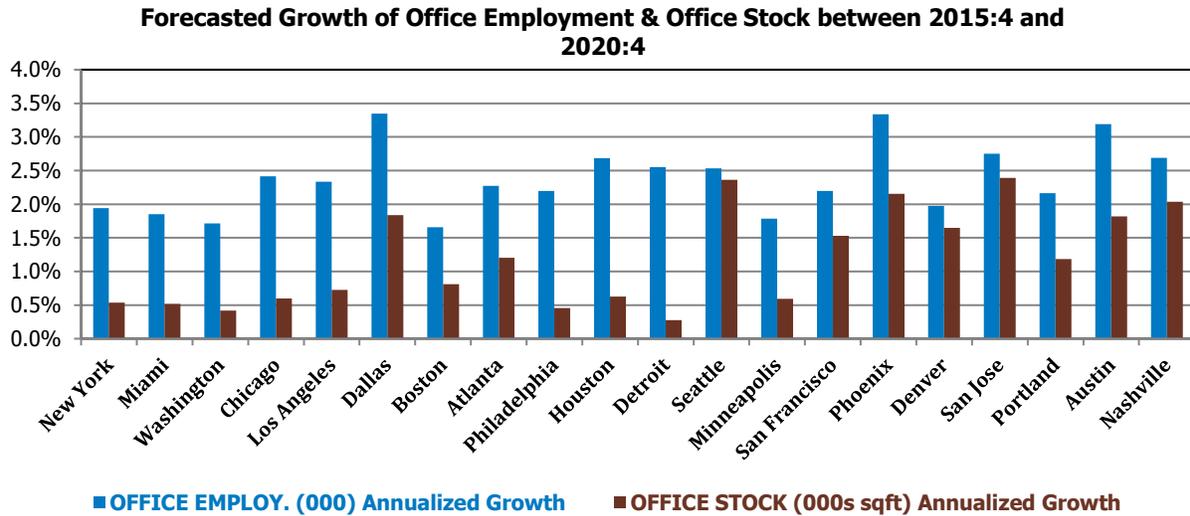
Table 18B details how past office using employment has grown in relation to office inventory growth for selected major markets. Los Angeles and Washington are among the markets in which inventory growth exceeded OUG growth.

Table 18B



All the markets detailed below are forecast by CoStar to have OIJ growth exceed office inventory growth.

Table 19



Source: CoStar

Technology has been a driving force of office space demand. The table below details the metros with the highest location quotients (LQs) for technology related jobs. Metros towards the top of the list are more resistant to office using job losses due to automation and artificial intelligence.

Table 20

Metro	Location Quotient (2015Q1)
San Jose-Sunnyvale-Santa Clara, CA	5.63
San Francisco-Oakland-Fremont, CA	2.26
Boston-Cambridge-Quincy, MA	2.11
Washington-Arlington-Alexandria, DC	1.97
Austin-Round Rock-San Marcos, TX	1.82
San Diego-Carlsbad-San Marcos, CA	1.81
Seattle-Tacoma-Bellevue, WA	1.81
Portland-Vancouver-Hillsboro, OR	1.59
Minneapolis-St. Paul-Bloomington, MN	1.37
Denver-Aurora-Broomfield, CO	1.35
Kansas City, MO	1.33
Baltimore-Towson, MD	1.28
Atlanta-Sandy Springs-Marietta, GA	1.28
Dallas-Fort Worth-Arlington, TX	1.22
Philadelphia-Camden-Wilmington, PA	1.22
Indianapolis-Carmel, IN	1.20
Tampa-St. Petersburg-Clearwater, FL	1.16
New York-Northern New Jersey-Long Island, NY	1.08
Phoenix-Mesa-Glendale, AZ	1.07
Los Angeles-Long Beach-Santa Ana, CA	1.05
United States	1.00

Source: CoStar

The table below details metros with the highest growth in technology jobs. Metros at the top of the list have outperformed.

