“New York, Just Like I Pictured It”
NYC’s post-COVID recovery compared to other large cities

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J.P.Morgan

New York City: a summary

NYC has unique advantages regarding its outright size (output, labor force, purchasing power), business sector diversification and global financial sector dominance. Many measures have now reached pre-pandemic levels, including the labor force, airport utilization and seated diners. NYC residential and industrial vacancy rates are low, and NYC crime stats also compare favorably to other cities which sometimes comes as a surprise. But:

- Mass transit use is still 73% of 2019 levels, which is unsustainable given required capital and operating costs
- NYC office vacancy rates of 18% are the highest since the early 1990's, leased-but-underutilized space is high and ~35% of work days are still done from home; office to residential conversions are unlikely to materially reduce the stock of underutilized office space given cost and complexity
- Given projected operating deficits, the city must enact deep budget cuts and/or tax hikes while reinvesting in infrastructure, mass transit and public housing
- NYC is still a very difficult place to do business, and its zoning restrictions are particularly burdensome at a time when flexibility is paramount in a post-COVID world
- NYC's household tax rates and municipal debt burdens are high, and its home affordability is very low. These factors may partially explain why NYC has had one of the highest net outmigration rates in recent years, and why New York State ranked next to last among all states from 2011-2021 regarding outmigration of both the number of taxpayers and their earned income (only Alaska is worse)
- NYC's asylum influx threatens to substantially impair the city's financial situation
- The city's electricity prices are high due to low regional wind and solar capacity factors, and the city is increasingly exposed to natural gas prices with the closure of Indian Point nuclear plant

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Heat map of current conditions: NYC above median on high frequency measures of urban recovery, but dragged down by a weak economic recovery, structural problems related to business conditions and poor fiscal health

Heat map by category

	ATL	AUS	BOI	BOS	CHA	CHI	DAL	DEN	DET	HOU	LA	MIA	NYC	PHL	PHO	RAL	SLC	SANT	SF	SANJ	SEA	DC
Urban recovery: urban mobility (restaurants, retail, grocers), mass transit utilization (heavy/light rail, bus, air), real estate vacancies (office, residential, industrial), crime																						
Urban recovery	44	54	82	61	52	48	47	36	38	43	60	78	63	41	44	53	62	56	26	58	44	48
Economy/demographics since 2019: population, labor force, payrolls, housing permits, personal income, business spending, consumer spending, outmigration																						
Economy/demographics since 2019	51	79	82	45	73	23	60	62	22	51	28	37	31	41	61	79	59	64	38	34	62	32
Business conditions: Market size, economic complexity, housing affordability, zoning restrictions, youth unemployment, ease of doing business, tax rates, electricity prices																						
Business conditions	67	62	72	46	67	64	75	55	53	71	39	63	38	59	61	63	65	65	28	29	51	52
Fiscal health: tax revenue growth, government debt as a % of revenues, liquidity ratios, unfunded pensions and retiree healthcare (OPEB)																						
Fiscal health	48	58	55	70	36	19	32	34	32	43	50	53	39	47	56	53	49	41	43	50	58	60
Equal weighted composite	**52**	**63**	**73**	**55**	**57**	**38**	**53**	**47**	**36**	**52**	**44**	**58**	**43**	**47**	**56**	**62**	**59**	**56**	**34**	**43**	**54**	**48**

Source: JPMAM. 2023. See report for individual sources for each measure.

NYC trails most cities in the peer group, and is ahead of only Chicago, Detroit and San Francisco

Real estate companies and large corporations should treat NYC the way an asset manager treats a megacap stock in a diversified equity portfolio: avoid being “overweight” relative to some agnostic benchmark of regionally diversified assets. It’s worth having exposure, but the risks argue against too much concentration.

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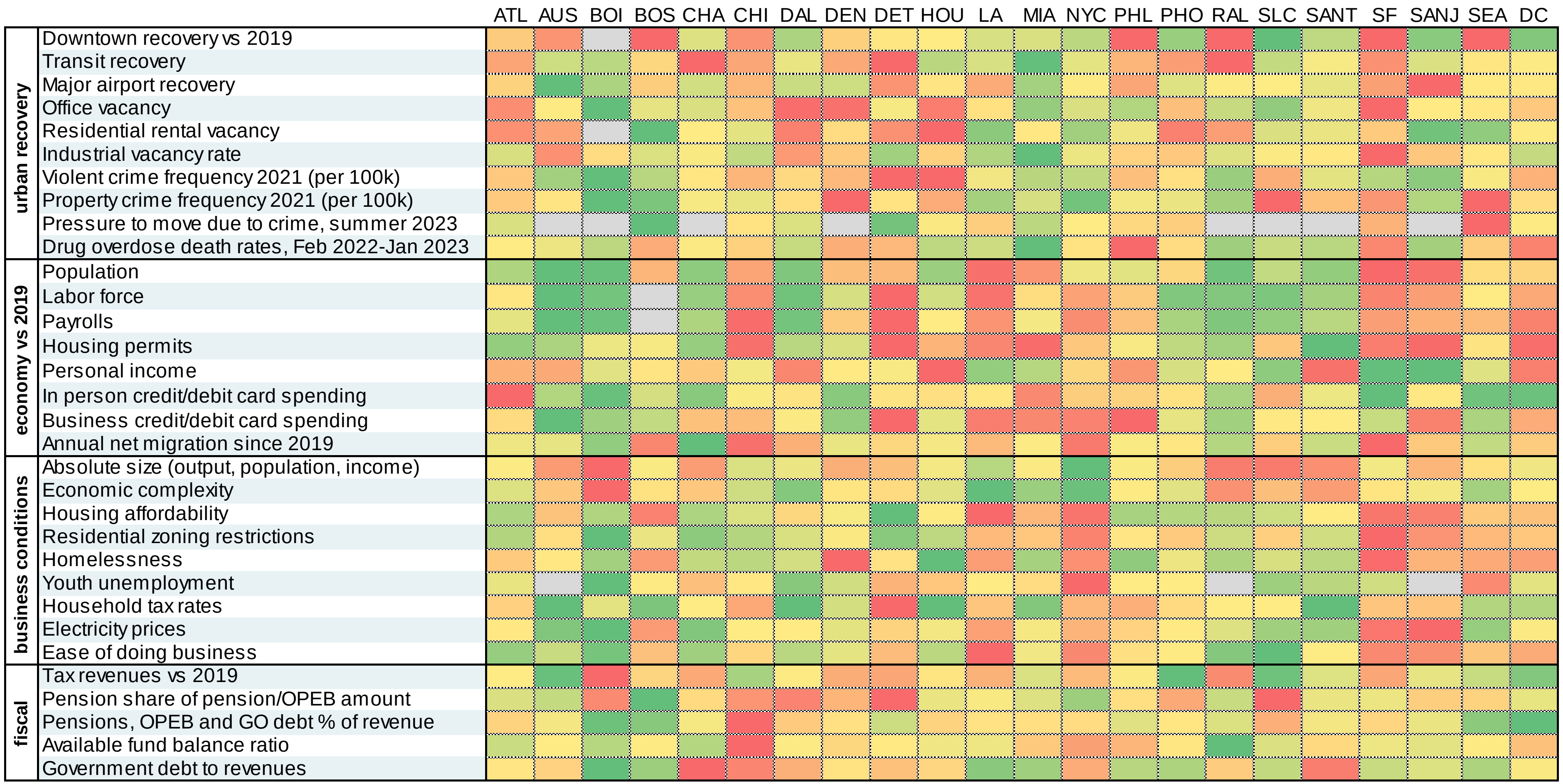
Heat map of current conditions: the details



	ATL	AUS	BOI	BOS	CHA	CHI	DAL	DEN	DET	HOU	LA	MIA	NYC	PHL	PHO	RAL	SLC	SANT	SF	SANJ	SEA	DC
Composite, equal weighted (100 = highest):	52	63	73	55	57	38	53	47	36	52	44	58	43	47	56	62	59	56	34	43	54	48

Source: JPMAM. 2023. See report for individual sources for each measure.

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Policy options: no magic bullets, only a few ideas to increase efficiency/productivity and tax revenues

Zoning

- NYC ranks #43 out of 44 cities (Wharton Residential Land Use Zoning Index) and #83 out of 83 cities according to the University of Arizona's zoning regulation index
- Department of Transportation: relaxation of zoning restrictions can substantially increase output per worker, increase mean wages and decrease commuting times
- NYC: new apartment buildings cannot be constructed in parking lots or where one-story retail establishments once existed; new apartments and new retail often require off-street parking which can be prohibitively expensive to provide; some areas benefit from limited development "special district" status in place since 1978; some areas have never been zoned for apartment buildings at all; some streets preclude development of new housing even along streets adjacent to public transit

Sources: "*Zoning and the Density of Urban Development*", Delventhal (Claremont), Kwon (USC) and Parkhomenko (USC), Pacific Southwest Region University Transportation Center, August 2020; and "*How to Solve NYC's Housing Crisis*", Eric Kober, Manhattan Institute, June 2022

Policy options: no magic bullets, only a few ideas to increase efficiency/productivity and tax revenues

- More public/private partnerships to develop apprenticeship programs, particularly for those without a four-year degree
- Second chance legislation to increase employment and reduce recidivism
    - Automatically expunge certain criminal records if individuals remain arrest-free for a specified period; require private employers to postpone asking about an applicant's criminal record until after the applicant has had an opportunity to interview; prevent unpaid court debts (fines, fees, costs and restitution) from being a barrier to record clearing; and standardize record clearing timetables across states; end the practice of suspending driver's licenses for non-driving offenses and providing state-issued IDs for individuals leaving prison facilities, which helps with access to employment, housing, education and mainstream banking services
- Reduce state licensing requirements to improve interstate and intrastate mobility
    - Occupations that require licensing in New York: bail bondsmen, barbers, shorthand court reporters, nail cosmetologists, interior designers, horse trainers, jockeys, "creative arts therapists", notary publics, librarians, road race officials and ticket resellers

Policy options: no magic bullets, only a few ideas to increase efficiency/productivity and tax revenues

- Negotiate PILOT payments from tax-exempt owners of NYC real estate (tax exempt hospitals, universities and their medical centers, museums and religious institutions)
  - Many universities have technology transfer offices to privatize and profit from federally sponsored research, collecting millions in tax-exempt royalties. In addition, tax exempt Trinity Church owns a real estate portfolio reportedly worth $6 billion
  - Columbia University is now the city's largest landowner; its property tax savings are 50% larger than those given to Yankee Stadium, and greater than the tax incentives for Citi Field and Madison Square Garden combined. The situation gets worse very time Columbia expands, since it takes over previously taxable real estate
  - ~12,000 NYC properties worth at least $40 billion in 2012 (almost certainly a lower bound estimate) are exempt from property tax since they're owned by non-profit entities, even though these entities earned revenues of $134 billion in that year

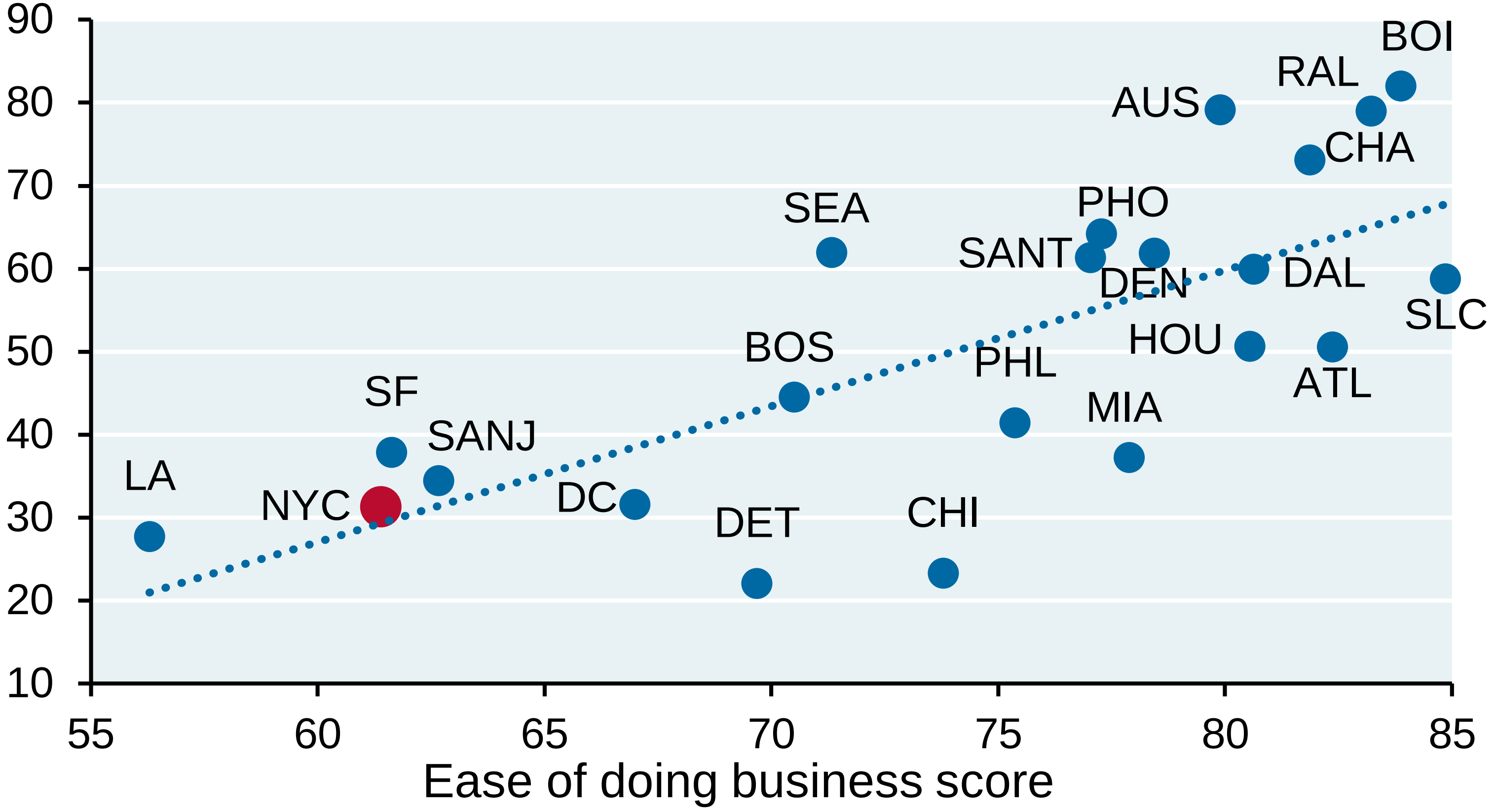
See accompanying word document for more details on policy options

Sources: "*The Untouchables: How Columbia and NYU Benefit From Huge Tax Breaks*", NYT, September 23, 2023; and "*Three policy questions for non-profit property tax exemptions*", Charles Brecher (NYU and Research Co-Director of the Citizens Budget Commission) and Thad Calabrese (NYU), 2015

NYC is a difficult place to do business, and is being outflanked by cities with a different approach

Ease of doing business vs economic recovery

Economic/demographic growth since 2019



Source: Ariz. State University, BEA, BLS, Chase Data Science, JPMAM. 2023.

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For buyers of New York State/City municipal bonds…

I typically recommend that taxable clients residing in highly indebted states have some holdings of national municipal portfolios, and not invest only in-state holdings

- A NYS resident would currently sacrifice 40-50 basis points by owning a national muni portfolio instead, which I consider a fair price for portfolio insurance on safe haven assets
- That's roughly what investors would pay for 10 year default protection on Walmart…and I think New York State/City default risk is comparable to or greater than Walmart

For those investing in New York, our portfolio managers tend to prefer the following:

- Debt supported by personal income or sales taxes, typically issued by NYS Dormitory Authority or NYS Urban Development Corporation
- State Revolving Funds for essential services (water/sewer and public power)
- High quality GO debt supported by property tax revenues (i.e., Islip, Brookhaven, Huntington) and high-income school district debt supported by property tax revenues (Garden City, Scarsdale)
- Private colleges and universities with strong enrollment and resource base (Cornell, Columbia)
- Local sales tax supported debt with limits on additional debt (interim finance authorities)

Contents

On the 21-city peer group used to assess NYC: we included most of the largest cities in the country, and some faster growing cities as well using the following criteria: Population > 800,000; > 20% population growth since 2004; > 30% payroll growth since 2004; > 120% growth in gross metropolitan output since 2004

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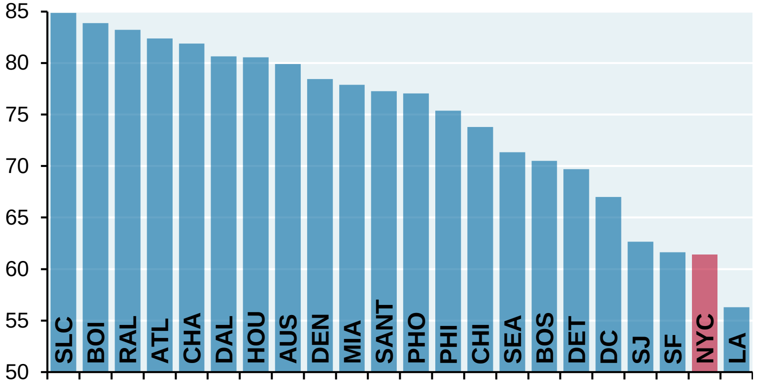
If there were an unforeseen negative change in a city, what might the catalysts be?

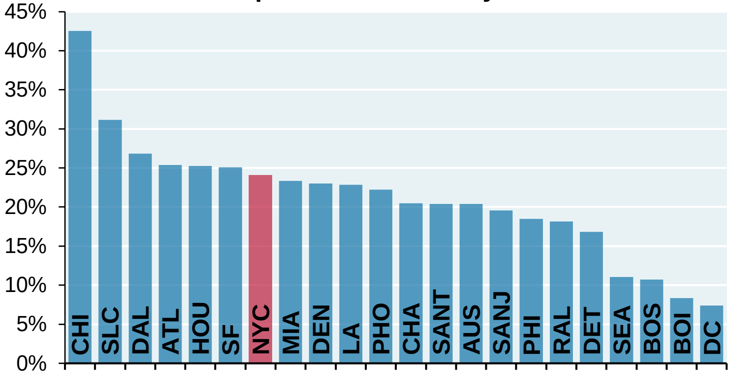
In a city that is already a difficult place to do business, a combination of fiscal pressures, out-migration of the tax base and high tax rates lead politicians to raise taxes further, fueling a further decline in investment and further outmigration

Ease of doing business by city
Score (out of 100)



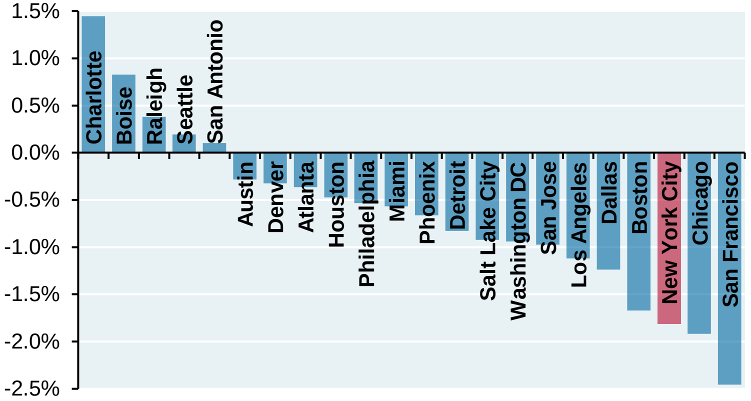
Source: Arizona State University "Doing Business North America" project, JPMAM. 2022.

Cost of pension and retiree healthcare plans (including amortization of unfunded amounts), government debt and defined contrbution plans as a % of city revenues



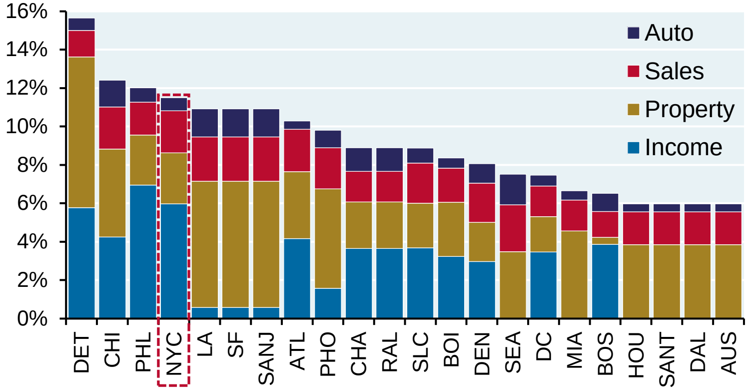
Source: Individual city CAFRs, Moody's, JPMAM. FY 2022.

Annual net migration by city, 2019-2023
Percent, annual rate



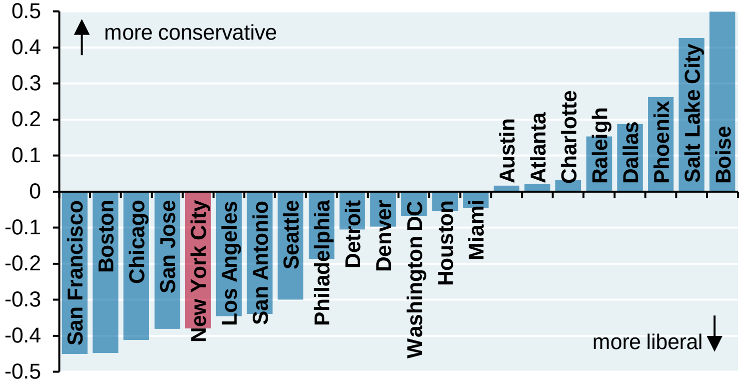
Source: J.P. Morgan Data Science, JPMAM. June 2023.

Tax burden for family earning $75,000 per year
Percent



Source: "*2020 Tax Rates and Tax Burdens in the District of Columbia: A Nationwide Comparison*", City of Washington DC. 2022.

Political spectrum by city
Avg dimension score, based on voting records of congressional reps mapped to MSA areas, 112th-117th Congresses



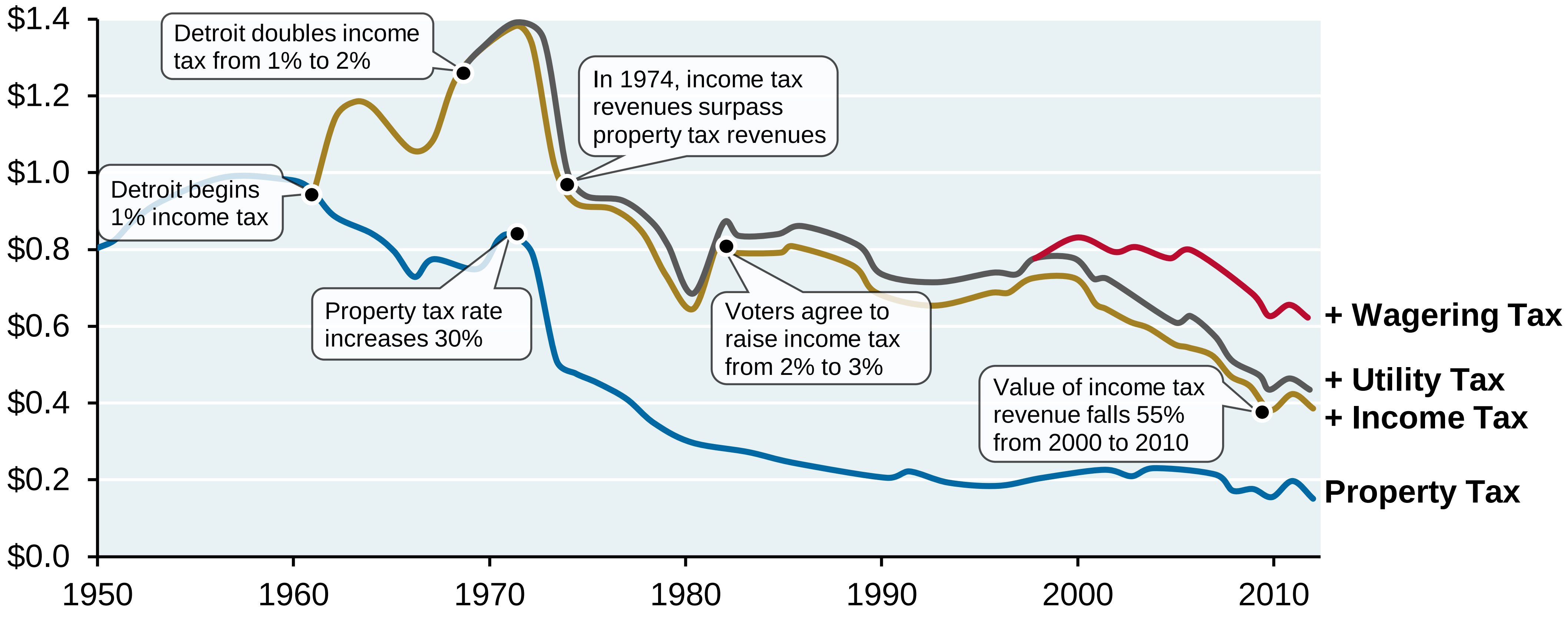
Source: VoteView Roll Call Votes database, JPMAM. 2023.

Time Capsule: Detroit

This is the story of Detroit, whose tax revenues fell despite a series of tax hikes…

Detroit tax revenues fall despite new taxes imposed

Tax revenues, 2013 US$, billions



Source: "*How Detroit Went Broke*", Detroit Free Press. September 2013.

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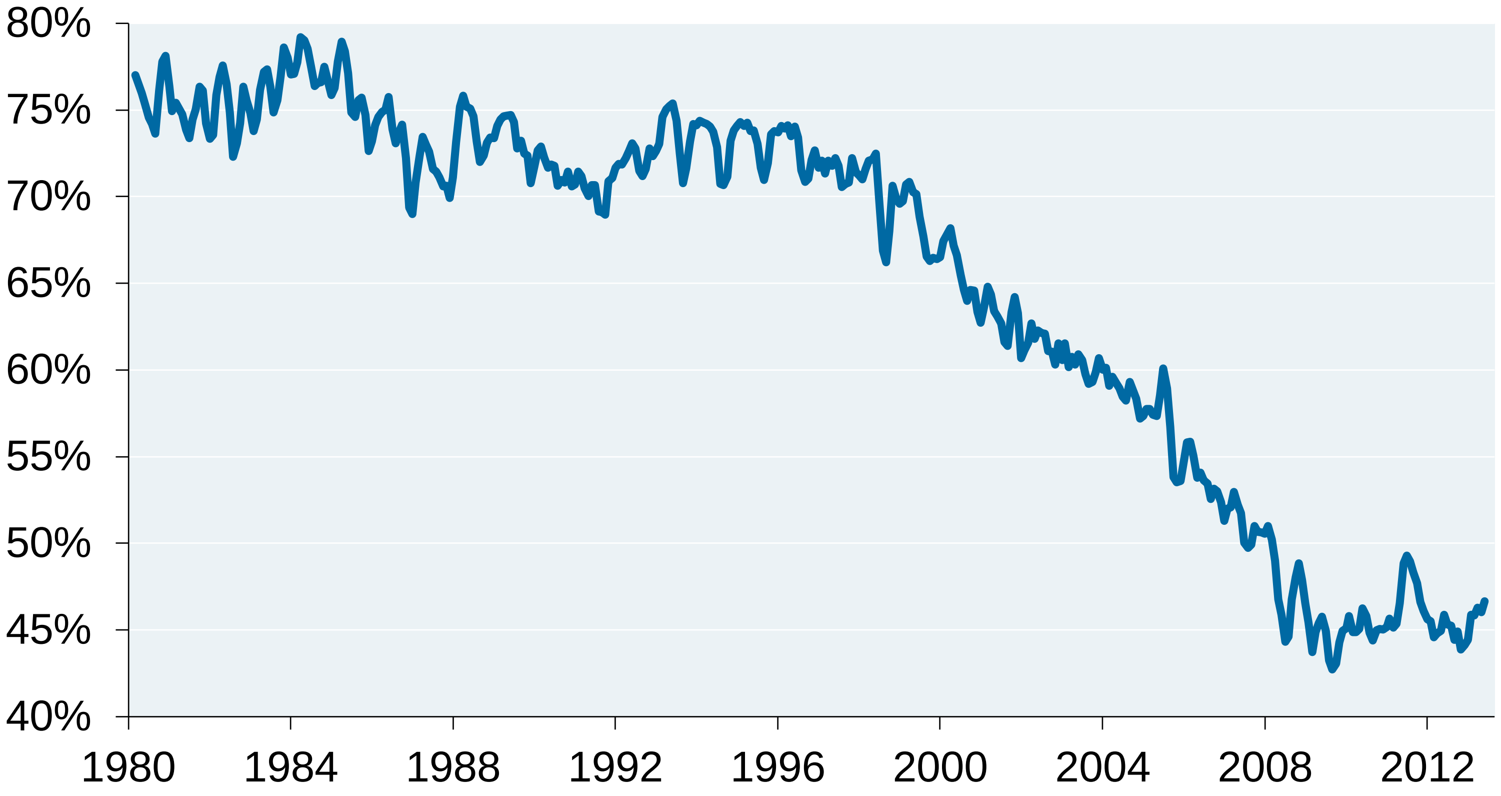
…and whose decline was exacerbated by the high auto sector concentration of its employment and tax base

Sales of Big 3 auto companies as a percent of total US auto sales, 3-month moving average

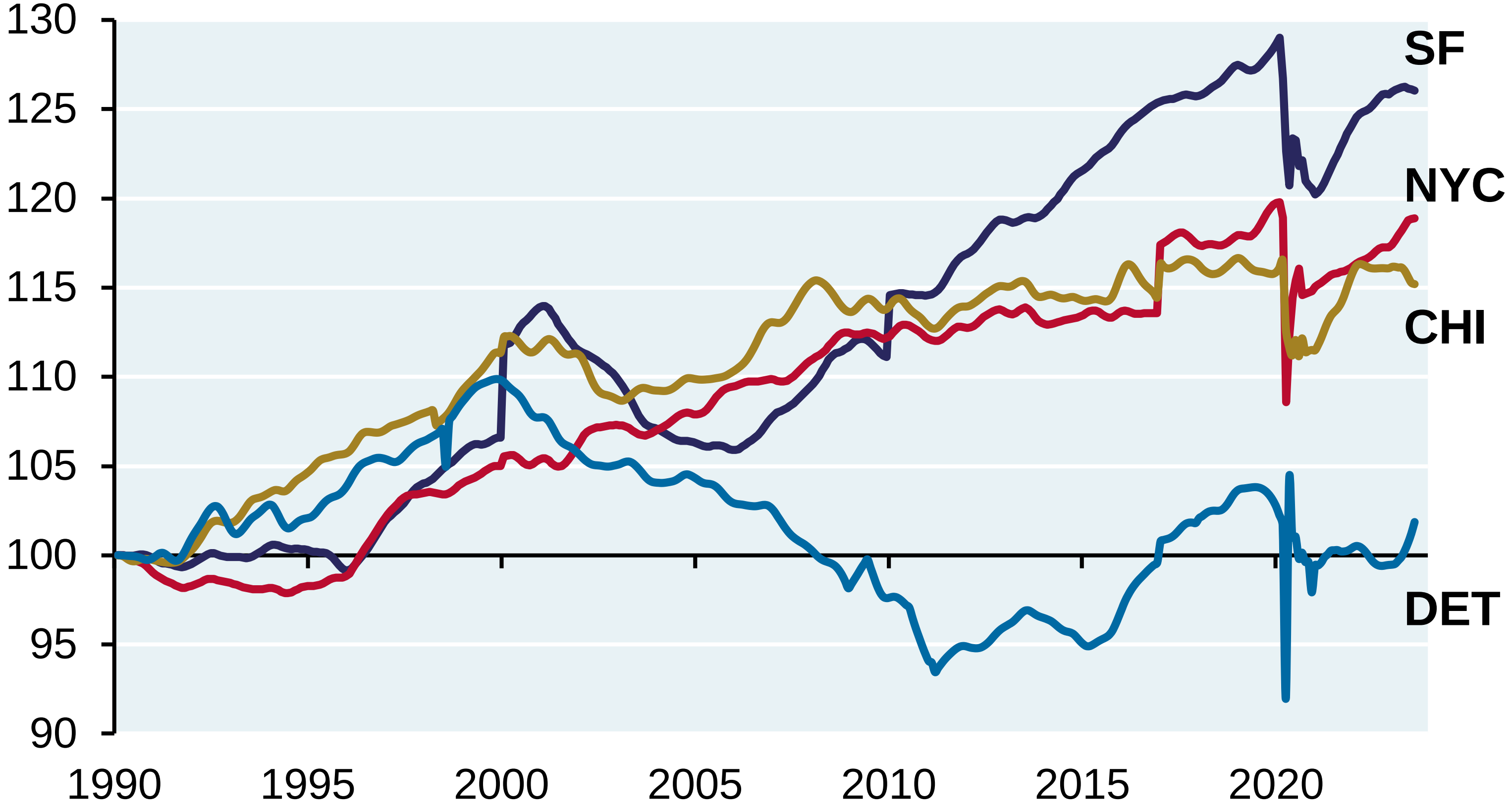


Source: J.P. Morgan Securities. Big 3 = GM, Ford, and Chrysler. June 2013.

NYC, Chicago and San Francisco are substantially more economically diversified and fiscally sound than Detroit in 2013, but that's a very low bar

Detroit's decline in context

Size of labor force, index (100 = January 1990)



Source: BLS, JPMAM. August 2023.

[1] High frequency indicators

- NYC urban activity, mobility and mass transit use have reached ~70% of pre-pandemic levels; while a large gap remains, this figure is ahead of most peers
- NYC airport and hotel utilization have reached pre-pandemic levels, roughly median in the peer group
- NYC employment has shifted more towards finance, healthcare and education and away from real estate, manufacturing, retailing and the arts
- NYC multifamily rent growth and vacancy have normalized after COVID shocks; multifamily vacancy and industrial vacancy rates lower than most cities in peer group
- Office vacancy rates of 18% are high even before including underutilized space, which is comparable to peer group; NYC ranks higher than peers on work-from-home days at ~35%
- NYC violent and property crime rates are lower than most peer group cities, and is concentrated in a subset of precincts
- NYC had one of the highest outmigration rates in recent years, and New York State ranks next to last regarding outmigration of both number of taxpayers and their earned income

High frequency measures: NYC post-COVID recovery generally above median with the exception of net population out-migration

NYC Recovery

City (MSA)	Downtown recovery	Transit recovery	Major airport recovery	Office vacancy	Industrial vacancy	Residential vacancy	Annual net migration	Violent crime per 100k	Property crime per 100k
Atlanta	56%	58%	95%	25%	4.8%	8.7%	-0.4%	884	3,674
Austin	53%	78%	124%	21%	8.0%	8.1%	-0.3%	491	3,343
Boise		82%	113%	11%	6.1%		0.8%	297	1,344
Boston	48%	65%	94%	19%	4.9%	2.9%	-1.7%	551	1,648
Charlotte	63%	48%	107%	18%	5.5%	5.9%	1.4%	782	3,139
Chicago	52%	58%	90%	22%	4.4%	5.4%	-1.9%	943	2,983
Dallas	69%	72%	109%	26%	7.7%	9.2%	-1.2%	825	3,421
Denver	56%	59%	108%	26%	6.5%	6.4%	-0.3%	932	5,780
Detroit	57%	48%	82%	20%	3.7%	8.7%	-0.8%	2,154	3,356
Houston	57%	82%	99%	25%	6.3%	9.9%	-0.5%	1,211	4,106
Los Angeles	63%	76%	87%	21%	4.0%	3.7%	-1.1%	722	2,148
Miami	63%	100%	114%	14%	2.4%	6.0%	-0.6%	556	2,750
NYC	67%	73%	101%	18%	5.3%	4.1%	-1.8%	578	1,558
Philadelphia	46%	60%	86%	16%	6.3%	5.6%	-0.5%	909	3,097
Phoenix	72%	57%	105%	22%	6.5%	9.2%	-0.7%	798	2,989
Raleigh	44%	50%	101%	17%	5.0%	8.3%	0.4%	464	2,137
Salt Lake City	139%	80%	101%	14%	5.6%	5.2%	-0.9%	969	6,841
San Antonio	67%	69%	104%	20%	5.7%	5.5%	0.1%	683	3,814
San Francisco	32%	55%	85%	26%	9.0%	6.9%	-2.5%	544	4,394
San Jose	74%	75%	73%	21%	6.6%	3.2%	-1.0%	425	2,316
Seattle	46%	67%	100%	21%	5.7%	3.8%	0.2%	745	5,102
Washington DC	76%	68%	100%	22%	4.4%	5.9%	-0.9%	958	3,431

Source: University of Toronto, compilation of transit and airport authority data, CoStar, Census, FBI, JPMAM. Office vacancy includes pending vacancy. 2023.

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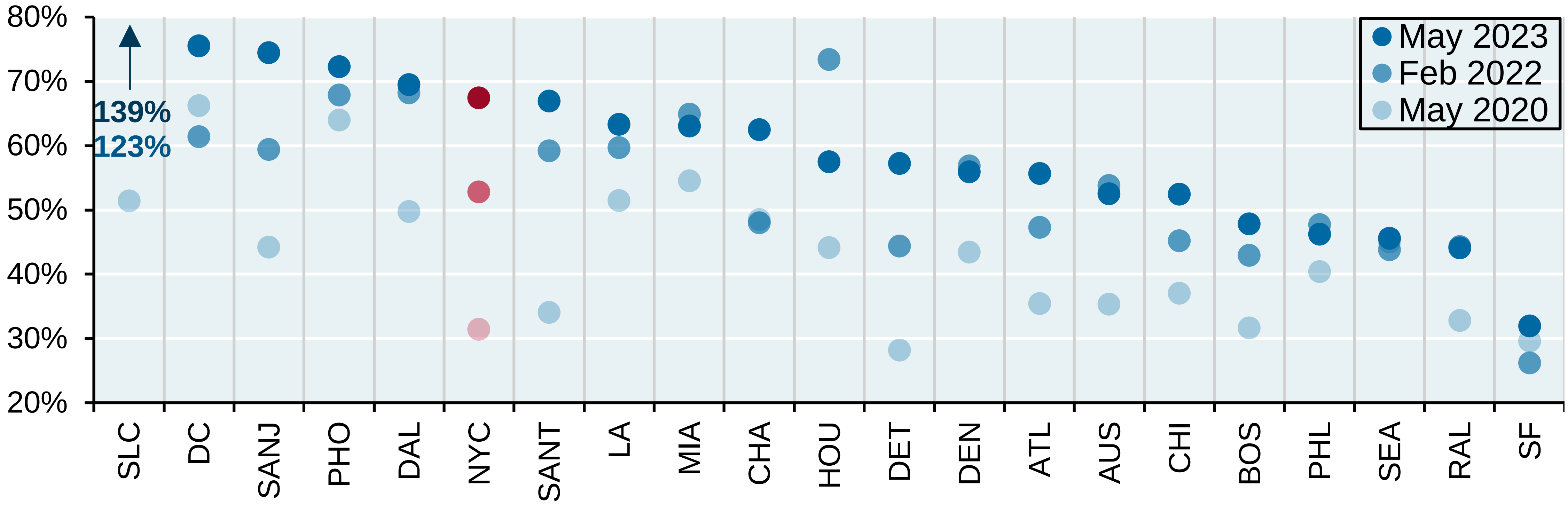
NYC ranks at high end of urban recovery measures (mobile-phone tracked visits to retail stores, supermarkets, restaurants, museums), but a 30% gap is still significant

Downtown recovery rankings of major metropolitan areas

Recovery vs pre-COVID activity levels, tracked via mobile phone use



Source: University of Toronto, JPMAM. May 2023. Fort Worth is used as a proxy for Dallas.

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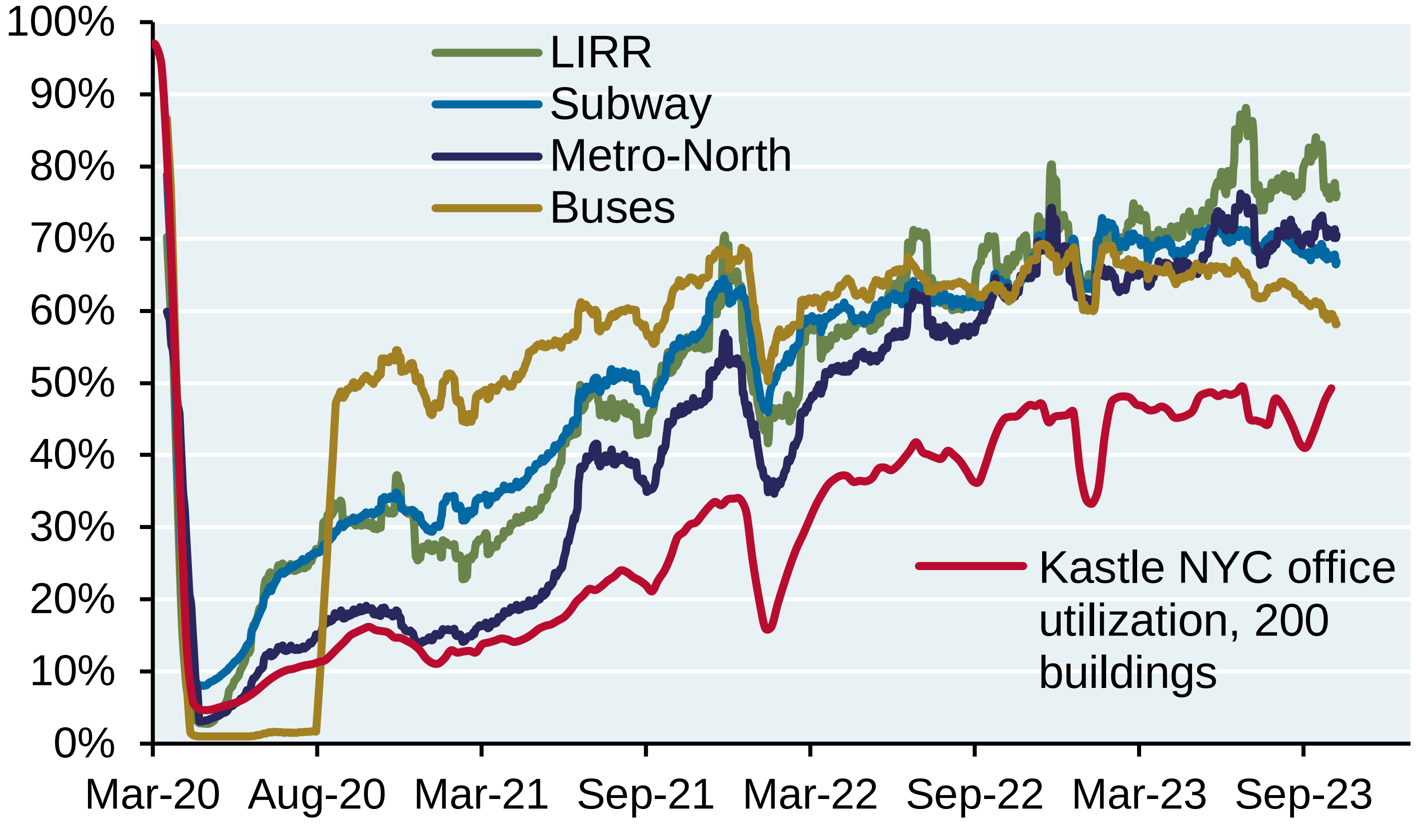
NYC transit recovery exceeds NYC office utilization, which is consistent with national trends

Mind the gap: NYC transit use vs office utilization

% vs pre-pandemic baseline, 3-week average



Source: Kastle, MTA, JPMAM. October 10, 2023.

