



# Guide to Alternatives<sup>®</sup>

2Q 2023

As of May 31, 2023





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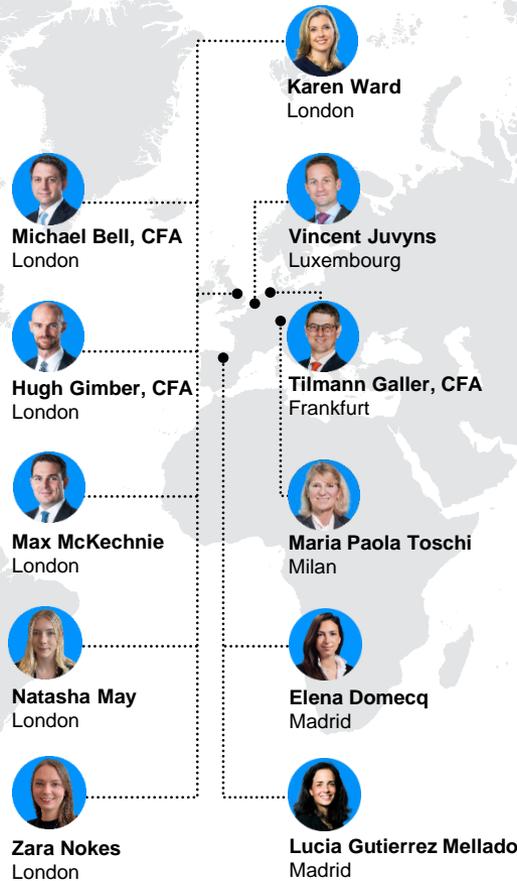
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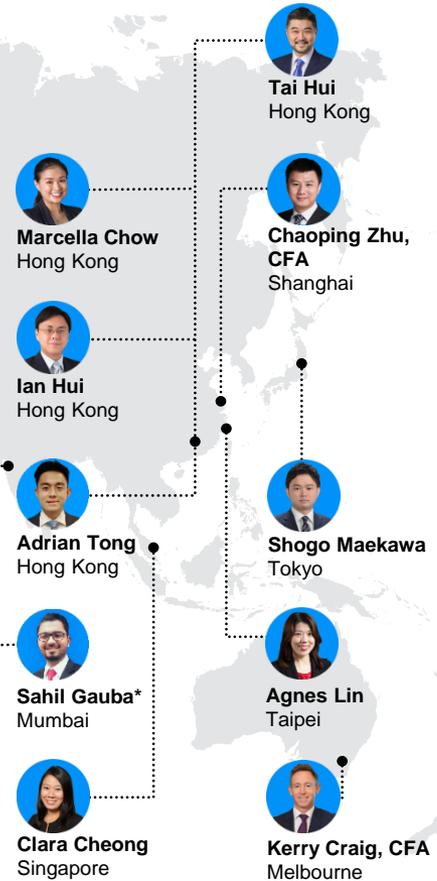
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## Hedge funds

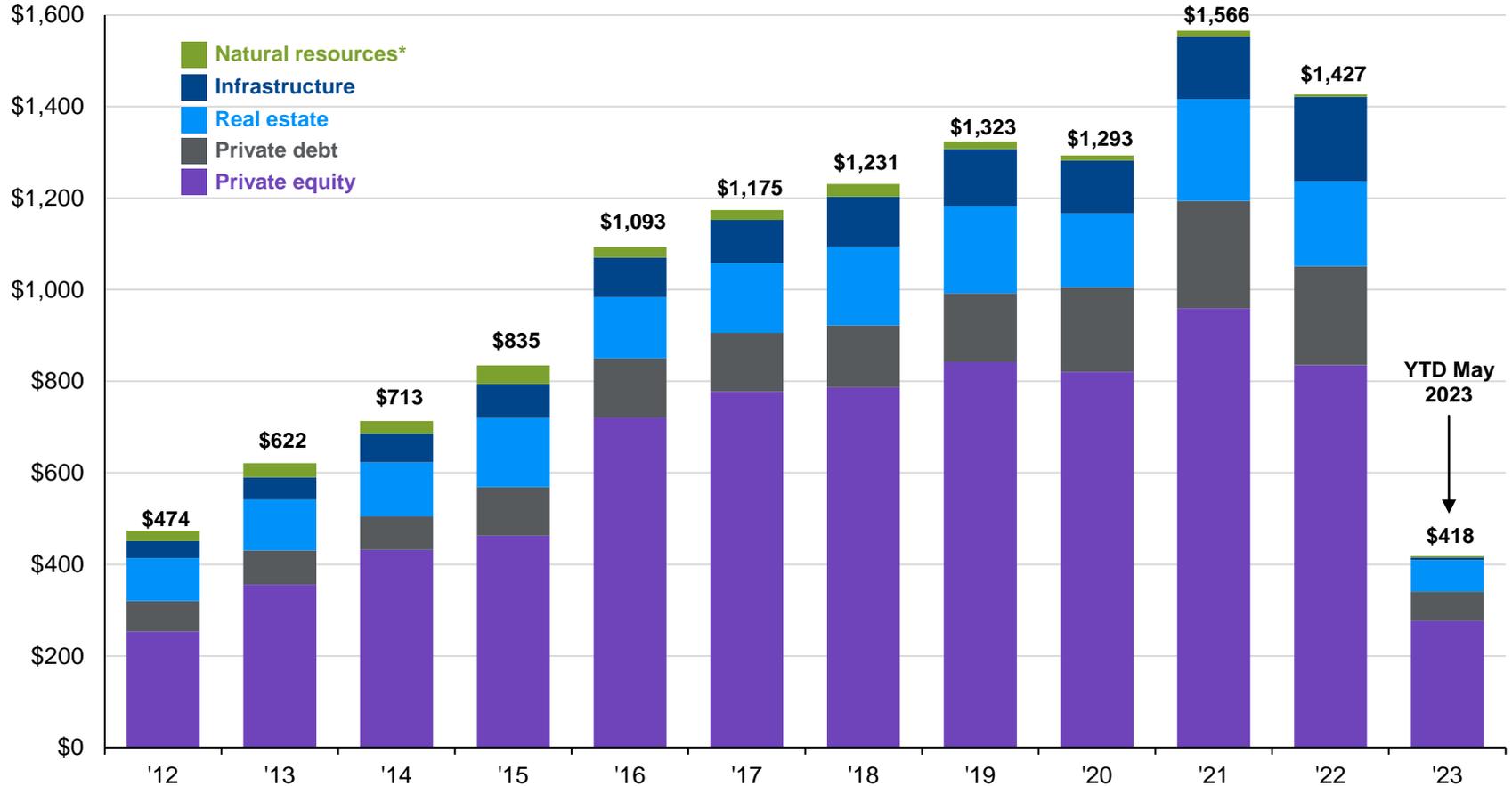
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# Alternatives fundraising

Alts in aggregate

## Global private capital fundraising USD billions



Source: Preqin, J.P. Morgan Asset Management. Fundraising categories are provided by Preqin and represent their estimate of annual capital raised in closed-end funds. Data may not sum to total due to rounding. \*Natural resources include natural resources agriculture, energy, metals & mining, timberland and water. Fundraising Data are as of May 31, 2023. Data are based on availability as of May 31, 2023.

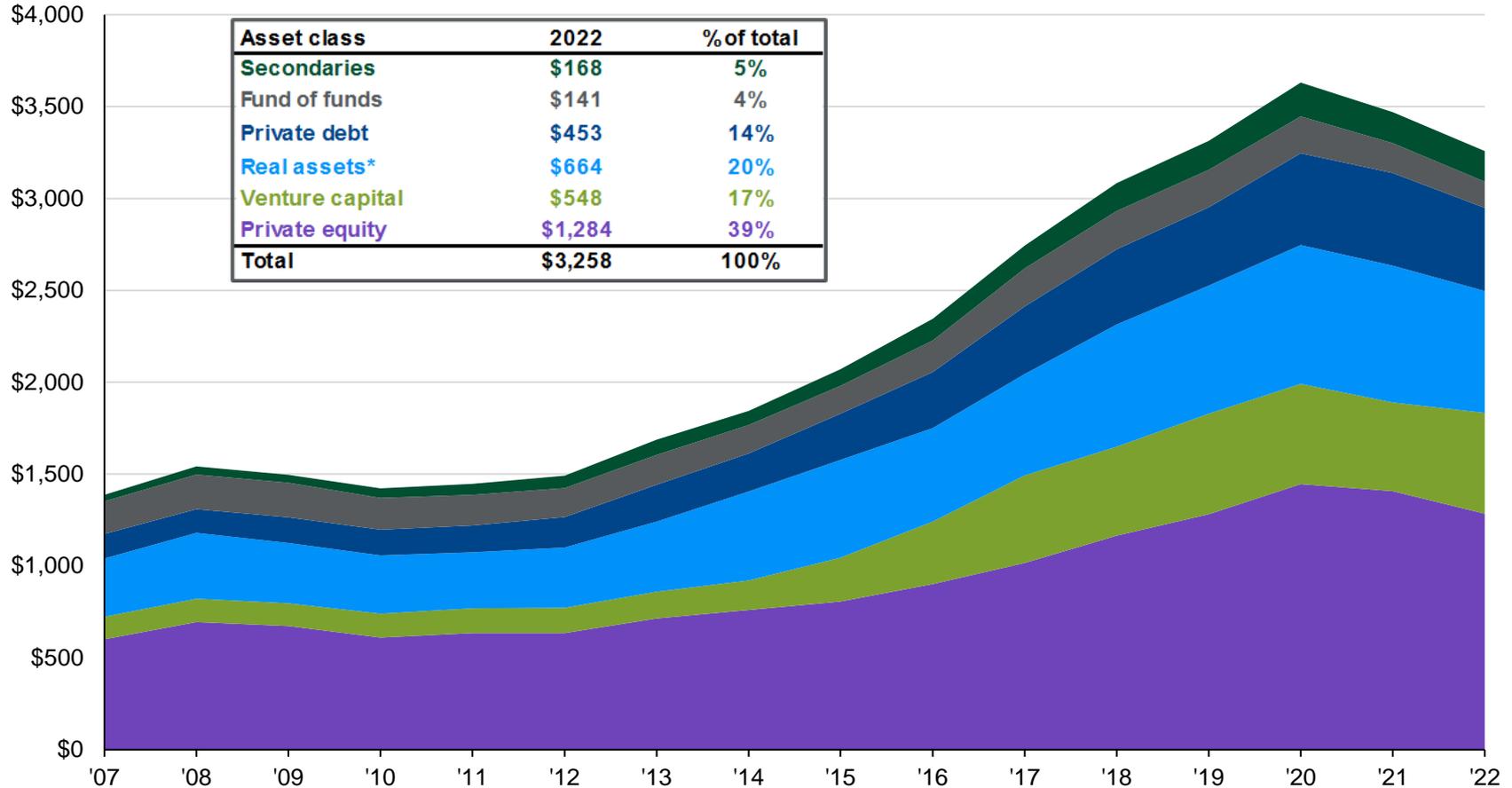


# Alternatives dry powder

Alts in aggregate

## Dry powder by asset class

Cumulative dry powder, USD billions



Source: PitchBook, J.P. Morgan Asset Management. Dry powder Data are as of September 30, 2022. Percentages may not sum to 100 due to rounding. \*Real assets dry powder includes real estate & infrastructure. Data are based on availability as of May 31, 2023.



# Public and private market correlations

Alts in aggregate

## Public and private market correlations Quarterly returns

2008 - 2022		Global Bonds	Global Equities	U.S. Core RE	Europe Core RE*	APAC Core RE	Global Core Infra	Transport	Timber	Direct Lending	Venture Capital	Private Equity	Equity Long/Short	Relative Value	Macro	Bitcoin
Financial assets	Global Bonds	1.0														
	Global Equities	0.4	1.0													
Global real estate	U.S. Core RE	-0.2	0.0	1.0												
	Europe Core RE*	-0.2	0.1	0.7	1.0											
	APAC Core RE	-0.2	0.0	0.8	0.7	1.0										
Real assets	Global Core Infra	-0.1	0.1	0.4	0.3	0.5	1.0									
	Transport	-0.2	-0.1	0.4	0.1	0.4	-0.1	1.0								
	Timber	-0.2	-0.1	0.2	0.0	0.1	0.2	0.2	1.0							
Private markets	Direct Lending	0.0	0.7	0.3	0.3	0.3	0.3	0.1	-0.1	1.0						
	Venture Capital	0.1	0.6	0.3	0.4	0.3	0.2	0.0	0.0	0.5	1.0					
	Private Equity	0.3	0.9	0.3	0.4	0.4	0.2	0.0	-0.1	0.8	0.8	1.0				
Hedge funds	Equity Long/Short	0.3	0.9	-0.1	0.1	0.0	0.1	0.0	-0.1	0.7	0.7	0.9	1.0			
	Relative Value	0.2	0.9	-0.1	0.1	0.0	0.1	-0.1	-0.2	0.9	0.5	0.8	0.9	1.0		
	Macro	0.1	0.3	0.0	0.1	0.0	0.0	-0.2	0.1	0.1	0.2	0.2	0.4	0.3	1.0	
Crypto	Bitcoin	0.1	0.1	0.2	0.0	0.1	0.2	0.0	0.0	0.1	0.2	0.2	0.1	0.1	0.0	1.0

Source: MSCI, Bloomberg, Burgiss, NCREIF, Cliffwater, HFRI, J.P. Morgan Asset Management. \*Europe Core RE includes continental Europe. Private Equity and Venture Capital are time weighted returns from Burgiss. RE – real estate. Global equities: MSCI AC World Index. Global Bonds: Bloomberg Global Aggregate Index. U.S. Core Real Estate: NCREIF Property Index – Open End Diversified Core Equity component. Europe Core Real Estate: MSCI Global Property Fund Index – Continental Europe. Asia Pacific (APAC) Core Real Estate: MSCI Global Property Fund Index – Asia-Pacific. Global infrastructure (Infra.): MSCI Global Quarterly Infrastructure Asset Index. U.S. Direct Lending: Cliffwater Direct Lending Index. Timber: NCREIF Timberland Property Index (U.S.). Hedge fund indices include equity long/short, relative value, and global macro and are all from HFRI. Transport: returns are derived from a J.P. Morgan Asset Management index. All correlation coefficients are calculated based on quarterly total return data for the period 6/30/2008 – 12/31/2022, except correlations with Bitcoin which are calculated over the period 12/31/2010 – 12/31/2022. Returns are denominated in USD. Data are based on availability as of May 31, 2023.

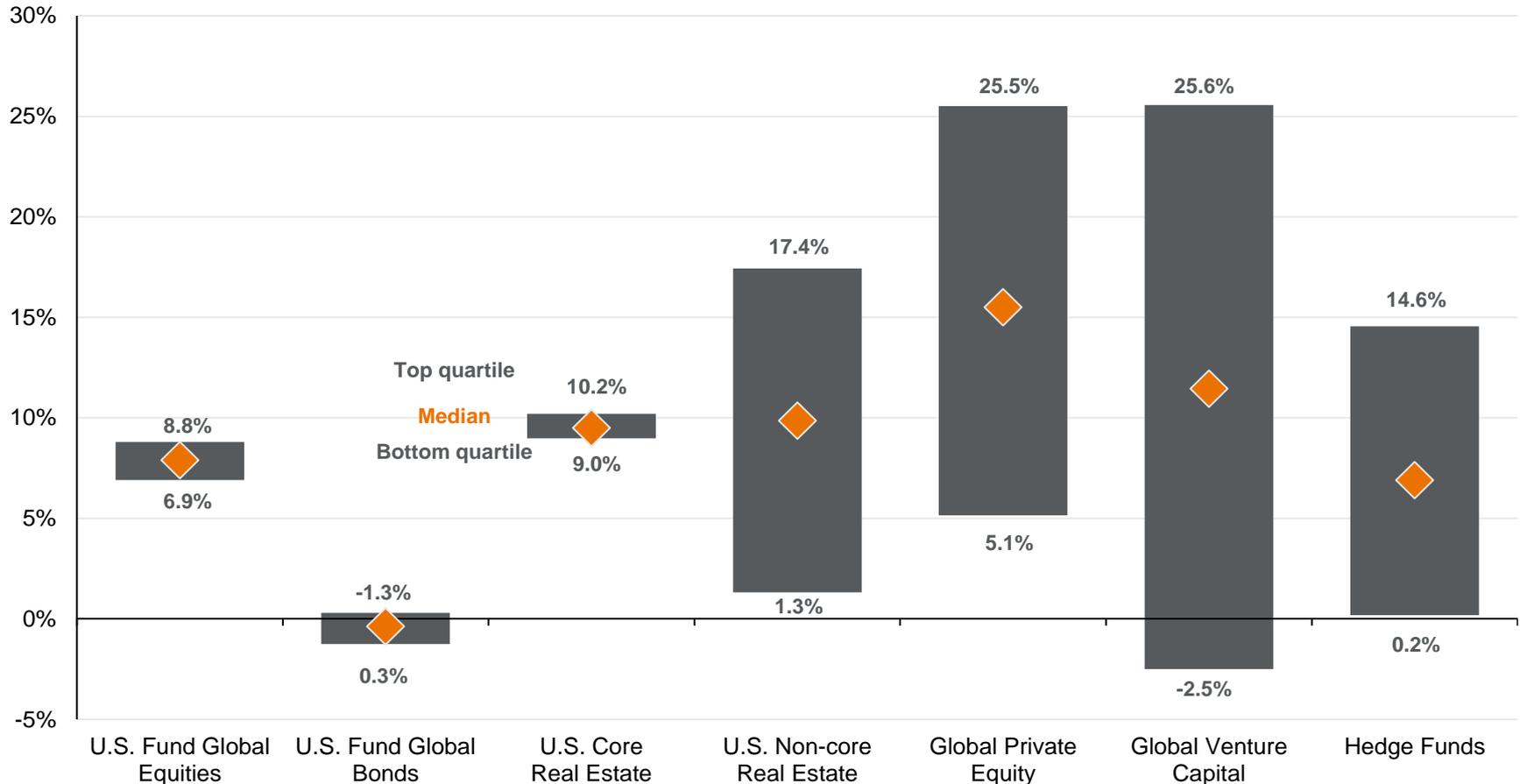


# Alternatives and manager selection

Alts in aggregate

## Public and private manager dispersion

Based on returns over a 10-year window\*



Source: Burgiss, NCREIF, Morningstar, PivotalPath, J.P. Morgan Asset Management.

Global equities (large cap) and global bonds dispersion are based on the world large stock and world bond categories, respectively. \*Manager dispersion is based on the annual returns for U.S. Fund Global Equities, U.S. Fund Global Bonds, Hedge Funds, and U.S. Core Real Estate are over a 10-year period ending 1Q 2023. Non-core Real Estate, Global Private Equity and Global Venture Capital are represented by the 10-year horizon internal rate of return (IRR) ending 4Q 2022. U.S. Fund Global Equities and Bonds are comprised of U.S.-domiciled mutual funds and ETFs. Data are based on availability as of May 31, 2023.

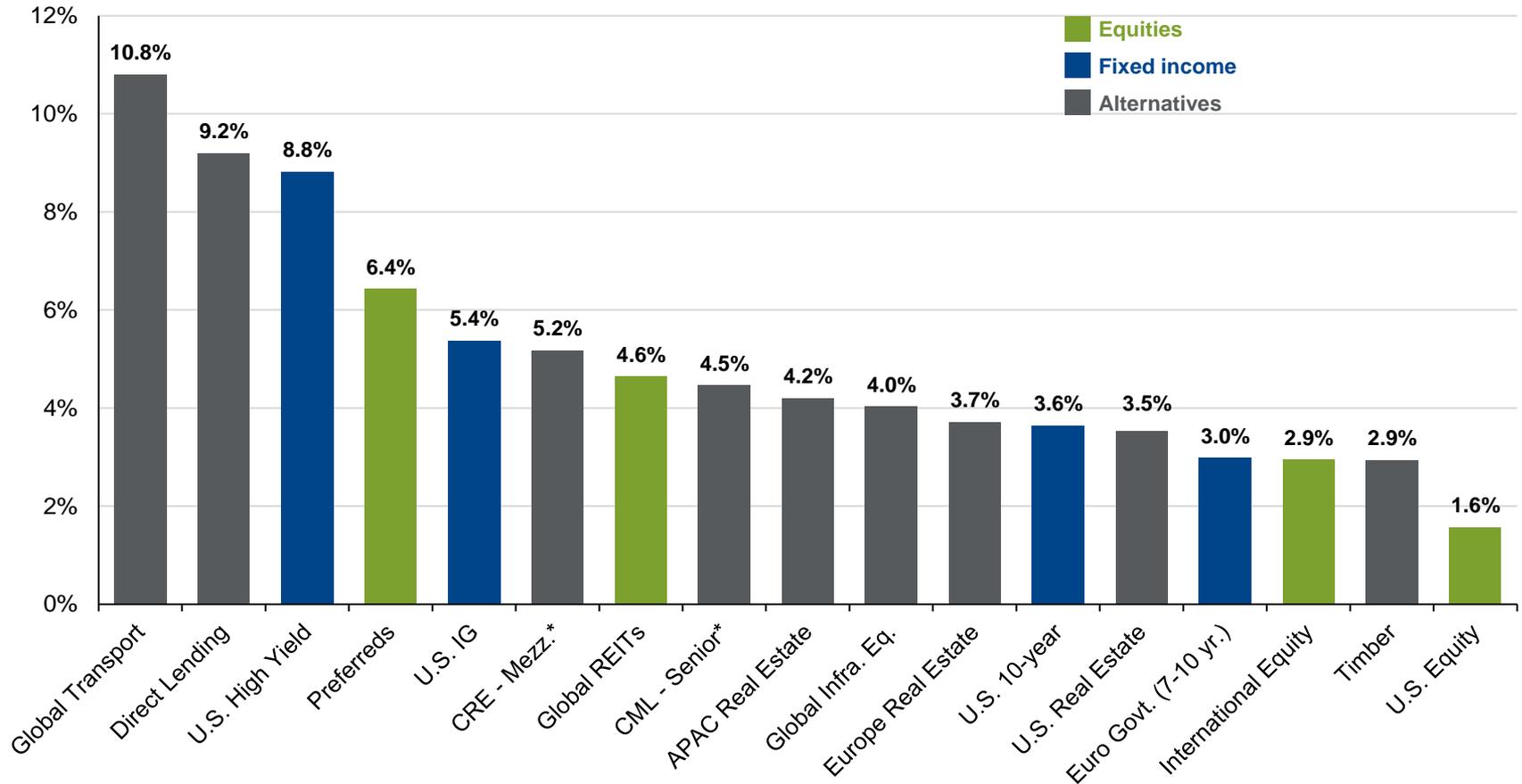


# Yield alternatives

Alts in aggregate

## Asset class yields

Percent



Source: BAML, Bloomberg, Clarkson, Cliffwater, Drewry Maritime Consultants, Federal Reserve, FTSE, MSCI, NCREIF, FactSet, Wells Fargo J.P. Morgan Asset Management. \*CML is commercial mortgage loans. Equities and fixed income yields are as of 5/31/2023. Alternative yields are as of 12/31/2023 except Direct Lending, Timber, and CML - Senior, which are as of 3/31/2023; and, CRE - Mezz, which is as of 4/30/2023. CML - Senior: Gilberto-Levy Performance Aggregate Index (unlevered). Mezzanine commercial mortgage loans yield is derived from a J.P. Morgan Survey and U.S. Treasuries of a similar duration. Global Transport: Levered yields for transport assets calculated as the difference between charter rates (rental income), operating expenses, debt amortization and interest expenses, as a percentage of equity value, and are based on a historical 15-year average. Yields for each of the sub-vessel types are calculated and respective weightings are applied to arrive at the current levered yields for Global Transportation; Preferreds: BAML Hybrid Preferred Securities; Direct Lending: Cliffwater Direct Lending Index; U.S. High Yield: Bloomberg US Aggregate Corporate High Yield; Global Infrastructure: MSCI Global Infrastructure Asset Index-Low Risk; U.S. Real Estate: MSCI Global Property Fund Index - North America; Global REITs: FTSE NAREIT Global REITs; International Equity: MSCI AC World ex-U.S.; U.S. 10-year: 10-year U.S. Treasury yield; U.S. Equity: MSCI USA, Europe Real Estate: Market weighted-avg. of MSCI Global Property Fund Indices - U.K. & Cont. Europe; Asia Pacific (APAC) core real estate: MSCI Global Property Fund Index - Asia-Pacific. Euro Govt. (7-10 yr.): Bloomberg Euro Aggregate Government - Treasury (7-10Y); Timber: NCREIF Timberland Index (U.S.) - EBITDA Return. Data are based on availability as of May 31, 2023.

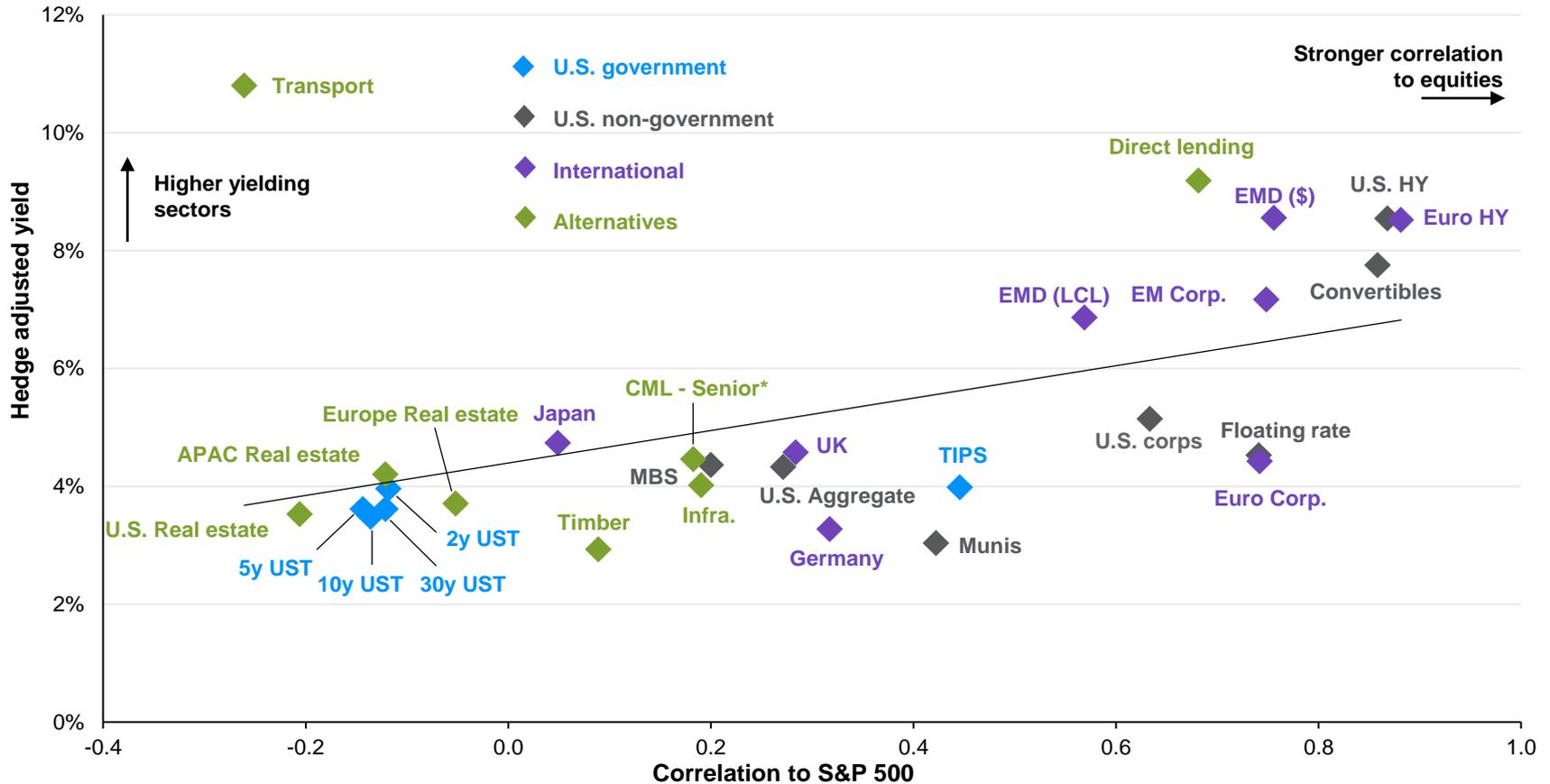


# Equity market correlations and yields

Alts in aggregate

## Equity market correlations and yields

Hedge adjusted yield, last 12 months



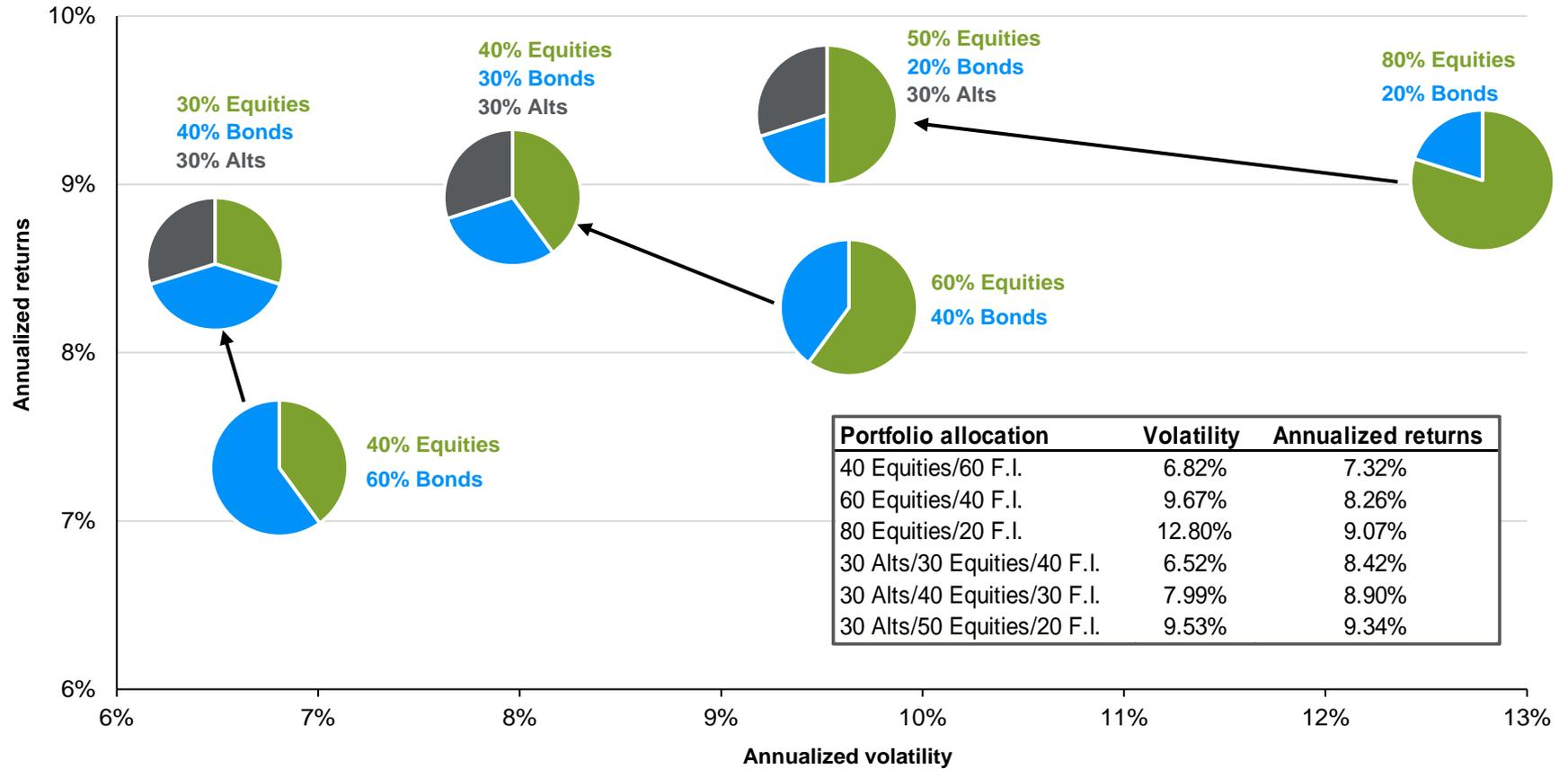
Source: Bloomberg, Gilberto-Levy, NCREIF, MSCI, FactSet, ICE, J.P. Morgan Asset Management. \*CML is commercial mortgage loans. Fixed income shown above are represented by Bloomberg indices except for EMD and ABS – U.S. Aggregate; MBS: U.S. Aggregate Securitized – MBS; U.S. corps: U.S. Corporates; Munis: Municipal Bond; U.S. HY: Corporate High Yield; TIPS: Treasury Inflation-Protected Securities (TIPS); Floating Rate: U.S. Floating Rate; Convertibles: U.S. Convertibles Composite; ABS: J.P. Morgan ABS Index; EMD (\$): J.P. Morgan EMBIG Diversified Index; EMD (LCL): J.P. Morgan GBI EM Global Diversified Index; EM Corp: J.P. Morgan CEMBI Broad Diversified Index; Euro Corp.: Euro Aggregate Corporate Index; Euro HY: Pan-European High Yield Index; U.S. Real Estate: NCREIF Property Index – ODCE; Europe Real Estate: Market weighted-avg. of MSCI Global Property Fund Indices – U.K. & Cont. Europe; APAC Real Estate: MSCI Global Property Index – Asia-Pacific; Global infra.: MSCI Global Quarterly Infrastructure Asset Index (equal weighted blend); U.S. Direct Lending: Cliffwater Direct Lending Index; Timber: NCREIF Timberland Property Index (U.S.); Transport returns and yield are derived from a J.P. Morgan Asset Management index; CML – Senior: Gilberto-Levy Commercial Mortgage Performance Aggregate Index. Convertibles yield is based on the U.S. portion of the Bloomberg Global Convertibles. Country yields are represented by the global aggregate for each country. Yield and return information based on bellwethers for Treasury securities. U.S. Real Estate yield is calculated using the MSCI Global Property Fund Index – North America. Alternative correlations are based on quarterly returns over the past 10 years through 12/31/2022, except Direct Lending, Timber, CML – Senior, and U.S. Real Estate which are through 3/31/2023. Stock and bond correlations are based on quarterly returns over the past 10 years through 3/31/2023. All non-alternative yields are as of 5/31/2023. Altyields are as of 12/31/2022, except Direct Lending, Timber, CML – Senior, and U.S. Real Estate which are through 3/31/2023. Data are based on availability as of May 31, 2023.