Table 21

Growth in Tech Jobs Past 10 Years	2005Q1 (000s)	2015Q1 (000s)	Growth
Nashville-Davidson--Murfreesboro--Franklin, TN	20.03	28.98	44.7%
San Francisco-Oakland-Fremont, CA	167.18	237.04	41.8%
Jacksonville, FL	19.45	26.36	35.6%
Seattle-Tacoma-Bellevue, WA	119.86	160.26	33.7%
San Jose-Sunnyvale-Santa Clara, CA	209.99	272.63	29.8%
Charlotte-Gastonia-Rock Hill, NC	27.47	35.34	28.6%
Austin-Round Rock-San Marcos, TX	63.17	79.30	25.5%
Atlanta-Sandy Springs-Marietta, GA	123.05	152.47	23.9%
Baltimore-Towson, MD	67.62	83.21	23.1%
Boston-Cambridge-Quincy, MA	215.28	259.89	20.7%
Las Vegas-Paradise, NV	16.49	19.74	19.8%
San Antonio-New Braunfels, TX	30.64	36.24	18.3%
San Diego-Carlsbad-San Marcos, CA	101.24	117.51	16.1%
Houston-Sugar Land-Baytown, TX	91.17	105.75	16.0%
Memphis, TN	15.28	17.54	14.8%
Indianapolis-Carmel, IN	48.51	55.38	14.2%
Denver-Aurora-Broomfield, CO	76.12	86.67	13.9%
Orlando-Kissimmee-Sanford, FL	40.63	45.92	13.0%
Cincinnati-Middletown, OH	35.06	39.63	13.0%
Portland-Vancouver-Hillsboro, OR	73.06	82.13	12.4%
Columbus, OH	41.14	46.11	12.1%
United States	5990.99	6690.32	11.7%
New York-Northern New Jersey-Long Island, NY	411.98	457.56	11.1%

Source: CoStar

Projected growth over the next ten years involves a mixture of markets. Please note that some of those markets are starting from a very low base.