NYC ranks #8 in mass transit recovery at ~75% utilization vs 2019

Recovery of mass transit ridership

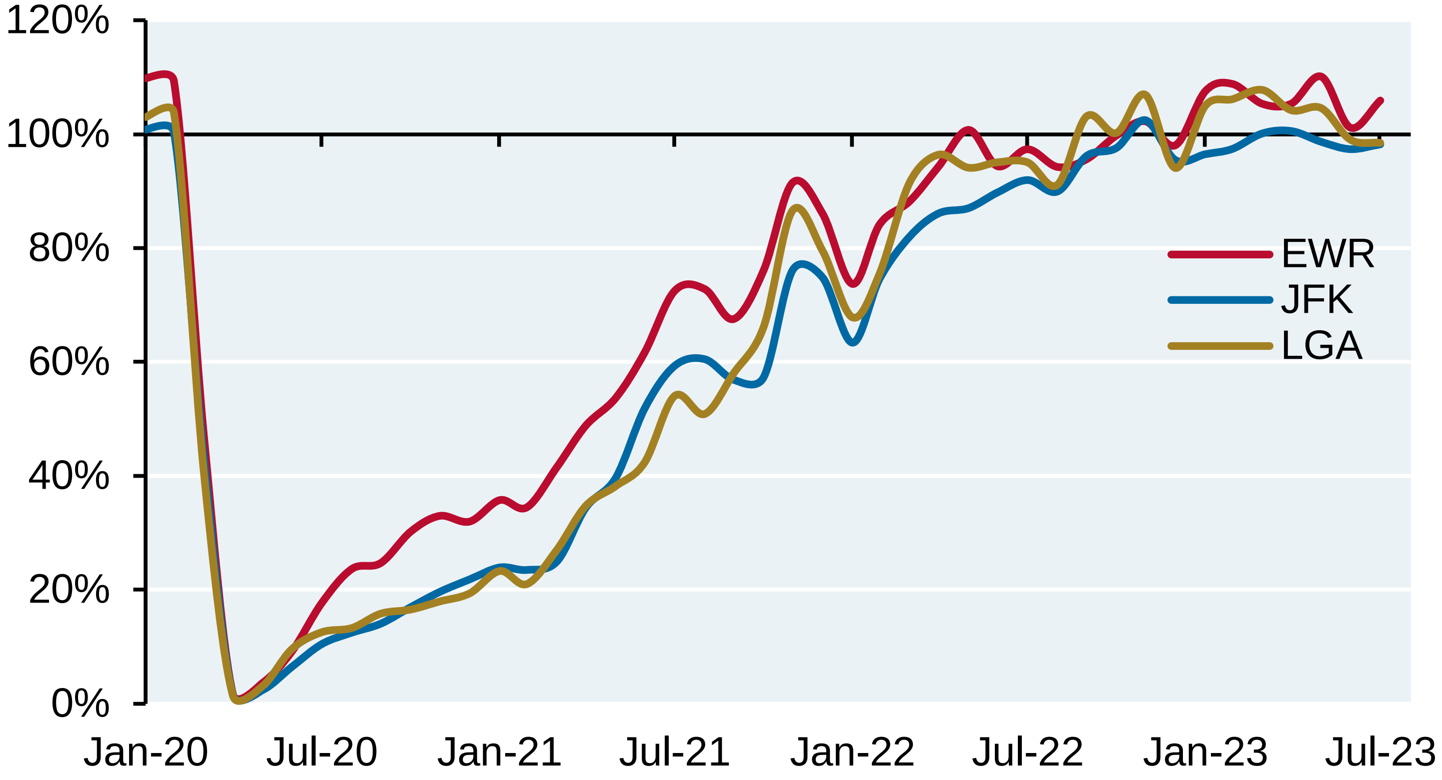
#	City	Recovery vs 2019	Transit Authorities
1	Miami	100%	Miami-Dade Transit Agency
2	Houston	82%	Metro Tr Auth of Harris Co
3	Boise	82%	Valley Regional Transit
4	Salt Lake City	80%	Utah Transit Authority
5	Austin	78%	Capital Metropolitan Trp Auth
6	Los Angeles	76%	Access Services, Los Angeles County MTA, Southern California RRA
7	San Jose	75%	Santa Clara Valley Trp Auth
8	**NYC**	**73%**	**MTA Bus Company, MTA Long Island Rail Road, MTA Metro-North Railroad, MTA New York City Transit, MTA Staten Island Railway, New York City DOT**
9	Dallas	72%	Dallas Area Rapid Transit, Trinity Railway Express
10	San Antonio	69%	VIA Metropolitan Transit
11	Washington DC	68%	District Dept of Transp, Washington Metro Area TA
12	Seattle	67%	King County Dept of Trp, Sound Transit, Washington State Ferries
13	Boston	65%	Massachusetts Bay Tr Auth
14	Philadelphia	60%	Southeastern Penn TA
15	Denver	59%	Regional Trp District
16	Chicago	58%	Chicago Transit Authority, Metra
17	Atlanta	58%	Atlanta-Region Transit Link Authorit, Metro Atlanta Rapid Tr
18	Phoenix	57%	City of Phoenix PTD, Valley Metro, Valley Metro Rail, Inc.
19	San Francisco	55%	Golden Gate Bridge, Hwy & TD, San Francisco Bay Area RTD, San Francisco Muni Rwy
20	Raleigh	50%	GoRaleigh
21	Charlotte	48%	Charlotte Area Transit
22	Detroit	48%	City of Detroit Dept of Trp, Detroit Transp Corp/DPM

Source: APTA, individual transit reports, JPMAM. June 2023.

NYC airport utilization has now reached 100% of pre-pandemic levels…

Total revenue passengers at NYC airports

Percent of 2019 levels



Source: Port Authority NY/NJ, JPMAM. July 2023.

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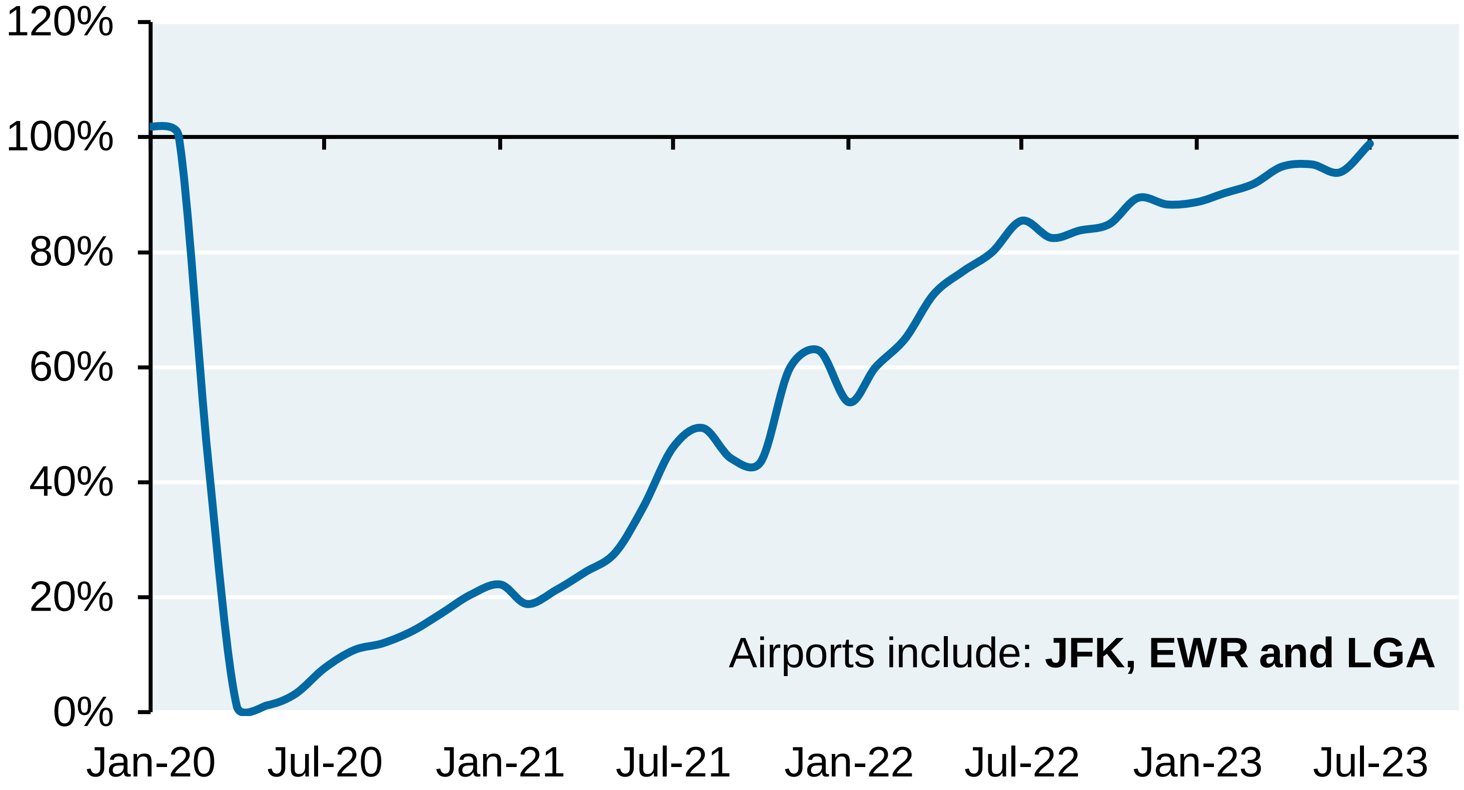
…and the same is true when looking at international arrivals, although new restrictive AirBnB rules are worth watching

Total international revenue passengers at NYC airports

Percent of 2019 levels



Source: Port Authority NY/NJ, JPMAM. July 2023.

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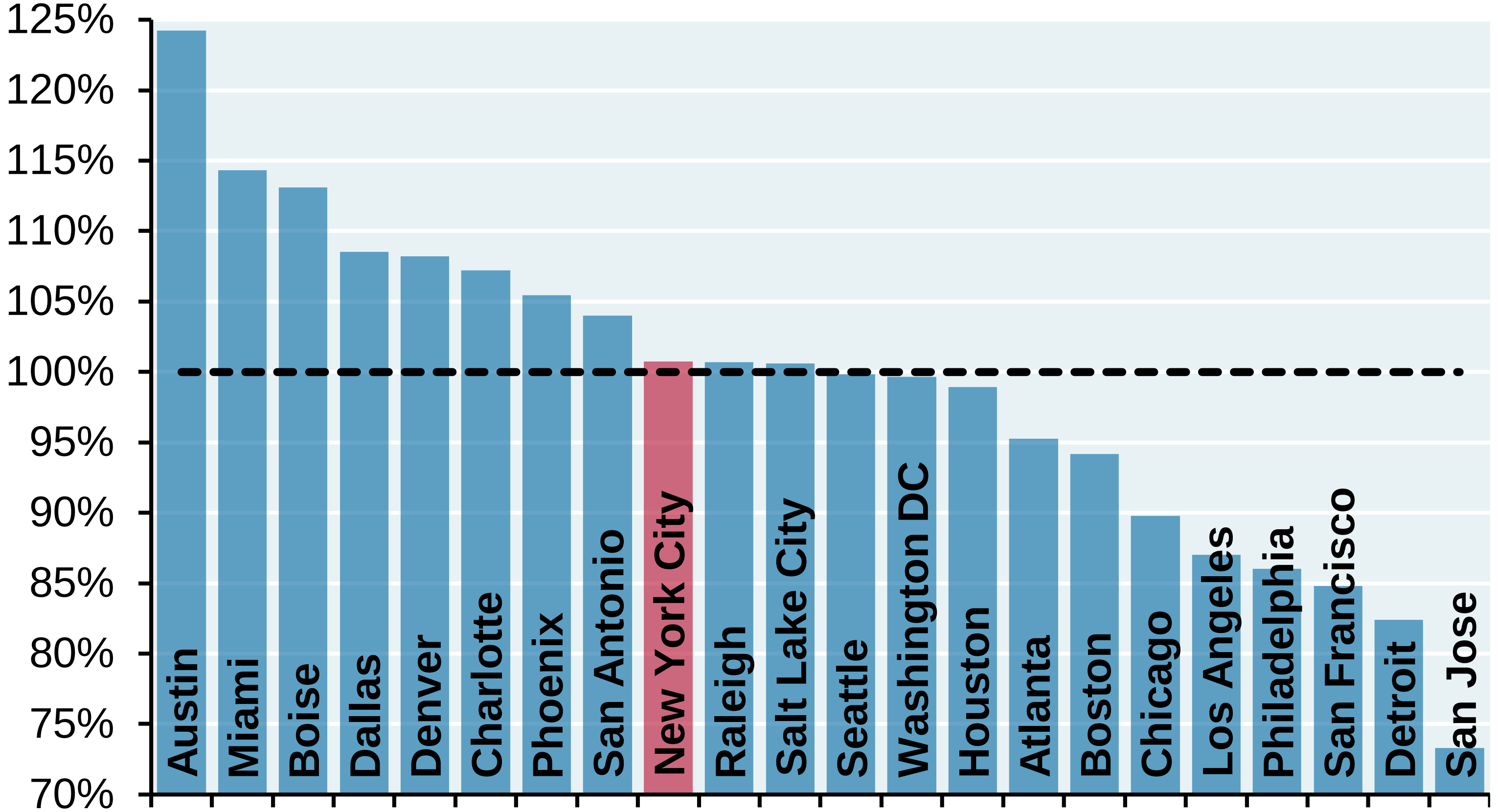
NYC is roughly median regarding its airport utilization recovery

Recovery of major airports by city

Percent vs corresponding month in 2019



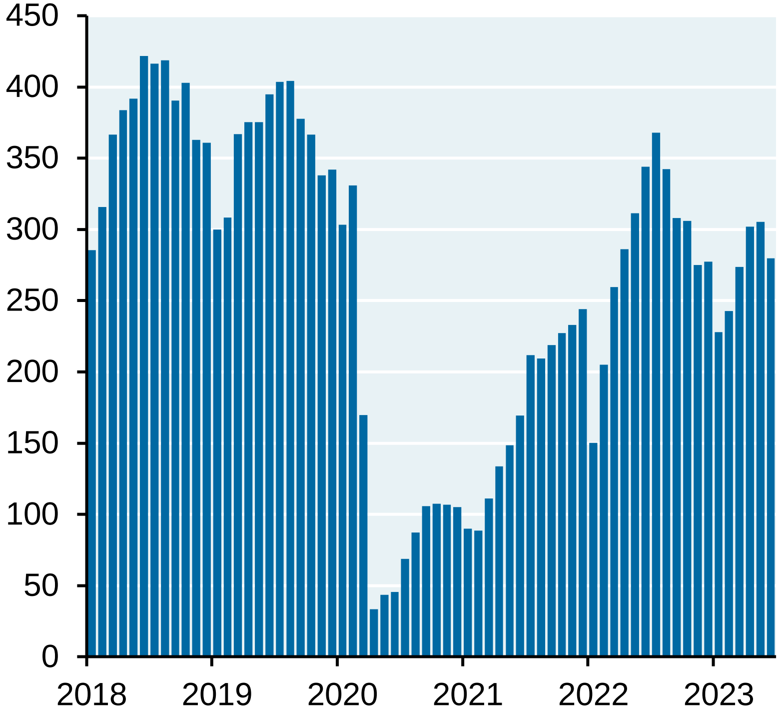
Source: Compilation of airport data and reports, JPMAM. August 2023.

While NYC residents and tourists are circulating close to pre-pandemic levels…

Broadway show attendance by calendar year, Number of people, thousands

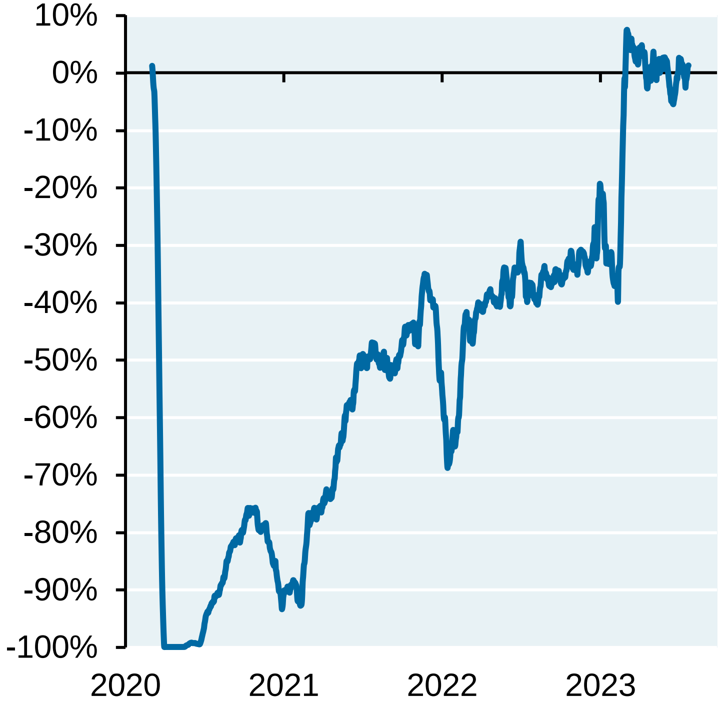
Source: Internet Broadway Database. July 16, 2023

Average daily pedestrian count in Times Square, Number of pedestrians, thousands



Source: Timesquarenyc.org, JPMAM. June 2023.

New York City seated diners
Percent, y/y

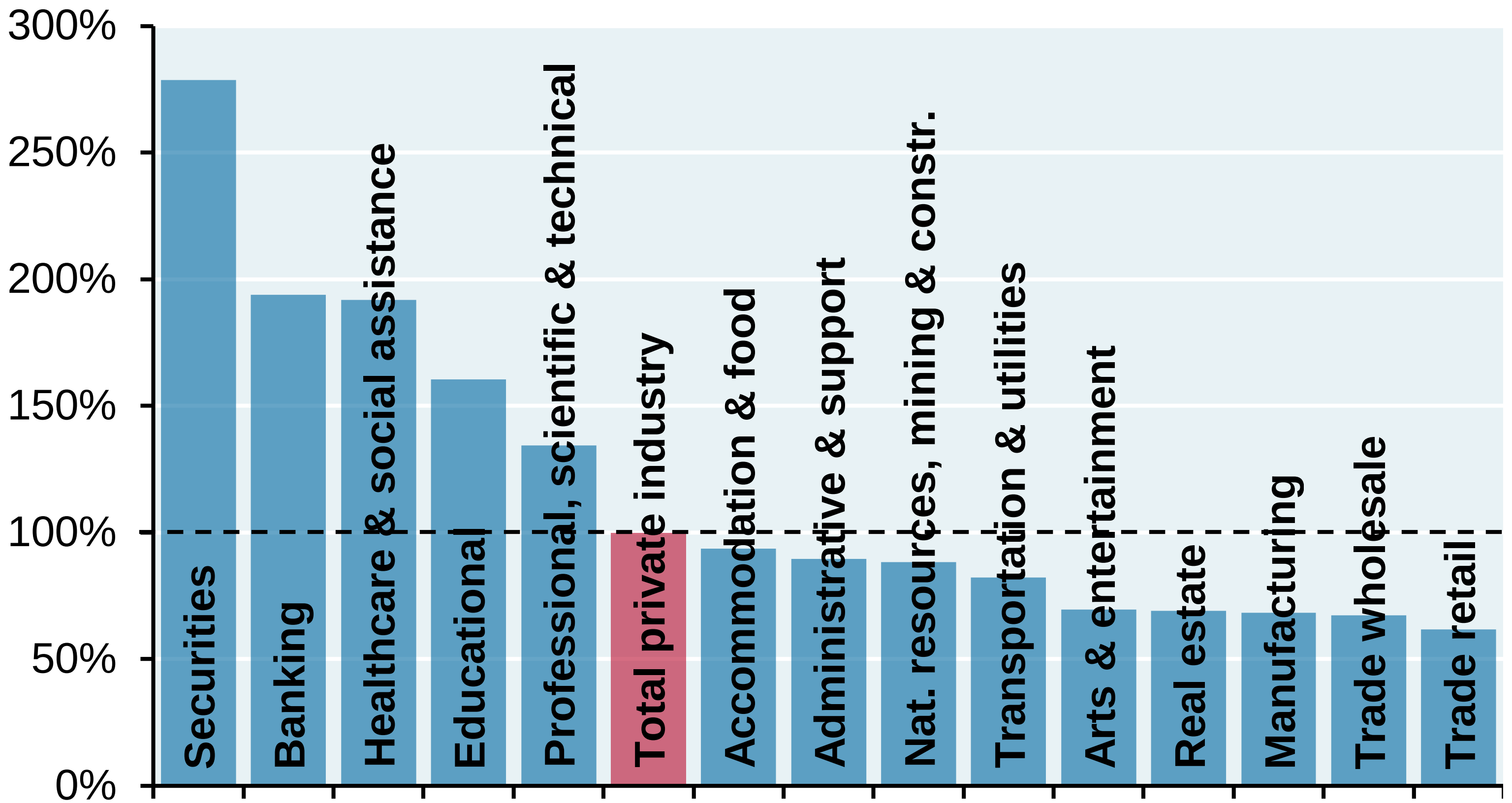


Source: Bloomberg, JPMAM. July 26, 2023. 14d smooth.

…and while NYC employment has now recovered to pre-pandemic levels…

NYC lost jobs regained by industry

Percent of pre-pandemic to trough jobs lost

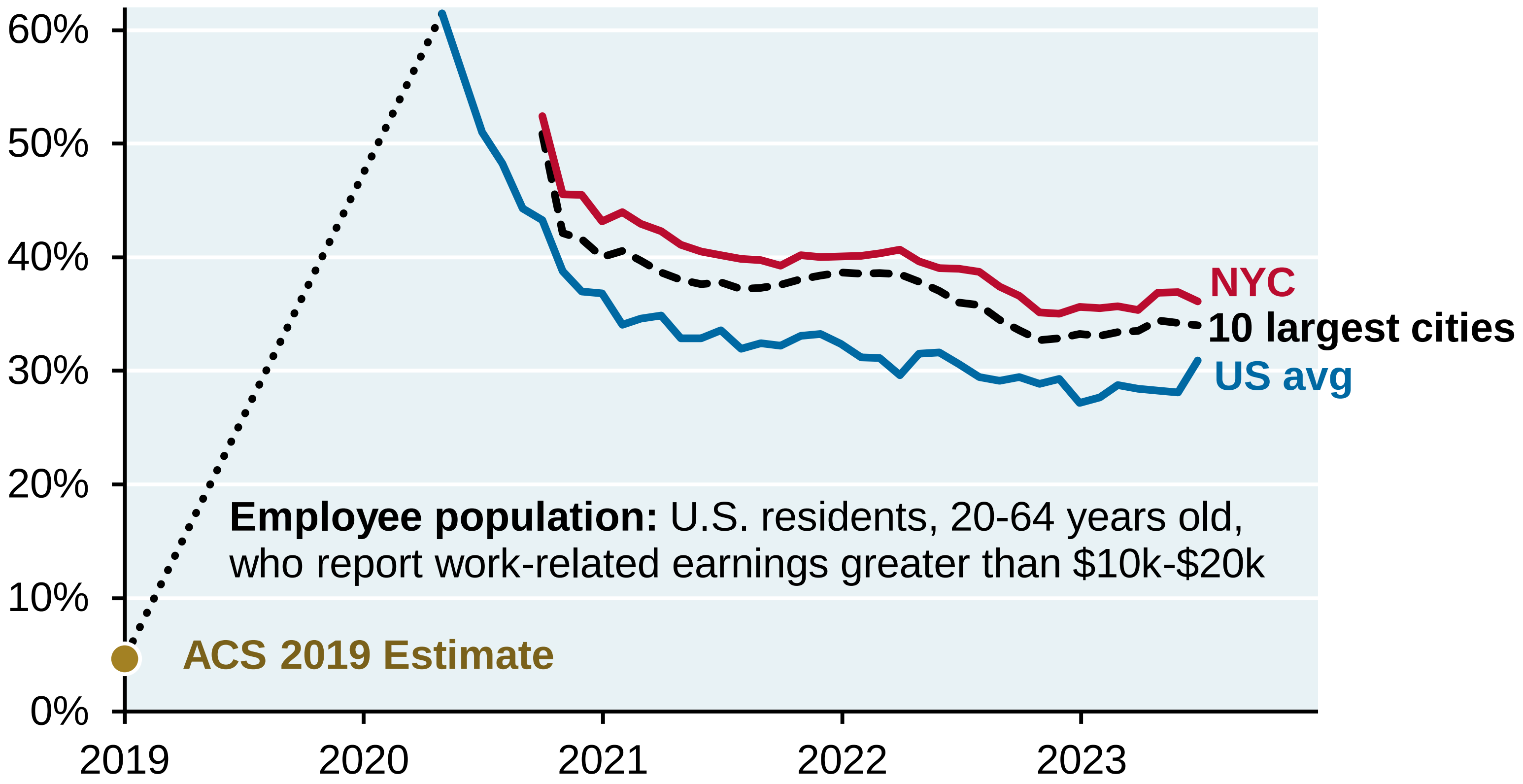


Source: NYC Economic Development Corporation. July 2023.

…close to 35% of NYC work days are still remote which is modestly above the national average, and showing no signs of changing

Pandemic permanently increased remote work nationally

Percent of full paid days worked from home

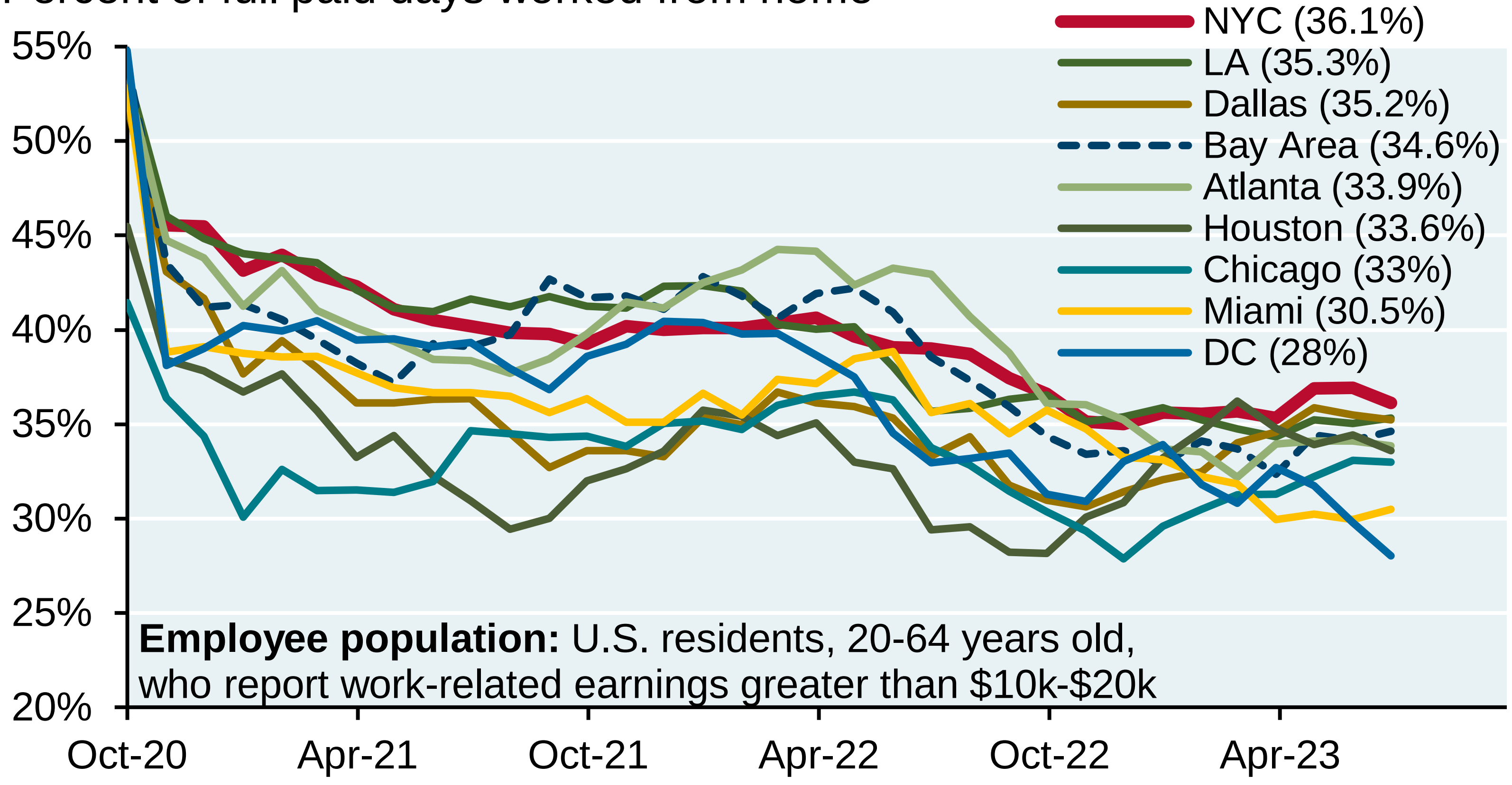


Source: "*Why working from home will stick*", Barrero, Bloom and Davis, NBER. July 2023.

NYC remote work: highest in the peer group shown

Work from home: large metropolitan cities

Percent of full paid days worked from home



Source: "*Why working from home will stick*", Barrero, Bloom and Davis, NBER. July 2023.

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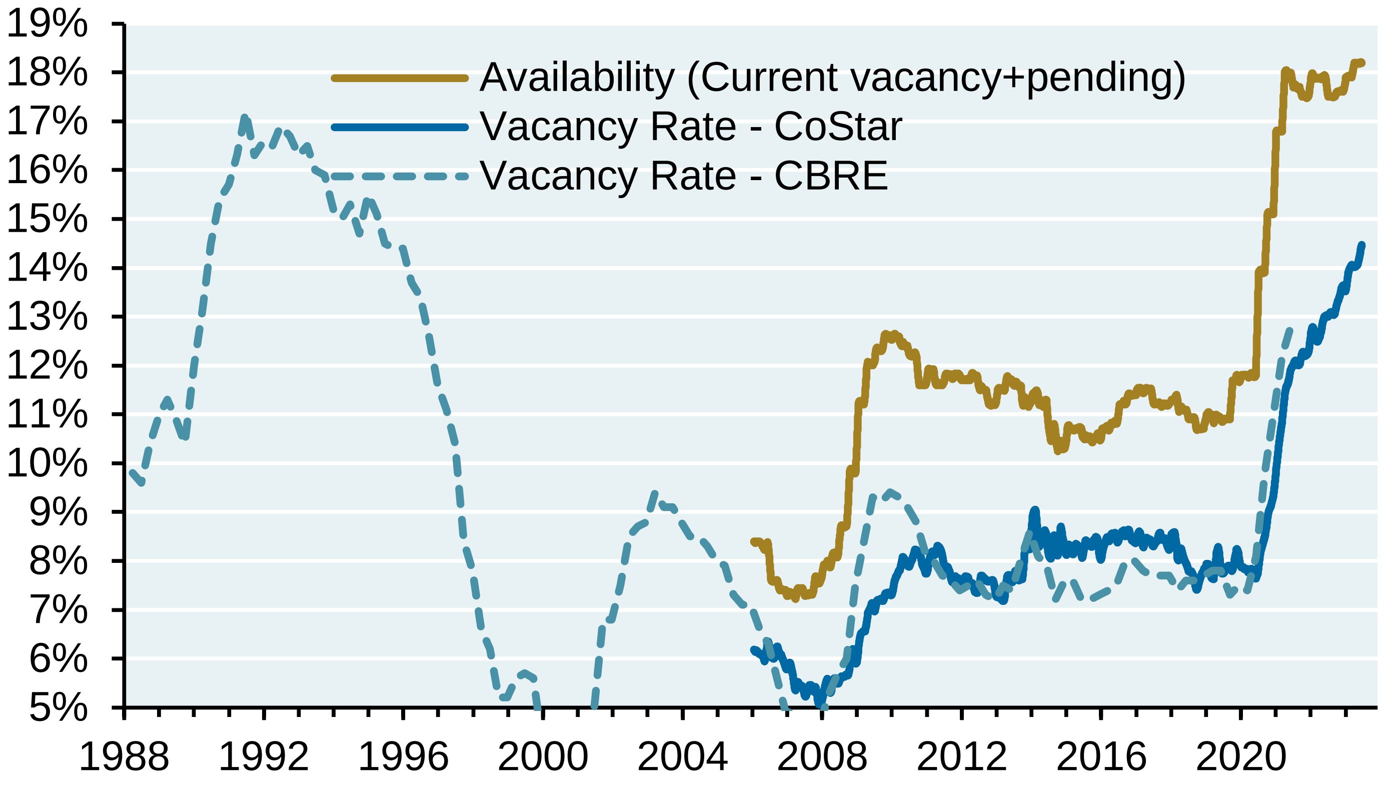
Remote work is a key driver of rising NYC office vacancy rates; Manhattan office vacancy of ~18% is high but above median within the peer group

Manhattan office (10k sf+) daily vacancy
Percent



Source: CoStar, CBRE, JPMAM. July 17, 2023. 30 day smoothing.

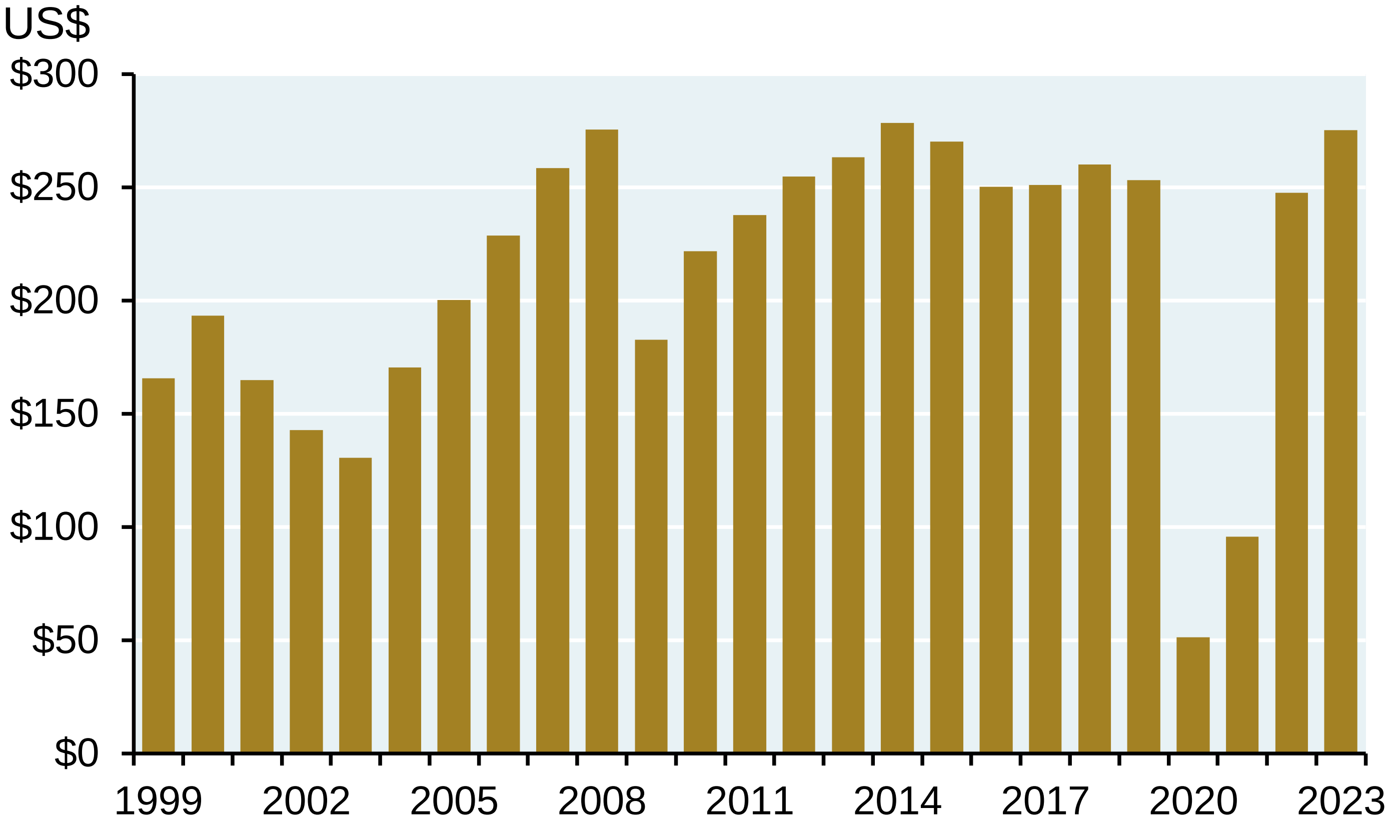
City	2Q23 Availability All Bldgs	Rank	New Bldgs	Rank
Atlanta	24.5%	18	13.3%	13
Austin	20.5%	11	12.0%	10
Boise	11.5%	1	1.0%	1
Boston	18.9%	8	14.9%	14
Charlotte	18.2%	7	9.8%	7
Chicago	22.3%	16	13.1%	12
Dallas	25.8%	21	11.0%	8
Denver	25.7%	20	17.9%	17
Detroit	20.0%	10	9.4%	6
Houston	25.2%	19	8.8%	5
Los Angeles	21.0%	14	18.2%	18
Miami	13.8%	3	19.4%	20
Manhattan	**18.2%**	7	**11.7%**	9
Philadelphia	15.7%	4	2.8%	2
Phoenix	22.4%	17	20.8%	21
Raleigh	17.0%	5	25.6%	22
Salt Lake City	13.6%	2	7.7%	3
San Antonio	19.6%	9	16.5%	16
San Francisco	26.0%	22	19.3%	19
San Jose	20.6%	12	13.0%	11
Seattle	20.7%	13	8.8%	5
Washington DC	22.0%	15	16.2%	15

Source: CoStar, JPMAM. 2Q 2023.

Hotels: NYC back to pre-pandemic REVPAR, median with respect to occupancy recovery

NYC Recovery

Manhattan Q2 hotel revenue per available room



Source: PwC, STR. Q2 2023.

Hotel occupancy, % change vs March 2019

City	% change
Boston	0.8%
Houston	0.5%
Dallas	-1.3%
Phoenix	-3.2%
DC	-3.5%
Miami	-4.6%
Denver	-5.8%
Detroit	-6.1%
NYC	-6.3%
Atlanta	-6.9%
Los Angeles	-7.1%
Chicago	-8.7%
Seattle	-12.0%
Philadelphia	-14.7%
San Francisco	-17.1%

Source: CoStar Group. March 2023.

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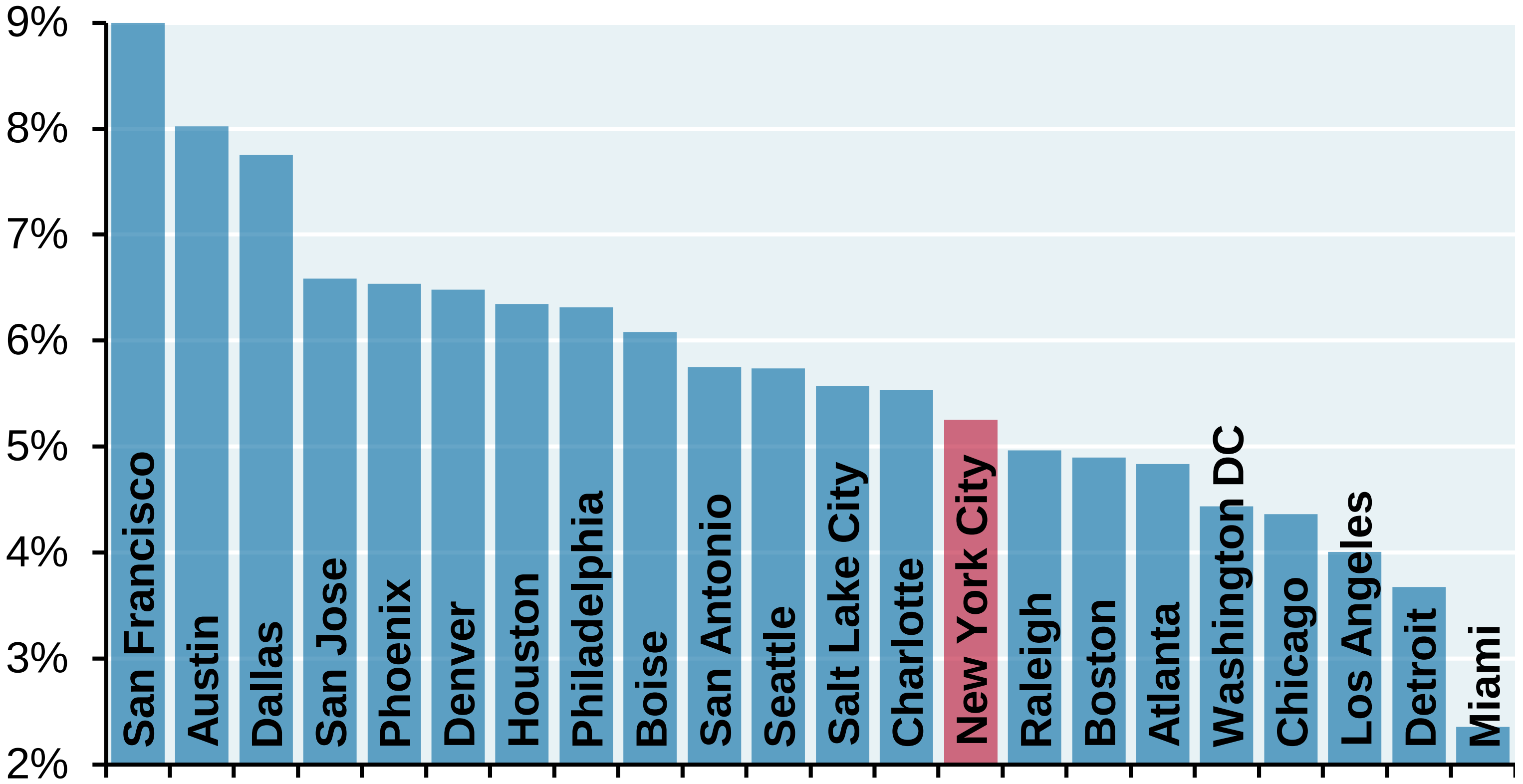
Industrial vacancy rate by city

Percent



Source: CoStar, JPMAM. Q3 2023.

