THE FUTURE OF COMMERCIAL REAL ESTATE

Transformation in a Post-Covid World
Cycles of Suburban/Urban Shift

Focus on Office Buildings: The Workplace of the Future

SPECIAL REPORT | MAY 2023

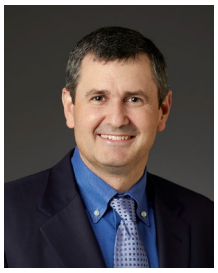
MORRISON STREET RESEARCH

4949 Meadows Road, Suite 490 | Lake Oswego, OR 97035 | 503-952-0700 | www.morrisonstreetresearch.com | @mstreetresearch

A DIVISION OF NORRIS, BEGGS & SIMPSON COMPANIES, LLC

SOURCES:
Morrison Street Research
American Economic Review
Bloomberg
Brookings Institution
CBRE
CoStar
Federal Reserve Bank of Dallas
Harris/Bloomberg
JLL
NAREIT
NCREIF
National Bureau of Economic Research
U.S. Bureau of Labor Statistics
U.S. Census Bureau
Wall Street Journal
WFH Research

Letter from the Editor

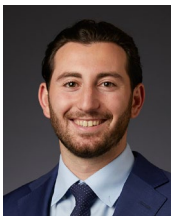


RANCE GREGORY
CEO

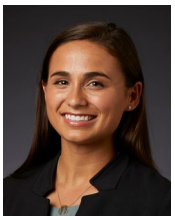
This Special Report examines some of the key questions impacting commercial real estate in the post-Covid economy, with a particular focus on office buildings. We review a broad history cities and domestic migratory trends, particularly cyclical shifts between core downtown locations and less dense suburban markets. We also conduct a bottom-up analysis of current projected office building demand, beginning granularly with a modern space plan allocating space among in-person, hybrid and remote employees and working our way up to total office occupancy.

Contributors:

KIM KAMERER



PETER SHERMAN



MARY GRACE MARKGRAFF

ABOUT US: Morrison Street Research ("MSR") is a division of Norris, Beggs & Simpson Companies, LLC, a 91-year-old commercial real estate firm based in Portland, OR. MSR publishes newsletters, special reports and white papers to serve clients of its affiliated companies, Morrison Street Capital and NBS Real Estate Consulting.

Overview

Too much ink has been spilled by the popular press on the trends in working from home without attempting to do the difficult but necessary math to evaluate the post-Covid supply and demand for commercial real estate generally and for office space specifically. In this paper we intend to evaluate two important areas affecting commercial real estate ("CRE") in a post-pandemic environment:

1. The intersection of the pandemic, new technologies, and demographic trends combining to reverse the pendulum swing from a 2000's cycle shift toward urban living, back to a renewed cycle of relatively more suburban live/work/play.

2. A detailed evaluation of the pre- and post-pandemic status of office properties with a focus on forecasting the downsizing of occupancies.[1]

To assemble our data and arrive at appropriate conclusions we tied together three important channels of information: i) published academic research on work-from-home trends; ii) government data; iii) market research provided by commercial real estate brokerage shops and research firms.

The migration trends pointing away from northern locations and toward the southeast and away from center cities and back to the suburbs that began as far back as 2016 were accelerated by Covid-19 and sustained through 2022. These sorts of migratory shifts tend to occur over longer periods based on job growth/losses, cost of living, demographics, traffic, crime, taxes, weather, and other quality of life factors. For now, other than some cost of living and recent job losses in previously high-growth markets, the momentum out of larger cities and toward surrounding suburbs and smaller cities (particularly those south of the 40th parallel) remains in motion.

We also note that while the valuation of office properties should take a significant hit and this will in turn negatively impact banks and other CRE investors, the supply/demand information broadly circulating in the popular press may be overstating the extent of the problem. Finally, we conclude that many of the wrong questions are being asked. It's not particularly helpful to ask whether broadly a given property type is viable or poised for growth, since all property types remain necessary. Commercial real estate has existed since the origins of towns and commerce and has continuously evolved for centuries. The better questions about the future of commercial real estate get to the heart of ***where, when, why, how much and in what form?***

1 This paper will focus less on office building valuations and more on supply/demand fundamentals. Valuation methodologies will be discussed in a separate and subsequent piece.

A Brief History of American Cities

The late 19th and early 20th centuries marked a zenith in the urbanization of American cities. Populations clustered around central business district office building jobs, surrounded by a layer of industrial warehouse, factories and other logistics or manufacturing/assembly properties. Suburbs were found outward beyond the office core and industrial outer layer, largely following outward rail and streetcar lines that were the primary modes of transportation.

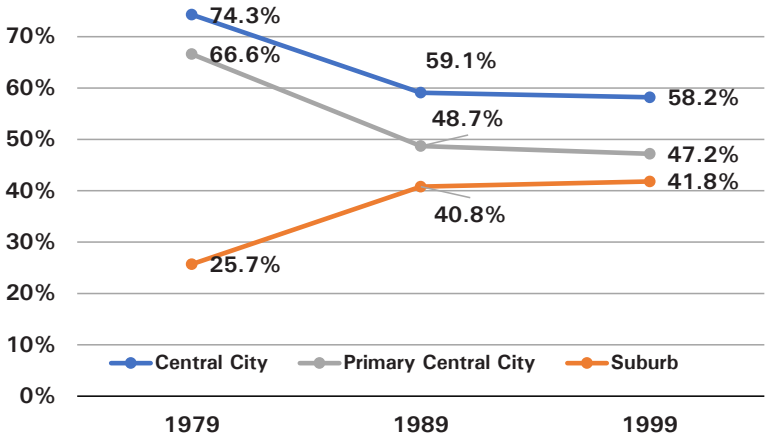
The first step in growth beyond cities was the mass production of automobiles, notably including Ford's Model T. The adoption of the automobile led to the passage of the Federal Aid Road Act of 1916 and the Federal Aid Highway Act of 1921 (Phipps Act), which put the Federal government in the business of guiding and subsidizing the development of a national roadway system.

The outward expansion and highway construction facilitated the hub-and-spoke design of modern cities, connecting new regions of outlying growth that were untethered from rail lines, and launching the very early days of suburbanization.

Soon advancements in technology allowed for the expansion of the trucking industry, which made possible the dispersion of manufacturing and warehousing locations out of the core and further along the new highway systems. These trends were amplified by the passage of the Federal Housing Act in 1934 which vastly increased homebuilding and access to mortgage financing. Then in 1944 suburban growth was advanced by returning soldiers benefiting from the financial benefits of the GI Bill, and the concept of American sprawl kicked into high gear. The Federal Aid Highway Act of 1956 originally authorized the construction of 41,000 miles of highways and created new growth patterns by connecting new locations all over the country. Throughout the period from 1920 to 1960, telephones were an essential technological innovation in providing the ability to live and work in a non-agricultural capacity outside the urban core.

To illustrate how much of a swing can occur in working and living patterns over the decades, consider this: in 1979, a Brooking Institution study of 13 major metropolitan markets found that the core downtown areas of major cities housed a 74% share of total office inventory and only 26% was found in the suburbs. By

Share of Metropolitan Office Space (1979-1999)



Source: Brookings Institution, October 2000, Center on Urban & Metropolitan Policy, Office Sprawl, the Evolving Geography of Business.

1999, central cores held only 58% of total inventory with 42% in the surrounding suburbs.[2]

The following table, also excerpted from the Brookings study, shows the magnitude in the percentage growth differentials during that two-decade period, which saw a push to expand outward with the addition of suburban office space, retail amenities and increased transportation options.[3]

Growth in Metropolitan Office Space (1979-1999)*

	Total SF Pre-1979	Total SF 1989	% Growth Total SF 1980-1989	Total SF 1999	% Growth Total SF 1990-1999	% Growth Total SF 1979-1999
Central City	**676,371,828**	**1,285,879,942**	**90%**	**1,565,718,590**	**22%**	**112%**
Primary Central Cities	606,822,137	1,047,224,173	73%	1,268,172,093	21%	94%
Other Central Cities	69,549,691	238,655,769	243%	297,546,497	25%	268%
Suburbs	**234,564,508**	**888,813,494**	**279%**	**1,123,766,268**	**26%**	**305%**
TOTAL	**910,936,336**	**2,174,693,436**	**139%**	**2,689,484,858**	**24%**	**163%**

**The 13 metropolitan offices markets are: Atlanta, Boston, Chicago, Dallas, Denver, Detroit, Houston, Los Angeles, Miami, New York, Philadelphia, San Francisco, Washington DC. Source: Brookings Institution, October 2000, Center on Urban & Metropolitan Policy, Office Sprawl, the Evolving Geography of Business.*

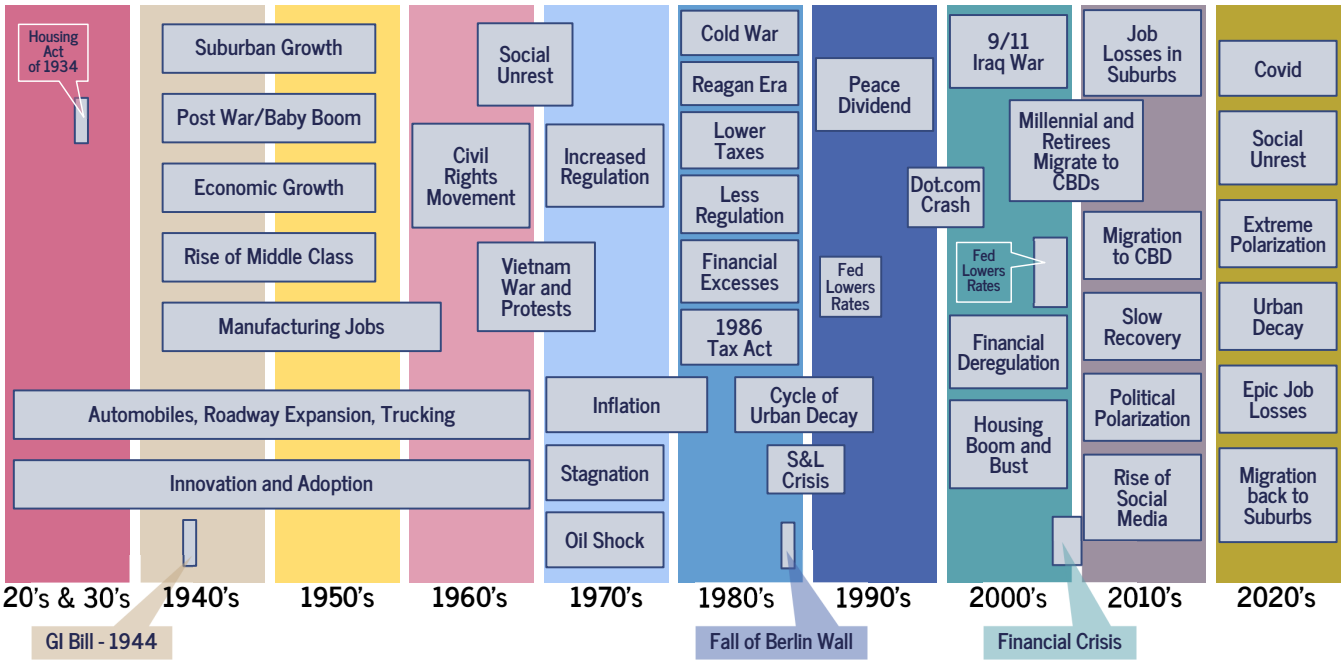
The fundamental arc from urban to suburban locations for work, live and play materially shifted again in the early 2000's, when Millennials and Baby Boomers began to yearn for hip urban lifestyles and CBDs were redeveloped into modern office, residential and retail uses. Old office buildings were converted to cool loft apartments, old loft apartments and multistory warehouses were converted to cool office spaces with exposed ceilings. Public transportation experienced a renaissance including light rail and streetcars. Street level retail was expanded including a significant increase in the number of urban movie theaters, common gathering spaces, concert venues and restaurants.

As we all witnessed, the onset of the pandemic and increases in urban crime noticeably altered the urban/suburban dynamic in many large metro areas. What is less commonly known is that the shift in relative employment and population growth back to the suburbs was already underway since those same Millennials began to enter parenthood and seek space in the form of larger homes, yards, and access to better schools. The Baby Boomers who were enjoying their urban lifestyles also began to get older and start to think about moving closer to their kids and/or elder care facilities that tend to cluster in the outer rings. Covid clearly accelerated those decisions for many people. When politcal leaders shut down cities, they also took away many of the vices and virtues that make urban areas dynamic. The increases in crime didn't help. Only a few years prior, companies were increasing exploration of video conferencing technologies. The second Covid hit, Zoom and Teams took off. And here we are, 100 years after the first instance of technology drawing people out of cities, witnessing a catalytic convergence of technology and demographic cycles producing a shift of population and jobs back out of the core. The following simple chart illustrates some of the notable events that shaped relative locational appeal and prompted similar swings back and forth from urban and suburban areas throughout the past century.

2 Brookings Institution, Center on Urban and Metropolitan Policy, *Office Sprawl, the Evolving Geography of Business*, October 2000. Author Robert E. Lang, Fannie Mae Foundation.