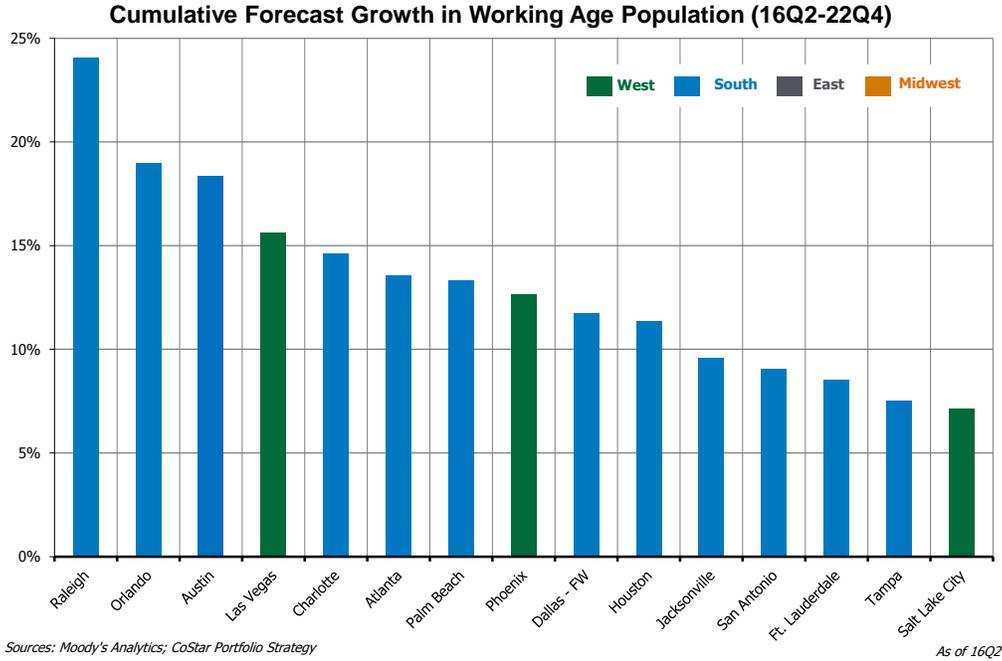
Table 22

Growth in Tech Jobs Projected 10 Years	2015Q1 (000s)	2025Q1 (000s)	Growth
Birmingham-Hoover, AL	16.45	20.95	27.4%
Atlanta-Sandy Springs-Marietta, GA	152.47	190.66	25.1%
Cincinnati-Middletown, OH	39.63	49.17	24.1%
Las Vegas-Paradise, NV	19.74	24.28	23.0%
Nashville-Davidson--Murfreesboro--Franklin, TN	28.98	35.08	21.1%
Charlotte-Gastonia-Rock Hill, NC	35.34	42.56	20.4%
Seattle-Tacoma-Bellevue, WA	160.26	192.47	20.1%
Houston-Sugar Land-Baytown, TX	105.75	126.66	19.8%
Miami-Fort Lauderdale-Pompano Beach, FL	84.14	99.74	18.5%
San Antonio-New Braunfels, TX	36.24	42.72	17.9%
Dallas-Fort Worth-Arlington, TX	189.62	222.91	17.6%
New York-Northern New Jersey-Long Island, NY	457.56	531.25	16.1%
Jacksonville, FL	26.36	30.57	16.0%
Denver-Aurora-Broomfield, CO	86.67	99.79	15.1%
Phoenix-Mesa-Glendale, AZ	96.66	111.27	15.1%
Detroit-Warren-Livonia, MI	88.53	101.62	14.8%
St. Louis, MO	57.63	66.12	14.7%
United States	6690.32	7656.38	14.4%
Austin-Round Rock-San Marcos, TX	79.30	90.61	14.3%
San Jose-Sunnyvale-Santa Clara, CA	272.63	309.78	13.6%
Chicago-Joliet-Naperville, IL	214.39	243.24	13.5%
Columbus, OH	46.11	51.99	12.8%
Portland-Vancouver-Hillsboro, OR	82.13	92.37	12.5%

Source: CoStar

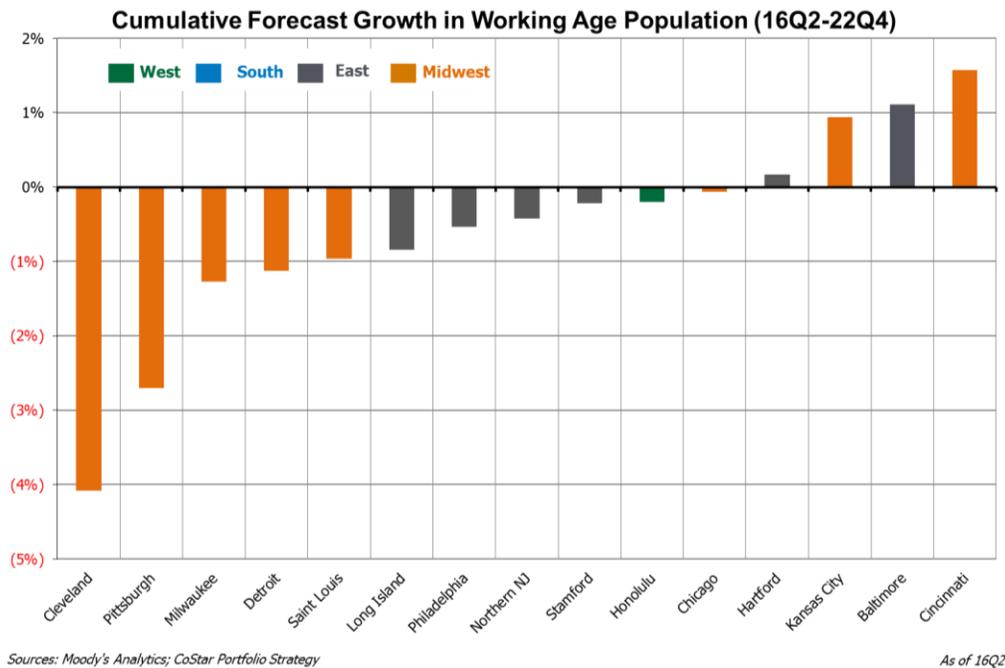
A growing working age population is vital to a healthy functioning office market. The charts below detail the metros with the fastest forecast growing working age populations and the metros with declining working age populations. Medium sized cities of Raleigh, Orlando, Austin, Las Vegas, Charlotte are forecast for the greatest growth.

Table 23A



Midwestern metros have stagnant to declining working age populations including Chicago, Cleveland, Detroit, and Pittsburgh.