# Portfolio diversification

Alts in aggregate

## Alternatives and portfolio risk/return Annualized volatility and returns, 1989 – 2022



Source: Bloomberg, Burgiss, HRFI, NCREIF, Standard & Poor's, FactSet, J.P. Morgan Asset Management. Alts include hedge funds, real estate, and private equity, with each receiving an equal weight. Portfolios are rebalanced at the start of the year. Data are based on availability as of May 31, 2023



# Alternative asset class returns

Alts in aggregate

										2013-2022	
2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Ann.	Vol.
Venture Capital 26.0%	Venture Capital 26.0%	Transport 16.2%	Infra. 14.2%	Private Equity 23.0%	Venture Capital 20.7%	Venture Capital 19.9%	Venture Capital 57.5%	Venture Capital 48.9%	Transport 29.9%	Venture Capital 19.3%	Venture Capital 12.7%
Private Equity 19.8%	Infra. 13.9%	Infra. 15.5%	Transport 13.4%	Transport 20.2%	Infra. 11.6%	Private Equity 16.8%	Private Equity 24.2%	Private Equity 36.5%	Infra. 9.7%	Private Equity 15.3%	Transport 8.8%
Transport 18.8%	U.S. Core RE 12.5%	U.S. Core RE 15.0%	Private Equity 12.0%	Venture Capital 14.8%	Europe Core RE 9.8%	Infra. 11.5%	Asset Allocation 11.5%	Transport 27.7%	U.S. Core RE 7.5%	Transport 14.2%	Private Equity 8.5%
U.S. Core RE 13.9%	Europe Core RE 12.3%	Venture Capital 15.0%	Direct Lending 11.2%	Asset Allocation 12.2%	APAC Core RE 9.4%	Europe Core RE 9.4%	Hedge Funds 8.9%	U.S. Core RE 22.2%	APAC Core RE 6.9%	Infra. 10.9%	Hedge Funds 5.6%
Asset Allocation 12.9%	Asset Allocation 11.2%	Europe Core RE 12.8%	APAC Core RE 10.5%	Infra. 12.2%	Private Equity 9.2%	Asset Allocation 9.2%	CML - Senior* 6.3%	Asset Allocation 20.1%	Direct Lending 6.3%	Asset Allocation 10.7%	U.S. Core RE 4.3%
Direct Lending 12.7%	Private Equity 9.8%	APAC Core RE 11.8%	U.S. Core RE 8.8%	APAC Core RE 11.6%	Asset Allocation 8.6%	Direct Lending 9.0%	Transport 5.9%	Europe Core RE 14.2%	Europe Core RE 4.6%	U.S. Core RE 10.1%	CML - Senior* 3.7%
Infra. 11.0%	Direct Lending 9.6%	Asset Allocation 10.3%	Asset Allocation 8.5%	Europe Core RE 9.8%	U.S. Core RE 8.3%	CML - Senior* 8.4%	Direct Lending 5.5%	Hedge Funds 13.9%	Asset Allocation 3.2%	Direct Lending 8.9%	Europe Core RE 3.6%
Hedge Funds 9.6%	APAC Core RE 9.4%	Private Equity 9.1%	Europe Core RE 8.1%	Direct Lending 8.6%	Direct Lending 8.1%	APAC Core RE 6.6%	Europe Core RE 4.8%	Direct Lending 12.8%	Private Equity -2.7%	APAC Core RE 8.7%	Infra. 3.4%
APAC Core RE 9.1%	CML - Senior* 7.4%	Direct Lending 5.5%	Hedge Funds 3.2%	Hedge Funds 8.5%	Transport 7.7%	Hedge Funds 5.6%	U.S. Core RE 1.2%	APAC Core RE 12.0%	Hedge Funds -2.8%	Europe Core RE 8.4%	Direct Lending 2.9%
Europe Core RE 5.8%	Transport 6.9%	CML - Senior* 2.7%	CML - Senior* 2.9%	U.S. Core RE 7.6%	CML - Senior* 2.6%	U.S. Core RE 5.3%	Infra. 0.2%	Infra. 10.5%	CML - Senior* -9.0%	Hedge Funds 4.9%	Asset Allocation 2.8%
CML - Senior* 2.9%	Hedge Funds 4.3%	Hedge Funds -0.2%	Venture Capital 1.0%	CML - Senior* 5.7%	Hedge Funds -1.2%	Transport -0.5%	APAC Core RE 0.1%	CML - Senior* 1.9%	Venture Capital -18.4%	CML - Senior* 3.1%	APAC Core RE 2.1%

Source: Cliffwater, Gilberto-Levy, HRFI, MSCI, NCREIF, FactSet, J.P. Morgan Asset Management. \*CML is commercial mortgage loans. CML - Senior: Gilberto-Levy Commercial Mortgage Performance Index. Private Equity and Venture Capital are time weighted returns from Burgiss. Hedge funds: HRFI Fund Weighted Composite. Transport returns are derived from a J.P. Morgan Asset Management index. U.S. Core RE: NCREIF Property Index - Open End Diversified Core Equity component. Europe Core Real Estate: MSCI Global Property Fund Index - Continental Europe. Asia Pacific (APAC) Core Real Estate: MSCI Global Property Fund Index - Asia-Pacific. Direct Lending: Cliffwater Direct Lending Index. Global infrastructure (Infra.): MSCI Global Quarterly Infrastructure Asset Index (equal-weighted blend). Commercial Mortgage Loans: Gilberto-Levy Commercial Mortgage Performance Index. The "Asset Allocation" portfolio assumes an evenly weighted portfolio consisting of the above alternatives. Annualized return (Ann.) and volatility (Vol.) represents the period from 12/31/2012 to 12/31/2022. Data are based on availability as of May 31, 2023.

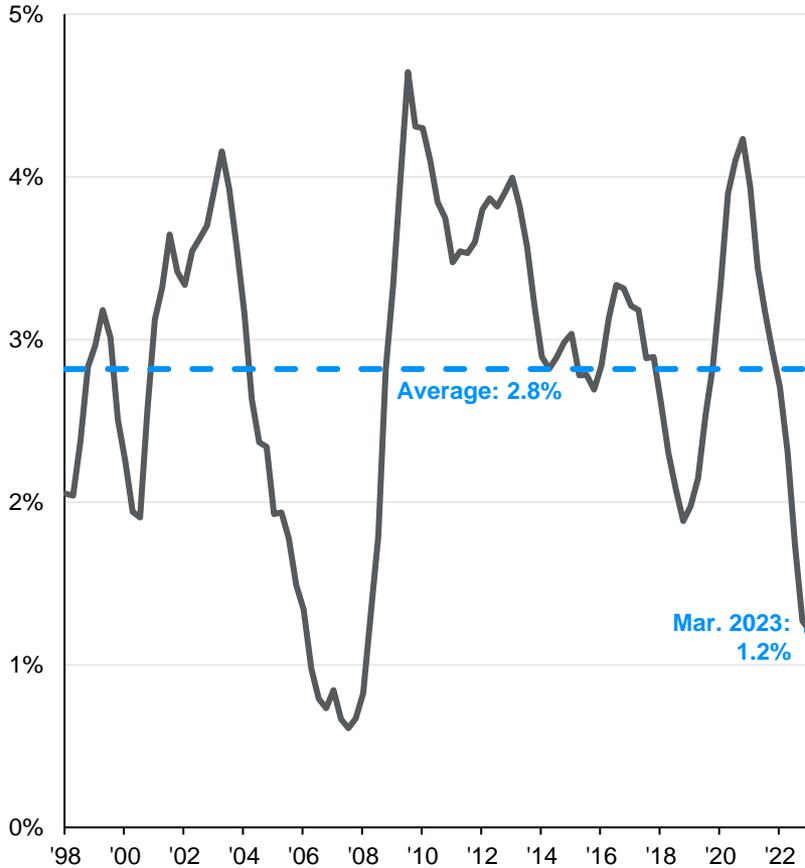


# U.S. real estate dynamics

Real estate

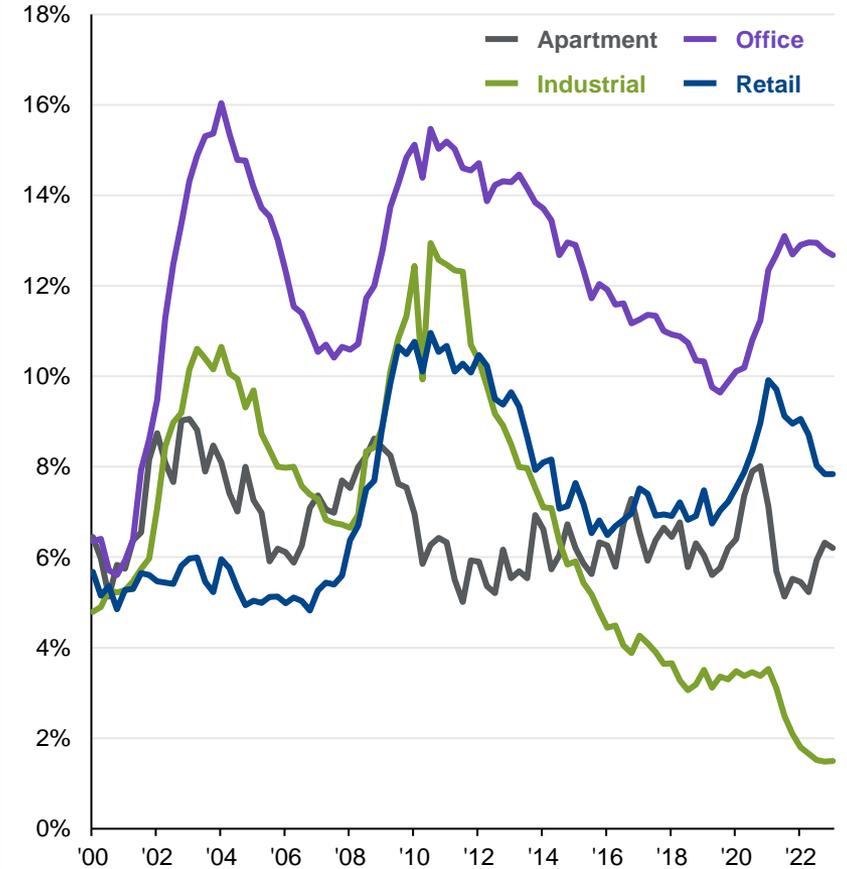
## U.S. real estate cap rate spreads

Transaction based, spread to 10y UST, 4-quarter rolling average



## U.S. vacancy rates by property type

Percent



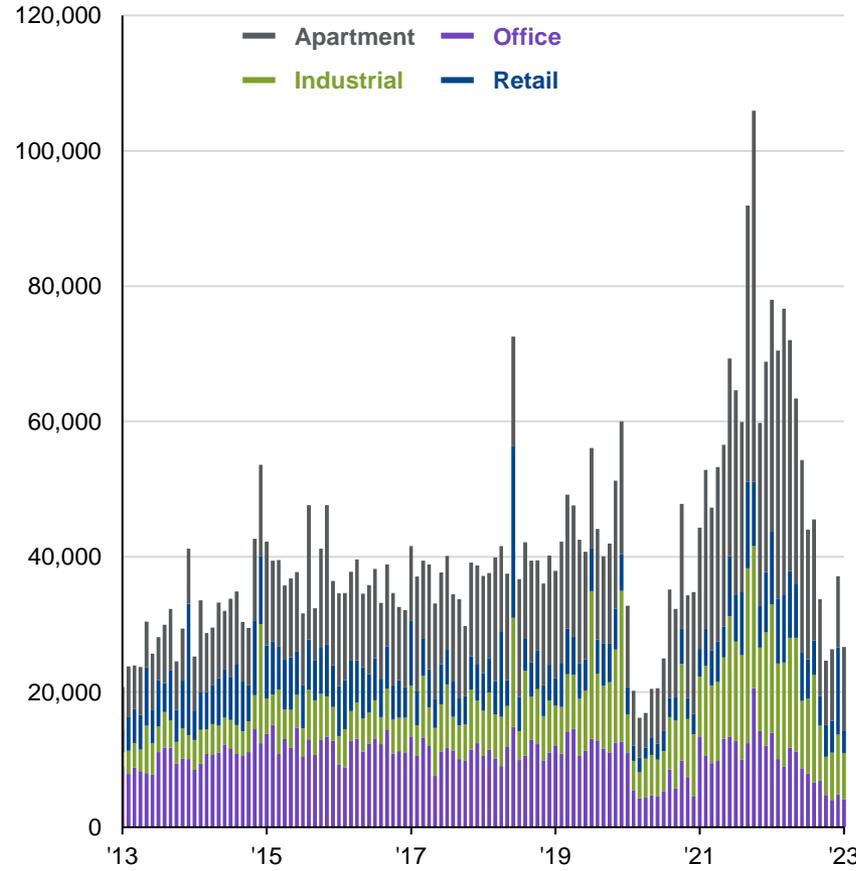
Source: NCREIF, NAREIT, Statista, J.P. Morgan Asset Management.  
 The cap rate, which is computed as the net operating income over sales price, is the rate of return on a real estate investment property. Vacancy rate Data are as of March 31, 2023.  
 Data are based on availability as of May 31, 2023.



# U.S. real estate: NOI growth and transaction volumes

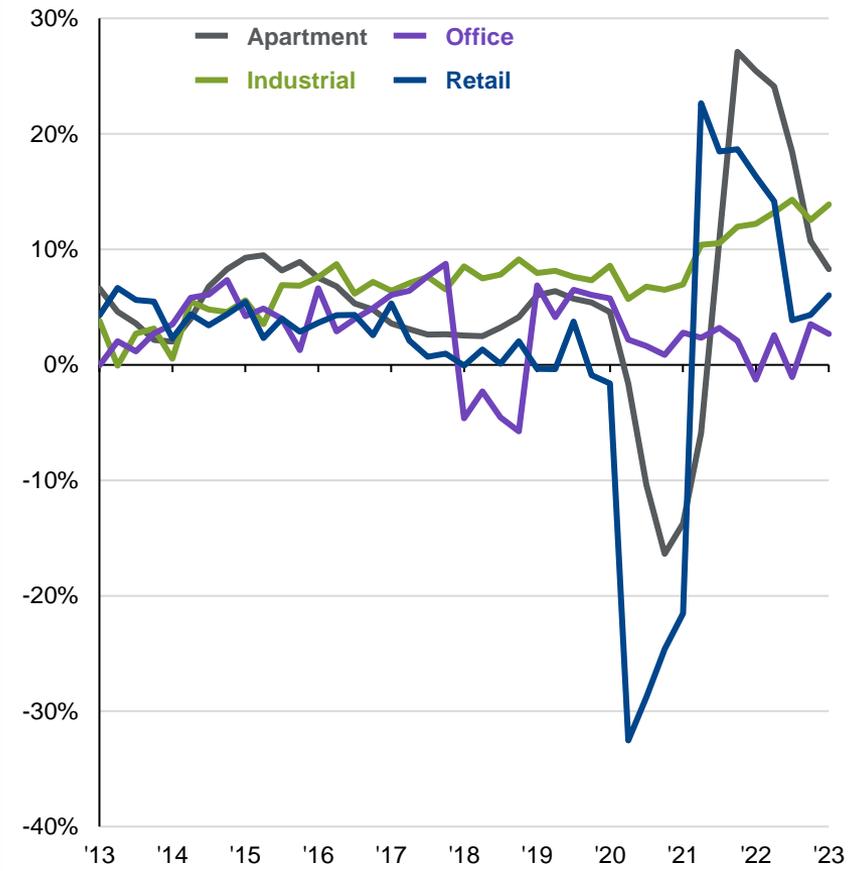
## U.S. real estate transaction volumes

USD millions, seasonally adjusted, last 10 years



## Net operating income growth by property type

Rolling 4-quarter growth, last 10 years



Source: NCREIF, NAREIT, Statista, J.P. Morgan Asset Management.  
 NOI is net operating income. Transaction volume and net operating income growth data are as of March 31, 2023.  
 Data are based on availability as of May 31, 2023.

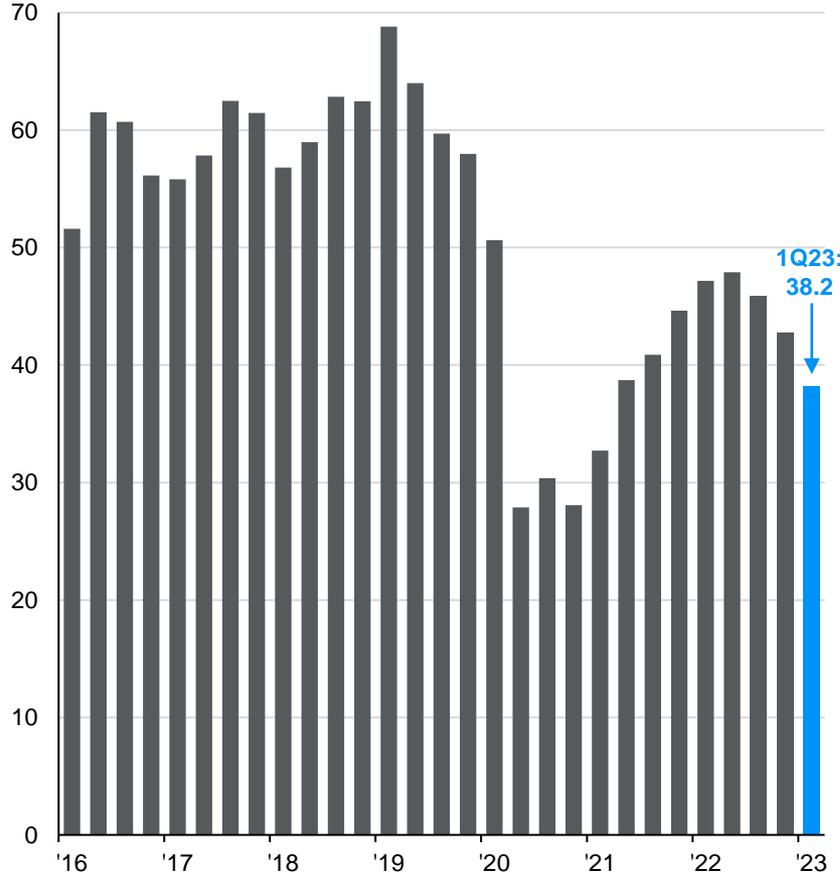


# U.S. real estate: Office

Real estate

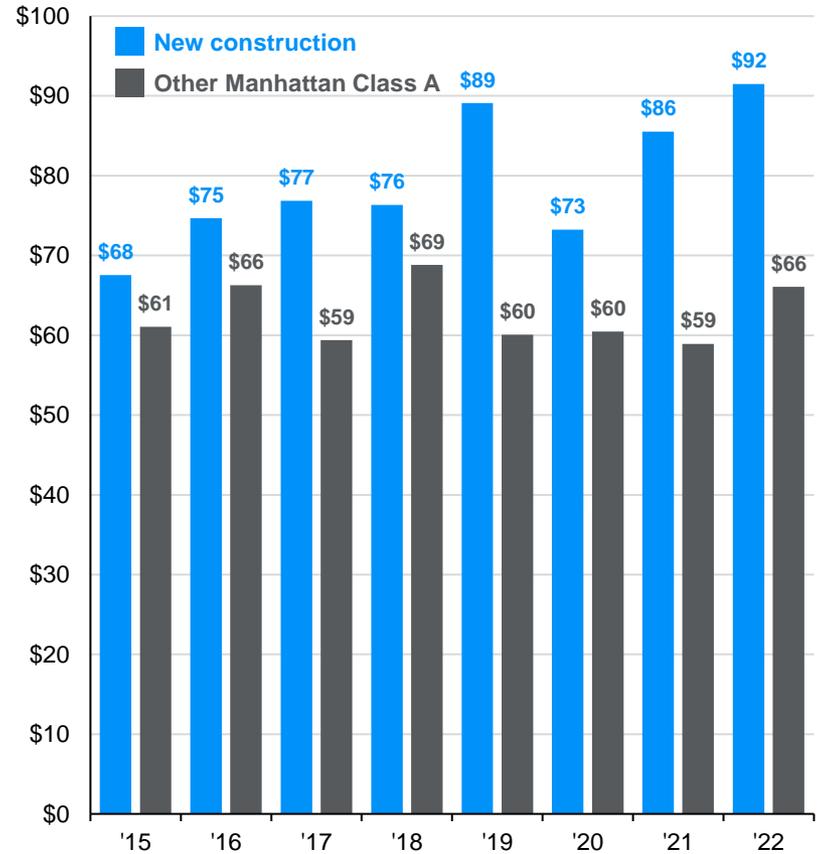
## U.S. office leasing activity

In million square feet, quarterly



## New construction vs. other Manhattan Class A\*

Net effective rent per square foot



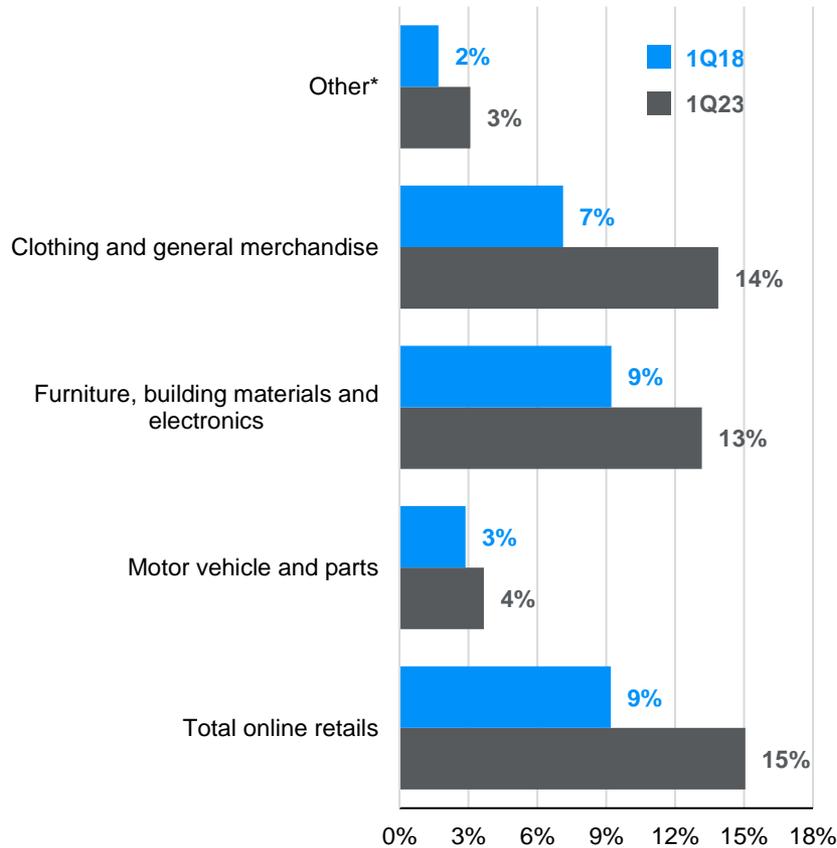
Source: JLL, J.P. Morgan Asset Management. "U.S. Office Outlook – 3Q 2022," JLL, October 2022; "U.S. Office Outlook – 1Q 2023," JLL, April 2023.  
 \*Class A office buildings, as defined by JLL, are new or recently renovated and located in the central business district of a major city. Interior build outs will generally feature high-end finishes and quality construction.  
 Data are based on availability as of May 31, 2023.



# U.S. real estate: Retail

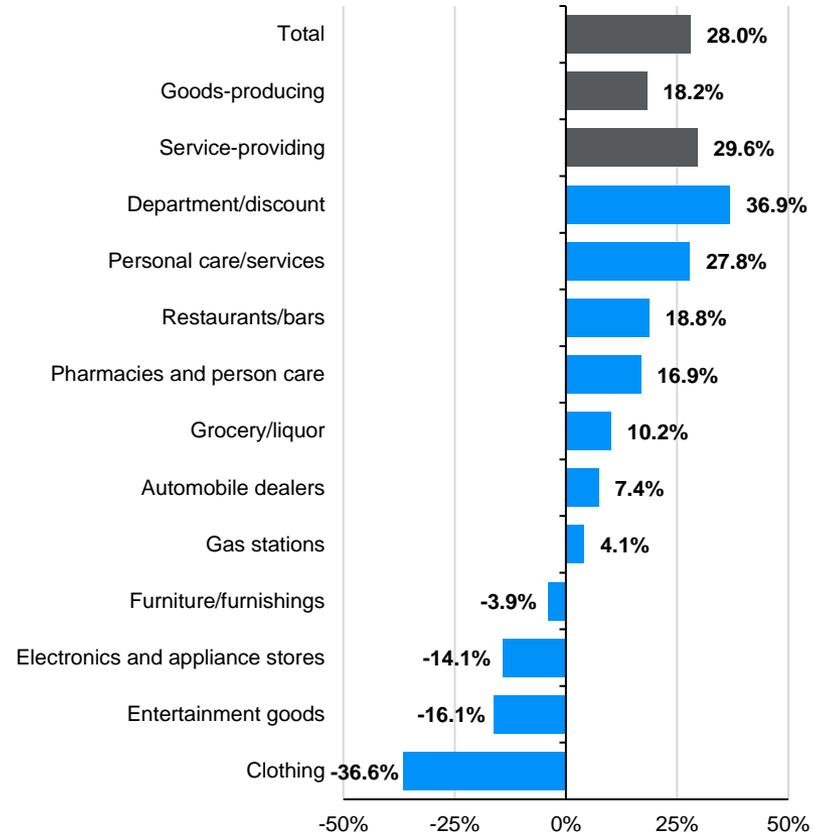
### U.S. online retails sales by segment

% of total retail sales by segment, NSA



### Change in number of retail establishments

3Q12 – 3Q22, percent



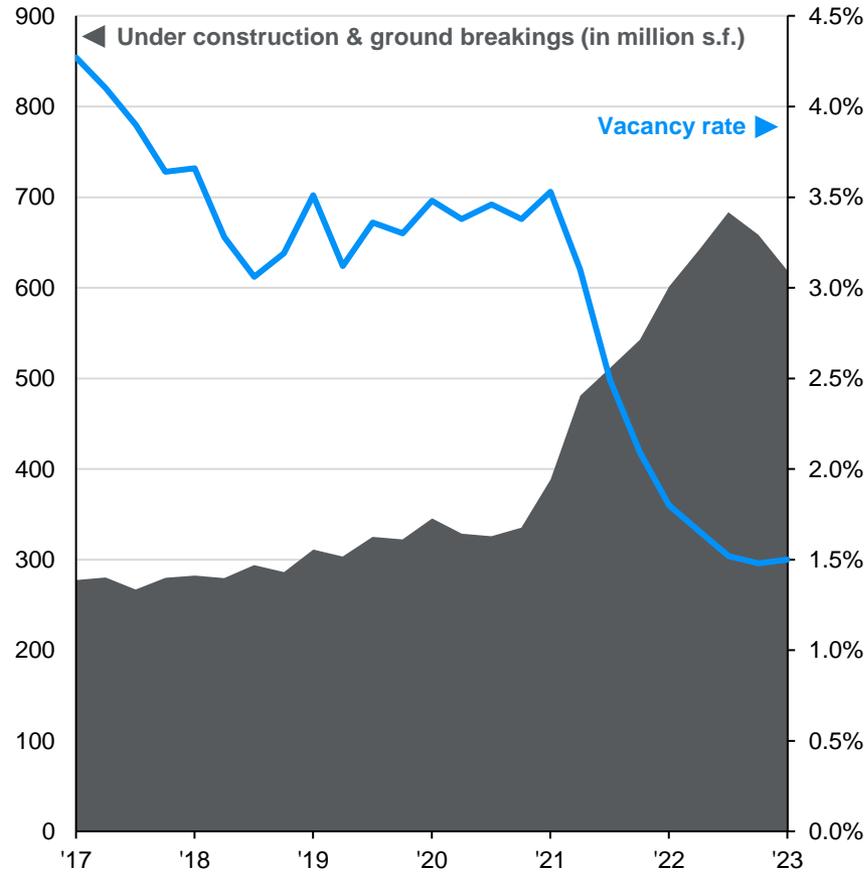
Source: Bureau of Labor Statistics, U.S. Census Bureau, J.P. Morgan Asset Management. \*Other includes food, health and entertainment. Data are based on availability as of May 31, 2023.



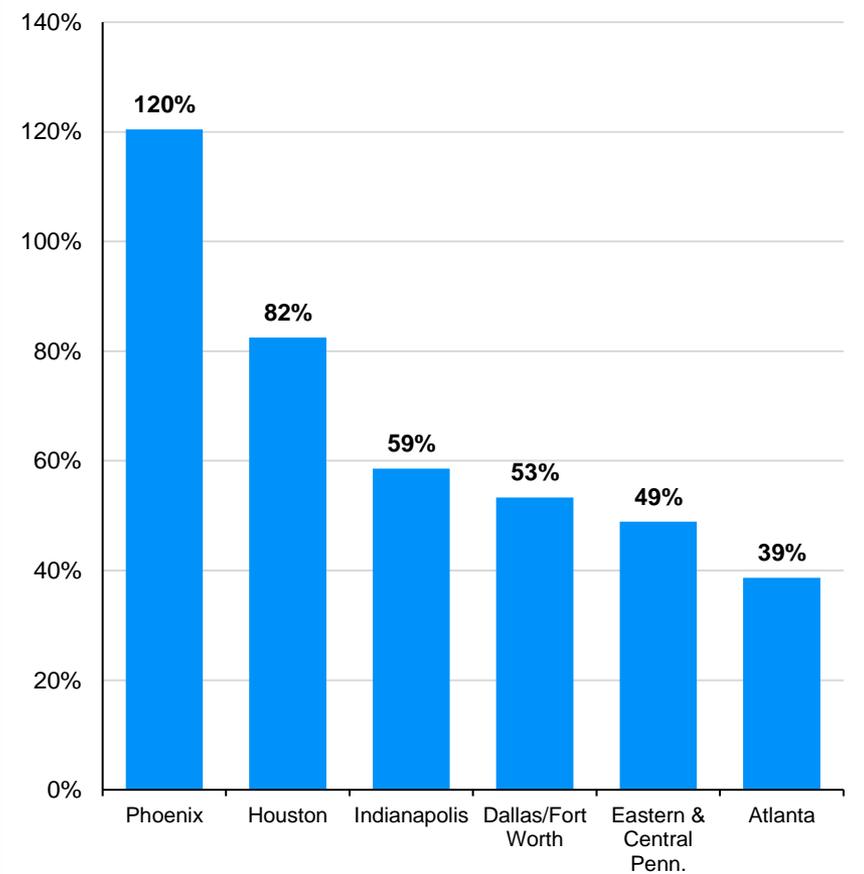
# U.S. real estate: Industrial

Real estate

### U.S. industrial construction activity and vacancy rates 1Q17 – 1Q23



### U.S. cities with highest industrial net absorption Net absorption as a % of total deliveries, 1Q23



Source: JLL, NCREIF, J.P. Morgan Asset Management. "U.S. Industrial Outlook – 1Q 2023," JLL, April 2023. Data are based on availability as of May 31, 2023.

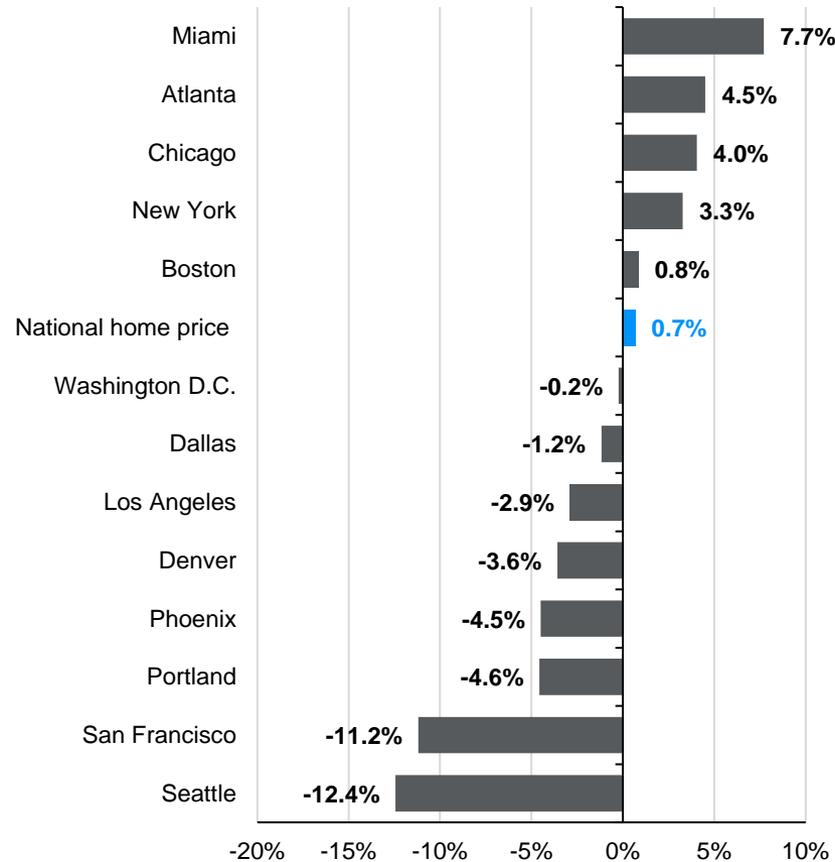


# U.S. real estate: Residential

Real estate

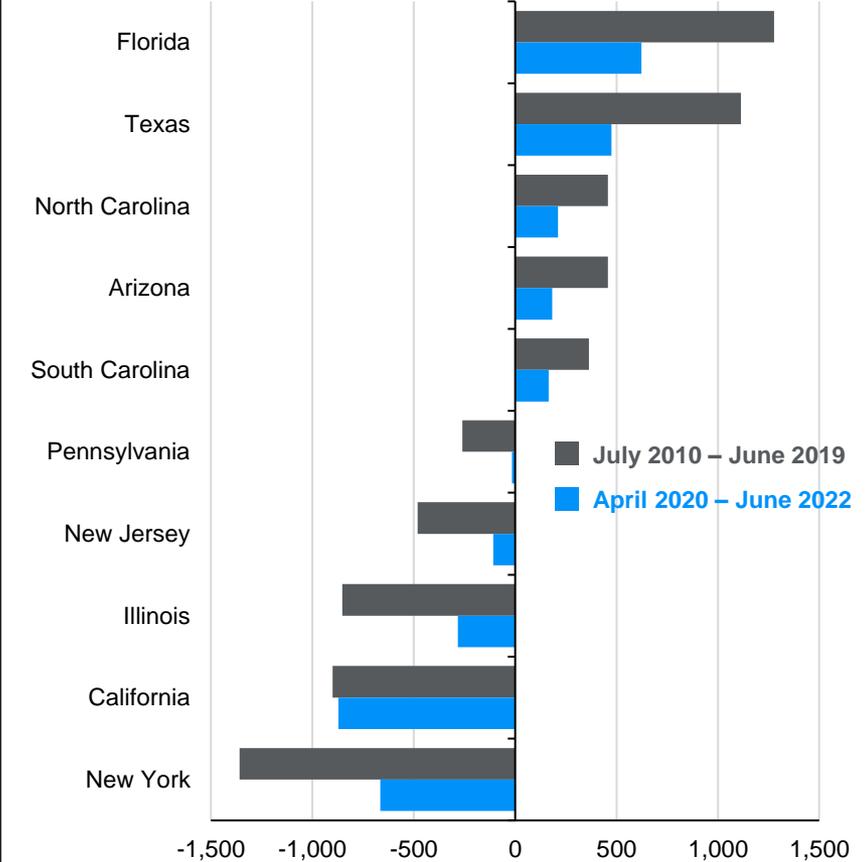
## U.S. home price growth by city

S&P Case-Shiller Home Price Index, March 2023, y/y% change



## Cumulative net domestic migration\*

Top and bottom 5 states, thousands of people



Source: FactSet, Standard & Poor's, Robert Shiller, U.S. Census Bureau, J.P. Morgan Asset Management. \*Net domestic migration is defined as total in-migration less total outmigration. Data are based on availability as of May 31, 2023.