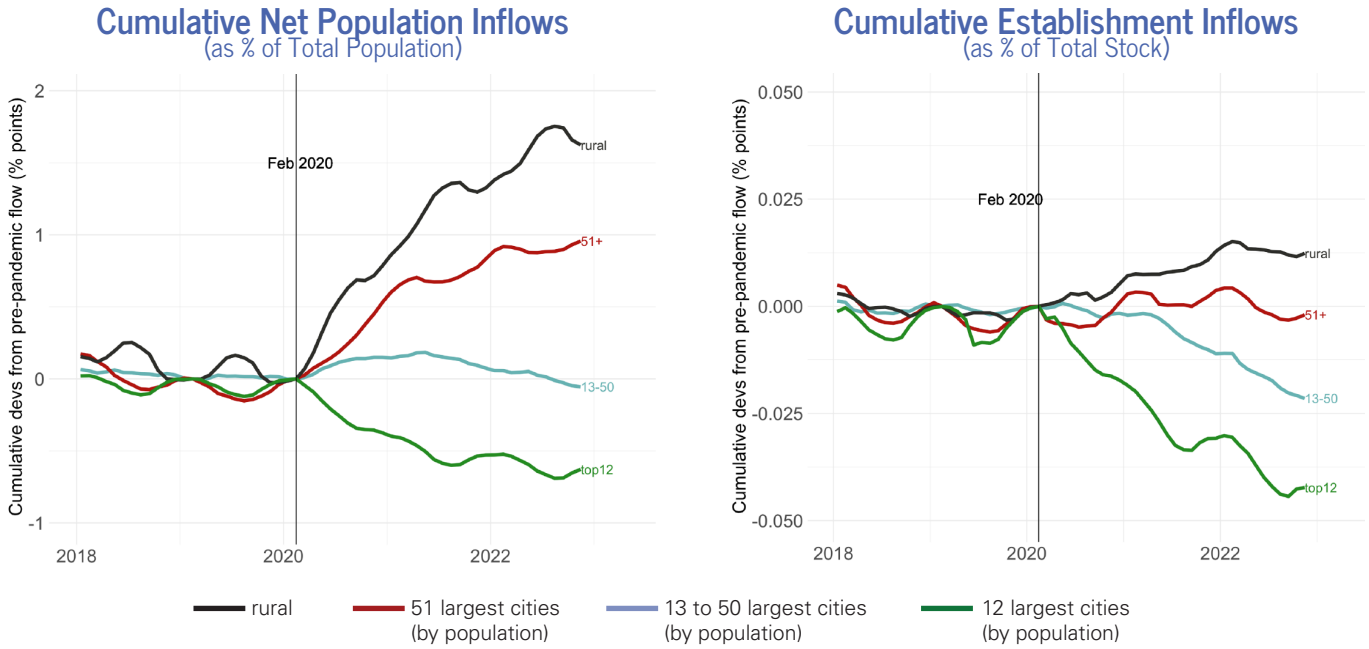
3 Varying descriptions of coalescing suburban clusters of residences and jobs have existed over the years to identify areas that begin to gain significance as secondary cities to primary CBD locations. Satellite Cities and Edge Cities are examples of descriptions that attempt to get at denser outlying locations. In concept, a Satellite City would be one that exists on its own with an independent municipal government and an employment base that supports its population. Whereas an Edge City is more indicative of an area that even if it has its own government and sufficient base of employment, it exists because of the sprawl of its larger urban parent. Joel Garreau characterized three types of Edge Cities in the early 1990's, including Boomers, Greenfields and Uptowns. Boomers indicated expanded areas that pop up around airports, significant retail clusters or freeway interchanges. Greenfields were meant to describe large new master-planned communities. Uptowns were older areas that found themselves surrounded by a concentration of urban growth. These concepts were also modified into what Robert E. Lang referred to as Boomburbs in the early 2000's. Some fast-growth small urban or exurban areas were more recently known as Zoomtowns. Most of these labels describe areas that benefit during periods of excess population and job growth relative to the proximate larger metro area.

Political/Social Economic Cycles

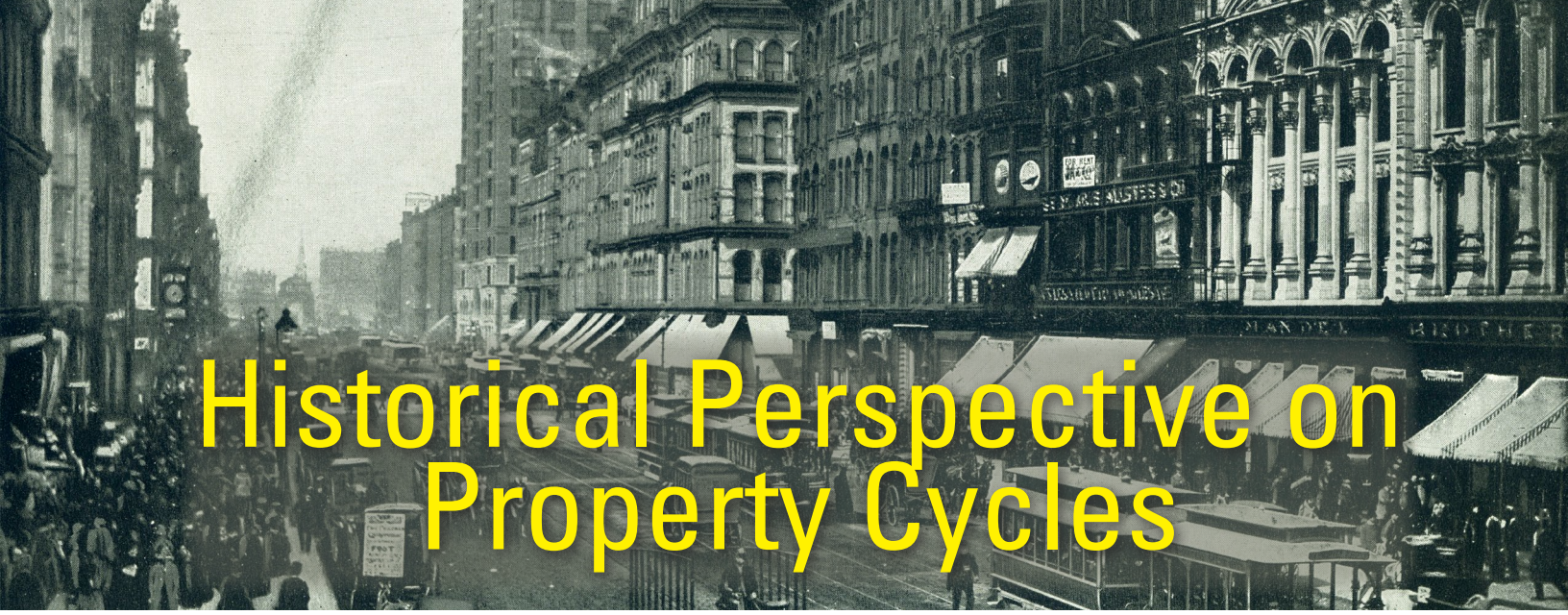


Nick Bloom and his colleagues at WFH Research have done much to advance research into work-from-home in pre- and post-Covid eras. Using Postal Service change of address data, Bloom et. al. produced the following graphs that highlight the 2020 to 2022 period of excess growth (both population and businesses) in smaller cities and less dense areas compared to relatively lower rates of growth in the larger metro areas.

Shift from Larger Center Cities to Suburbs and Smaller Cities



Source: WFH Research, The Donut Effect of Covid-19 on Cities by Arjun Ramani and Nicholas Bloom, December 2022



Historical Perspective on Property Cycles

Enough time spent in commercial real estate teaches you about the inevitability of supply/demand cycles. Every ten years or so we see a rotation in markets or product types that move peak-to-trough (or vice versa) after becoming over- or under-supplied relative to demand. The relationship between supply of a product and demand for it determines occupancy, rental rates, and property revenues. Inflationary and deflationary cost inputs influence property operating expenses. With revenue minus expense, we arrive at property net operating income. These items together form the basics of commercial real estate fundamentals. On top of these fundamentals are layered capital market factors including expectations for economic growth or contraction, the volume of property sales transactions and the supply and cost of equity and debt capital.

Commercial real estate experienced a boom phase during the early 1980's benefiting from favorable tax treatment and abundant debt and equity capital. The Economic Recovery Tax Act of 1981 had the effect of lowering the cost of capital for real estate through accelerated depreciation and sheltering of passive income. This motivated a cycle of acquisition syndications and new development, often financed by banks and savings and loan institutions. These conditions unraveled following the passage of The Tax Reform Act of 1986 (which slowed depreciation, reduced deductions, and effectively raised the cost of capital) and the subsequent failures of over 1,000 Savings and Loan institutions (nearly 1/3 of all S&L's) occurring between 1986 and 1995.

Real estate investors large and small were burned during this period, many swearing off multi-family housing (and office investments) that suffered from overbuilding in many markets during the Savings & Loan Crisis. It seems hard to believe now, but many mid-career institutional managers in the mid-1990's wouldn't touch apartment investments, believing them to be too easily oversupplied and volatile. Given the concerns surrounding oversupplied office and multifamily markets, capital moved in force to supply the resilient American consumer with a smorgasbord of shopping options as the U.S. continued to expand its lead in retail square feet per person. This cycle of excess supply lasted from the early 1990's all the way until the 2009 Global Financial Crisis. Along the way came the rise in internet retail sales. For much of the past decade, investors have been cautious and skeptical of retail investments but bullish on apartments and office. When Covid hit in 2020, all sectors took a pause. Leisure and hospitality obviously felt the full force of the economic shutdown and lack of human mobility. Brick and mortar retail struggled as well, but somehow came back out of the pandemic in reasonable shape (with the exception of aging enclosed malls) despite the success of pandemic online sales. As an example of how headlines can get disconnected from reality, in the case of retail's recovery from the pandemic, CBRE reported that overall availability had reached a 10-year low of 5.1% by Q2 2022. At that point, even mall vacancies were only 6.0%; meanwhile, new completions were down 56% year-over-year from mid-2021 to mid-2022. Industrial took off in rental rates and new construction to meet the warehousing and

logistics demands of growing online and multi-channel sales. Hotels bounced back. It was the behavior of office workers that had most fundamentally changed, and attention has now turned to office as the problem child.

The office sector is certainly in for a rough few years before achieving a new normal. One of the things that eventually brings a cycle back around is that when a product type becomes the focal point of concern, debt and equity financing for it diminishes and new construction declines. For example, multifamily housing development in recent years was catching up for decades of underinvestment caused by the S&L crisis and then, paradoxically, the single-family housing boom of the 2002 to 2006 timeframe. With so much perceived money to be made in for-sale housing, not only was multifamily development deprioritized, but some markets saw meaningful amounts of product converted—apartment properties purchased and mapped and sold as condos—thus reducing apartment supply. There is now similar talk of converting office buildings to apartments, although this is a much bigger challenge. Only a small minority of office buildings would be suitably cost-effective for conversion into multifamily housing.

The point is that real estate forever runs through product and market cycles. When and how they will occur is the subject of much conjecture, but the fact that they will occur is immutable. When viewing office assets today, some perspective is in order. What will happen is that the new supply pipeline will be largely cut off while other more favored asset classes become oversupplied. Then when demographic, technological or other externalities catalyze a change, the switch will flip, and the remaining competitive office properties will reabsorb back to stabilization. We do expect this cycle to require some time, but let's do the math to create an educated guess in lieu of some of the wild guesses we see floating around in the popular press.

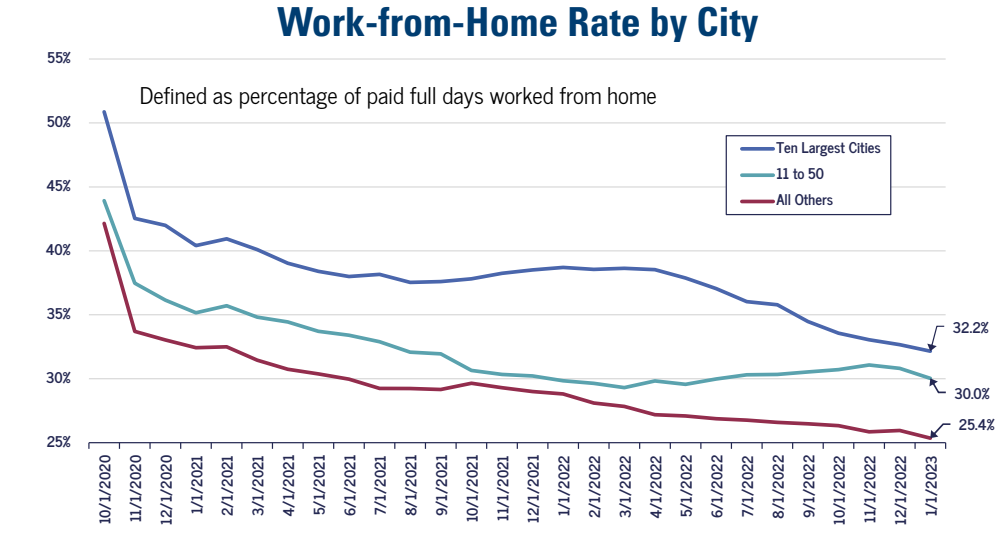
The Future of Commercial Real Estate:

Where, When, Why, How, and in What Form?

Given the massive shifts underway post-pandemic in migration patterns and working habits, changes will undoubtedly occur for all categories of commercial and residential real estate. The first step was a trend toward larger homes farther out to accommodate home offices. Industrial warehousing and logistics facilities locate and relocate as needed to serve retail and residential nodes. Modern office buildings need to exist closer to where hybrid employees want to live. The office property component is experiencing changes in so many factors including the percentage of employees in the office each day, amount of space per employee, redesigned common areas and collaboration spaces, increased amenities, and implementation of new onsite technologies. Employers need to be clear about what things are better accomplished in the office and require the relevant level of attendance. Reservations for desk space, as well as use of key fob and computer monitoring of employee work time will increase.

Suburban and smaller city work locations allow parents more flexibility to work, pick up children from school, and shuttle them to practices. Shorter commutes have become a fixture of demand, which will undoubtedly influence the ***where*** portion of our CRE demand formulation. Again, it's not a question

of whether office buildings are needed. But it does mean fewer may be needed in downtown areas and more in certain suburban locations. It may also mean relatively more new office space is needed in smaller cities compared to larger, previously oversupplied areas. Our job as commercial real estate investors is to catch demand in the form of population and job growth. Interestingly, workers in smaller cities generally exhibit less of a propensity to work-from-home.



Source: WFH Research, Morrison Street Research

In forecasting submarkets suitable for office investment, researchers should target areas with favorable transportation access and housing occupied by high percentages of potential office-using employees, and compare the potential demand to existing stock of nearby office product. If a significant number of companies and office workers have moved to that area during the past 1-2 years, that spot might be conducive to repositioning an older office building and capturing leasing demand.