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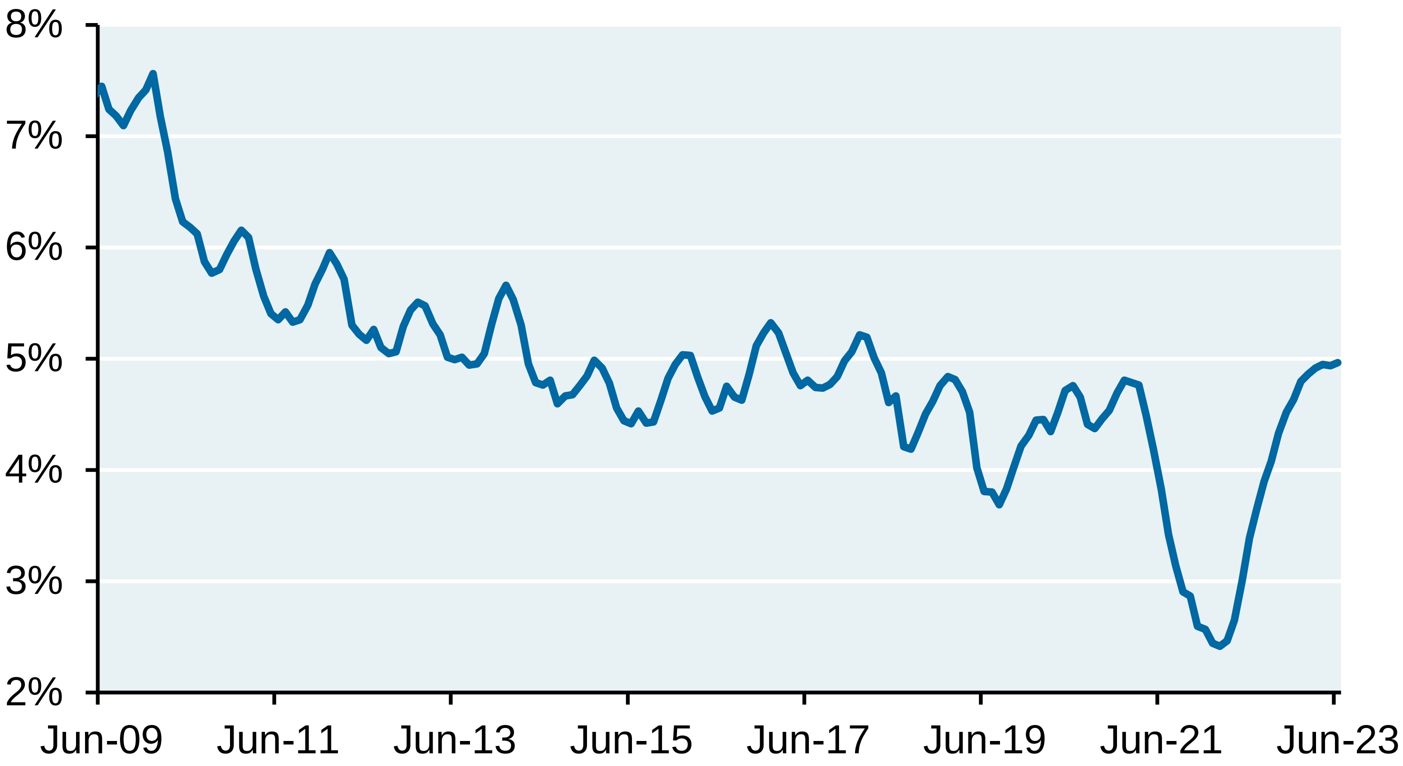
Manhattan multifamily vacancy rates have normalized after COVID-induced plunge

Manhattan multifamily vacancy rates

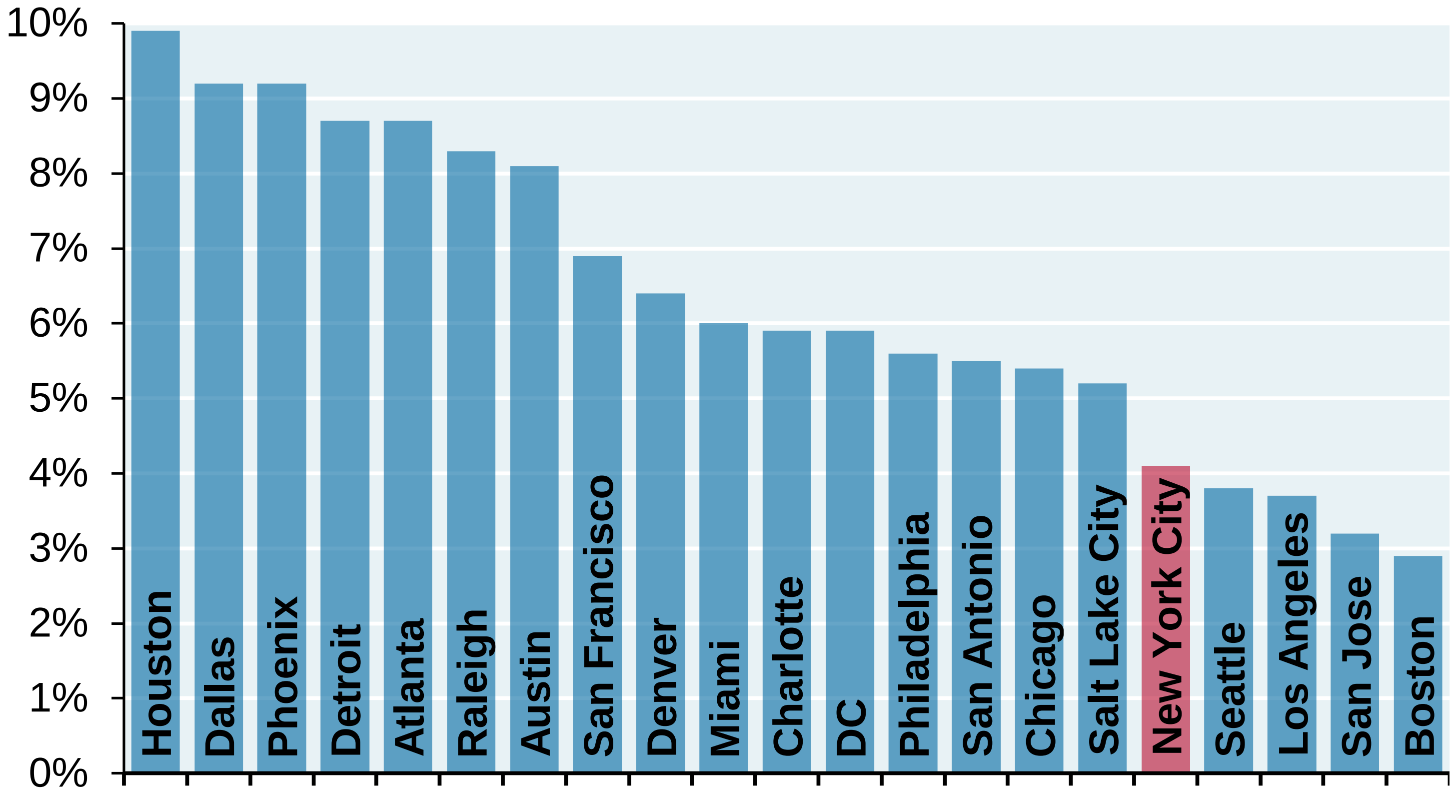
Percent



Source: Axiometrics, JPMAM. June 2023.

NYC ranks well above median on residential vacancy

Residential rental vacancy rate by city, Q2 2023
Percent (single family and multifamily)

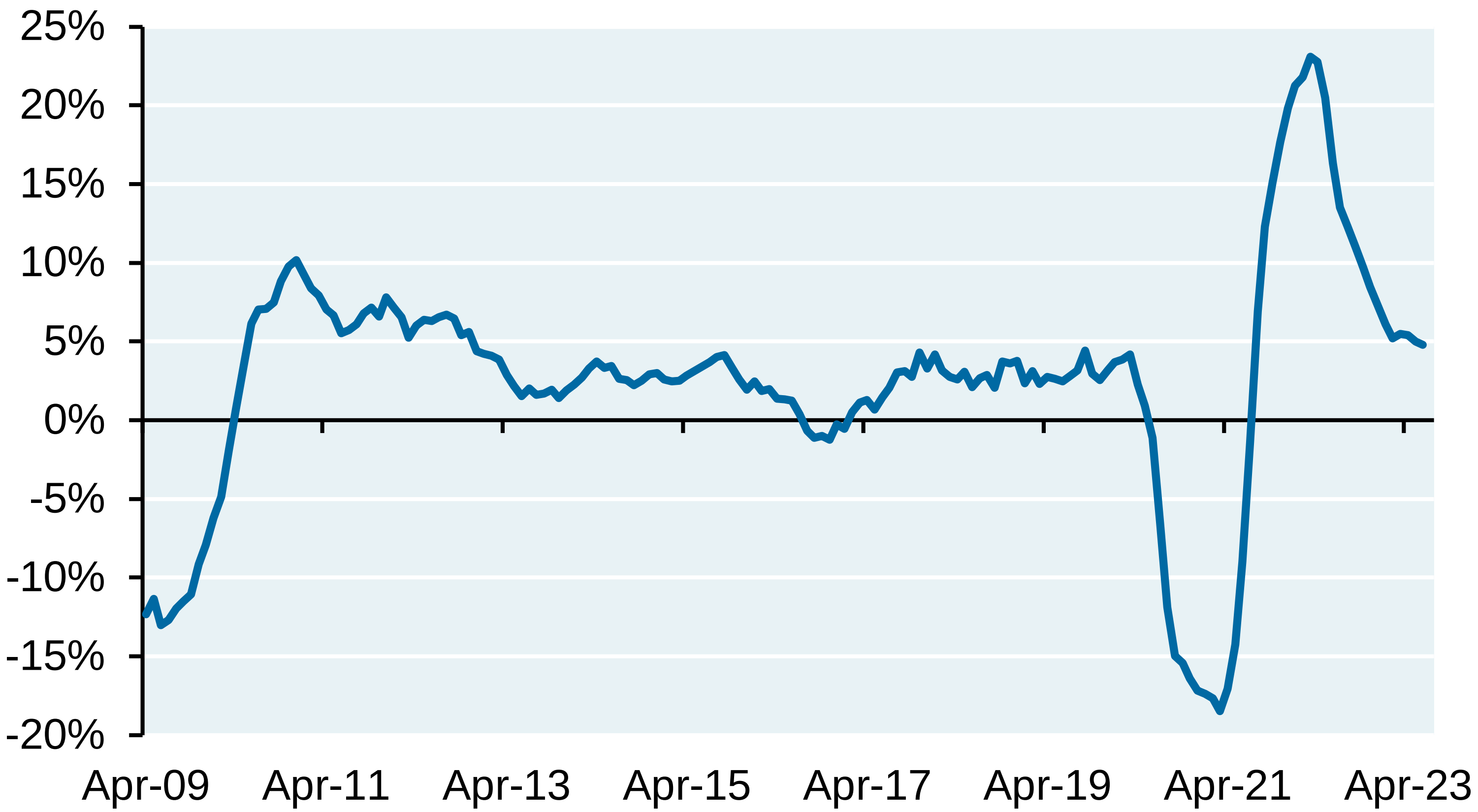


Source: Census Bureau, JPMAM. Q2 2023.

Manhattan multifamily rent growth also falling from COVID induced peak

Manhattan multifamily effective rent growth

Percent, y/y



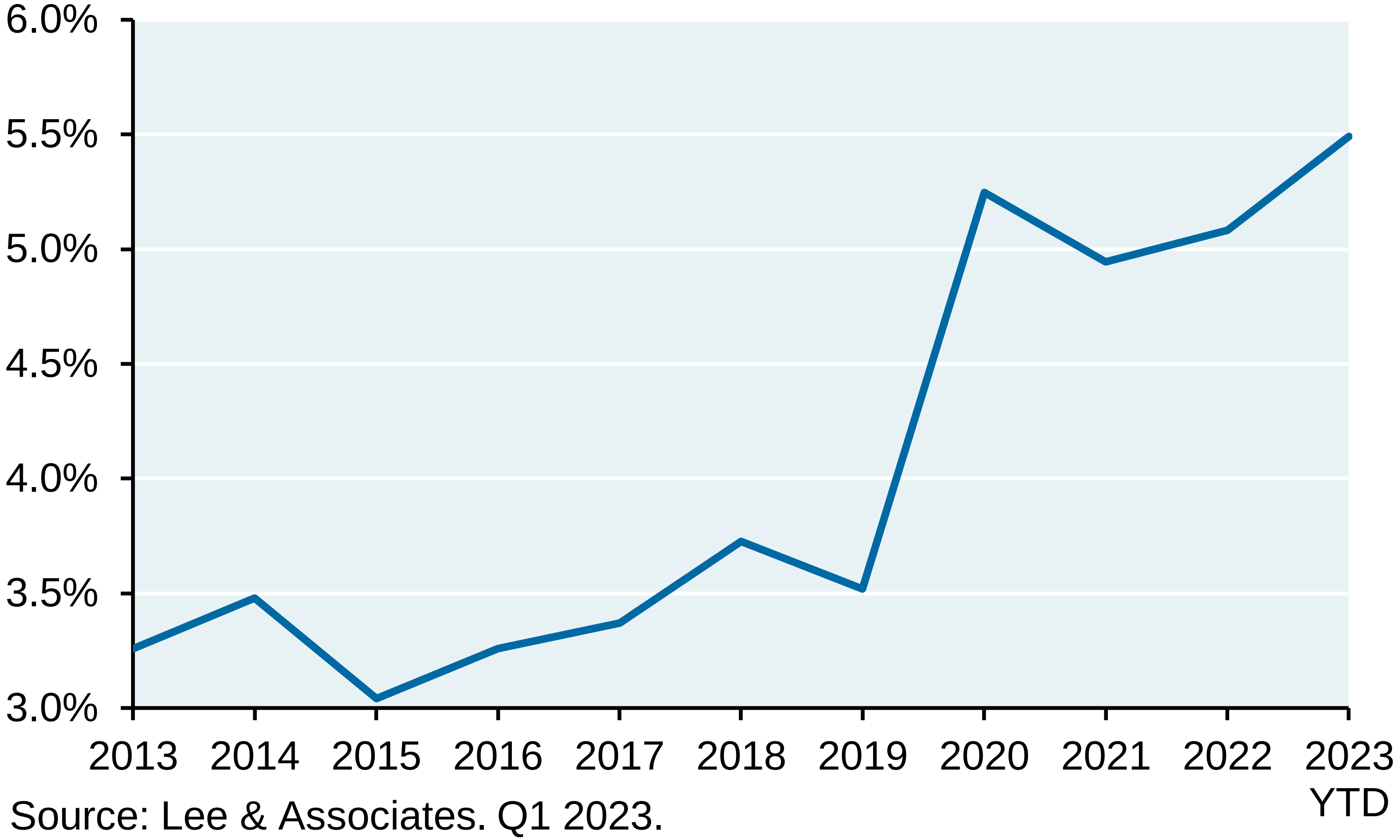
Source: Axiometrics, JPMAM. June 2023.

NYC retail vacancy rate rising but data quality is poor and generally excludes storefront data

NYC Recovery

New York City retail vacancy rate

Percent



Source: Lee & Associates. Q1 2023.

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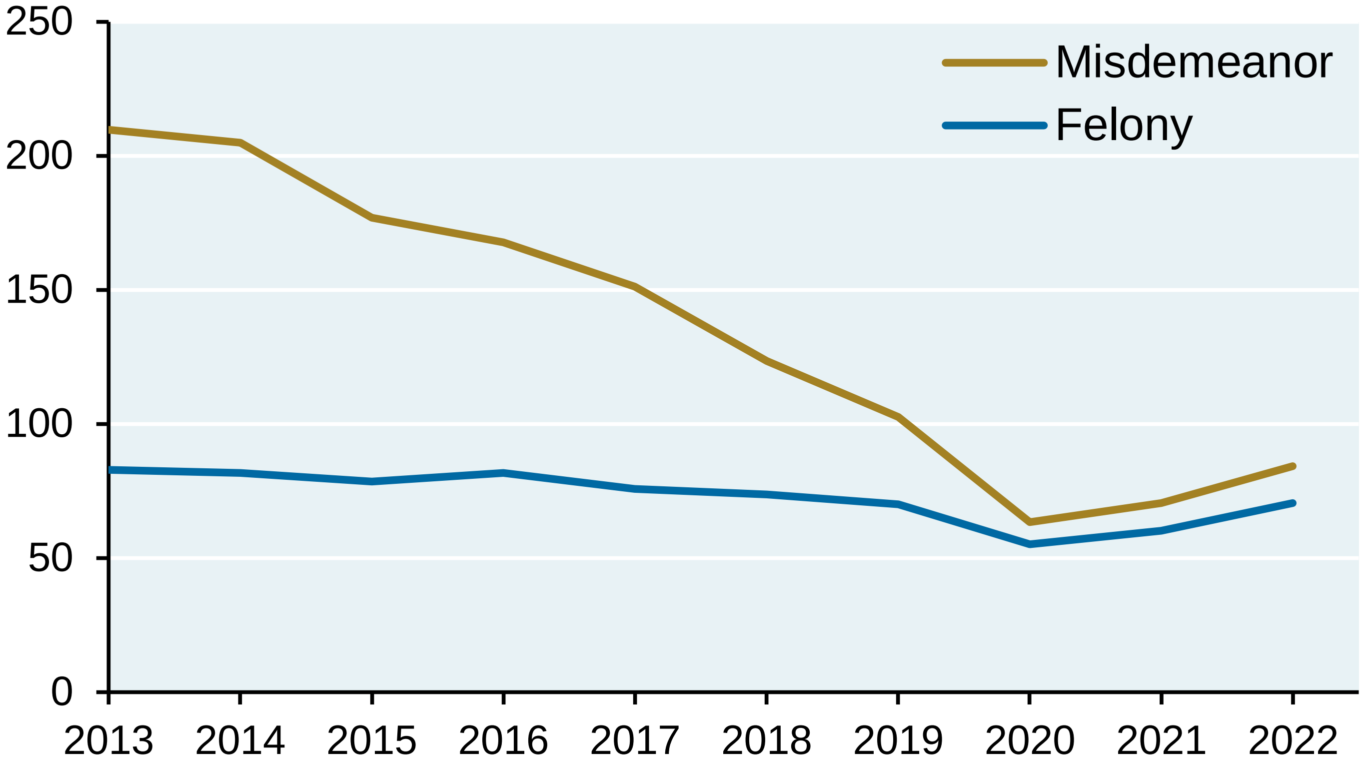
NYC post-COVID crime wave in context

NYC arrests

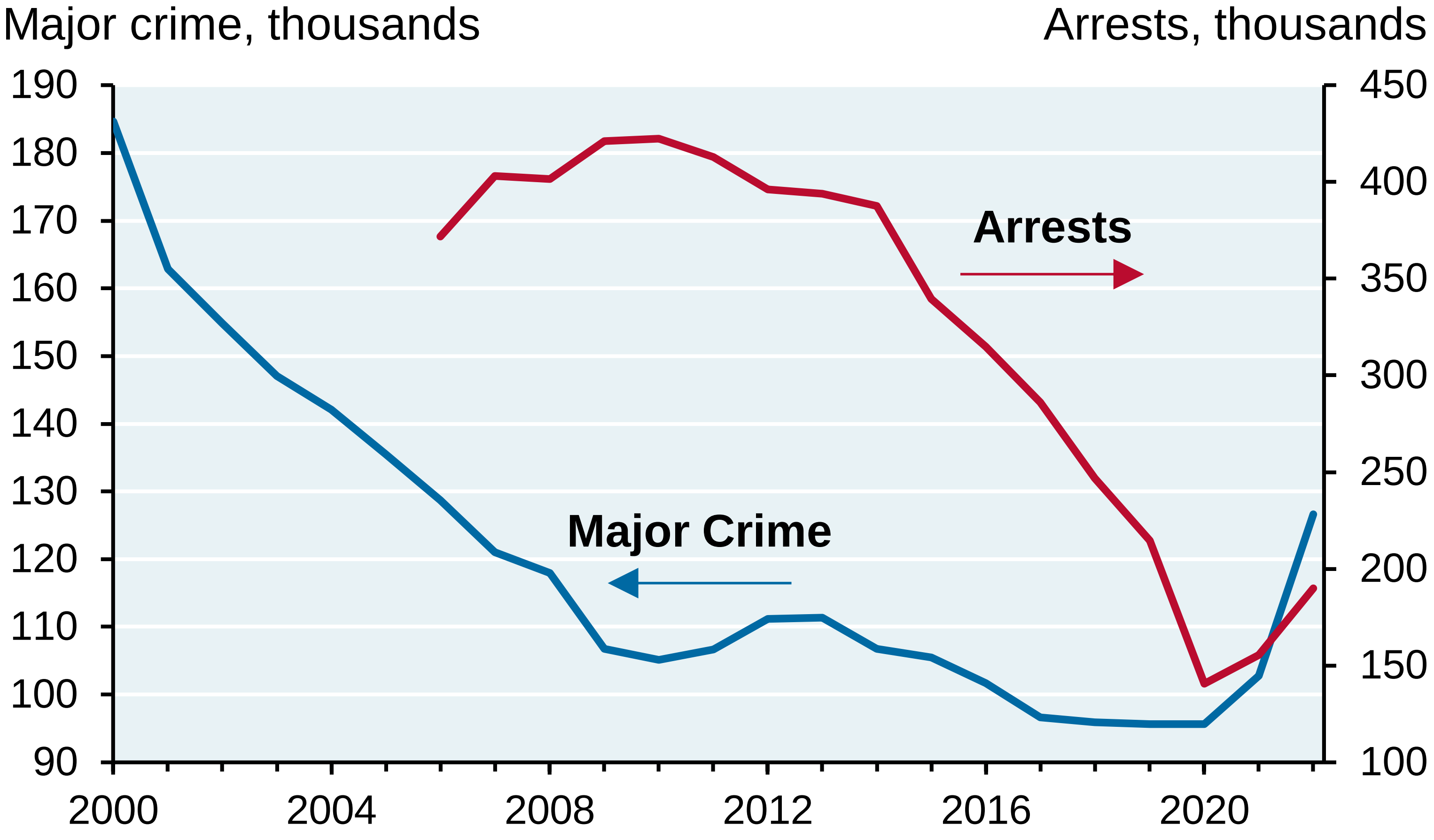
Number of arrests per year, thousands



Source: NY State Division of Criminal Justice Services, JPMAM. 2022.

NYC post-COVID crime wave in context

NYC major crime vs arrests



Source: NYPD, JPMAM. 2022.

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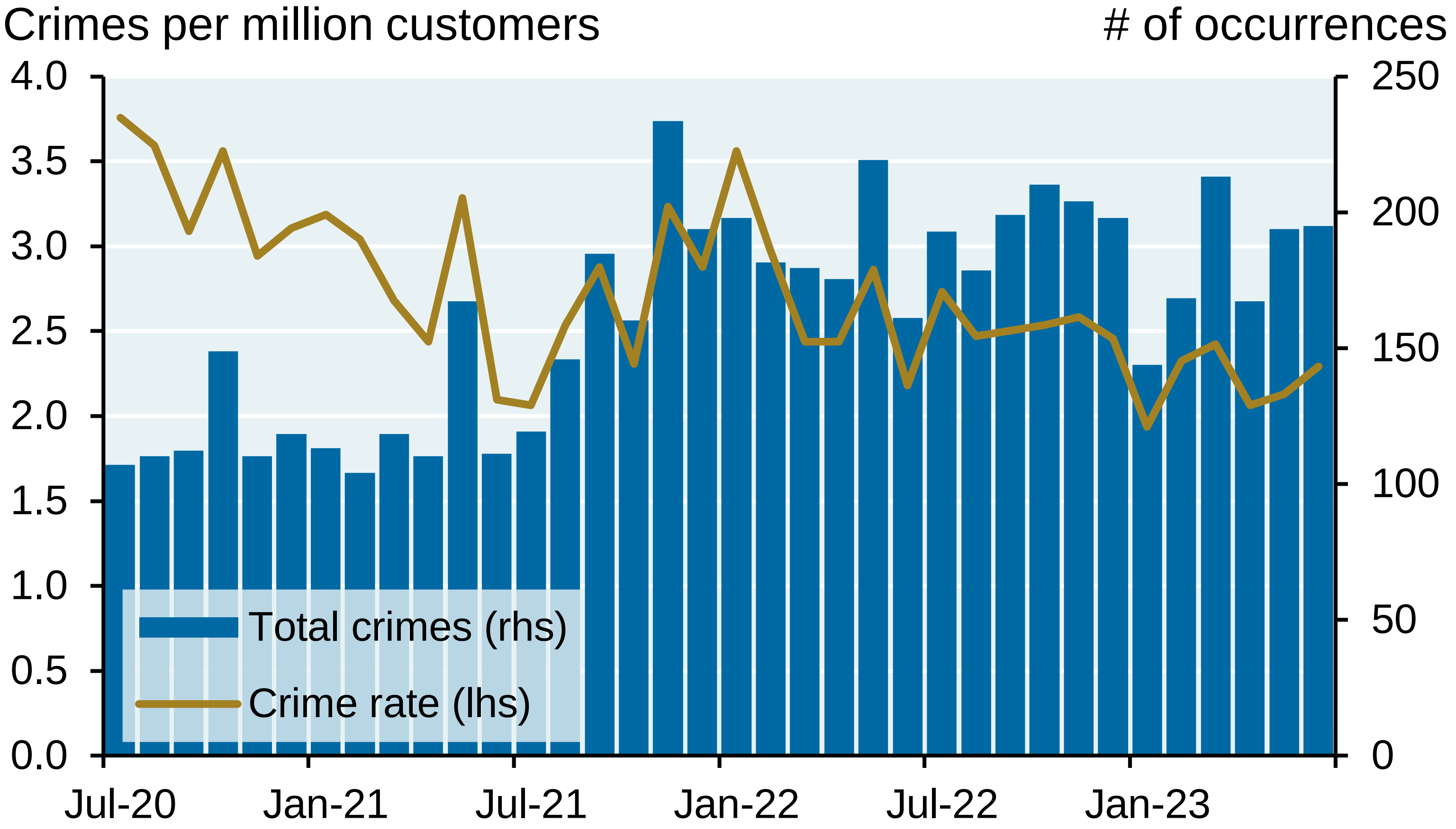
NYC post-COVID crime wave in context

Major crimes against subway customers

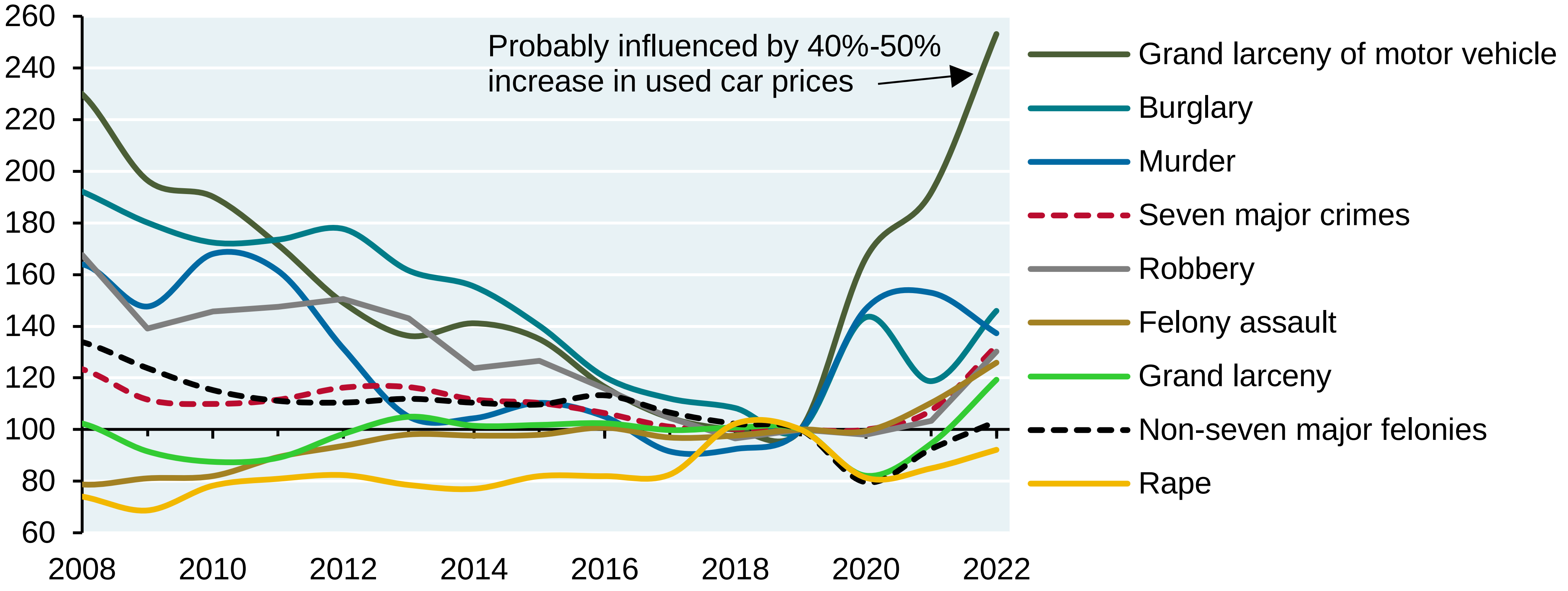


Source: *"New York City Transit Key Performance Metrics"*, MTA. July 2023.

NYC car theft stands out as the biggest change vs pre-pandemic levels

New York City crime

Index (2019 = 100)

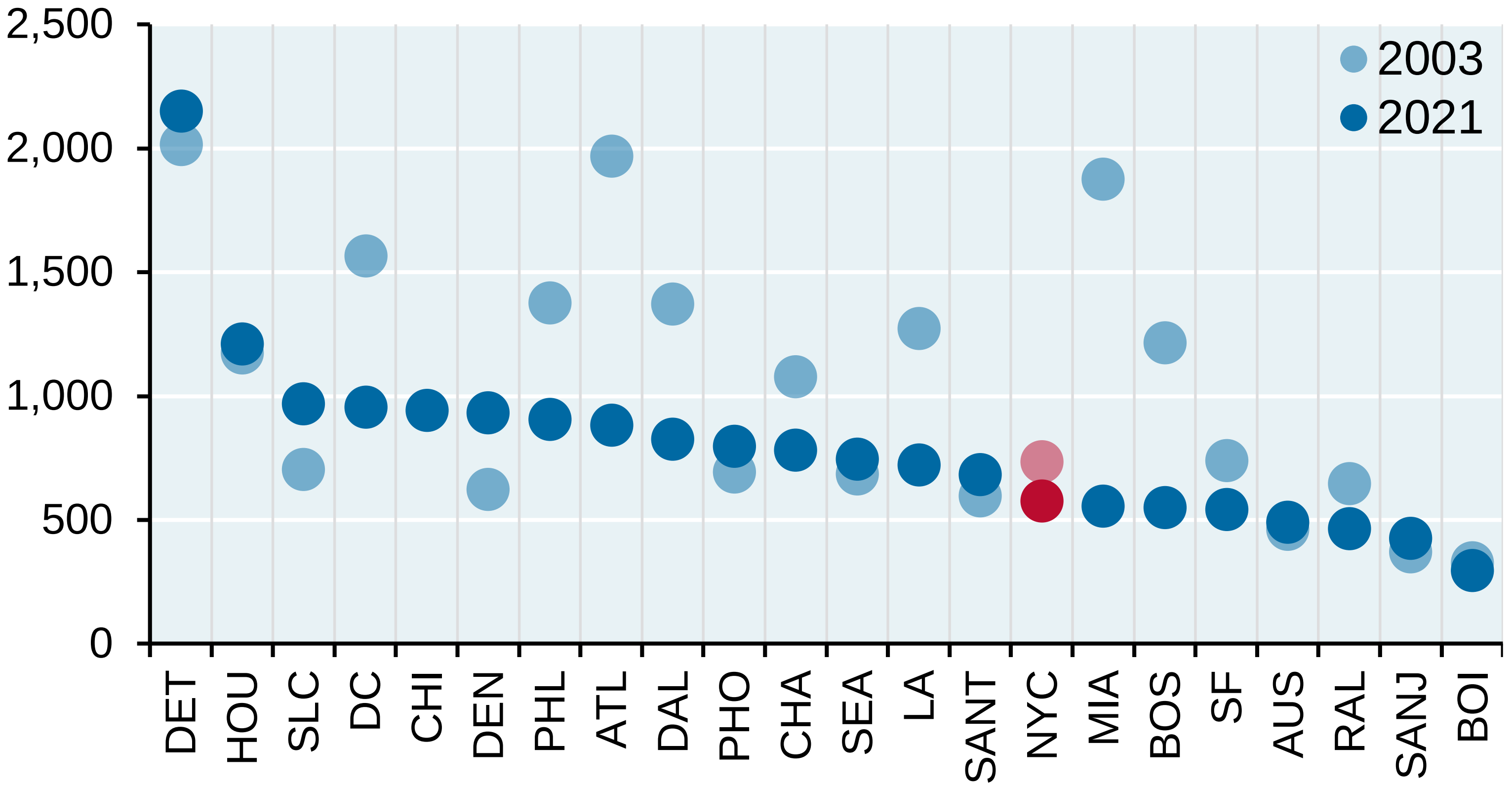


Source: NYPD, JPMAM. 2022.

FBI crime data is lagged and is currently only available for 2021
In 2021, NYC violent crime rates were lower than most other major cities

Violent crime frequency in major US cities

Rate per 100,000 inhabitants

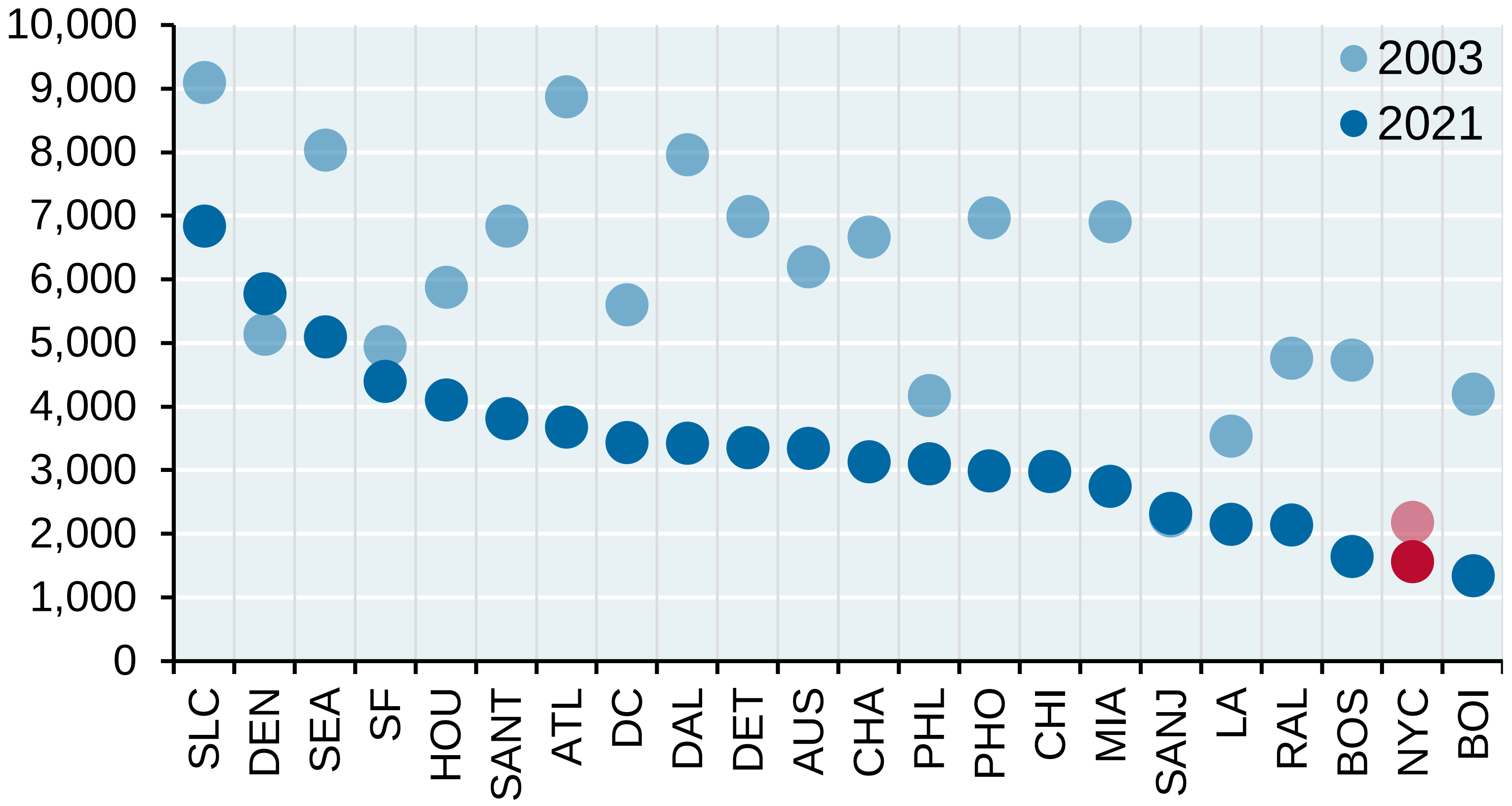


Source: FBI Uniform Crime Reporting Program. 2021.

FBI crime data is lagged and is currently only available for 2021
In 2021, NYC property crime rates were lower than almost all cities in the peer group

Property crime frequency in major US cities

Rate per 100,000 inhabitants



Source: FBI Uniform Crime Reporting Program. 2021.

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Updated census surveys on moving intentions due to crime are consistent with our prior findings: NYC is median among cities that report data

NYC Recovery

Pressure to move in the last 6 months due to an unsafe neighborhood

%, share of respondents (per two-week period of 2023)

	6/7 - 6/19	6/28 - 7/10	7/26 - 8/7	8/23 - 9/4	Avg.
Seattle	6.5%	7.2%	5.5%	4.5%	5.9%
San Francisco	4.7%	4.2%	5.9%	2.7%	4.4%
Phoenix	3.8%	3.5%	4.1%	3.8%	3.8%
Los Angeles	2.8%	4.8%	4.0%	3.6%	3.8%
Philadelphia	5.1%	3.5%	4.0%	1.8%	3.6%
Chicago	4.6%	4.9%	2.4%	1.4%	3.3%
New York	3.4%	3.4%	3.8%	2.2%	3.2%
Washington D.C.	4.3%	3.2%	2.7%	2.4%	3.1%
Houston	2.6%	4.2%	2.6%	2.9%	3.1%
Dallas	2.6%	2.8%	3.1%	2.3%	2.7%
Atlanta	2.1%	3.1%	4.2%	1.4%	2.7%
Miami	3.9%	1.8%	1.7%	1.8%	2.3%
Detroit	2.2%	1.6%	0.9%	0.9%	1.4%
Boston	1.8%	0.9%	1.1%	0.9%	1.2%

Source: Census Bureau Household Pulse Survey, JPMAM. September 4, 2023.

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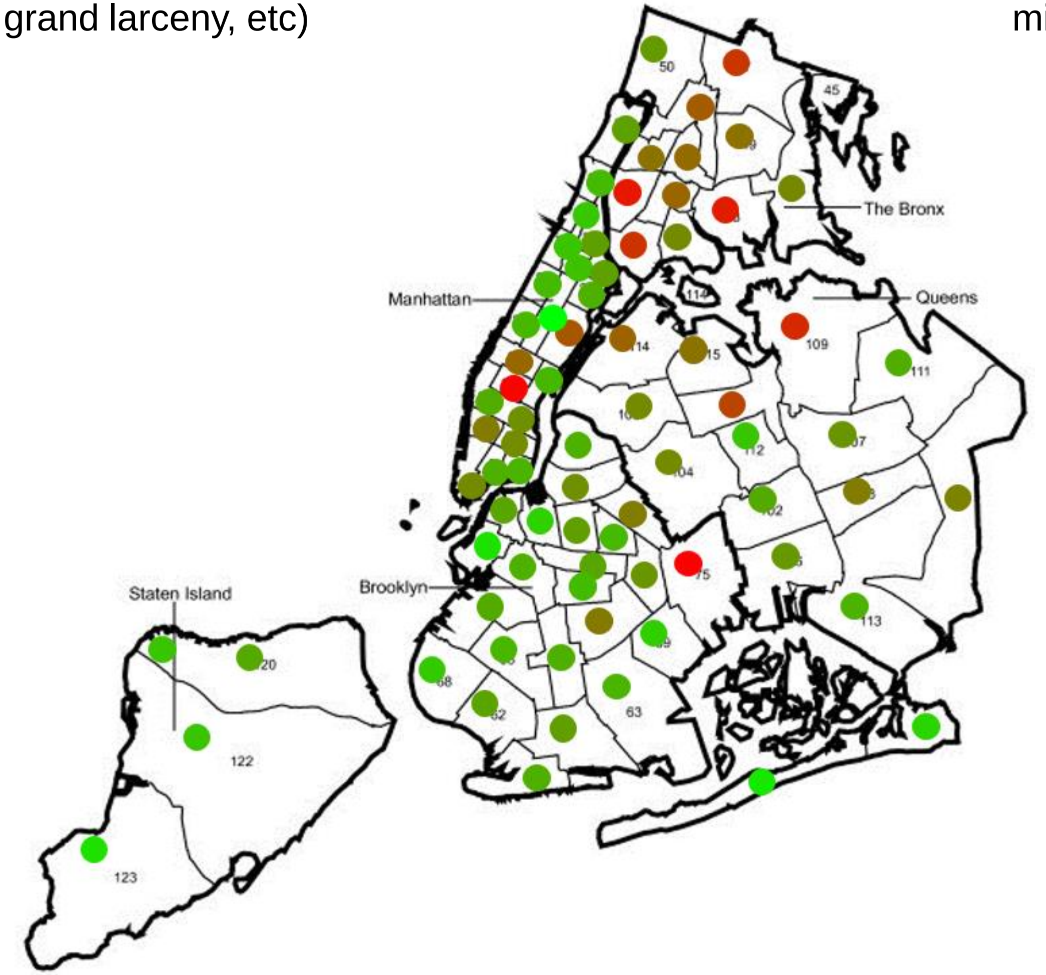
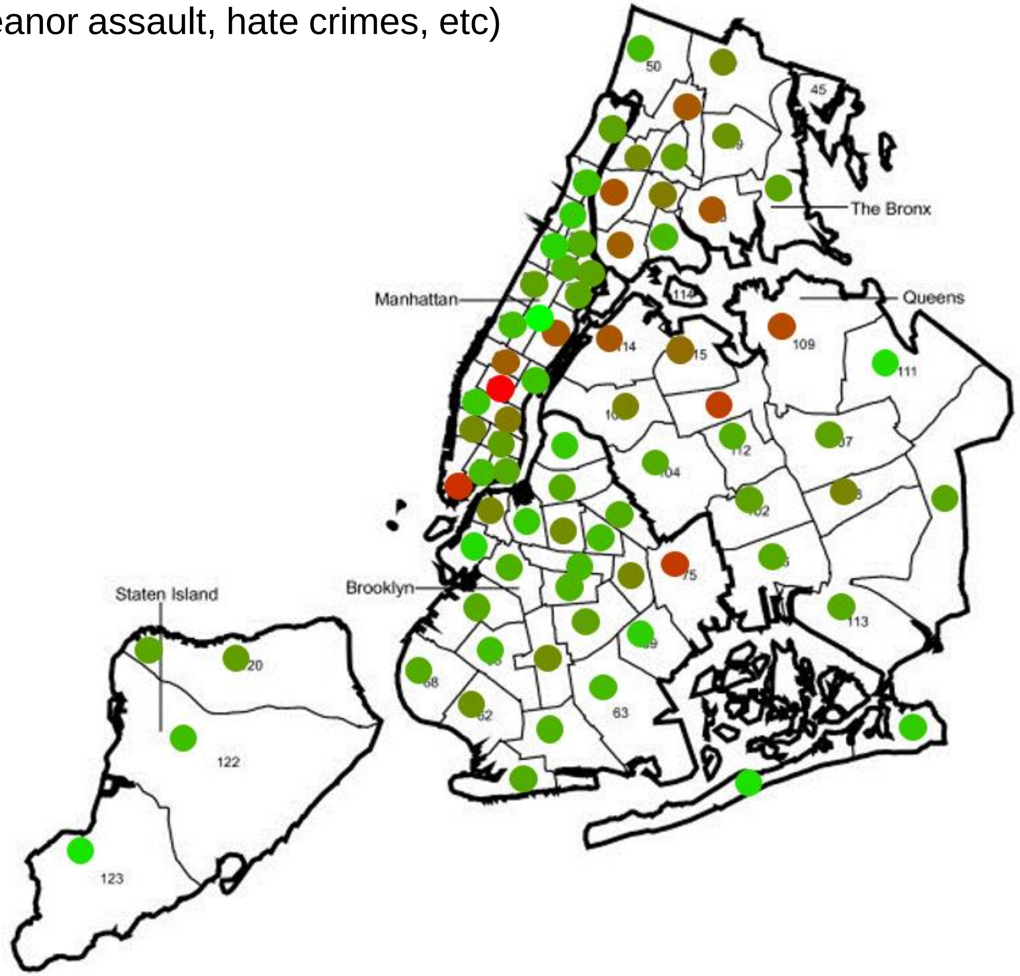
As with many urban centers, crime intensity differs by precinct
Roughly half the crime occurs in 30% of all precincts

NYC Recovery

Major crime heat map (murder, rape, robbery, grand larceny, etc)



Minor crime heat map (transit, housing, petit larceny, misdemeanor assault, hate crimes, etc)



Source data: NYPD Borough and Precinct Crime Statistics; our renderings

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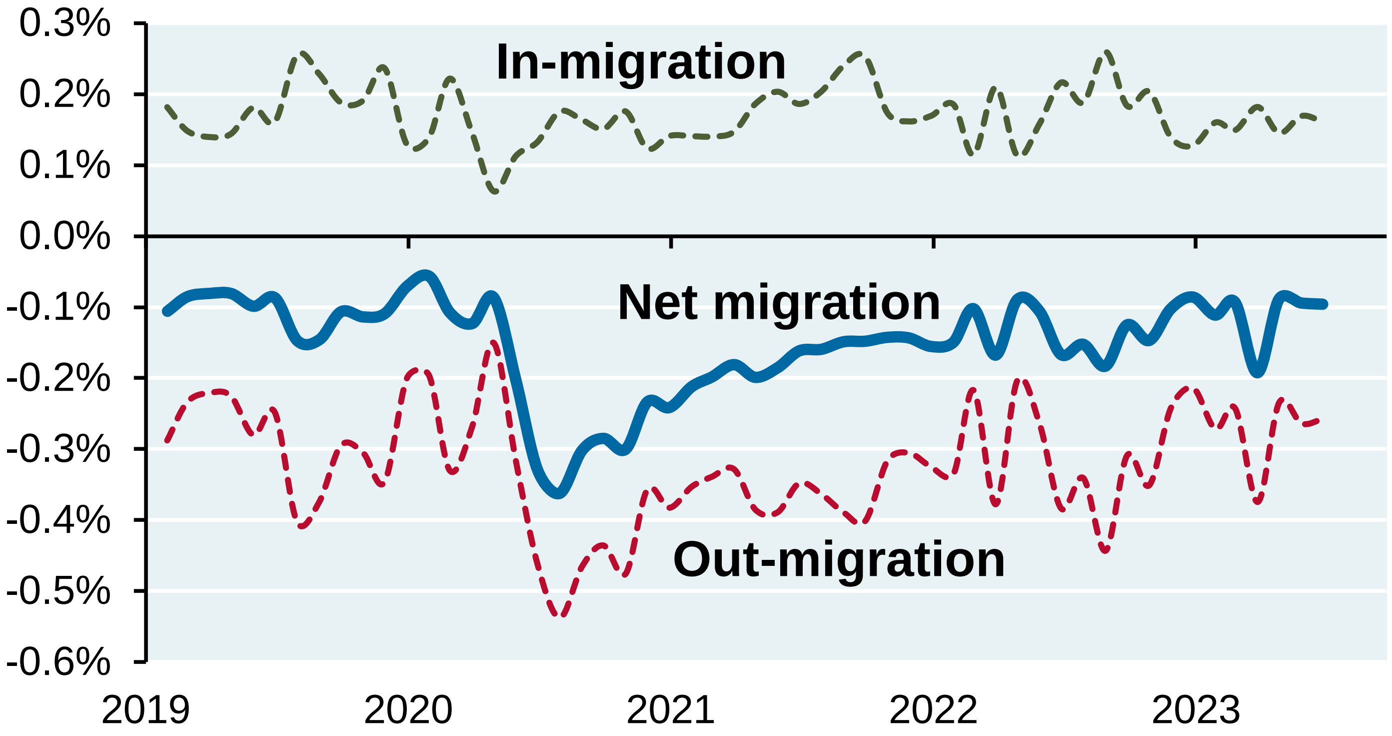
While the spike in estimated NYC net out-migration has stabilized…

Estimated NYC migration patterns

Percent, monthly rate



Source: J.P. Morgan Data Science, JPMAM. June 2023.

