

# Guide to Alternatives

---

4Q 2021 | As of November 30, 2021

*J.P. Morgan*

## ■ Alts in aggregate

3. Alternatives fundraising
4. Alternatives dry powder
5. Public and private market correlations
6. Alternatives and manager selection
7. Manager dispersion
8. Yield alternatives
9. Equity market correlations and yields
10. Portfolio diversification
11. Alternatives asset class returns

## ■ Global real estate

12. Global real estate investment
13. U.S. real estate dynamics
14. U.S. real estate: Office
15. U.S. real estate: Retail and industrial
16. Global real estate: Retail
17. Global real estate: Industrial
18. U.S. REITs and real estate
19. U.S. REIT sector returns

## ■ Global infrastructure and transport

20. Global infrastructure investment
21. Infrastructure transactions
22. Sources of global infrastructure returns
23. Utility profitability and household spending
24. Sources of carbon emissions
25. Global renewable energy
26. Clean energy investment and electricity generation
27. Carbon pricing
28. Forestry, inflation, and carbon offsets
29. Electric transportation investment and vehicle sales
30. Global trade
31. Shipping trends: orderbook

## ■ Global infrastructure and transport (cont.)

32. Shipping trends: Port calls
33. Natural gas trends
34. Inland transportation
35. Wind power
36. Aircraft trends

## ■ Private markets

37. U.S. public vs. private equity
38. Business activity
39. Private equity deals and multiples
40. Private equity deal trends
41. Middle market deals and capital calls
42. Private equity co-investments and the secondary market
43. Private equity exit activity and IPOs
44. Venture capital
45. Global M&A
46. Private debt fundraising
47. Credit market participants and sources of financing
48. New-issue loans and high yield spreads
49. Credit returns across recent economic cycles: 2004-2021
50. Drawdown dispersion and recovery rates
51. Loan issuance and EBITDA
52. Growth equity
53. Commercial mortgage loans

## ■ Hedge funds

54. Hedge fund strategy returns
55. Hedge funds and manager selection
56. Hedge fund flows and exposures
57. Hedge funds and traditional portfolios
58. Hedge funds and volatility
59. Equity and credit dispersion
60. Equity and fixed income positioning

## ■ Hedge funds

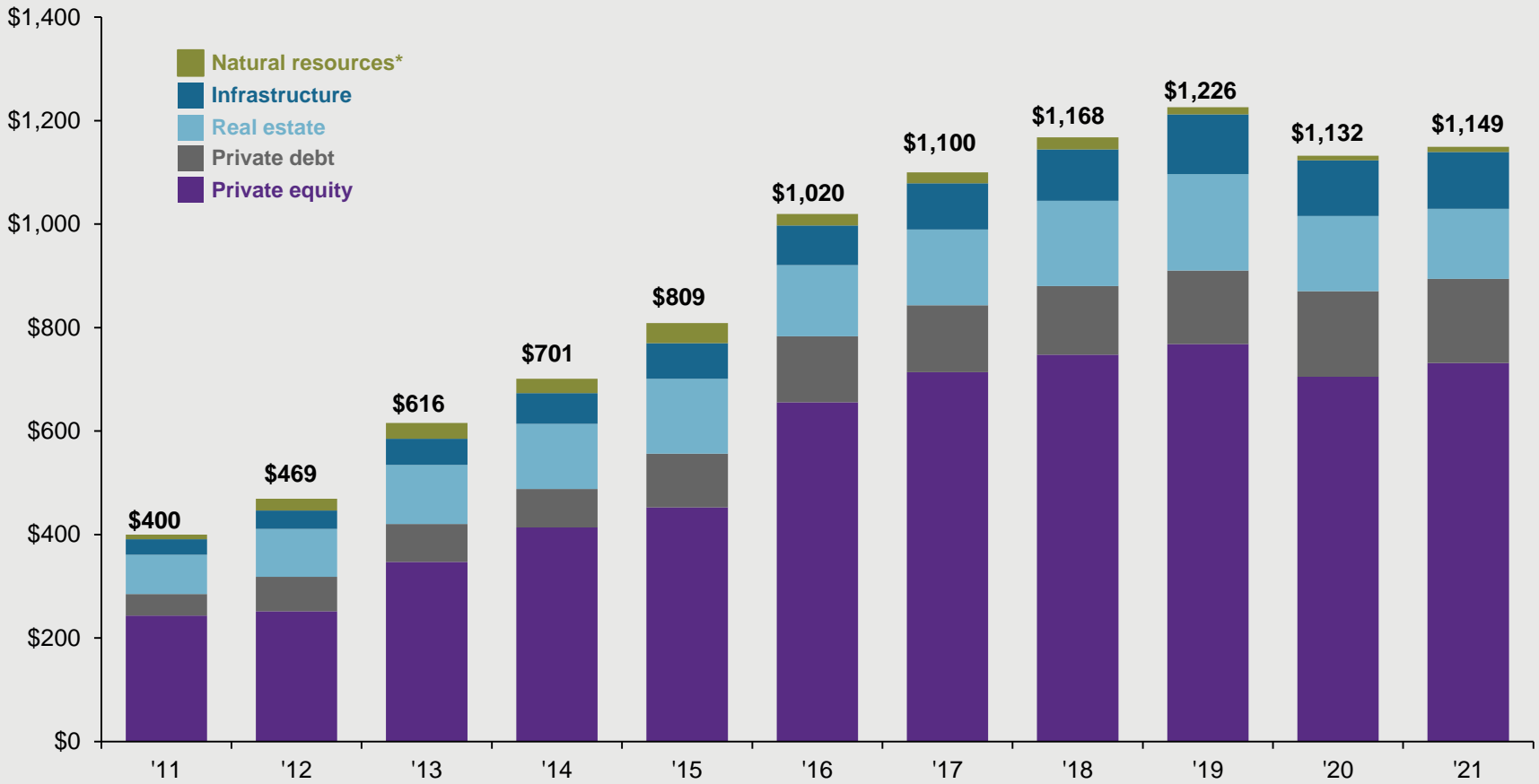
61. Asset class volatility
62. Cryptocurrencies and electricity consumption
63. Cryptocurrency transactions and block sizes
64. Evolution of crypto volatility