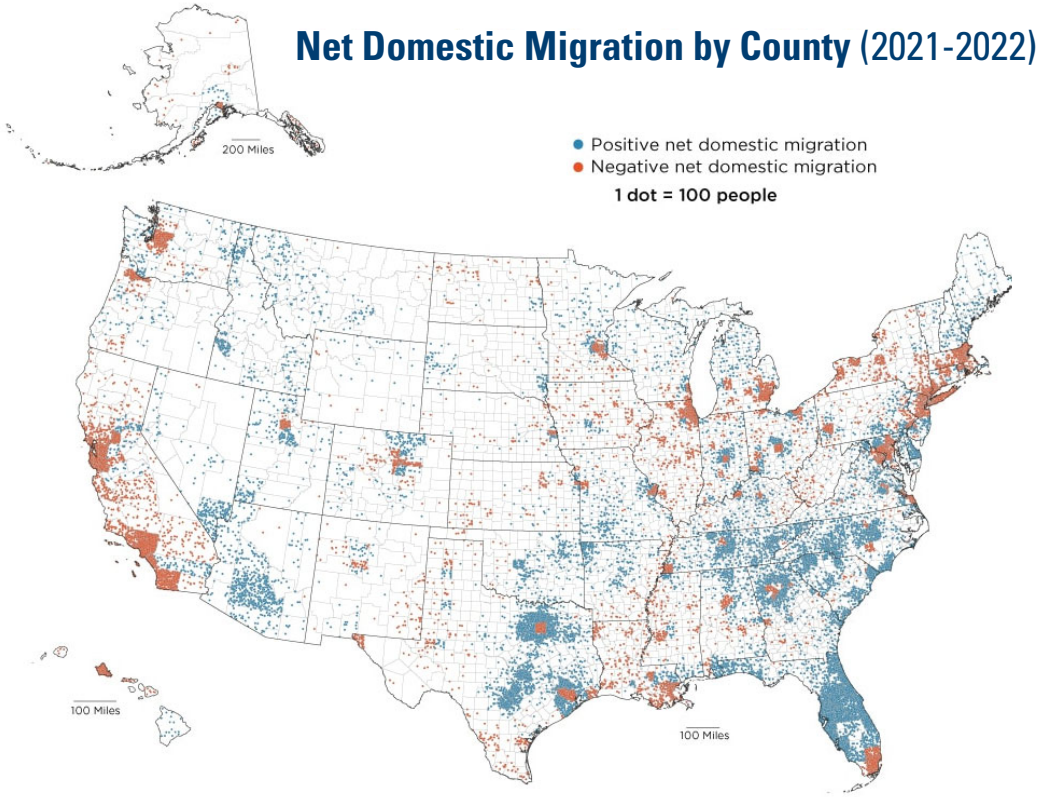
The pandemic lasted long enough to alter human behavior, which informs the ***why*** portion of the analysis. In other words, ***why*** do people want to have a shorter commute and/or work-from-home? Is this recent lifestyle change permanent? Will the "why" change when a recession eventually hits and employers call employees back to the office? The answer may depend on the length and severity of a recession—will it be enough time to once again alter human habits back into a daily office routine? Alternatively, will the countless negative externalities[4] of work-from-home trends cause enough of a backlash to return to prior levels of office utilization?

The ***when*** component is somewhat immediate. People moved outward from city centers during the pandemic, a phenomenon well-described as the "Donut Effect" by Nick Bloom and WFH Research. The demographic influences on this factor were already underway. Millennials were seeking out larger homes and better school districts, and the need for home offices and the lack of need to be in the office pushed them further out than would have perhaps been the case pre-pandemic. Meanwhile, older Baby Boomers were leaving their downtown condos and beginning to occupy age-related facilities nearer to their Gen X children in the suburbs.

Unsurprisingly, the latest population migration data from the Census Bureau seems to show absolute out-migration from many western and northern cities (the orange areas in the chart following). Surprising is that the following image seems to show the donut effect as the most pronounced in some of the high

4 In addition to the obvious aspects of social isolation and reduced in-person collaboration, remote work trends may have a devastating impact on the public and private revenue of central cities.

growth southern cities. In those areas absolute population and job growth have been strong; but even there, residents seem to have left the core of some cities (the negative growth orange clusters) for the surrounding areas (the growing blue rings).



Source: U.S. Census Bureau, Vintage 2022 Population Estimates

The ***how much*** answer certainly depends heavily on the particular supply/demand fundamentals of each market. In the 2000 to 2020 timeframe, much of the new office supply was concentrated in CBD locations. As residents moved into downtown locations, retail and restaurants were built to accommodate increased demand for urban lifestyles. Now that a flow of residents and jobs are decamping center cities, high-demand inner suburbs and certain smaller cities will need new supply to keep up with demand.

For those wanting more quantitative and analytical details, the enclosed supplement, *Focus on Office Buildings*, dives deep into the impacts of Covid changes to lifestyle, human behavior and office occupancies. For now, to wrap up this overview, some generalizations can be made. In the near-term, do dense urban markets need lots of new commercial real estate supply? Generally speaking, no. For office buildings, definitively, NO. Will many growing live/work/play suburbs need additional supply of commercial real estate (including office) to accommodate the cohort of downtown population and jobs relocating to the suburbs? Yes. So what about the answer to ***in what form***? Will suburban areas and smaller cities need a renovated or refreshed supply of flexible, sustainable, modern office buildings to replace 1970's to 1990's vintage properties? Yes. Will these same growing areas need affordable housing to accommodate workers wanting to live closer to their jobs, which may now be found near the expensive housing areas of their company's decision-makers? Undoubtedly, yes.

Asking and answering the above questions and backing them up with data specific to each submarket and each potential transaction are the keys to investment success in this highly disrupted post-Covid market environment. We recommend investors avoid painting any product type or geographic area with too broad of a brush, and work instead to uncover facts and circumstances indicating emerging pockets of job and population growth supportive of future investment performance.

Focus on Office Buildings:
The Workplace of the Future

"Commuting to office work is obsolete. It is now infinitely easier, cheaper, and faster to do what the nineteenth century could not do: move information, and with it, office work, to where the people are. The tools to do so are already here: the telephone, two-way video, electronic mail, the fax machine, the personal computer, and so on." Peter Drucker, 1989.

A concept called telecommuting has been around for decades. By dramatically accelerating the adoption of remote technologies and increasing the percentage of people working some or all days from a location other than the office, the entire telecommuting concept seems to have been rebranded as "work-from-home", which includes both hybrid and remote work. A perhaps forgotten episode of telecommuting was the period when IBM had up to 40% of its 380,000 employee workforce acting in some form of remote work capacity. IBM operated this program for decades but terminated it in 2017 on 30 days' notice after a stretch of disappointing earnings.[1]

Similarly, Yahoo! called its remote employees back to work in 2013! The exclamation point to end the sentence seems appropriate given the company involved and also the fact that it happened a decade ago.[2] Covid-19 undoubtedly altered certain human behaviors and dramatically accelerated the take-up rate of working from home for employees with remote-capable jobs. However, these examples highlight the ever-evolving nature of in-person and remote work. Individual employees and their employers will adapt over time. What works for some may not work for others, and what works well one year may not be the best fit down the road. A helpful analogy might be the retail sector. For years observers have debated the future of online versus brick-and-mortar sales. Clearly online sales experienced exponential growth following the expansion of consumer internet knowledge and access. Over time, the industry approached equilibrium, the rate of growth in online sales slowed, and retailers began exploring omni-channel approaches to maximize sales. Something similar will happen in the office sector where companies experiment to arrive at the ideal mix of in-person, remote and hybrid workforces.

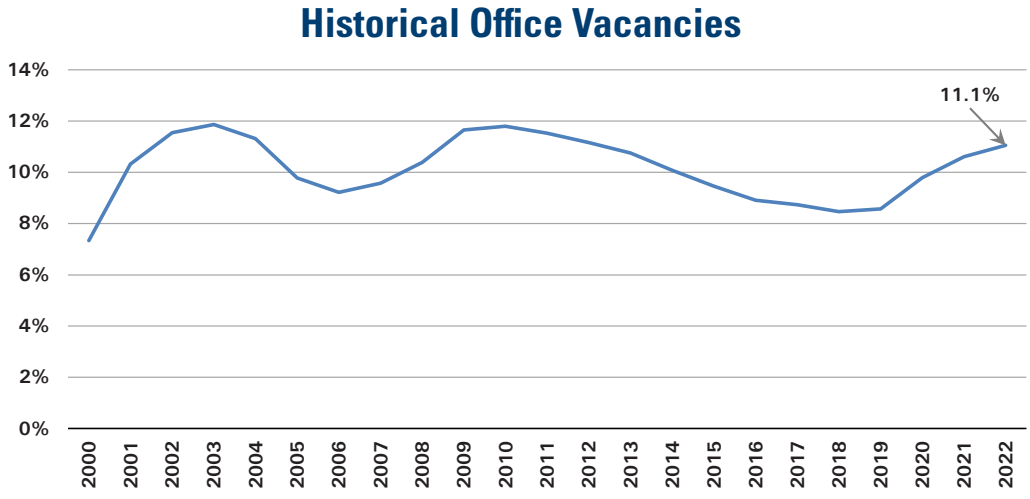
Summary Findings

This office analysis is intended to measure supply and demand for space but doesn't take the extra step of estimating the impact on values, which will be saved for a later report. Our forecast assumes a total 17.6% reduction in square feet per employee, decreasing from 163 in 2019 to 153 today and 134 SF per

1 WSJ, May 18, 2017, *IBM, a Pioneer of Remote Work, Calls Workers Back to the Office*
2 WSJ, February 26, 2013, *The Home Office in the Spotlight*

employee once all leases have rolled, estimated to occur in another 4-5 years. In a static case, with no new job growth and an immediate rightsizing of all leases to a new hybrid space plan, overall national office occupancy would drop from CoStar's current estimate of 89.0% to 78.1%. This reduction is less than might be expected, and is due to three factors: i) the CoStar data set is the most expansive and has a higher starting occupancy than some other sources; ii) the number of office jobs increased from 2019 to 2022; iii) leases signed from 2020 to 2022 already reduced space allocated from 163 square feet per employee to 153, meaning a 6.1% reduction in footprint per employee has already occurred. If job growth hadn't occurred between 2019 and 2022, then the static trough occupancy at 134 square feet per employee would be measured at 75.3%.

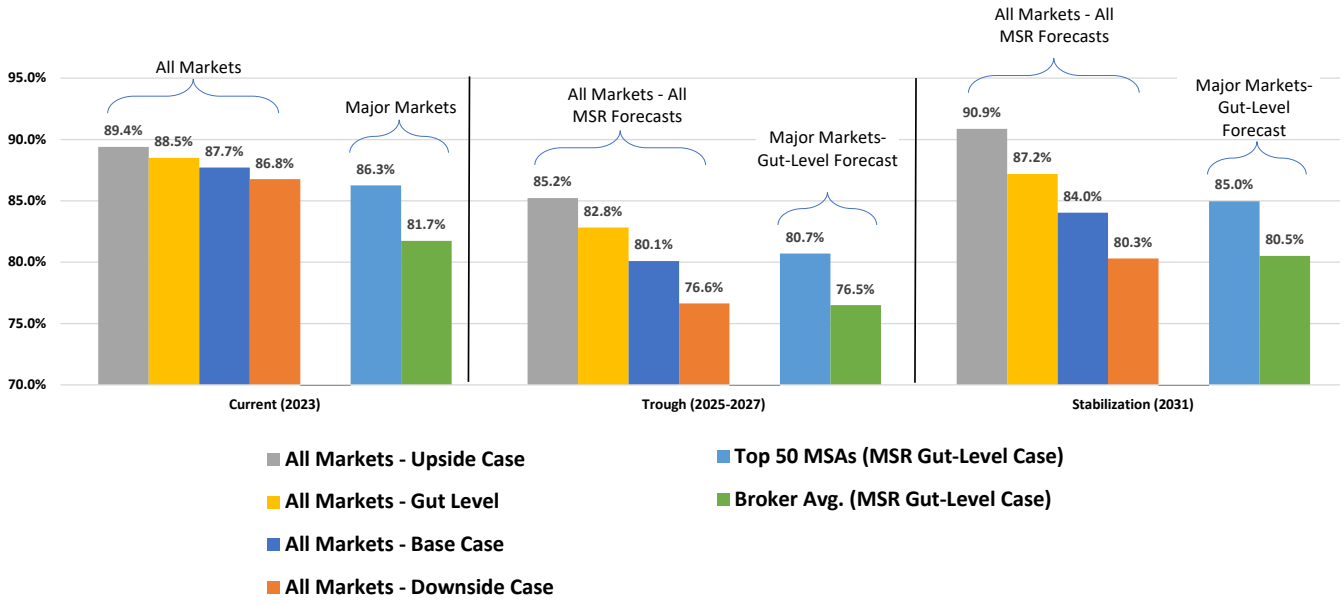
Under a reasonable forecast model that accounts for modest inventory and job growth over time, our scenario analyses shows a gradual occupancy decline as old leases roll and are replaced by downsized new and renewal leases. In our various forecast cases, nationwide office occupancy gradually drops to a cycle bottom in the range of years 2025 to 2027 before resuming a climb to stabilized occupancies in 2030 to 2032. The national brokerage firms typically use much more narrow data sets involving competitive multi-tenant properties in the top 50 markets. The average starting occupancy of five top brokers is 82.2% using only 5.1 billion SF of inventory compared to CoStar's 12.19 billion SF dataset. According to Cushman & Wakefield, the natural rate of market occupancy is 87%. At occupancies above 87%, market rent growth should occur in most cases. At occupancies below this breakpoint, the net rent growth equation depends on the status of the individual properties and overall market expectations for growth. The reason office buildings would have a lower natural rate of occupancy compared to something like an apartment property is that office spaces are lumpy and office buildings are 3D puzzles. Space sizes are not standardized. As an illustration, imagine you're a 25,000 square feet tenant in a small, 1 million square feet market that is only 80% occupied, but contains just two vacant suite options of 25,000 square feet. In that case, the 20% vacancy statistic is of little use to the tenant. The landlords holding those two blocks of space may not offer a great deal on rent to the tenant even though the market is 20% vacant, since all brokers and owners know the tenant has only two options to choose from.



Source: CoStar, Q4 2022

The following chart summarizes the four main scenarios we used to forecast future the national office market, using a starting point occupancy from CoStar's widest dataset of all classes of office properties in all markets. These four MSR scenarios are also compared to two others, one using the CoStar Top 50 markets inventory, and another that's an average of five top brokerage firm occupancy baselines (also generally focused on the top 50-75 markets). The MSR gut-level case was used to forecast the future occupancy path forward from the CoStar and broker average occupancy starting points.

U.S. National Office Occupancy (MSR Scenario Analysis)



The four MSR Scenarios vary square feet per employee, using the widest range of CoStar's all-market dataset (12.19 billion square feet) and the correspondingly expanded all-sector estimate of office-occupying jobs of 71 million. MSR also included a reference to CoStar's smaller 9.43 billion square feet inventory of the Top 50 MSAs, indicative of 43.4 million office jobs. Note that many commercial real estate brokerage firms use a smaller dataset of competitive office properties in major markets (usually 50-56 markets) averaging a total of 5.1 billion square feet of inventory. The brokerage firms often reference a more narrow subset of the top three sectors of office occupying employment (Information, Financial Activities and Professional/Business Services), which implies a much lower range of office jobs averaging 34-36 million. The most recent available national office reports averaged for the brokerage firm index were sourced from CBRE, JLL, Cushman & Wakefield, Colliers and Newmark.

Methodology and Key Statistics

Total National Office Inventory	12.18 billion SF [3]
Occupied Square Feet	10.84 billion SF [3]
Occupancy %	89.0% [3]
National Employment	155 million [4]
Jobs Capable of Working from Home	71.9 million[5] (46.4%)
Estimated Office Employment	66 to 71 million

We estimate 71.9 million jobs can be done from home, which is coincidentally very similar to our high-end estimate of 71.0 million in total office employment. The key distinction to understand is that not all office jobs are designated as being capable of working from home by Census surveys and the Bureau of Labor Statistics. A significant minority of employees are needed in-person on most days.