- Interstate taxpayer migration rates are typically available from the IRS, but with a three-year lag and only at the state level
- Chase Data Science estimates of migration rates are based on the zip codes of customers filing change of address forms with respect to their credit card bills
- **From April 2020 to July 2022, NYC estimated net migration was -5.3%, which matches Census data (in which NYC ranked 793 out of 796 metropolitan areas)**

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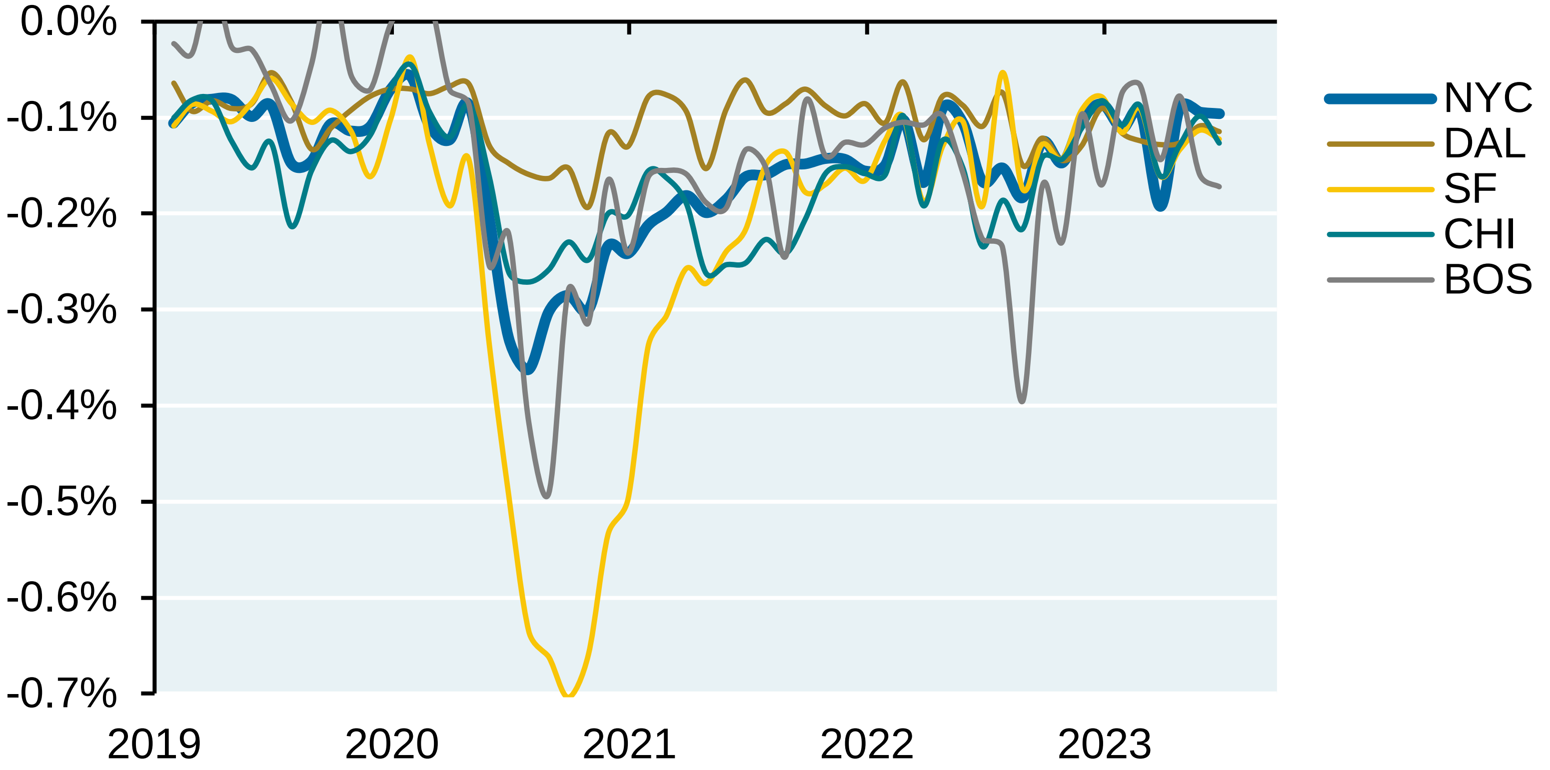
…NYC had the third highest estimated net out-migration rate in the peer group from 2019 to 2023

NYC Recovery

Highest estimated net out-migration rates

Percent, monthly rate



Source: J.P. Morgan Data Science, JPMAM. June 2023.

Annual Net Migration	
Charlotte	1.45%
Boise	0.83%
Raleigh	0.38%
Seattle	0.19%
San Antonio	0.10%
Austin	-0.28%
Denver	-0.32%
Atlanta	-0.36%
Houston	-0.47%
Philadelphia	-0.53%
Miami	-0.57%
Phoenix	-0.66%
Detroit	-0.83%
Salt Lake City	-0.92%
DC	-0.94%
San Jose	-0.97%
Los Angeles	-1.12%
Dallas	-1.24%
Boston	-1.67%
NYC	**-1.81%**
Chicago	-1.92%
San Francisco	-2.46%

Source: JPMAM. 2019-2023.

IRS state-level statistics: From 2011-2021, New York had the second highest out-migration rate of both people and income, exceeded only by Alaska

NYC Recovery

IRS migration statistics: Top 5 and Bottom 5 states, 2011-2021

	Number of filers, net annual chg		Adjusted Gross Income, net annual chg	
1	Nevada	1.2%	Florida	2.7%
2	Idaho	1.2%	Nevada	2.1%
3	South Carolina	1.0%	Idaho	2.1%
4	Arizona	1.0%	South Carolina	2.0%
5	Colorado	0.8%	Montana	1.6%
45	Massachusetts	-0.5%	Maryland	-0.7%
46	New Jersey	-0.6%	New Jersey	-0.8%
47	Connecticut	-0.6%	Connecticut	-0.9%
48	Illinois	-0.8%	Illinois	-1.3%
49	New York	-1.0%	New York	-1.3%
50	Alaska	-1.1%	Alaska	-1.4%

Source: IRS Statistics of Income. 2021.

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Peer group comparison

[2] NYC economic and demographic comparisons vs other cities

- Since 2019: NYC is mostly third quartile regarding economic and demographic growth vs all MSAs, and trails many peer group cities
  - Measures from BEA/BLS/etc: population growth, labor force, non-farm payrolls, building permits and personal income
  - Measures from Chase Data Science: consumer and business spending
  - MSA = metropolitan statistical area, currently defined as a city with at least 50,000 people; ~375 MSAs in the US
- The NYC advantage: the sheer size of its economy, workforce and purchasing power
- NYC ranks at the high end of “urban economic complexity” measures, indicating a more diverse set of industry capabilities and higher resilience
- NYC has one of the larger homeless populations in the peer group and the second worst housing affordability problem

Since 2019, NYC is mostly third quartile regarding growth in population, labor market, housing and income vs all MSAs, and trails most peer group cities

Peer group comparison

Percentile of growth in economic and demographic measures since 2019 vs all MSAs

City (MSA)	Population	Labor force	Payrolls	Housing permits	Personal income	5 indicator average	Peer group rank
Atlanta	75%	75%	83%	75%	25%	67%	9
Austin	97%	100%	100%	69%	23%	78%	3
Boise	96%	97%	99%	51%	54%	79%	2
Boston	33%	NA	NA	48%	41%	41%	17
Charlotte	85%	92%	90%	75%	33%	75%	5
Chicago	26%	30%	34%	7%	48%	29%	21
Dallas	89%	98%	98%	65%	12%	72%	6
Denver	36%	83%	69%	57%	43%	58%	10
Detroit	34%	11%	33%	5%	46%	26%	22
Houston	81%	84%	80%	29%	2%	55%	12
Los Angeles	7%	16%	49%	14%	81%	33%	19
Miami	21%	71%	82%	6%	69%	50%	14
NYC	**58%**	40%	46%	35%	37%	**43%**	**15**
Philadelphia	61%	61%	65%	48%	17%	50%	13
Phoenix	45%	96%	91%	64%	58%	71%	8
Raleigh	93%	95%	96%	71%	43%	80%	1
Salt Lake City	70%	96%	94%	35%	83%	75%	4
San Antonio	83%	90%	89%	89%	5%	71%	7
San Francisco	4%	25%	53%	12%	97%	38%	18
San Jose	7%	39%	59%	6%	98%	42%	16
Seattle	47%	77%	63%	44%	55%	57%	11
Washington DC	45%	44%	42%	7%	9%	29%	20

Source: BEA, BLS, FHFA, Census Bureau, JPMAM. Population through 2022; income through 2021. All others as of May or Q1 2023.

- For example: while NYC payrolls have recovered to pre-pandemic levels, that only ranks in the 46th percentile vs other MSAs
- NYC ranks third quartile compared to all MSAs
- NYC ranks #15 out of 22 within the peer group

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Since 2019: NYC also trails the peer group with respect to estimates of consumer and business spending

Peer group comparison

Spending recovery vs 2019

City	In person credit and debit card spending by individuals	Rank	Business card spending	Rank
Atlanta	65%	22	132%	13
Austin	108%	8	220%	1
Boise	118%	2	188%	3
Boston	104%	9	169%	6
Charlotte	114%	6	128%	14
Chicago	99%	11	127%	15
Dallas	96%	15	138%	10
Denver	114%	5	194%	2
Detroit	96%	14	112%	21
Houston	95%	17	150%	8
Los Angeles	97%	13	116%	20
Miami	74%	21	118%	17
NYC	**91%**	**19**	**117%**	**18**
Philadelphia	92%	18	112%	22
Phoenix	96%	16	150%	9
Raleigh	109%	7	187%	4
Salt Lake City	83%	20	135%	12
San Antonio	100%	10	136%	11
San Francisco	119%	1	166%	7
San Jose	97%	12	117%	19
Seattle	117%	4	181%	5
Washington DC	118%	3	124%	16

Source: Chase Data Science, JPMAM. June 25, 2023.

- Spending by city is not available on a high frequency basis from government sources
- Chase card spending estimates are based on city cohorts determined by zip code; they reflect the spending activity of Chase card customers only; and can be influenced in some cases by outsized spending of large individual customers

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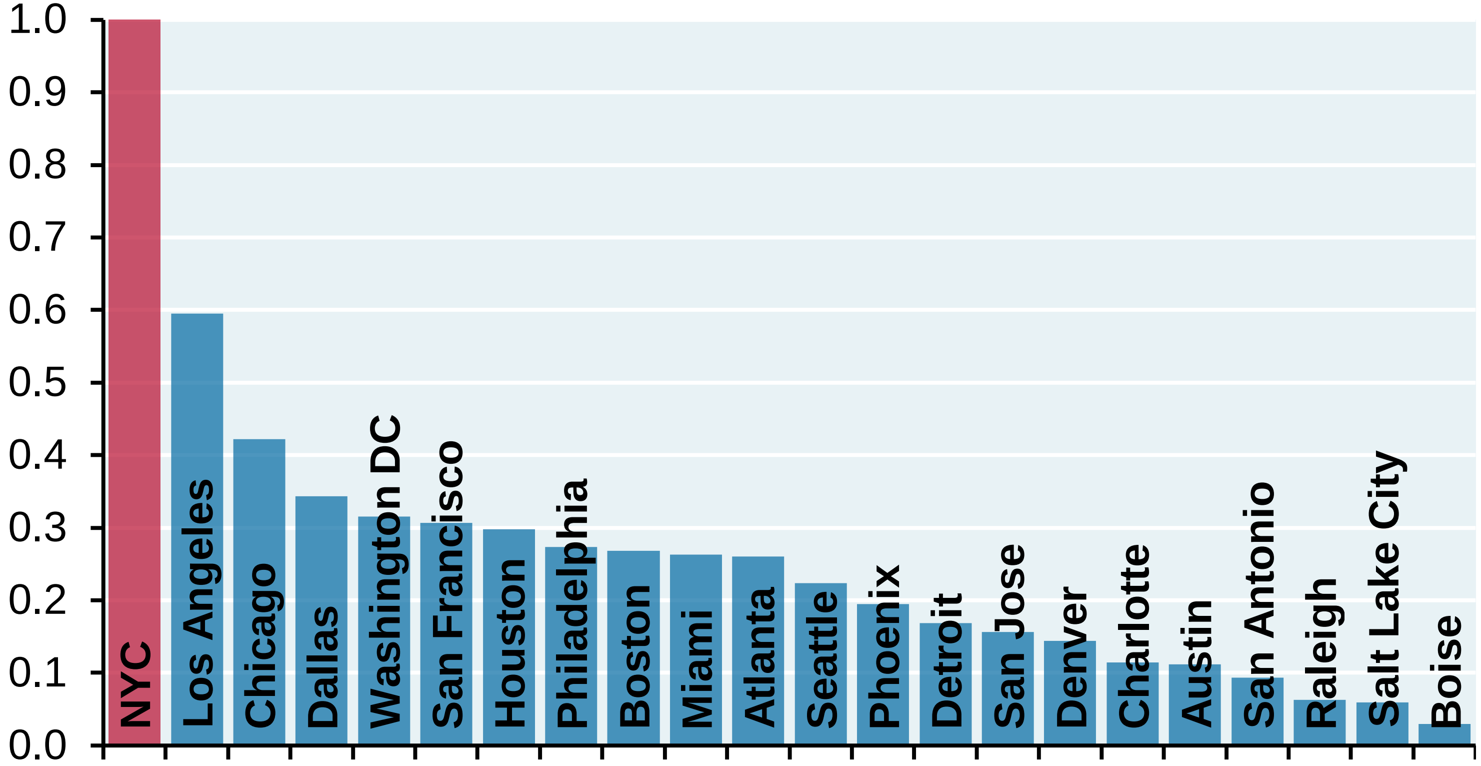
The NYC advantage: the sheer size of its economy, work force and purchasing power compared to the peer group

Peer group comparison

Relative MSA size: economic output (in $), labor force (# of people) and personal income (in $), Index (NYC=1)



- Using this approach: the NYC MSA is 3x larger than Dallas, 5x larger than Phoenix and 10x larger than San Antonio

Source: BLS, BEA, US Census, JPMAM. June 2023.

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NYC ranks at the high end of "urban economic complexity" measures, indicating a diverse set of industry capabilities and higher resilience

Peer group comparison

Urban complexity rankings

Brookings Universe: 384 US MSAs		**Manduca et al** Universe: 376 US MSAs		**Lapatinas et al** Universe: 1,171 International cities	
City	**Percentile**	**City**	**Percentile**	**City**	**Percentile**
San Jose	100.0	Los Angeles	100.0	**New York**	**100.0**
San Francisco	99.2	**New York**	**99.7**	Los Angeles	99.1
Washington	98.6	Chicago	99.4	Dallas	98.3
Austin	98.4	Philadelphia	99.2	Houston	97.4
Boston	97.9	Boston	98.9	Miami	94.9
Los Angeles	97.6	Dallas	98.6	Seattle	93.2
Seattle	97.3	San Francisco	98.4	Chicago	91.5
Salt Lake City	97.1	Atlanta	97.8	Atlanta	88.1
Denver	96.8	Miami	97.6	Phoenix	87.2
Miami	96.6	Seattle	97.3	San Jose	85.5
Phoenix	96.3	Detroit	97.0	Washington	84.7
New York	**96.0**	Houston	96.8	Philadelphia	83.8
Dallas	95.3	Phoenix	96.0	Denver	83.0
Raleigh	94.7	Charlotte	94.9	Detroit	80.5
Atlanta	94.2	Denver	92.5	San Francisco	74.5
Philadelphia	91.9	Washington	92.2	Boston	73.7
Charlotte	91.3	San Jose	91.4	Charlotte	69.4
Chicago	91.1	Salt Lake City	89.8	Austin	68.6
Detroit	88.5	Austin	89.3	Salt Lake City	64.4
Houston	85.3	San Antonio	85.6	San Antonio	63.5
San Antonio	84.0	Raleigh	80.8	Raleigh	50.8
Boise	83.0	Boise	71.4	Boise	50.0

Source: *"Economic Complexity and Technological Relatedness: Findings for American Cities"*, Daboin et al (Brookings). May 2019; *"The Economic Complexity of US Metropolitan Areas"*, Fritz/Manduca. Mar 2021; *"Economic Complexity of Cities and Its Role for Resilience"*, Lapatinas et al. Aug 2022.

Components:

- Share of employment by industry in each city relative to national or international averages
- Higher scores imply a more diverse set of industry capabilities, a more adaptable workforce and greater resilience

While methodologies differ; NYC ranks highly compared to other cities analyzed

In two of three studies, NYC ranks #1 or #2

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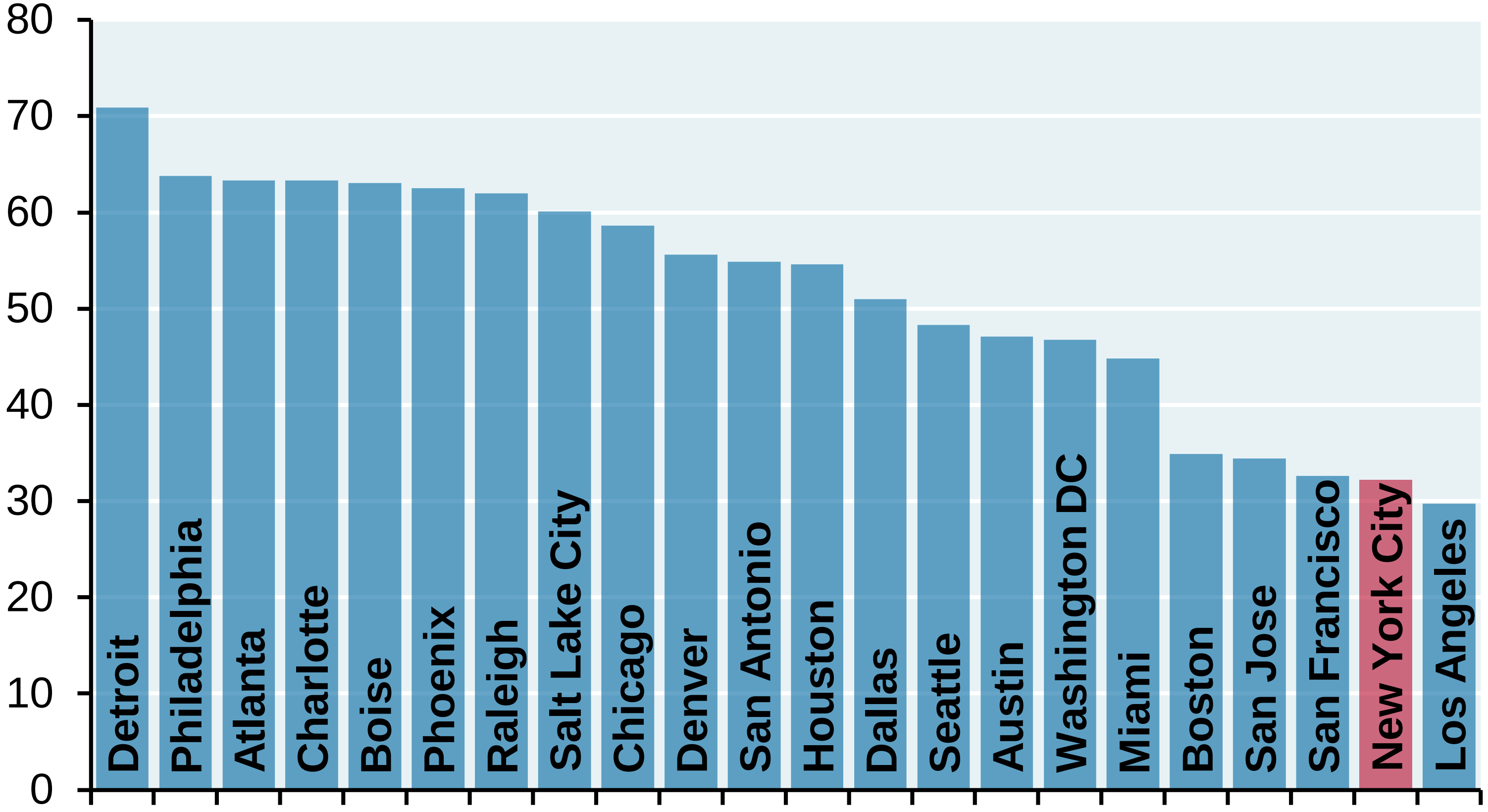
Peer group comparison

New York City ranks second-to-last in home affordability

Home affordability

Score (high score = more affordable)



Components, in order of highest to lowest weighting in calculation:

- Housing affordability
- Cost per square foot
- Maintenance affordability
- Cost of homeowner's insurance
- Cost of living
- Real estate tax rate
- Rent to price ratio
- Home price appreciation
- Active listings per capita
- Vacancy rates

Source: WalletHub, US Census Bureau, NAR, C2ER. 2023.

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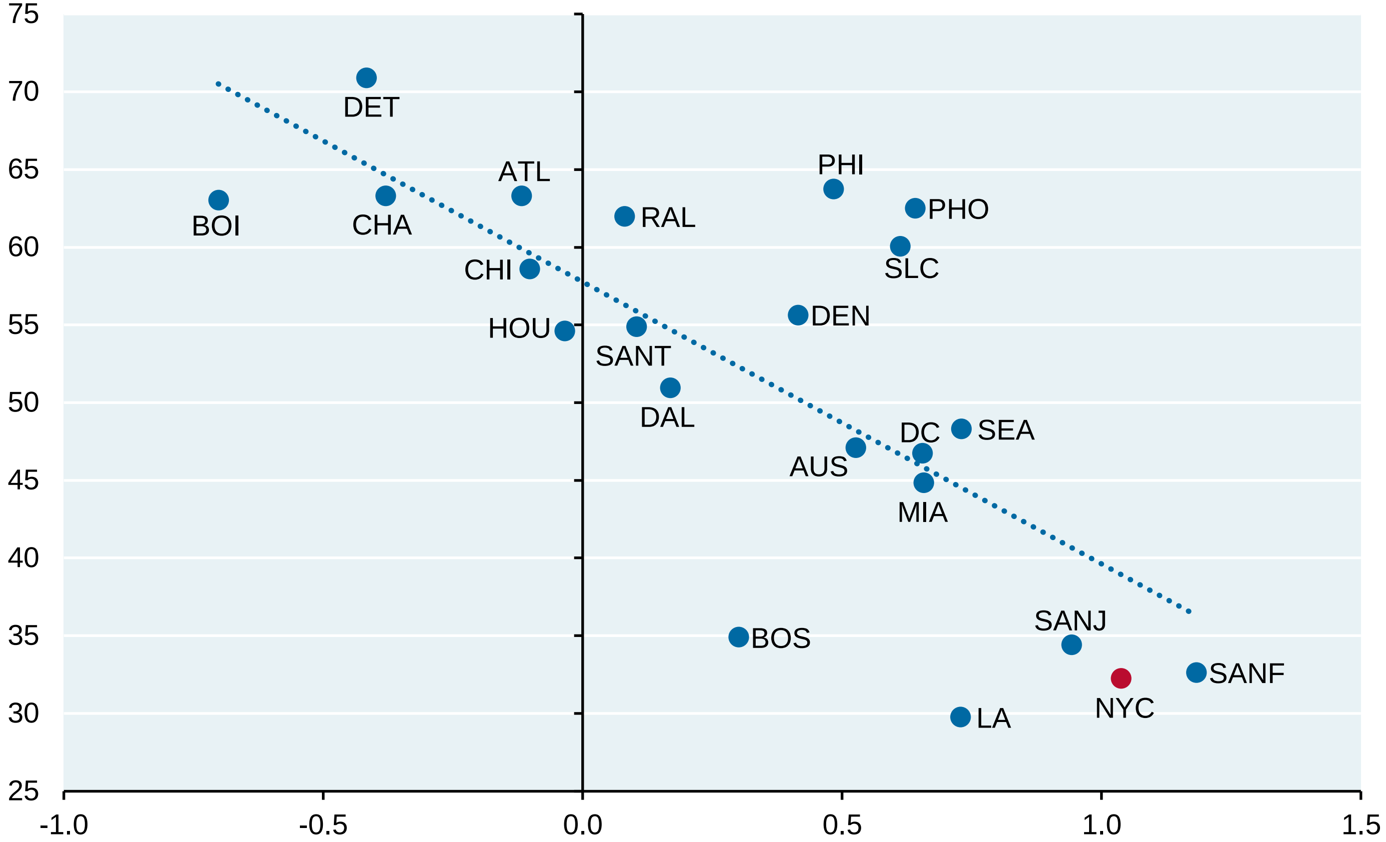
Home affordability appears to have some connection to zoning policies

Peer group comparison

Zoning policies vs Housing Affordability

Housing Affordability Score (higher=more affordable)



Wharton Residential Land Use Index (higher=more regulation)

Source:Wharton Zell/Lurie Real Estate Center,Gyourko et al. 2020.

Wharton Residential Land Use Index:

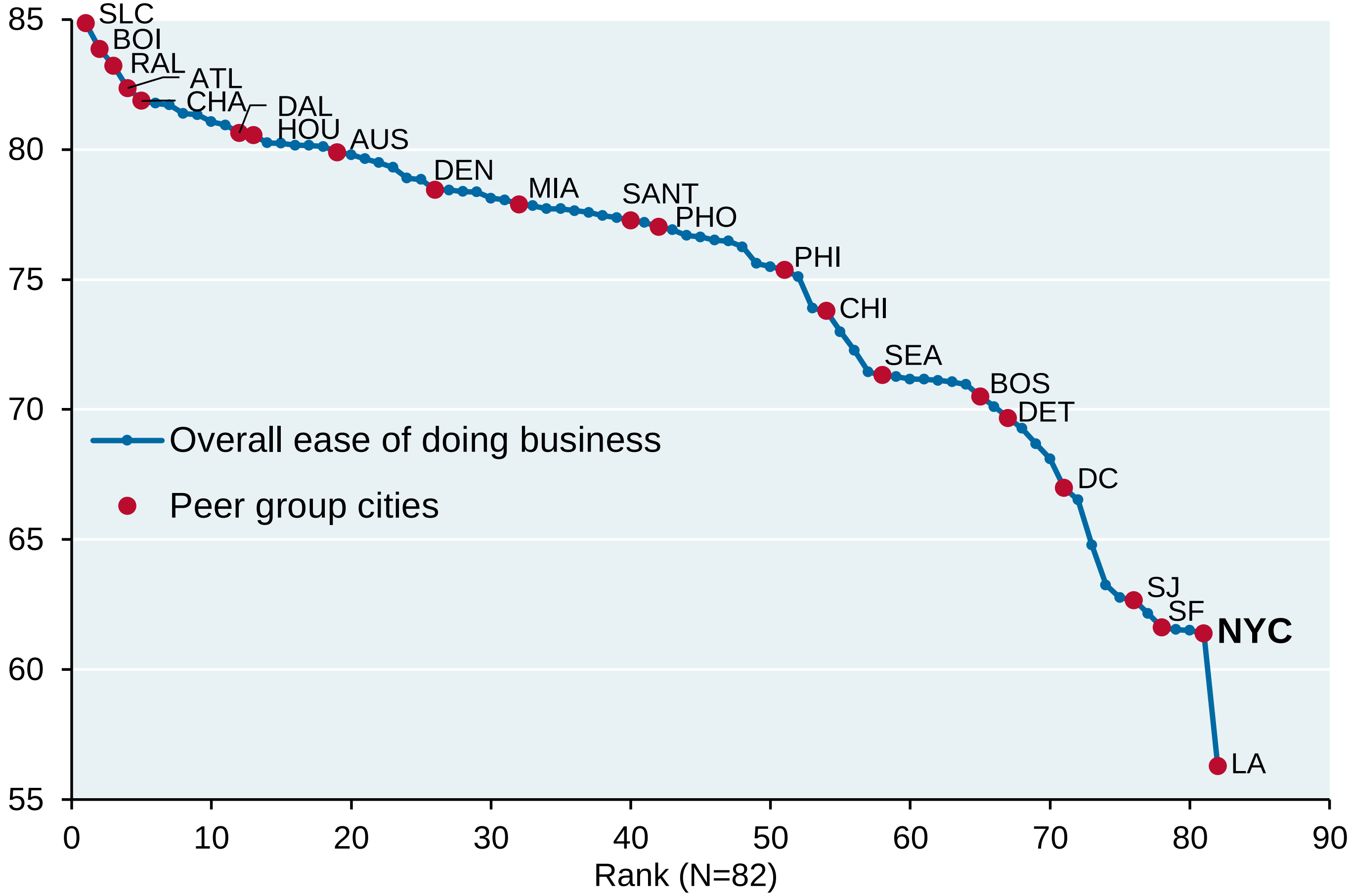
- # of zoning entities required for project approval
- Density and lot size restrictions
- Exactions requirements (developer infrastructure payments)
- Permit delays
- Community, judicial and political participation in project approvals
- Constraints or caps on new supply

Zoning restrictions are part of the broader context: relative to other cities, NYC is a very difficult place to do business

Peer group comparison

Ease of doing business by city

Score (out of 100)



Components:

- Cost and time to start a business
- Labor flexibility
- Cost and availability of power
- State & local corporate and personal tax rates
- Property tax rates
- Regulatory speed and cost of land transfer process
- Zoning restrictions and approvals required
- Cost and time required to resolve insolvency

Source: "*Doing Business North America*" project, Arizona State University, JPMAM. 2022.

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Peer group comparison

New York City has one of the larger homeless populations among peer group cities

City	HUD "Continuum of Care"	Homeless population	Homeless % of population
Atlanta	Atlanta	2,017	0.4%
Austin	Austin/Travis County	3,157	0.2%
Boise	Boise/Ada County	620	0.1%
Boston	Boston	4,439	0.7%
Charlotte	Charlotte/Mecklenberg	1,761	0.2%
Chicago	Chicago	3,875	0.1%
Dallas	Dallas City & County, Irving	4,410	0.2%
Denver	Metropolitan Denver	6,884	1.0%
Detroit	Detroit	1,691	0.3%
Houston	Houston, Pasadena, Conroe/Harris, Ft. Bend, Montgomery, Counties	3,124	0.0%
Los Angeles	Los Angeles City & County	65,111	0.7%
Miami	Miami-Dade County	3,276	0.1%
NYC	New York City	61,840	0.7%
Philadelphia	Philadelphia	4,489	0.1%
Phoenix	Phoenix, Mesa/Maricopa County	9,026	0.2%
Raleigh	Raleigh/Wake County	1,534	0.1%
Salt Lake City	Salt Lake City & County	2,095	0.2%
San Antonio	San Antonio/Bexar County	2,995	0.1%
San Francisco	San Francisco	7,754	1.0%
San Jose	San Jose/Santa Clara City & County	10,028	0.5%
Seattle	Seattle/King County	13,368	0.6%
Washington DC	District of Columbia	4,410	0.7%

Source: US Dept. of Housing and Urban Development (HUD), Census, JPMAM. 2022.

HUD Continuum of Care: geographic area comprised of representatives that administer HUD policy

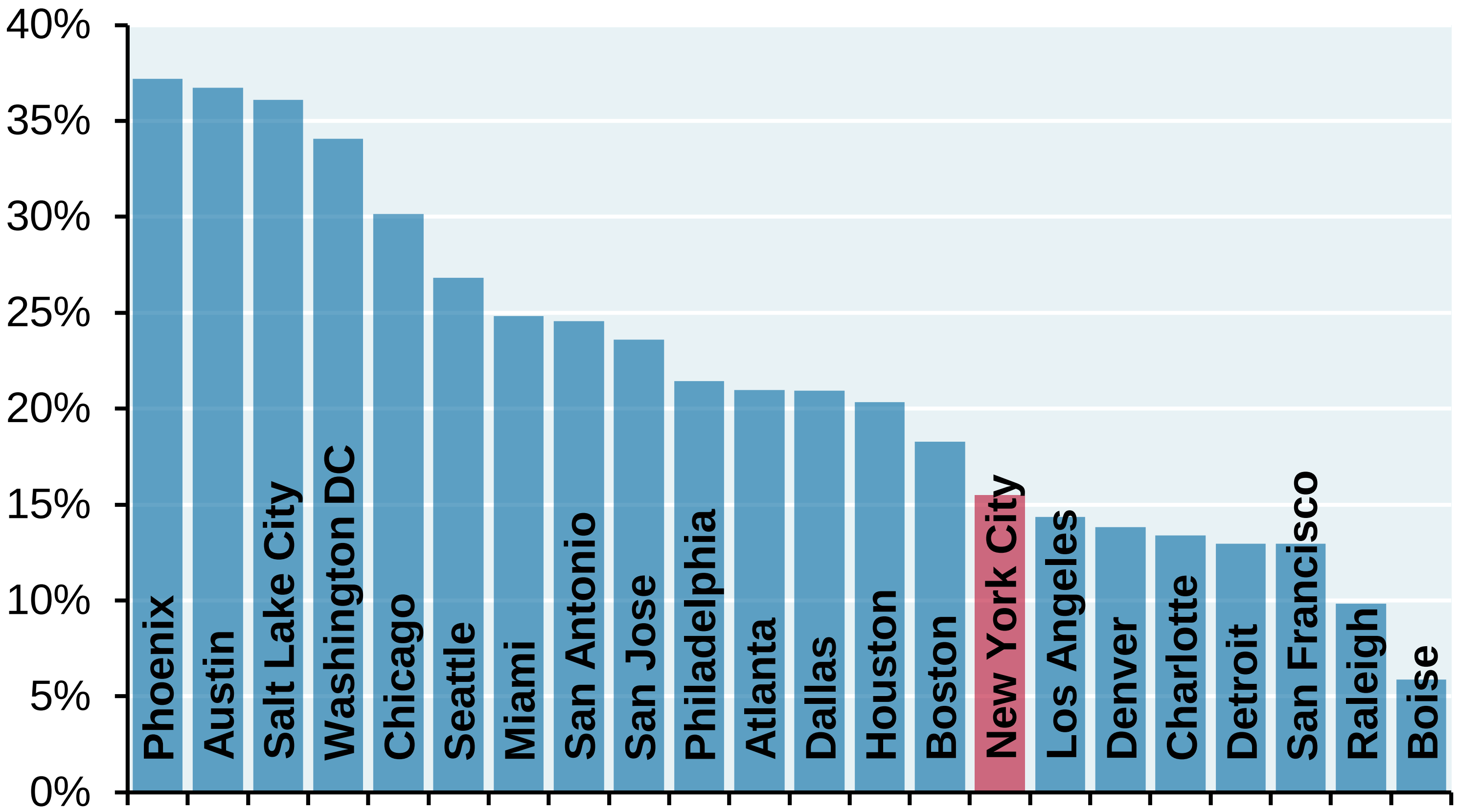
[3] NYC fiscal conditions

- NYC faces a large budget gap that requires large budget cuts and/or tax increases to close
  - Higher asylum related expenses and education expenses explain much of the gap between the City OMB estimate of $19 bn in 2023-2027 deficits and the NYC Comptroller estimate of $38 bn
  - However, both OMB and Comptroller revenue growth estimates are well below 2010-2022 levels and may overstate budgetary gap
- NYC residents will likely end up financing a large part of the MTA’s $2.5 bn operating deficit
- Despite 4th highest household tax burden, NYC tax revenue growth was below median from 2019 to 2022
- NYC municipal debt as a % of personal income and property values are in line with historical levels, but rank at the high end of the peer group when including unfunded pensions and retiree healthcare
  - NYC has run into judicial challenges to its plans to move 250,000 city employees to a privately run Medicare Advantage plan
- NYC liquidity measures are at the very low end of the peer group

New York City ranks in the third quartile of tax revenue growth since 2019

2022 vs 2019 revenues by city

Percent change vs 2019 values

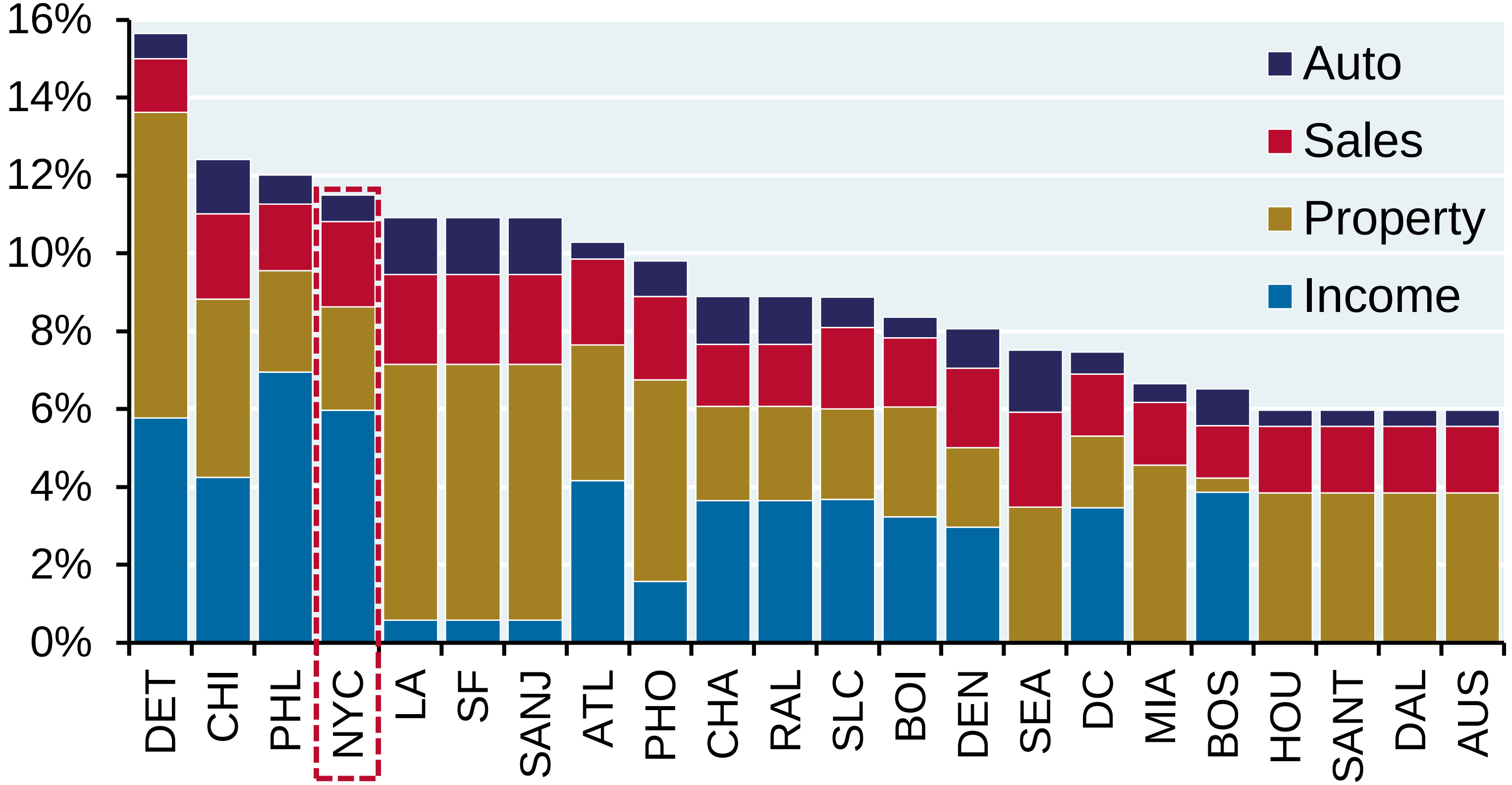


Source: Moody's, JPMAM. 2022.

State/local household tax burden in NYC is at the high end of peer group cities

Tax burden for family earning $75,000 per year

Percent



Source: "*2020 Tax Rates and Tax Burdens in the District of Columbia: A Nationwide Comparison*", City of Washington DC. 2022.