### Prepared by:

David Lebovitz, *Global Market Strategist*, Market Insights, J.P. Morgan Asset Management  
 Meera Pandit, CFA, *Global Market Strategist*, Market Insights, J.P. Morgan Asset Management  
 Nimish Vyas, *Analyst*, Market Insights, J.P. Morgan Asset Management

## Global private capital fundraising

USD billions



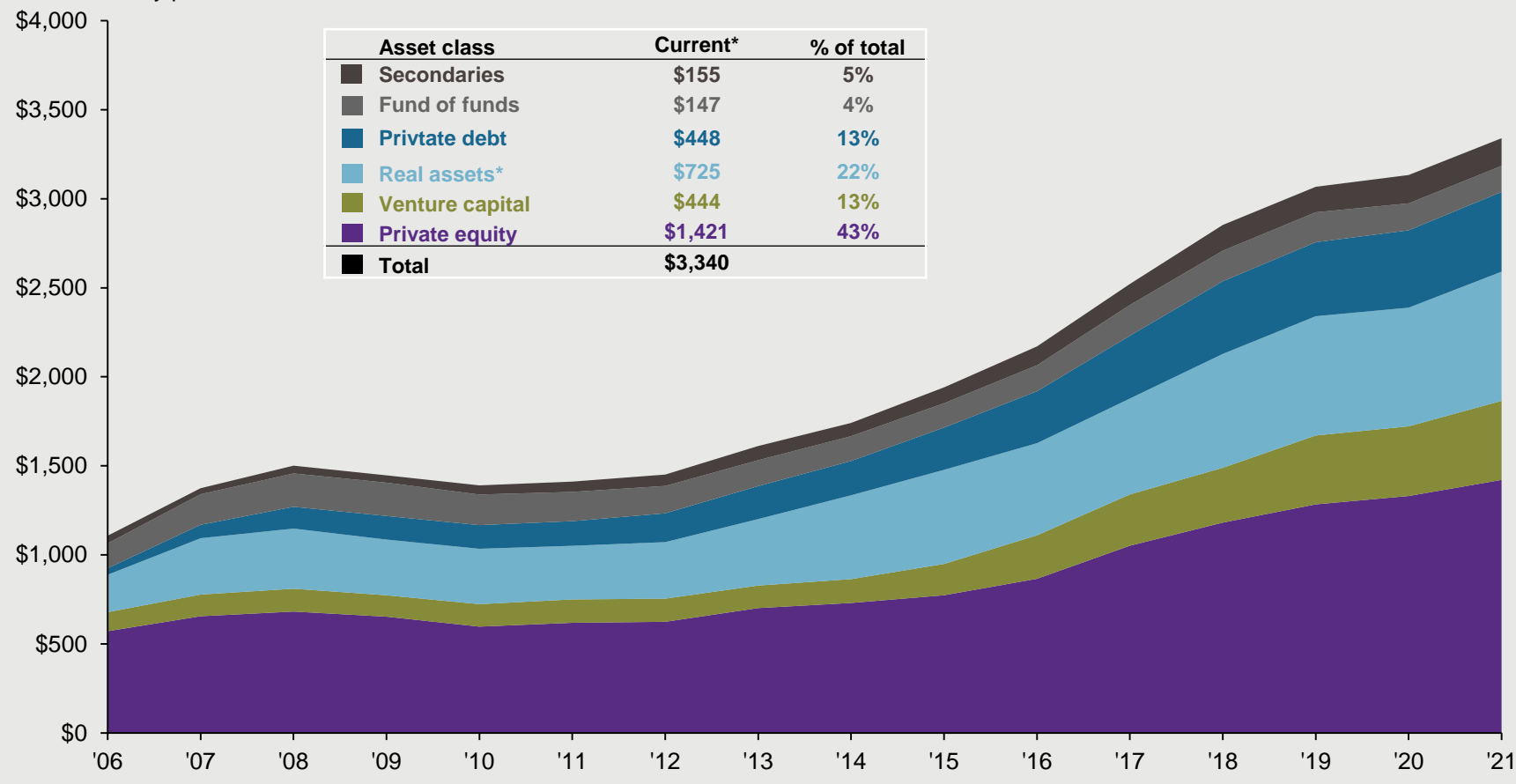
Source: Preqin, J.P. Morgan Asset Management.