Within the 88.3 million jobs in the six primary office-using sectors, we estimate that 53.3 million could be done at home (60.4%) and 35.0 million (39.6%) cannot. Among the 53.3 million remote-capable employees, 35.7 million (66.9%) are choosing some form of remote work, while 33.1% or 17.7 million employees are

3 CoStar, Fourth Quarter, 2022.

4 Bureau of Labor Statistics, January 2023, employment data; Michael Dalton and Jeffrey A. Groen, *Telework during the COVID-19 pandemic: estimates using the 2021 Business Response Survey*. Monthly Labor Review, U.S. Bureau of Labor Statistics, March 2022.

5 MSR derived total estimate of jobs capable of remote work, using 2023 BLS employment data and multiplying each category by the percentage of employees able to work from home contained in the April 2020 Current Population Survey, as summarized by: Matthew Dey, Harley Frazis, Mark A. Loewenstein, and Hugette Sun, *Ability to work from home: evidence from two surveys and implications for the labor market in the COVID-19 pandemic*. Monthly Labor Review, U.S. Bureau of Labor Statistics, June 2020.

nevertheless working fully onsite.[6]

These statistics are summarized and expanded in the chart below. The portion on the left sums to total jobs. The middle section removes jobs from each category not capable of remote work. And the right side of the chart shows a breakdown of only the jobs capable of remote work. You will note in the paragraph above we focused the discussion around the top six office job sectors, since the percentage of office jobs is much lower in the remaining six sectors, even though they constitute another 18.6 million jobs capable of remote work.

Allocation of Jobs as of January 2023

AS A PORTION OF ALL JOBS					SUBTRACT	AS A PORTION OF JOBSs CAPABLE OF REMOTE WORK			
Main 6 Sectors	Total Jobs	Full-Time Remote	Hybrid	Full-Time at Work	Not Capable of Remote	Jobs Capable of Remote Work	Full-Time Remote	Hybrid	Choosing Full-Time at Work
Information	3,119,000	1,628,118	492,802	998,080	611,324	2,507,676	1,628,118	492,802	386,756
Finance and Insurance	9,114,000	2,506,350	1,594,950	5,012,700	1,722,546	7,391,454	2,506,350	1,594,950	3,290,154
Professional and Business Services	22,912,000	7,056,896	3,551,360	12,303,744	6,507,008	16,404,992	7,056,896	3,551,360	5,796,736
Subtotal	35,145,000	11,191,364	5,639,112	18,314,524	8,840,878	26,304,122	11,191,364	5,639,112	9,473,646
	100.0%	**31.8%**	**16.0%**	**52.1%**	25.2%	74.8%	**42.5%**	**21.4%**	**36.0%**
Education and Health	24,937,000	2,345,930	2,912,169	19,679,001	12,992,177	11,944,823	2,345,930	2,912,169	6,686,724
Other Services	5,819,000	779,746	581,900	4,457,354	3,497,219	2,321,781	779,746	581,900	960,135
Government	22,389,000	6,789,778	5,431,822	10,167,400	9,627,270	12,761,730	6,789,778	5,431,822	540,130
Subtotal	53,145,000	9,915,454	8,925,891	34,303,755	26,116,666	27,028,334	9,915,454	8,925,891	8,186,989
	100.0%	**18.7%**	**16.8%**	**64.5%**	49.1%	50.9%	**36.7%**	**33.0%**	**30.3%**
Grand Subtotal	88,290,000	21,106,818	14,565,003	52,618,279	34,957,544	**53,332,456**	21,106,818	14,565,003	17,660,635
	100.0%	**23.9%**	**16.5%**	**59.6%**	39.6%	60.4%	**39.6%**	**27.3%**	**33.1%**

Other Sectors	Total Jobs	Full-Time Remote	Hybrid	Full-Time at Work	Not Capable of Remote	Jobs Capable of Remote Work	Full-Time Remote	Hybrid	Choosing Full-Time at Work
Manufacturing	12,999,000	636,951	948,927	11,413,122	7,669,410	5,329,590	636,951	948,927	3,743,712
Mining, quarrying, etc	631,000	13,251	22,085	595,664	376,707	254,293	13,251	22,085	218,957
Transportation and utilities	7,295,700	467,723	369,626	6,458,352	4,910,006	2,385,694	467,723	369,626	1,548,346
Wholesale and retail trade	21,523,600	1,454,842	1,177,316	18,891,442	15,819,846	5,703,754	1,454,842	1,177,316	3,071,596
Construction	7,884,000	260,172	465,156	7,158,672	6,252,012	1,631,988	260,172	465,156	906,660
Leisure and hospitality	16,450,000	257,635	335,510	15,856,855	13,110,650	3,339,350	257,635	335,510	2,746,205
Subtotal	66,783,300	3,090,574	3,318,620	60,374,106	48,138,631	18,644,669	3,090,574	3,318,620	12,235,475
		4.6%	**5.0%**	**90.4%**	72.1%	27.9%	**16.6%**	**17.8%**	**65.6%**
Grand Totals	155,073,300	24,197,392	17,883,623	112,992,386	83,096,175	**71,977,125**	24,197,392	17,883,623	29,896,111
	100.0%	**15.6%**	**11.5%**	**72.9%**	53.6%	46.4%	**33.6%**	**24.8%**	**41.5%**

The chart below is a simple illustration of how the overall status of remote work has changed from pre-to post-pandemic.

Work-from-Home (Total Jobs)

Pre-Covid			Post-Covid		
Office Status (Dec. 2019)	Total Jobs*	% of Total Jobs	Office Status (Jan. 2023)	Total Jobs**	% of Total Jobs
Fully Remote	6,024,336	4.0%	Fully Remote	24,197,376	15.6%
Hybrid	9,990,355	6.6%	Hybrid	17,883,611	11.5%
Full-Time at Work	135,551,109	89.4%	Full-Time at Work	112,992,313	72.9%
Totals	**151,565,800**	**100.0%**	**Totals**	**155,073,300**	**100.0%**

**MSR derived allocations using December 2019 BLS employment statistics and data from Dey, Frazis, Loewenstein, and Sun, June 2020 (see footnote 5 for full citation).*

***MSR derived allocations using January 2023 BLS employment statistics and Dalton and Groen, March 2022 (see footnote 4 for full citation).*

6 MSR derived table uses January 2023 BLS employment data and multiplies each job sector by the percentage of employees in each category of telework (Full-Time, Some of the Time, or Rarely/Never), as indicated in 2021 Business Response Survey (BRS) to the Coronavirus Pandemic and as summarized by: Michael Dalton and Jeffrey A. Groen, *Telework during the COVID-19 pandemic: estimates using the 2021 Business Response Survey*. Monthly Labor Review, U.S. Bureau of Labor Statistics, March 2022.

The following summarizes three scenarios for future composition of the office workforce by changing the percentages of onsite, hybrid and remote work.[7]

Work-from-Home (Office Jobs)

Office Status	2022 Jobs Capable of Remote Work	% of Jobs Capable of Remote Work
Fully Remote	24,197,392	34.1%
Hybrid	17,883,623	25.2%
Full-Time at Work	28,937,453	40.7%
Totals	**71,018,467**	**100.0%**

Base Case

Office Status	Total Jobs	% of Total Jobs	SF Leased
Fully Remote	11,362,955	16.0%	568,147,736
Hybrid	45,451,819	64.0%	6,090,322,637
Full-Time at Work	14,203,693	20.0%	2,857,658,747
Totals	**71,018,467**	**100.0%**	**9,516,129,120**
Market Occupancy			78.1%

Upside Case

Office Status	Total Jobs	% of Total Jobs	SF Leased
Fully Remote	14,203,693	20.0%	710,184,670
Hybrid	24,856,463	35.0%	3,330,645,192
Full-Time at Work	31,958,310	45.0%	6,429,732,181
Totals	**71,018,467**	**100.0%**	**10,470,562,043**
Market Occupancy			85.9%

Downside Case

Office Status	Total Jobs	% of Total Jobs	SF Leased
Fully Remote	14,203,693	20.0%	710,184,670
Hybrid	46,162,004	65.0%	6,185,483,928
Full-Time at Work	10,652,770	15.0%	2,143,244,060
Totals	**71,018,467**	**100.0%**	**9,038,912,658**
Market Occupancy			74.2%

We approached the question of the timing and level at which office occupancy should bottom from two different directions. As previously discussed, we started with the most static and simplistic assumption that if all offices were downsized by 17.6% from December 2019 baseline data, that meant market occupancy would drop from 89.0% to 75.3%. That decrease was based solely on downsizing the pre-Covid space requirements to account for remote work trends, and assumed no new construction, no tear-downs of existing supply, and no job growth or losses. Of course, that's not what will happen. The office market tends to average 5+ years of remaining lease term; therefore, adjustments to occupancy and market rental rates tend to occur slowly in something like 20% increments each year. Further, space needs tend to lag job growth and losses by 9 months. This means that the growth in office-using employment of the past few years is gradually impacting leasing activity. Correspondingly, a recession tends to flow through office occupancy well after a recession has ended.

MSR modeled a scenario using actual job growth, then forecasting a recession involving 1% job losses for 2023 and 2% job losses for 2024, followed by 1.5% job gains thereafter. This means that the 2022 number of office jobs isn't reached again until the year 2027. The model assumes some new supply is added (.3% in 2023, .2% in 2024 and another .3% in 2027), but these additions are overtaken by a 1% per

7 Morrison Street Research, Dey, Frazis, Loewenstein, and Sun (June 2020), also Dalton and Groen (March 2022) CoStar for SF leased.

year reduction in 2025 and 2026 inventory, as obsolete or less-competitive properties are taken off-line. We also assumed that 75% of all expiring tenants each year downsize and 25% renew in the same square footage until the market reaches 134 square feet per employee and 80.2% in 2027. As you can see, that is a vastly different reality than lazily assuming a market that falls overnight to 75.3% occupancy.

The projections in this paper depend on the variety of factors mentioned above and reasonable people will disagree on the specific assumptions used; however, the fundamental analytical concept of right-sizing space planning needs in conjunction with lease expirations over time to account for remote/hybrid work, then working up to total market occupancy is valuable. It will take time for the pandemic effects to work their way through the market. In reviewing the market statistics in the 2020 to 2022 timeframe, it is clear that companies have not downsized at nearly the pace or amount as would be expected given the in-person occupancies and headlines that suggest massive pending vacancies.

Using the proceeding data as a baseline, we built a simple forecast model accounting for new supply, job growth/loss, and the new space plan reducing future square feet per employee to 134. We also used a one-year lag between changes in number of jobs and the resulting reaction in leasing markets, which explains why occupancy initially goes up before going down. This brief improvement is not likely to occur, but we left it in place to be consistent with the rest of the framework. The model includes the presumption that 75% of each year's expiring leases downsize to the new space plan while 25% renew at the same footprint (no expansions).

Dynamic Analysis (Base Case)

ACTUALS	Recession	Recession							
	2023	2024	2025	2026	2027	2028	2029	2030	2031
Inventory	12,224,612,916	12,249,062,142	12,126,571,521	12,005,305,806	12,041,321,723	12,077,445,688	12,113,678,025	12,150,019,059	12,186,469,116
Occupancy	10,723,332,694	10,244,828,236	9,790,367,941	9,615,703,517	9,654,104,209	9,797,313,270	9,942,670,467	10,090,208,023	10,239,958,641
Occupancy %	87.7%	83.6%	80.7%	80.1%	80.2%	81.1%	82.1%	83.0%	84.0%
SF per employee	153	149	140	135	134	134	134	134	134
New Supply Growth %	0.3%	0.2%	-1.0%	-1.0%	0.3%	0.3%	0.3%	0.3%	0.3%
Job Growth by Year	-1.0%	-2.0%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Jobs By Year	70,308,282	68,902,117	69,935,648	70,984,683	72,049,453	73,130,195	74,227,148	75,340,555	76,470,664
Change in Jobs	(710,185)	(1,406,166)	1,033,532	1,049,035	1,064,770	1,080,742	1,096,953	1,113,407	1,130,108
Space Gain/Loss Rate	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
SF +/- for Change in jobs (lagged 1 yr)	227,444,779	(134,941,372)	(126,227,934)	139,007,558	141,092,671	143,209,061	145,357,197	147,537,555	149,750,619
% Change in Occupancy	1.9%	-1.1%	-1.0%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
BACK-SOLVE TEST Average Lease Term									
Annual Lease Expirations	2,168,658,887	2,144,666,539	2,048,965,647	1,958,073,588	1,923,140,703	1,930,820,842	1,959,462,654	1,988,534,093	2,018,041,605
SF of Expiring Tenants that Downsize	1,626,494,165	1,608,499,904	1,536,724,235	1,468,555,191	480,785,176	-	-	-	-
% of Expiring Tenants Downsizing	75.0%	75.0%	75.0%	75.0%	25.0%	0.0%	0.0%	0.0%	0.0%
Tenants Renewing the Same SF	542,164,722	536,166,635	512,241,412	489,518,397	1,442,355,527	1,930,820,842	1,959,462,654	1,988,534,093	2,018,041,605
Revised SF Total	1,821,252,366	1,801,103,452	1720733286	1,644,401,606	1,820,448,724	1,930,820,842	1,959,462,654	1,988,534,093	2,018,041,605
Increased Vacancy from downsizing	(347,406,521)	(343,563,086)	(328,232,361)	(313,671,983)	(102,691,979)	-	-	-	-
% Change in Occupancy	-2.8%	-2.8%	-2.7%	-2.6%	-0.9%	0.0%	0.0%	0.0%	0.0%
Total Occupancy Change	(119,961,742)	(478,504,458)	(454,460,295)	(174,664,425)	38,400,692	143,209,061	145,357,197	147,537,555	149,750,619
Occupancy % Change	-1.0%	-3.9%	-3.7%	-1.5%	0.3%	1.2%	1.2%	1.2%	1.2%
SF Occupied	10,723,332,694	10,244,828,236	9,790,367,941	9,615,703,517	9,654,104,209	9,797,313,270	9,942,670,467	10,090,208,023	10,239,958,641
Occupancy by Year	87.7%	83.6%	80.7%	80.1%	80.2%	81.1%	82.1%	83.0%	84.0%

Forecast Model

The second approach we took was to determine, once the market bottoms (which the math above suggests is at roughly 80.0% occupancy), how long it would take to reabsorb back to the natural stabilized level of 87.0% occupancy? For this question we establish a base case tied to 134 square feet per employee, an upside case at 147, and a downside of 127 square feet per employee. The other key assumption is office job growth, which we assumed is 1.5% per year (consistent with historical averages) following modeled 1% and 2% job losses in 2023 and 2024. Reviewing the base case, falling to 134 square feet per person implies an incremental vacancy of 1.2 billion square feet. That in turn requires 9.0 million jobs to get back to 87.0% occupancy, indicating a return to stability after 2033, more than 7 years from trough occupancy. These bands are wide: the upside case recovery would occur in 2027 and the downside stabilization would extend out to year 2037.