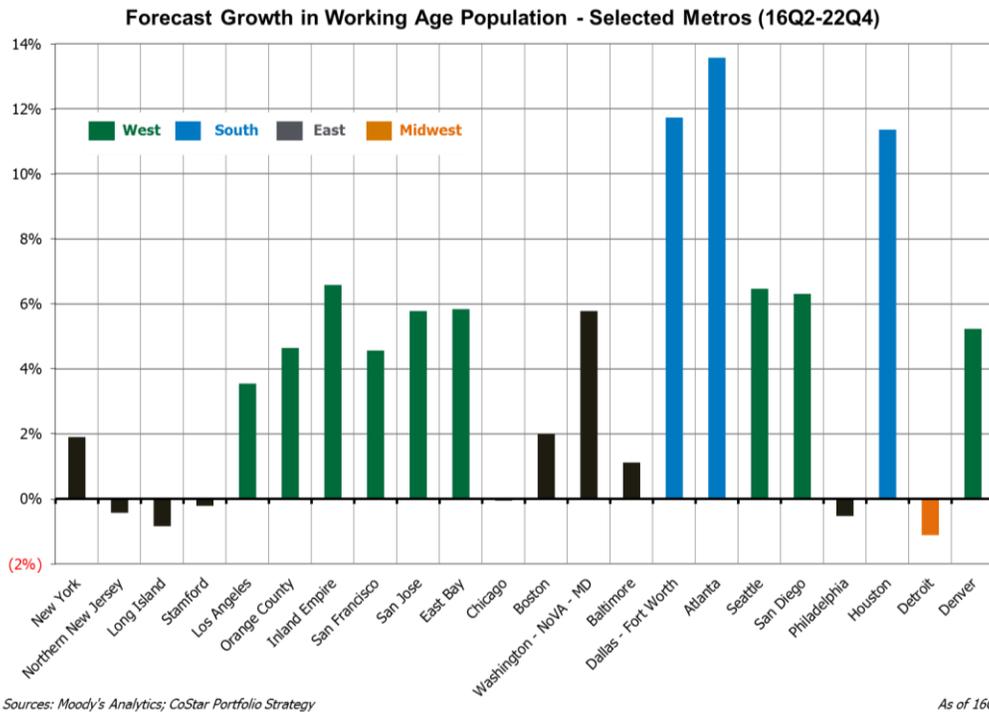
Table 23B



DIFFERENCES BETWEEN CITY AND SUBURBS IN SELECTED METRO AREAS

The table below highlights the aging New York City suburbs. Elevated residential real estate prices and some of the highest real estate taxes in the United States are driving away younger people. The result is a declining working age population. This does not bode well for suburban New York City office space. In contrast Los Angeles and San Francisco and their suburbs are forecast for working age population growth. In contrast, large Sunbelt metros such as Atlanta, Dallas, and Houston are forecast for significant growth.