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 and timber funds. 2021 fundraising figures are as of 3Q21,

Data is based on availability as of November 30, 2021.

## Dry powder by asset class

Cumulative dry powder, USD billions



Source: Pitchbook, J.P. Morgan Asset Management. \*Dry powder data is as of March 31, 2021. Percentages may not sum to 100 due to rounding.

\*Real assets dry powder includes real estate & infrastructure.

Data is based on availability as of November 30, 2021.

## Public and private market correlations

Quarterly returns

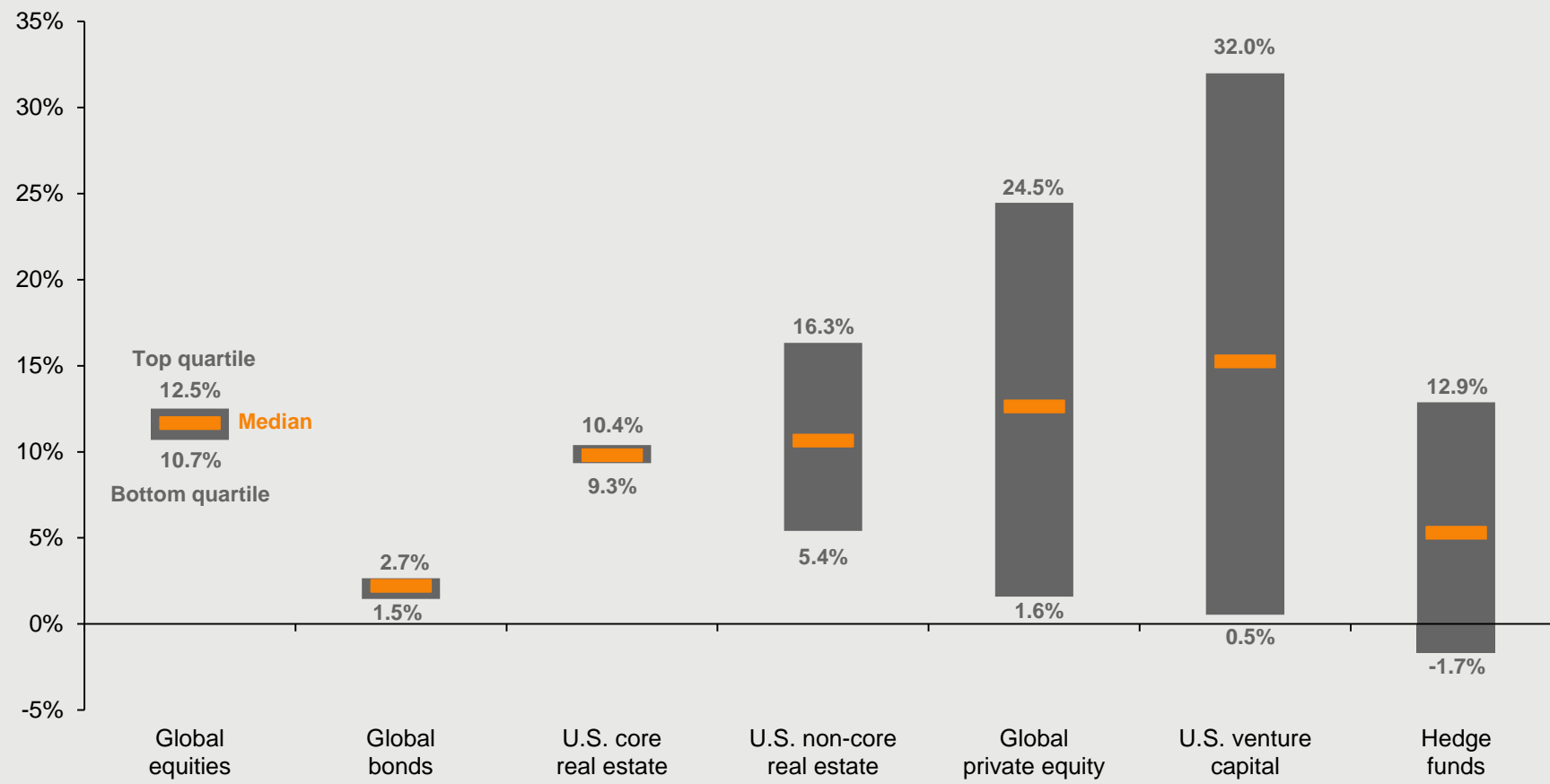
2008 - 2021		Global Bonds	Global Equities	U.S. Core RE	Europe Core RE*	APAC Core RE	Global Core Infra	Transport	Timber	Direct Lending	Venture Capital	Private Equity	Equity Long/Short	Relative Value	Macro	Bitcoin
Financial assets	Global Bonds	1.0														
	Global Equities	0.3	1.0													
Global real estate	U.S. Core RE	-0.1	0.1	1.0												
	Europe Core RE*	-0.2	0.3	0.8	1.0											