The numbered results in the table indicates the year in which occupancy stabilizes at 87%, with a starting point occurring with year-end 2022. For most reasonable cases this means the occupancy bottom occurs 3 to 5 years from the start of the analysis (i.e. - bottom occurs in 2025 to 2027). In the selected example of 140 square feet per employee and 1.5% job growth beginning in 2025, full recovery would occur at the end of 2030. All scenarios are more cautious than they might appear, since they begin with a recession that causes 1% job losses in 2023 and 2% job losses in 2024, followed by the percentage gains shown below.

Stabilization Year (87% Occupancy Reached)		Job Growth %				
		1.0%	1.5%	2.0%	2.5%	3.0%
SF Per Person	127	2047	2037	2034	2031	2029
	134	2040	2033	2031	2029	2028
	140	2035	**2030**	2029	2028	2027
	147	2029	2027	2026	2025	2025

Stepping back from the details of each case and adding some gut level thinking to the analysis, it's clear that some portion of the older office stock in lesser quality locations has become obsolete in a post-Covid world. How much of that unusable supply is converted or demolished will become an enormous factor in determining the return to stabilization timeline. Imagine for a moment that 5% of the existing inventory is removed from the market. A recession that produces slack in the labor market could encourage workers back into the office. A recognition of the negative societal consequences of remote work could cause some collective action to return to work. Any of these potential mitigants could accelerate the timeline to recovery. The rise of artificial intelligence could replace office workers and further suppress demand, or new and expanding AI companies could be a net source of demand.

Taking all these possibilities into consideration, selecting from all the forecast scenarios MSR reviewed, we find the most gut-level comfort in a specific case of 140 square feet per employee (compared to today's 153 SF and 89.0% occupancy). This scenario creates a late 2025-early 2026 low point in CoStar occupancy of 82.8%, followed by a gradual recovery back to 87.0% occupancy in 2030-2031.

Detailed Analysis

Now that we've previewed some conclusions, let's take a step back and look step-by-step at how we assembled these assumptions for future market conditions.

The goal of this report is to more specifically analyze the disproportionate impact of advances in technology and cultural shifts on the work-from-home propensity of office-using employment--in other words, to determine the potential impact on office building occupancies. We will save most of the math necessary to determine office building values for a subsequent report.

Modern Space Plan

Given the lack of one-size-fits-all cost/benefit analysis for office work, the likely market outcome is a blended set of circumstances. Some companies will be all in-person, some hybrid, and some fully remote. The best outcomes for specific employees and employers will vary based on location, industry, role, and familial circumstances. Even for those companies that choose to allow some hybrid work, a variety of solutions will emerge including desk hoteling and app-based desk reservations, team-based neighborhood concepts, and more comfortable areas for collaboration and seating. Improved remote conferencing technologies including multiple mics and camera angles, virtual reality headsets, and interactive programs, will allow participants to see and hear everyone. Some companies may benefit from more private workspaces (think phone booths instead of cubicles), while others may break down private

offices with closed doors and create more comfortable spaces with couches, tables, recliners and beanbag chairs. Most spaces will include more audio-visual enabled workstations for individuals and teams.

This analysis borrows from some post-pandemic space planning concepts contained in a November 2022 CBRE Global Workplace and Occupancy Insights report which sought to redesign office spaces for today's combination of in-person, hybrid and remote workforces. Morrison Street Research adapted this model and ran it through a sample 100-employee firm and compared its square feet per employee output to recent years to draw a trend line of pre-pandemic and post-pandemic space needs.

Under this construct, the model assigned 20 onsite workers, 64 managed hybrid workers and 16 remote workers. Careful design and management of these uses allows for only 20 dedicated seats for in-person daily workers, 56 shared spaces for the hybrid workers, and 6.4 hoteling stations for remote workers under a reservation system. Roughly speaking, that would mean 82.4 desks for 100 workers. This translates to a 17.6% reduction in overall space needs. CBRE describes this result as being 21% more efficient in that the design capacity allows for 100 employees to be covered by only 82.4 workstations. It should be noted that a potentially overly-cautious assumption embedded in here is the 20% percentage of fully in-person workers. If this were increased to 30%, then the nadir of overall office occupancy would be 82.0% compared to 80.1% in the base case.

Designing space this way is clearly better for tenants and worse for landlords in the sense that as tenants expand headcount, by maximizing sharing ratios the tenant could even fit up to 116.8 employees in the new space compared to their starting point of 100 employees.

We reallocated the downsized overall space plan of 134 square feet per person by reducing the space allocable to remote and hybrid employees and allocating more of the leased space to the onsite employees. In the below chart, the columns to the left indicate a pro rata allocation based on employee count, whereas the portion to the right attempts to allocate the space based on more likely space footprint for each category of employee. This allocation accounts for the entire leased premises, including common areas:

Space Allocation by Status	Pro Rata Per Person	SF Per Person	Square Feet	Adjusted %	Adj. SF Per Person	Square Feet	SF Per Seat
Remote	16.0%	134	2,144	6.0%	50	800	125
Hybrid	64.0%	134	8,576	64.0%	134	8,576	153
On-Site	20.0%	134	2,680	30.0%	201	4,024	201
TOTALS	100.0%	134	13,400	100.0%	134	13,400	163

Source: Morrison Street Research

Pre-Covid Remote Work and Occupancy Baselines (all Jobs)

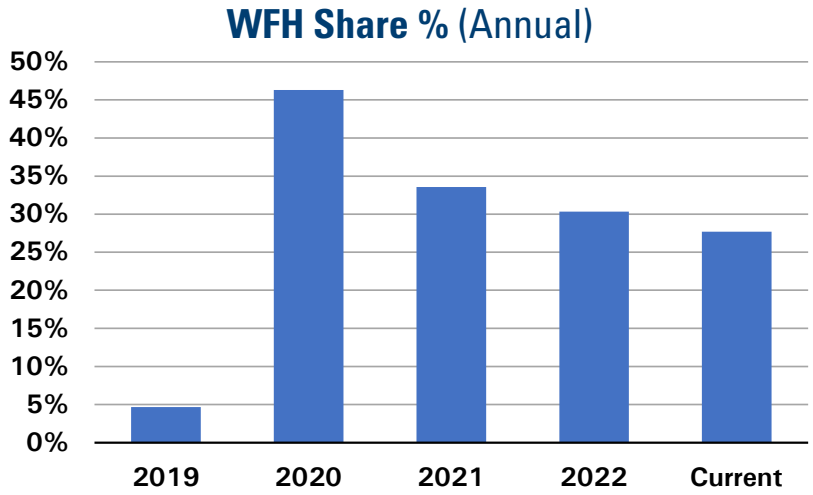
Prior to the onset of Covid-19, there was some survey and government data on propensity of remote work, but little was available about the absolute capacity for remote work—in other words, how many jobs could be performed from home? Despite advantages in technology, overall trends in flexible work and formal work-from-home had not materially changed in 20 years. Several academic papers[8] before Covid, along with various government surveys taken in the years before 2020, notably the American Time Use Survey, collectively seemed to conclude an average of around 30% to 40% of jobs could reasonably be performed at home. These estimates were perfectly tested by the real-world experience of the pandemic. By May 2020, 35% of all U.S. workers were at home.[9] As a point of comparison, 37% of all workers in the

8 American Economic Review, Alexandre Mas and Amanda Pallais, *Valuing Alternative Work Arrangements*, December 2017. *Alternative Work Arrangements*, Alexandre Mas and Amanda Pallais, December 2019. National Bureau of Economic Research Working Series Paper entitled *How Many Jobs Can Be Done At Home*, April, 2020. Authors Jonathan I. Dingel and Brent Neiman.

9 Federal Reserve Bank of Dallas, *Work from Home After the COVID-19 Outbreak,* July 2020. Alexander Bick, Adam Blandin and Karel Mertens.

U.K. were fully at home in April and May of 2020.[10] The 2021 American Time Use Survey showed that 38.0% of workers spent some or all of their time working at home.[11] While there was an extreme blip with the world locked down in the early stages of the pandemic, once settled over the course of a year or more, many of these estimates held up well.

WFH Research, a leader in this field, has a method of measuring this concept using a consistent, regular survey (the Survey of Working Arrangements and Attitudes) to determine a percentage of paid full workdays at home. WFH Research pulls from sources going back to 1965 and now regularly updates the SWAA survey to show that the work-from-home share of employment went from 0.4% in 1965 to just 4.7% in March 2020.[12] Then a massive change occurred almost overnight with Covid. The SWAA survey today has shown a recent stabilization around 27% to 30% paid days worked from home.



Using the March 2023 WFH Research update showing a 28.7% share of paid days worked from home would seem to indicate a 71.3% share of in-person work.[13] The March WFH data also shows the following split between categories of employee:

Full Work-from-Home	12.1%
Hybrid	28.3%
Fully on Site	59.6%

Morrison Street Research uses an almost inverse method to determine occupancy using given percentages of employees under each type of working arrangement. As shown following, we can back into an onsite occupancy rate of 73.8%, as follows (assuming a 50% hybrid schedule). Again, these are all employees, not just office-using employees. Although practically speaking most remote employees would otherwise be office occupants, not all would occupy traditional multi-tenant office buildings.

All Jobs	Fully On-Site	Hybrid	Full WFH	Total
Days per Week	5.0	2.5	0	
Occupancy	100.0%	50.0%	0	
Current % of Each	59.6%	28.3%	12.1%	73.8%

10 Data from the Bank of England's Decision-Maker panel, as referenced in the National Bureau of Economic Research Working Series Paper entitled *How Many Jobs Can Be Done At Home*, April, 2020. Authors Jonathan I. Dingel and Brent Neiman.
11 Bureau of Labor Statistics, 2021 American Time Use Survey.
12 WFH Research, Time Series Data.
13 WFH Research, *Survey of Working Arrangements and Attitudes*, March 2023. Jose Maria Berrero, Nicholas Bloom, Shelby Buckman, Steven J. Davis. WFH Research, March 2023 update to Barrero, Jose Maria, Nicholas Bloom, and Steven J. Davis, 2021. *Why working from home will stick*. National Bureau of Economic Research Working Paper 28731.

To test and cross-check the pre-Covid baseline, MSR averaged data from six different surveys conducted between 2012 and February 2020 to arrive at a pre-Covid work-from-home rate averaging 6.0% of all jobs.[14] We subtracted the 6.0% work-from-home average from the 2019 American Use Time Survey indication that 24.0% of workers were spending some or all of their working time at home, backing into an 18.0% hybrid rate. MSR then sketched out a possible business utilization framework for the pre-pandemic phase, which could have looked something like this. Note that the chart data below represents percentages for all jobs, not only office jobs.

2019 Estimate - All Jobs	Fully On-Site	Hybrid	Full WFH	Avg. Daily Occupancy
Days per Week	5.0	2.5	0	
Occupancy	100.0%	50.0%	0	
% of Each	76.0%	18.0%	6.0%	85.0%

Note: The above chart uses 5 days per week for full-time employees, but not all full-time, in-person workers would be present every day. CBRE and JLL estimate that daily pre-Covid office space utilization was around 75%.

Using the category splits from the March 2023 SWAA from WFH Research for those able to work from home (as a rough proxy for office uses), MSR calculates that the average workweek occupancy should look like this:

Jobs Capable of Working from Home	Fully On-Site	Hybrid	Full WFH	Total
Days per Week	5.0	2.5	0	
Occupancy	100.0%	50.0%	0	
Current % of Each	34.7%	45.7%	19.6%	57.6%

Office Occupancies

Now focusing on the office-only portion of job status and occupancies, let's establish a simple framework for determining office utilization. An interesting aspect of calculating space need and occupancy is to consider the fact that just because a firm averages 50% daily occupancy over the course of a week does not mean they can reduce their footprint by 50% if they want to specify any days for mandatory collaboration. If a company requires full in-person work, we assume that's 5 days per week or 100% occupancy. If

14 2012 U.S. Census Bureau Survey of Income and Program Participation (SIPP), 2014 General Social Survey (GSS) Quality of Life Survey, 2018 U.S. Census Bureau American Community Survey, 2019 Bureau of Labor Statistics American Time Use Survey, 2019 Atlanta Federal Reserve Survey of Business Uncertainty, 2020 Federal Reserve Bank of Dallas Real-Time Population Survey, Alexander Bick and Adam Blandin.

another company is fully remote, that's 0 days per week and 0% occupancy. A fully hybrid company with a reservation system may require employees to work a minimum number of days per week (let's say half-time) and that gets us to 2.5 days per week or 50% occupancy. What seems to be happening in real life is that many employees are extending weekends by staying home on Mondays and Fridays, and most employees who go to the office do so on Tues, Wed, and Thurs. These scenarios all have different implications for true office leasing and physical occupancy. Take the example of a company where most employees work in-person on Tuesday through Thursday. If all employees stayed home on Monday and Friday each week, but all employees worked in-person during the midweek, the office would average 60% occupancy over the 5-day work week. Yet if that company desires to have all its workers in the space on a single day during the week, it can't easily downsize significant office space since it will be 100% occupied on the specified collaboration day. ***This is the primary reason that the popular and business press is off target in its assessments of the impact of remote work on office leasing—many articles seem to feature average weekly occupancy rates without regard to peak occupancy requirements.***

For the post-Covid look at occupancy, we ran this rubric through three different indicative forecasts (Upside, Base, Downside). These cases are merely indicative back-solving of the concepts of days per week, average occupancy, and peak occupancy. The data in these tables serving as actual inputs in the model are the job status percentages of each category (remote, hybrid, on-site).