Table 24



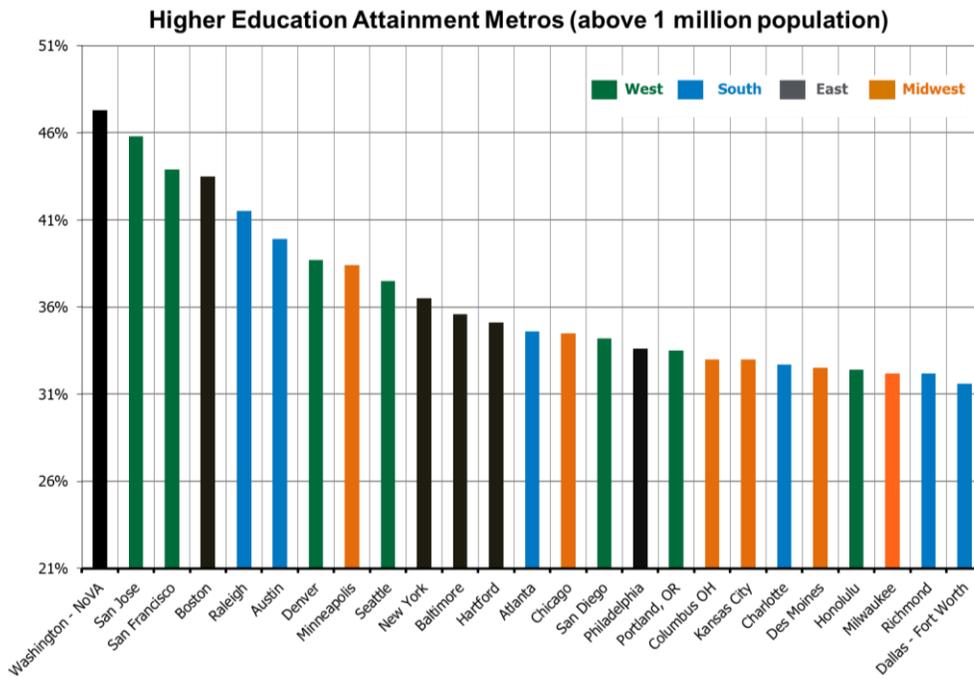
EDUCATION ATTAINMENT RATES

As of 2012, the Educational Attainment Rate (EAR)²³ for the top 100 metros in the US was 31.5% for those 25 years of age or older.

In the chart below 25 higher EAR markets are presented. Top tier markets such as San Francisco, San Jose, New York, and Boston are ranked high in terms of EAR as are ascendant cities like Raleigh, Austin and Denver.

²³ defined as having obtained a four-year degree

Table 25

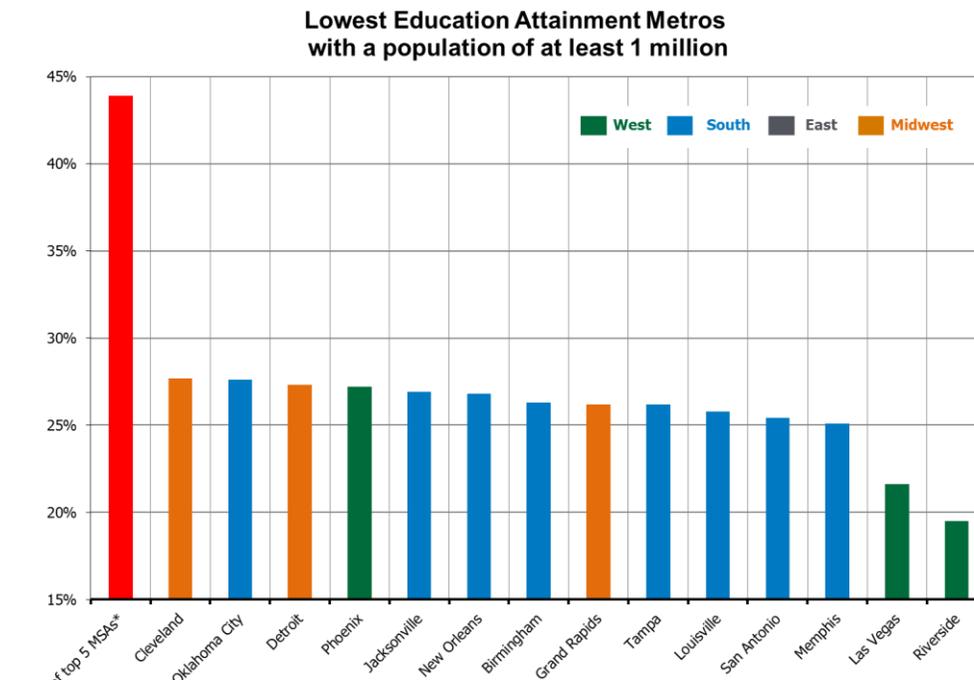


Sources: US Census

As of 2012

In the chart below 15 lower Education Attainment Rate metros are presented and compared to the average of the top 10.

Table 26



Sources: US Census

*Top 5 MSAs include Washington, San Jose, San Francisco, Boston, and Raleigh

As of 2012

TRANSCENDENT MARKETS

Markets that should outperform their peers and prove more resistant to the headwinds detailed earlier in this report include certain top tier markets, ascendant lower cost markets, and technology focused markets. Other less educated low cost markets should continue to exhibit strength but may ultimately be challenged by machinery risk.