- Los Angeles was used as proxy for San Francisco and San Jose
- Houston was used as proxy for San Antonio, Dallas and Austin
- Charlotte was used as proxy for Raleigh
- Jacksonville was used as proxy for Miami

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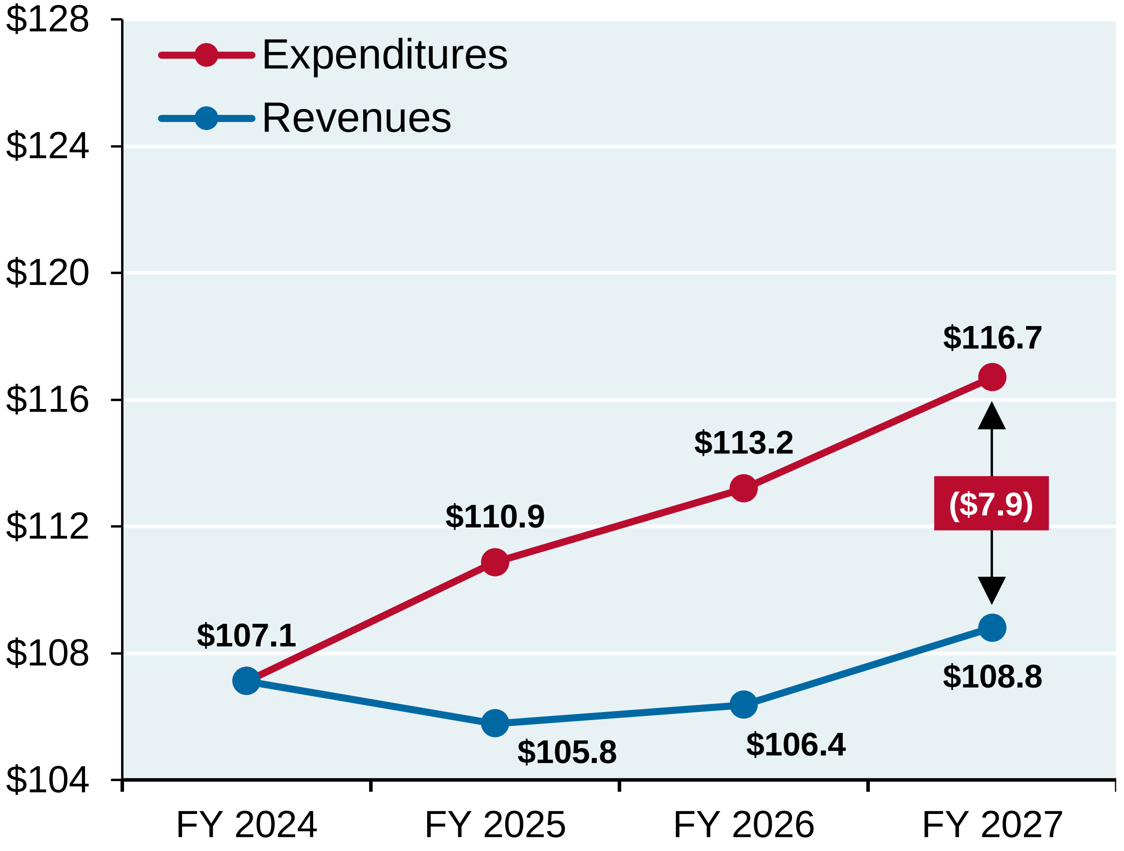
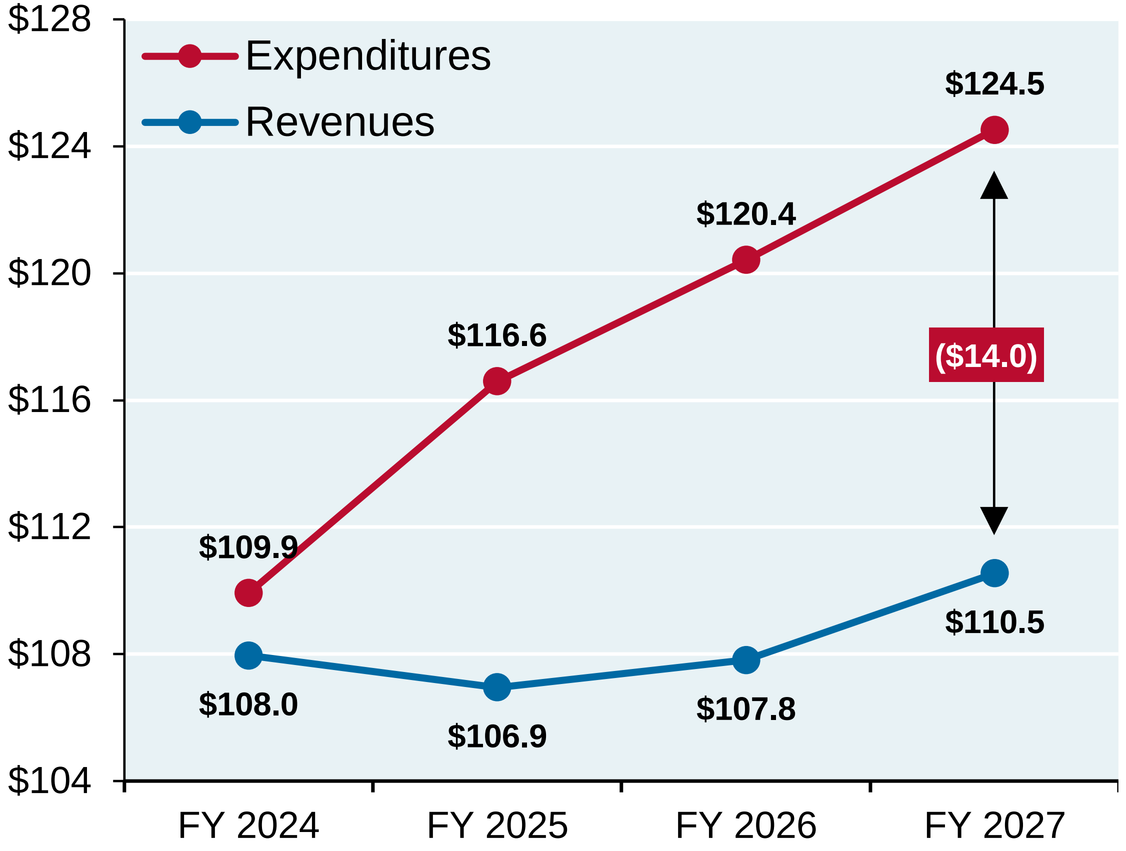
NYC faces a fiscal cliff that will require large budget cuts and/or tax increases to close

Mayor's OMB budget gap projections
$US, billions



Source: Mayor's Office of Management and Budget. June 2023.

NYC Comptroller's budget gap projections
$US, billions



Source: NYC Comptroller. August 2023.

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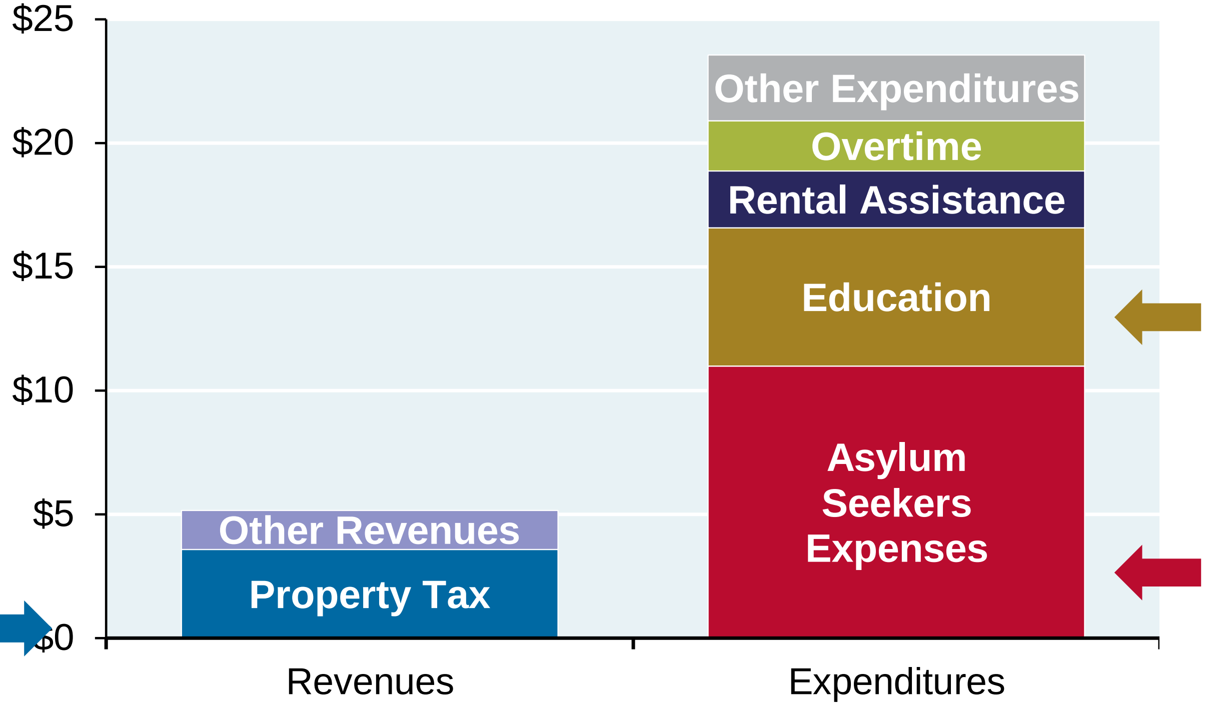
NYC Comptroller 2023-2027 budget gap estimate of $38 bn is 2x larger than the City's OMB estimate

Components of Comptroller estimated revisions, 2023-2027, Differences vs City's OMB budget, US$, billions



Source: NYC Comptroller. August 2023.

Property Tax: Comptroller projects property tax revenues will grow at an average annual rate of 2.3% through 2027. OMB left its property tax revenue forecast unchanged from 2025 -2027

Education: Cost of special education Carter Cases, exhaustion of COVID stimulus funding for programs that are expected to continue past their expiration. OMB did not include funding for State's mandate to reduce class size by September 2028

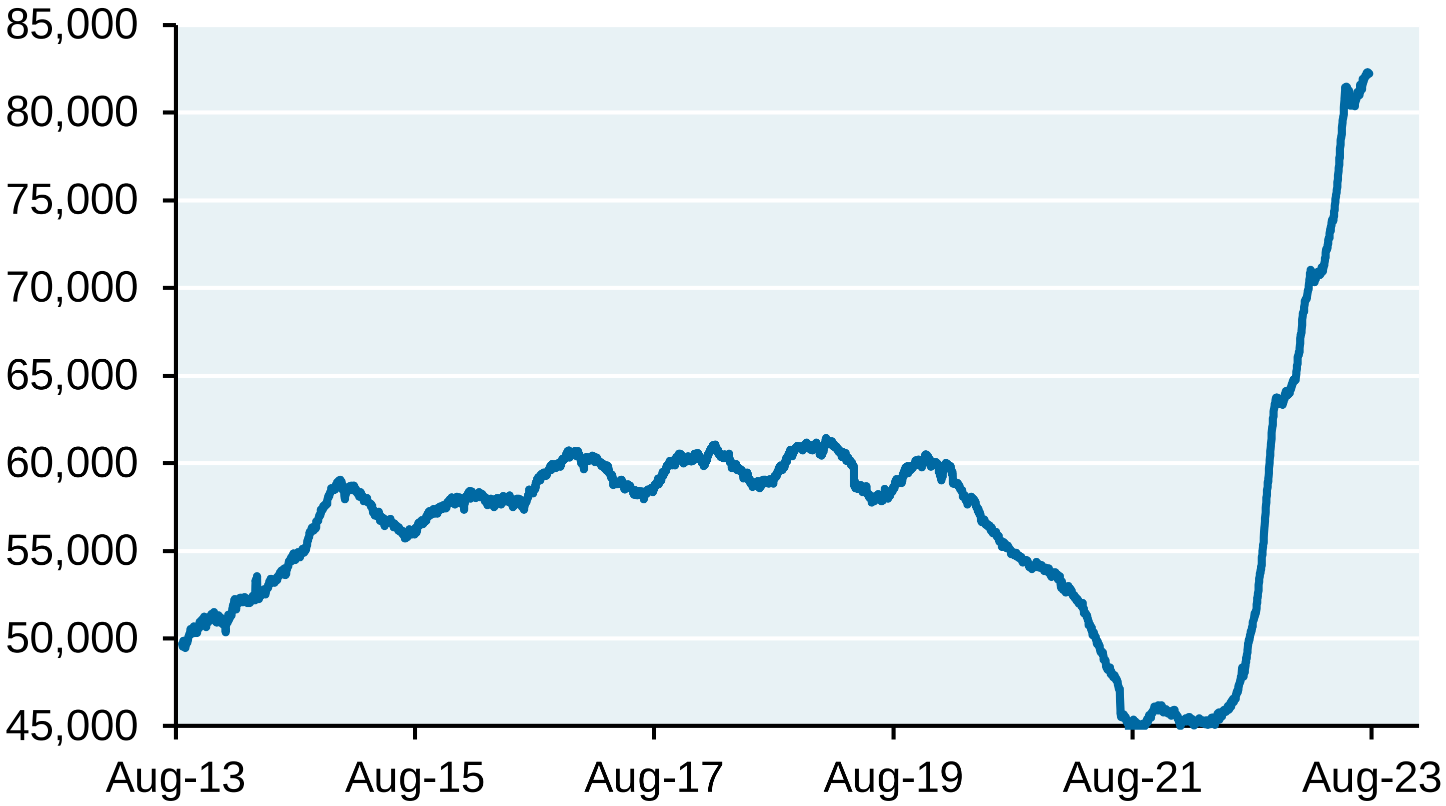
Asylum Seekers Expenses: OMB did not include funds for services in 2026 or 2027

Budget risks not include in Mayor/OMB or Comptroller report: Rikers closure and capital plans to build or expand jail alternatives; Unbudgeted health and hospital gaps; Capital plans required for class size reduction; Energy transition costs

Spike in NYC asylum seekers

NYC Department of Homeless Services shelter system

Number of individuals

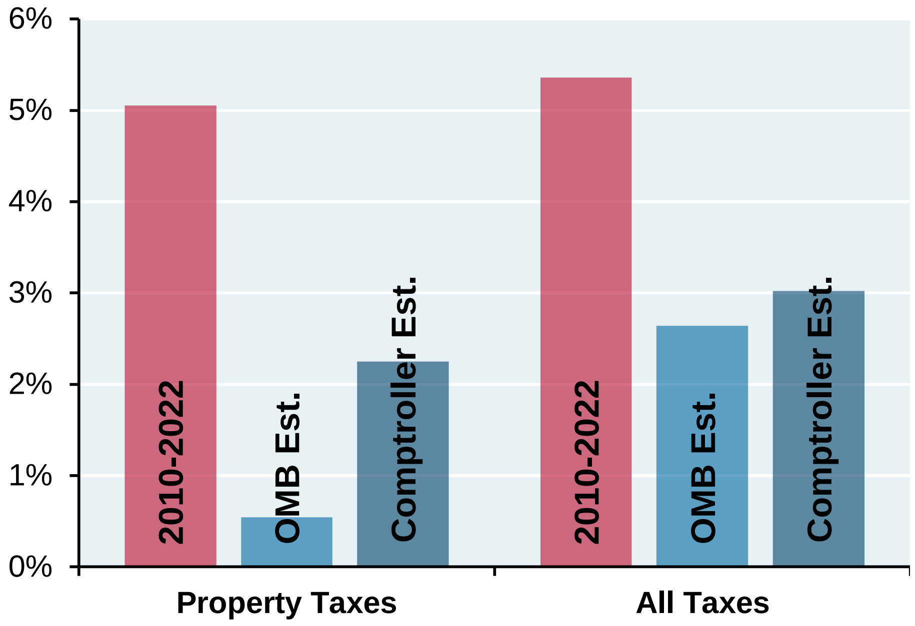


- Approximately 70% of families and 50% of single adults seeking asylum settle into the shelter system or a Humanitarian Emergency Response and Relief Center
- NYC estimated asylum seeker costs:
  - FY 2023: $1.4 bn
  - FY 2024: $4.7 bn
  - FY 2025: $6.1 bn
  - Estimates for FY’24 and FY’25 have nearly tripled since March 2023

Source: Department of Homeless Services, JPMAM. August 1, 2023.

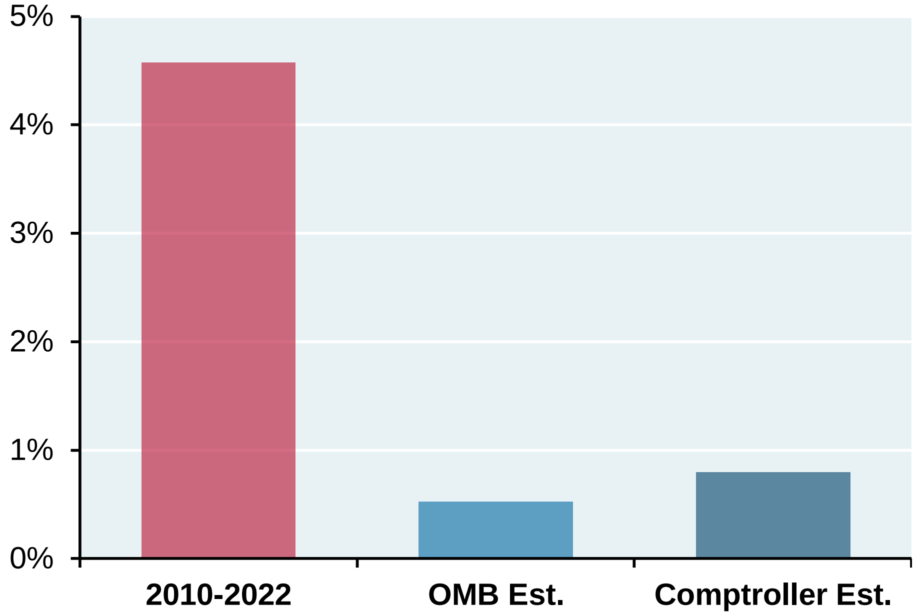
NYC estimates for tax revenue growth are lower than 2010-2022 period, and may modestly overstate budgetary challenges

Historic NYC tax revenue growth vs projections
CAGR, percent



Source: Mayor's Office of Management & Budget, NYC Comptroller, JPMAM. 2023. Projections are for FY 2024-2027.

Historic NYC revenue growth vs projections
CAGR, percent



Source: Mayor's Office of Management & Budget, NYC Comptroller, JPMAM. 2023. Projections are for FY 2024-2027.

2010-2022 period was characterized by low nominal and real interest rates, no prolonged economic recession and preceded the office overhang issue

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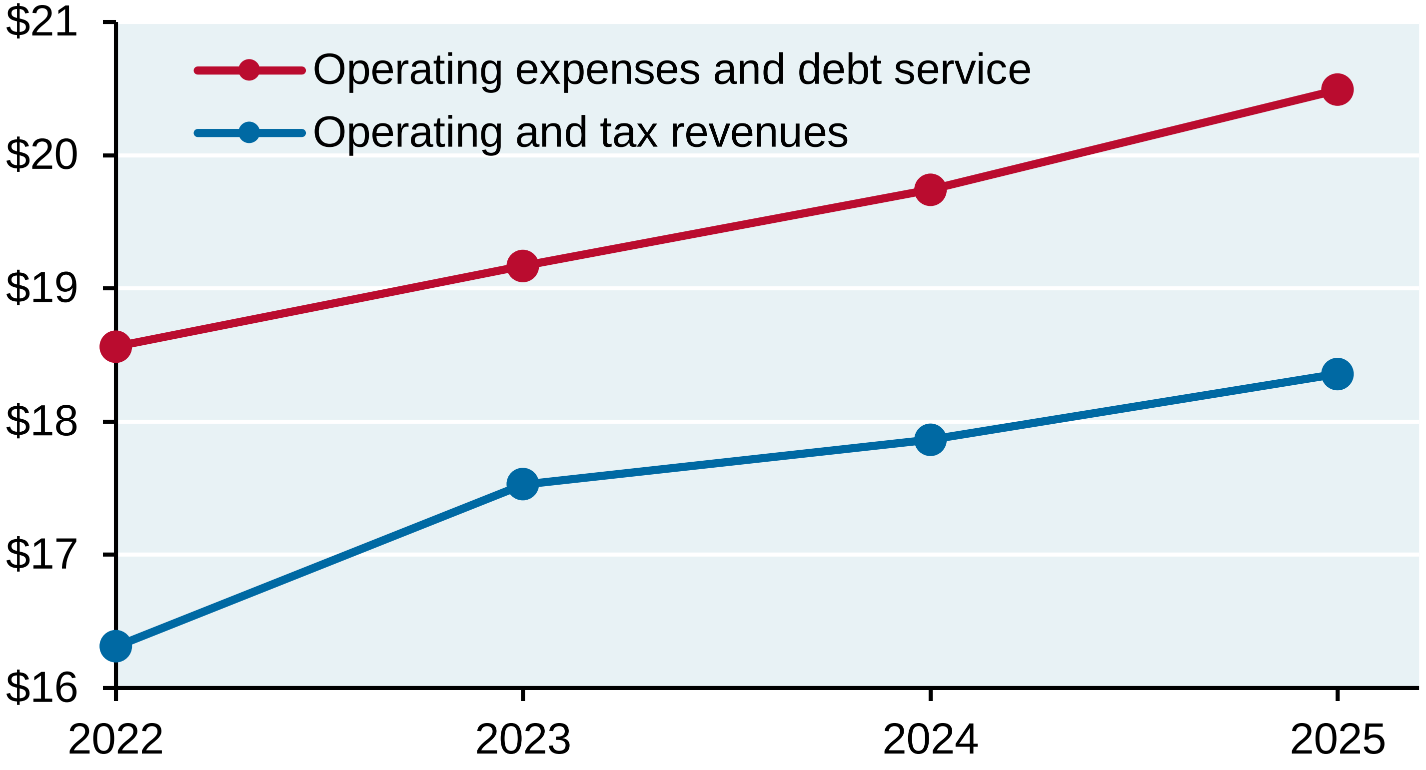
The MTA faces a large operating deficit, which is technically an obligation of NY State…

Fiscal conditions

MTA forecasted operating revenues vs expenses

US$, billions



- MTA is expected to raise fares and reduce services due to $2.5B budget deficit in 2025
- *Technically*, the MTA is a state-controlled authority and has no statutory claim on NYC revenues, and its debt is not a NYC obligation

Source: New York Comptroller. July 2022. Note: Revenues include projected fare and toll increases. Expenses include non-baselined expense items.

J.P.Morgan

…but one way or another, NYC residents will likely end up having to close a large part of the MTA deficit

MTA revenue sources, excluding bridges and tunnels

	2019	2022	2026 est
Farebox revenue	6,351	3,836	5,325
Toll surplus	779	1,069	856
Other operating revenue	683	630	811
Real Estate Transactions taxes	**1,109**	**1,194**	**1,280**
Payroll Mobility Tax	**1,805**	**2,026**	**2,161**
MMTOA	**1,824**	**2,601**	**2,763**
Other taxes and subsidies	2,552	2,796	3,141
Federal aid	0	1,498	201
Total	15,103	15,650	16,538
Share from NYC targeted taxes	**31%**	**37%**	**38%**

Source: MTA, NYC Comptroller's Office

NY State relies heavily on NYC to fund the MTA:

- **Real Estate Transaction Taxes**: includes a 1% real property levy on NYC CRE transactions and a mortgage tax on borrowers and institutional lenders of real property in MTA commuter districts
- **Payroll Mobility Tax**: surcharge levied on employer payrolls in MTA commuter districts
- Metropolitan Mass Transportation Operating Assistance (**MMTOA**): funded by sales taxes and corporate surcharges on general business corporations in MTA commuter districts

NYC Comptroller projects significant increase in NYC municipal debt

Projected NYC debt outstanding, FY 2022 - FY 2032

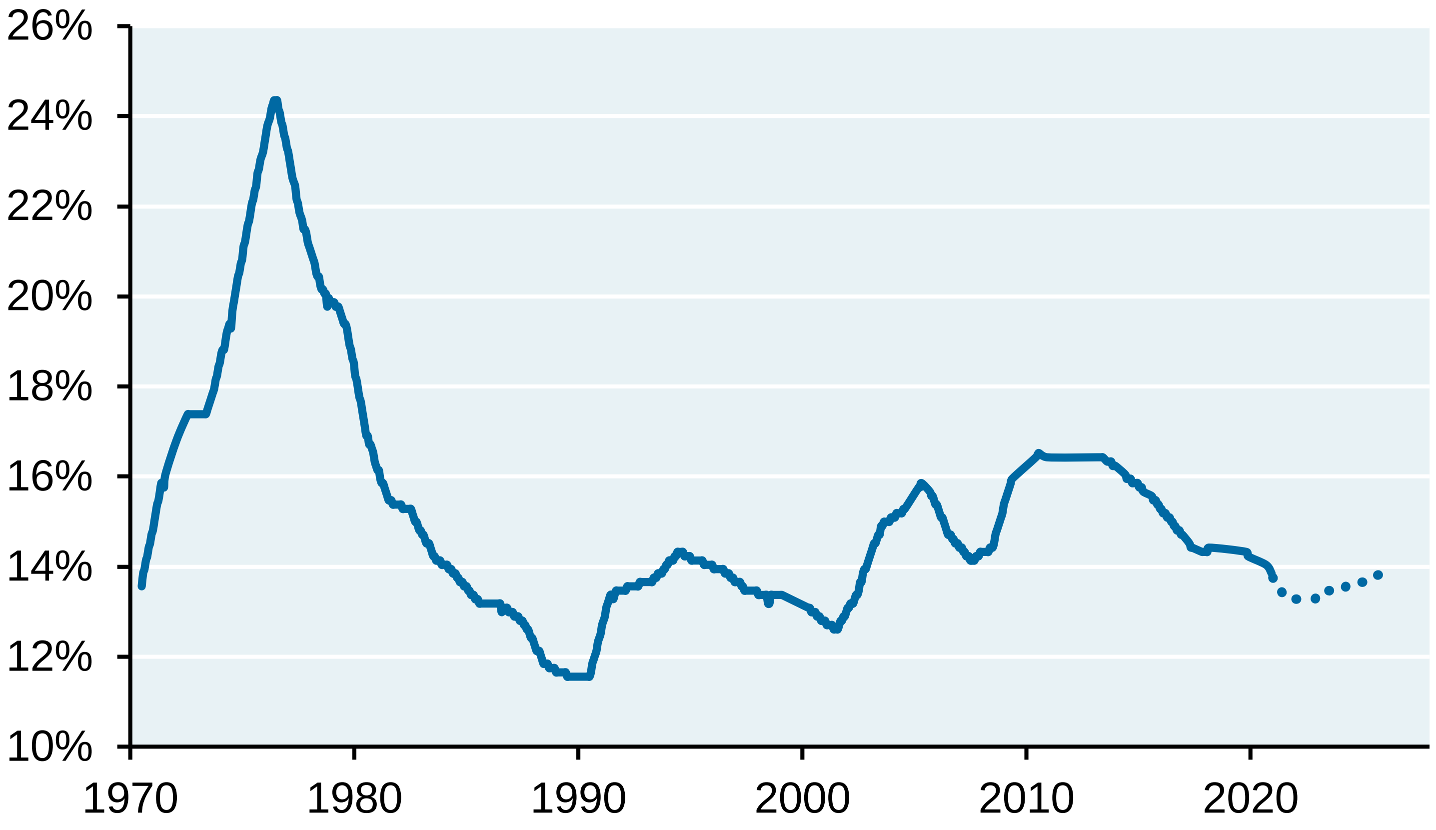
End of Fiscal Year	Debt Outstanding for GO, TFA, & TSASC ($ bn)	Percent Change in Debt Outstanding
2022	$92	2.4%
2023	$96	4.9%
2024	$102	5.6%
2025	$108	6.8%
2026	$115	6.6%
2027	$123	6.3%
2028	$130	5.7%
2029	$136	5.1%
2030	$142	4.3%
2031	$147	3.4%
2032	$150	2.1%

Source: NYC Comptroller, NYC OMB. December 2022.

However, NYC debt as a % of personal income is within the post-1990 range, and well below levels seen during the 1970's NYC financial crisis

NYC gross debt, FY 1970-2026

Percent of personal income



Source: NYC Comptroller. December 2022.

Same for debt service to income, whose spike mostly reflects the increase in Fed policy rates

NYC debt service, FY 1992-2026

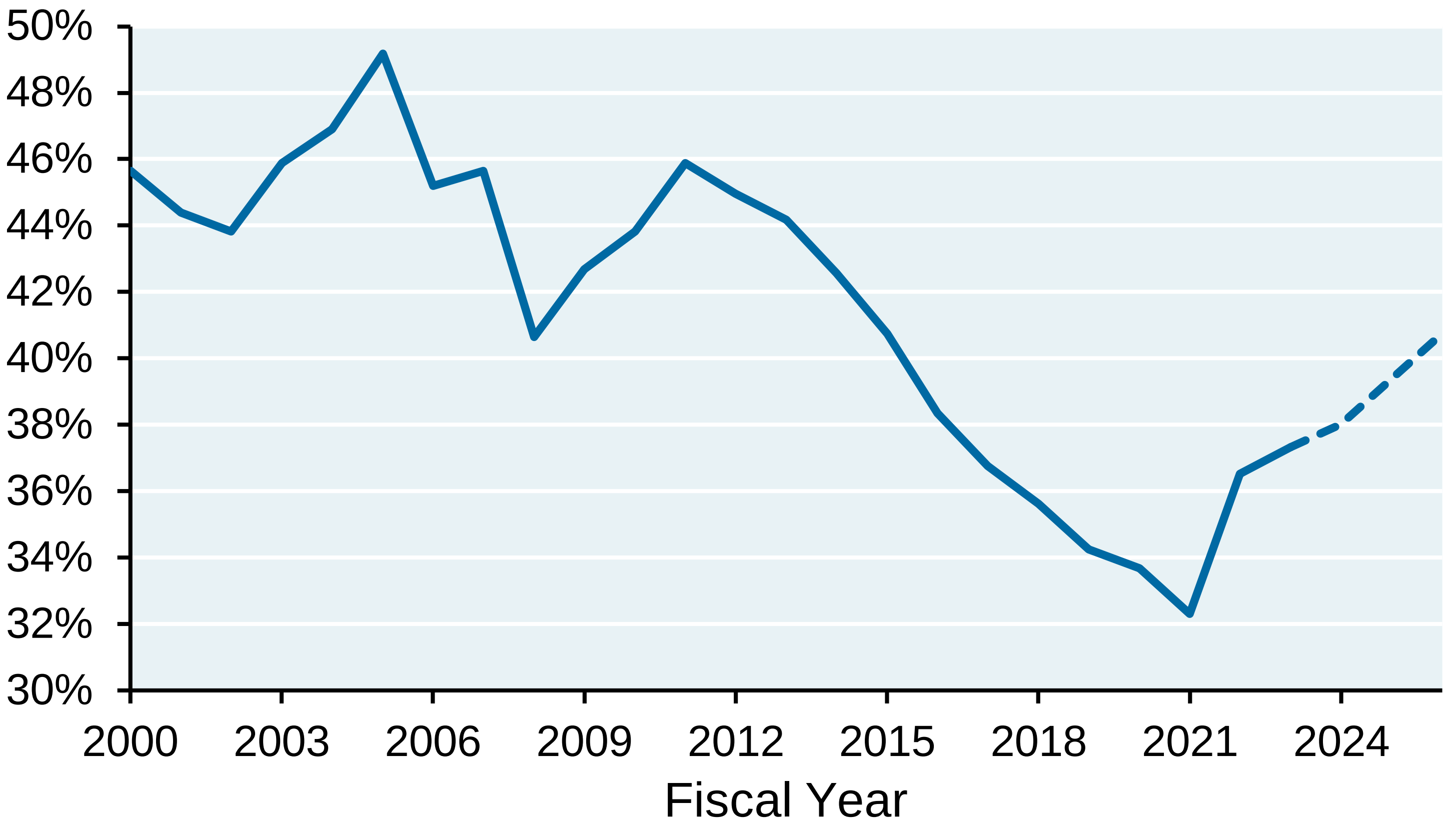
Percent of personal income

Source: NYC Comptroller. December 2022.

Debt to *assessed* property value rising but still below post-2000 levels

NYC outstanding debt

Percent of assessed value of taxable real property

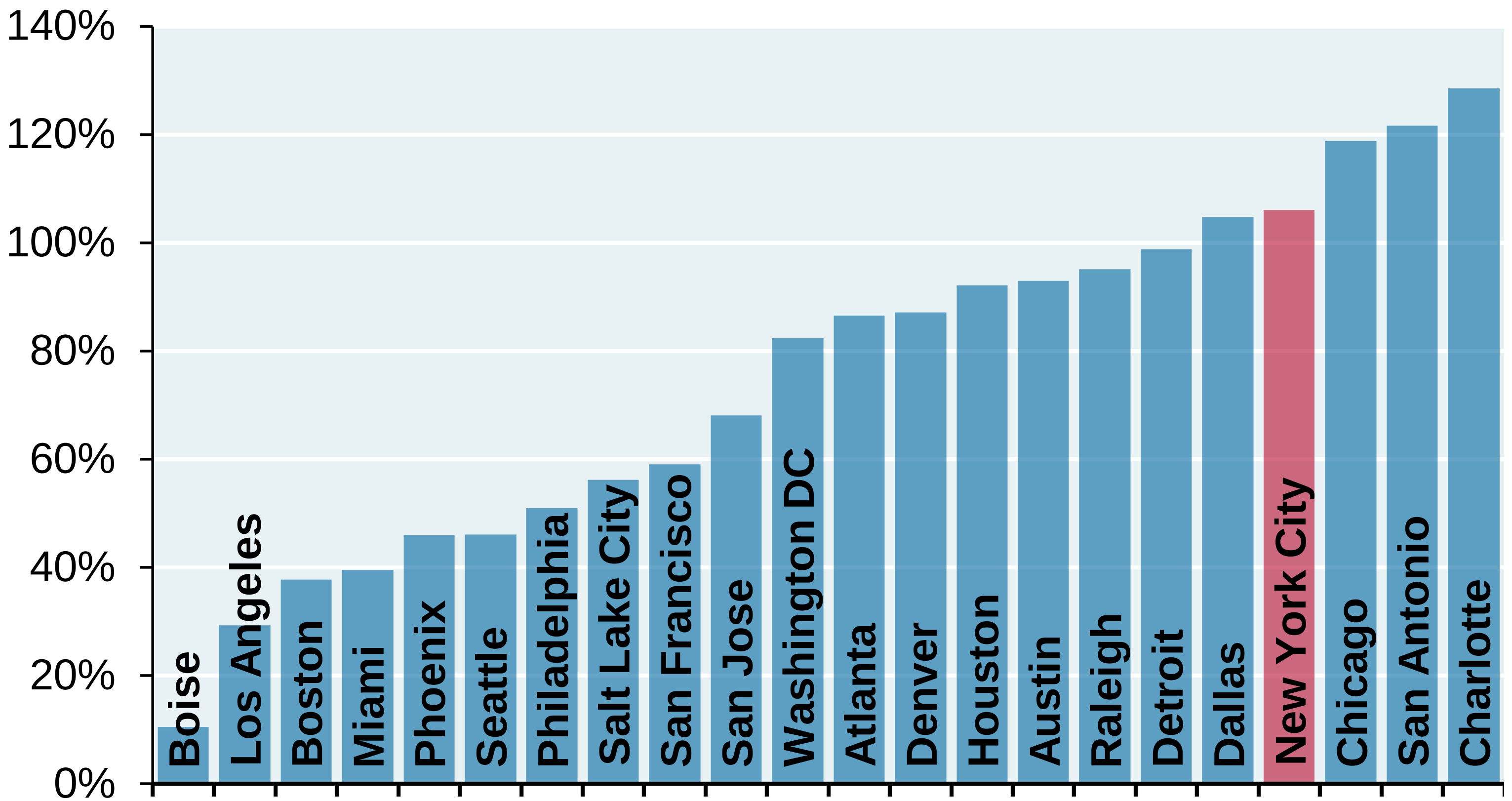


Source: NYC Comptroller. December 2022.

NYC debt to revenues is high vs peers

Governmental debt to revenues

Percent of govermental fund revenues



Source: Moody's, JPMAM. 2022.

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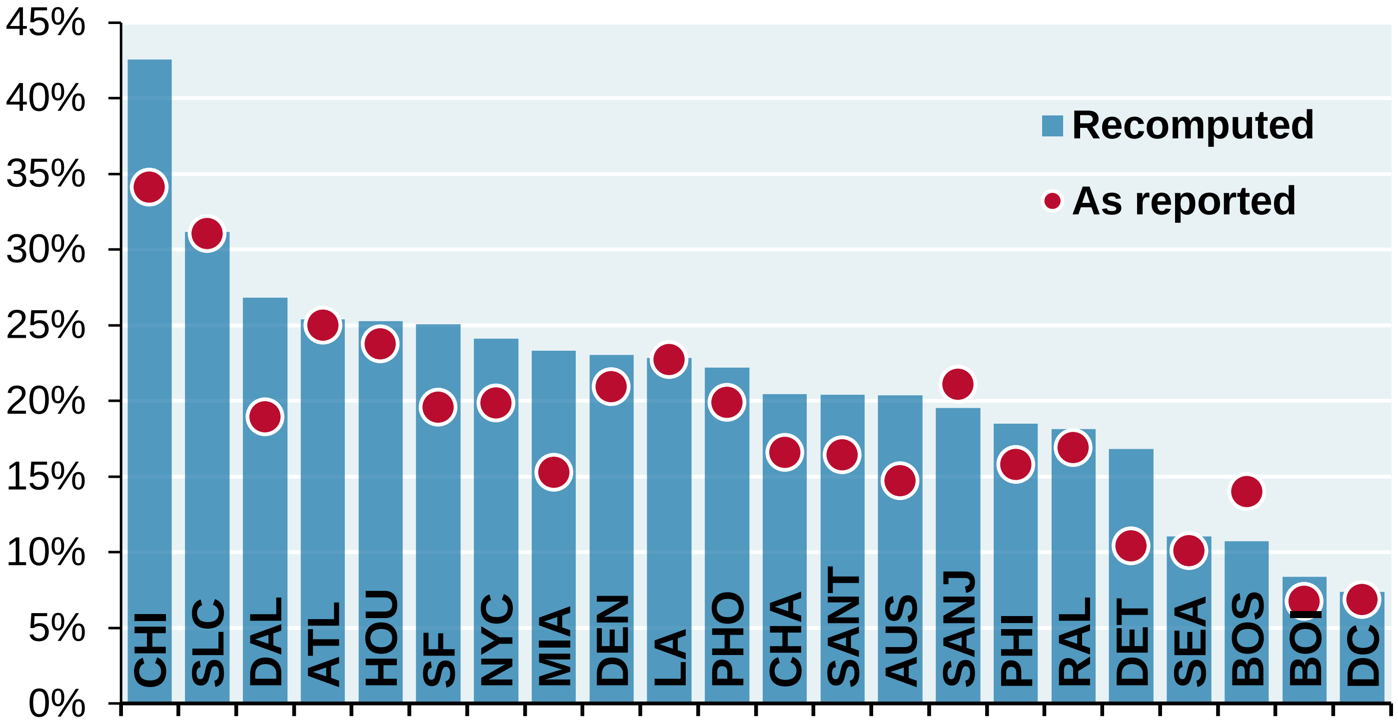
Debt analyses should include unfunded pension and retiree healthcare obligations as well as bonds; NYC total obligations ratio is at the high end of the peer group

Cost of pension and retiree healthcare plans (including amortization of unfunded amounts), government debt and defined contrbution plans as a % of city revenues



Source: Individual city CAFRs, Moody's, JPMAM. FY 2022.

- We recompute the obligations ratio using normalized discount rates and amortization terms, and fully amortize unfunded balances
- Gap between reported and recomputed amounts in NYC mostly reflects underfunding of retiree healthcare plans
- Chicago stands alone within the peer group regarding fiscal distress
- These calculations include essential service entities (water/sewer, mass transit, electric utilities) unless they are supported by the state

➢ SLC recently completed construction of a new $4bn airport; excluding essential service entities, SLC ratio is 5th lowest

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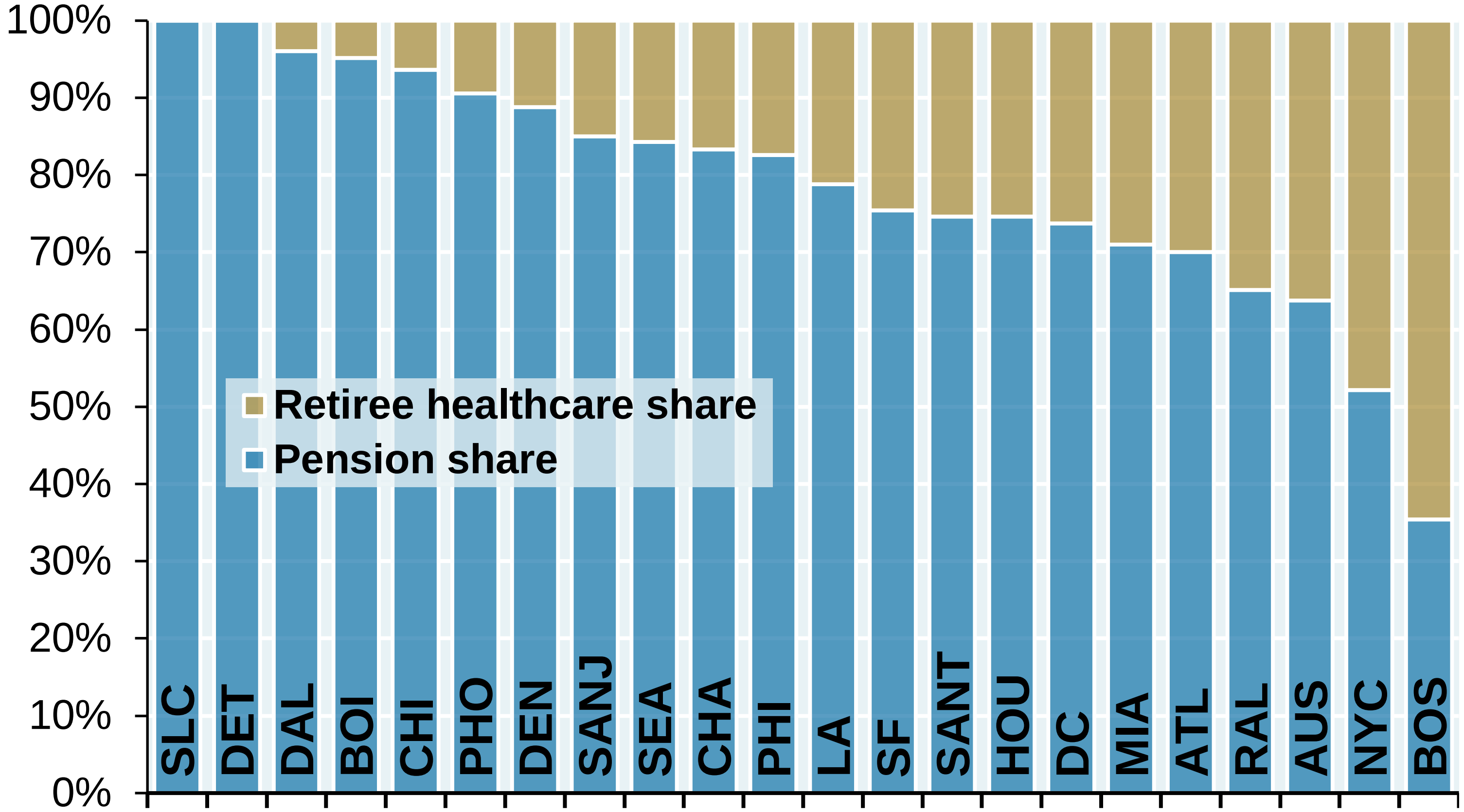
NYC unfunded obligations are more skewed to retiree healthcare than pensions, which in principle should provide more flexibility to manage costs…

Fiscal conditions

Split between pension and retiree healthcare obligations

Percent of annual recomputed Annual Required Contribution



Source: Individual city CAFRs, Moody's, JPMAM. FY 2022.