UPSIDE CASE

Job Status	% of Office Jobs	SF Per Person	Days per Week	Average Occupancy	Peak Occupancy
Remote	20.0%	50	0.50	10.0%	20.0%
Hybrid	35.0%	134	3.00	60.0%	70.0%
On-Site	45.0%	201	5.00	100.0%	100.0%
	100.0%	**147**	**3.40**	68.0%	73.5%

BASE CASE

Job Status	% of Office Jobs	SF Per Person	Days per Week	Average Occupancy	Peak Occupancy
Remote	16.0%	50	0.25	5.0%	10.0%
Hybrid	64.0%	134	2.50	50.0%	65.0%
On-Site	20.0%	201	5.00	100.0%	100.0%
	100.0%	**134**	**2.64**	52.8%	63.2%

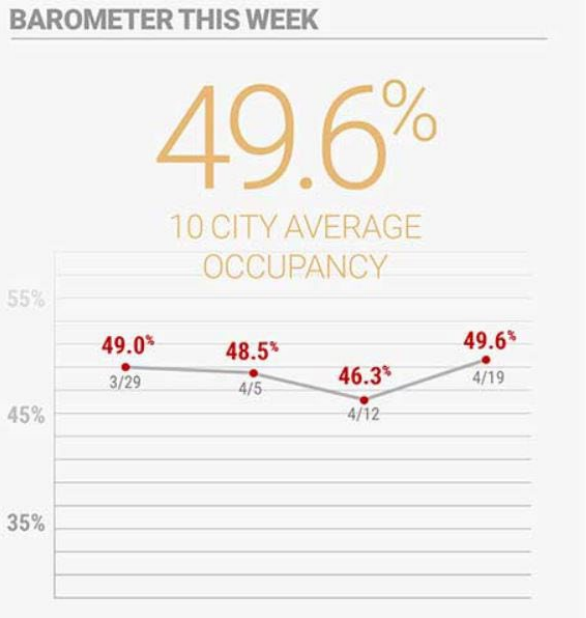
DOWNSIDE CASE

Job Status	% of Office Jobs	SF Per Person	Days per Week	Average Occupancy	Peak Occupancy
Remote	20.0%	50	0.00	0.0%	0.0%
Hybrid	65.0%	134	2.00	40.0%	60.0%
On-Site	15.0%	201	5.00	100.0%	100.0%
	100.0%	**127**	**2.05**	41.0%	54.0%

With these concepts in mind, let's review the most commonly referenced post-Covid office occupancy, the large-city key fob data from Kastle Systems' Back to Work Barometer. From the first chart, the main takeaway is that there is incredible variation by market. At first glance, cities with a high propensity for tech workers should have higher percentages of work-from-home arrangements. However, there is a clear cultural influence as well, since a city like Austin, TX has a heavy supply of technology workers and leads the pack in office occupancy whereas San Francisco and San Jose are perpetual laggards.

Kastle Back to Work Barometer (4/24/23)

Weekly Occupancy Report from Kastle Access Control System Data

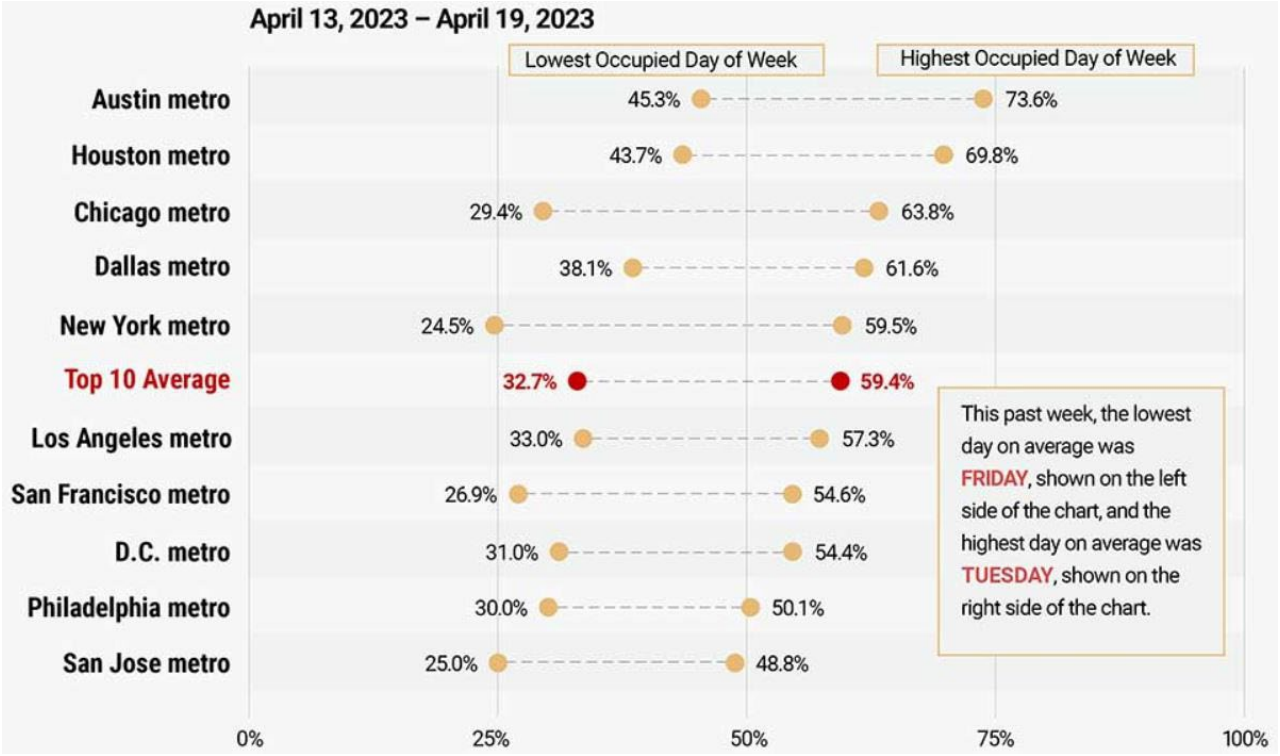


	Wed 4/12	Wed 4/19	% Change
Houston metro	55.7%	61.3%	5.6% ▲
New York metro	41.3%	47.0%	5.6% ▲
Dallas metro	50.2%	53.6%	3.4% ▲
Average of 10	**46.3%**	**49.6%**	**3.3%** ▲
Austin metro	60.0%	63.2%	3.2% ▲
Washington D.C. metro	43.1%	45.9%	2.9% ▲
San Francisco metro	41.3%	44.0%	2.7% ▲
Philadelphia metro	40.2%	42.9%	2.7% ▲
San Jose metro	36.4%	38.8%	2.4% ▲
Chicago metro	49.1%	51.3%	2.2% ▲
Los Angeles metro	45.8%	47.8%	2.0% ▲

Rather than weekly occupancy, the following chart shows the variability of daily occupancy. Cities in Texas must prepare for 60% to 75% of their workers to be in the office on Tuesdays. Even San Francisco and San Jose occasionally exceed 50% maximum daily occupancy.

Kastle 10-City Analysis (4/24/23)

Return to office rates vary significantly over the course of the week



We should note that Kastle Systems sets March 2020 as a sort of index year, and sets starting occupancy at or around 100%. In terms of physical occupancy compared to lease square footage, however, CBRE and JLL indicate pre-Covid utilization rates of 70%[15] and 75%[16]. This is a good time to note an odd and troubling disconnect in the most popular numbers from Kastle Systems, the top brokerage firms and WFH Research data referenced earlier. Assume office buildings were only 75% daily occupied before Covid. If Kastle Systems set their index baseline around 100 for March 2020, and their key fobs indicate building traffic has recently been averaging 46% to 50% of that starting point, doesn't that imply 34.5% to 37.5% average daily occupancy? If so, how do we square that with the implied WFH Research data above (57.6% avg. occupancy) and other survey data that implies a much higher level of current physical occupancy, with most indicators typically above 50%? To reconcile Kastle Systems output and WFH Research survey splits of Fully On-Site, Hybrid and Full WFH categories to arrive at mid-30% occupancies could only be done if hybrid employees were all working zero (0) days in the office. This makes no sense. It's hard to determine which of the three expert sources has a flaw in methodology, but something isn't tying here. Using the MSR-derived data point of 85% pre-Covid average daily occupancy, we could narrow the gap to Kastle Systems' 50% average daily occupancy. Even then, applying the 50% Kastle Systems to MSR's higher measurment of 85% initial occupancy would imply 42.5% current daily occupancy. Again, that's too low. Does that indicate that it's Kastle Systems measurements where the disconnect is found? Perhaps. Or it could be that survey results aren't generating the correct splits among actual working patterns. By noting the discrepancy, we hope others will pick up the baton and dial in a more accurate reconciliation.

Tying it all together: Office Inventory, Job Numbers and Categories, Space Planning, Occupancies

This paper attempts to provide a framework that can be used to forecast office occupancy. The more granular the view required, the more precise the information should become. In other words, if we were to look at only one city or one submarket, we could drill down to determine the most accurate measurements of market inventory, then scour through BLS job reports to settle upon an exact starting and ending point of occupancy. Assembling a uniform data set for forecasting office occupancy nationwide is important to creating accuracy across a wider view. Ultimately the data required include a good space planning template, total office inventory, starting occupancy, and office employment. From that we can make assumptions for future amounts of supply and job growth to derive forecast occupancy.

A quick example is shown in the table below. CoStar casts a very wide dataset of office buildings totaling 12,188,048,770 square feet and occupancy of 10,843,294,436 square feet or 89.0%. Using Bureau of Labor Statistics data, we then layered in each year from 2019 to 2022 to measure the changes in space allocated to employees. This means that since the pandemic the occupied square feet per employee has dropped about 10 SF from 163 to 153. However, note that most of this decrease in SF per employee is due to the increase in office jobs. If we apply today's occupied square feet to the 2019 job numbers, then the SF per employee has only dropped from 163 to 161. This appears to reflect a wait-and-see approach from many companies in determining their future space needs.

Year	Inventory SF	Vacant Available SF	Occupied SF	Office Employment	Occupied SF Per Employee	Total SF Per Employee	Occupancy
2019	11,980,286,231	1,029,154,062	10,951,132,169	67,343,735	163	178	91.4%
2020	12,054,624,424	1,182,502,568	10,872,121,856	64,729,202	168	186	90.2%
2021	12,131,365,160	1,291,130,171	10,840,234,989	67,019,060	162	181	89.4%
2022	12,188,048,770	1,344,754,334	10,843,294,436	71,018,467	153	172	89.0%

Sources: CoStar, Bureau of Labor Statistics, Morrison Street Research

15 CBRE Global Workplace and Occupancy Insights, November 2022.
16 JLL Q3 2022 U.S. Office Outlook Report indicates a range of 70% to 80%. MSR adjusted to 75% for simplicity.

With these variables in place (SF per person, total jobs, total square feet of office supply) we can determine an occupancy rate. Depending on the data set and the method used, one can arrive at a very wide range of office jobs and total square feet of office inventory. One of the bottom-line conclusions we reached from studying other reports and building our forecast model is that no matter the buildings or the markets you want to measure, the key metric to derive is office space per employee. An effective way to determine square feet per employee is to use a space planning tool to generate average daily and weekly occupancies, which in turn leads to conclusions regarding overall market occupancies.

Space Planning Rubric

Regardless of the starting point for inventory and job totals, we believe a range of a 10% to 20% decrease in space needs per lease is appropriate, allowing a model to be built around a percentage range of space reduction as leases expire over time. In our case, by exploring the CBRE model for space planning, we've determined the best estimate would decrease square feet per employee by 17.6%.

That said, the CBRE space plan assumes only 20% dedicated seating for full-time, onsite workers, which does seem a bit cautious. Increasing the percentage of full-time onsite employees would increase the assumed SF per employee, which in turn improves the space reduction percentage and boosts the forecasted bottom in market occupancy.

Job Categories and Counts

For the job portion of the equation, we downloaded all Bureau of Labor Statistics job data by sector from December 2019 to January 2023. The primary non-farm employment numbers have 24 sector categories which can be further reduced into 12 industry sectors. Six of those sectors constitute what is commonly thought to constitute office-using employment, comprised of three primary sectors (Information, Financial Activities and Professional/ Business Services) and another three sectors that constitute a lower, but still important percentage of office-using employment (Education/Healthcare, Other Services, Government). After much study and review of the individual job codes used in assembling and sorting the Bureau of Labor Statistics data, we believe the most accurate range for total office jobs would be somewhere between 66 and 71 million. Rather than limiting our analysis to the three primary job sectors, or even to the six sectors that contain the most office-using employment, we used an expansive measurement incorporating job codes across all BLS job sectors to arrive at 71 million office jobs for our analysis.[17] The purpose of this is merely to establish a square feet per employee base. This base correctly adjusts pro rata according to the space plan reduction framework to arrive at a proper relationship between square feet and employees in a selected market.

Space Inventory/Supply

In establishing total inventory and occupancy, we elected to use CoStar data, since CoStar has among the widest data sets and incorporates properties ranging from high-end assets in the largest markets down to the smaller markets and smaller properties. That combination currently reflects a higher average occupancy (89%) than other brokerage firms and research providers, who show current office occupancy percentages in the low-to-mid 80's. CoStar's data appears to indicate lower occupancy in the top markets and an implied higher occupancy in some smaller and secondary markets.[18] One goal of this paper is to

17 Depending on the data set and the method used, one can arrive at a very wide range of office jobs and total square feet of office inventory. Using only the top three office-occupying sectors (Information, Financial Activities and Professional/Business Services will yield only 35 million jobs. Adding the next three sectors (Education/Healthcare, Other Services and Government) can increase the estimate above 50 million. Including all job sectors and teasing out possible office-using roles can increase the widest estimate to 70-75 million office jobs. For more detail, please review the endnotes at the end of the paper.

18 CoStar's database includes a high-side office inventory of 12.19 billion square feet. Therefore, we elected to measure office jobs using a more expansive view of BLS categories that may contain office-using employment. On the lowest end of the estimates for office supply we've seen is Cushman and Wakefield's total of 5.56 billion square feet. Clearly these aren't the same data sets. Either Cushman & Wakefield is measuring only certain markets or certain asset quality, or they backed into square feet by using job totals, since they measure square feet per employee using only the three sectors of primary office employment. Despite their much smaller inventory and number of office

establish an underwriting template, to be customized for local market job/industry concentrations and square feet of office supply. We recommend using the best source of local market inventory data and applying the appropriate space planning assumptions and the implied footprint reductions to arrive at stabilized occupancy for a specific market under consideration for investment.

Sorting Worker Populations by Remote, Hybrid, Onsite

After scouring job codes and reviewing relevant surveys and research on remote work capability and propensity, we derived employee counts tying to Bureau of Labor Statistics data for each job sector. The objective was to establish a pre-Covid baseline of remote work and compare it to key indicators of post-Covid patterns of remote and in-person work.

To begin, we utilized data from a 2020 Bureau of Labor Statistics Monthly Labor Review article[19] summarizing results from two 2017-2018 surveys (the ATUS and NLSY79) which help establish a pre-Covid baseline of the percentage of workers in each job sector who could (able to WFH) and those who did work-from-home (the take-up rate). These results are line-item based on O*Net job content and telework feasibility. The 2020 BLS article then compares those pre-Covid era numbers for employees able to work from home plus the take-up rate of those who chose to work from home to the applicable measurements for the period from February to April 2020. This latter measurement provided a post-Covid indicator of ability and propensity to work remotely.

Next, we uploaded comparable data from another Bureau of Labor Statistics research piece from March 2022.[20] This later paper further broke down the teleworking propensity into categories of full time, some of the time, or rarely/never for 11 of the 12 key industry sectors. MSR estimated the Government portion to round out all 12 categories. We applied those category percentages to the Bureau of Labor Statistics job totals for each year and derived the number of jobs for each category of employment that are Remote, Hybrid or Onsite.