	APAC Core RE	-0.1	0.1	0.8	0.7	1.0										
Real assets	Global Core Infra	-0.1	-0.1	0.3	0.0	0.2	1.0									
	Transport	-0.1	0.0	0.7	0.6	0.6	0.1	1.0								
	Timber	-0.2	-0.1	0.2	0.1	0.1	0.1	0.1	1.0							
Private markets	Direct Lending	0.0	0.7	0.3	0.4	0.3	0.2	0.2	-0.1	1.0						
	Venture Capital	0.0	0.6	0.3	0.6	0.3	0.1	0.3	0.1	0.5	1.0					
	Private Equity	0.2	0.9	0.3	0.5	0.4	0.0	0.3	-0.1	0.8	0.8	1.0				
Hedge funds	Equity Long/Short	0.2	1.0	0.0	0.2	0.0	0.0	0.3	-0.1	0.7	0.7	0.9	1.0			
	Relative Value	0.2	0.9	0.0	0.2	0.0	0.0	0.0	-0.2	0.9	0.5	0.8	0.9	1.0		
Crypto	Macro	0.3	0.4	-0.1	0.0	-0.1	0.0	-0.1	0.0	0.2	0.4	0.3	0.5	0.4	1.0	
	Bitcoin	0.1	0.1	0.3	-0.2	0.1	0.5	0.2	0.0	0.1	0.1	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 (equal-weighted blend). 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 – 6/30/2021, except correlations with Bitcoin which are calculated over the period 12/31/2010 – 6/30/2021. Returns are denominated in USD.

Data is based on availability as of November 30, 2021.