…but NYC has run into judicial challenges to its plan to restructure retiree healthcare

- In March 2023, NYC signed a contract to switch 250,000 retired employees to a privately run Medicare Advantage plan (est. $600 mm in annual savings for NYC)
- Retirees sued over the plan in late May 2023; lawsuit claimed it could increase out-of-pocket costs and make it more difficult to get approvals for procedures
- New York State Supreme court ruling 'permanently' blocked the Medicare Advantage switch in early August; city administrators intend to appeal

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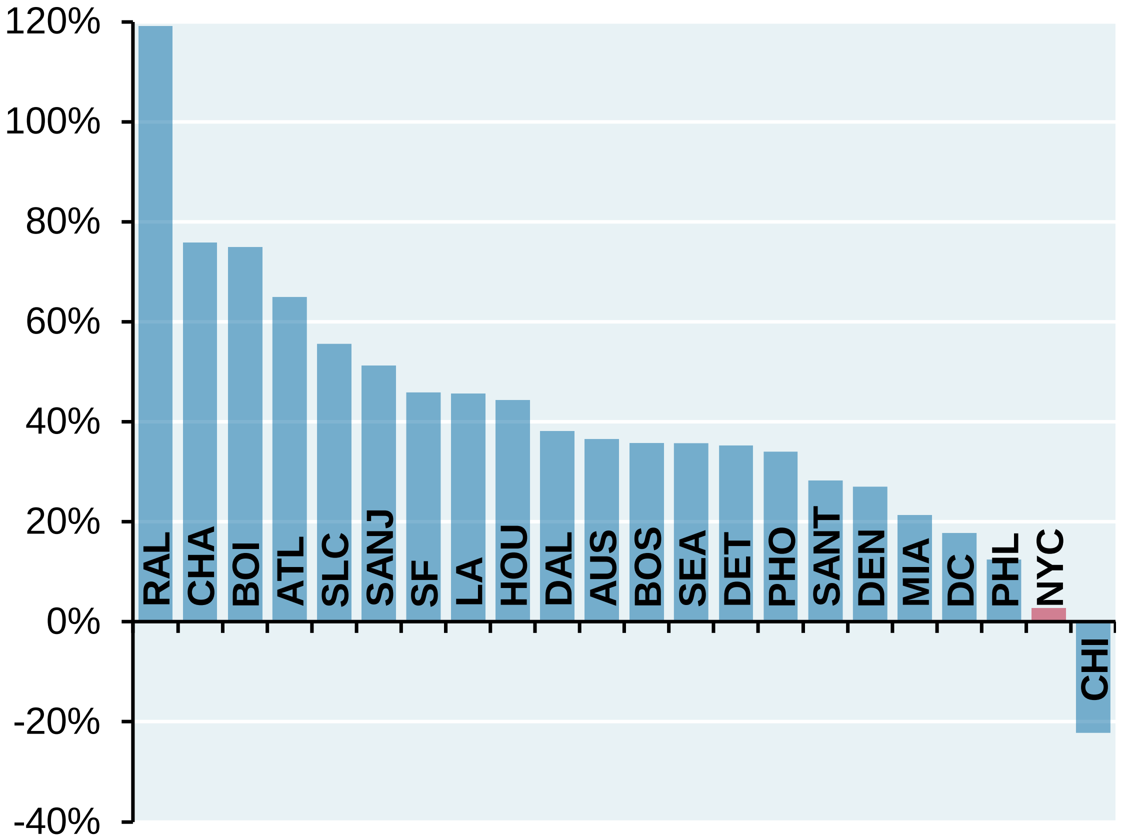
NYC liquidity measures are well below peer group average

Available fund balance ratio

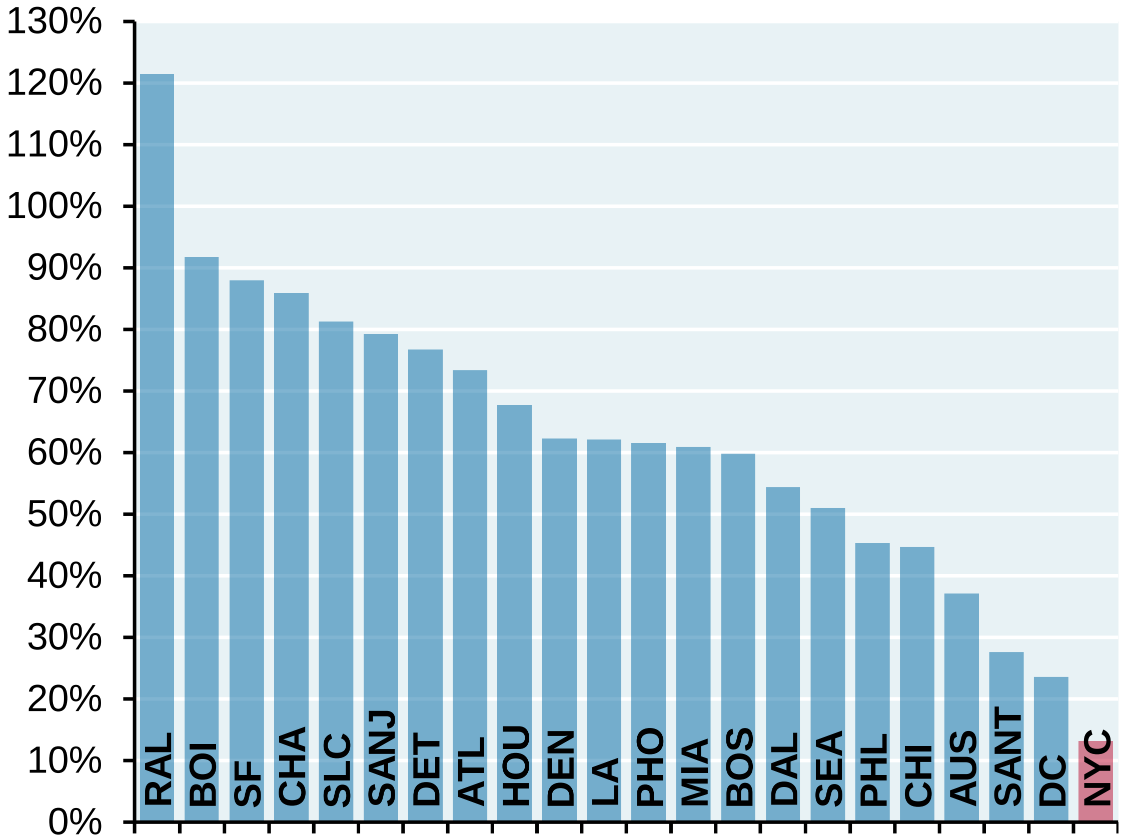
Available fund balance as a % of revenue



Source: Moody's, JPMAM. 2022.

Liquidity ratio

Net unrestricted cash as a % of revenue

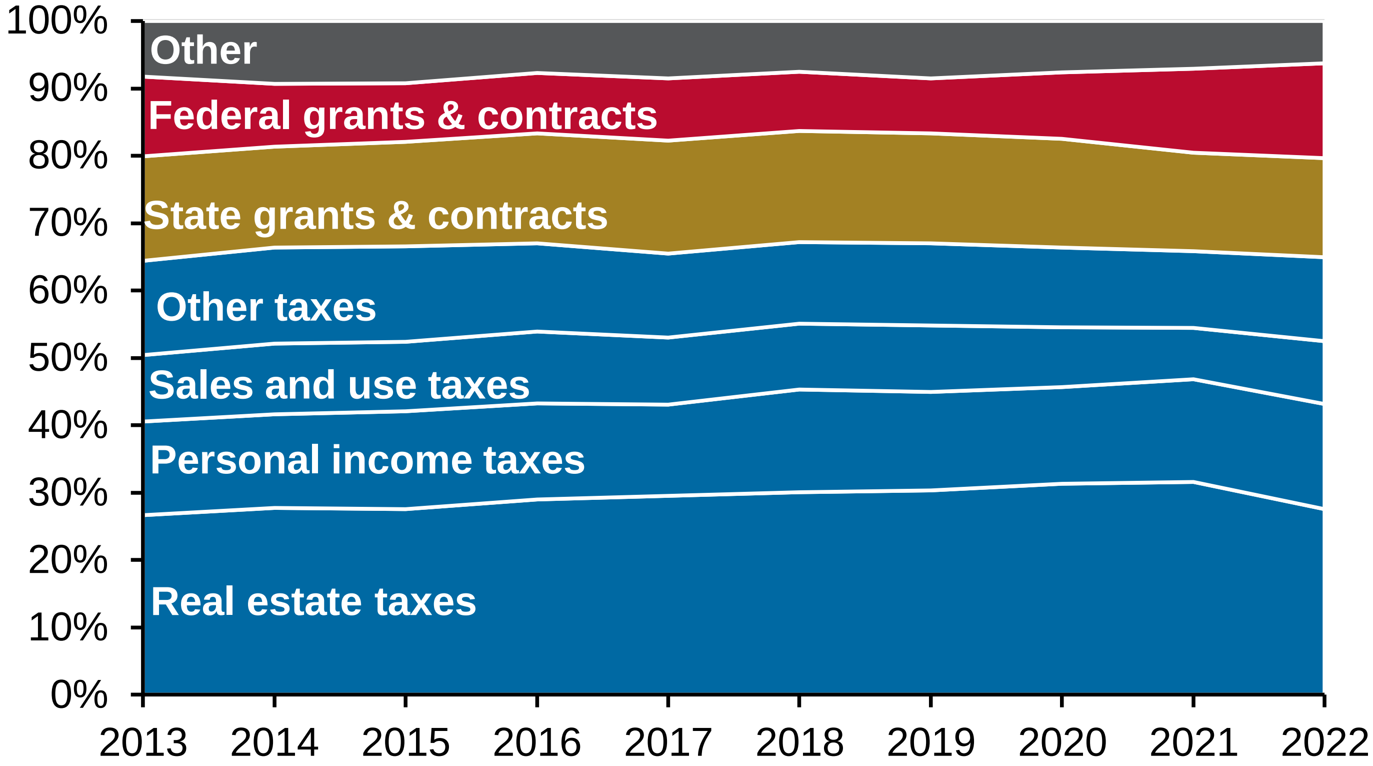


Source: Moody's, JPMAM. 2022.

Black Swan fiscal event: legislation that disallows NYC from collecting personal income taxes from remote out-of-state workers

General fund revenue sources

Percent of general fund revenue



Source: NYC Comptroller, JPMAM. 2022.

- Currently, NY State taxes earned income of out of state workers that are employed by companies located in NY State, even when that work is performed in other states
- Some states allow these workers to credit taxes paid to NY State against their home state income tax liability, but others don’t
- The risk to NYC: Federal court rulings or Congressional legislation that proportionally allocate state income taxes of out-of-state workers based on the number of work days physically present in each state
- WFH prevalence may force a resolution given rising double taxation and rising receipt of income tax payments by states in which no work was actually performed

[4] NYC infrastructure, energy and office to residential conversions

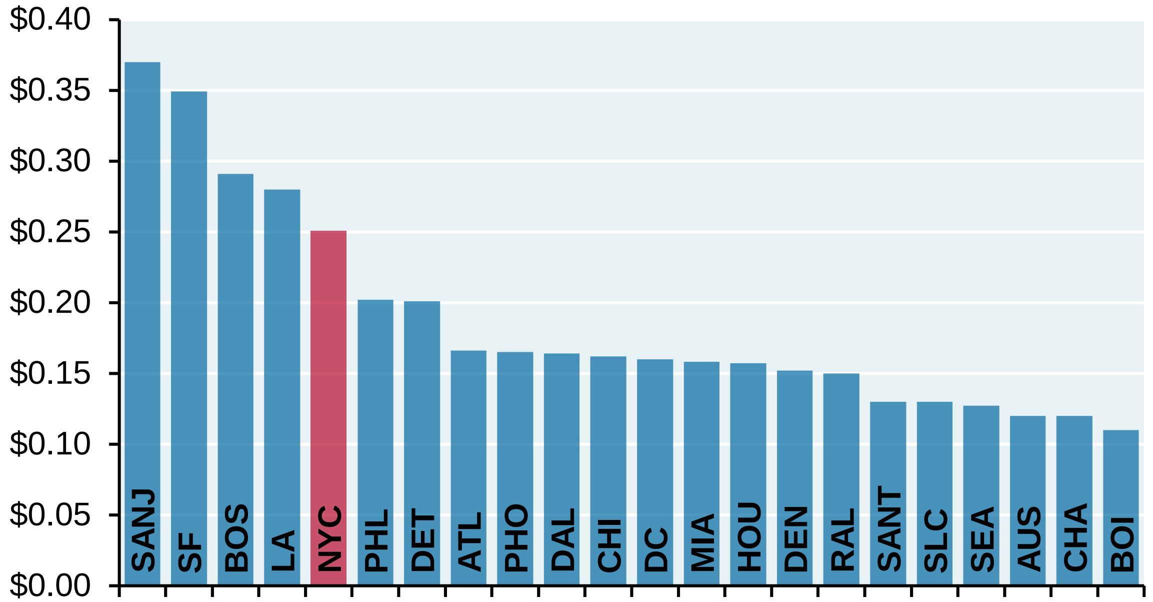
- NYS electricity prices are at the high end of the peer group
- NYS renewable transition more difficult than in other states due to low wind and solar capacity factors; Shutdown of Indian Point nuclear plant mostly offset by natural gas rather than renewables
- NYC power grid facing reserve margin deficiency by 2025 which should be resolved by 2026 with completion of the Champlain Hudson Power Express from Quebec
- Aging NYC mass transit/road/aviation/port/water/public housing infrastructure needs replacement
- NYC carbon taxes on buildings: modest targets for 2024, much harder by 2030
- Class B/C office to residential conversions face significant economic and regulatory challenges, and may only be feasible for 3%-5% of NYC office space

NYC electricity prices are at the high end of the peer group; NY State faces renewable transition headwinds due to relatively poor wind and solar conditions

- Natural gas and imports of gas-fired power are the primary replacements for decommissioned Indian Point nuclear plant

Price of household electricity

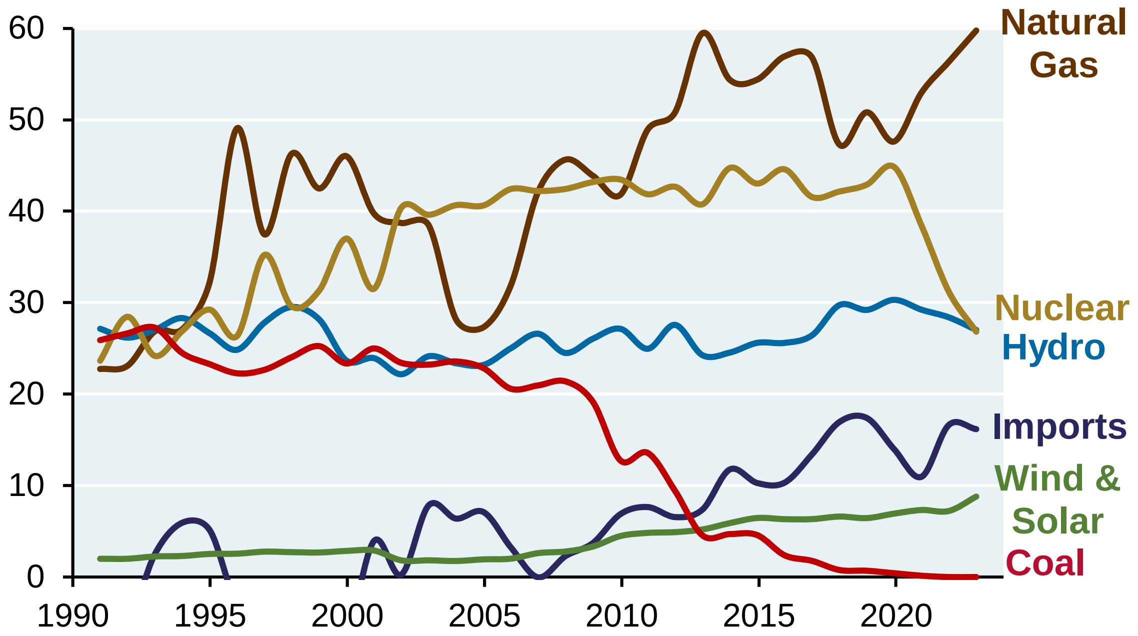
US$ per kWh



Source: BLS, Energy Sage, JPMAM. July 2023.

New York: electricity generation by source

Terawatt hours



Source: EIA, JPMAM. 2022.

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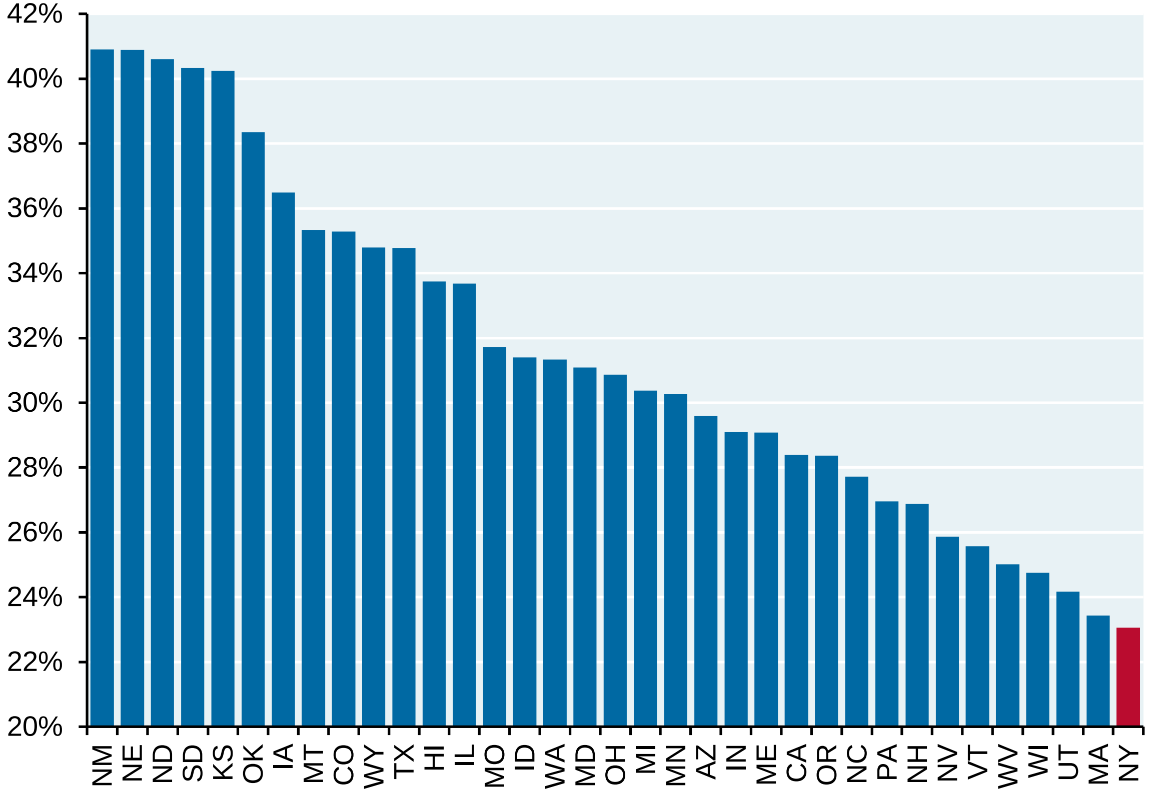
NY State ranks last in terms of wind capacity factors and close to the bottom in solar (measures of actual generation vs potential)

Infrastructure

Wind capacity factors by state

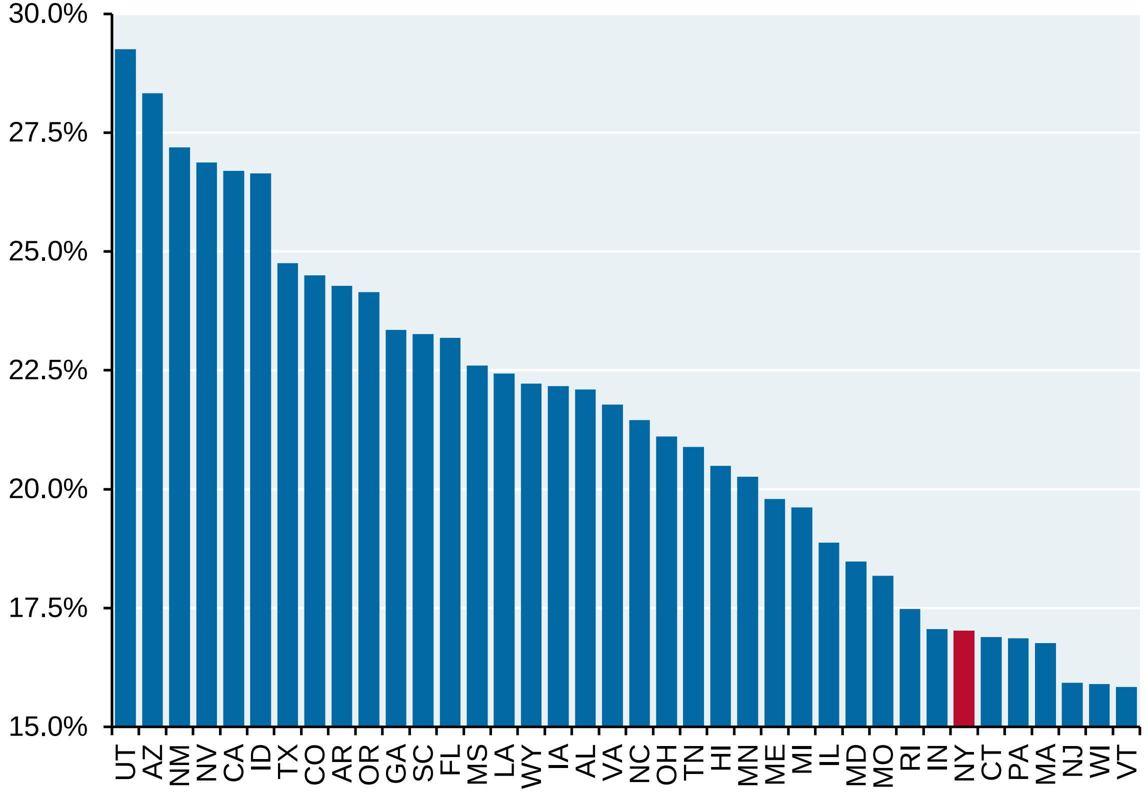
Percent



Source: EIA, JPMAM. 2021. All states with more than 100 MW of installed capacity.

Solar capacity factors by state

Percent



Source: EIA, JPMAM. 2021. All states with more than 50 MW of installed capacity.

* Both charts derived from EIA forms #923 (generation) and #860 (capacity)

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NYC power grid will be in much better shape with completion of Champlain Power Hudson Express, bringing hydropower from Quebec to Queens

Infrastructure

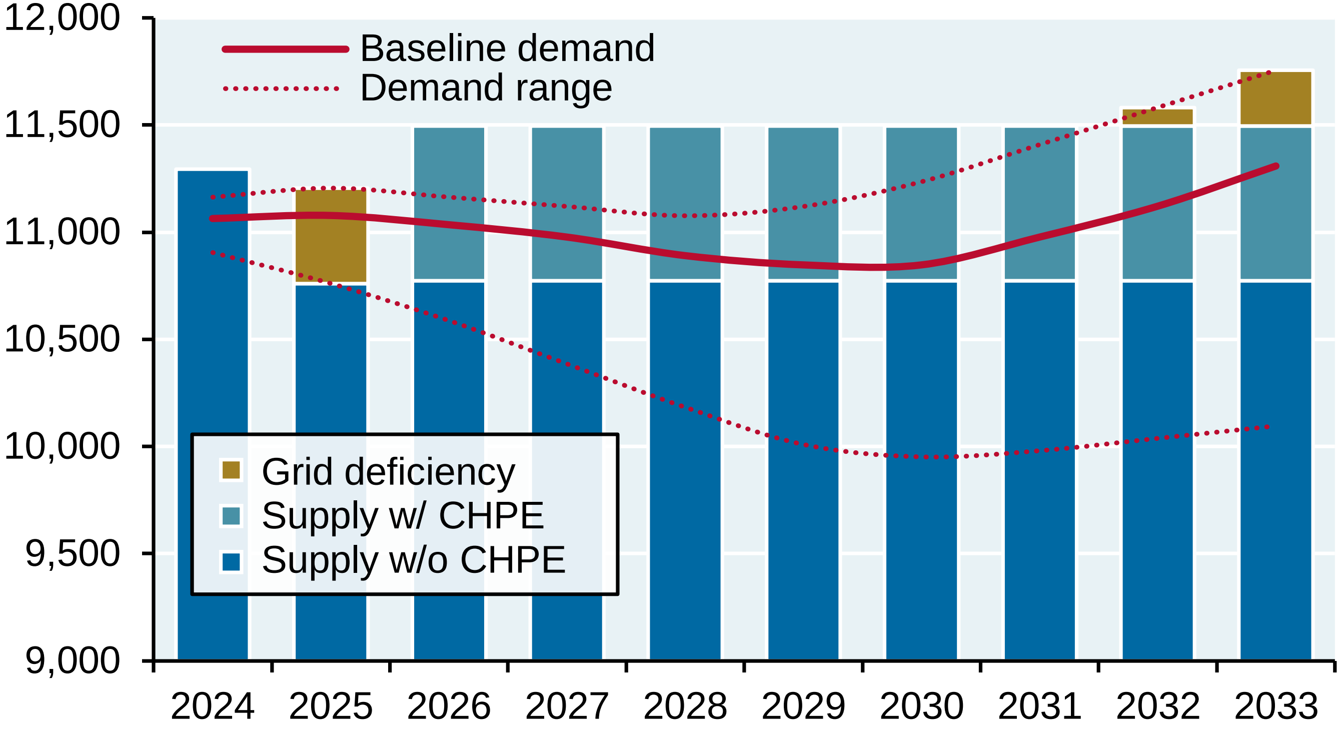
NYISO: reliability margin deficiency of as much as 446 MW by summer 2025 due to increased electrification of transportation and building sectors, continued economic growth and retirement of natural gas peaking generators

- as of May 2023, the Peaker Rule resulted in closure or reduced operation of ~950 MW of generation in NYC. An additional 500 MW of generation is expected to limit or discontinue operations by 2025

By 2026, the need is expected to be resolved with the completion of the Champlain Power Hudson Express transmission line with no projected further deficiency until 2032

- 7.6 TWh per year of Quebec hydropower delivered via High Voltage Direct Current Line to Astoria, Queens
- NYC consumes ~55 TWh annually

NYC grid security: Champlain Power Hudson Express (CHPE) needed to restore reliability margin, megawatts



Source: 2023 Power Trends Report, NYISO. August 13, 2023.

Infrastructure: an old city needs a lot of new money

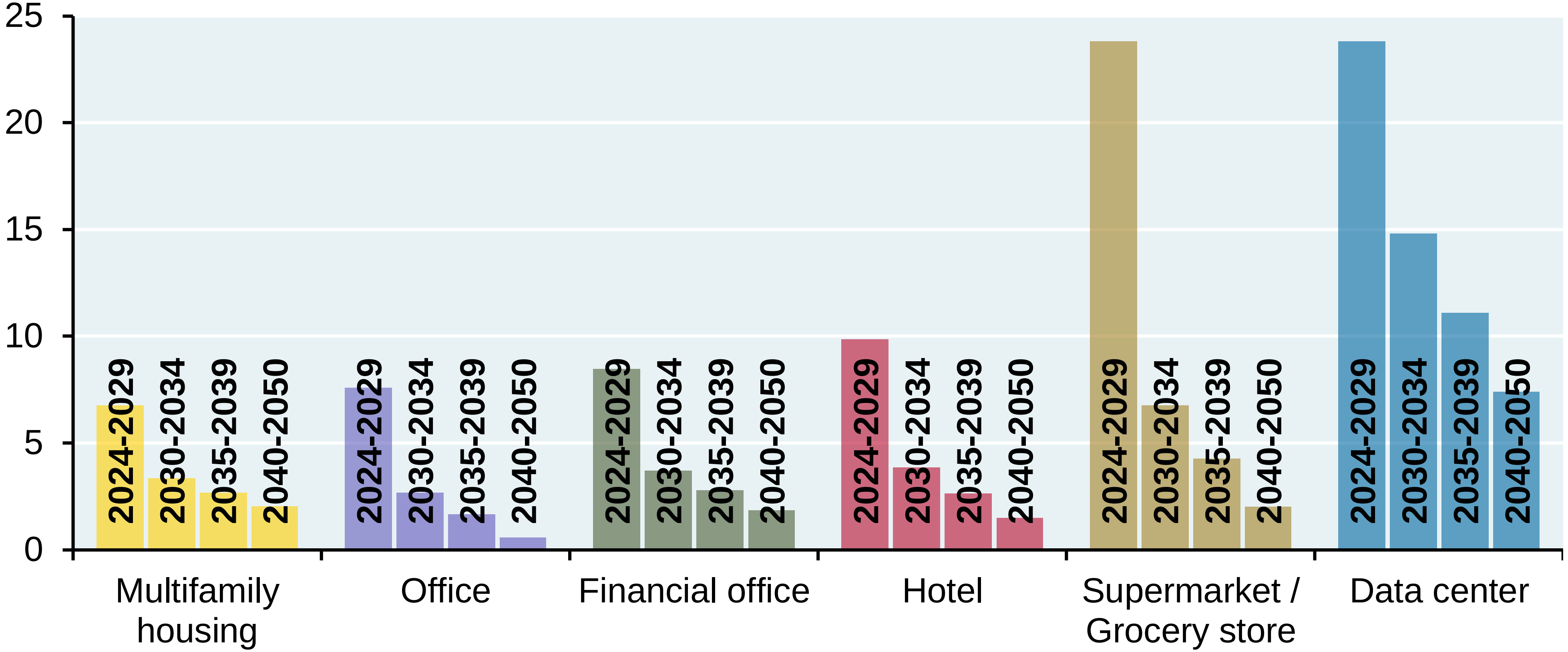
New York State received "C" grades from the American Society of Civil Engineers regarding aviation, bridges, dams, drinking water and ports, and "D" grades for roads, transit and wastewater

- **Roads**. NYC is the most congested city in the country, with drivers wasting 360 million gallons of gasoline per year stuck in traffic
- **Power**. Only 50%-60% of LIRR and Metro North power supply stations and signals are in good condition
- **Water**. ~40% of NYC water pipes were installed before 1941; only designed for 50-70 year useful lives
- **Ports**. NY/NJ port system, the second largest in the country after Los Angeles, is ranked #250 out of 370 ports globally, behind many developing economy port systems
- **Rail**. Penn Station has been upgraded but Amtrak still faces a $38 billion maintenance backlog and the MTA maintenance backlog is $62 billion
- **Public housing**. $78 bn capital project backlog for repairs/renovations over the next 20 years
- **Aviation**. By 2045, passenger demand at LGA, JFK and Newark airports expected to reach 177% of 2015 levels; JFK passenger demand is expected to exceed capacity by 3x by ~2025. Newark and LGA rank #1 and #2 on the Frommer's list of worst US airports
- **Climate exposure**. Storm surges of 6-8 feet render FDR drive, Metro North, LaGuardia Airport, A/C/M/N/R trains, Holland Tunnel and Verrazano Bridge inoperable (Hurricane Sandy storm surge peaked at ~9 feet)

Source: "*Report Card for New York Infrastructure*", American Society of Civil Engineers. 2022.

Carbon taxes on NYC buildings: modest targets for 2024, much harder by 2030
LL97 is the most ambitious/costly building emissions framework in the US

New York City building emissions caps by property type
kg of CO_2 per square ft



Source: Urban Green Council. September 2023.

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Carbon taxes on NYC buildings: modest targets for 2024, much harder by 2030
LL97 is the most ambitious/costly building emissions framework in the US

- Applies to 50,000 buildings over 25,000 sq ft; carbon tax of $268 per tonne of CO_2
- Only 11% of buildings expected to not be in compliance in 2024, and most are only 10%-20% over the cap
- Low-cost fixes: insulation of heating pipes, LED lighting, fine tuning of HVAC systems
- Much deeper targets set for 2030; REBNY estimates compliance fines could reach $900 mm per year since 70% of buildings are not in compliance with 2030 targets
- 2030 targets will require more electrified heating and building retrofits
- Law as written appears to punish density, since higher occupancy = higher HVAC emissions
- Unclear whether utility-level generation mix out of building owner control should affect LL97
- Mayor’s office proposed that non-compliant buildings could postpone compliance for two years, and purchase renewable energy credits to offset emissions after that date
- Moody’s: $139 billion in CMBS debt backed by NYC commercial property; by 2030, owners of properties issuing ~3% of that debt will face emissions fines that will exceed 10% of NOI

Sources: REBNY Press, January 2023; CFO Dive, November 2022

NYC airborne particulate matter exposure is low, ozone higher; NYC water quality benefits from pristine watersheds that are distant from industrial uses

Infrastructure

Air quality of major cities: 2019-2022

City	Ozone grade	High particle pollution grade
Atlanta	D	A
Austin	B	B
Boise	F	D
Boston	B	B
Charlotte	F	C
Chicago	F	C
Dallas	F	B
DC	C	A
Denver	F	F
Detroit	F	F
Houston	F	C
Los Angeles	F	F
Miami	B	B
New York City	D	A
Philadelphia	F	C
Phoenix	F	F
Raleigh	A	B
Salt Lake City	F	F
San Antonio	F	B
San Francisco	B	F
San Jose	F	F
Seattle	C	F

Source: American Lung Association. 2023.

City	% of watershed rainfall that traverses non-pristine land (oil& gas, cropland, livestock, industrial, etc)	% of municipal water supply sourced from upstream wastewater treatment facilities
Atlanta	26.6%	4.6%
Austin	1.6%	1.2%
Boise	0.0%	0.0%
Boston	1.6%	0.0%
Charlotte	4.6%	1.6%
Chicago	17.6%	4.6%
Dallas	9.8%	8.7%
Washington DC	7.3%	1.7%
Denver	0.0%	0.3%
Detroit	17.2%	2.7%
Houston	6.6%	14.4%
Los Angeles	0.1%	0.5%
Miami		
New York City	3.0%	0.2%
Philadelphia	15.7%	3.7%
Phoenix	0.0%	0.4%
Raleigh	6.9%	2.1%
Salt Lake City	1.0%	7.3%
San Antonio	0.1%	0.2%
San Francisco	0.3%	0.0%
San Jose	0.6%	0.6%
Seattle	0.6%	0.0%

Source: "*Comparison of potential drinking water source contamination across one hundred U.S. cities*", Turner et al, Nature Communications. 2021.

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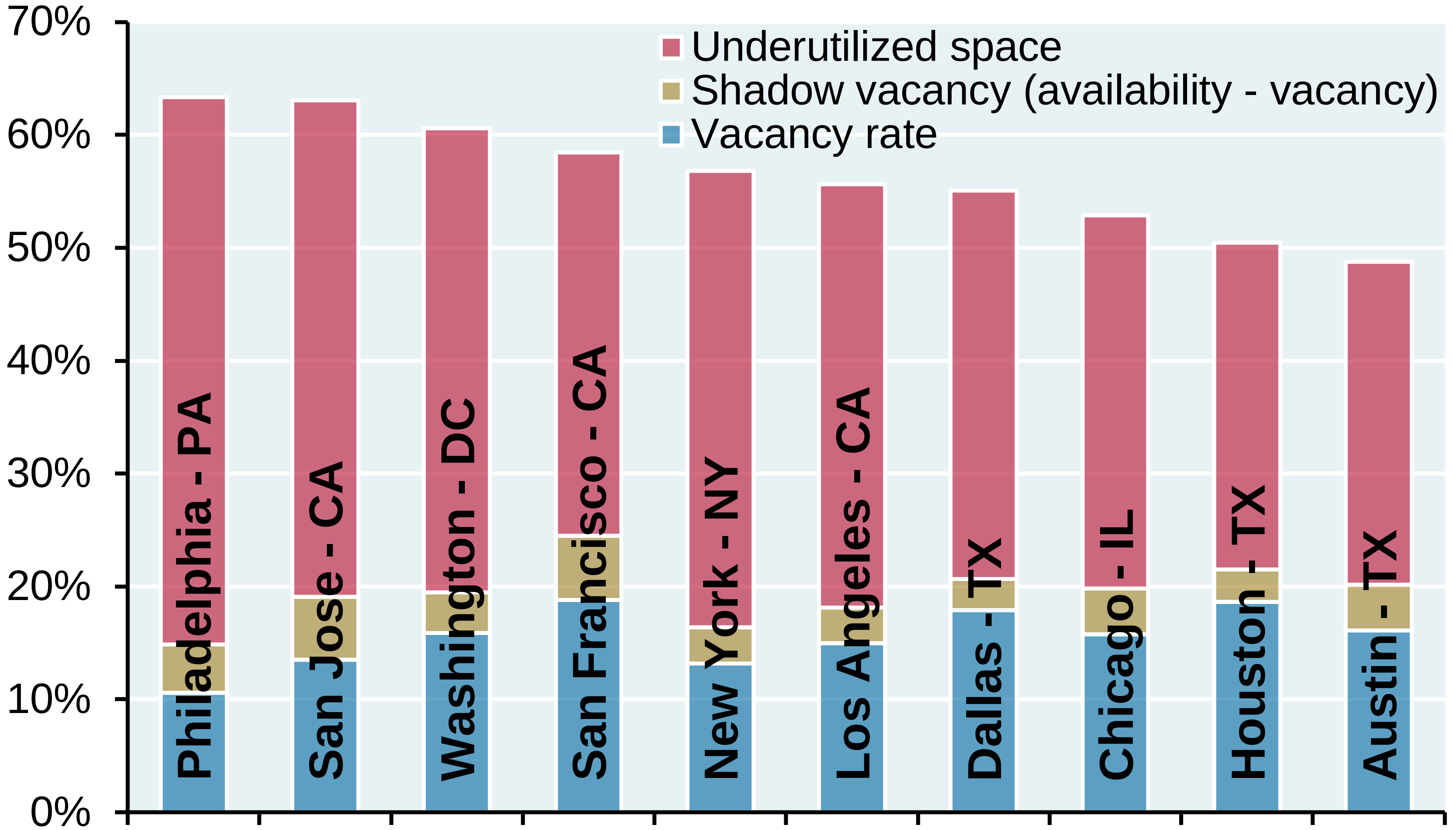
The office overhang: NYC underutilized space is high, and consistent with other cities tracked by Kastle Systems (KeyFob tracking of office utilization)

Infrastructure

Office stress measures by market

Percent



Source: Kastle Systems, CoStar, JPMAM. Q2 2023.

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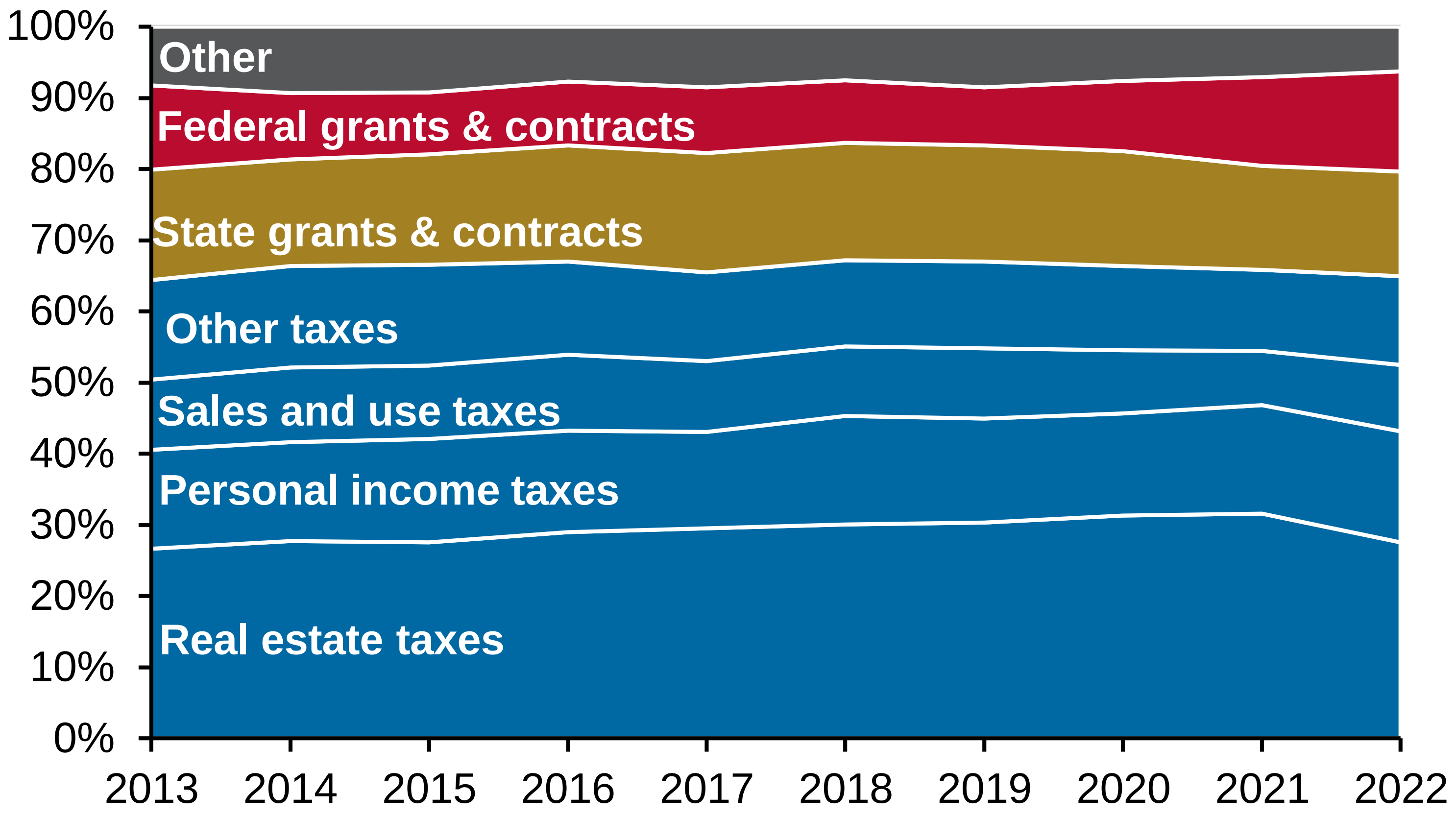
NYC Comptroller: only a modest impact on city revenues in the “doomsday” office scenario (40% drop in office values by 2031)…

Infrastructure

General fund revenue sources

Percent of general fund revenue



Source: NYC Comptroller, JPMAM. 2022.