Ultimately, as shown in the next two charts in succession, we compiled sector job data from December 2019 and compared it to results from December 2021, in each case applying the before and after remote-work abilities and propensities gathered from the two BLS research papers from 2020 and 2022. The shaded column in the middle indicates the total number of jobs capable of remote work (these aren't

jobs, Cushman & Wakefield reduces office footprint per employee by 12.7%, not far from the CBRE estimates, demonstrating that a space plan can be more determinative for modeling occupancy gains/losses than the data used for total stock of office buildings and assumed jobs.

19 Matthew Dey, Harley Frazis, Mark A. Loewenstein, and Hugette Sun, *"Ability to work from home: evidence from two surveys and implications for the labor market in the COVID-19 pandemic"* from the Monthly Labor Review, U.S. Bureau of Labor Statistics, June 2020.

20 Michael Dalton and Jeffrey A. Groen, *"Telework during the COVID-19 pandemic: estimates using the 2021 Business Response Survey,"* Monthly Labor Review, U.S. Bureau of Labor Statistics, March 2022.

necessarily all office jobs). To the right, the MSR estimates are a sector-by-sector analysis we did to create our own sense of potential office jobs across categories. For 2019, we show 32.8 million primary office-using sector jobs, plus another 27.9 million in the three secondary sectors. Then adding an estimate of 6.5 million additional office-oriented roles contained with the other six sectors not traditionally associated with office industries, we arrive at 67.3 million potentially office-occupying jobs.[21] This higher total is less limiting and fits better within the expanded database of all properties and market types gathered into CoStar's database.

Employment Characteristics by Sector
Pre-Covid (December 2019)

Sector	% of Jobs that can work remotely (2018 data)	% of Jobs that Did work Remotely pre-Covid	Total December 2019 Jobs Per Sector	2019 Jobs Capable of Remote Work	Fully On-Site Jobs	Actual Remote Jobs Pre-Covid (Full and PT)	MSR Assumed Full-Time Remote Jobs	2019 MSR Adjustment % to Arrive at Multi-Tenant Office Uses	Multi-Tenant Office Jobs
Information	74.3%	27.6%	2,839	2,108	2,057	782	604	86.4%	2,454
Financial	76.6%	21.8%	8,737	6,692	6,831	1,905	714	100.0%	8,737
Prof. Services	69.2%	24.6%	21,652	14,983	16,332	5,320	2,505	100.0%	21,652
Subtotal	71.6%	24.1%	33,227	23,783	25,220	8,007	3,823	**98.8%**	**32,842**
							11.6%		
Education and Health	49.3%	8.6%	23,743	11,705	21,693	2,050	411	64.7%	15,360
Other Services	43.3%	7.4%	5,959	2,577	5,515	443	134	53.8%	3,205
Government	60.1%	9.1%	22,646	13,599	20,576	2,070	1,033	41.5%	9,404
Subtotal	53.3%	8.7%	52,347	27,881	47,784	4,563	1,578	**53.4%**	**27,968**
Total	60.4%	14.7%	85,574	**51,664**	73,004	12,570	5,402	**71.1%**	**60,811**
							8.9%		
Manufacturing	36.5%	8.8%	12,855	4,692	11,728	1,127	153	23.7%	3,051
Mining, quarrying, and oil and	35.5%	11.3%	731	259	649	83	4	10.0%	73
Transportation and utilities	25.9%	4.6%	6,120	1,585	5,836	284	84	2.3%	139
Wholesale and retail trade	28.1%	5.9%	21,793	6,124	20,499	1,294	307	4.2%	913
Construction	19.6%	2.3%	7,551	1,476	7,379	171	30	20.0%	1,510
Leisure and hospitality	16.8%	2.9%	16,942	2,838	16,456	485	44	5.0%	847
Subtotal	25.8%	5.2%	65,992	16,974	62,547	3,444	623	9.9%	6,533
							9.5%		
Totals	**45.3%**	**10.6%**	**151,566**	**68,638**	**135,551**	**16,015**	**6,024**	**44.4%**	**67,344**
				45.3%	89.4%	10.6%	4.0%		

Rolling this data set forward to include December 2021 work-from-home capabilities and take-up rates, we apply those December 2021 rates to 2023 job totals[22]. The resulting updated 2023 breakdown is as follows:

21 Ultimately the total number of jobs capable of remote work and the MSR estimate of office jobs are similar. This is mostly caused by the substantial overlap between the universe of remote-capable work and office work, though it's also in part coincidence. While the totals may be approximate, the line items and the subtotals describe different journeys to the results. Interestingly, we also cross-checked the sub-totals and totals by asking ChatGPT to read through all the BLS data and sort by job codes to determine office uses. A 12-page discussion with ChatGPT largely confirmed our assumptions and conclusions.

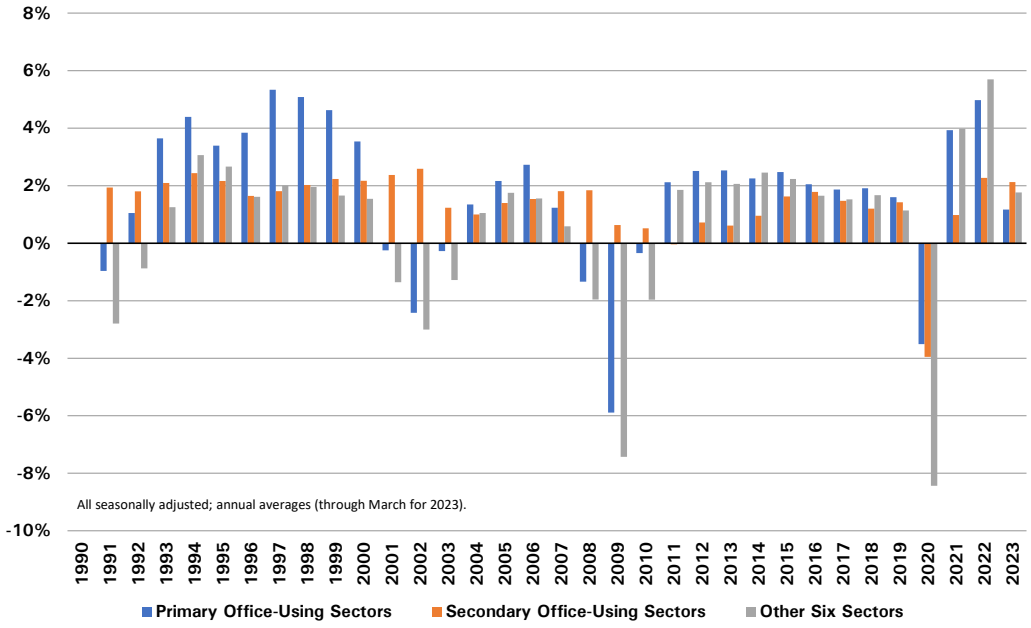
22 We aren't aware of a comparable BLS study using December 2022 data. We could have applied WFH Research data for each category of remote or onsite work, but that may have created an extra unnecessary mismatch, and the one-year lag may not have created that much difference in result.

Employment Characteristics by Sector
Post-Covid (January 2023)

Sector	% of Jobs that can work remotely (April 2020 data)	% of Jobs that Did work Remotely (Dec 2021 data)	January 2023 Jobs Per Sector	2023 Jobs Capable of Remote Work	Fully On-Site Jobs	Actual Remote Jobs Post-Covid (Full and PT)	Full-Time Remote Jobs	2023 MSR Adjustment % to Multi-Tenant Office Use	Net Office Jobs
Information	80.4%	68.0%	3,119	2,508	998	2,121	1,628	87.4%	2,725
Financial	81.1%	45.0%	9,114	7,391	5,013	4,101	2,506	100.0%	9,114
Prof. Services	71.6%	46.3%	22,912	16,405	12,304	10,608	7,057	100.0%	22,912
Subtotal	74.8%	47.9%	35,145	26,304	18,315	16,830	11,191	**98.9%**	**34,751**
Education and Health	47.9%	21.1%	24,937	11,945	19,679	5,258	2,346	65.9%	16,422
Other Services	39.9%	23.4%	5,819	2,322	4,457	1,362	780	51.9%	3,019
Government	57.0%	54.6%	22,389	12,762	10,167	12,222	6,790	45.4%	10,167
Subtotal	50.9%	35.5%	53,145	27,028	34,304	18,841	9,915	**55.7%**	**29,608**
Total	60.4%	40.4%	88,290	**53,332**	52,618	35,672	21,107	**72.9%**	**64,359**
					59.6%	40.4%			
Manufacturing	41.0%	12.2%	12,999	5,330	11,413	1,586	637	23.8%	3,089
Mining, quarrying, and o	40.3%	5.6%	631	254	596	35	13	15.0%	95
Transportation and utiliti	32.7%	11.5%	7,296	2,386	6,458	837	468	2.2%	163
Wholesale and retail trac	26.5%	12.2%	21,524	5,704	18,891	2,632	1,455	4.2%	914
Construction	20.7%	9.2%	7,884	1,632	7,159	725	260	20.0%	1,577
Leisure and hospitality	20.3%	3.6%	16,450	3,339	15,857	593	258	5.0%	823
Subtotal	29.5%	9.6%	66,783	18,645	60,374	6,409	3,091	10.0%	6,660
Totals	**46.4%**	**27.1%**	**155,073**	**71,977**	**112,992**	**42,081**	24,197	**45.8%**	**71,018**
% of Total				46.4%	72.9%	27.1%			
				12,235	Potential Added WFH Other Categories				
				29,896	Total Added Potential WFH				
				17,661	Added Potential WFH Gap in Primary Office Jobs				

A potential bright spot for office buildings is that office-using roles have been among those producing the strongest prospects for current and future job growth, as shown in the following chart showing job growth by categories over time.

Job Growth



Bureau of Labor Statistics

In the following chart, complied from BLS data, we can see that of the total 3.5 million increase in jobs from 2019 to 2023 (151.6 million to 155.1 million), 1.9 million of the increase came from the three primary job-using sectors, a total of 2.7 million new jobs in the top six sectors, and only 792,000 from the other six sectors.

Job Growth By Sector

	Sector	Dec. 2019	Jan. 2023	Change	% Change	Office Use %	Gross SF of New Office Demand
Primary Job Sectors (Big 3)	Information	2,839	3,119	280	9.9%		
	Financial	8,737	9,114	377	4.3%		
	Prof. Services	21,652	22,912	1,261	5.8%		
	Subtotal	33,227	35,145	1,918	**5.8%**	98.9%	254,118
Secondary Job Sectors (Next 3)	Education and Health	23,743	24,937	1,194	5.0%		
	Other Services	5,959	5,819	(140)	-2.3%		
	Government	22,646	22,389	(257)	-1.1%		
	Subtotal	52,347	53,145	798	**1.5%**	55.7%	59,557
Top 6 Subtotal		85,574	88,290	2,716	**3.2%**	72.9%	265,267
Other	Manufacturing	12,855	12,999	144	1.1%		
	Mining	731	631	(100)	-13.7%		
	Transportation and utilities	6,120	7,296	1,175	19.2%		
	Wholesale and retail trade	21,793	21,524	(269)	-1.2%		
	Construction	7,551	7,884	333	4.4%		
	Leisure and hospitality	16,942	16,450	(492)	-2.9%		
	Subtotal	65,992	66,783	792	**1.2%**	10.0%	10,579
Totals		151,566	155,073	3,508	**2.3%**	45.8%	**215,239**

Using a space plan of 134 square feet per employee, and assuming a 72.9% office-using employment rate for the three primary and three secondary office sectors, the incremental 2.7 million gain in those categories should create gross space demand of 215.2 million square feet, dropping overall market vacancy by 1.77%. However, we also noticed a recent CBRE data point[23] that indicates an unusual disruption to the customary strong correlation between office job growth and occupancy, likely the result of companies taking time and thinking more carefully about their future space needs.

Office-Using Employment & Occupied Office Space

Source: CBRE, Disconnect Emerges Between Office Job Growth & Office Demand, March 13, 2023

23 CBRE, *Disconnect Emerges Between Office Job Growth & Office Demand*, March 13, 2023

The following chart details the allocation of jobs between remote, hybrid and onsite. The format includes all 155 million jobs, not merely office-using categories. As you can see, total remote work involves around 42 million jobs compared to nearly 72 million that could work-from-home, a gap of almost 30 million.

Total Employment (Number and %)

MSR Adjusted WFH #'s	Full Remote	Hybrid	On-Site	Fully Remote Jobs	Hybrid Jobs	On-Site Jobs	Check	Jobs Able to WFH but choose not to
Information	52.2%	15.8%	32.0%	1,628	493	998	3,119	387
Financial	27.5%	17.5%	55.0%	2,506	1,595	5,013	9,114	3,290
Prof. Services	30.8%	15.5%	53.7%	7,057	3,551	12,304	22,912	5,797
Subtotal	31.8%	16.0%	52.1%	11,191	5,639	18,315	35,145	9,474
Education and Health	9.4%	11.7%	78.9%	2,346	2,912	19,679	24,937	6,687
Other Services	13.4%	10.0%	76.6%	780	582	4,457	5,819	960
Government	30.3%	24.3%	45.4%	6,790	5,432	10,167	22,389	540
Subtotal	18.7%	16.8%	64.5%	9,915	8,926	34,304	53,145	8,187
Total Six Sectors	23.9%	16.5%	59.6%	21,107	14,565	52,618	88,290	17,661
Manufacturing	4.9%	7.3%	87.8%	637	949	11,413	12,999	3,744
Mining, quarrying, etc	2.1%	3.5%	94.4%	13	22	596	631	219
Transportation and utilities	6.4%	5.1%	88.5%	468	370	6,458	7,296	1,548
Wholesale and retail trade	6.8%	5.5%	87.8%	1,455	1,177	18,891	21,524	3,072
Construction	3.3%	5.9%	90.8%	260	465	7,159	7,884	907
Leisure and hospitality	1.6%	2.0%	96.4%	258	336	15,857	16,450	2,746
Subtotal	4.6%	5.0%	90.4%	3,091	3,319	60,374	66,783	12,235
Totals	15.6%	11.5%	72.9%	24,197	17,884	112,992	155,073	29,896
Category % of Total	15.6%	11.5%	72.9%	15.6%	11.5%	72.9%	100.0%	19.3%

Jobs Capable of Working from Home	71,977
Remote Capable Jobs Working in Office	29,896
Total Remote Work (Full and Part-Time)	**42,081**

As a distinct measurement, the job totals (71.98 million) and percentages in the following chart are based only on the portion jobs (46.4%) capable of working from home.