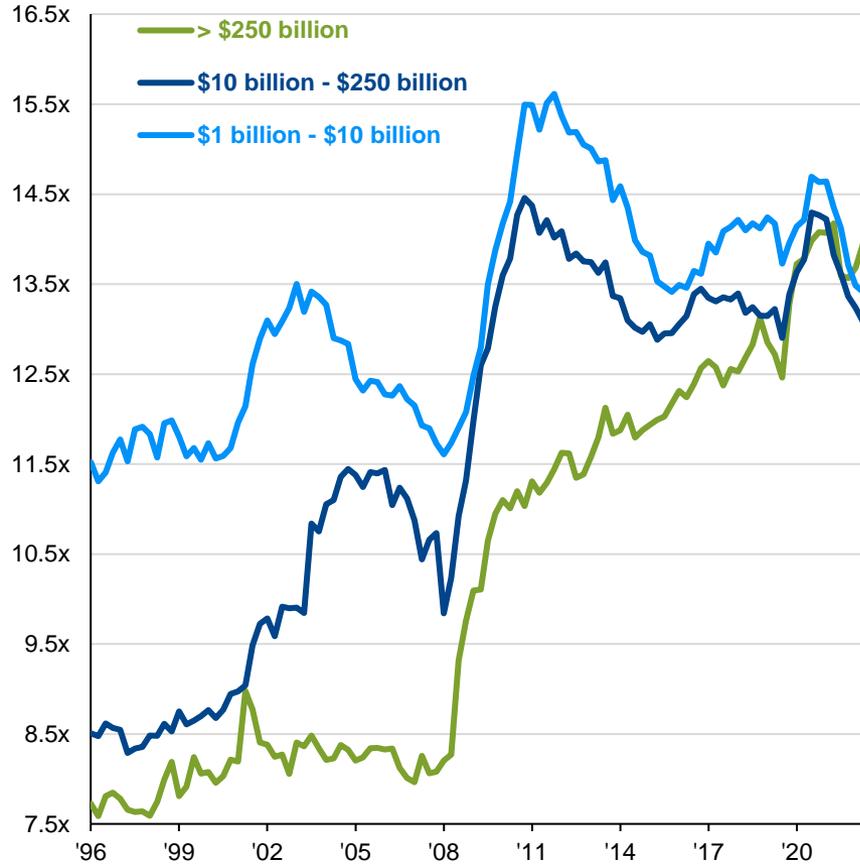


# U.S. regional banks and commercial real estate

Real estate

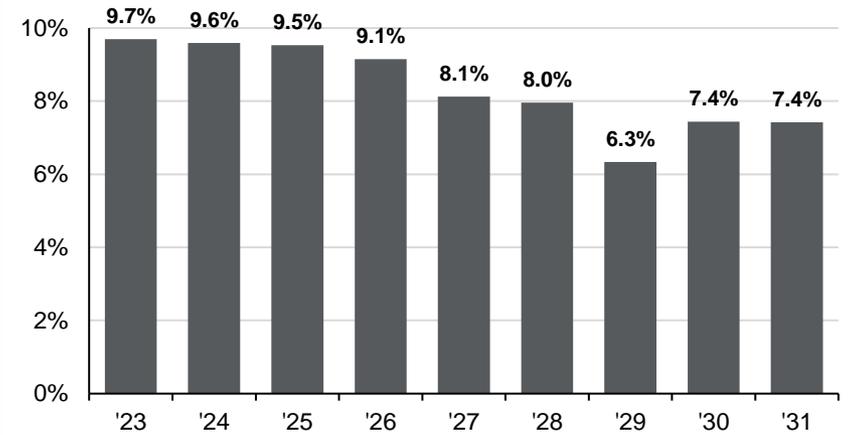
## Tier 1 risk-based capital ratios by asset size

Percentage, quarterly, 4Q96 – 4Q22



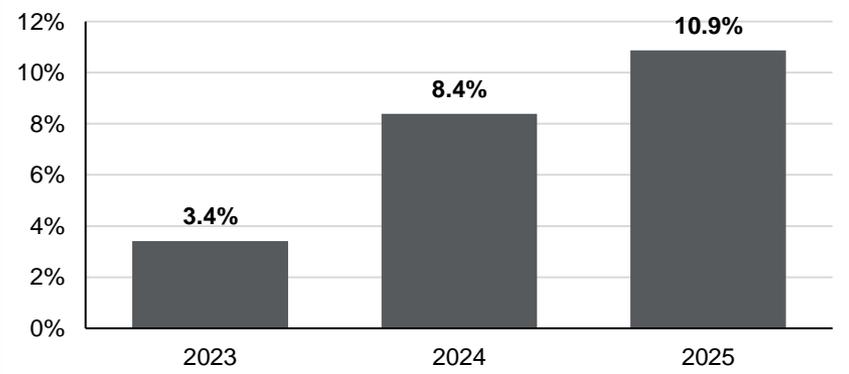
## Office real estate lease expiration

Expiration by year as % of total square feet



## Office real estate debt maturity

% of current total debt balance



Source: FDIC, SNL, J.P. Morgan Global Economic Research, J.P. Morgan Asset Management. Office real estate data are for large U.S. REITs. Data are based on availability as of May 31, 2023.

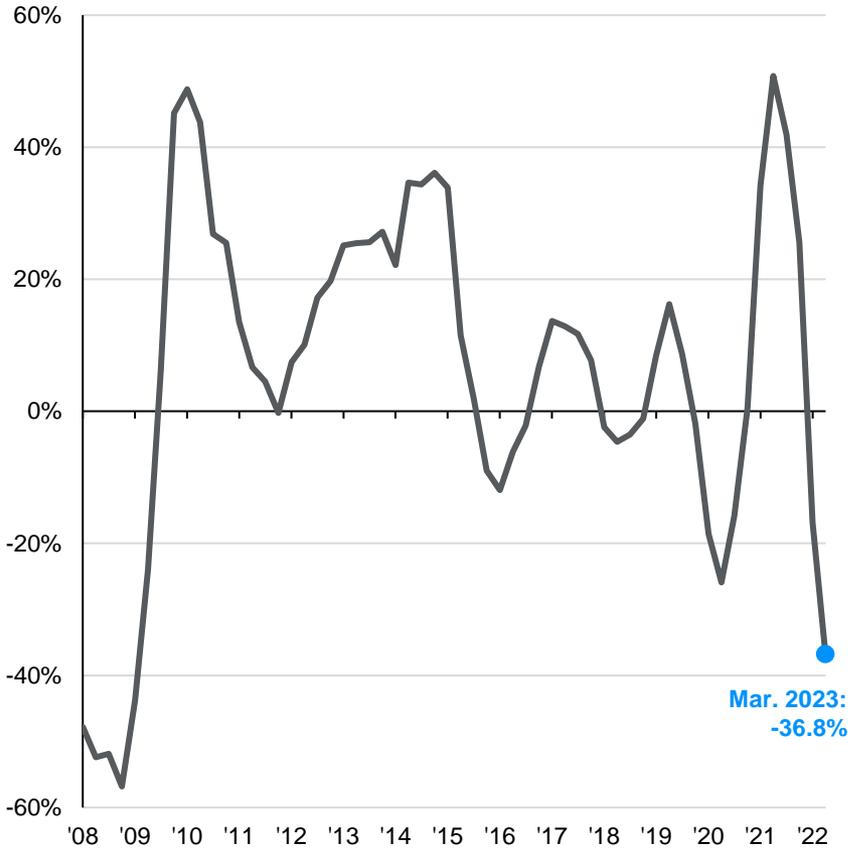


# Europe real estate: Transaction volumes

Real estate

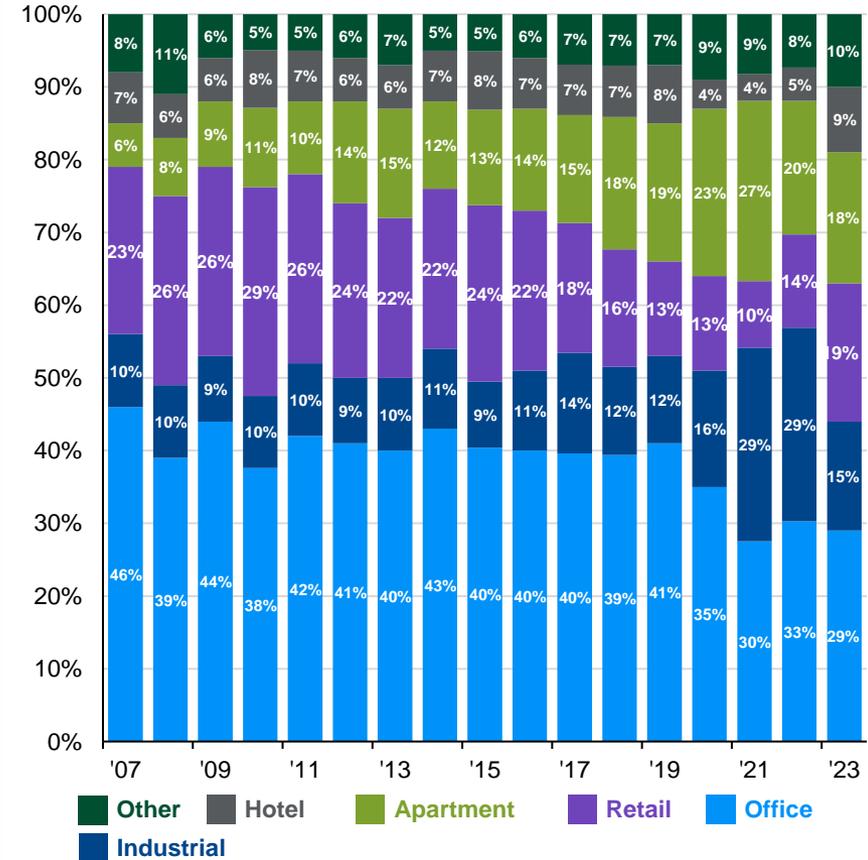
### European transaction volumes

Rolling year-over-year % change, 4Q08 – 1Q23



### European transaction volumes by property type

2007 – 1Q23



Source: RCA, J.P. Morgan Asset Management. Percentages may not sum to 100 due to rounding. Data are based on availability as of May 31, 2023.

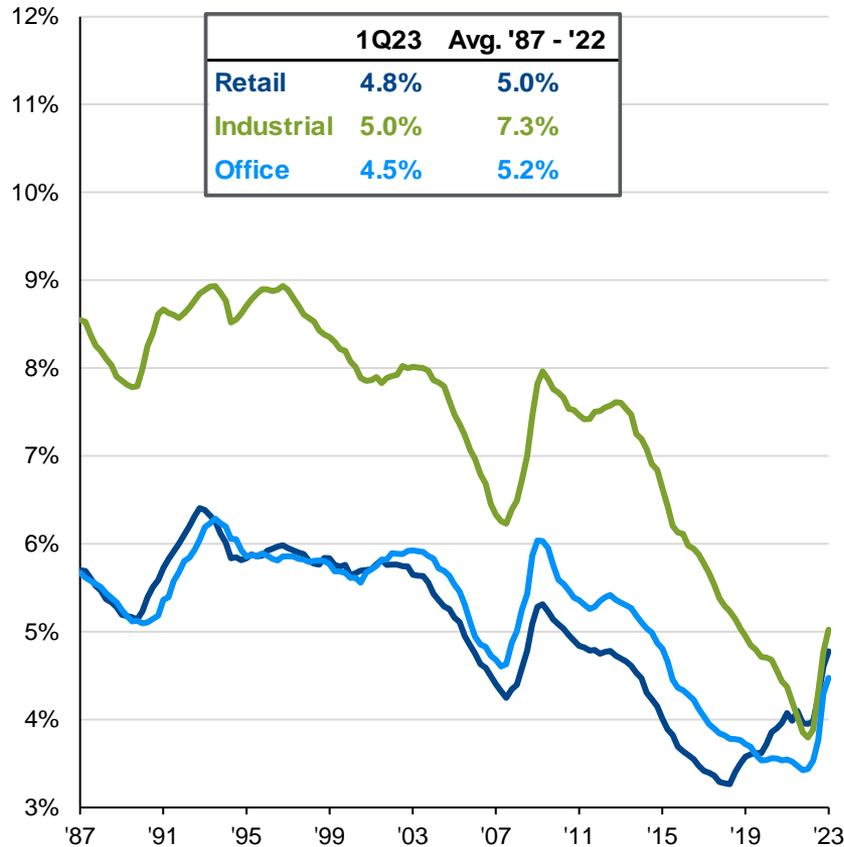


# Europe real estate: Yield and income

Real estate

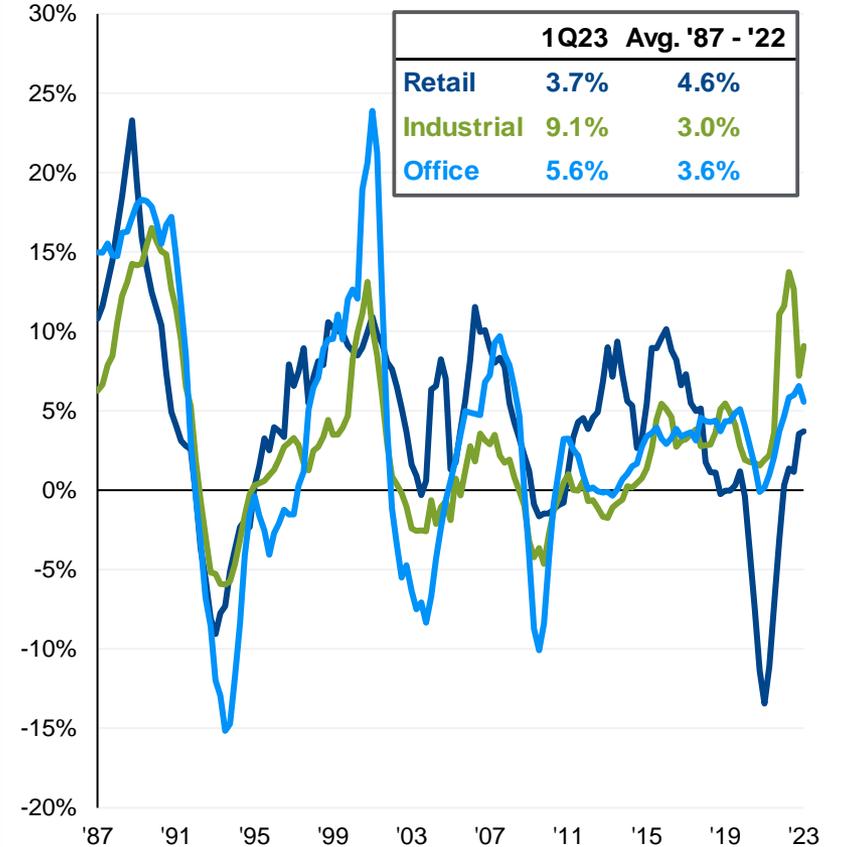
## Net yield by property type\*

1987 – 1Q23



## Rent growth by property type

Year-over-year % change, 1987 – 1Q23



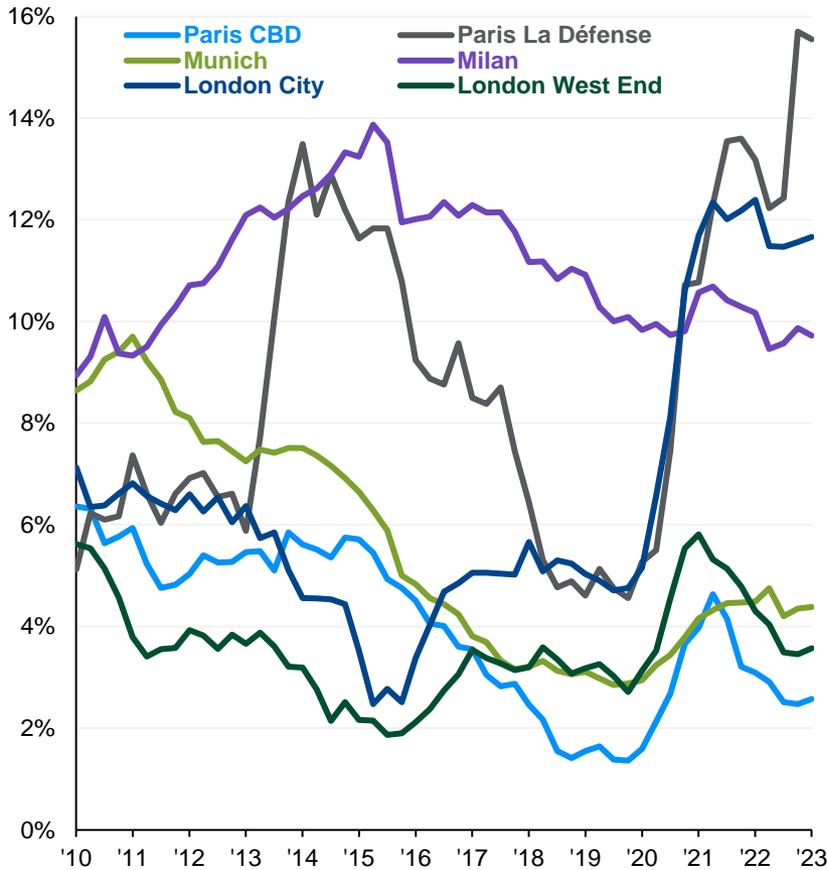
Source: CBRE ERIX, J.P. Morgan Asset Management. \*CBRE EU15 net yield by sector. Data are based on availability as of May 31, 2023.



# Europe real estate: Office vacancy rates

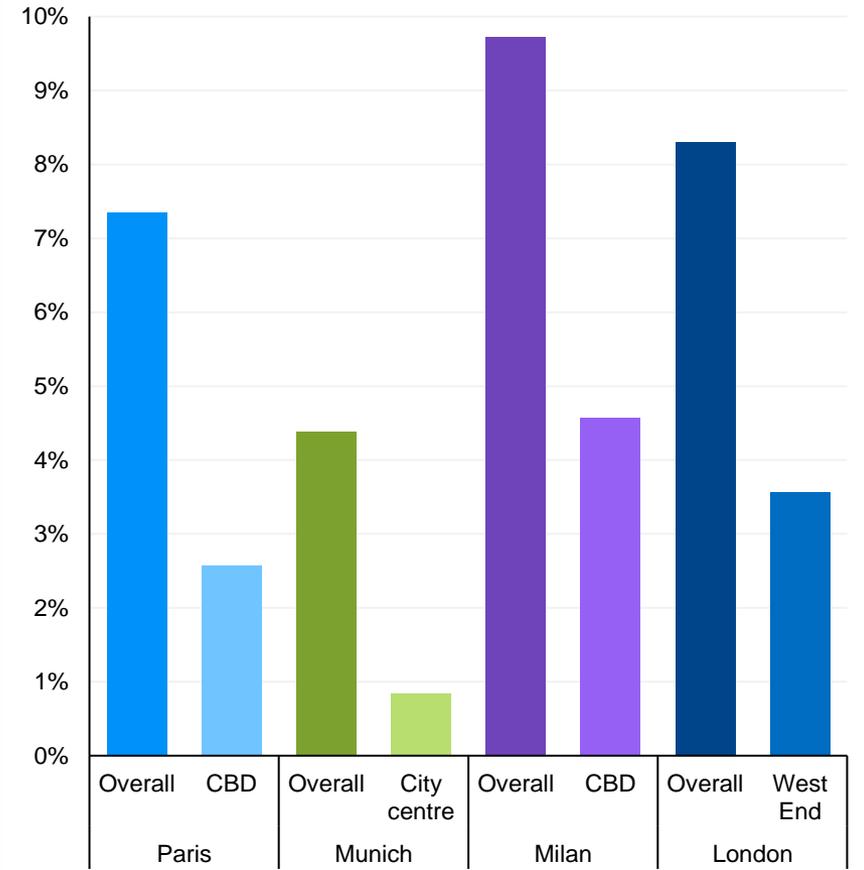
Real estate

### Office vacancy rates by city 2010 – 1Q23



### Office vacancy rates within cities

Total city vacancy rates vs. central business districts\*, 1Q23



Source: CBRE/ERIX, J.P. Morgan Asset Management. \*Includes both central business districts (CBDs) and prime areas. Data are based on availability as of May 31, 2023.

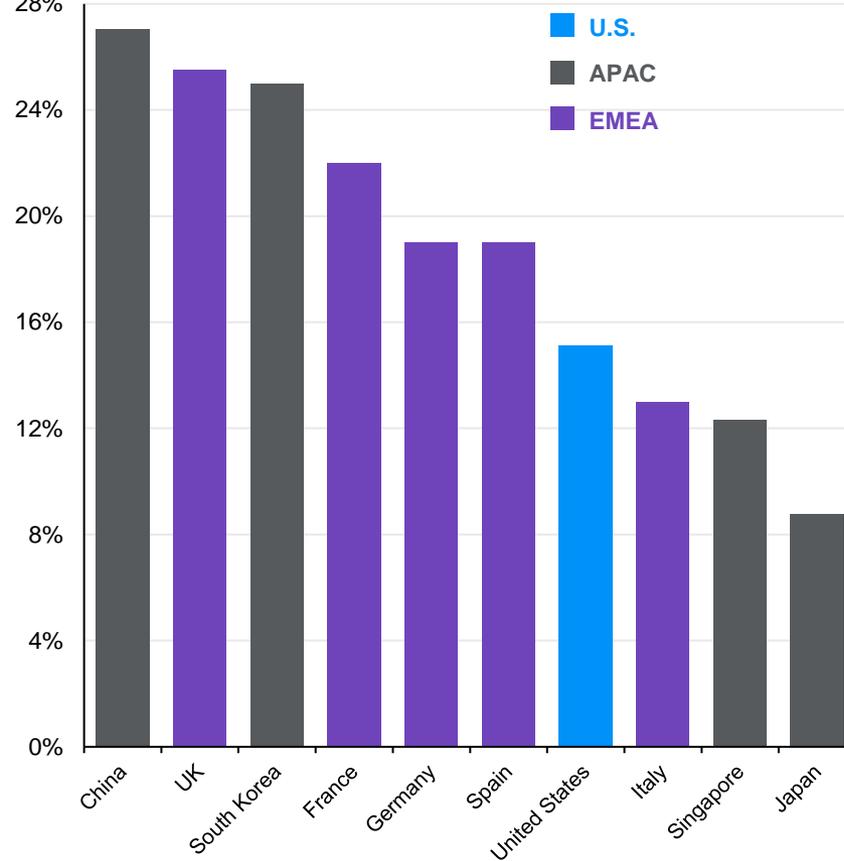


# Global real estate: Retail

Real estate

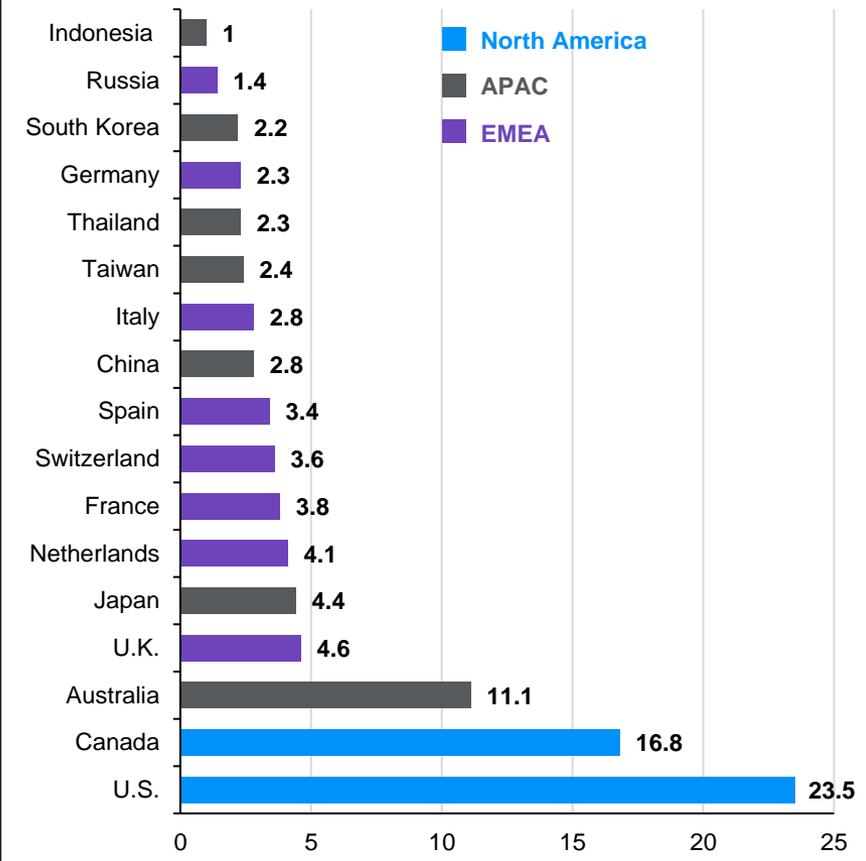
## Global online retail sales

Percent of total retail sales, 4Q22\*  
28%



## Retail real estate per capita

Square feet per person



Source: (Left) Australian Bureau of Statistics, Centre for Retail Research (Germany, France, Italy, Spain), Korean Statistical Information Service, METI (Japan), National Bureau of Statistics (China), ONS (UK), Statistics of Singapore, U.S. Census Bureau. \*All data are as of 1Q23 except Japan, France, Germany, Spain and Italy, which are as of 2021. (Right) Statista, J.P. Morgan Asset Management. Retail space per capita per country data was published in November 2020 and represents retail square footage per person in 2018. Data are based on availability as of May 31, 2023.

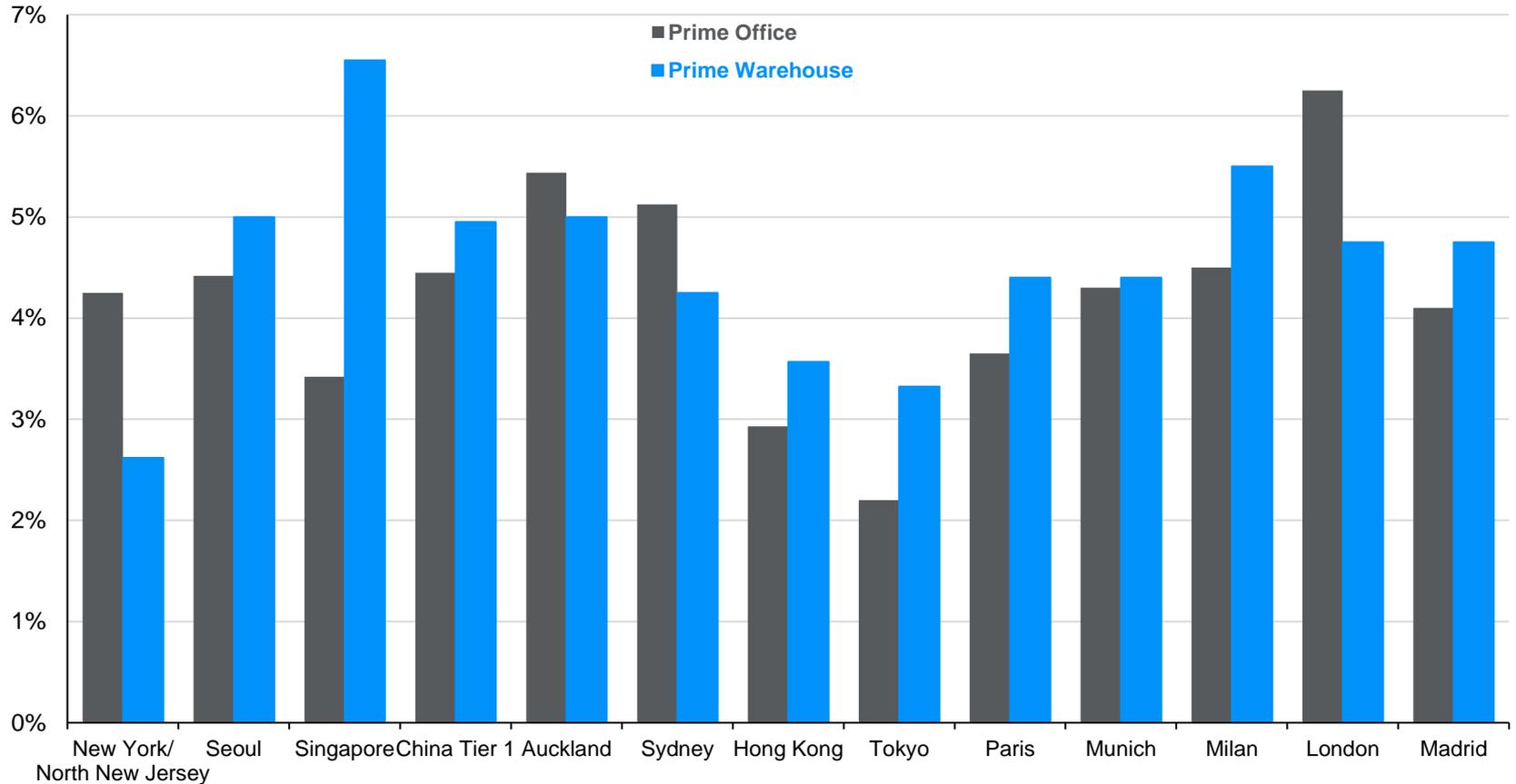


# Global real estate: Logistics

Real estate

## Global office and logistics pricing

Yields, 1Q 2023



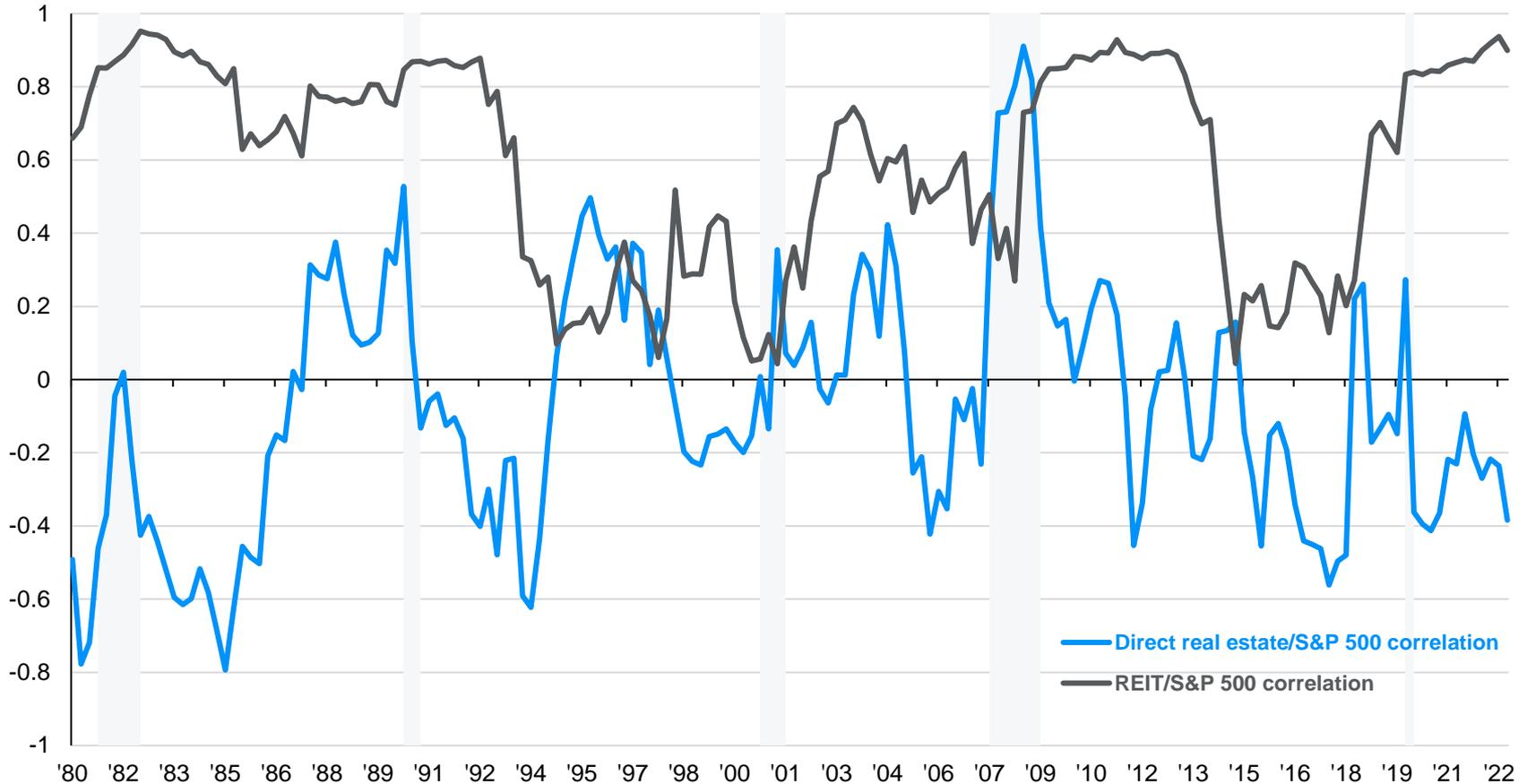
Sources: CBRE, JLL, J.P. Morgan Asset Management. London is South East for office. Data are based on availability as of May 31, 2023.



# U.S. REITs and real estate

Real estate

## U.S. REITs, real estate and equities 12-quarter rolling correlations, total return



Source: NAREIT, NCREIF, Standard & Poor's, FactSet, J.P. Morgan Asset Management. Real estate investment trusts (REITs). Indices do not include fees or operating expenses and are not available for actual investment. Past performance is not necessarily a reliable indicator for current and future performance. Correlations are as of 4Q22. Data are based on availability as of May 31, 2023.

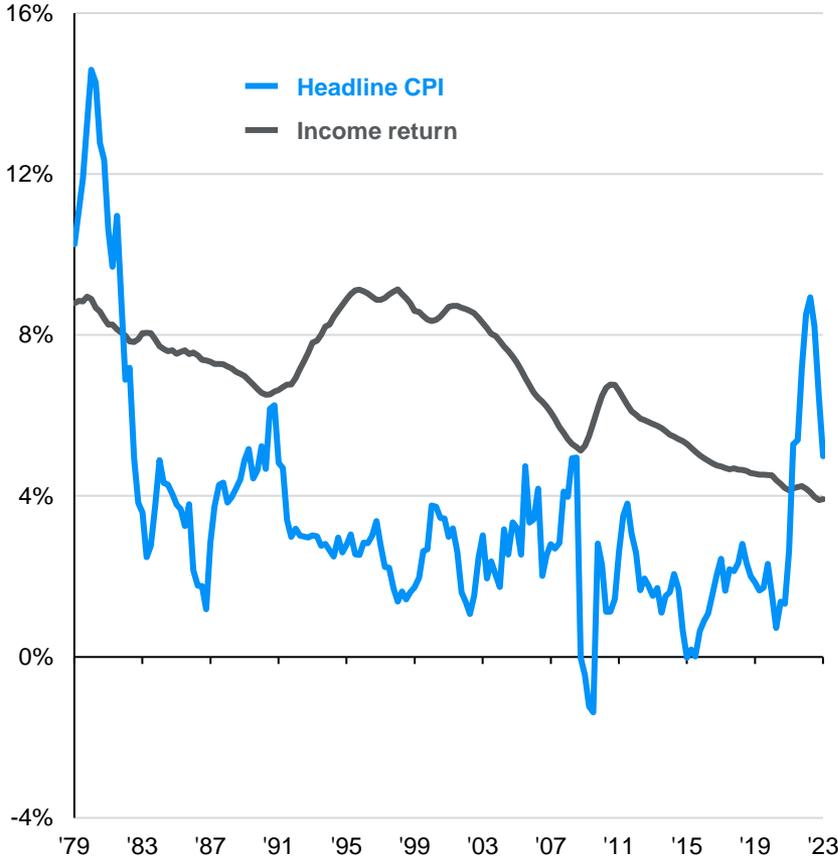


# Real estate and inflation

Real estate

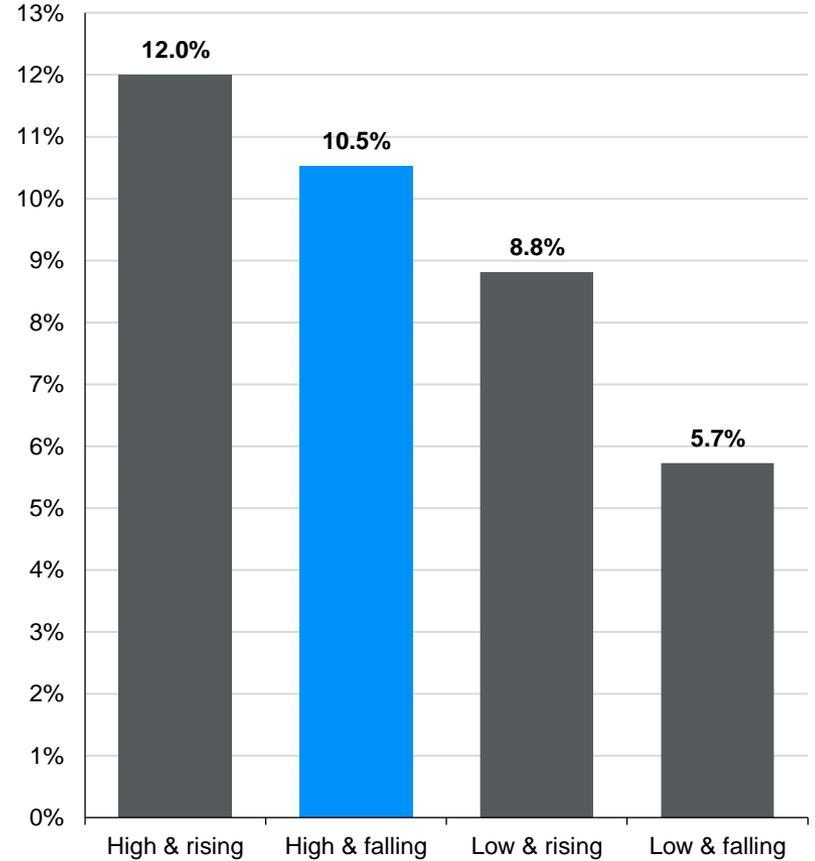
### Real estate income return and inflation

1978 – 1Q23, quarterly, year-over-year (%)



### Real estate performance in different inflationary regimes

1978 – 1Q23, quarterly, headline CPI, NCREIF ODCE Index, y/y %



Source: BLS, NCREIF, FactSet, J.P. Morgan Asset Management. “High” inflation is defined as any year-over-year headline CPI reading above the historical median, while “low” inflation is defined as any year-over-year headline CPI reading below the historical median. The median y/y headline CPI for period between 1978 to 1Q23 is 2.91%. Data are based on availability as of May 31, 2023.