TOP TIER METROS

Top tier markets continue to do well including San Francisco/San Jose, Boston, New York, Washington, and Seattle. These world-class metros have high technology location quotients, and are professional, business and/or financial service jobs powerhouses. These are global international cities with a significant corporate headquarters presence and they should continue to transcend headwinds.

Although Los Angeles exhibits weaker education attainment rates and office using jobs it continues to be a center of the entertainment industry, financial services, and a growing technology sector. Interestingly, Los Angeles is considered a low cost alternative to the San Francisco Bay area for technology companies. Its Orange County suburbs are projected to experience above average growth in OJ. Chicago has traditionally been the mid-America center of commerce and a financial services hub. It now faces competition on both these fronts from Dallas-Ft. Worth, but is still the undisputed regional capital of the Midwest. San Diego has one of the top technology job LQs at 1.81 and together with its relatively high EAR should continue to be an important office market.

Growing Second and Third Tier Low Cost Markets

OJ migration patterns have traced a route to metros concentrated in but not limited to the south and the intermountain west. These markets are categorized by a growing working age population and lower costs associated with commercial and residential real estate, labor and taxes. They are generally situated in states with less regulation. These expanding markets are experiencing self-perpetuating growth as population increases spawn demand for business and professional services, financial services, government etc. that in turn attract more migration to fill the additional jobs that are created. Part of the migration trend is explained by the overall US population shift to the South. Many are in states with no income tax such as Texas, Florida, and Tennessee. In addition, companies have relocated jobs from established high cost metros such as New York, Chicago and Los Angeles. These areas are also more attractive to employees because of lower cost housing and taxes. For example, a middle manager may earn less in Dallas than in Los Angeles and nevertheless have more spending power and a more comfortable lifestyle.

In tandem with other office using jobs, financial activities jobs are migrating toward ascendant and lower cost cities. The top five growing markets for financial activities jobs since 2010 are: Nashville up 24.5%, Dallas 23.2%, Salt Lake City 19.9%, Phoenix 19.7%, and Charlotte 14.2%. The top five growing markets for professional and business services employment since 2010 are: Nashville up 47.2%, San Francisco 45.7%, Austin 42.3%, San Jose 36.4%, and Dallas 28.9%²⁴.

Not all lower cost markets are equally strong for the long term. Metros with high and/or growing education attainment rates and a technology focus may prove more resilient. This includes markets that have high or growing technology job location quotients and host the types of jobs that are more resistant to the threat of artificial intelligence and automation. In addition, regional economic capitals and state capitals, especially those that domicile a strong university, are less susceptible to machinery risk. These areas have attracted relatively high paying professional and business and services jobs. This category includes Dallas-Ft. Worth, Atlanta, Denver, Nashville, Austin, Raleigh, Columbus, Salt Lake City/Provo/Ogden, Charlotte, Minneapolis, and Portland.

²⁴ The data in this paragraph is from NewGeography.com a joint venture of Joel Kotkin and Praxis Strategy Group

Other small sized low cost markets generally have lower education rates but are nevertheless growing and attracting office using jobs. These metros include Phoenix, Louisville, San Antonio, Orlando, Tampa, and Jacksonville²⁵. These metros are experiencing accelerated working age population growth and are expected to continue to do so over the next decade. Featuring low cost commercial and residential real estate, they also benefit from lower taxes and less regulation compared to metros in other regions. However, these cities are particularly vulnerable to the challenges of artificial intelligence, the second machine age and automation. Many of the back office jobs in these locations are exposed to offshoring as well. These are low cost places – but locations in India and Philippines are even more low cost.

CONCLUSION

The office sector is facing headwinds in the form of densification, teleworking, technological advances, globalization, and a very slow growing working age population. Top tier metros should continue to thrive despite their high costs. Ascendant metros that are technology focused, lower cost, with a growing educated working age population are outperforming despite the aforementioned national trends. Smaller lower cost markets with below average education attainment rates and growing working age populations are attracting office using jobs but are particularly exposed to machinery risk.

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²⁵ Other small sized low cost markets that have experienced a significant increase in office using jobs, but have less positive demographics include Kansas City, Indianapolis, and Pittsburgh.