Jobs Capable of Working from Home (Number and %)

MSR Adjusted WFH #'s	Full Remote	Hybrid	On-Site	Fully Remote Jobs	Hybrid Jobs	Onsite Jobs	Total Jobs able to WFH
Information	64.9%	19.7%	15.4%	1,628	493	387	2,508
Financial	33.9%	21.6%	44.5%	2,506	1,595	3,290	7,391
Prof. Services	43.0%	21.6%	35.3%	7,057	3,551	5,797	16,405
Subtotal	42.5%	21.4%	36.0%	11,191	5,639	9,474	26,304
Education and Health	19.6%	24.4%	56.0%	2,346	2,912	6,687	11,945
Other Services	33.6%	25.1%	41.4%	780	582	960	2,322
Government	53.2%	42.6%	4.2%	6,790	5,432	540	12,762
Subtotal	36.7%	33.0%	30.3%	9,915	8,926	8,187	27,028
Total Six Sectors	39.6%	27.3%	33.1%	21,107	14,565	17,661	53,332
Manufacturing	12.0%	17.8%	70.2%	637	949	3,744	5,330
Mining, quarrying, etc	5.2%	8.7%	86.1%	13	22	219	254
Transportation and utilities	19.6%	15.5%	64.9%	468	370	1,548	2,386
Wholesale and retail trade	25.5%	20.6%	53.9%	1,455	1,177	3,072	5,704
Construction	15.9%	28.5%	55.6%	260	465	907	1,632
Leisure and hospitality	7.7%	10.0%	82.2%	258	336	2,746	3,339
Subtotal	16.6%	17.8%	65.6%	3,091	3,319	12,235	18,645
Totals	33.6%	24.8%	41.5%	24,197	17,884	29,896	71,977

Total Remote Work (Full and Part-Time)	**42,081**
Full and Part as % of total able to work remotely	58.5%

Predicting the Future

There will soon be a societal struggle with the remote work phenomenon. Workers will want flexibility, while employers will want a return to the office. A weaker job market could tilt the power balance back to employers. There may also be an eventual reckoning with the broader societal costs of work-from-home trends. The resumption of other aspects of social life in juxtaposition with the lack of return to work is a serious collective active problem. More specifically, the remote work movement is likely a disguised Social Trap, where the increasing adoption of work-from-home offers benefits to the individual (in the short run), but over the longer-term is likely to have negative consequences both for individuals and society. By way of comparison, traffic in major cities has long been a common example of a Social Trap where individuals enjoy driving their own cars, but that freedom comes at a cost that is noted and known. Thus far, work-from-home seems to be escaping broader detection of its serious flaws.

The worst impacts will be felt by cities with large work-from-home industries and individual propensities, combined with high levels of homelessness, drug use, and crime. These cities have a difficult task to avoid a doom loop of departing jobs and residents leading to a decline in property values, which reduces city property tax, income tax, and sales tax revenues, in turn making it more difficult to provide needed services. Many of these cities had already experienced the challenges of righting the ship in similar cycles from the late 1960's/early 1970's and again in the late 1980's and early 1990's. A great deal of public focus and investment in safety and transportation infrastructure was required to turn around struggling urban areas.

Short-Term Benefits

A greater incidence of remote work may reduce lease costs, improved retention, and may even lower labor costs over time as employees trade lower pay for more flexibility. In certain industries and roles, remote workers may be more productive. Introverted employees make up roughly half the U.S. population, and a significant percentage of them may find remote work less stressful. Remote work may include more workers in the workforce who were previously unable to participate.

Long-Term Costs

Remote work can prevent deeper in-person relationships, reduce impromptu discussions, and cause a reluctance to reach out and collaborate. It can be difficult to train and mentor new employees, build culture, and monitor productivity. Not all extroverts enjoy work from home since many crave in-person interaction. Companies may become uncomfortable with reduced control of IT security and infrastructure—there are company computers walking around everywhere. Younger employees can have a disillusioning initial experience with vacant offices.[24]

Not all factors fall cleanly into the benefits or costs category. Some employees may have better physical and mental health outcomes and morale when working from home, others may thrive under in-person working conditions. For example, promotions tend (though not always) to favor in-person employees. Is that a pro or a con?

24 A September 2022 Harris/Bloomberg poll found that two-thirds of interns working remotely and more than half of those working in-office felt lost at work (presumably due to a lack in-person supervision, training and mentoring).

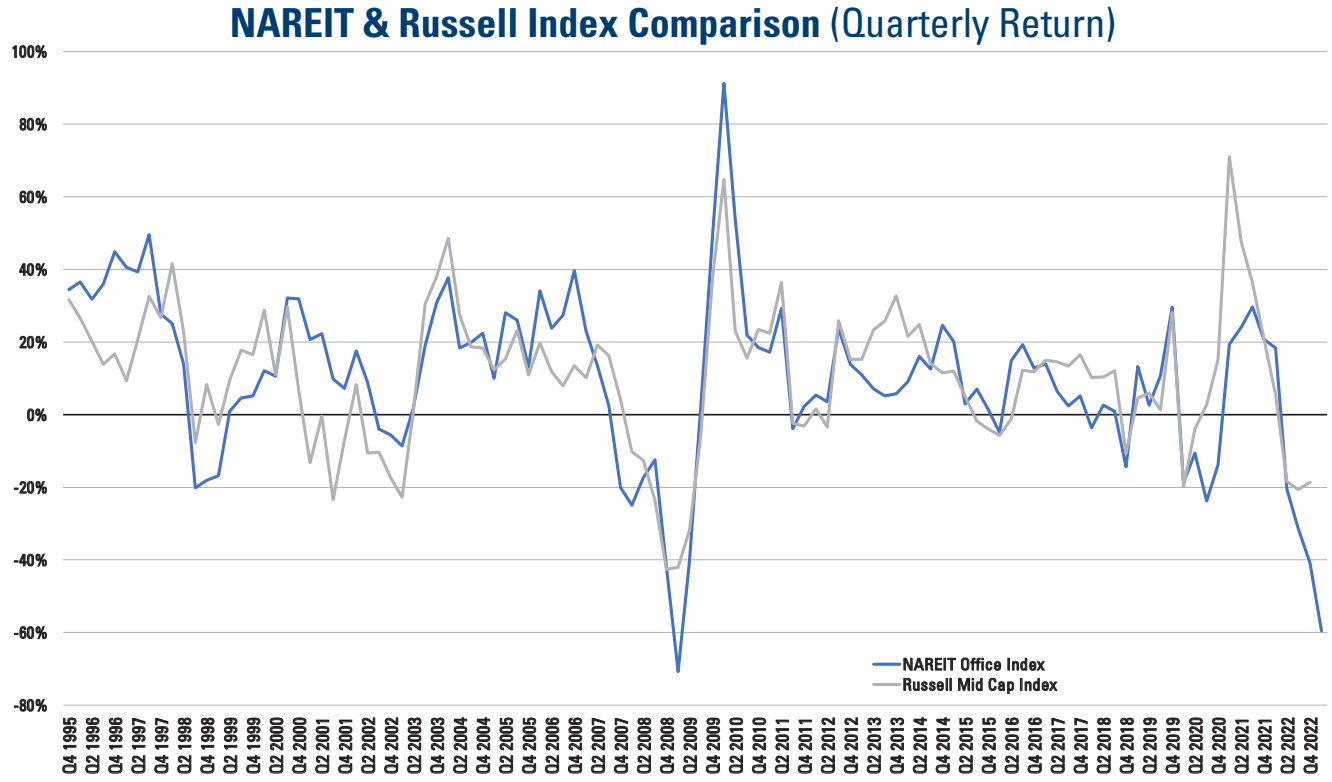
Impact on Office Values

Although we promised not to focus in this paper on the implications for value, we do want to make an observation about the disconnect between public and private valuations of office buildings. It's extremely important to note that REIT share prices represent the value to buyers and sellers of REIT shares, but not necessarily—almost never, in fact—the values of the underlying properties. The REIT market operates at an ever-evolving premium or discount to the private market trading value of the underlying buildings. You will often hear analysts say the REIT market merely leads private market values in terms of timing and accurately signals the eventual private market value. This is not correct. The REIT sector is more correlated to the Russell 2000 Midcap Value Index than to private market real estate values (expressed here by the NCREIF index).

	NAREIT Correlations
NAREIT	1
Russell Mid Cap Index	0.75
Russell 2000 Index	0.68
NCREIF	0.18

**The larger the number, the greater the correlation.*

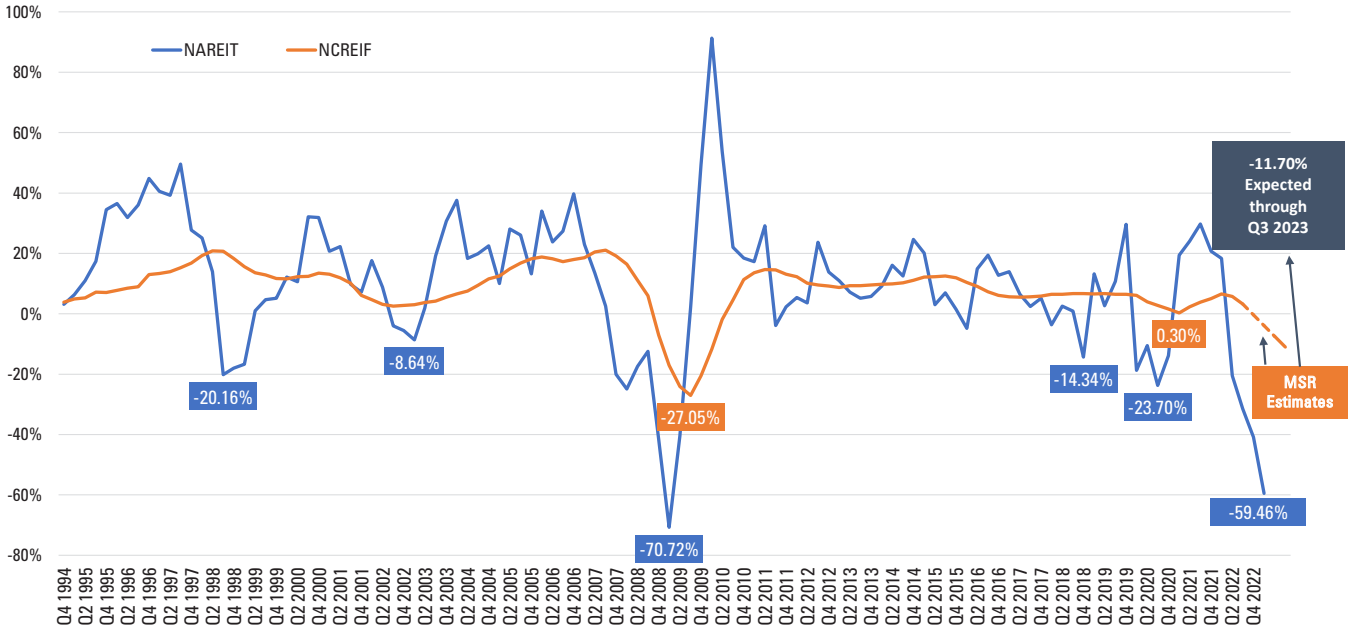
The relative strength of the correlation between the NAREIT Index and Russell 2000 Mid Cap Index over time is shown in the chart below.



Source: NAREIT

We find it more instructive to compare NAREIT returns to the NCREIF index, which tracks privately held commercial real estate values. Not only do we see the commonly noted appraisal lag, but we also find that NCREIF never reaches the full amplitude of the valuation peaks and valleys of NAREIT returns.

NAREIT & NCREIF Office Total Returns (Trailing Annual Return)



Source: NAREIT, NCREIF

Endnote #1: As previously discussed in footnote 18, the BLS identifies 35.1 million jobs (January 2023) under the narrowest scope of office-using categories (the Big 3 of Information, Financial Activities and Professional and Business Services). Of the 35.1 million jobs in the Big 3 sectors, 26.3 million or 74.8% are capable of remote work. However, even in this post-Covid environment and all its technological innovation, only 16.8 million of these workers are choosing full- or part-time remote work (a take-up rate of 64.0%).

By incorporating the secondary three sectors of Education/Health, Other Services, and Government, the total increases by 53.1 million jobs concentrated in the Big 6 job sectors (defined below) to a total Big 6 employment base of 88.3 million. Of the 53.1 million in the three secondary sectors, approximately 27 million or 50.9% are capable of working from home. With a take-up rate of 69.7%, 18.8 million of these workers choose some form of remote work.

When combined, the subtotal of jobs housed under the Big 6 sectors is 88.3 million, of which 53.3 million are capable of working from home. At a blended take-up rate of 66.9%, 35.7 million of these employees are in some form of work from home.

From the remaining six job sectors, with a combined total employment of 66.78 million jobs, only 18.64 million (27.9%) are capable of working from home. Accounting for all employment categories, an estimated 71.97 million (46.4%) can work from home. Currently 42.1 million people are in some form of work-from-home, including fully remote (24.2 million) or hybrid (17.9 million). This leaves a gap of another 17.7 million Big 6 office workers who could work from home if they wanted to, plus another 12.2 million employees in other employment categories (other than the Big 6) who are choosing on-site work in lieu of working from home.

Endnote #2: We are using an expansive data set of all office markets, tying to a CoStar measurement of 12.18 billion square feet of total supply. Many other studies take a narrow view of only the top metro areas, or include only certain building grades, or they simply back into a total office supply number by multiplying the traditional categories of office-using employment by an assumption of square feet per employee.

Morrison Street Research is a wholly-owned subsidiary of Norris, Beggs & Simpson Companies, LLC.

NORRIS BEGGS & SIMPSON COMPANIES

www.nbscollc.com

Other Affiliates Include:

MORRISON STREET CAPITAL

Morrison Street Capital, LLC places investment capital nationwide on behalf of the Morrison Street series of private equity funds. MSC is a trusted source of small balance equity, mezzanine debt and preferred equity investments.

www.morrisonstreetcapital.com

NBS REAL ESTATE CONSULTING

NBS Real Estate Consulting can assist in providing advice, planning and strategic guidance for complex projects. Services include development management, acquisition/disposition guidance and execution, interim/supplemental resource, receivership, and expert testimony.

www.nbsreconsulting.com

NORRIS BEGGS & SIMPSON FINANCIAL SERVICES

Norris, Beggs & Simpson Financial Services manages a loan portfolio backed by office, retail, industrial, multifamily and hotel properties. Our services include loan monitoring, accounting, property inspections, insurance and tax compliance/confirmations, and lender reporting.

www.nbsfinancial.com

MORRISON STREET RESEARCH

4949 Meadows Road, Suite 490 | Lake Oswego, OR 97035 | 503-952-0700 | www.morrisonstreetresearch.com | @mstreetresearch