# U.S. REIT sector returns

Real estate

											2013-2022	
2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	YTD '23	Ann.	Vol.
Lodging/Resorts 27.2%	Mfgd. Homes 46.2%	Self Storage 40.6%	Industrial 30.7%	Data Centers 28.4%	Ret. Free Standing 13.9%	Mfgd. Homes 49.1%	Data Centers 21.0%	Regional Malls 92.1%	Ret. Free Standing -6.5%	Data Centers 11.2%	Mfgd. Homes 17.0%	Regional Malls 30.1%
Mfgd. Homes 10.5%	Apartments 39.6%	Mfgd. Homes 25.6%	Lodging/Resorts 24.3%	Mfgd. Homes 24.9%	Mfgd. Homes 11.4%	Industrial 48.7%	Self Storage 12.9%	Self Storage 79.4%	Shopping Centers -12.5%	Industrial 8.9%	Industrial 14.7%	Lodging/Resorts 28.5%
Self Storage 9.5%	Health Care 33.3%	Apartments 16.5%	Ret. Free Standing 17.0%	Industrial 20.6%	Health Care 7.6%	Data Centers 44.2%	Industrial 12.2%	Shopping Centers 65.1%	Lodging/Resorts -15.3%	Self Storage 5.4%	Self Storage 12.8%	Shopping Centers 27.6%
Industrial 7.4%	Regional Malls 32.6%	Ret. Free Standing 5.9%	Mfgd. Homes 14.2%	All Equity 8.7%	Apartments 3.7%	Office 31.4%	Mfgd. Homes -1.7%	Apartments 63.6%	Health Care -22.2%	Apartments 2.3%	Ret. Free Standing 7.9%	Ret. Free Standing 20.8%
Ret. Free Standing 7.3%	Lodging/Resorts 32.5%	Shopping Centers 4.7%	Office 13.2%	Lodging/Resorts 7.2%	Self Storage 2.9%	All Equity 28.7%	All Equity -5.1%	Industrial 62.0%	Regional Malls -22.9%	Lodging/Resorts 2.1%	Apartments 7.2%	Health Care 20.5%
Office 5.6%	Self Storage 31.4%	Regional Malls 4.2%	All Equity 8.6%	Office 5.2%	Industrial -2.5%	Apartments 26.3%	Health Care -9.9%	Mfgd. Homes 42.0%	All Equity -24.9%	Health Care 0.9%	All Equity 7.1%	Self Storage 20.2%
Shopping Centers 5.0%	Shopping Centers 30.0%	All Equity 2.8%	Health Care 6.4%	Self Storage 3.7%	All Equity -4.0%	Shopping Centers 25.0%	Ret. Free Standing -10.5%	All Equity 41.3%	Self Storage -26.7%	All Equity -2.3%	Shopping Centers 3.9%	Industrial 18.2%
All Equity 2.9%	All Equity 28.0%	Industrial 2.6%	Shopping Centers 3.7%	Apartments 3.7%	Regional Malls -7.0%	Ret. Free Standing 24.8%	Apartments -15.3%	Data Centers 25.5%	Data Centers -28.0%	Ret. Free Standing -4.2%	Health Care 2.8%	Office 16.8%
Regional Malls -1.0%	Office 25.9%	Office 0.3%	Apartments 2.9%	Ret. Free Standing 3.1%	Lodging/Resorts -12.8%	Health Care 21.2%	Office -18.4%	Office 22.0%	Mfgd. Homes -28.3%	Mfgd. Homes -7.0%	Lodging/Resorts 2.7%	Apartments 16.7%
Apartments -6.2%	Industrial 21.0%	Health Care -7.2%	Regional Malls -5.2%	Health Care 0.9%	Data Centers -14.1%	Lodging/Resorts 15.6%	Lodging/Resorts -23.6%	Ret. Free Standing 19.7%	Industrial -28.6%	Shopping Centers -8.9%	Office 1.0%	Mfgd. Homes 15.6%
Health Care -7.1%	Ret. Free Standing 9.7%	Lodging/Resorts -24.4%	Self Storage -8.1%	Regional Malls -2.7%	Office -14.5%	Self Storage 13.7%	Shopping Centers -27.6%	Lodging/Resorts 18.2%	Apartments -32.0%	Regional Malls -9.1%	Regional Malls -0.1%	All Equity 14.9%
Data Centers N/A	Data Centers N/A	Data Centers N/A	Data Centers N/A	Shopping Centers -11.4%	Shopping Centers -14.5%	Regional Malls -9.1%	Regional Malls -37.2%	Health Care 16.3%	Office -37.6%	Office -24.1%	Data Centers N/A	Data Centers N/A

Sources: FTSE NAREIT, FactSet, J.P. Morgan Asset Management.  
 All indices are from FTSE NAREIT. Mfgd. Homes represents manufactured homes.  
 Data are based on availability as of May 31, 2023.



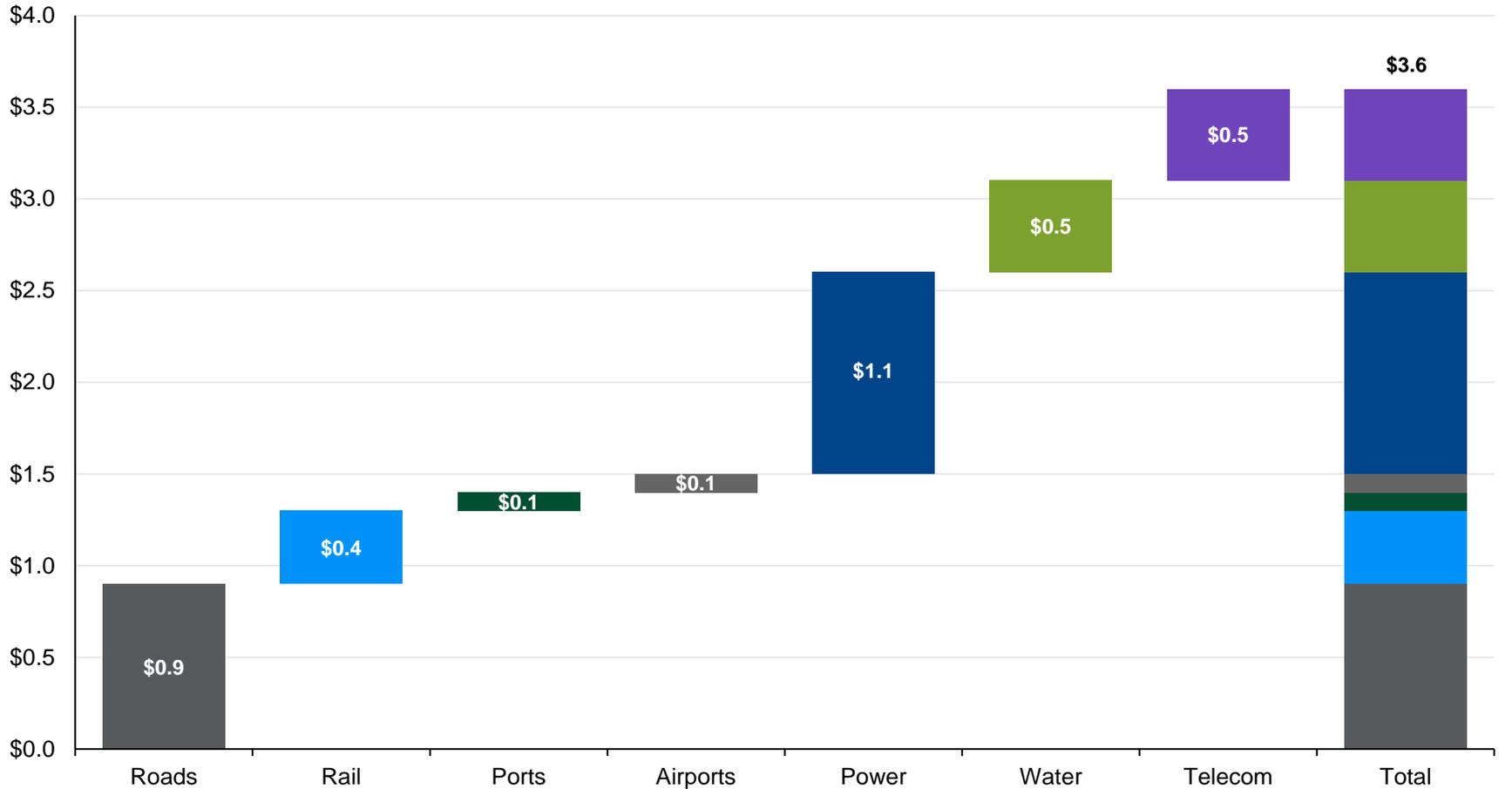
# Global infrastructure investment

GTA U.S. 27

## Average annual infrastructure need

USD trillions, constant 2017 dollars

Infrastructure



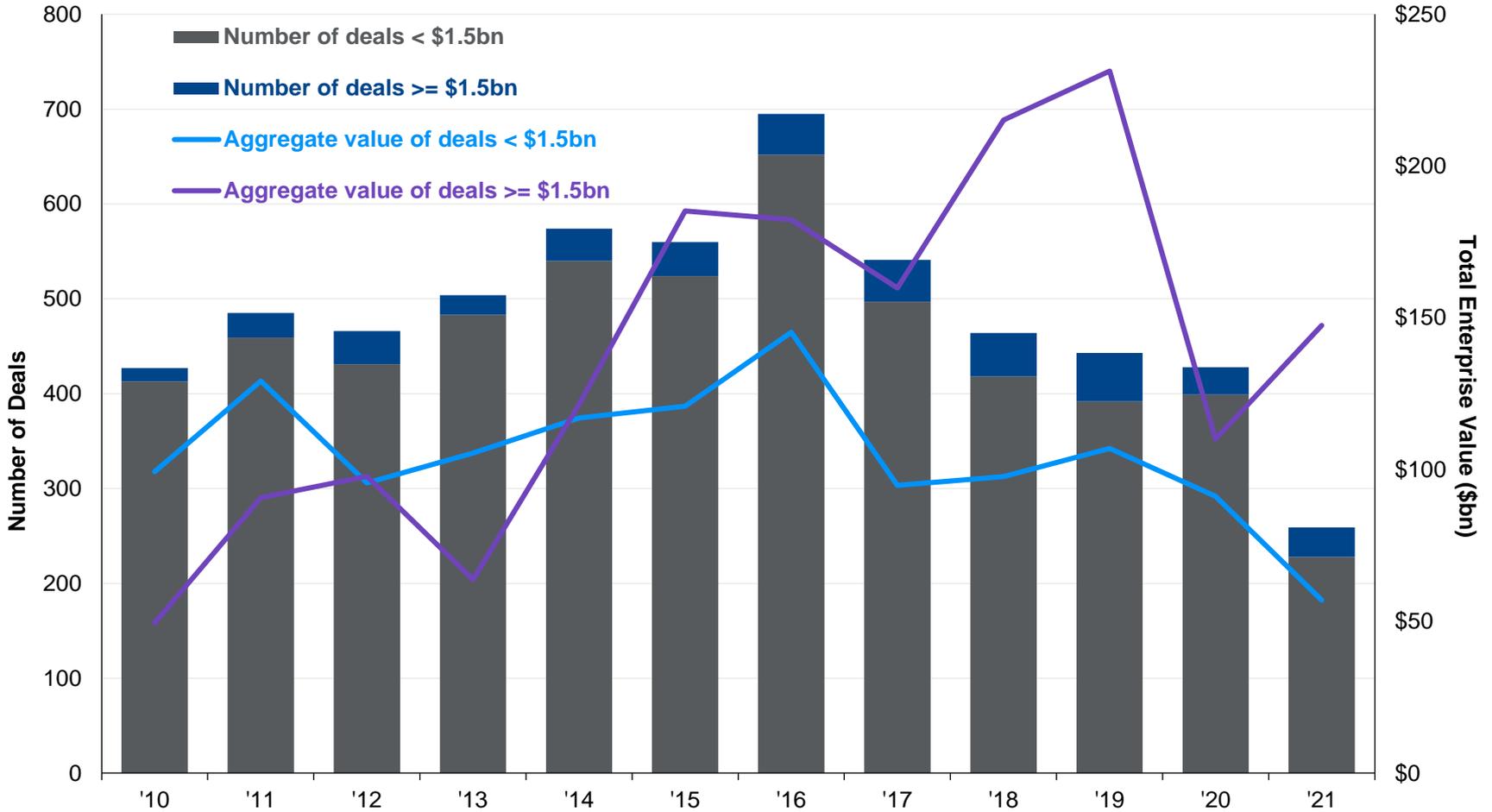
Source: McKinsey Global Institute, J.P. Morgan Asset Management.  
Data are based on availability as of May 31, 2023.



# Infrastructure transactions

Infrastructure

### Infrastructure deal count and value



Source: Prequin, J.P. Morgan Asset Management. Transaction data are as of September 2021. Data are based on availability as of May 31, 2023.

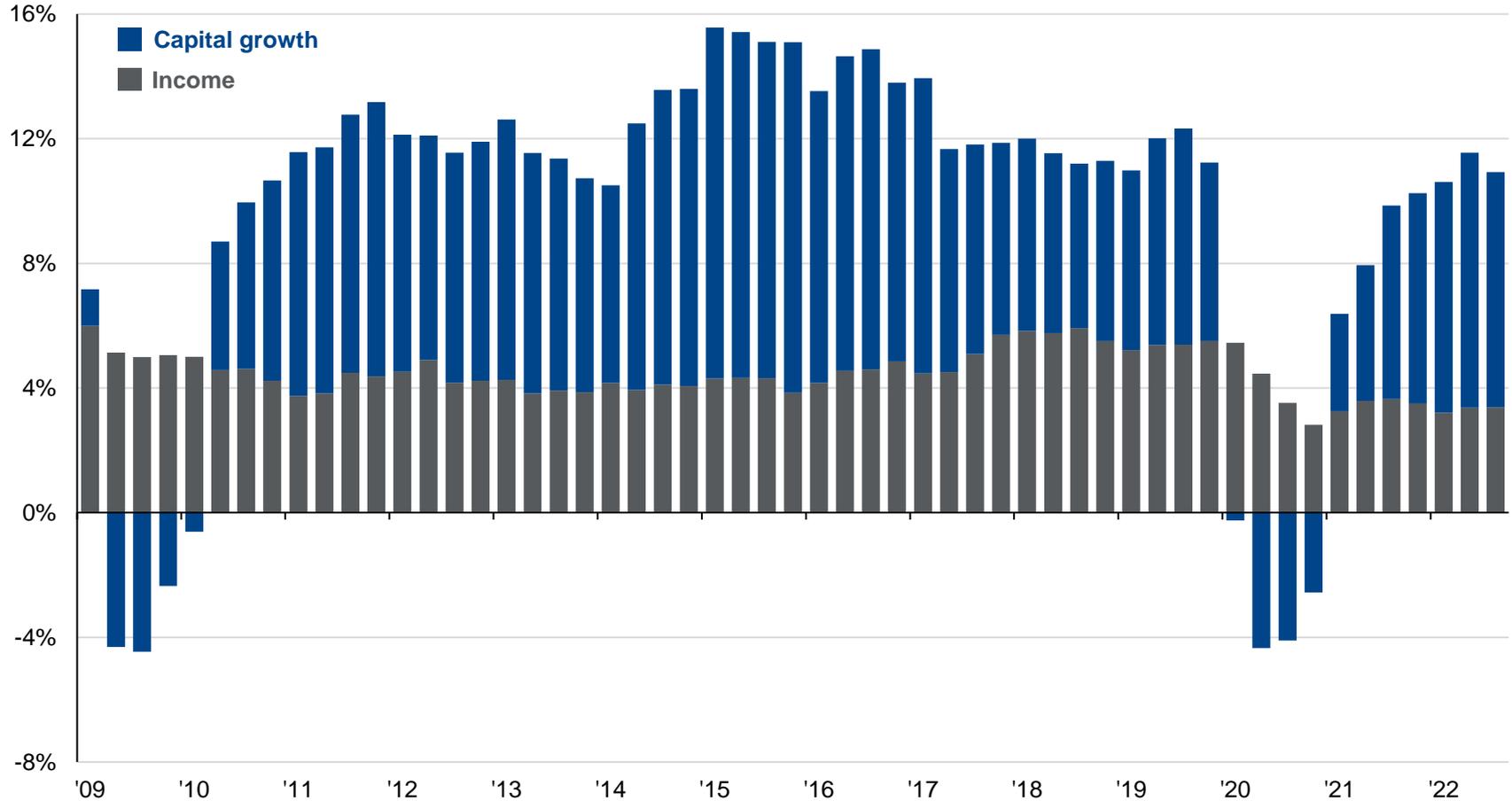


# Sources of global infrastructure returns

Infrastructure

## Global core infrastructure returns

Rolling 4-quarter returns from income and capital appreciation



Source: MSCI, J.P. Morgan Asset Management.

Infrastructure returns represented by the MSCI Global Quarterly Infrastructure Asset Index. Data show rolling one-year returns from income and capital growth. The chart shows the full index history, beginning in 1Q09, and ending in 4Q22. Past performance is not indicative of future results. Alternative investments carry more risk than traditional investments and are recommended only for long-term investment. Some alternative investments may be highly leveraged and rely on speculative investments that can magnify the potential for loss or gain. Diversification does not guarantee investment returns or eliminate the risk of loss. Data are based on availability as of May 31, 2023.

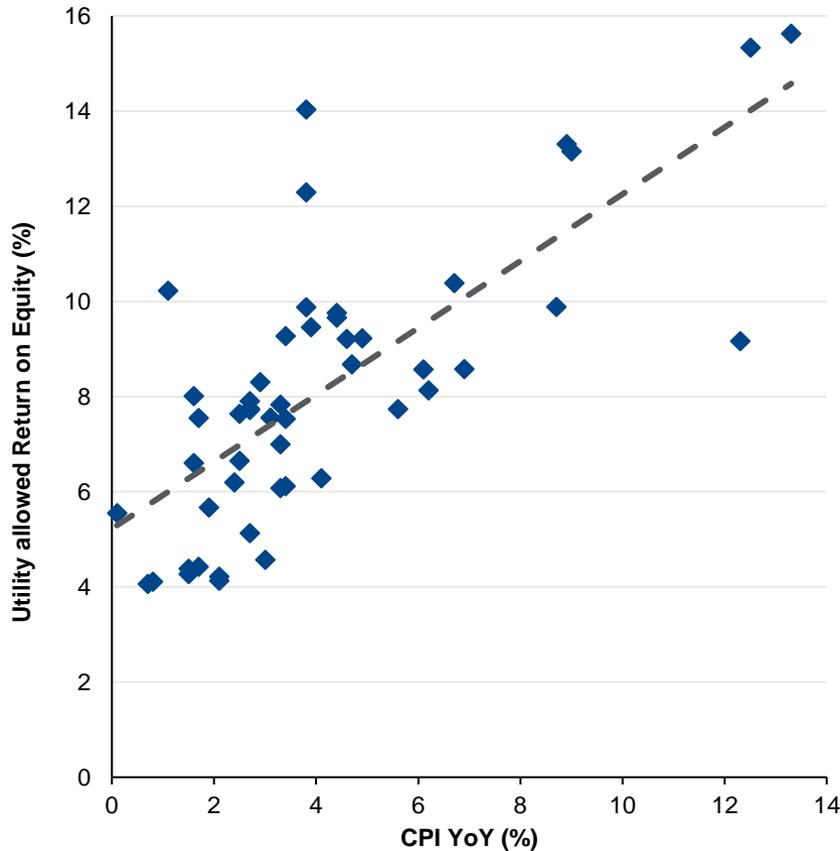


# Utility profitability and household spending

Infrastructure

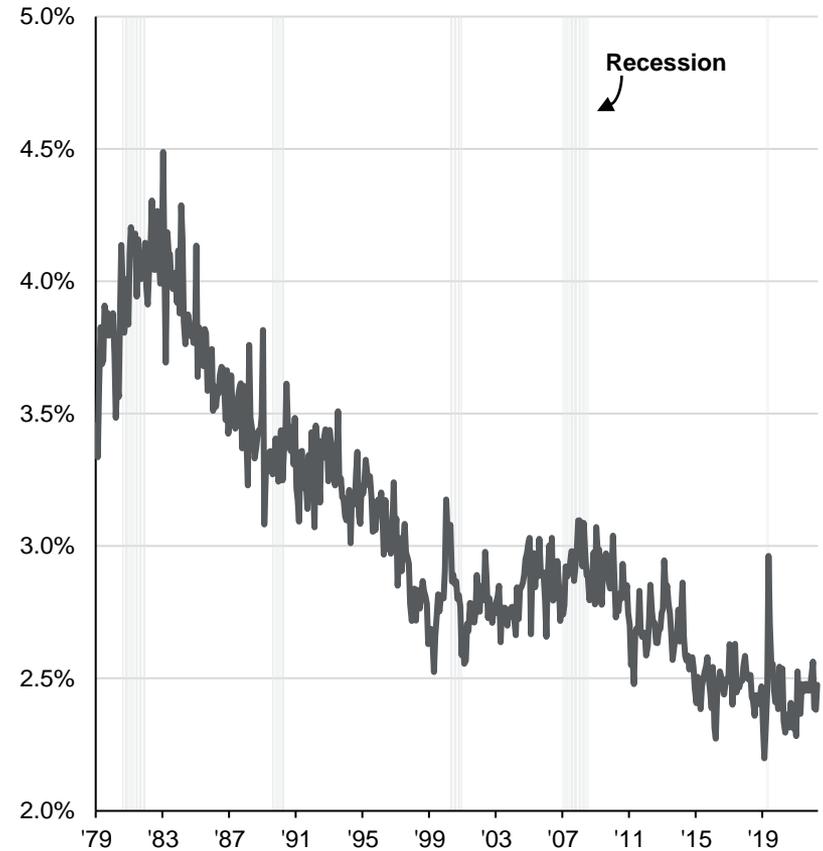
### U.S. utilities allowed returns versus inflation

Average allowed return on equity\*



### Household utility spending

Household utility spending % of personal consumption expenditures



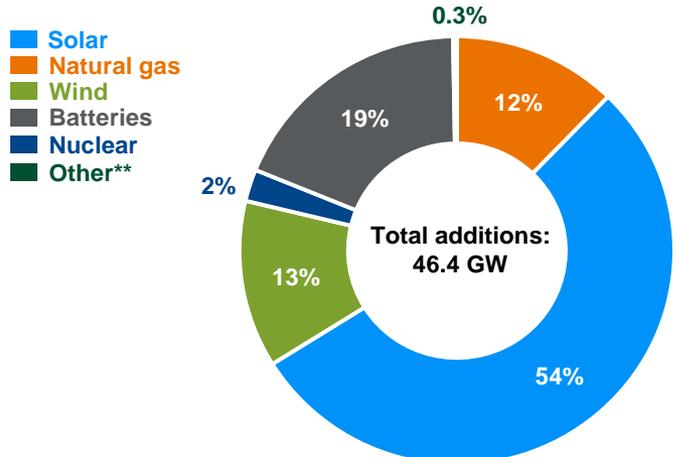
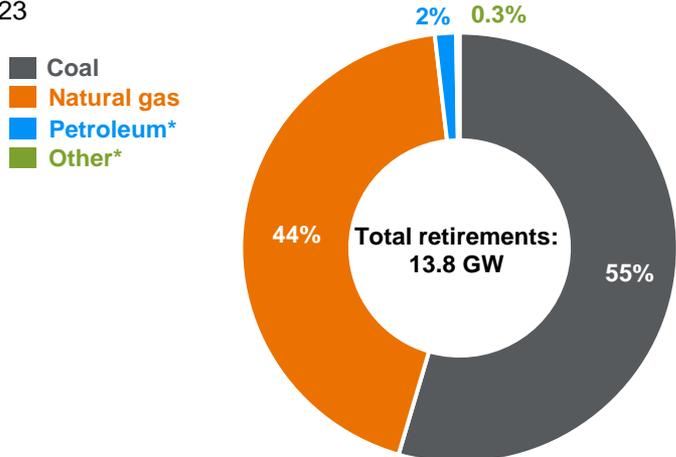
Source: Bloomberg, Bureau of Economic Analysis, SNL, AEU, J.P. Morgan Asset Management. Data represent average allowed return on equities (RoEs) for Electricity and Natural Gas Utilities, from 1970 through December 2020, and annual inflation from 1968 through 2018. \*Return on equity is lagged by 2 years. Utility spending is as of January 2023. Data are based on availability as of May 31, 2023.



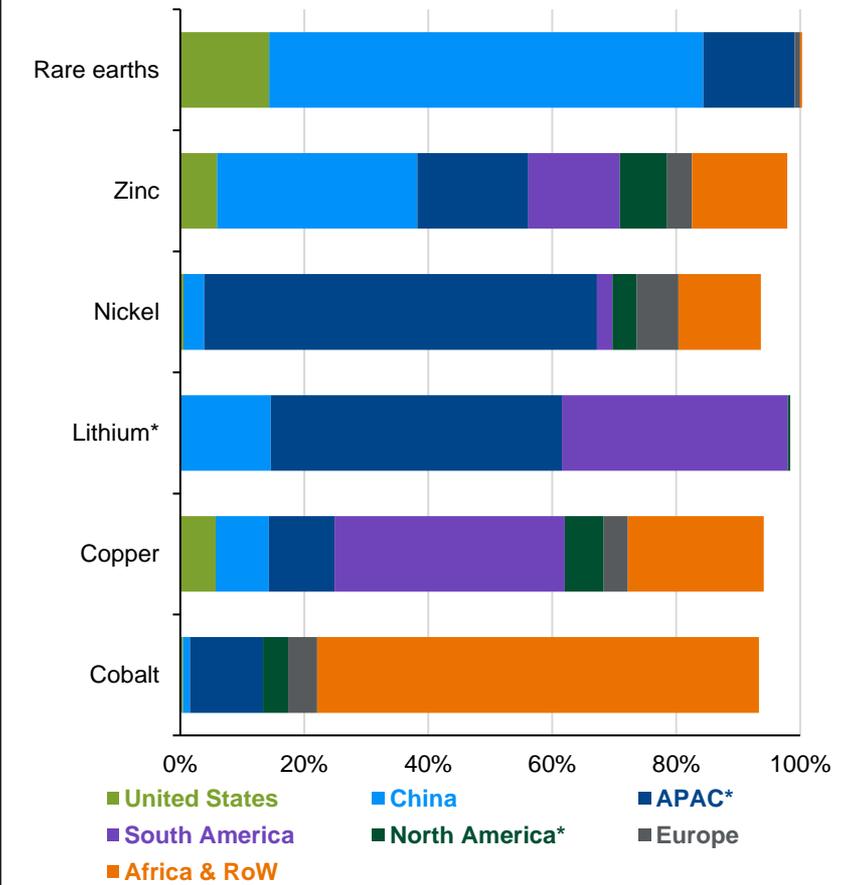
# U.S. electricity and the energy transition

Infrastructure

### Planned U.S. electricity generating capacity 2023



### Share of global commodities mining production by region 2022



Source: EIA, U.S. Geological Survey, U.S. Department of the Interior, J.P. Morgan Asset Management. (Left) 2023 planned capacity retirements and additions are from the March 2023 Monthly Electric Generator Inventory report published by the EIA and uses net summer capacity to illustrate share of retirements and additions. \*Other retirements include conventional hydroelectric, wood/wood/ waste biomass, landfill gas, onshore wind turbine, batteries, and other gases. \*\*Other additions include batteries, geothermal, conventional hydroelectric, petroleum, biomass and landfill gas. (Right) \*U.S. lithium mining production is excluded in this analysis in order to protect individual company information. North America excludes the U.S. APAC excludes China. Data are based on availability as of May 31, 2023.

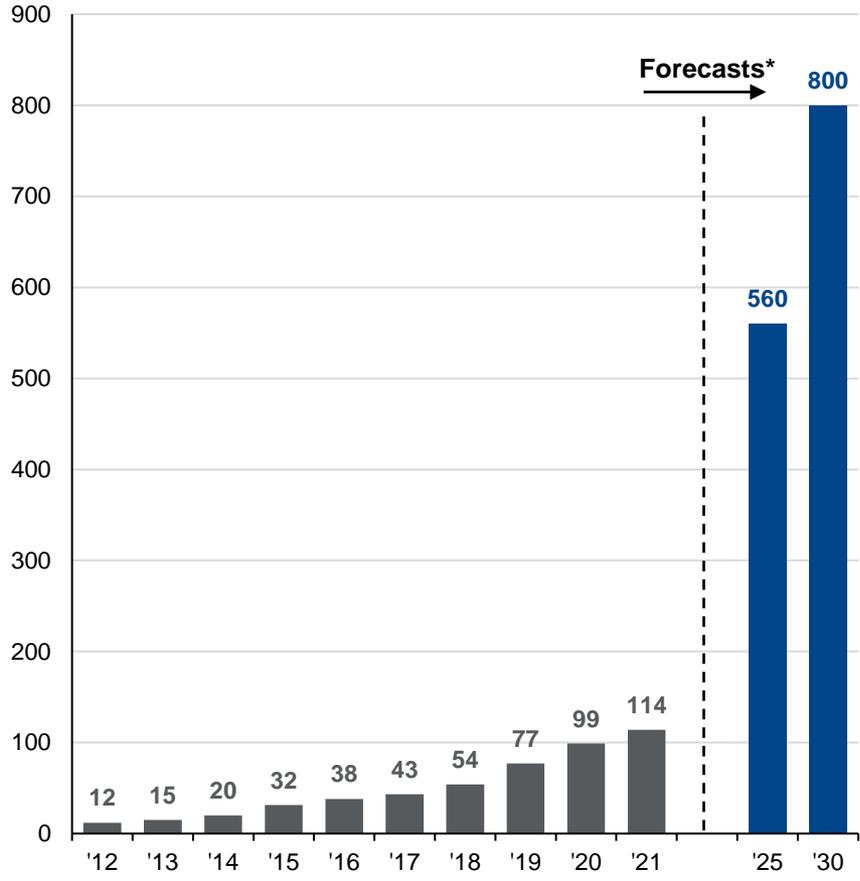


# Renewable energy infrastructure

Infrastructure

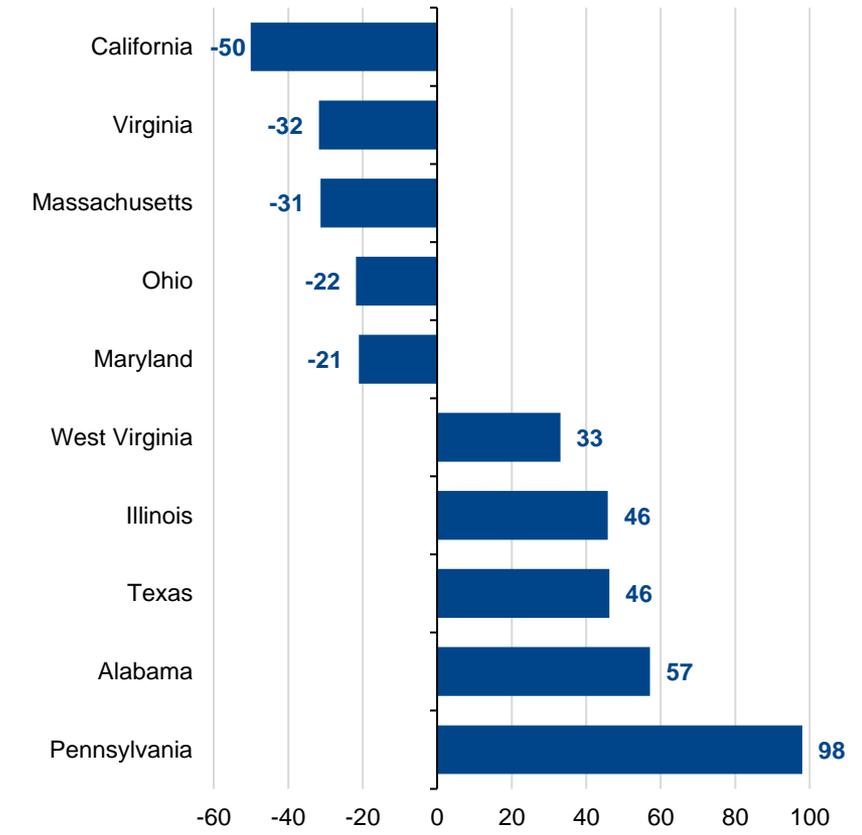
### Number of electricity vehicle charging points

In thousands, U.S.



### State power balances

Net electricity generation\*\*, in million MWh, 2021



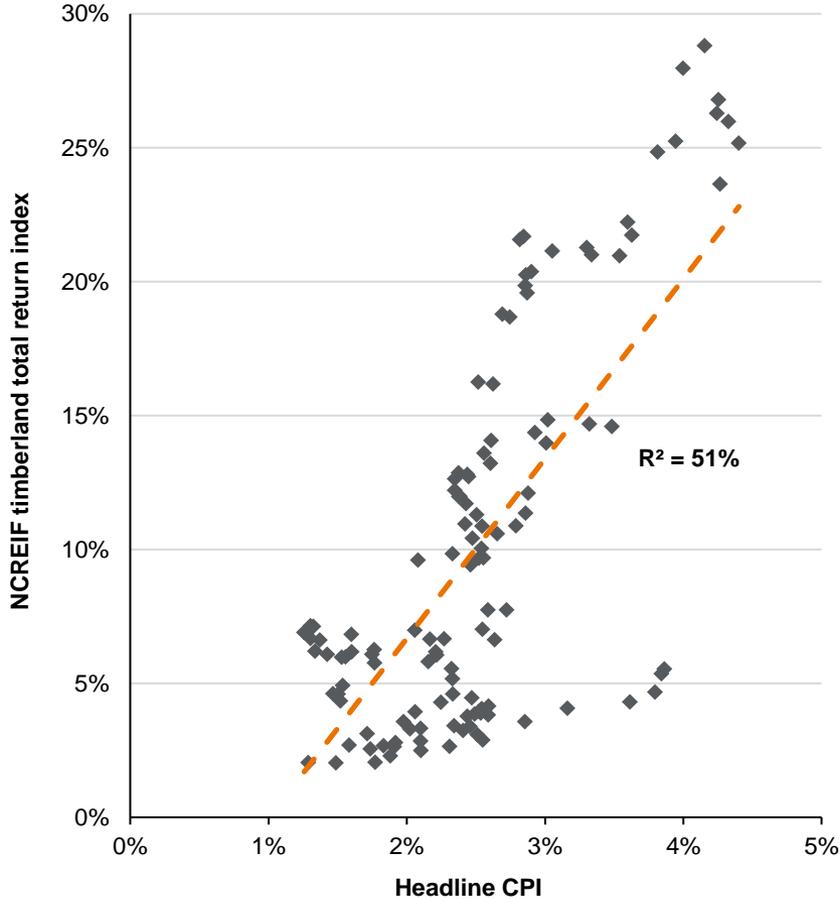
Source: EIA, J.P. Morgan Asset Management. \*Forecasts are from the IEA and are made assuming their "STEPS" outlook. The State Policies Scenario (STEPS) outlook from the IEA does not assume governments will meet announced policy goals and instead looks at what the IEA considers feasible given current progress. \*\*Net electricity generation is calculated as total electricity generation minus total retail sales of electricity. Data are based on availability as of May 31, 2023.