- The NYC office of the Comptroller performed a revenue impact analysis to analyze the effect of changes in office building market values on tax levies
- “Doomsday scenario”: -6% annual change in market valuations; -40% cumulative drop in valuations vs pre-pandemic levels by 2031
- Estimated tax revenue shortfall vs baseline projection: 1.4% in 2027
- Estimated total revenue shortfall vs baseline projection: 1% in 2027

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…but a 40% decline in office values underestimates broader impacts on residential, retail and hotel sectors, leading to a debate on office conversions

- A national policy debate is occurring regarding the merits and feasibility of **large-scale urban office to residential conversions**
- NYC may face challenges given its very poor comparative ranking with respect to the ease of doing business and zoning specifically
- Using estimates for conversion costs, Class B/C office rents/vacancies, residential rents, rentable space and sales prices, **both Moody's and Columbia University studies find that only 3%-5% of office properties would be feasible for residential conversion**
- Feasible conversions would probably only add to the luxury end of the market, doing little to alleviate the shortage of affordable housing. Subsidies/grants/tax abatements would be needed
- NYC had some prior success with policies designed to drive conversion of low-occupancy office buildings in lower Manhattan (1995-2006)

NYC office to multifamily conversions: Moody's report and the Mayor's Task Force

Moody's

- Office to multifamily conversions generally require smaller floor plates (~14,000 sq ft or less), Class B or C space with lower office rents (less than $4.6 per sq ft per month, which is the median rent for NYC apartments) and higher vacancy (30%+)
- Moody's estimated in 2022 that of 1,100 NYC office buildings, only 35 would meet the criteria (3%)

Mayor Adams task force recommendations: requires impasse at the State level to be resolved

- Most office buildings: highest and best use is to remain an office building
- Change Multiple Dwelling Law which caps the floor area ratio (total square footage of the building less mechanicals, divided by plot size) at 12
- Eligibility for streamlined zoning and conversion approvals: currently Financial District pre-1977, Midtown pre-1961; Mayor proposing 1990
- Offices in "high intensity" districts or those that do not allow residential use would be eligible for streamlined zoning
- Acknowledges the need for tax incentives if the goal is to increase affordable housing (from 2010 to 2020, only 4,300 residential units were created via office conversion without subsidies)
- Impasse at State level: factions in the Senate insist on "Good Cause Eviction" laws which would effectively rent-regulate all market-rent units in exchange for supporting laws that improve conversion economics

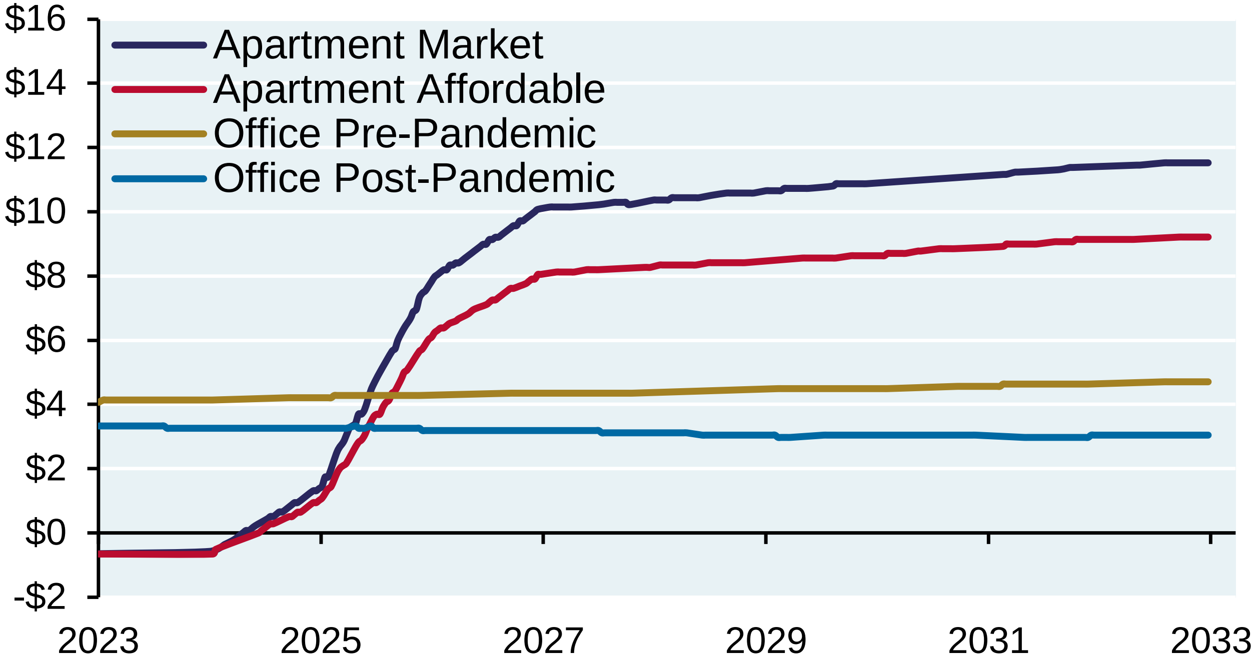
Sources: *"Why Office-to-Apartment Conversions are Likely a Fringe Trend at Best"*, Moody's, April 2022

NBER Study: conversion of a 250,000 sq ft Class B office building into residential can be economically attractive but requires a LOT of assumptions

Infrastructure

Annual net operating income

US$, millions



Source: *"Converting Brown Offices to Green Apartments"*, Nieuwerburgh (Columbia), Gupta (NYU), Martinez (Columbia). August 2023.

Conversion of a vacant 200-unit prewar Class B office:

- Rentable space declines from 85% to 70%
- **Purchased from prior owner/bank $175 psf, a 60% discount to pre-pandemic value**; owner has incentive to sell at distressed price since property was refinanced at peak LTVs and bottom in cap rates
- Conversion cost of $320 psf + $40 psf for green efficiency
- Rental income: 90th percentile of rents psf, $7,000 per month for an 875 sq 1 BR for a family of 3 ($96 psf ann.)

Class B Office (assuming no conversion):

- Pre-pandemic: $400 psf market value, 12% vacancy, monthly rent of $4.12 psf
- Post-pandemic: monthly rents decline 15% from $4.12 psf to $3.50, rent growth declines from 1.5% to 1%, vacancy increases to 17% by 2023 and to 27% by 2033, credit losses increase from 1.5% to 3.0%, imposition of GHG taxes

Other potential issues increasing conversion cost: amenities required to attract upper income tenants

Other potential issues increasing conversion incentives: rising tenant improvements and free rent required by office tenants

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Subsidies and tax abatements would be required to impact affordable housing stock

NBER study on NYC conversions, continued

- Post conversion rent of $7,000 per month compares to affordability threshold of $1,900 per month assuming 30% of household income is used for rent
- Without subsidies, 20% mandatory affordable units negates the economics of conversion. A 40% tax abatement would be required to incentivize conversion, or a 25% tax abatement combined with debt subsidies/guarantees
- On a national level, properties that meet both physical and economic filters are ~5% of office universe (similar to Moody's)

Some prior success in NYC: 1995-2006 period

- Program 421-G provided 15-year full tax abatements and other incentives to encourage conversion of low-occupancy Class B/C lower Manhattan office buildings into residential
- Results: 98 office building conversions, ~13,000 new units which accounted for 43% of the increase in the lower Manhattan housing stock
- Some disagreement remains regarding rent-regulation of market rents in 421-G 80/20 conversions, potentially dampening interest in a new program without enough clarity

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[5] US and Global rankings: NYC dominates world surveys of major cities

- US city rankings are mixed and highly sensitive to who/how they are ranked
- NYC remains the world's premiere global financial center by a wide margin over London, Singapore and Hong Kong (Global Financial Centers Index)
- NYC ranks at the top of a survey which measure competitiveness, market dynamics, human capital and political engagement (Global Cities Index)
- NYC ranks #2 in the world behind London in a survey measuring a city's power to attract people, capital and enterprises (Global Power Index)
- NYC ranks #1 when measuring economic competitiveness: the ability to attract, control and transform resources and dominate the global market (Global Urban Competitiveness Index)
- NYC is one of the two most integrated cities in the world regarding corporate activity (GaWC Globalization Classifications), along with London
- **These tangible and intangible measurements are positives, but are more of a reflection of the past than the future. New York will have to make progress on the issues mentioned in prior sections to retain these high rankings**

US city rankings: some agreements (Austin, San Jose) and more disagreements

US city rankings, 100=best

	US News & World Report "Best Places to Live"	Resonance "Best Cities"	WalletHub "Best-Run Cities"
ATL	57	88	48
AUS	73	82	89
BOI	92	26	94
BOS	71	93	87
CHA	95	69	73
CHI	18	98	10
DAL	25	85	32
DEN	34	86	58
DET	24	71	0
HOU	7	91	25
LA	7	97	60
MIA	8	94	76
NYC	35	99	77
PHL	21	87	15
PHO	27	77	69
RAL	98	67	91
SLC	61	75	78
SANT	31	70	71
SF	70	96	92
SANJ	91	90	89
SEA	46	92	93
DC	74	95	

Source: US News, Resonance, WalletHub, JPMAM. 2023

US News & World Report: quality of life, housing value, desirability, job market

Resonance: Place, product, programming, people, prosperity and promotion (the alliteration used here did not inspire a lot of confidence in the rigor of this particular analysis)

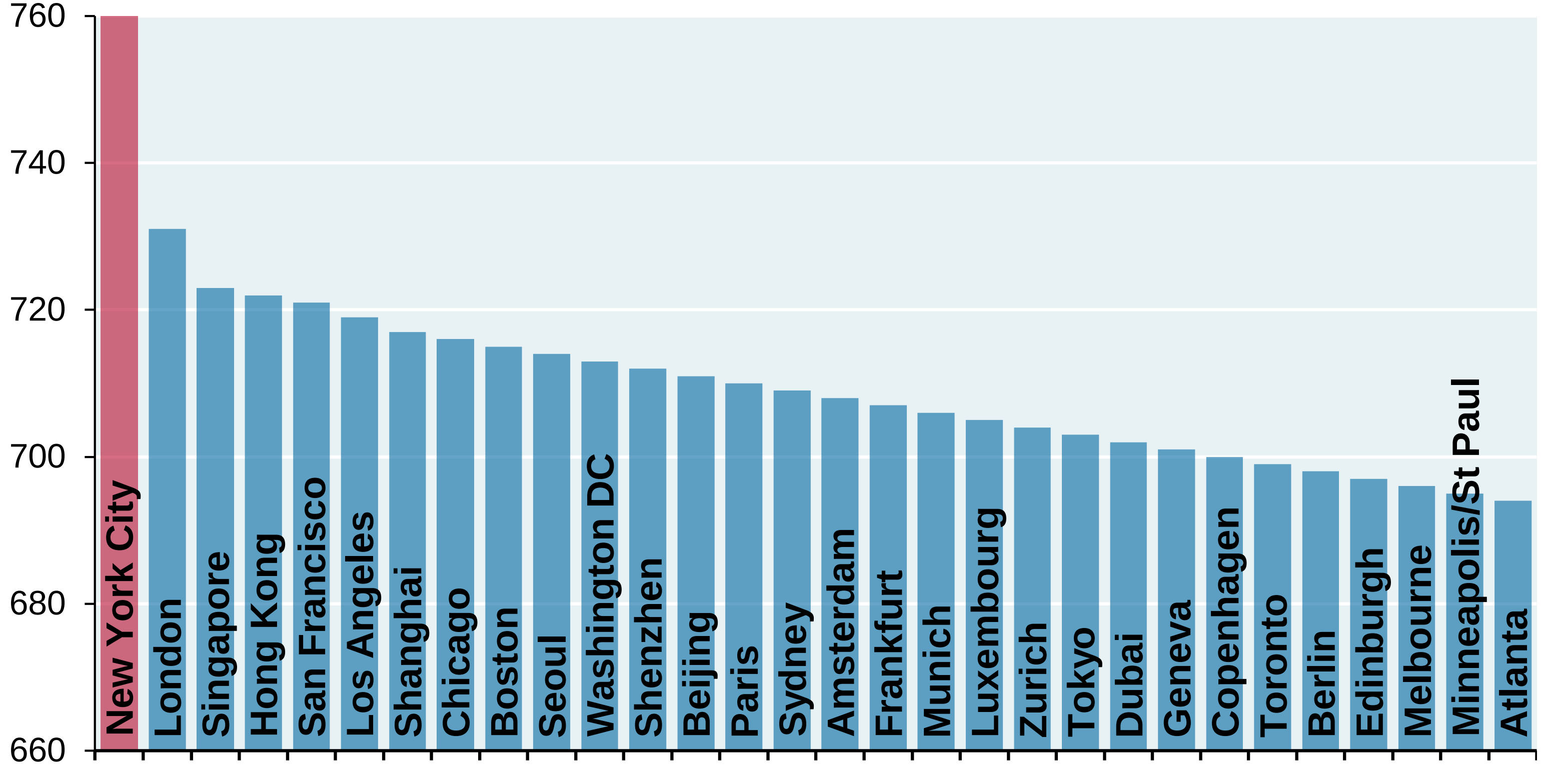
Wallet Hub: Financial Stability, education, health, safety, economy and infrastructure

New York City remains the world's premiere global financial center by a wide margin over London, Singapore and Hong Kong

City rankings

Global Financial Centers Index

Rating



Source: Z/Yen Group, China Development Institute. 2023.

Components:

- **Business environment**: political stability, taxation
- **Human capital**: availability of skilled personnel, education
- **Infrastructure**: transport, information and communication technology
- **Financial sector development**: liquidity, economic output
- **Reputation**: innovation, diversity, attractiveness, location

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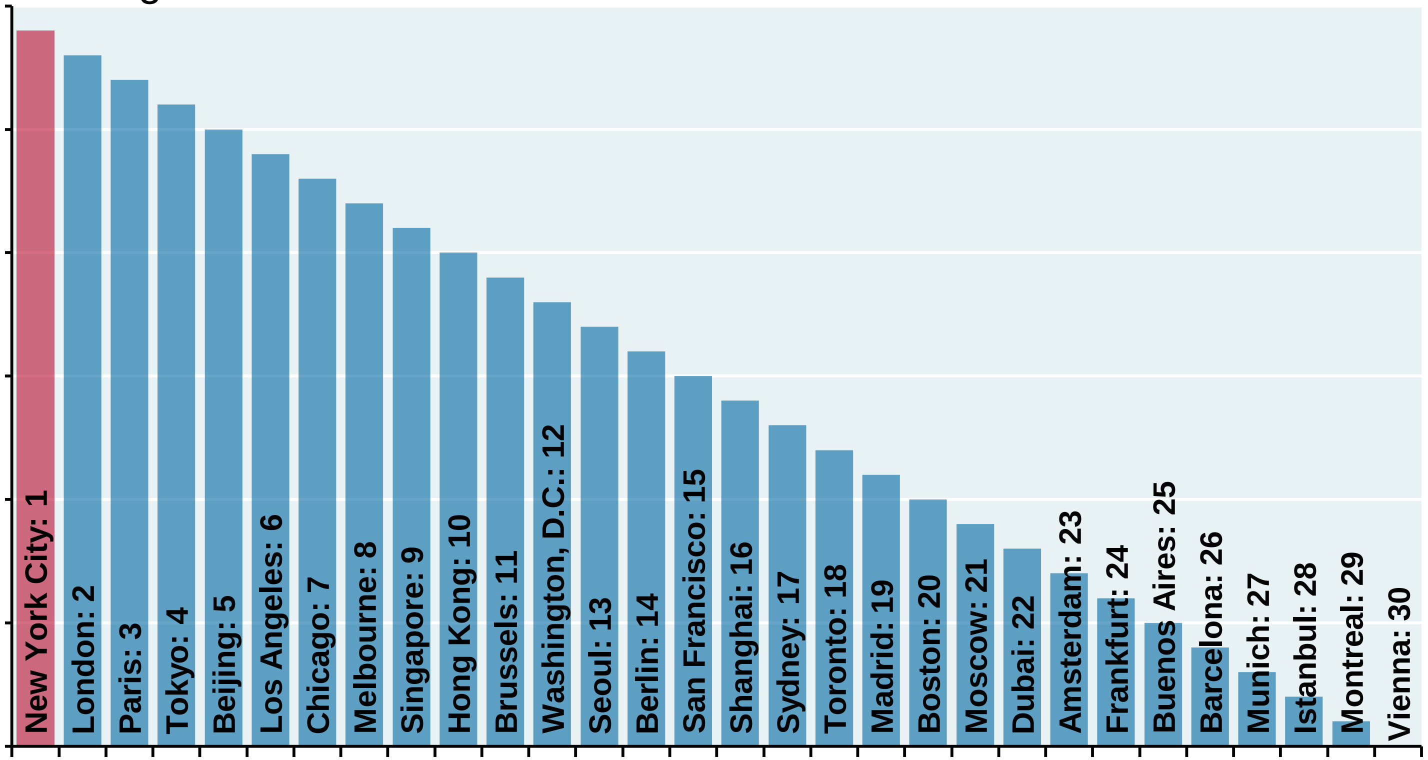
New York City ranks at the top of a survey which measures competitiveness, market dynamics, human capital and political engagement

City rankings

Global cities index

Ranking



Source: *"The 2022 Global Cities Report",* Kearney. 2022.

Components:

- **Business activity**: capital flow, market dynamics, presence of major companies
- **Human capital**: education levels
- **Information exchange**: access to information
- **Cultural experience**: access to sporting events, museums, and other expos
- **Political engagement**: political events, think tanks, and embassies

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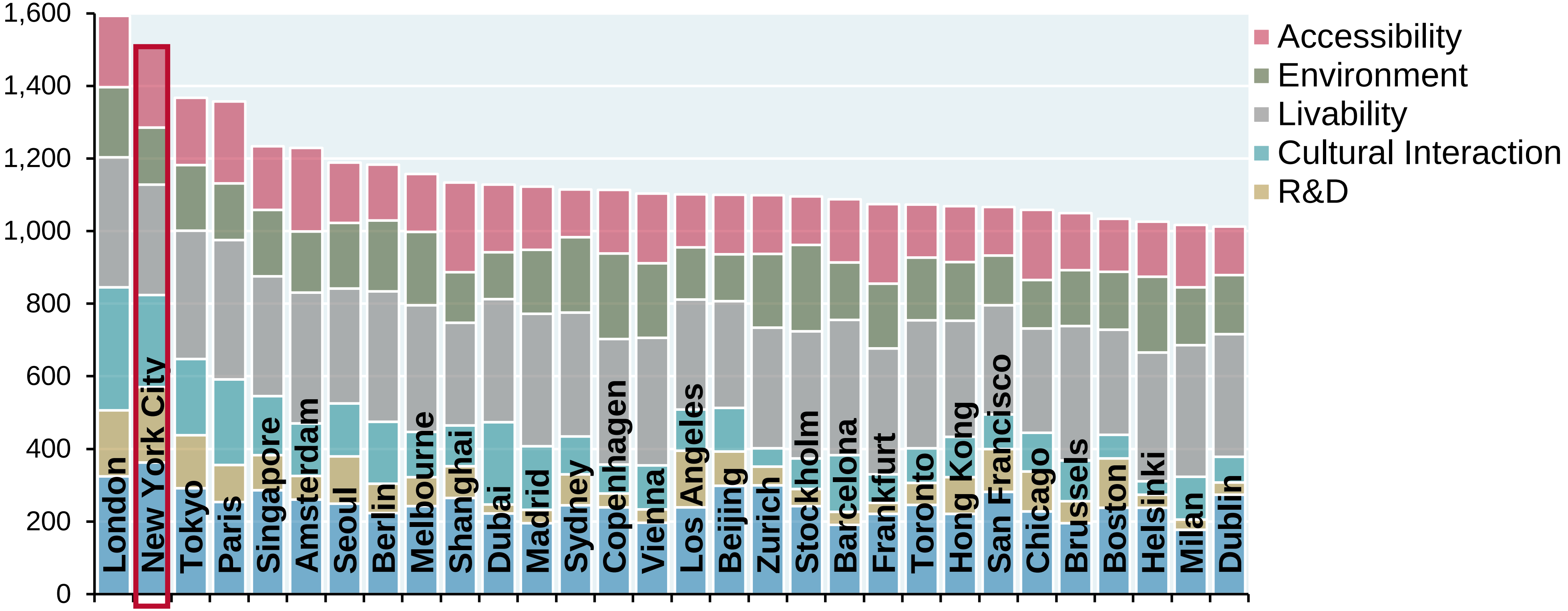
New York City ranks #2 in a survey measuring a city's power to attract people, capital and enterprises

City rankings

Global Power City Index

Index score



Source: Global Power City Index, Institute for Urban Strategies at Mori Foundation. 2022.

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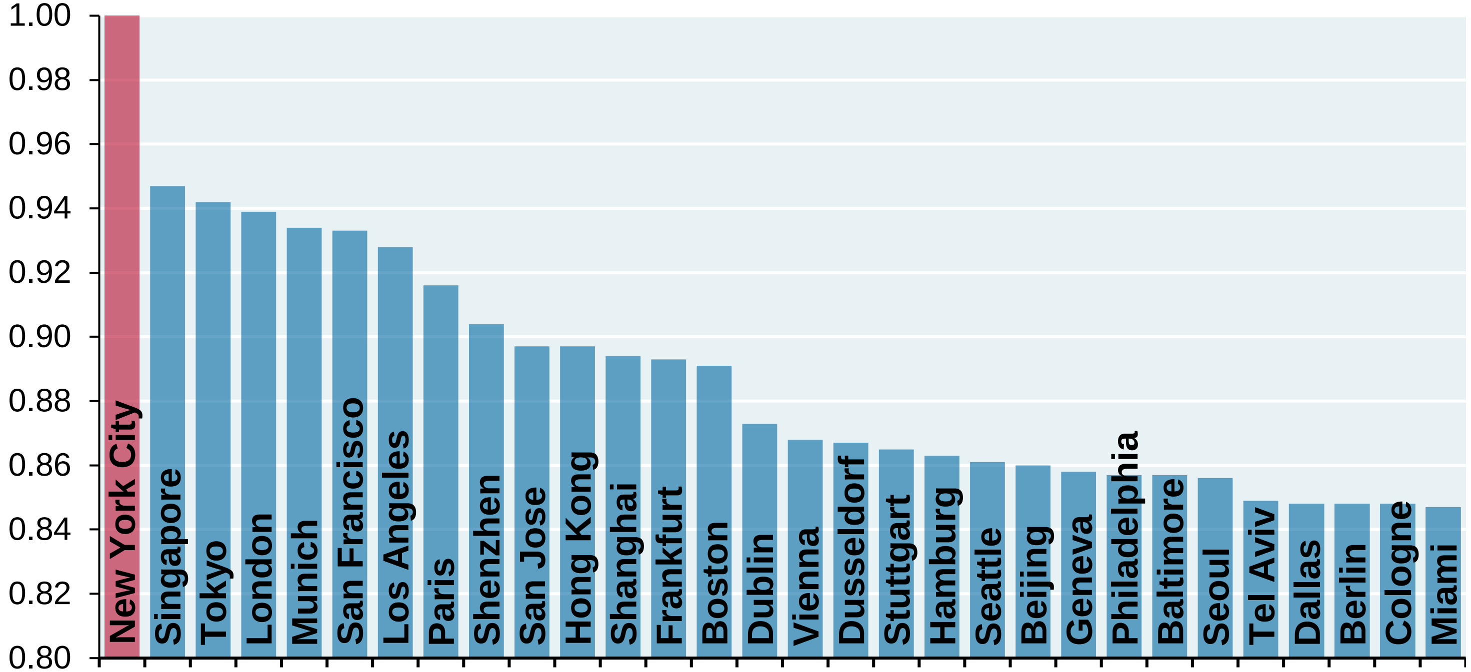
New York City ranks #1 when measuring the economic competitiveness of a city: the ability to attract, control and transform resources and dominate the global market

City rankings

Global Urban Competitiveness Index

Score



Source: "Global Urban Competitiveness Report", Chinese National Academy of Economic Strategy/ CASS, UN-Habitat. 2023.

Components:

- **Economy**: GDP growth, GDP per square km of land area
- **Local elements**: patents, young talent, working population
- **Living environment**: cost of living, climate, healthcare
- **Soft & hard business environment**: ease of doing business, education, shipping convenience, openness
- **Global connectivity**: airline flights, researchers, companies

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New York City is one of the two most integrated cities in the world regarding corporate activity, along with London

City rankings

Classifications are derived from the activities of 175 leading firms providing “advanced producer services” across 707 cities worldwide: accountancy, advertising, banking/finance and law

Alpha++	Alpha+	Alpha		Alpha-	
London	Hong Kong	Sydney	Jakarta	Warsaw	San Francisco
New York City	Singapore	Los Angeles	Brussels	Seoul	Luxembourg
	Shanghai	Toronto		Johannesburg	Montreal
	Beijing	Mumbai		Zurich	Munich
	Dubai	Amsterdam		Melbourne	Delhi
	Paris	Milan		Istanbul	Santiago
	Tokyo	Frankfurt		Bangkok	Boston
		Mexico City		Stockholm	Manila
		Sao Paulo		Vienna	Shenzhen
		Chicago		Guangzhou	Riyadh
		Kuala Lumpur		Dublin	Lisbon
		Madrid		Taipei	Prague
		Moscow		Buenos Aires	Bangalore

Source: *"The World According to GaWC"* , Globalization and Word Cities Research Network, Loughborough University London. 2020.

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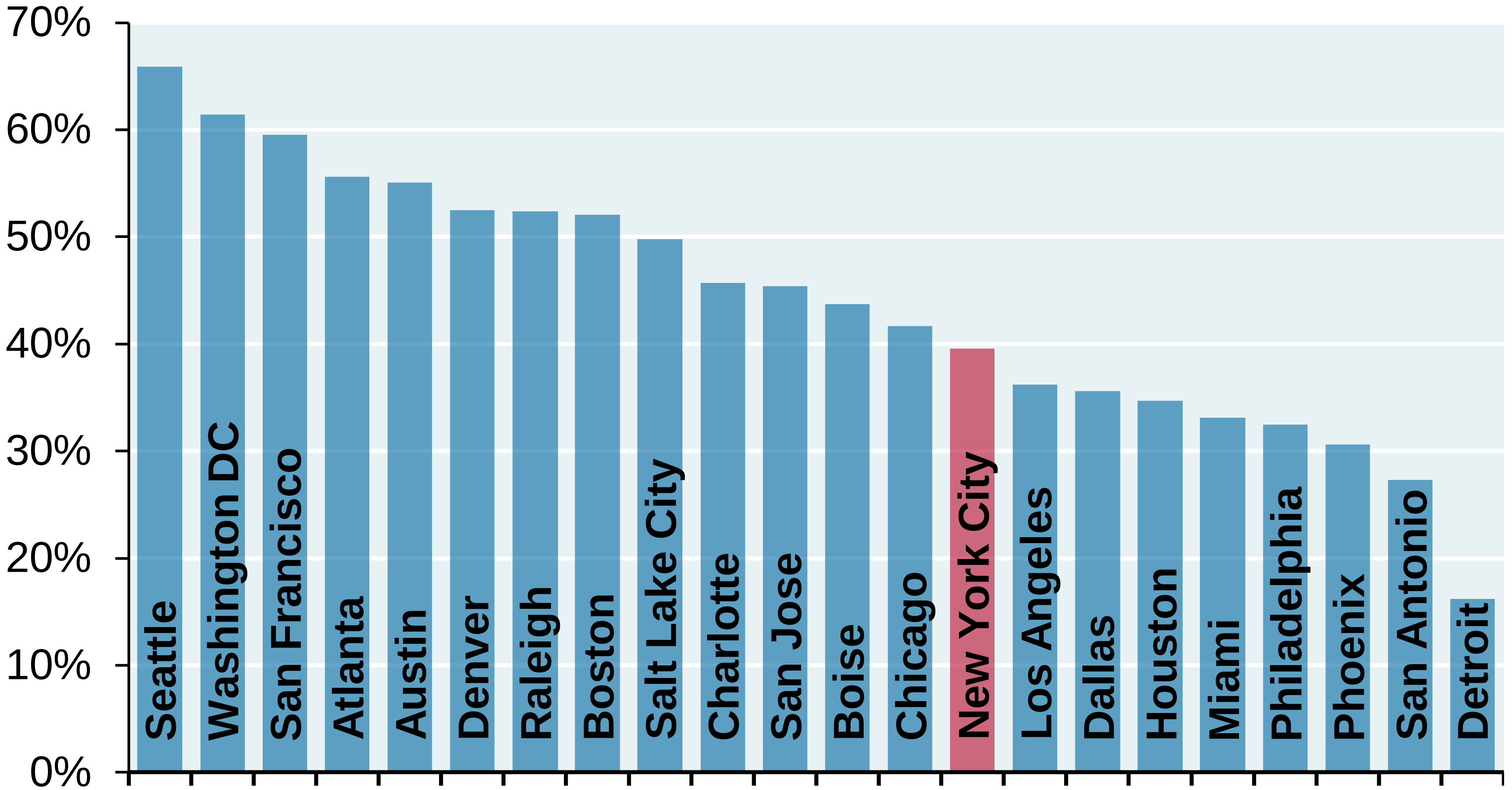
Appendix

- Education and poverty levels by city
- Population by borough
- Asylum: actual vs prior projections
- Economic fantail charts by metric since 2019
- Median office building ages by city
- Market value of tax base per capita
- Office building emissions by city vs state grid emissions
- Utility patents by city, 2011-2015
- Ratio of multifamily to office space for select cities

Peer group comparison

Education level by city, 2017-2021

Percent, Bachelor's degree or higher, Age 25+

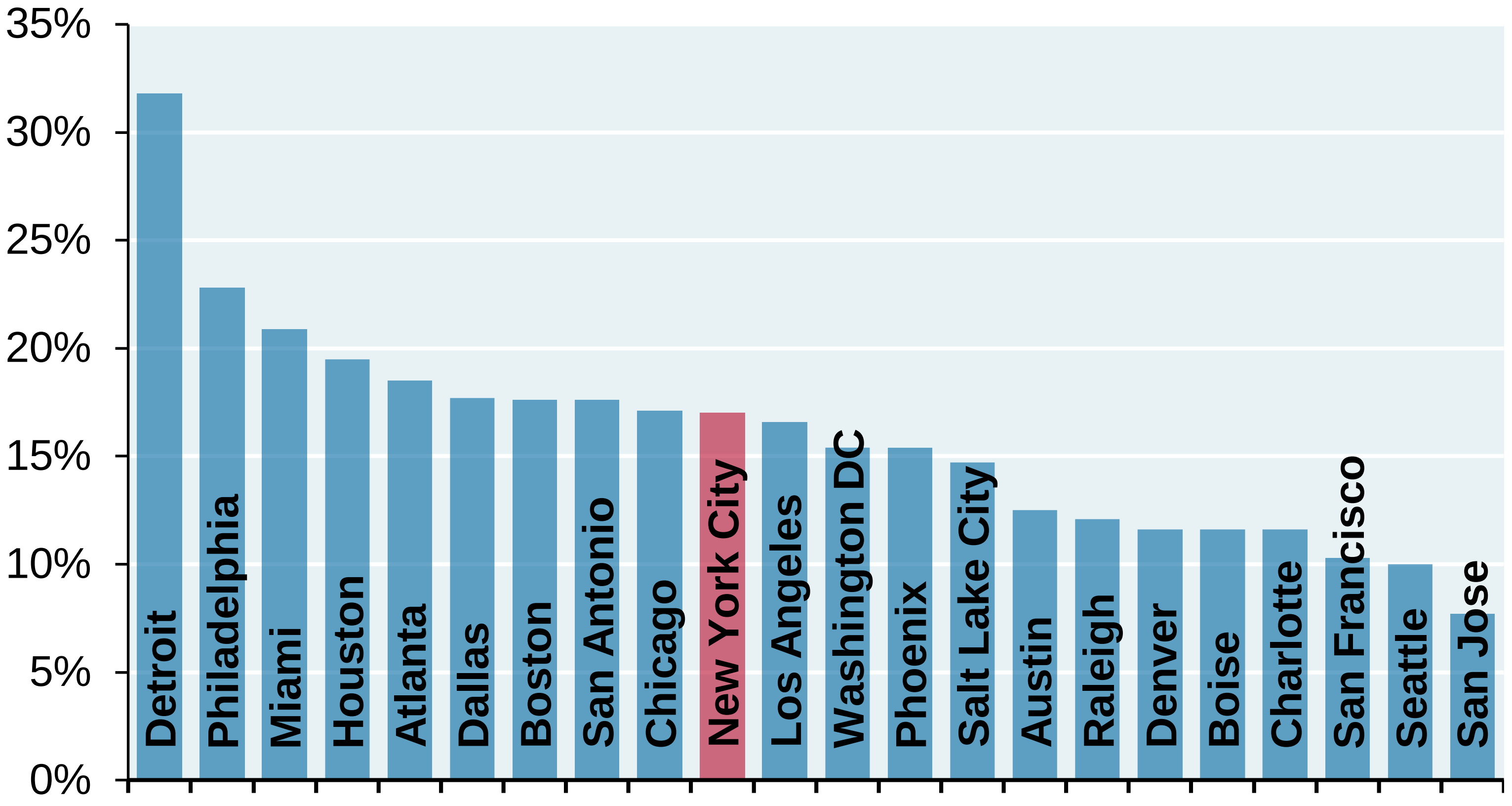


Source: Census Bureau. 2021.

Peer group comparison

Poverty rate by city, 2021

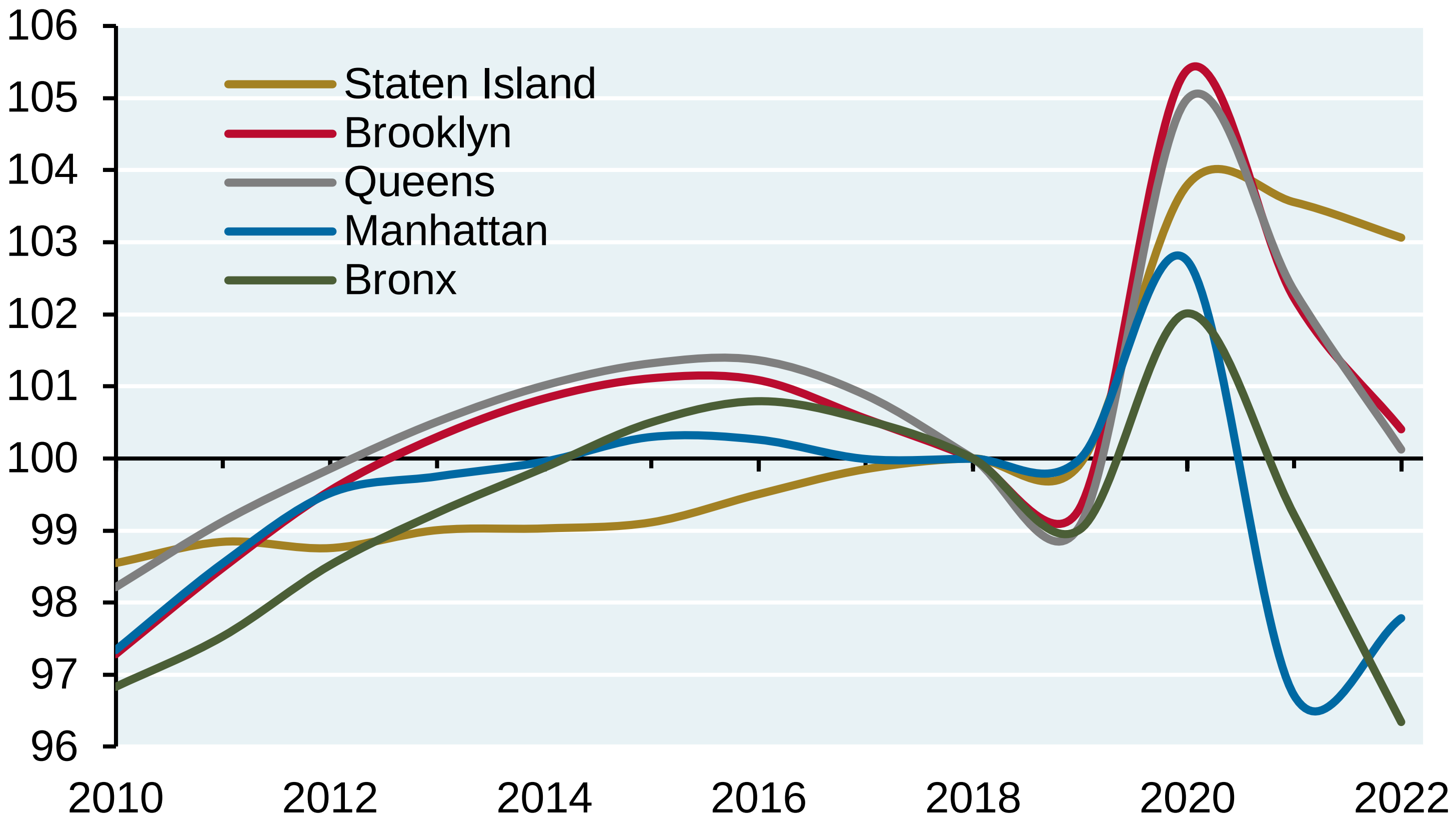
Percent



Source: Census Bureau. 2021.

Population shifts in NYC boroughs

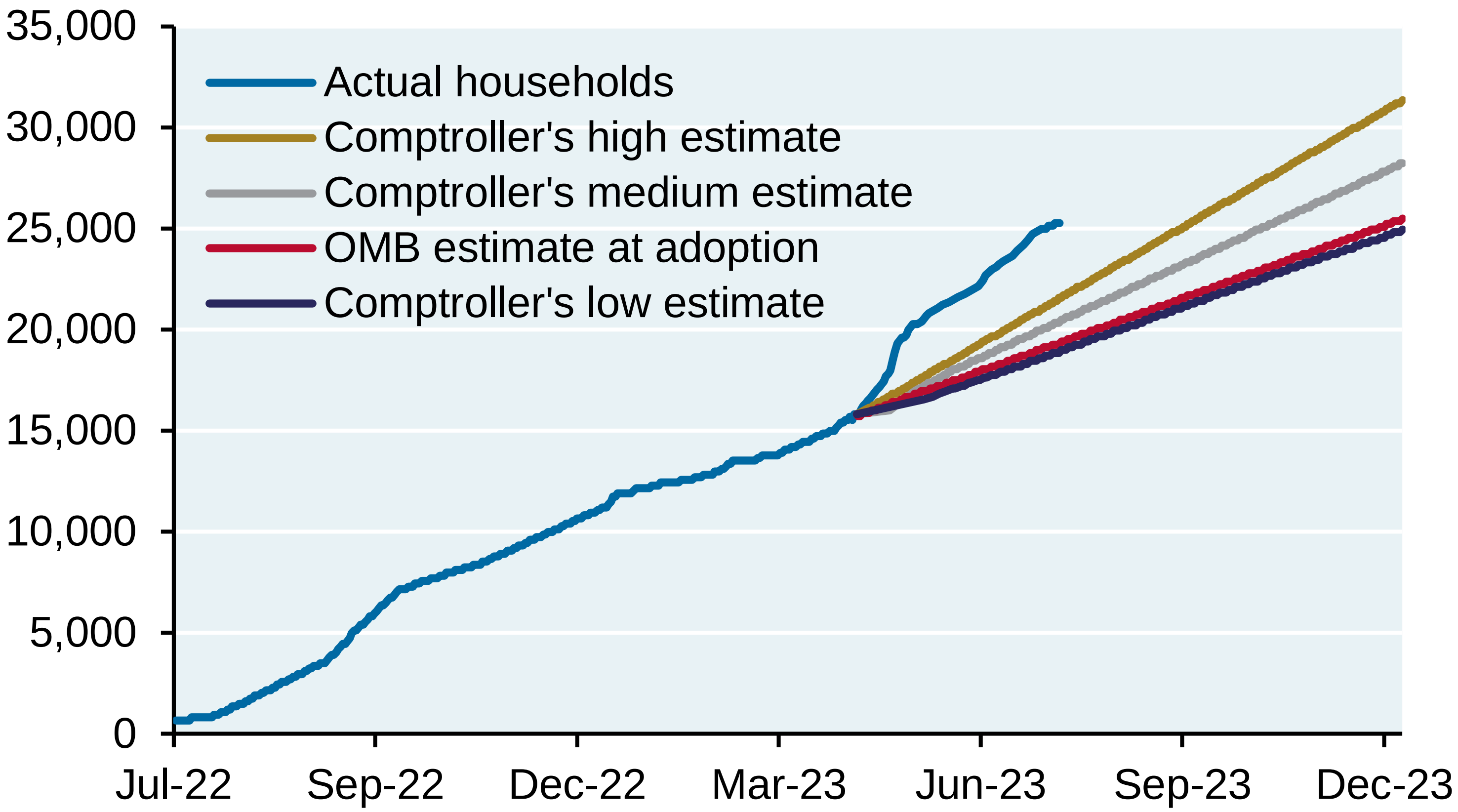
Index (100 = December 2018)



Source: Census Bureau, JPMAM. 2022.

Households seeking asylum: actual vs projected

Number of households

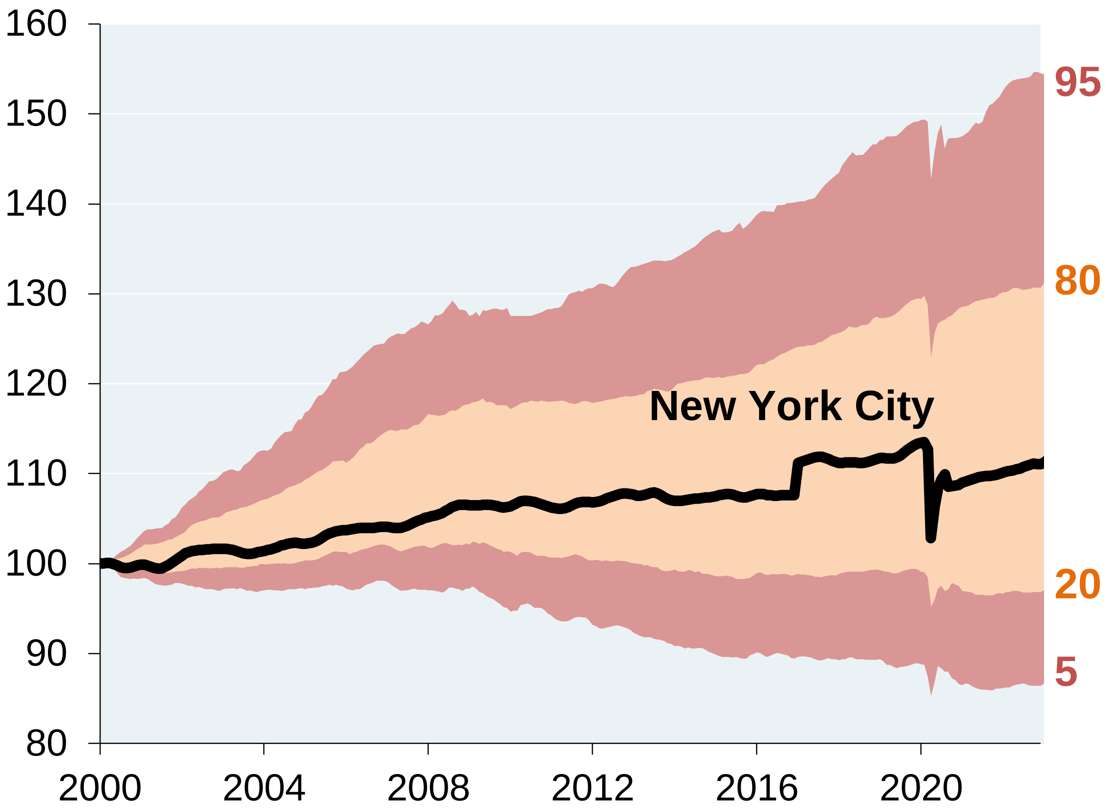


Source: NYC Comptroller, Mayor's Office of Management Budget. July 2023.

Labor force

Labor force growth (employed + unemployed)

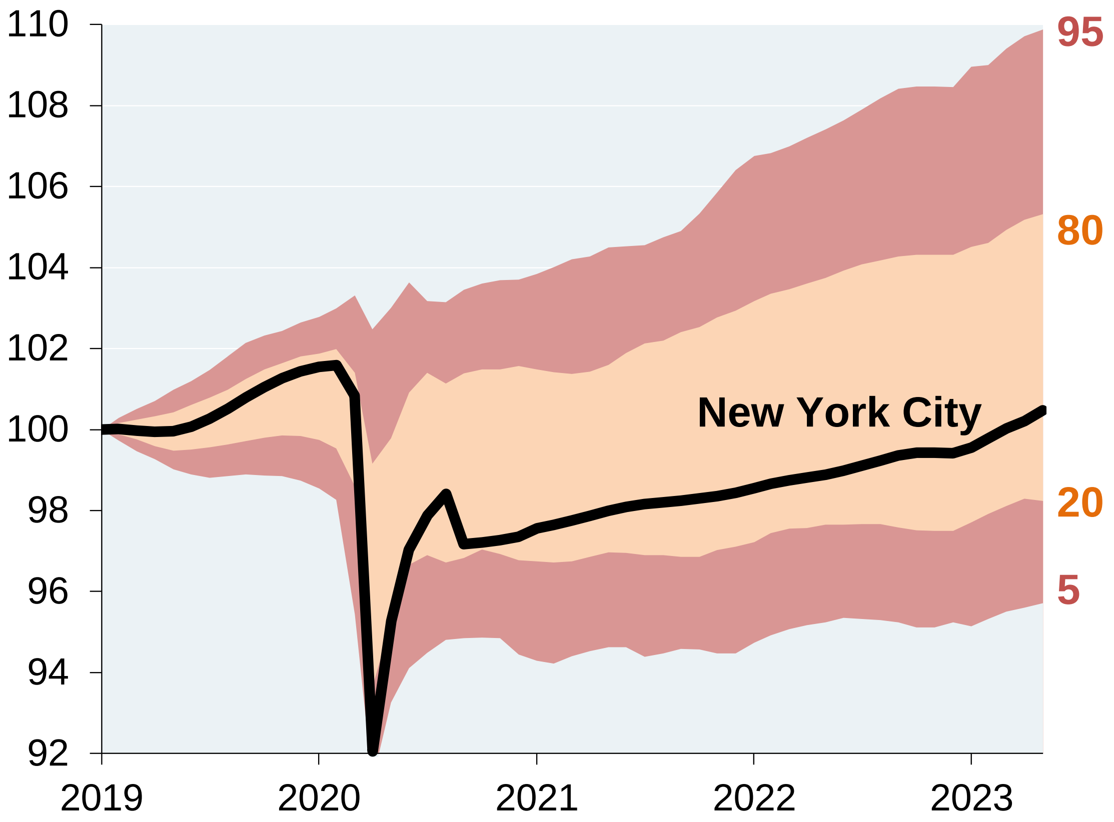
Index (Jan 2000 = 100), with percentiles



Source: Bureau of Labor Statistics, JPMAM. May 2023.