# Forestry, inflation and carbon offsets

## Timber returns and inflation

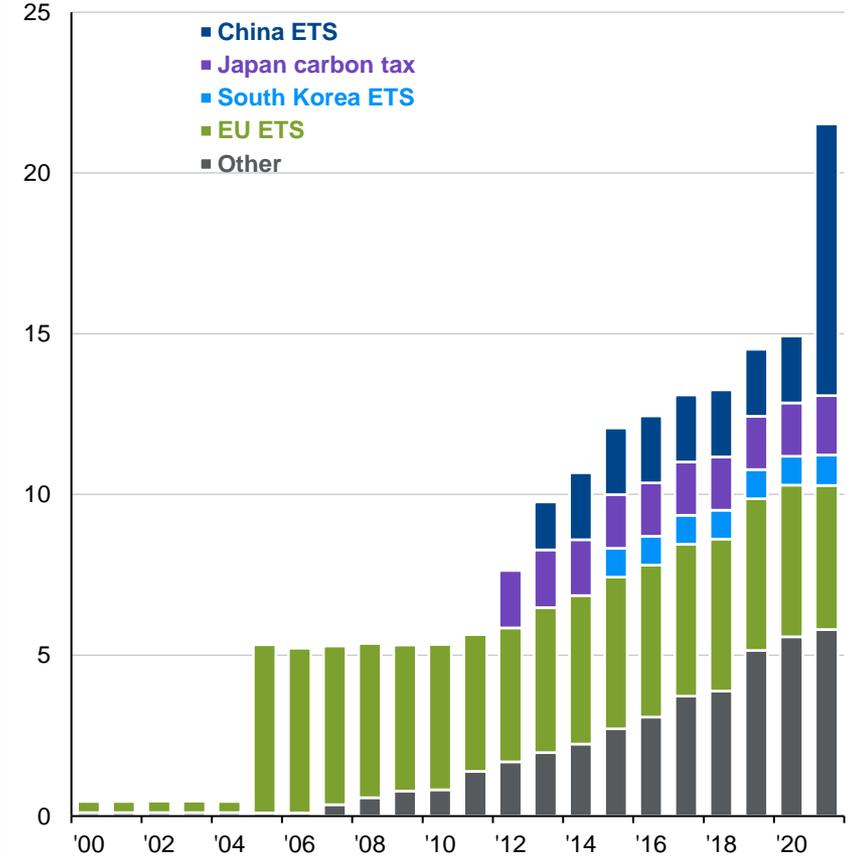
Headline CPI, NCREIF Timberland Index, 5-yr. annualized change



Source: BLS, NCREIF, World Bank, J.P. Morgan Asset Management. Data are based on availability as of May 31, 2023.

## Global emissions covered by carbon pricing initiatives

% of global greenhouse gas emissions



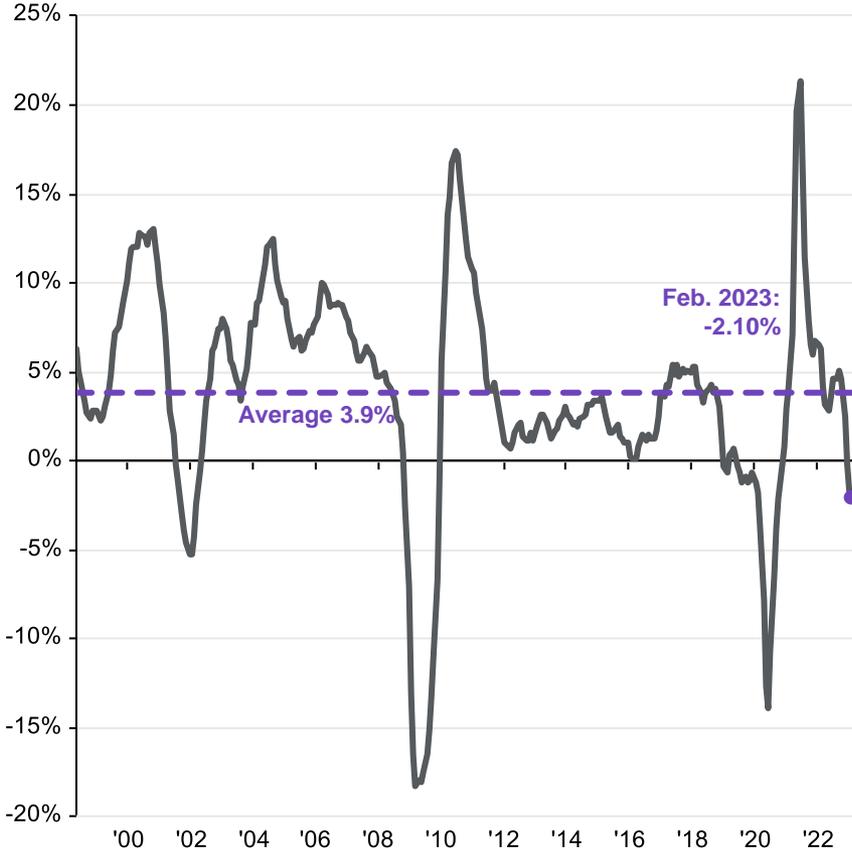


# Global trade

Infrastructure

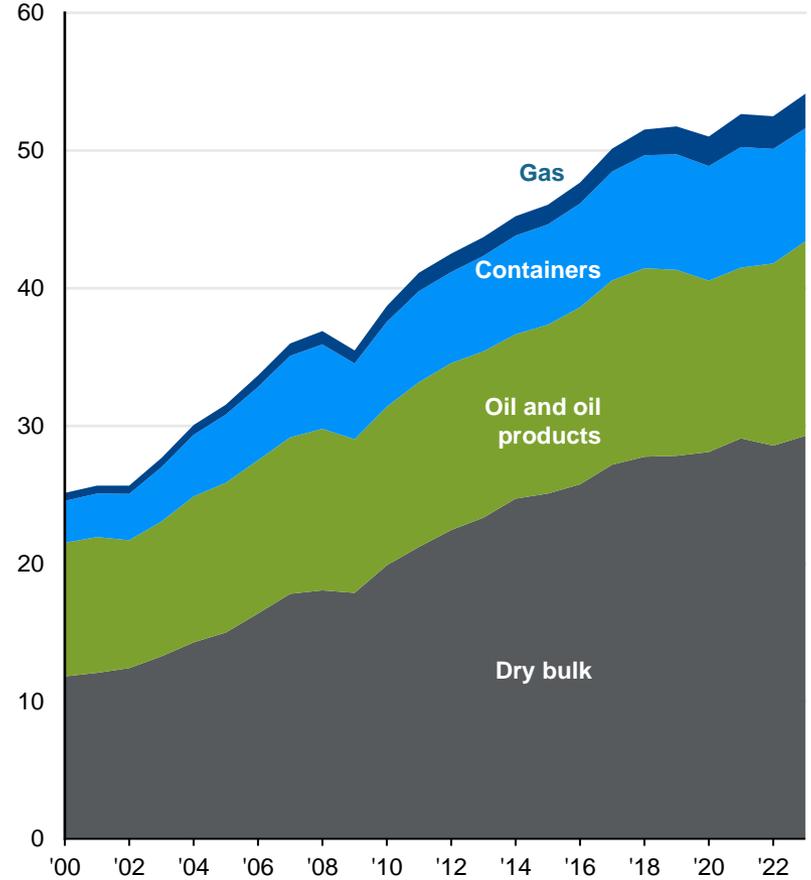
## World trade volume

Year-over-year, % change, 3-month moving average, monthly



## World seaborne trade by product

Estimated in trillion ton-miles



Source: CPB Netherlands Bureau for Economic Policy Analysis, Clarksons, FactSet, J.P. Morgan Asset Management. World seaborne trade by product as of May 2023. Data are based on availability as of May 31, 2023.

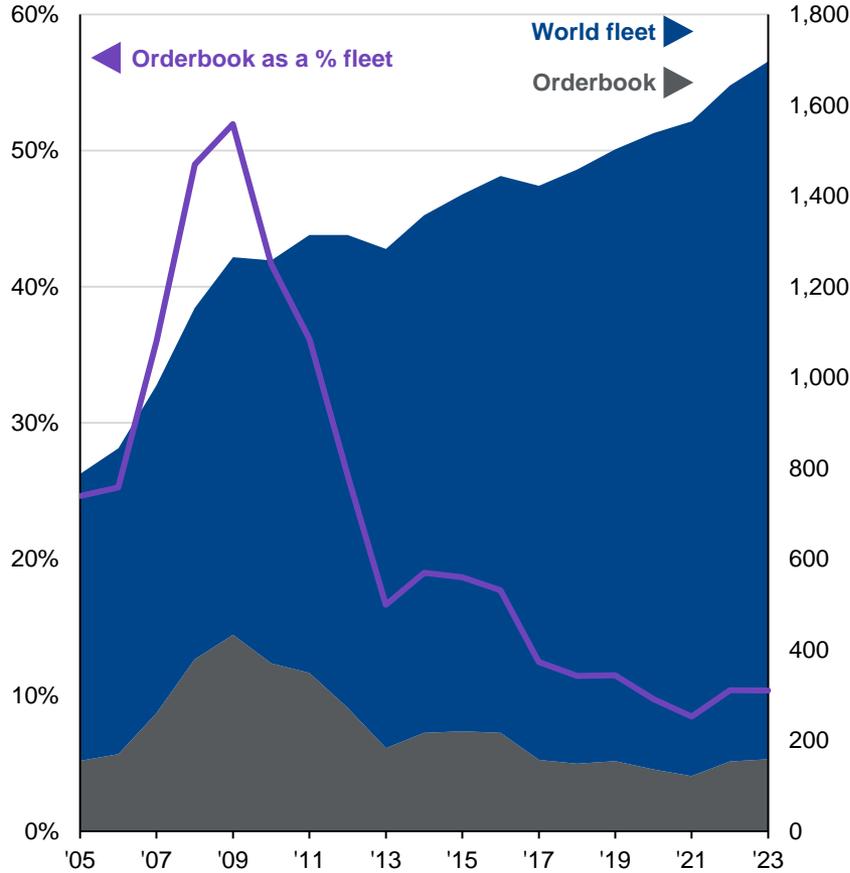


# Shipping trends: Orderbook

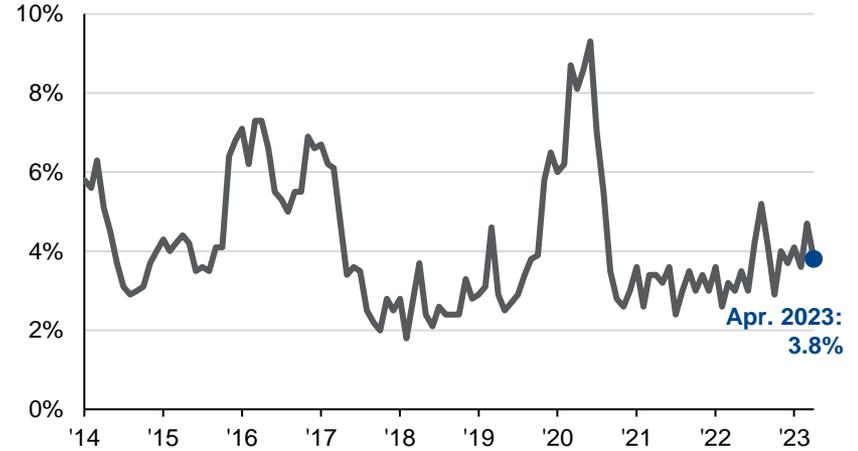
Transport

## Global fleet and orderbook

Gross tonnage

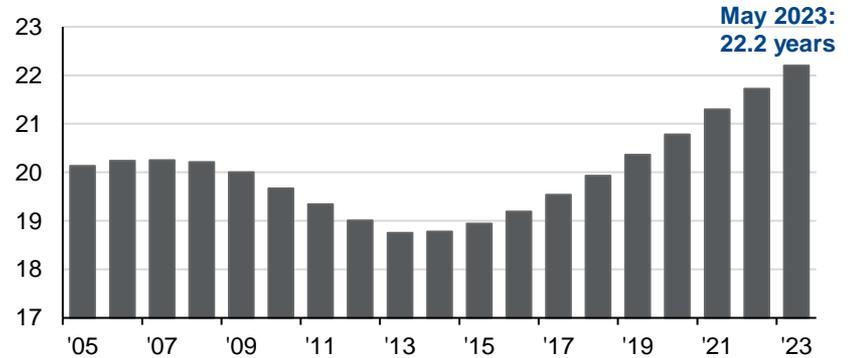


## Idle containership capacity as % of fleet



## Global fleet age

+100 gross tonnage, years



Source: Clarksons Research, MSI, Sea/net, J.P. Morgan Asset Management. Data are based on availability as of May 31, 2023.

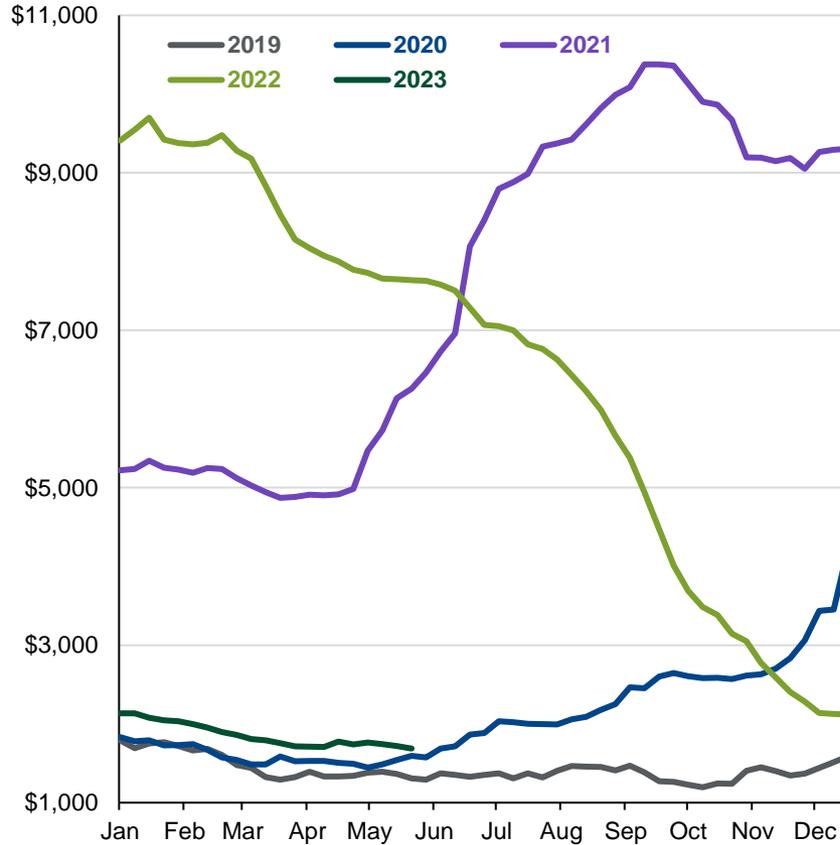


# Shipping trends: Pricing and port calls

Transport

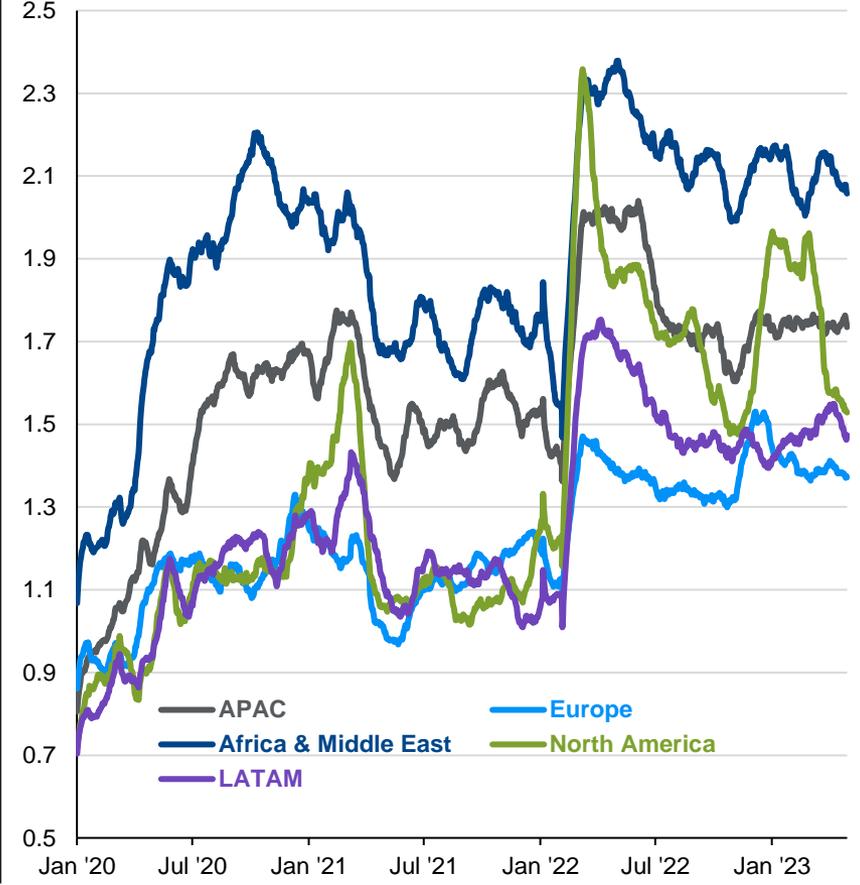
### Global shipping costs

USD per 40-foot container, weekly



### Global port call duration\*\*

Number of days, 30-day moving average



Source: Bloomberg, Clarksons Research, MSI, Sea/net, J.P. Morgan Asset Management. Port calls defined as all instances of a vessel entering and leaving a defined port location, excluding instances where vessel not recorded as travelling at less than 1 knot, and combining multiple consecutive instances at the same port where the vessel has not left a buffered shape around the port. Data basis date vessel last recorded in port location. \*Global Port Calls excludes calls at ports by tugs. \*\*U.S. and Europe port calls are of deep-sea cargo vessels, which only includes larger bulkers. \*\* Port call duration is defined as the average number of days spent by the vessels seen at a location. The duration is calculated using the total number of hours a vessel spent at location to complete the visit based on the time arrival and time of departure. Data are based on availability as of May 31, 2023.

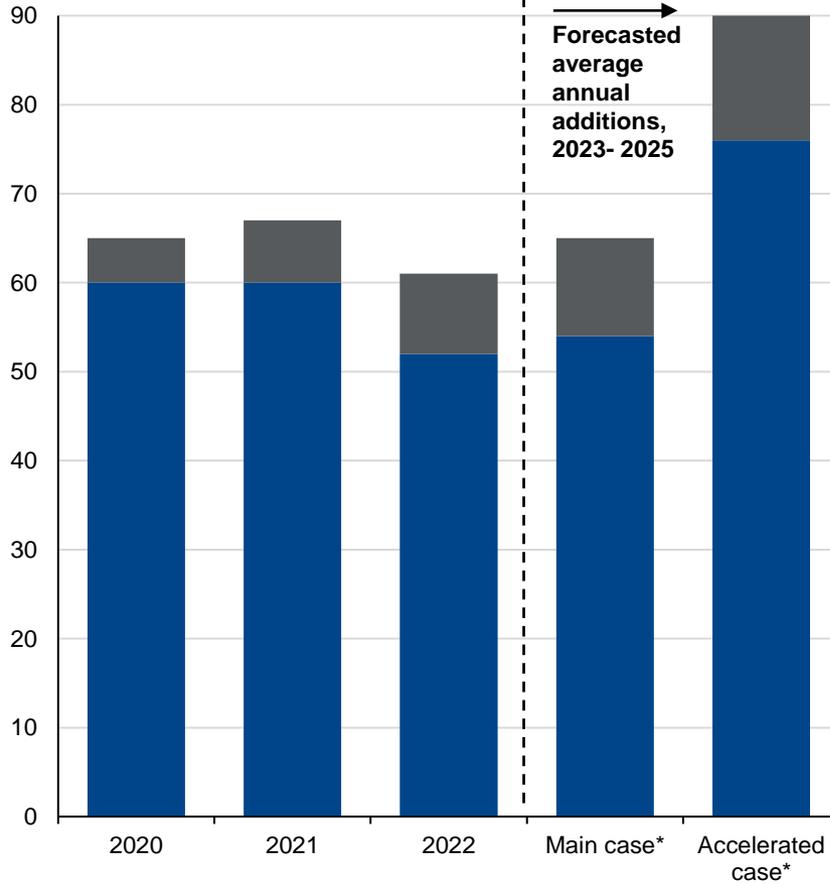


# Wind power

Transport

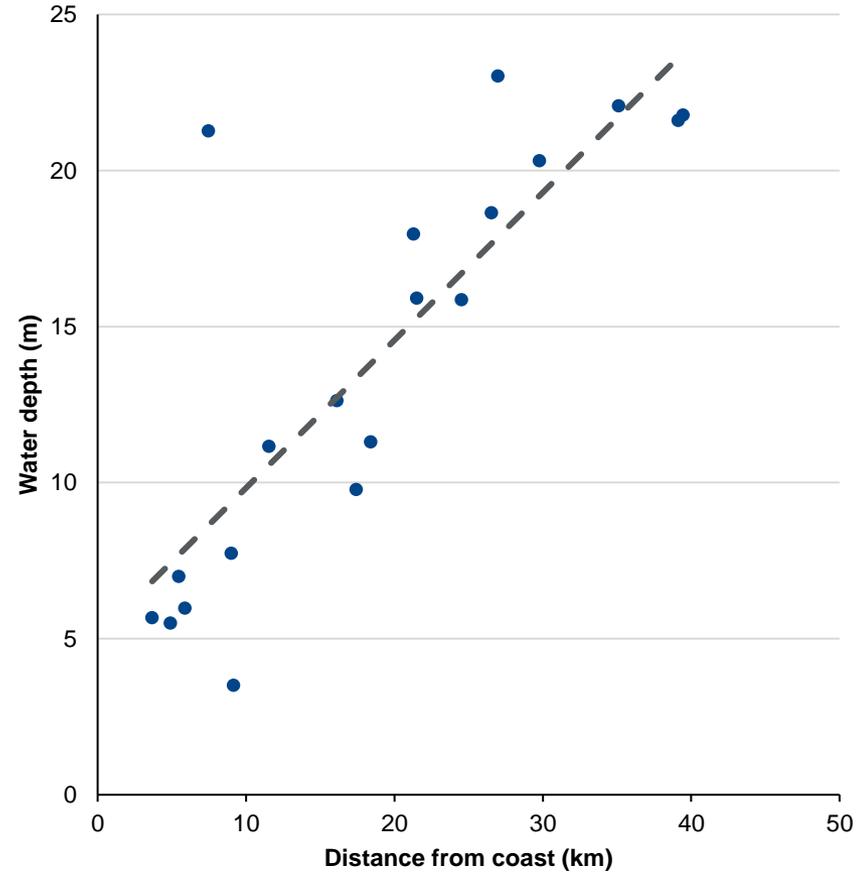
## Global wind net capacity additions

Onshore versus offshore, gigawatt



## Offshore wind project locations

Distance from shore and water depth



Source: IEA, The Wind Power, J.P. Morgan Asset Management. \*In its “main case” scenario, the IEA projects wind, solar, hydro, and other renewable sources of energy accounting for 95% of the increase in the world’s electricity generating capacity over the next 5 years. Data are based on availability as of May 31, 2023.

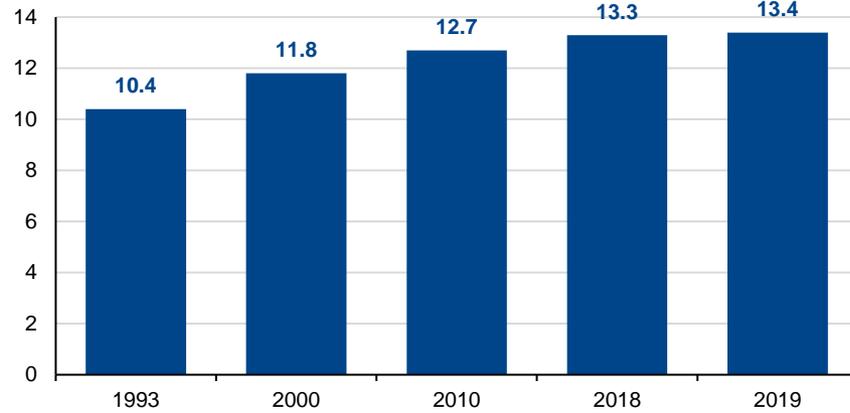


# Aircraft trends

Transport

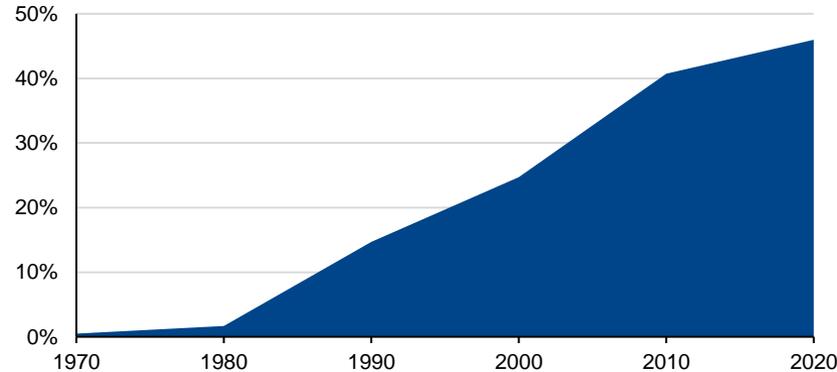
## Average age of major airline aircraft

Years, U.S.



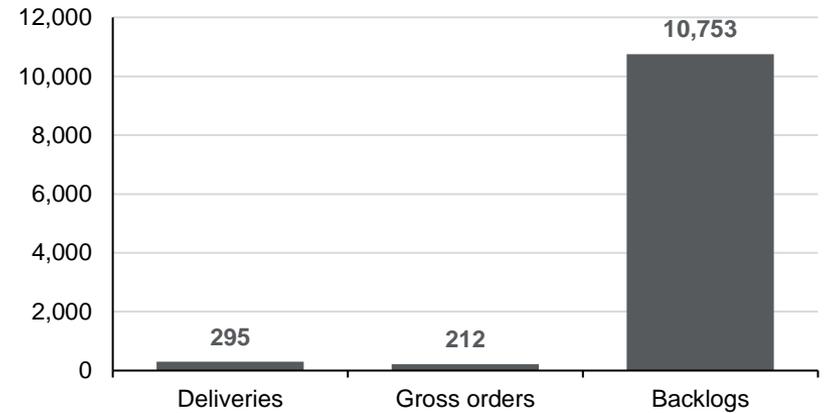
## Percent of industry wide aviation fleet leased\*

Global



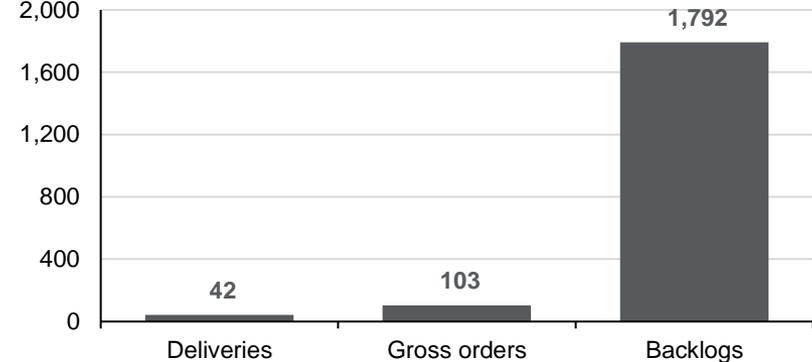
## Narrow-body aircraft demand\*\*

Year-to-date April 2023, number



## Wide-body aircraft demand\*\*

Year-to-date April 2023, number



Source: Cirium, Defense & Security Monitor, Statista, U.S. Bureau of Transportation Statistics, J.P. Morgan Asset Management. \*Includes parked and in-service regional, single-aisle and widebody aircraft. \*\*Aircraft demand is based on aggregate data released by Airbus and Boeing. Data are based on availability as of May 31, 2023.

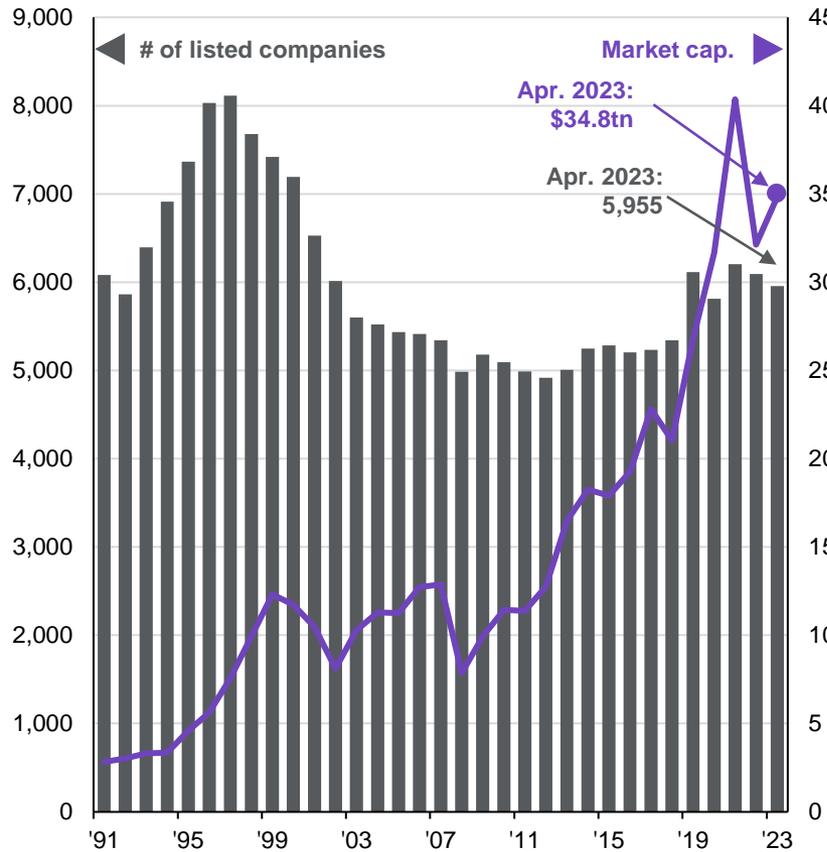


# U.S. public vs. private equity

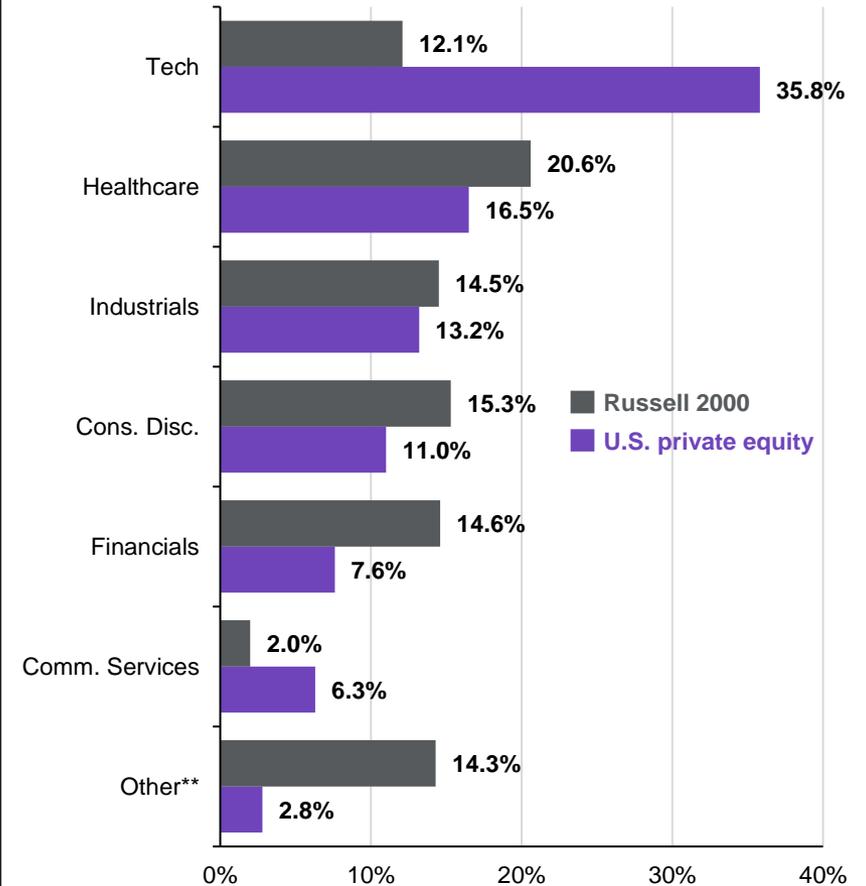
Private markets

### Number of listed U.S. companies\* and market cap.

Number, S&P 500 market capitalization in USD trillions



### Private vs. public equity sector weights



Sources: Cambridge Associates, Russell, World Federation of Exchanges, J.P. Morgan Asset Management.  
 \*Number of listed U.S. companies is represented by the sum of number of companies listed on the NYSE and the NASDAQ.\*\*Other includes real estate, utilities and energy. Percentages may not sum due to rounding. Sector weights are as of June 31, 2021. Data are based on availability as of May 31, 2023.

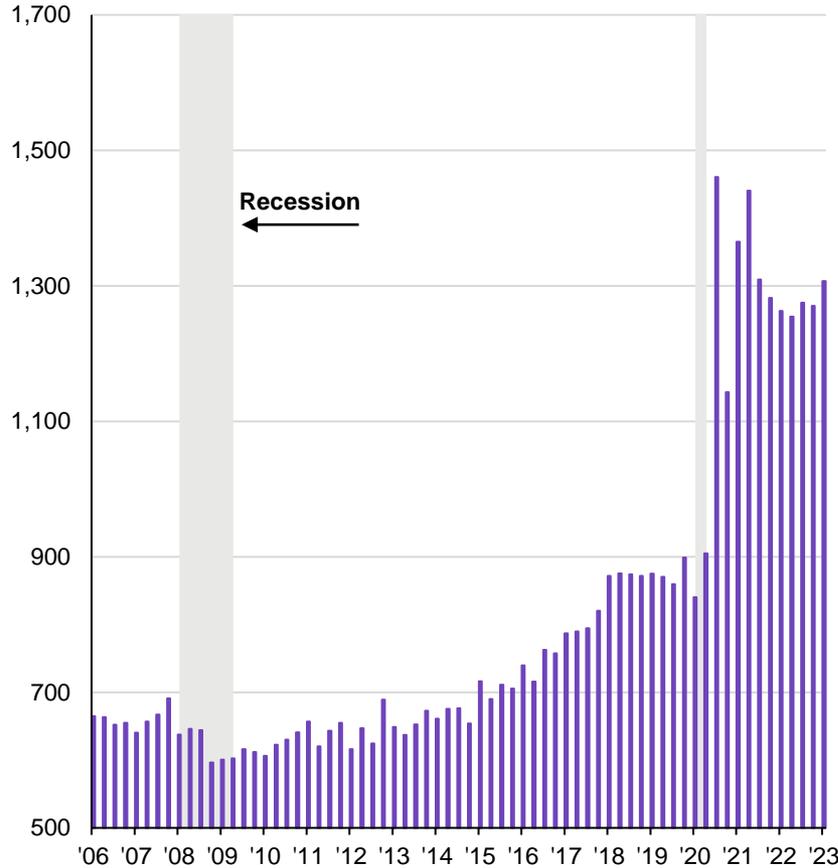


# U.S. business formation

Private markets

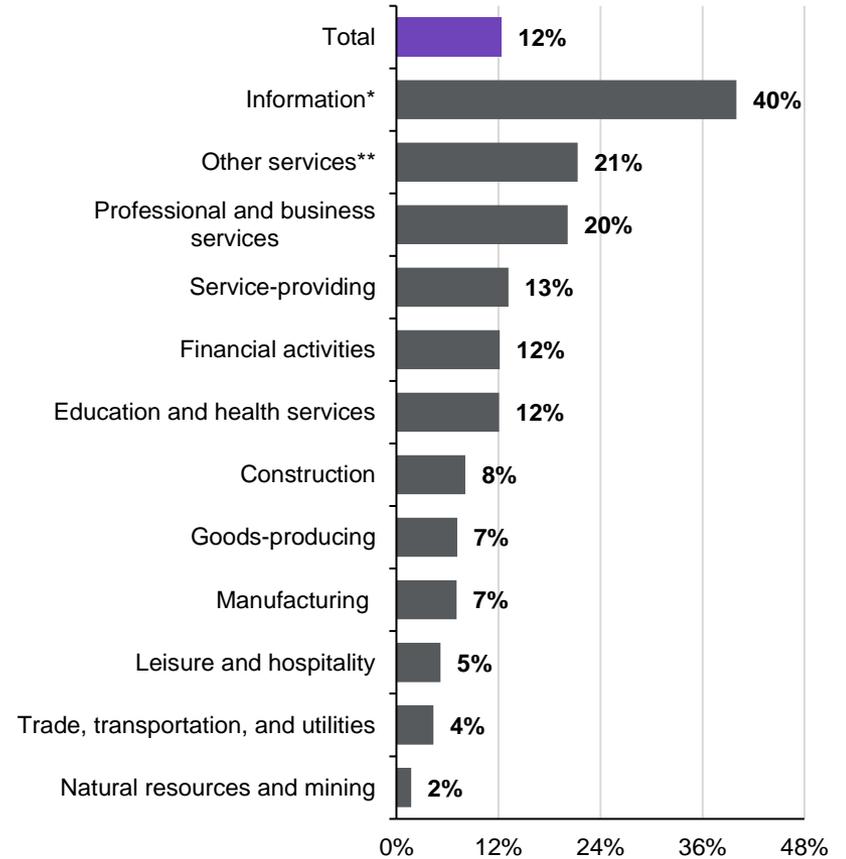
### U.S. applications for business formation

Seasonally adjusted, thousands



### Growth in business establishments by private industry

December 2019 – September 2022



Source: Bureau of Labor Statistics, U.S. Census Bureau, J.P. Morgan Asset Management. Business formation data are as of 1Q23. \*Information includes broadcasting (excluding internet), data processing, hosting and related services, motion picture and sound recording industries, publishing industries (excluding internet) and telecommunications. \*\*Other services includes unclassified businesses. Data are based on availability as of May 31, 2023.

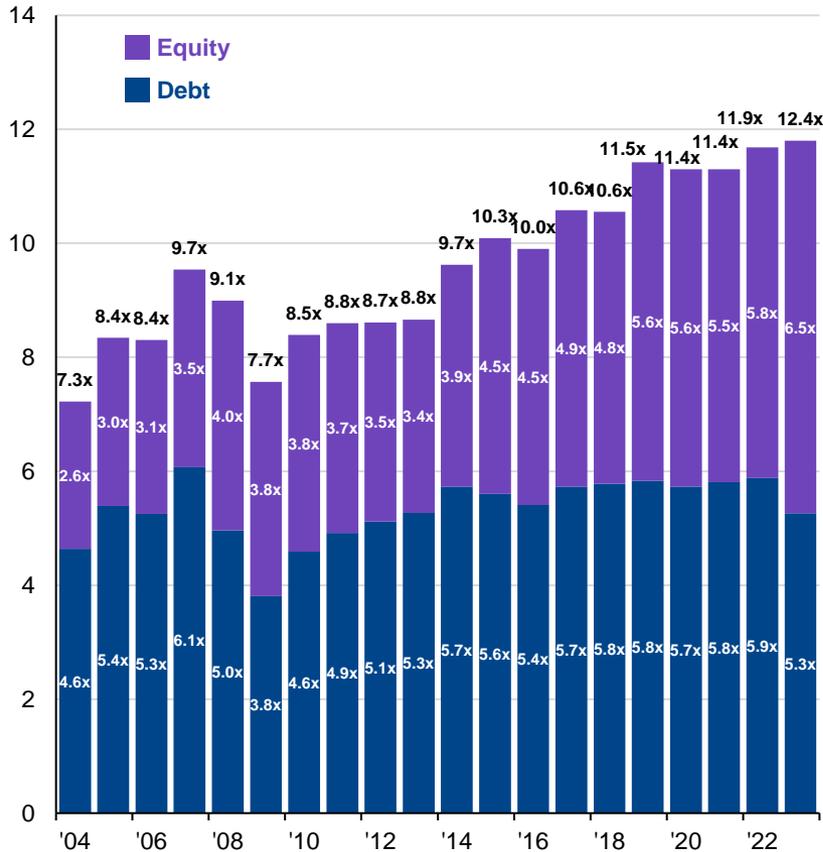


# Private equity valuations

Private markets

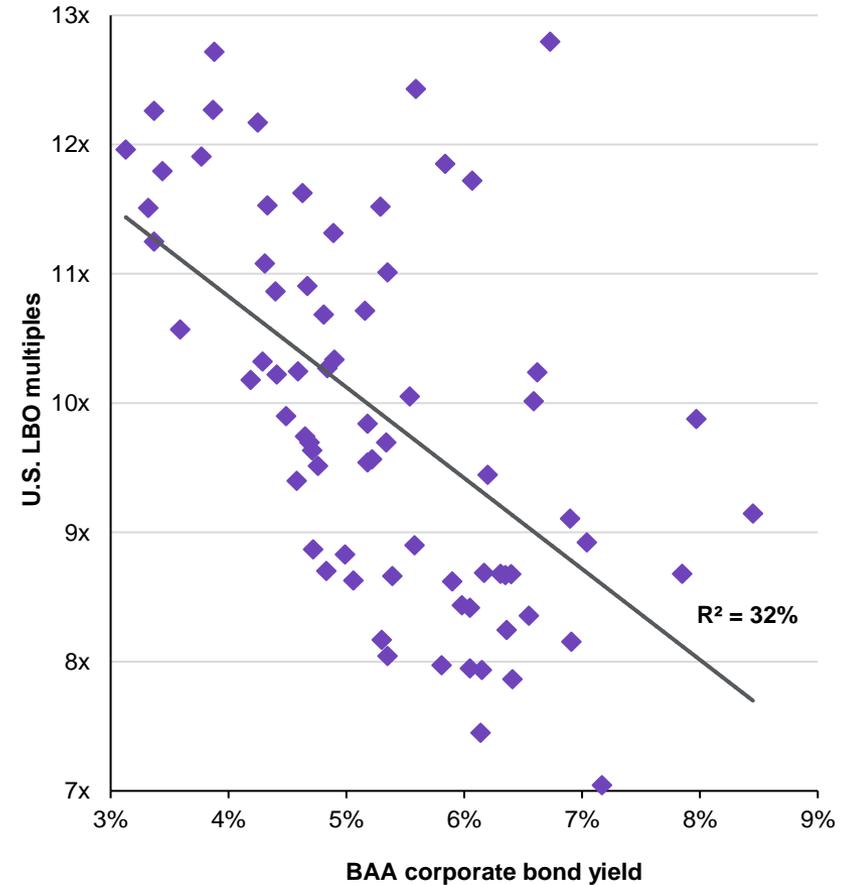
### U.S. LBOs: purchase price multiples

Equity and debt over trailing EBTIDA



### U.S. LBO multiples and BAA corporate bond yields

Quarterly, 2005 – 1Q23



Source: PitchBook, LCD, J.P. Morgan Asset Management. Purchase price multiples are as of March 31, 2023. Data are based on availability as of May 31, 2023.

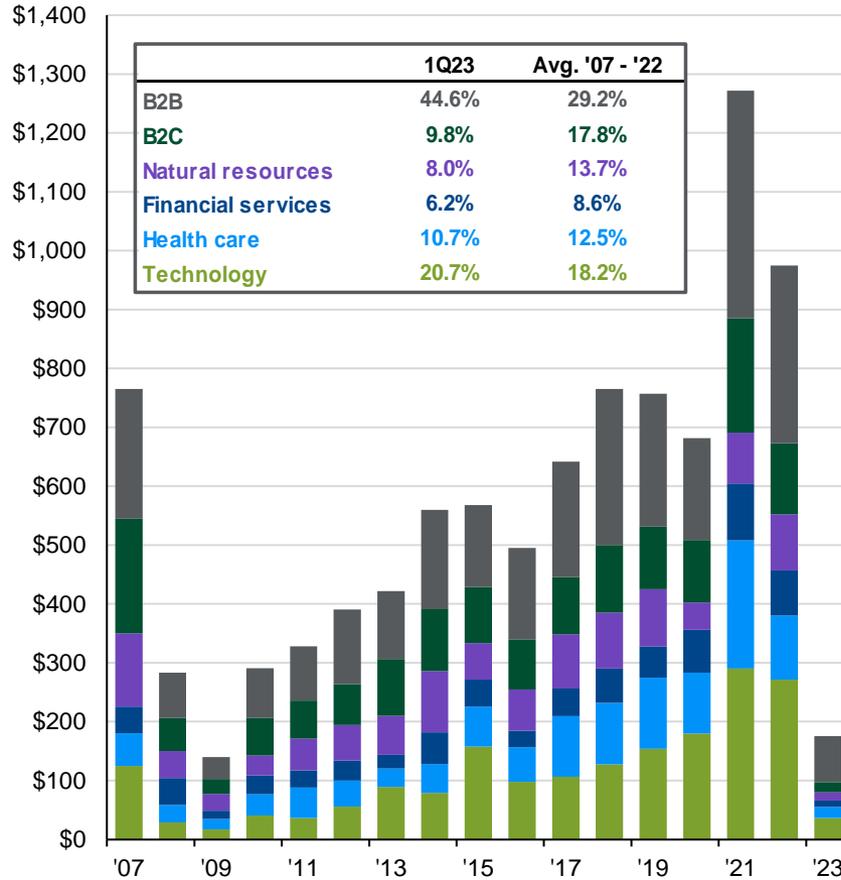


# Private equity deals and exits

Private markets

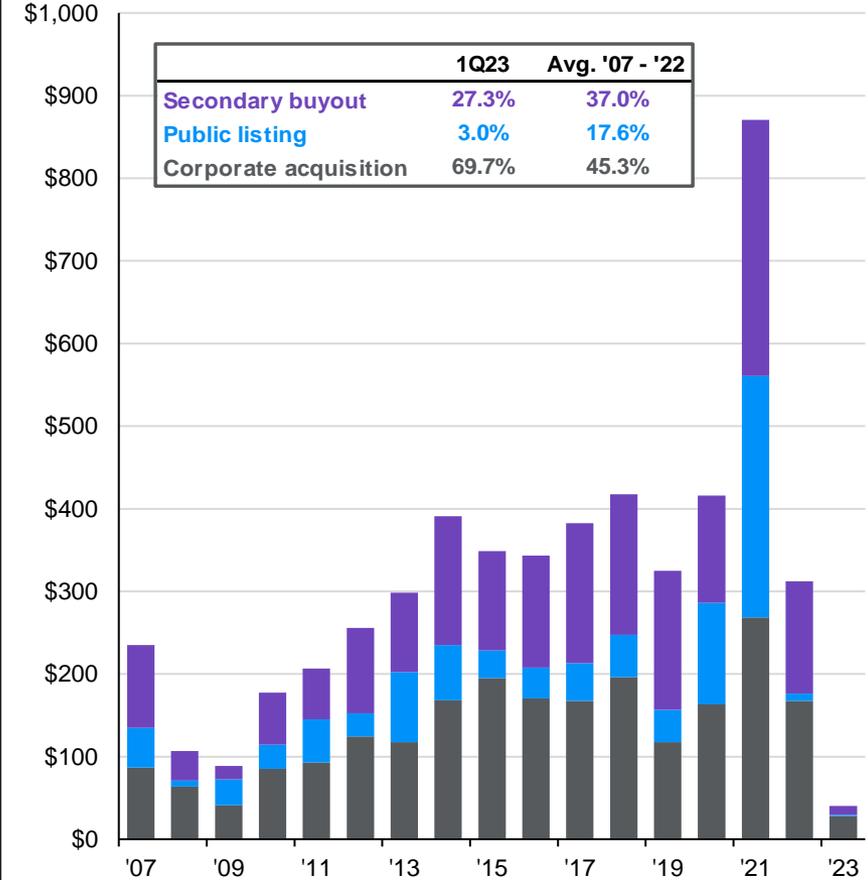
## U.S. private equity deals

USD billions



## Private equity exits by type

USD billions



Source: PitchBook, J.P. Morgan Asset Management.

B2B is business to business. B2C is business to consumer. Natural resources = Materials & resources and energy. Private equity deal and exit data are as of March 31, 2023.

Data are based on availability as of May 31, 2023.

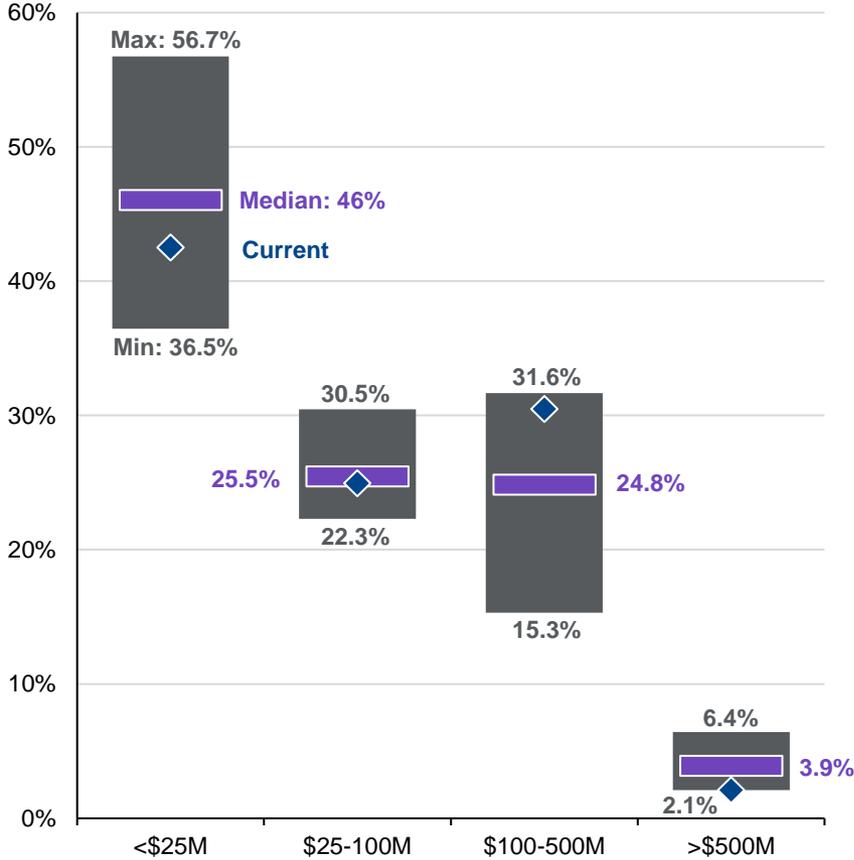


# Private equity deals by size and type

Private markets

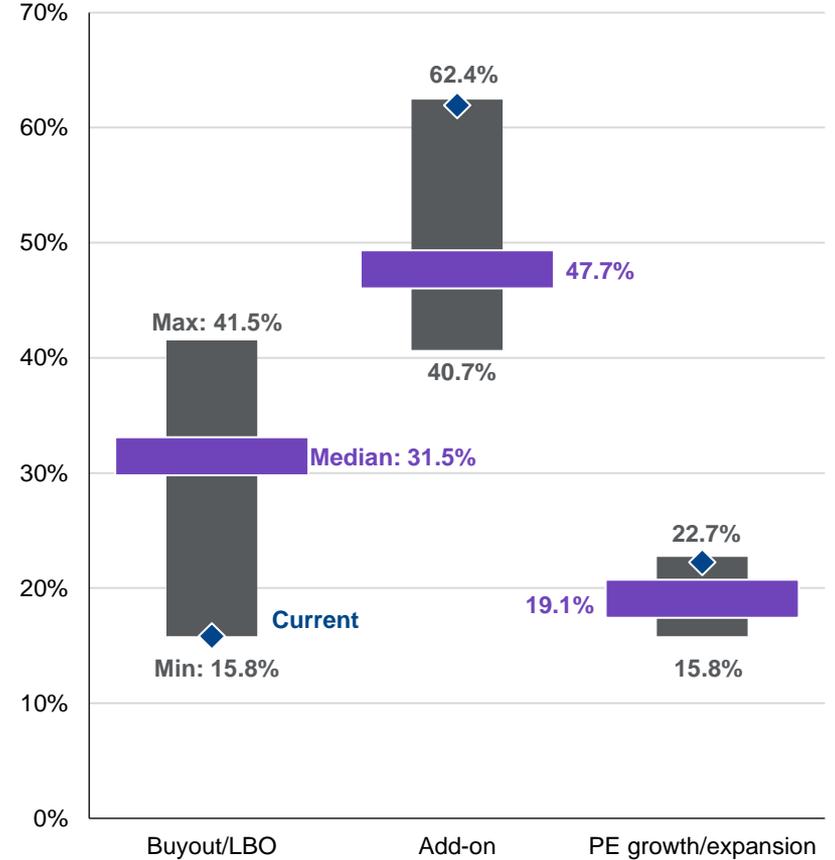
## U.S. private equity deals by size

% of total deals, 2007 – 1Q23



## U.S. private equity deals by type

% of total deals, 2007 – 1Q23



Source: PitchBook. J.P. Morgan Asset Management. Private equity deal size and type activity are as March 31, 2023. Data are based on availability as of May 31, 2023.

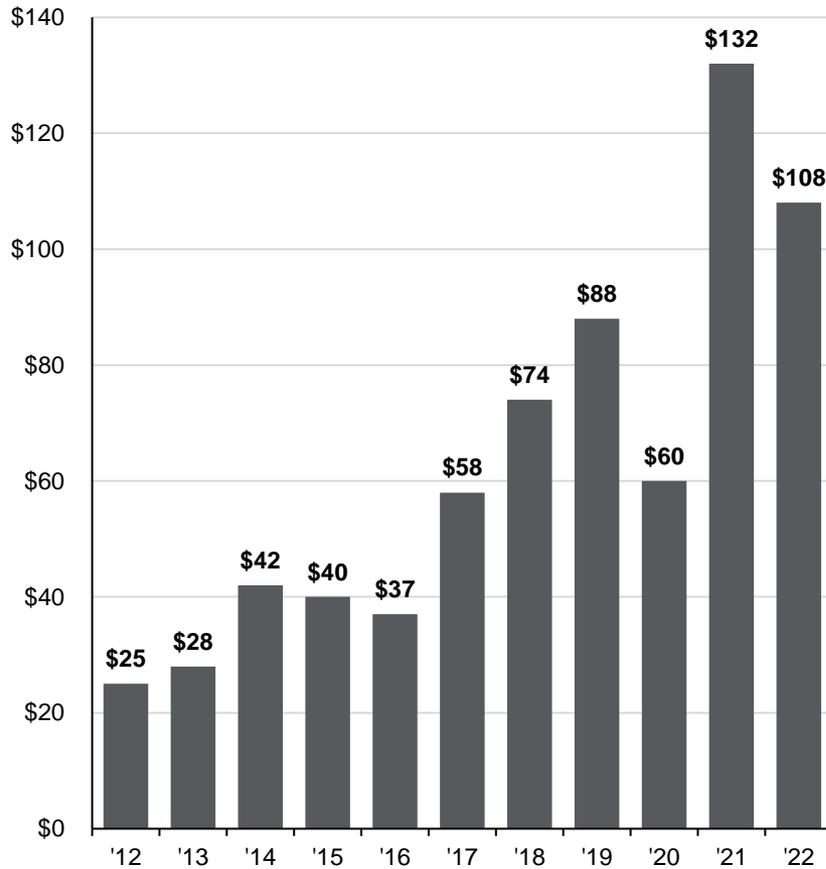


# Secondary market

Private markets

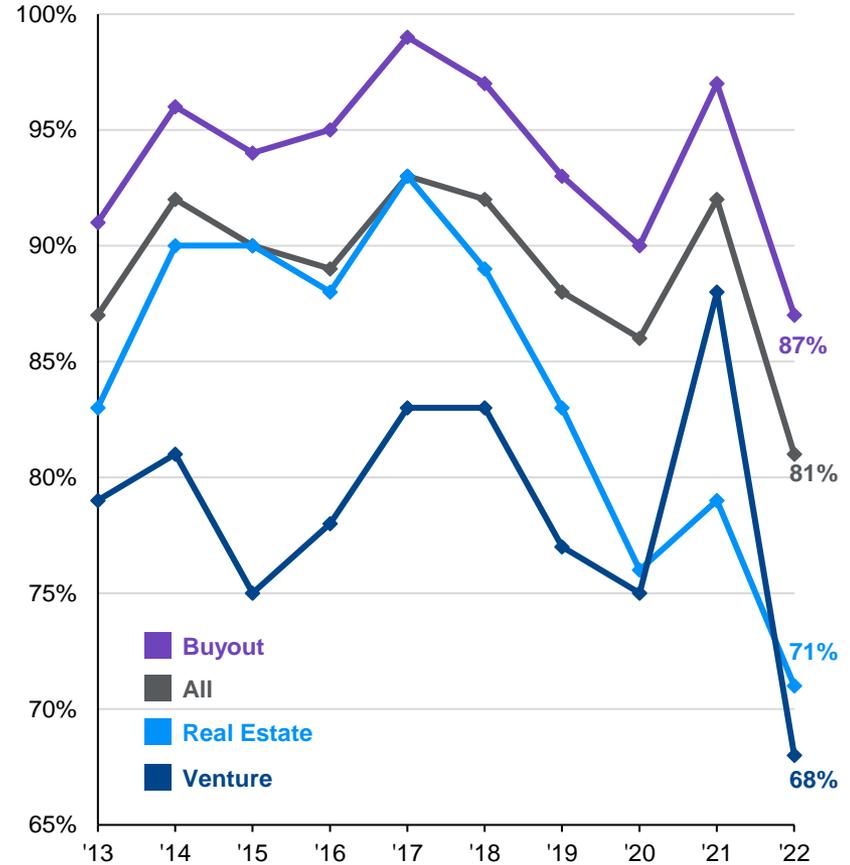
### Secondary market volume

USD billions



### Secondary pricing\*

Percent of net asset value (NAV)



Source: Greenhill, Jefferies, J.P. Morgan Asset Management. \*Secondary pricing of LP portfolios. Data are based on availability as of May 31, 2023.

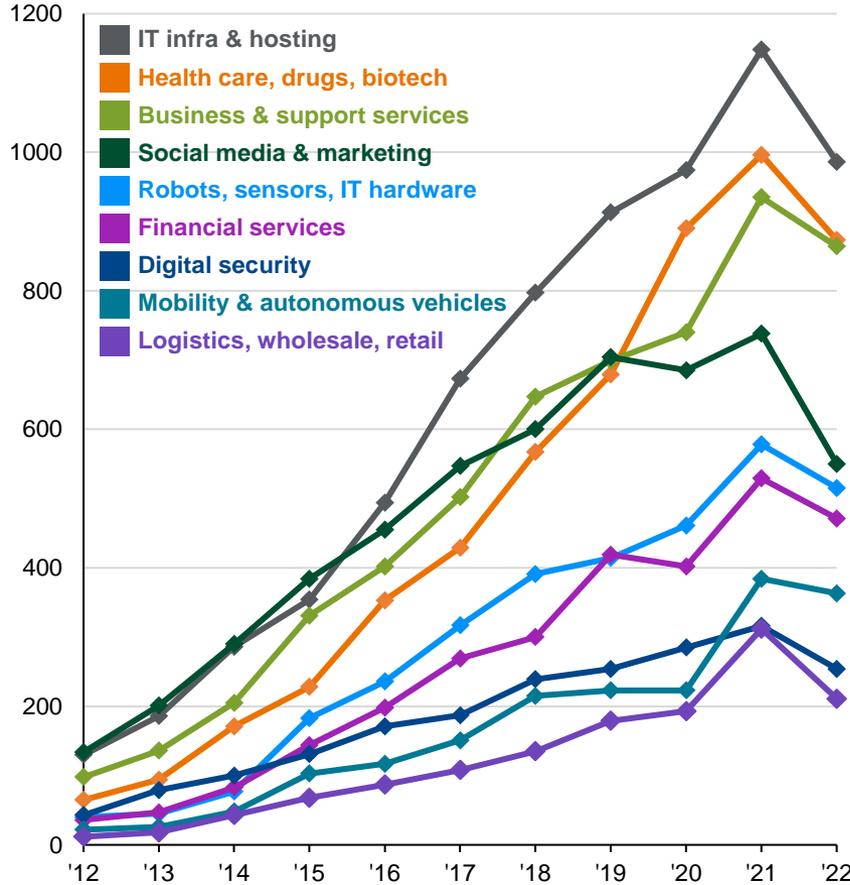


# Venture capital

Private markets

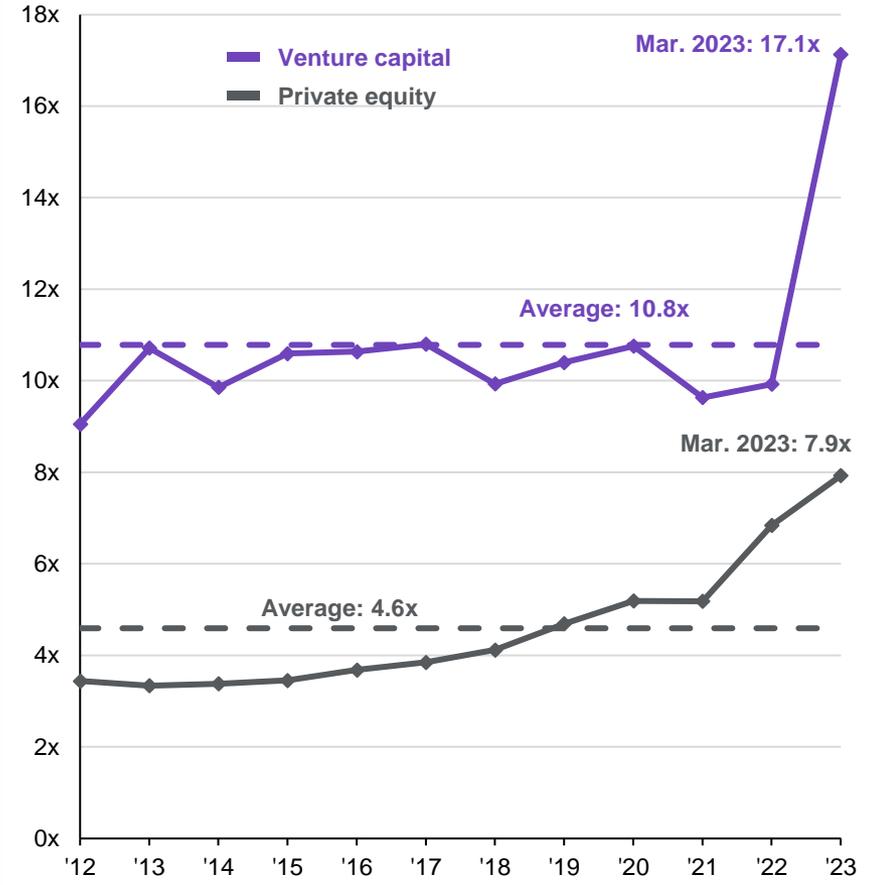
### Venture capital investments in AI by industry

Number of investments



### Investment and exit activity

Number of investments/number of exits\*



Source: OECD.AI (2023), Preqin, PitchBook, J.P. Morgan Asset Management. VC investments in AI data are as of 3Q22. \*Number of investments is defined as deal count. Investment and exit activity data are as of 4Q22. Data are based on availability as of May 31, 2023.

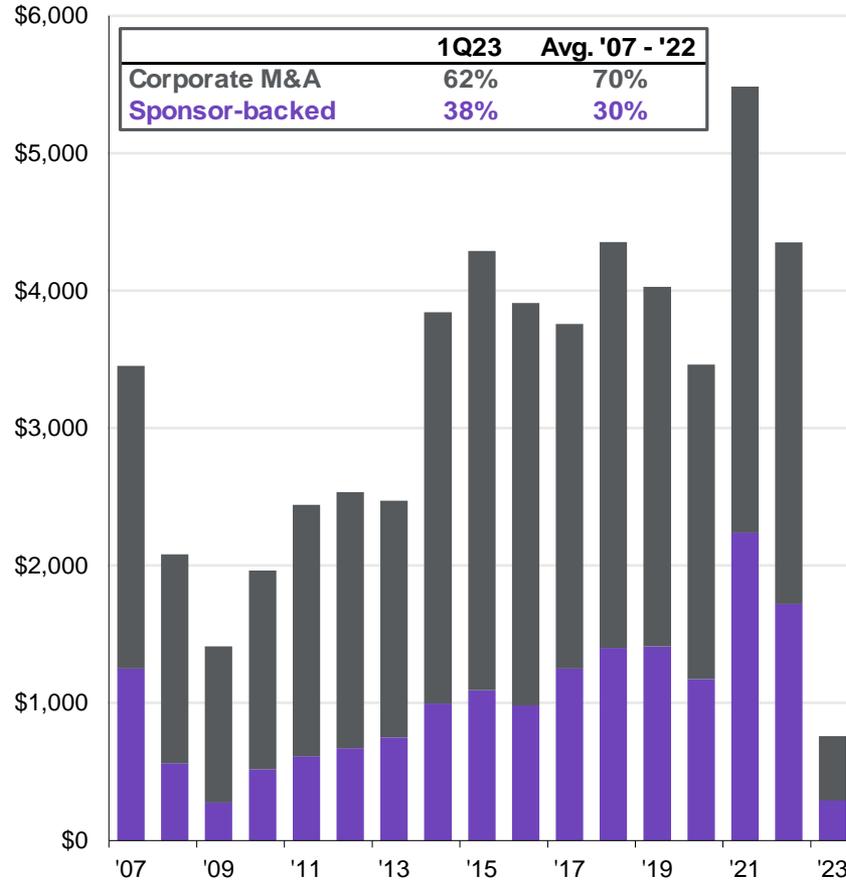


# Global M&A

Private markets

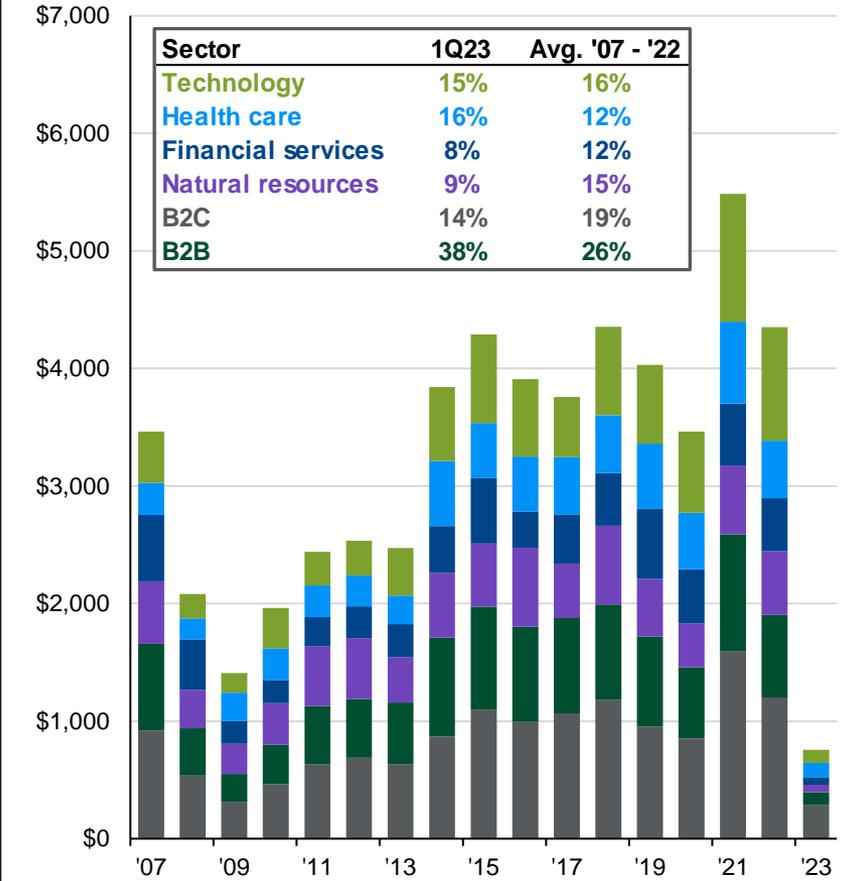
## Global M&A by acquirer type

USD billions



## Global M&A by sector

USD billions



Source: PitchBook, J.P. Morgan Asset Management. M&A deal data are as of March 31, 2023. Percentages may not sum to 100 due to rounding. Data are based on availability as of May 31, 2023.

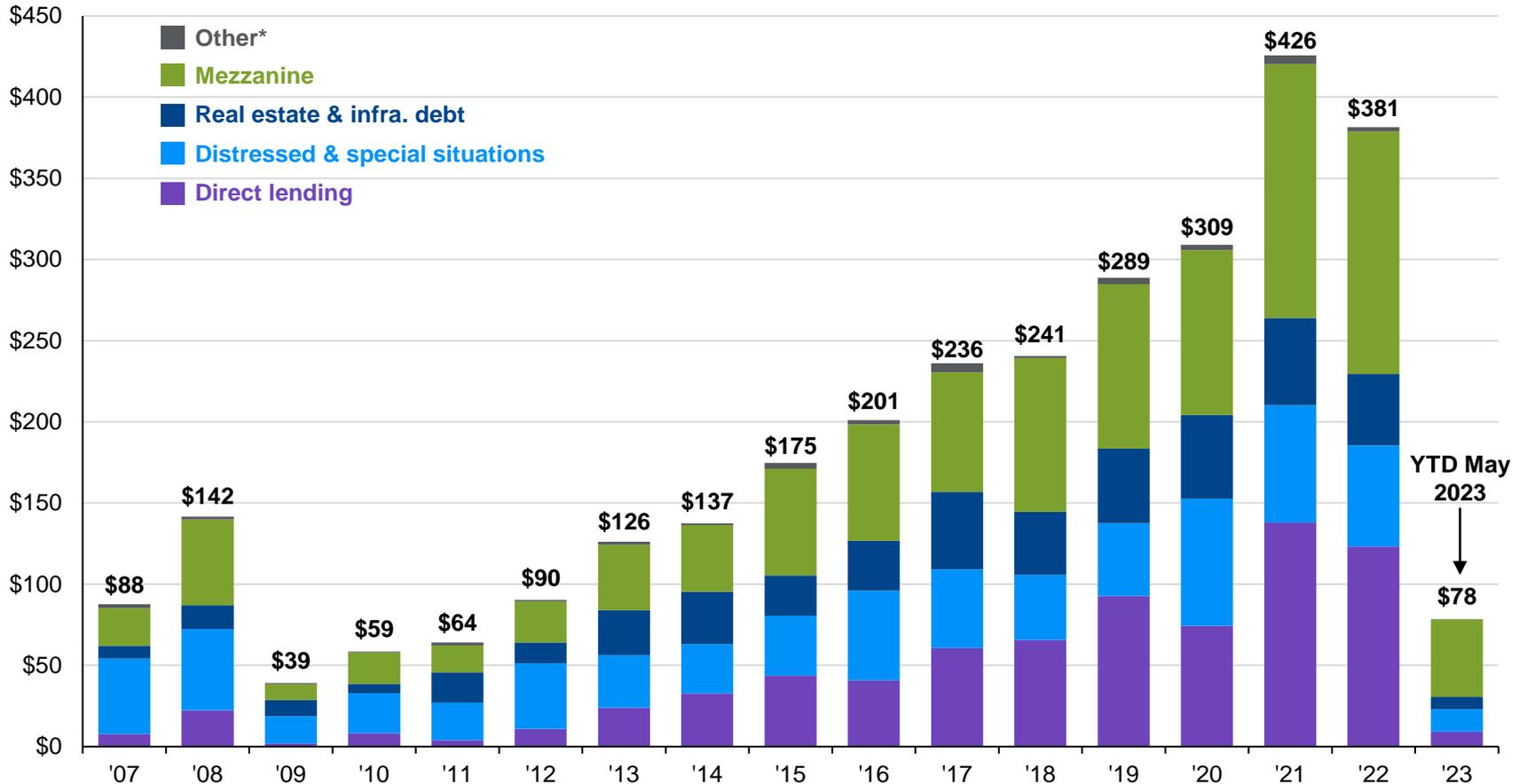


# Private debt fundraising

### Private debt fundraising by type

USD billions

Private markets



Sources: Preqin, J.P. Morgan Asset Management. \*Other includes venture debt and fund of funds. Data are based on availability as of May 31, 2023.