Labor force growth (employed + unemployed)

Index (Jan 2019 = 100), with percentiles



Source: Bureau of Labor Statistics, JPMAM. May 2023.

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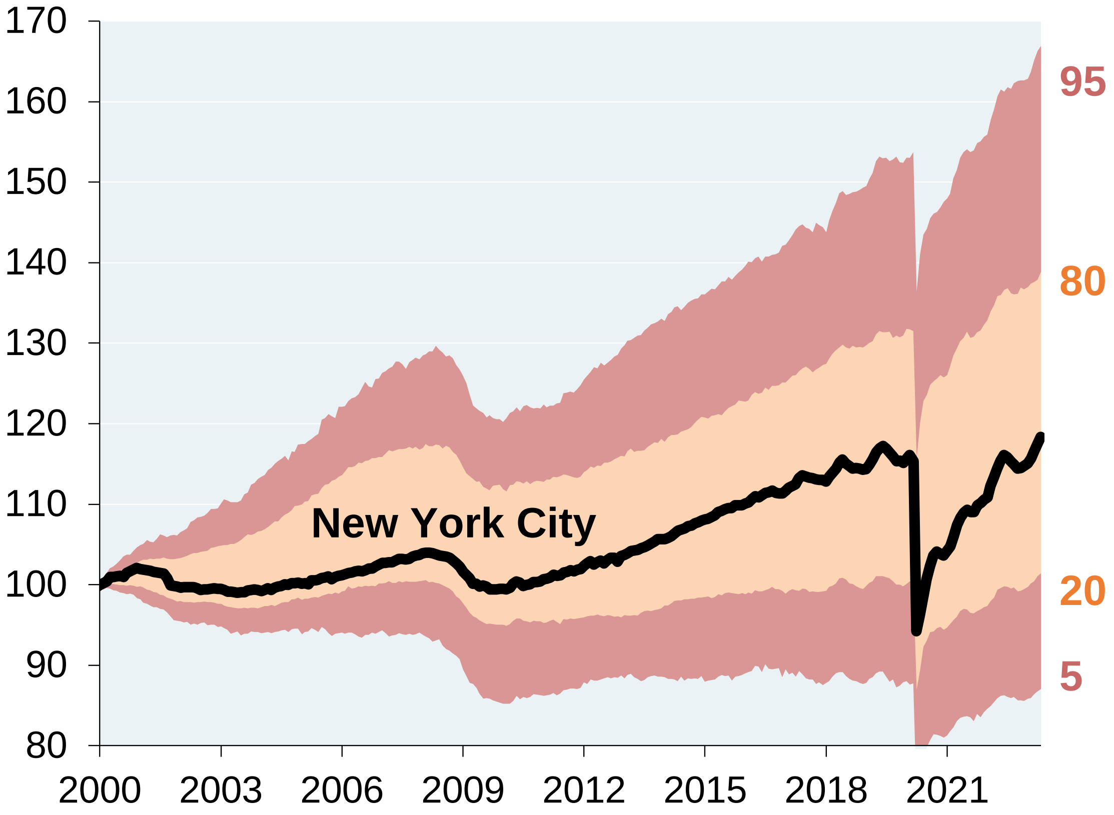
Nonfarm payrolls

Growth in nonfarm payrolls

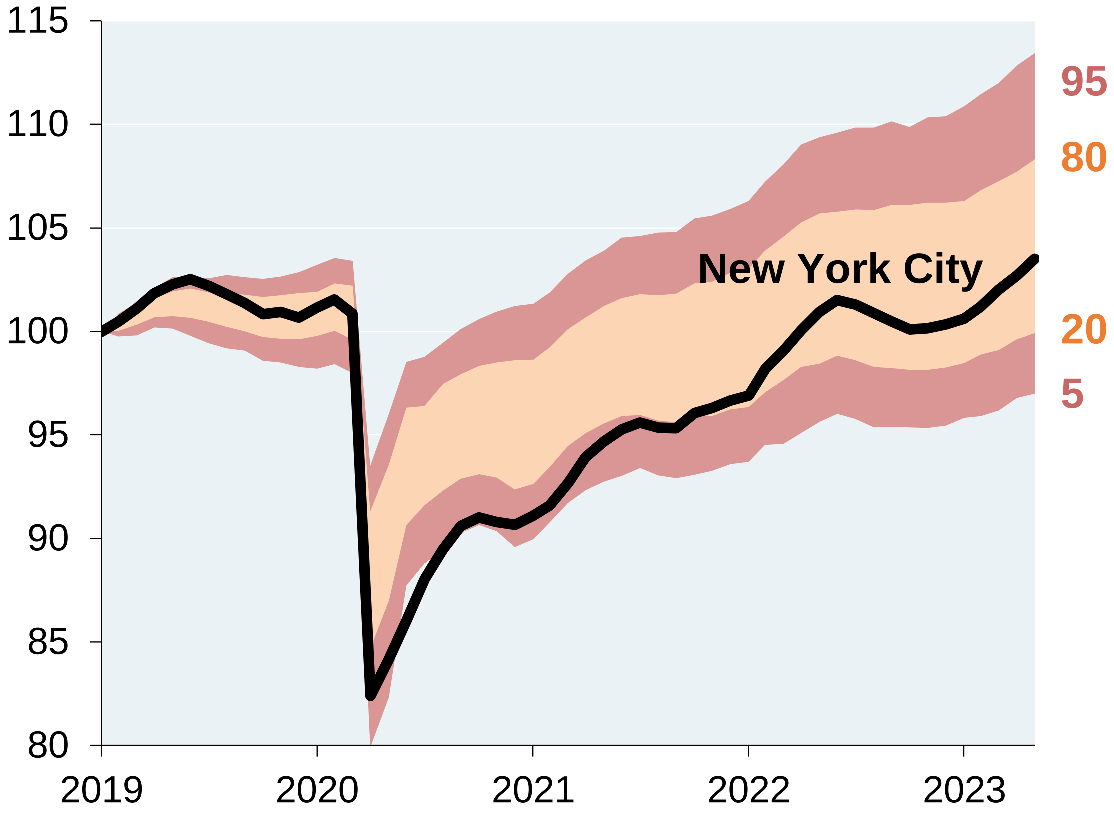
Index (Jan 2000 = 100), with percentiles



Source: Bureau of Labor Statistics, JPMAM. May 2023.

Growth in nonfarm payrolls

Index (Jan 2019 = 100), with percentiles



Source: Bureau of Labor Statistics, JPMAM. May 2023.

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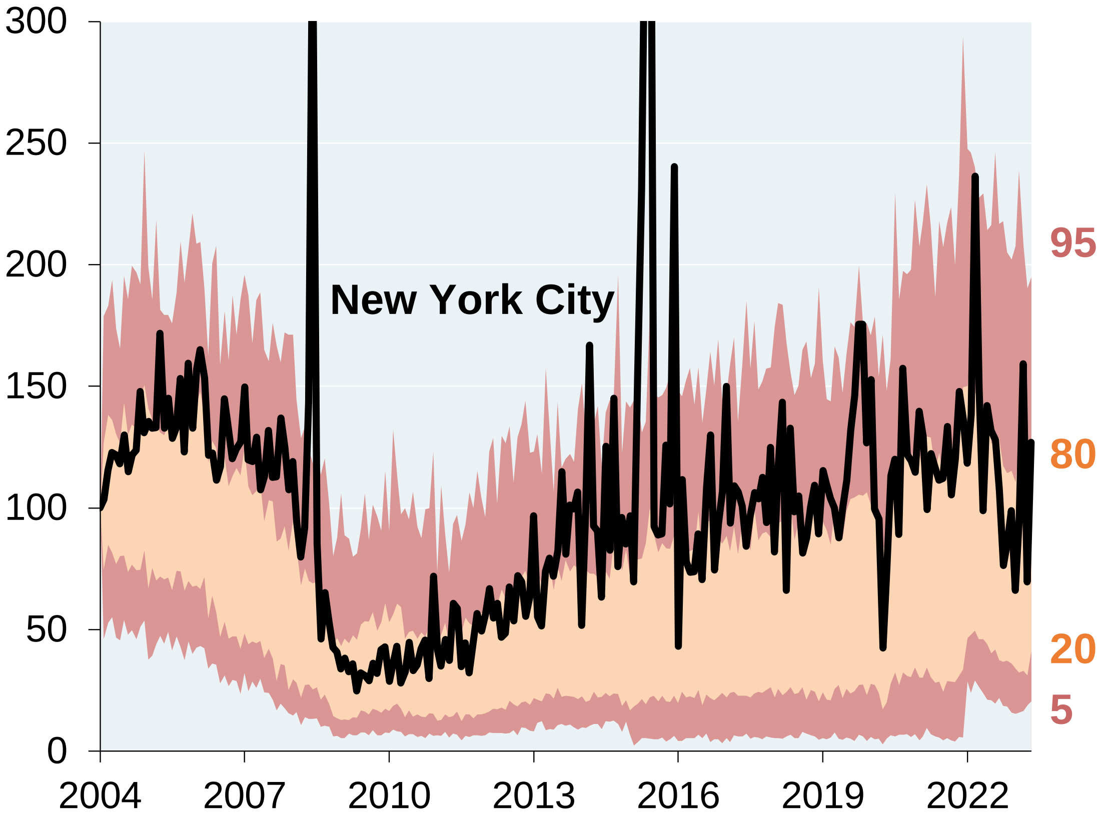
Building permits

Growth in building permits

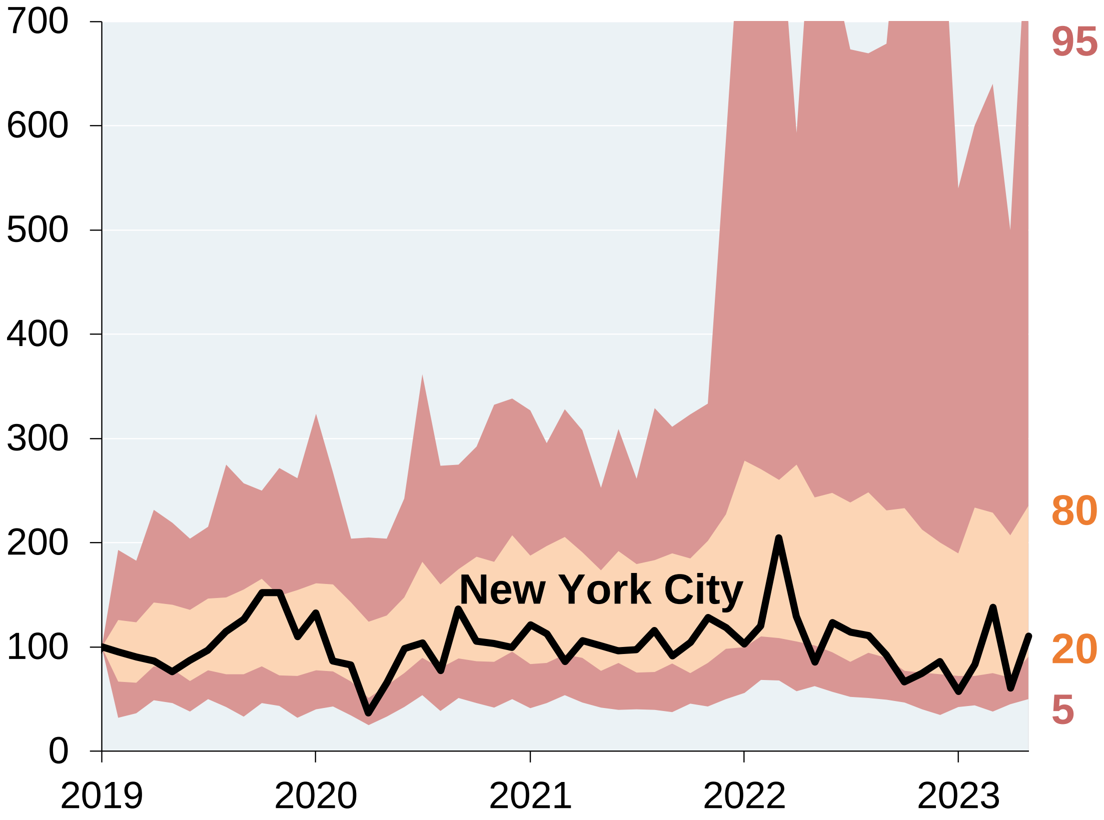
Index (Jan 2004 = 100), with percentiles



Source: Census Bureau, JPMAM. May 2023.

Growth in building permits

Index (Jan 2019 = 100), with percentiles



Source: Census Bureau, JPMAM. May 2023.

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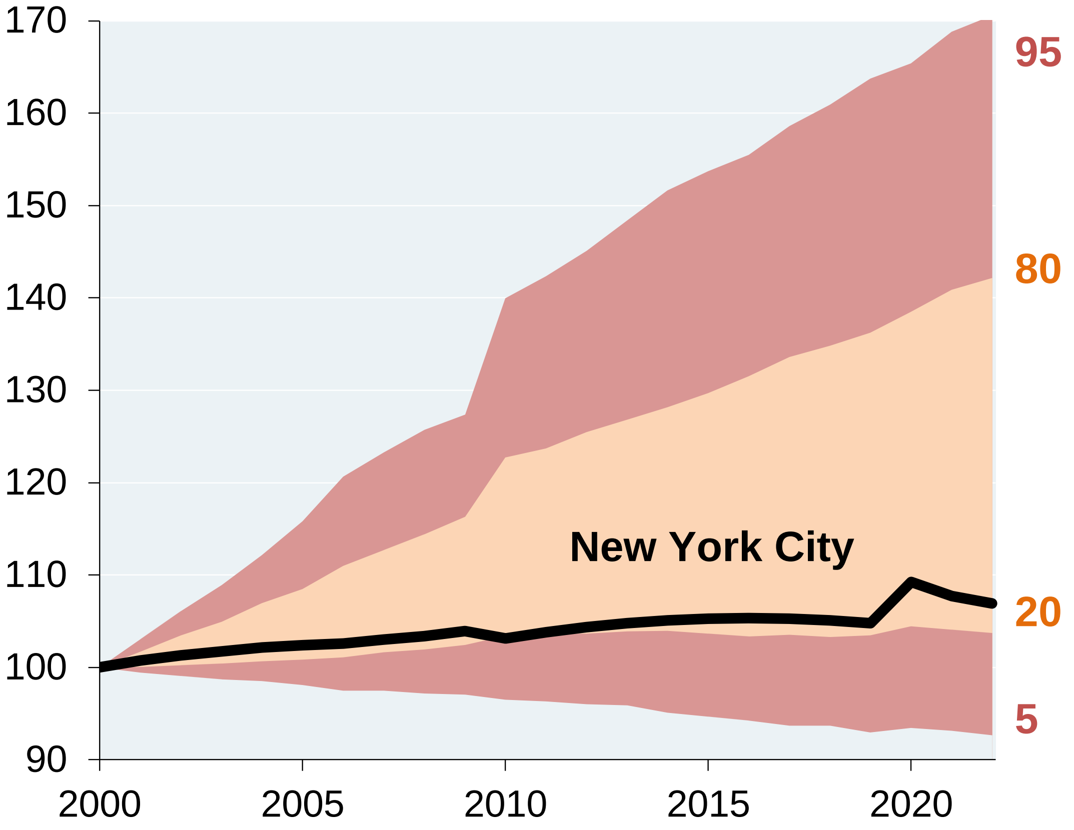
Population

MSA-level population growth

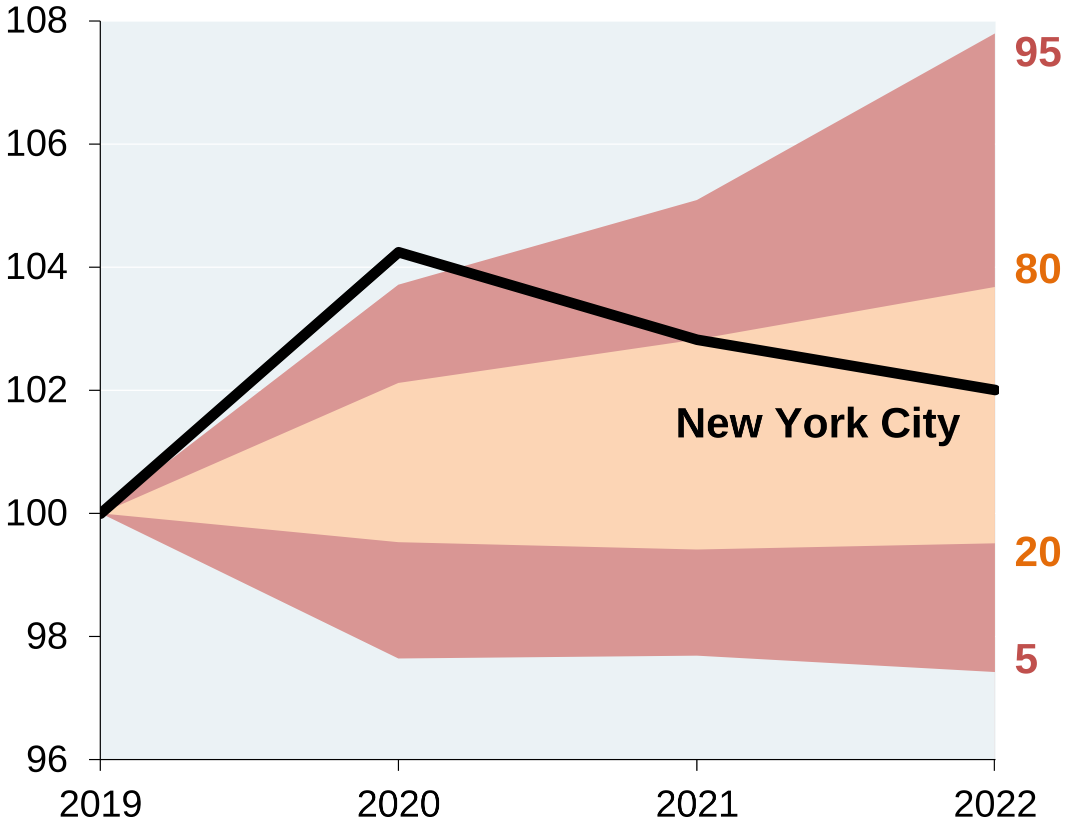
Index (2000 = 100), with percentiles



Source: Census Bureau, JPMAM. 2022.

MSA-level population growth

Index (2019 = 100), with percentiles



Source: Census Bureau, JPMAM. 2022.

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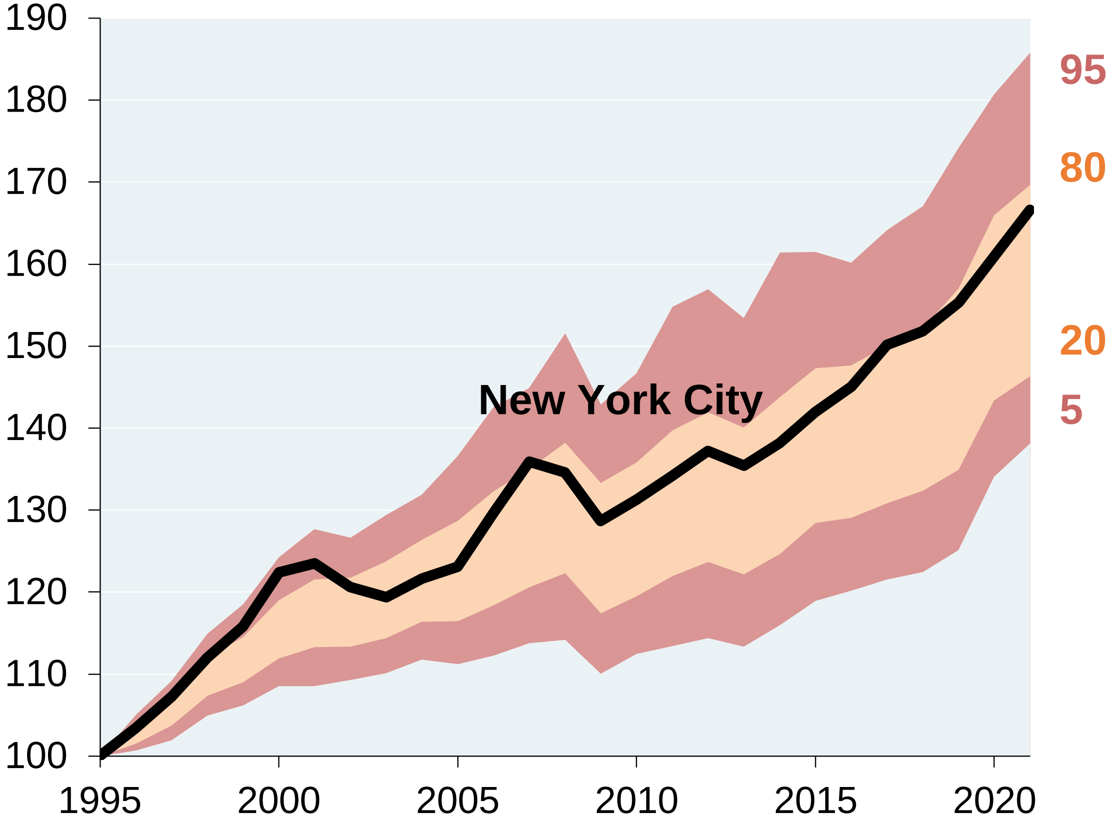
Personal income

Growth in real personal income per capita

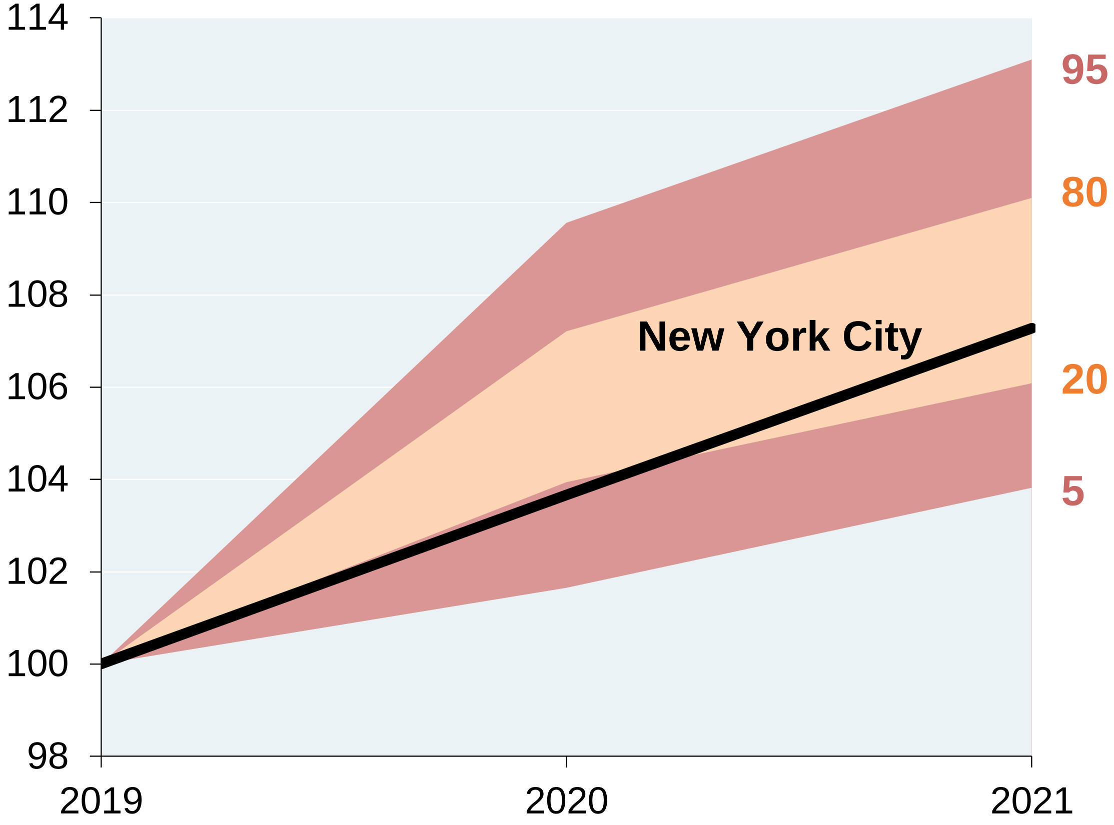
Index (1995 = 100), with percentiles



Source: BEA, JPMAM. 2021.

Growth in real personal income per capita

Index (2019 = 100), with percentiles

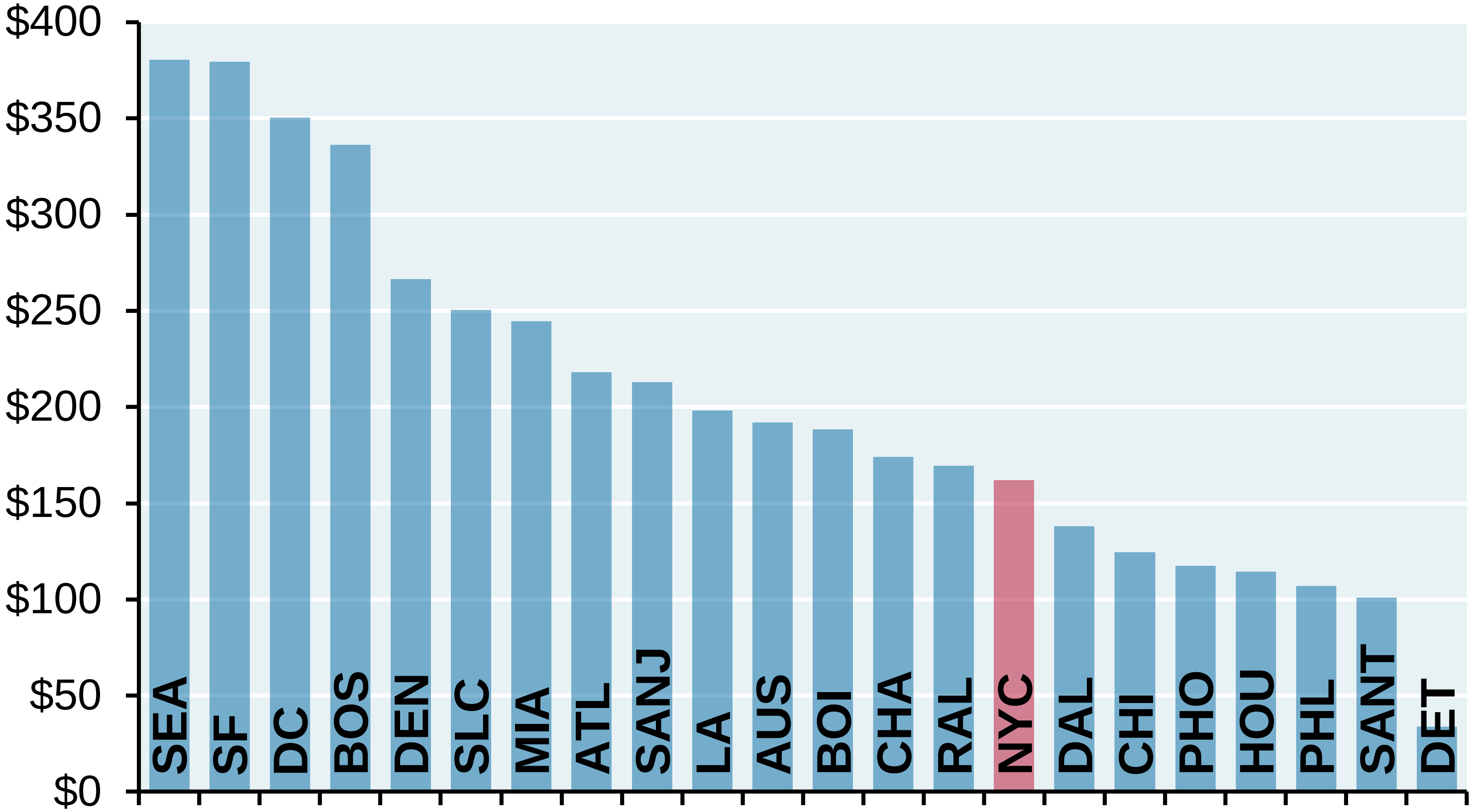


Source: BEA, JPMAM. 2021.

NYC ranks below median regarding taxable property per capita

Full value per capita

Estimated market value of taxable property / population, thousands



Source: Moody's, JPMAM. 2022.

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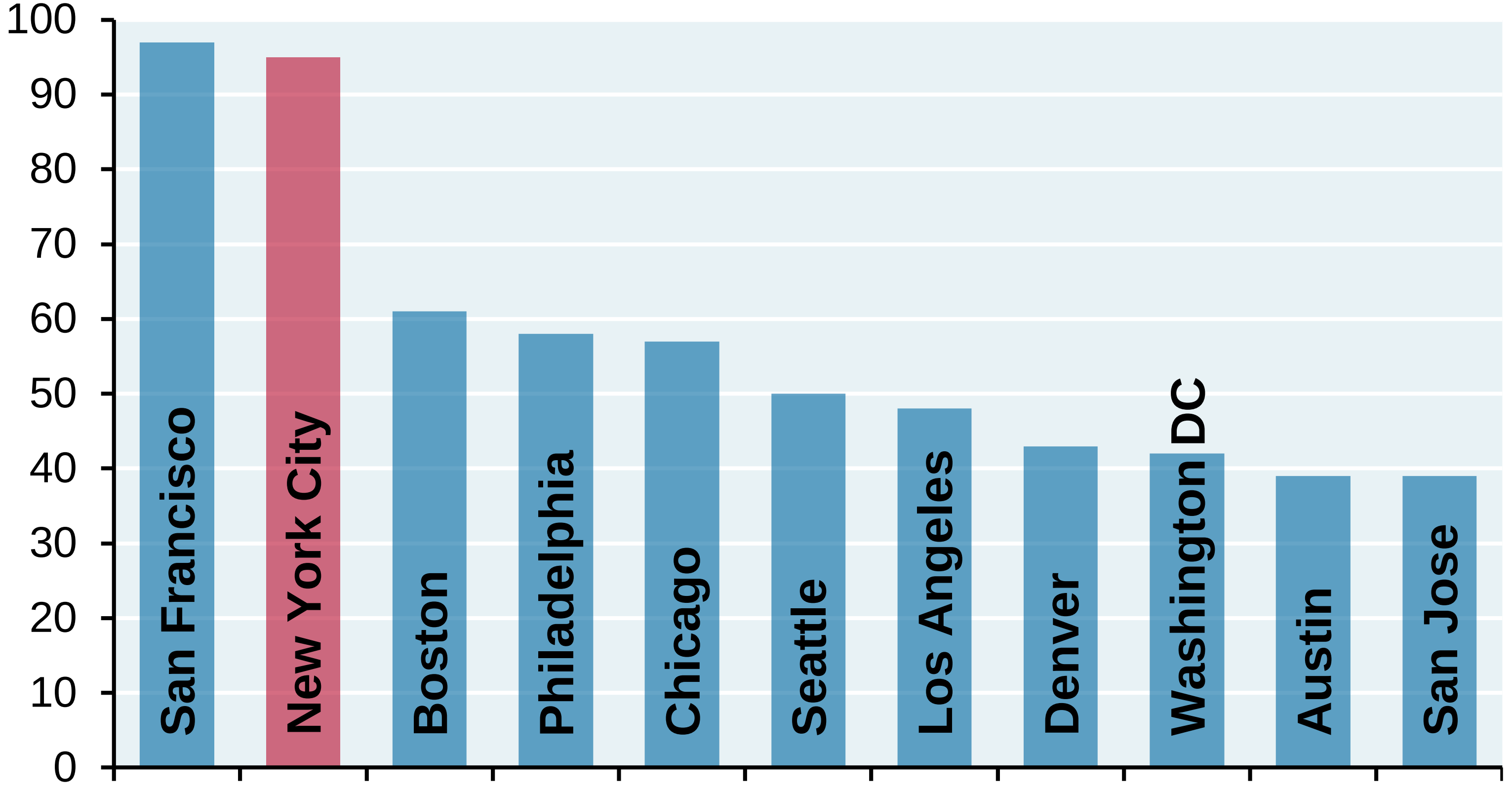
NYC: older buildings, more expensive conversions

Median office building age by city

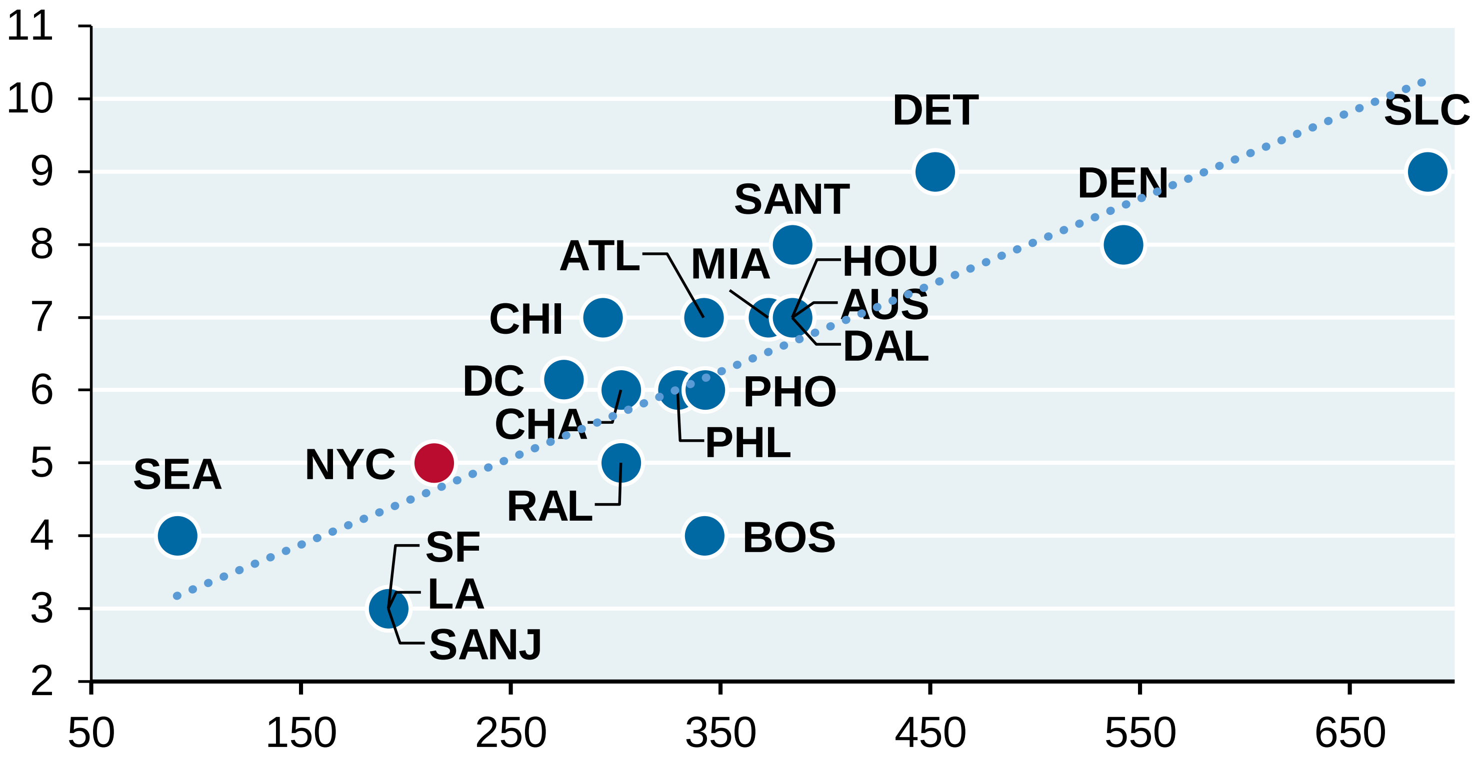
Years



Source: DOE Building Performance Database, JPMAM. 2021.

Office building emissions vs state grid emissions intensity

Office building emissions, kg CO_2e / sqft / year

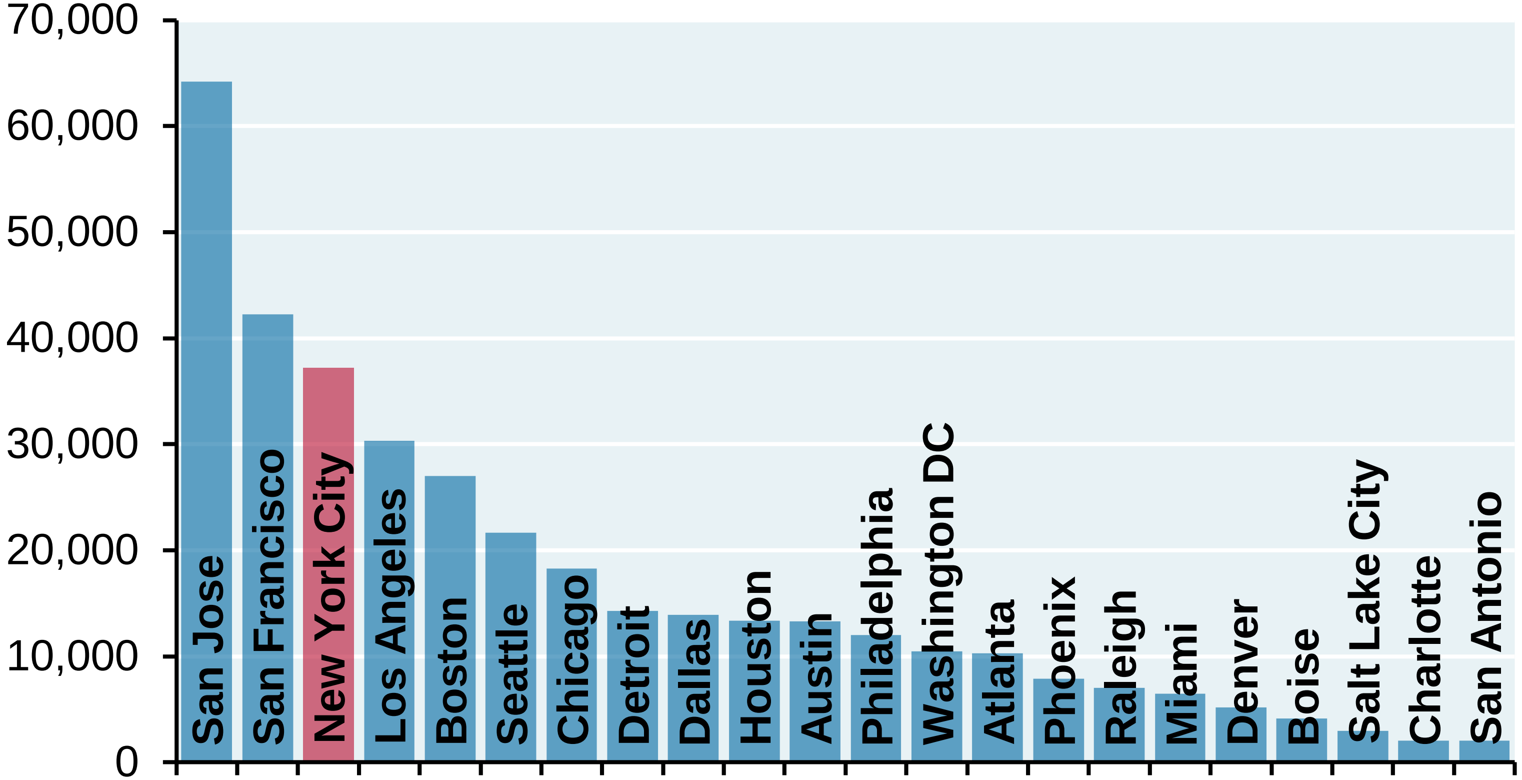


State emissions intensity, kg CO_2 / MWh

Source: DOE Building Performance Data, Carnegie Mellon, JPMAM. 2021.

Utility patents granted from 2011-2015

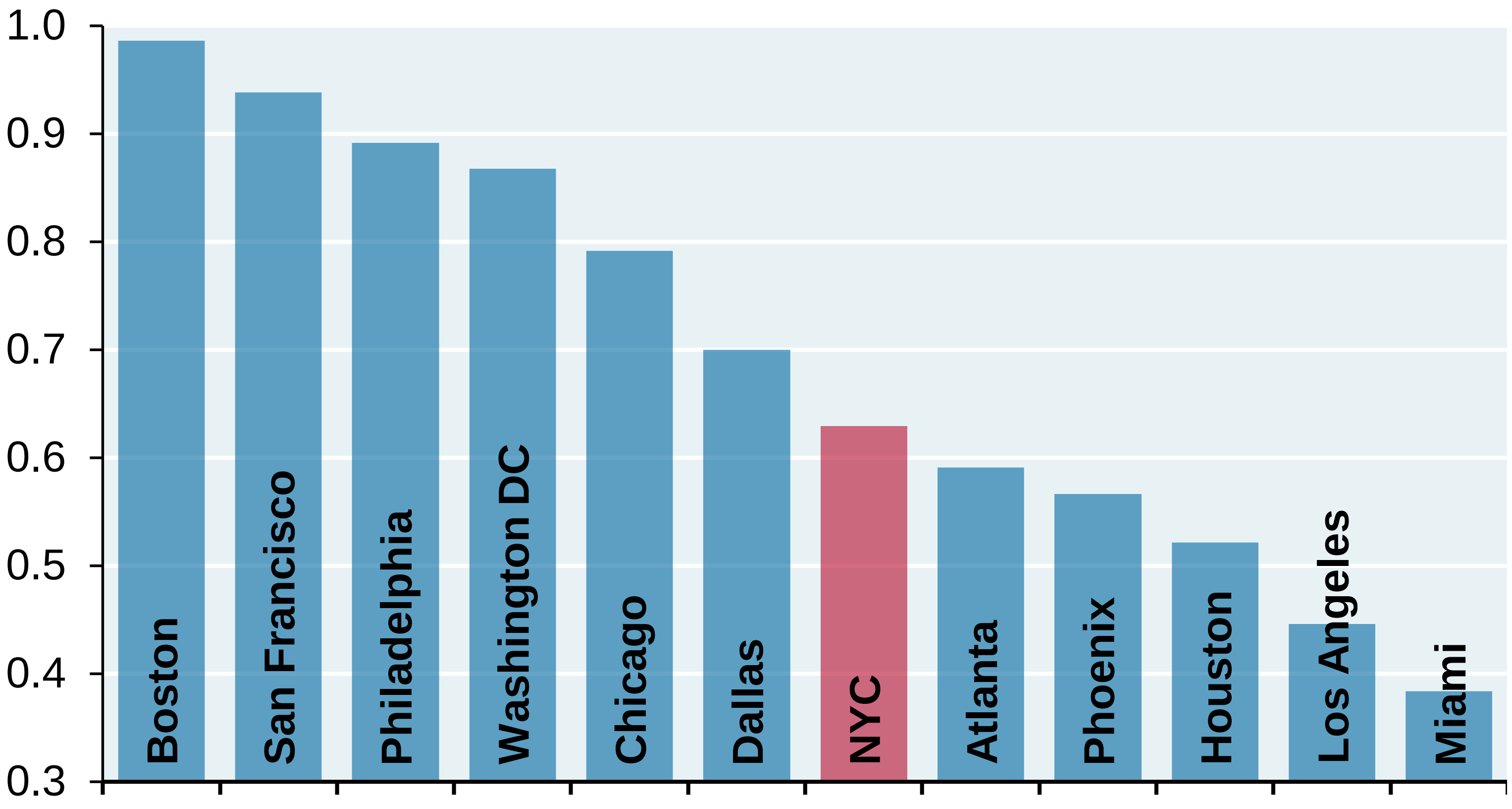
Count



Source: US Patent and Trademark Office, JPMAM. 2015.

Office to multifamily square footage

Ratio



Source: CoStar, Axiometrics. Q3 2023.

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