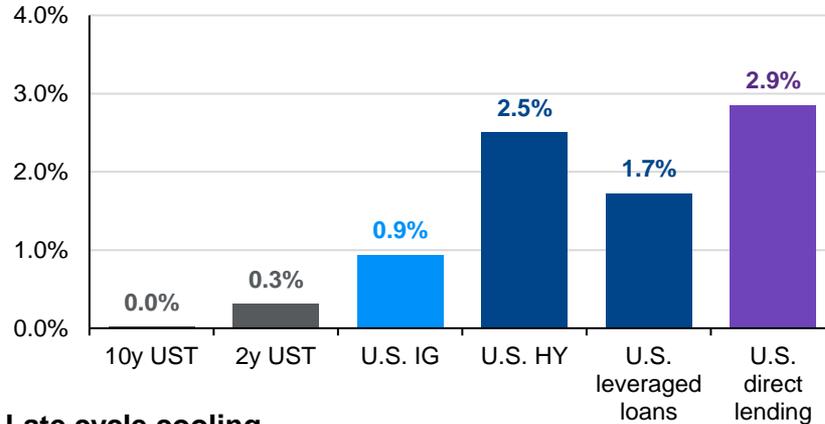


# Credit returns across recent economic cycles

Private markets

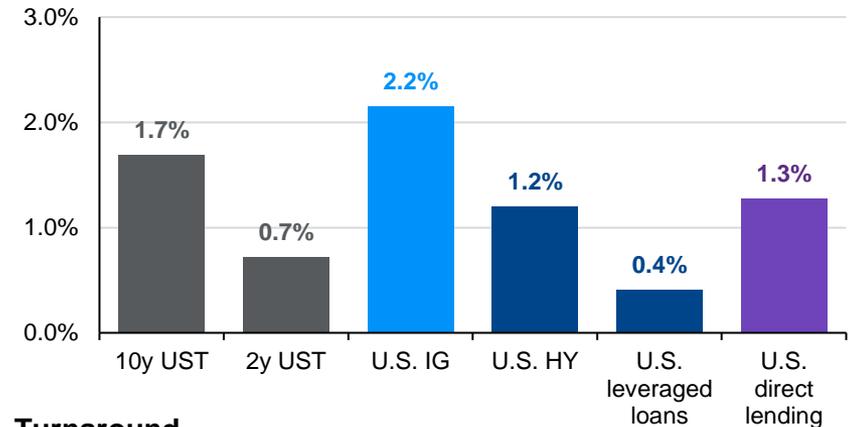
## Expansion

Manufacturing ISM > 50 and rising



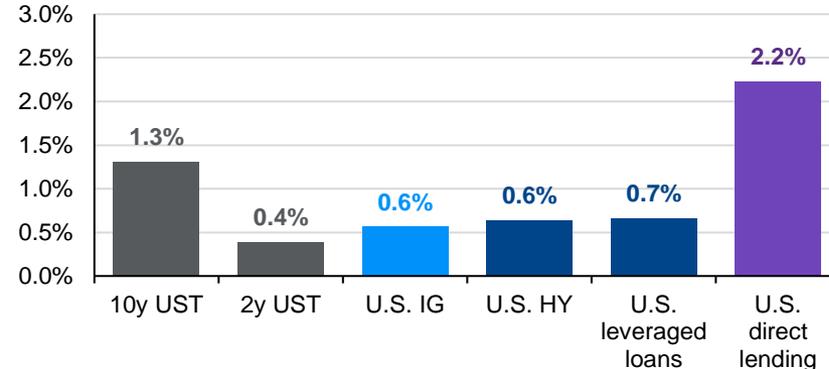
## Recession

Manufacturing ISM <50 and falling



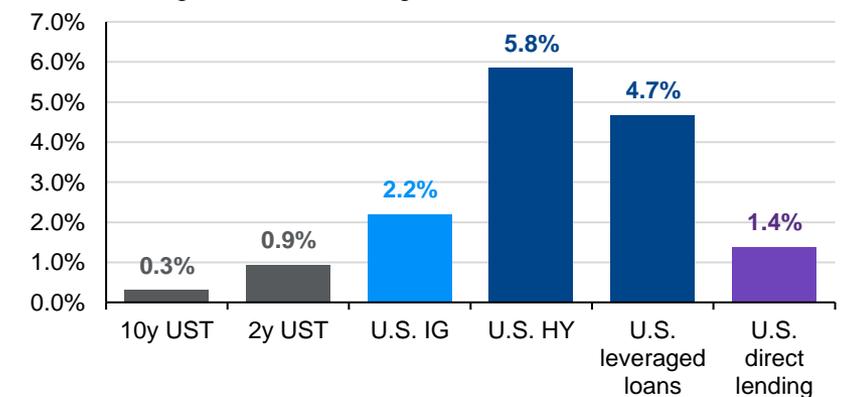
## Late cycle cooling

Manufacturing ISM > 50 and falling



## Turnaround

Manufacturing ISM <50 and rising



Source: Institute for Supply Management, Bloomberg, Credit Suisse, Cliffwater, J.P. Morgan Asset Management. The ISM Manufacturing Index is a nationwide survey of purchasing executives. A reading greater than 50 indicates increased economic activity and a reading less than 50 indicates decreased economic activity. 10y UST: Bloomberg U.S. Treasury Bellwethers (10y), 2y UST: Bloomberg U.S. Treasury Bellwethers (2y), U.S. IG: Bloomberg U.S. Aggregate Corporate Investment Grade, U.S. HY: Bloomberg U.S. Aggregate Corporate High Yield, U.S. leveraged loans: Credit Suisse Leveraged Loan Index, U.S. direct lending: Cliffwater Direct Lending Index. All returns are from 12/31/2004 through 3/31/2023. Data are based on availability as of May 31, 2023.

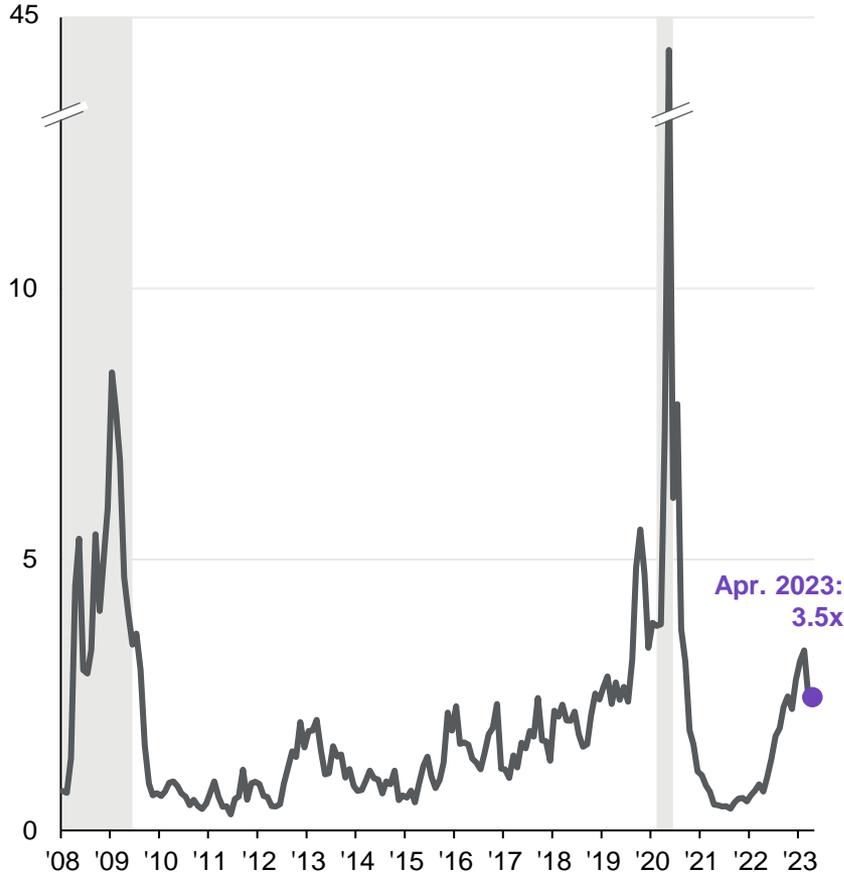


# Upgrades, downgrades, and drawdown dispersion

Private markets

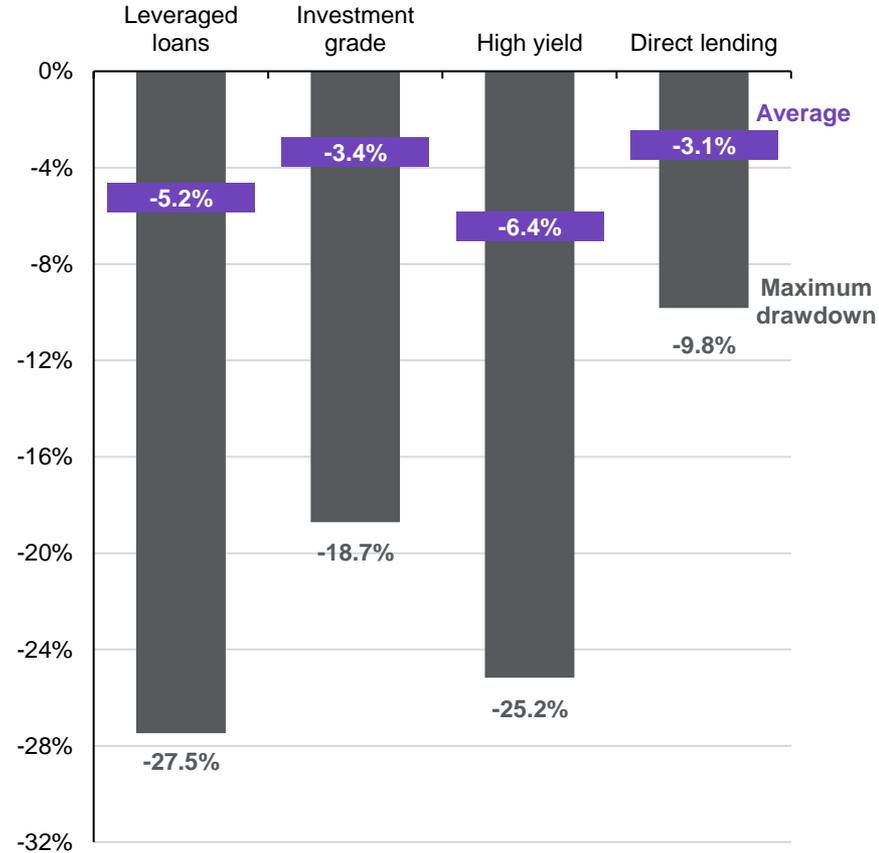
### U.S. leveraged loans downgrade/upgrade ratio

Rolling 3-month average



### Public and private credit drawdown dispersion

Maximum and average drawdown, quarterly



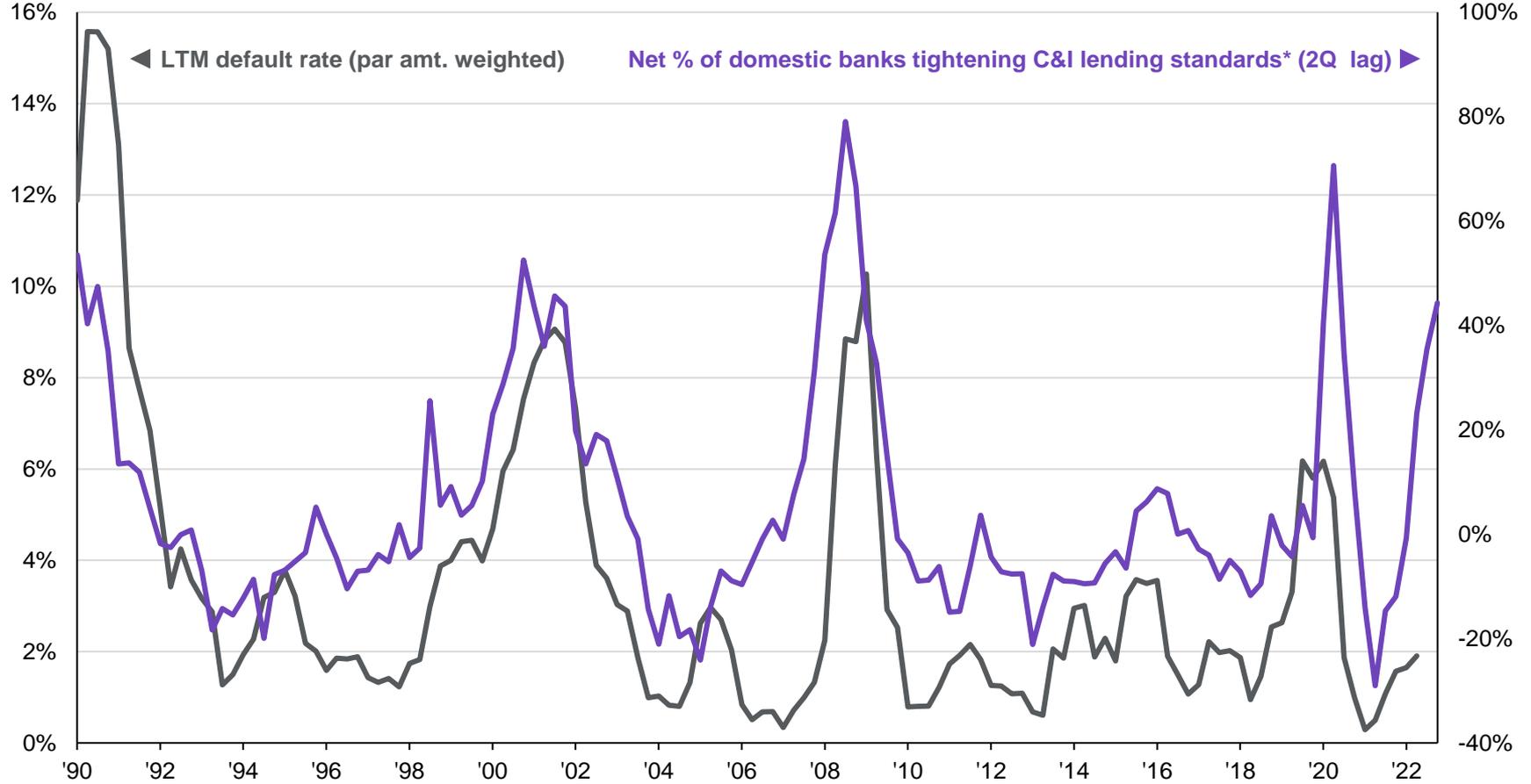
Source: Federal Reserve, Bloomberg, Cliffwater, LCD, J.P. Morgan Asset Management.  
 Leveraged loans: Credit Suisse Leveraged Loans Total Return Index. Investment grade: Bloomberg U.S. Corporate Investment Grade Total Return Index. Bloomberg U.S. Corporate High Yield Total Return Index. Direct Lending: Cliffwater Direct Lending Index. Drawdowns are cumulative.  
 All returns analyzed are from 12/31/2004 through 3/31/2023.  
 Data are based on availability as of May 31, 2023



# Lending and default rates

## Tightening lending standards and high-yield default rates

December 1990 – present, quarterly



Private markets

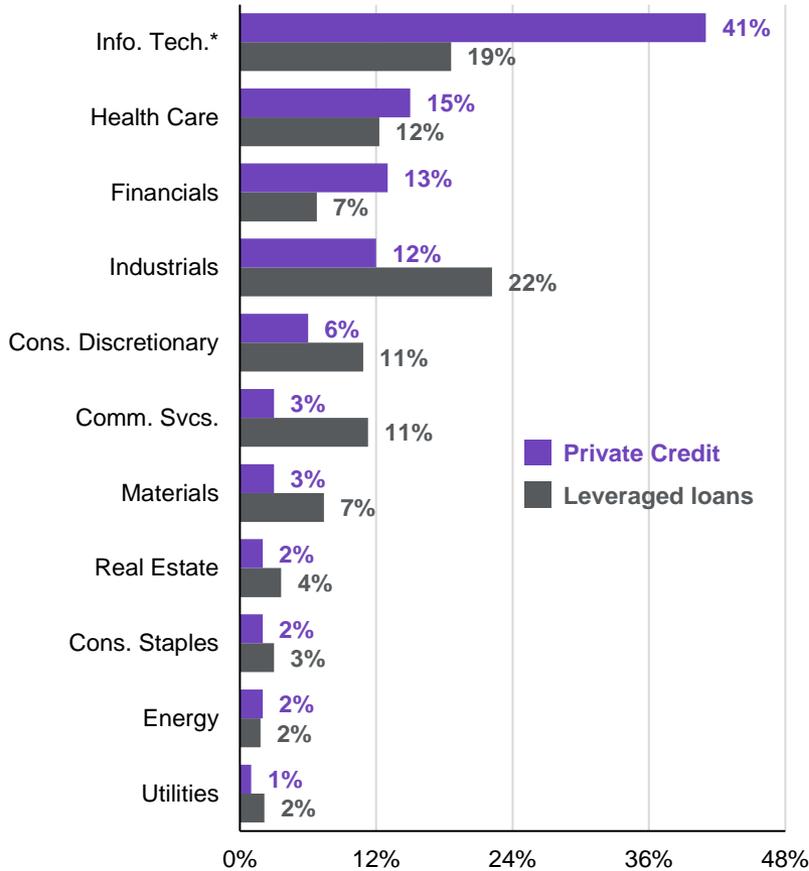
Source: J.P. Morgan Global Economic Research, Federal Reserve, FactSet, J.P. Morgan Asset Management.  
 Default rates are defined as the par value percentage of the total market trading at or below 50% of par value and include any Chapter 11 filing, prepackaged filing or missed interest payments. The default rate is an LTM figure (last 12 months) and tracks the % of defaults over the period. \*C&I lending standards are an average of responses from large, medium, and small firms as compiled in the Senior Loan Officer Opinion Survey at the Federal Reserve.  
 Data are based on availability as of May 31, 2023.



# Direct lending and the bank loan market

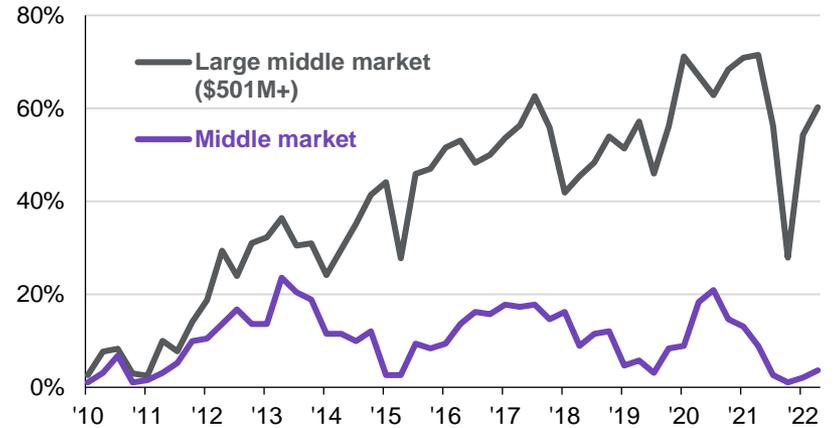
Private markets

## Private credit vs. leveraged loans sector exposure



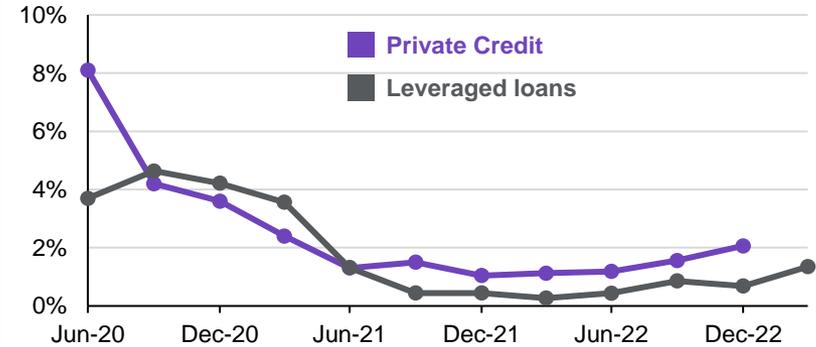
## Covenant-lite loans\*\*

% of total loans, 4Q10– 1Q23, quarterly



## Private credit and leverage loans default rate

Quarterly, 2Q20 – present



Source: Cliffwater, LCD, Standard & Poor's, Proskauer, J.P. Morgan Markets Research, J.P. Morgan Asset Management. \*For private credit, information technology includes business services. Private credit sector exposure is as of December 31, 2022. Leveraged loans sector exposure is as of April 2023. \*\*Covenant-lite loans are a type of financing that is issued with fewer restrictions on the borrower regarding collateral, level of income, and loan payment terms, and fewer protections for the lender, including financial maintenance tests that measure the debt-service capabilities of the borrower. All leveraged loans data are from the Morningstar LSTSA U.S. Leveraged Loan Index. The leveraged loans default rate is calculated using the LTM number of defaults as a % of total issuers. Private credit default rate is as of December 31, 2023. The private credit default rate is calculated by dividing the number of defaulted loans by the aggregate number of loans in the Index. Data are based on availability as of May 31, 2023

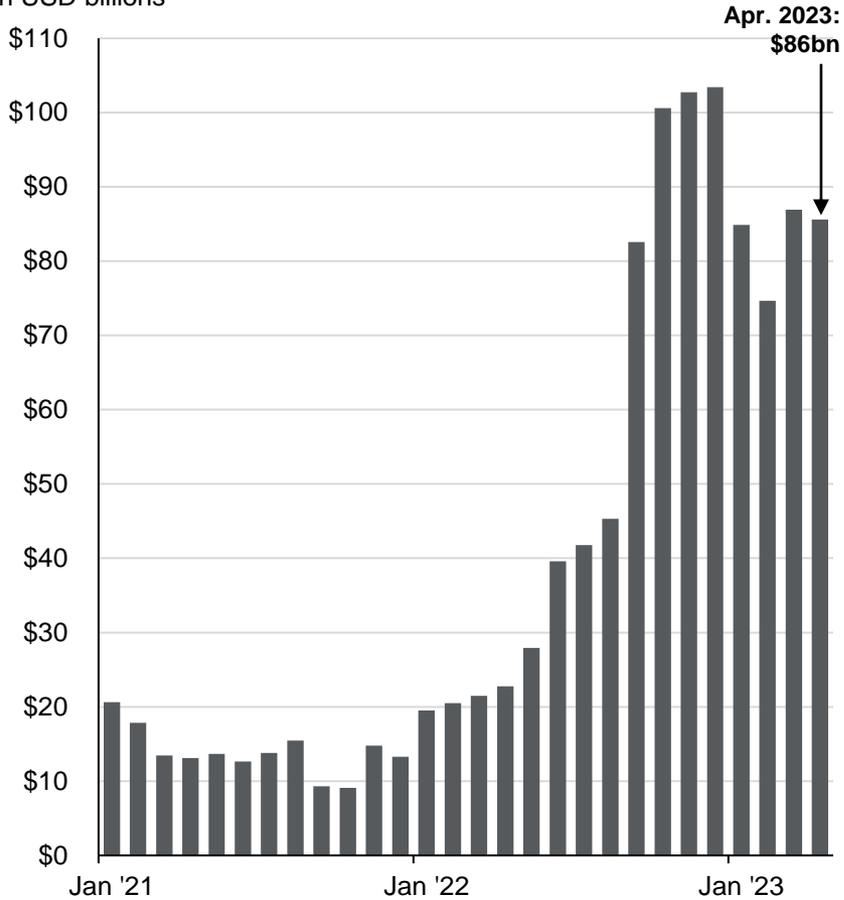


# U.S. distressed loans

Private markets

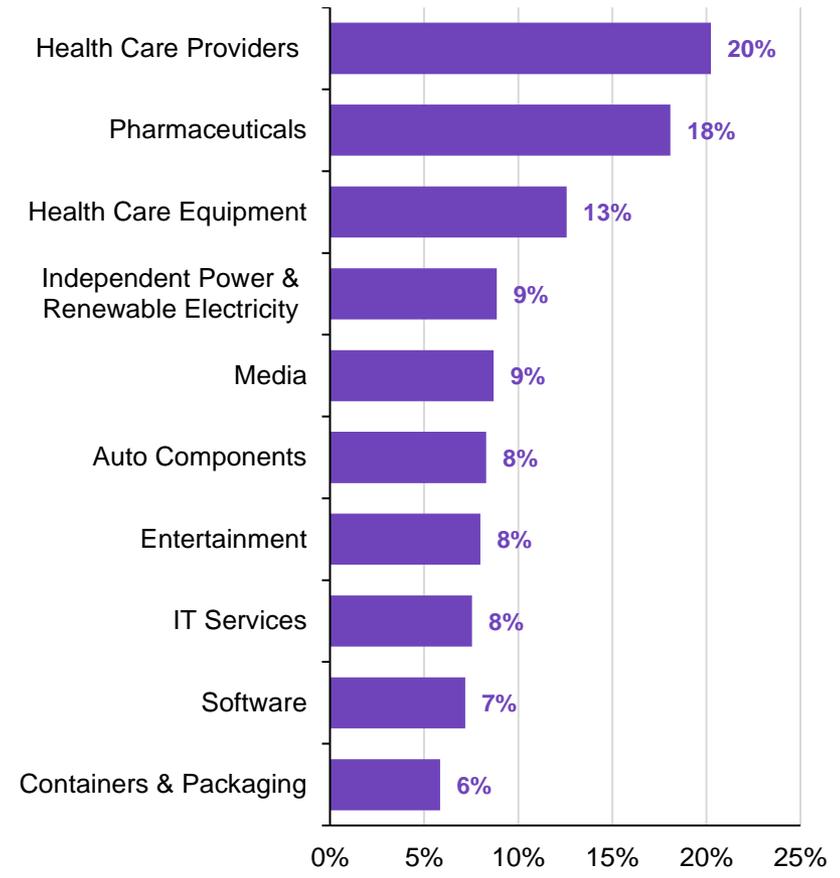
### U.S. distressed loan volume

In USD billions



### Share of distressed leveraged loans by industry

U.S., February 2023



Source: Pitchbook, LCD, Morningstar, Morgan Asset Management. Distressed loan data are from the Morningstar LSTSA U.S. Leveraged Loan Index, which defines distressed loans as performing leveraged loans priced below 80 cents on the dollar. Data are based on availability as of May 31, 2023.

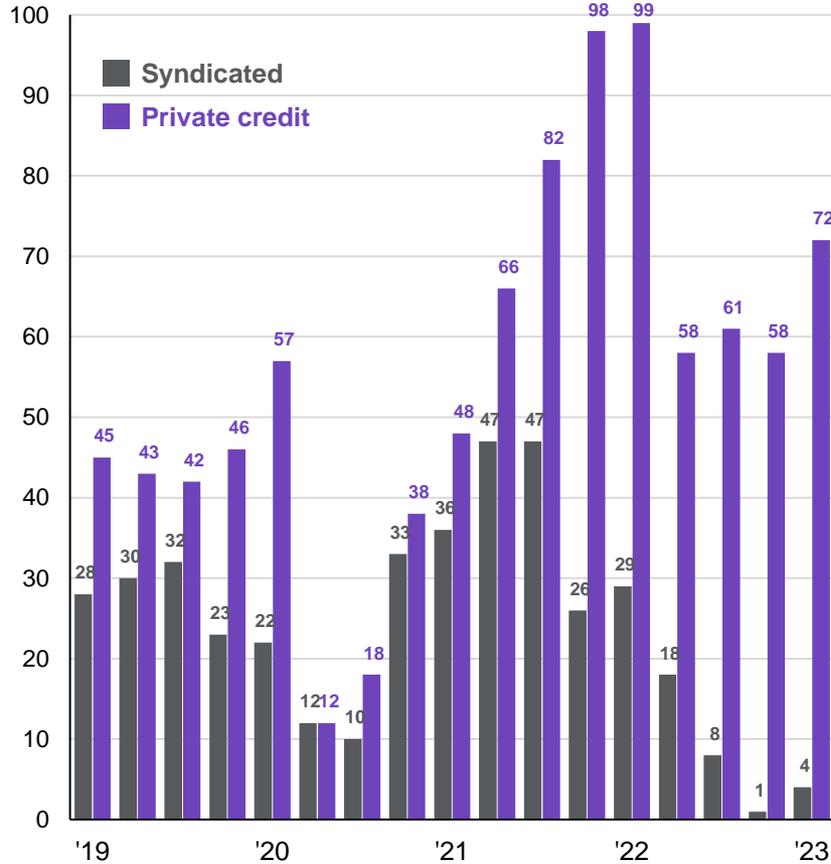


# Sponsored versus non-sponsored leveraged loans

Private markets

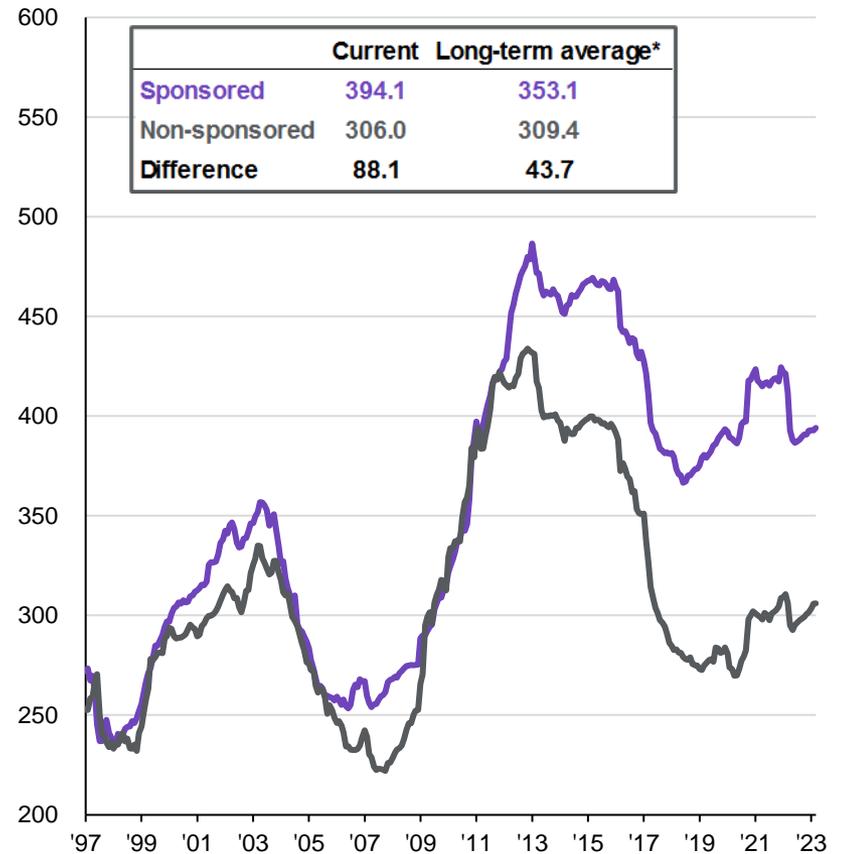
## Sources of LBO financing

Bank syndicated loan and private credit markets, quarterly



## Sponsored and non-sponsored leveraged loan spreads

Weighted average nominal spreads, monthly, since 1997



Source: Pitchbook, LCD, Morningstar LSTSA U.S. Leveraged Loan Index. LBO financing and Sponsored and non-sponsored leveraged loan data are as of March 31, 2023. \*Averages are since 1997. Data are based on availability as of May 31, 2023.

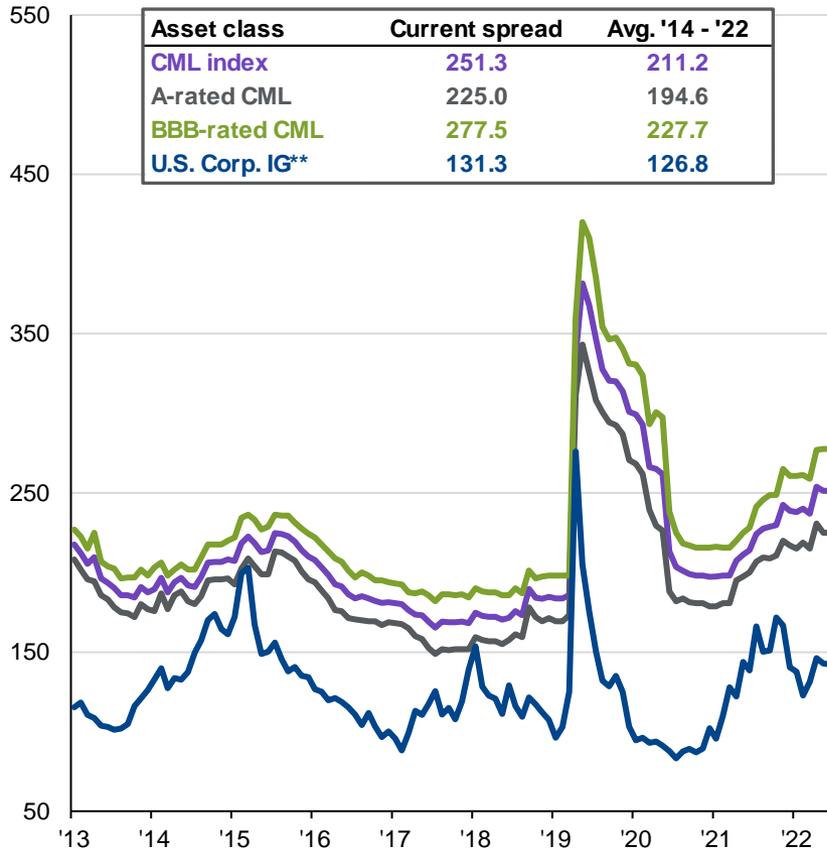


# Commercial mortgage loans

Private markets

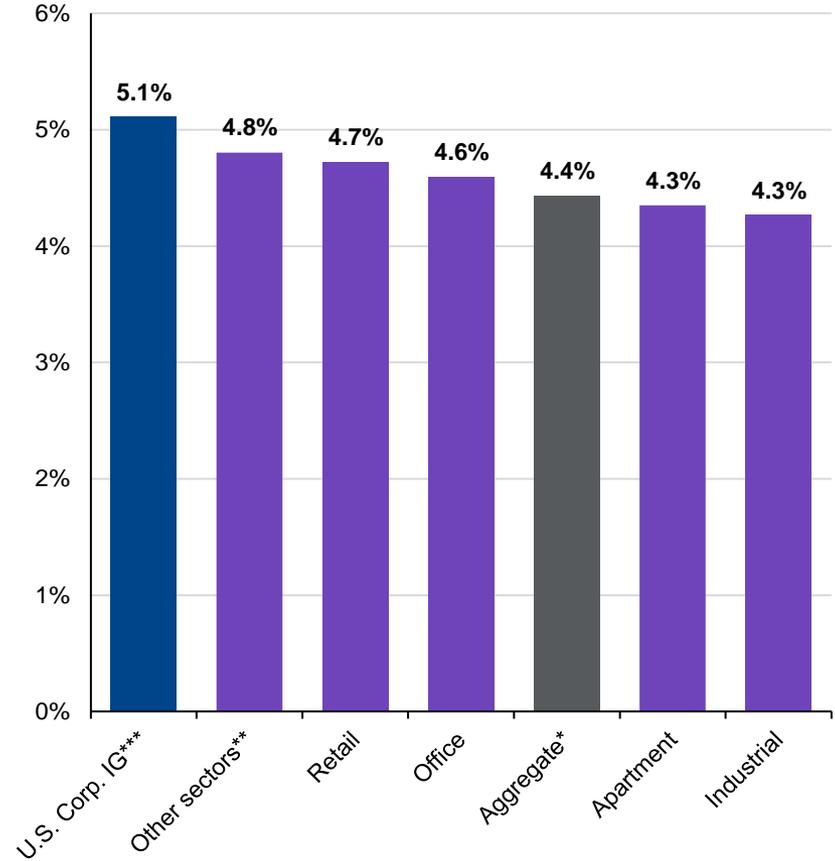
## Commercial mortgage spreads

Spreads over Treasury, basis points, senior loans



## Commercial mortgage yields

12-month income return, unlevered, senior loans, 1Q23



Source: Bloomberg, Gilberto-Levy, FactSet, J.P. Morgan Asset Management. All spreads are as of May 2023. \*Aggregate: Gilberto-Levy Commercial Mortgage Loans Performance Index. \*\*Other sectors includes hotels, motels, mixed-use, and miscellaneous. \*\*\*U.S. Corp. IG: Bloomberg U.S. Corporate Investment Grade Index. The income return shown for U.S. Corp. IG is the last 12-month average yield to worst as of March 31, 2023. Commercial mortgage spreads are from a J.P. Morgan survey and are calculated as the difference between the average yield as indicated by the survey and the yield of a U.S. Treasury security with a similar duration. Data are based on availability as of May 31, 2023



# Hedge fund strategy returns

Hedge funds

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	YTD '23	2013-2022	
											Ann.	Vol.
Global Equities 23.4%	Global Macro 5.8%	Eq. Market Neutral 4.5%	Distressed 9.8%	Global Equities 24.6%	Merger Arbitrage 4.3%	Global Equities 27.3%	Global Equities 16.8%	Distressed 20.0%	Global Macro 9.7%	Global Equities 7.9%	Global Equities 8.5%	Global Equities 15.5%
Distressed 15.1%	Relative Value 5.3%	Merger Arbitrage 2.6%	Global Equities 8.5%	Equity Long/Short 12.8%	Relative Value 2.1%	Global Bonds 6.8%	Equity Long/Short 14.2%	Global Equities 19.0%	Merger Arbitrage 2.7%	Equity Long/Short 1.9%	Equity Long/Short 5.8%	Distressed 7.8%
Equity Long/Short 14.5%	Global Equities 4.7%	Global Macro 0.4%	Relative Value 5.4%	HFRI Composite 8.5%	Distressed 2.1%	Equity Long/Short 6.7%	Global Bonds 9.2%	Equity Long/Short 16.3%	Eq. Market Neutral 1.8%	Relative Value 1.9%	Distressed 5.0%	Equity Long/Short 7.7%
HFRI Composite 9.6%	HFRI Composite 4.3%	Relative Value 0.2%	Merger Arbitrage 3.5%	Distressed 7.7%	Eq. Market Neutral -0.8%	Global Macro 6.0%	HFRI Composite 8.9%	HFRI Composite 13.9%	Relative Value -0.6%	Global Bonds 1.4%	HFRI Composite 4.9%	Global Bonds 6.5%
Relative Value 7.5%	Equity Long/Short 3.6%	Equity Long/Short -0.2%	Equity Long/Short 3.4%	Global Bonds 7.4%	Global Bonds -1.2%	HFRI Composite 5.6%	Distressed 8.4%	Merger Arbitrage 13.4%	HFRI Composite -2.8%	HFRI Composite 1.1%	Merger Arbitrage 4.6%	HFRI Composite 5.6%
Eq. Market Neutral 6.4%	Eq. Market Neutral 3.2%	HFRI Composite -0.2%	HFRI Composite 3.2%	Relative Value 5.5%	HFRI Composite -1.2%	Merger Arbitrage 5.3%	Merger Arbitrage 2.9%	Global Macro 11.1%	Distressed -3.1%	Eq. Market Neutral 1.0%	Relative Value 4.1%	Global Macro 5.0%
Merger Arbitrage 5.3%	Merger Arbitrage 1.9%	Global Equities -1.8%	Global Bonds 2.1%	Merger Arbitrage 5.0%	Equity Long/Short -2.2%	Relative Value 4.1%	Relative Value 2.7%	Relative Value 9.5%	Equity Long/Short -8.1%	Distressed 0.3%	Global Macro 3.2%	Merger Arbitrage 4.1%
Global Macro 0.1%	Distressed 1.2%	Global Bonds -3.2%	Eq. Market Neutral 1.6%	Eq. Market Neutral 4.9%	Global Macro -3.6%	Eq. Market Neutral 2.3%	Global Macro 2.0%	Eq. Market Neutral 7.4%	Global Bonds -16.2%	Merger Arbitrage -0.9%	Eq. Market Neutral 3.0%	Relative Value 4.1%
Global Bonds -2.6%	Global Bonds 0.6%	Distressed -7.4%	Global Macro -1.3%	Global Macro 2.5%	Global Equities -8.9%	Distressed -0.7%	Eq. Market Neutral -1.2%	Global Bonds -4.7%	Global Equities -18.0%	Global Macro -1.5%	Global Bonds -0.4%	Eq. Market Neutral 2.2%

Source: MSCI, Bloomberg, HFRI, FactSet, J.P. Morgan Asset Management. Global equities reflect the MSCI AC World Index and global bonds reflect the Bloomberg Global Aggregate Index. All hedge fund returns are from HFRI. HFRI Composite: HFRI FW Composite Index. Returns may fluctuate as hedge fund reporting occurs on a lag. Please see disclosure pages for index definitions. Data are based on availability as of May 31, 2023.



# Hedge funds and manager selection

## Hedge fund manager dispersion

Based on 10-year trailing returns



Hedge funds

Sources: PivotalPath, J.P. Morgan Asset Management.

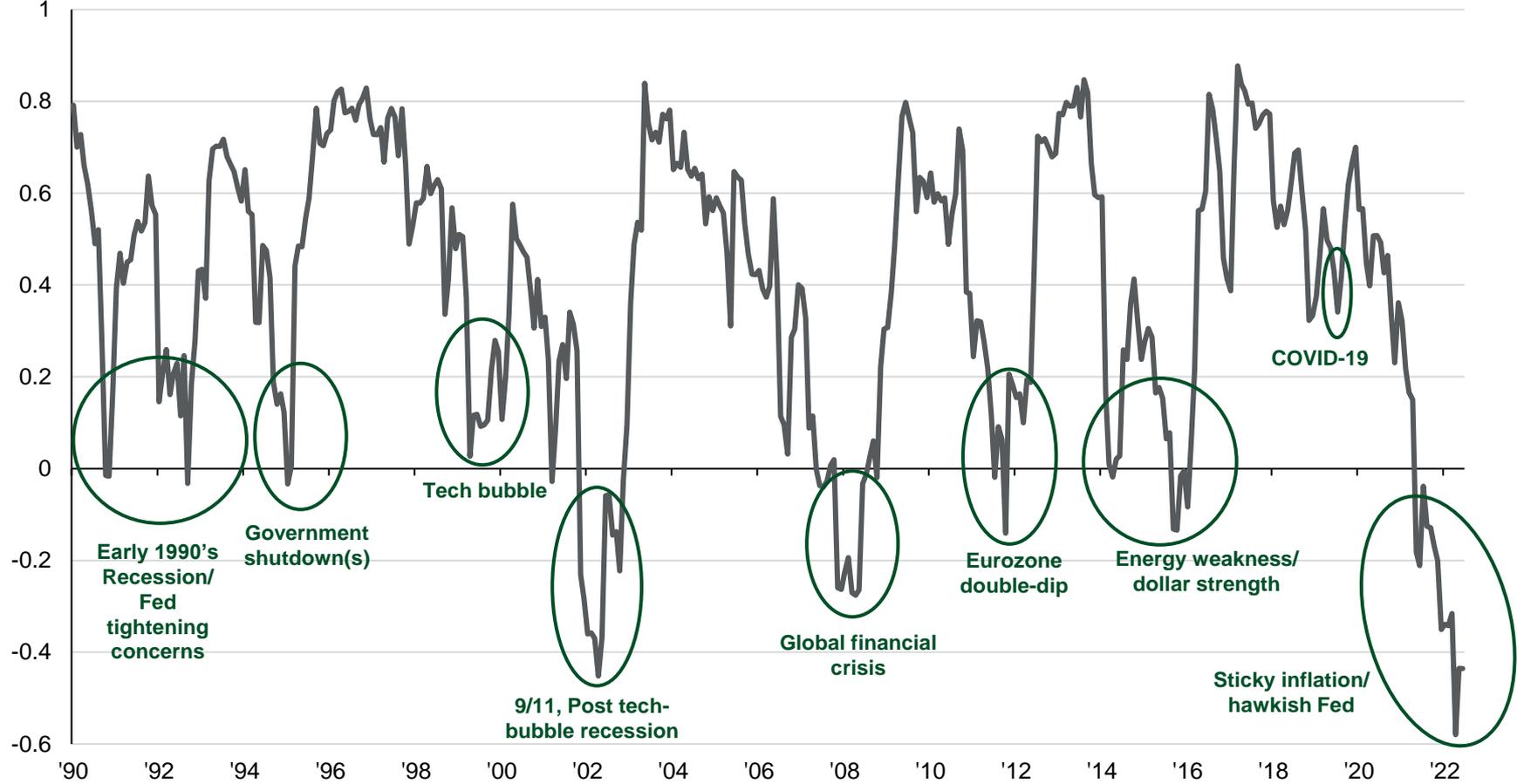
Manager dispersion is based on monthly returns for hedge funds. Blue bar denotes median. All hedge funds: Fund Weighted Composite Index, Equity market neutral: Equity hedge – equity market neutral, Event-driven: Event-Driven (Total), Relative value: Relative Value (Total), Relative value multi-strategy: Relative Value Multi-Strategy, Macro total: Macro (Total), Equity hedge: Equity Hedge (Total), Emerging markets: Emerging Markets Global. All Data are as of 1Q23.

Data are based on availability as of May 31, 2023.



# Hedge funds and traditional portfolios

### Hedge fund correlation with a 60/40 stock-bond portfolio\* 1990 – May 2023, monthly



Sources: HFRI, Standard & Poor's, Bloomberg, FactSet, J.P. Morgan Asset Management.  
 \*60/40 portfolio is 60% S&P 500 and 40% Bloomberg U.S. Aggregate. Hedge funds are represented by HFRI Macro. Correlation is calculated on a 12-month rolling basis.  
 Data are based on availability as of May 31, 2023.

Hedge funds

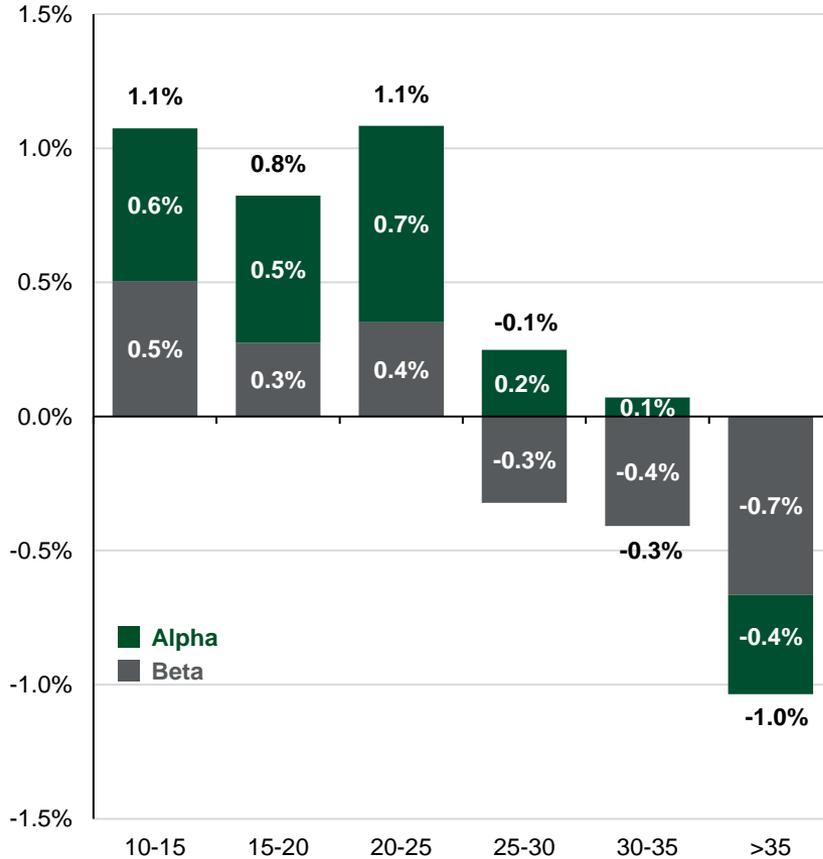


# Hedge funds and volatility

Hedge funds

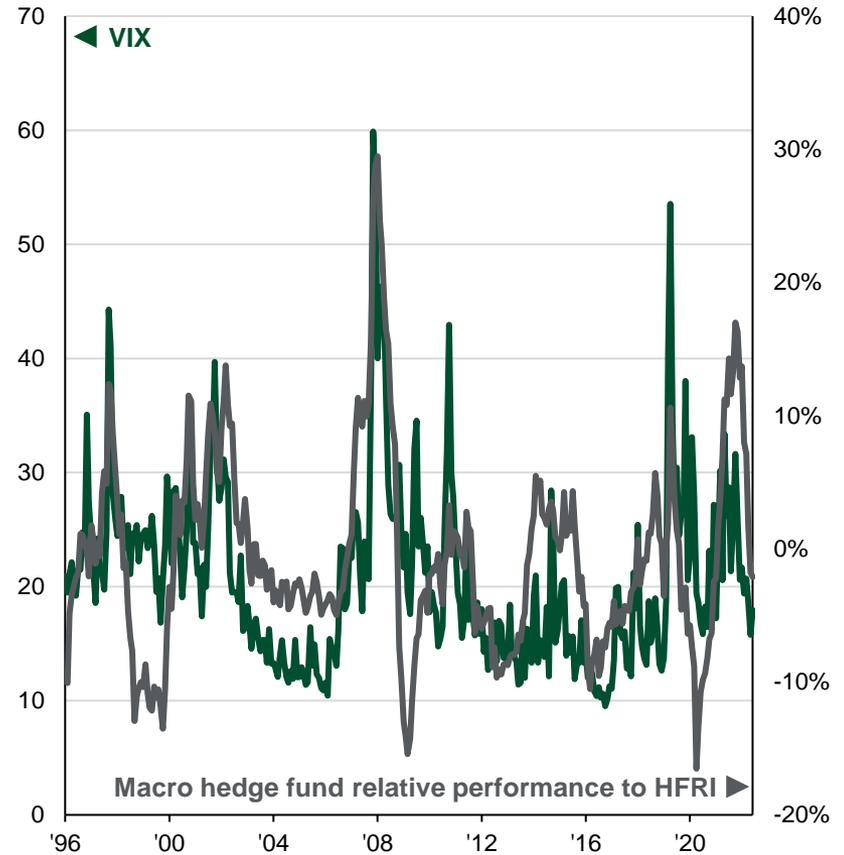
## Hedge funds and volatility

Average monthly hedge fund returns by VIX level, 1990 – present



## Macro hedge fund relative performance & volatility

VIX index level, y/y change in rel. perf. of HFRI Macro index



Source: HFRI, CBOE, MSCI, FactSet, J.P. Morgan Asset Management.  
 Historical beta is based on regression analysis, where the HFRI is the dependent variable and the MSCI AC World Index is the independent variable.  
 Monthly VIX reading is an average. Numbers may not sum to 100% due to rounding.  
 Data are based on availability as of May 31, 2023

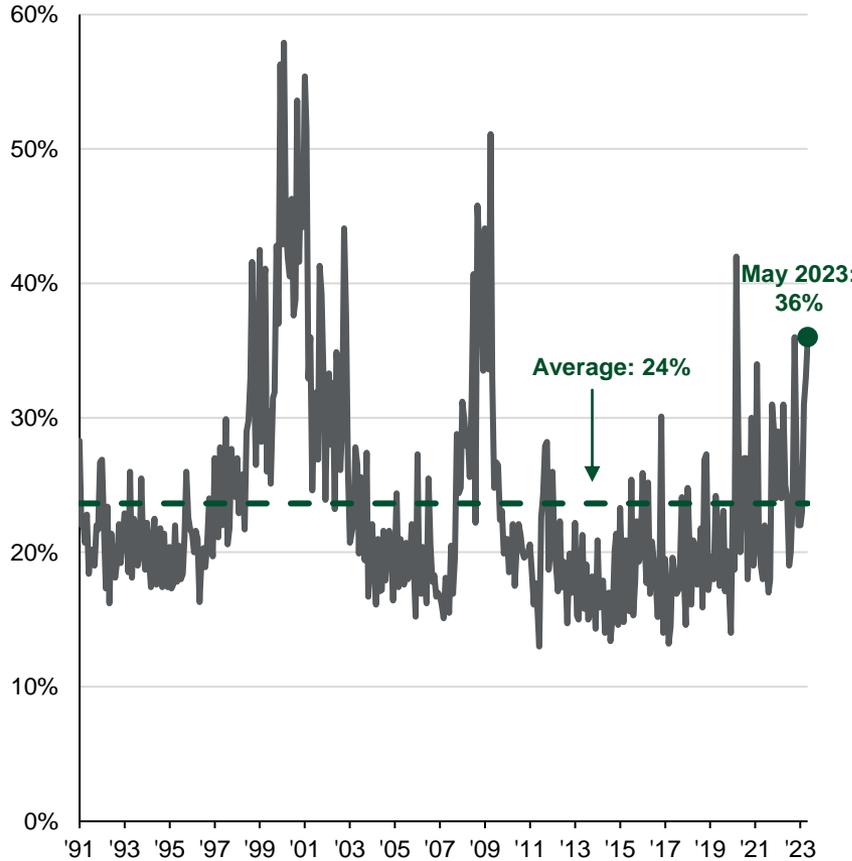


# Equity market dispersion and positioning

Hedge funds

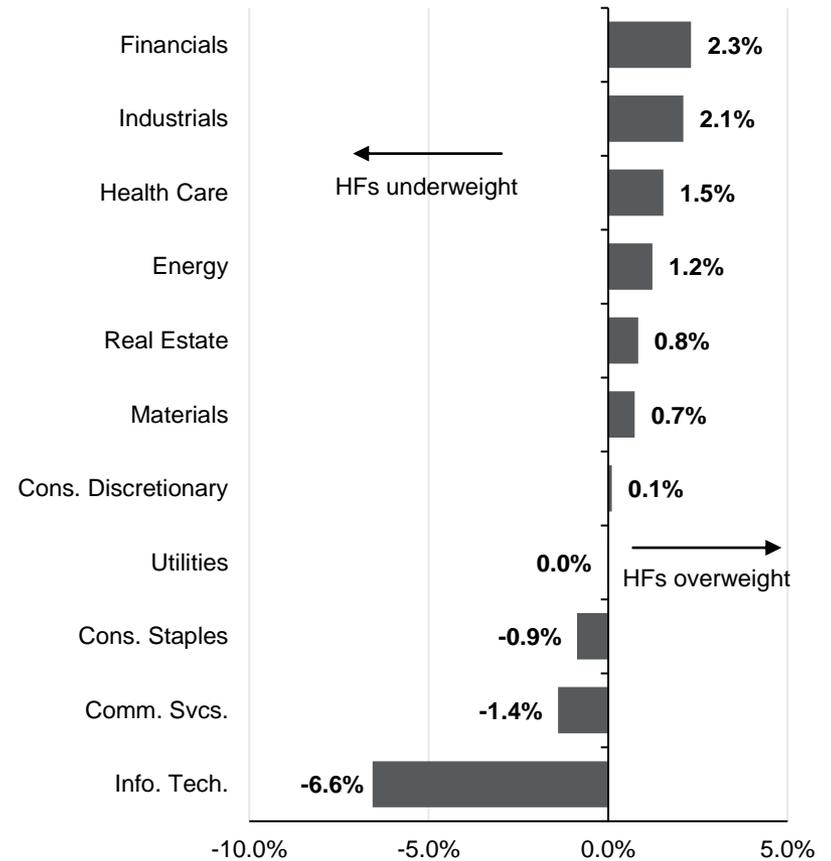
### S&P 500 Index dispersion\*

Monthly, 1991 – present



### Hedge fund sector exposure relative to S&P 500

1Q23



Source: Standard & Poor's, SEC, HFRI, FactSet J.P. Morgan Asset Management.

\*S&P 500 Index dispersion is calculated as the annualized, index-weighted standard deviation of the index constituent's full-month total returns.

Hedge fund positioning relative to the S&P is compiled using aggregated data from the SEC Form 13F and Standard & Poor's.

Data are based on availability as of May 31, 2023

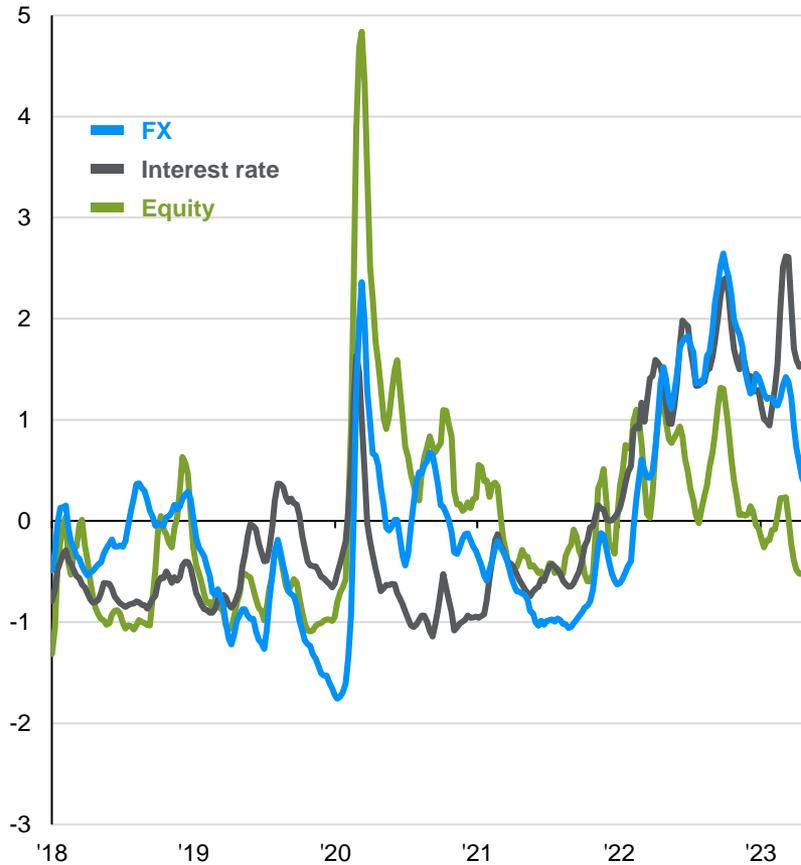


# Volatility, rates, and hedge fund returns

Hedge funds

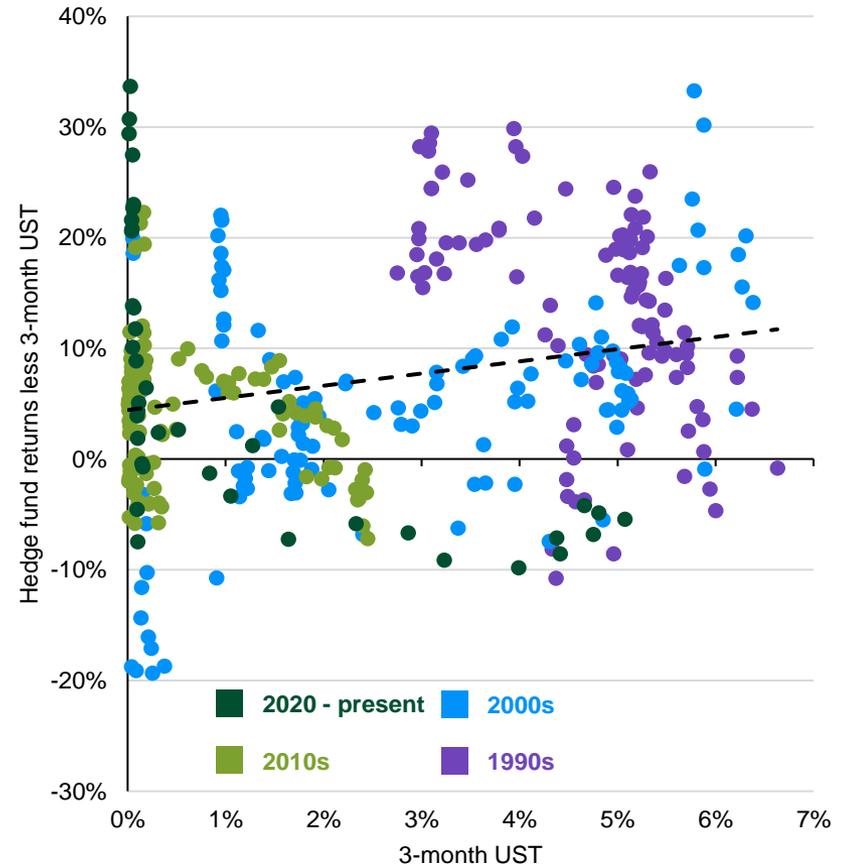
### Equity, interest rate and foreign exchange volatility

Z-score, 4-week moving average



### Hedge fund returns and short-term rates

December 1990 – present, monthly, year-over-year total returns

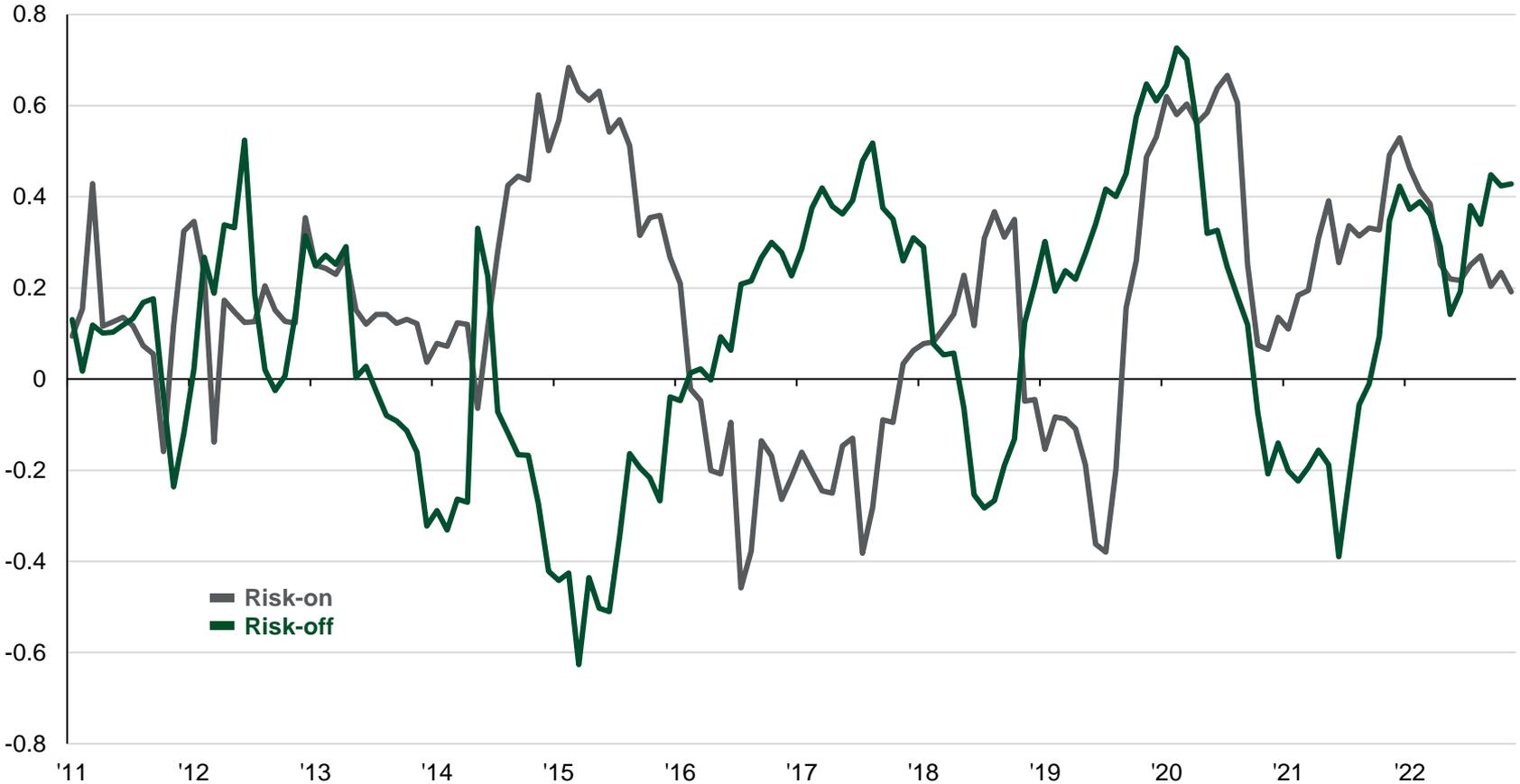


Source: CBOE, ICE BofA, J.P. Morgan Index Research, HFRI, FactSet, J.P. Morgan Asset Management. Equity volatility is represented by the VIX Index, interest rate volatility is represented by the MOVE Index and foreign exchange volatility is represented by the J.P. Morgan Global FX Volatility Index. Data are based on availability as of May 31, 2023.



# Cryptocurrency correlations

## Risk-on and risk-off assets 12-month rolling correlations, monthly



Hedge funds

Source: Bloomberg, FactSet, J.P. Morgan Asset Management. Risk-on correlations are calculated by taking the average rolling 12-month correlations between Bitcoin and the S&P 500 and 5 year, 5 year forward inflation expectations. Risk-off correlations are calculated by taking the average rolling 12-month correlations between Bitcoin and Gold and the Bloomberg U.S. Aggregate. Data are based on availability as of May 31, 2023.



# J.P. Morgan Asset Management – Definitions

GTA

U.S.

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**Alpha** – Is the difference between an investment's return and its expected return, given its level of beta.

**Accredited investor** – Defined by Rule 501 of Regulation D, an individual (i.e. non-corporate) "accredited investor" is either a natural person who has individual net worth, or joint net worth with the person's spouse, that exceeds \$1 million at the time of the purchase OR a natural person with income exceeding \$200,000 in each of the two most recent years or joint income with a spouse exceeding \$300,000 for those years and a reasonable expectation of the same income level in the current year. For the complete definition of accredited investor, see the SEC website.

**Capital commitment** – A Limited Partner's obligation to provide a specific amount of capital to a Closed-end Fund (defined below) for investments. The Capital Commitment is "drawn down" or "called" over time, meaning a portion of the commitment must be wired to the Closed-end Fund by a set date.

**Capital called** – The amount of capital wired to a fund that is "drawn down" over time as the General Partner selects investments.

**Carried interest (aka incentive fee)** – A fee paid to a fund manager for generating returns over a benchmark; calculated as a percentage of investment profits over a hurdle rate and charged in addition to a management fee. In Private Equity, carried interest (typically up to 20% of the profits) becomes payable once the investors have achieved repayment of their original investment in the fund, plus a defined hurdle rate.

**Catch-up** – This is a common term of the private equity partnership agreement. Once the general partner provides its limited partners with their preferred return, if any, it then typically enters a catch-up period in which it receives the majority or all of the profits until the agreed upon profit-split, as determined by the carried interest, is reached.

**Clawback** – A clawback obligation represents the general partner's promise that, over the life of the fund, the managers will not receive a greater share of the fund's distributions than they bargained for. Generally, this means that the general partner may not keep distributions representing more than a specified percentage (e.g., 20%) of the fund's cumulative profits, if any. When triggered, the clawback will require that the general partner return to the fund's limited partners an amount equal to what is determined to be "excess" distributions.

**Closed-end fund** – A fund that has a finite capital raising period and stated term (i.e. 5 years, 10 years, etc.). Clients will have the ability to commit to the fund during the set fundraising period, after which point the fund will be closed to new investors. Unlike an open-ended fund, there is limited flexibility on when a client may invest and there is no liquidity/redemptions. Clients who invest are obligated to remain in the fund for the duration of the term; they will be required to fulfill capital calls during the stated commitment period and will receive periodic distributions based on underlying monetization of investments.

**Commitment period** – The period of time within which the fund can make investments as established in the Limited Partnership Agreement ("LPA"), meaning the governing document, for the fund.

**Direct co-investment** – An investment made directly in a single underlying asset of a fund. Example: The General Partner elects to invest in an operating company alongside a fund.

**Dispersion** – Difference between the best-performing and worst-performing strategies.

**Distressed** – A financial instrument in a company that is near or is currently going through bankruptcy. This usually results from a company's inability to meet its financial obligations. As a result, these financial instruments have suffered a substantial reduction in value. Distressed securities can include common and preferred shares, bank debt, trade claims (goods owed) and corporate bonds.

**Distributions** – The total proceeds distributed by the fund to the Limited Partners, which may include both return of capital and gain distributions.

**General partner** – The managing partner of a Limited Partnership. The General Partner is managed by the asset management team responsible for making fund investments (i.e., the intermediary between investors with capital and businesses seeking capital to grow).

**Gross IRR** – The dollar-weighted internal rate of return, before management fees and carried interest generated by the fund.

*Hedge Fund strategies:*

**Relative Value/Arbitrage** involves the simultaneous purchase and sale of similar securities to exploit pricing differentials. Strategies in this sector offer potential to generate consistent returns while minimizing directional risk.

**Opportunistic/Macro** strategies involve investments in a wide variety of strategies and instruments, which often have a directional stance based on the manager's global macroeconomic views.

**Long/Short (L/S) Equity** involves long and/or short positions in equity securities deemed to be under- or overvalued, respectively. Exposures to sectors, geographies, and market capitalizations are often flexible and will change over time.

**Merger Arbitrage/Event Driven** strategies invest in opportunities created by significant corporate transactions and events which tend to alter a company's financial structure or operating strategy.

**Distressed Securities** invests in debt and equity securities of firms in reorganization or bankruptcy.

**High watermark** – The highest peak in value that an investment fund has reached. This term is often used in the context of fund manager compensation. For example, a \$1,000,000 investment is made in year 1 and the fund declines by 50%, leaving \$500,000 in the fund. In year 2, the fund returns 100%, bringing the investment value back to \$1,000,000. If a fund has a high watermark, it will not take incentive fees on the return in year 2, since the investment has never grown. The fund will only take incentive fees if the investment grows above the initial level of \$1,000,000.

**Hurdle rate** – The rate of return that the fund manager must meet before collecting incentive fees.

**Internal rate of return (IRR)** – The dollar-weighted internal rate of return. This return considers the daily timing of cash flows and cumulative fair stated value, as of the end of the reported period.

**J-Curve effect** – Occurs when funds experience negative returns for the first several years. This is a common experience, as the early years of the fund include capital drawdowns and an investment portfolio that has yet to mature. If the fund is well managed, it will eventually recover from its initial losses and the returns will form a J-curve: losses in the beginning dip down below the initial value, and later returns show profits above the initial level.

**K-1** – Tax document issued for an investment in partnership interests to report your share of income, deductions and credits. (Note that Private Investments generally issue a Schedule K-1 instead of a Form 1099 for tax reporting. K-1s may at times be issued later than 1099s, requiring investors to file for an extension).

**Limited partner** – An investor in a Limited Partnership, which is a form of legal entity used for certain hedge funds, private equity funds and real estate funds.

**Management fee** – Fee paid to a fund manager for managing the fund; typically calculated as a percentage of assets under management.

**Mezzanine finance** – Loan finance that is half-way between equity and secured debt, either unsecured or with junior access to security. A mezzanine fund is a fund focusing on mezzanine financing.

**Multiple of Invested Capital (MOIC)** – Calculation performed by adding the remaining (reported) value and the distributions received (cash out) and subsequently dividing that amount by the total capital contributed (cash in).

**Net asset value (NAV)** – This is the current fair stated value for each of the investments, as reported by the administrator of the fund.

**Net IRR** – The dollar-weighted internal rate of return, net of management fees and carried interest generated by the fund. This return considers the daily timing of all cash flows and the cumulative fair stated value, as of the end of the reported period.



**Open-ended fund** – As it relates to private alternatives (not mutual fund structure), an open-ended fund is a fund that has no stated term or maturity and allows clients to invest and redeem on an ongoing basis. The frequency of investments (aka subscriptions) and / or redemptions may vary. Redemptions from open-ended private alternative funds generally require advance notice in writing.

**Pari Passu** – At an equal rate or pace, without preference.

**Portfolio company** – A business entity that has secured at least one round of financing from one or more private equity funds. A company in which a given fund has invested.

**Post-money valuation** – The valuation of a company immediately after the most recent round of financing. For example, a venture capitalist may invest \$3.5 million in a company valued at \$2 million "pre-money" (before the investment was made). As a result, the startup will have a post money valuation of \$5.5 million.

**Pre-money valuation** – The valuation of a company prior to a round of investment. This amount is determined by using various calculation methods, such as multiples to earnings or comparable to other private and/or public companies.

**Preferred return** – Also known as Hurdle Rate.

**Private equity** – Equity capital invested in a private company through a negotiated process.

**Primary investment** – An investment made in a newly formed limited partnership.

**Real estate investment trust (REITs)** – Stocks listed on an exchange that represent an interest in a pool of real estate properties.

**Realized value** – The amount of capital extracted from an investment.

**Reported/remaining value** – The current stated value for each of the investments in a fund, as reported by the General Partner of the fund.

**Return on equity (RoE)** - Amount of net income returned as a percentage of shareholders' equity.

**Secondary market investment** – The buying and selling of pre-existing investor commitments.

**Seed money** – The first round of capital for a start-up business. Seed money usually takes the structure of a loan or an investment in preferred stock or convertible bonds, although sometimes it is common stock. Seed money provides startup companies with the capital required for their initial development and growth. Angel investors and early-stage venture capital funds often provide seed money.

**Tax documents** – See K-1.

**Total value** – The combination of market value and realized value of an investment. Shows the total worth of an investment.

**Unfunded commitment** – Money that has been committed to an investment but not yet transferred to the General Partner.

**Venture capital** – A specialized form of private equity, characterized chiefly by high-risk investment in new or young companies following a growth path in technology and other value-added sectors.

**Vintage year** – The year of fund formation and first draw-down of capital.

**Write-down** – A reduction in the value of an investment.



# J.P. Morgan Asset Management – Risks & disclosures

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