## Private and public manager dispersion

Based on returns over a 10 year window\*



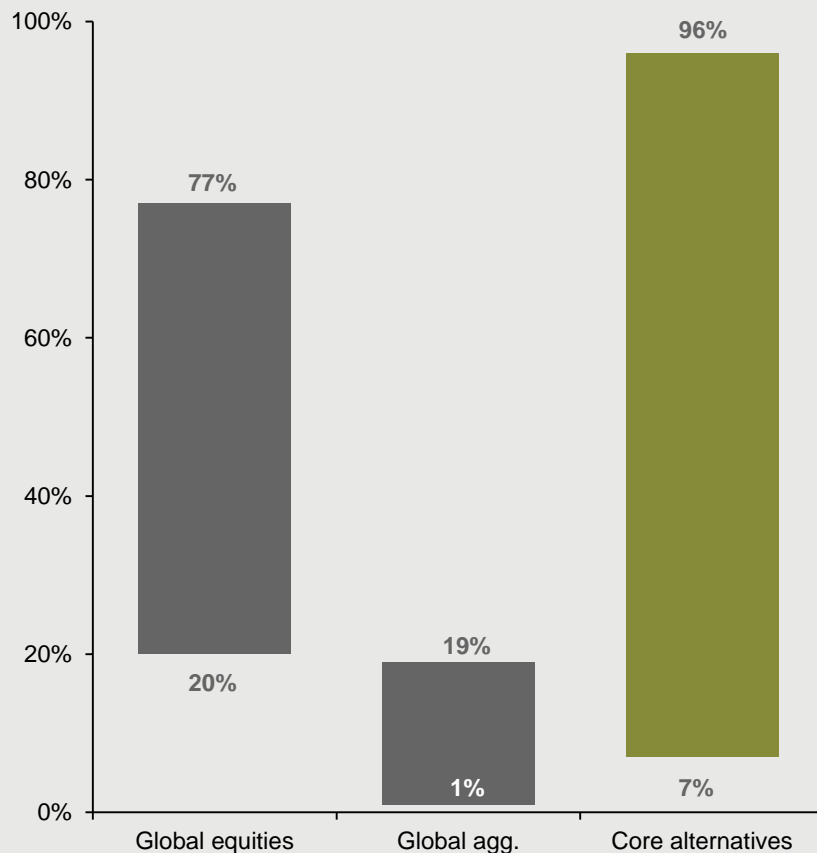
Sources: Lipper, NCREIF, Cambridge Associates, HFRI, J.P. Morgan Asset Management.

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 global equities, global bonds, and U.S. core real estate over a 10 year period ending 3Q 2021. Hedge fund returns are based on annual returns from Nov. 2011 – Oct. 2021. U.S. non-core real estate, global private equity and U.S. venture capital are represented by the 10-year horizon internal rate of return (IRR) ending 2Q 2021.

Data is based on availability as of November 30, 2021.

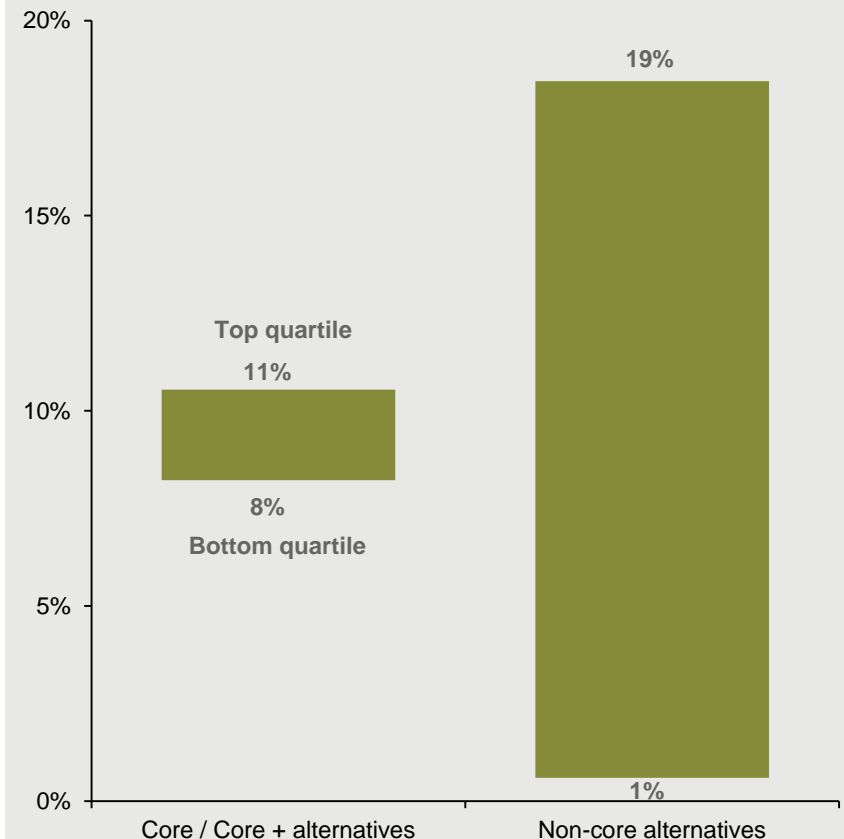
## Asset class dispersion

Based on returns over a 10 year window\*



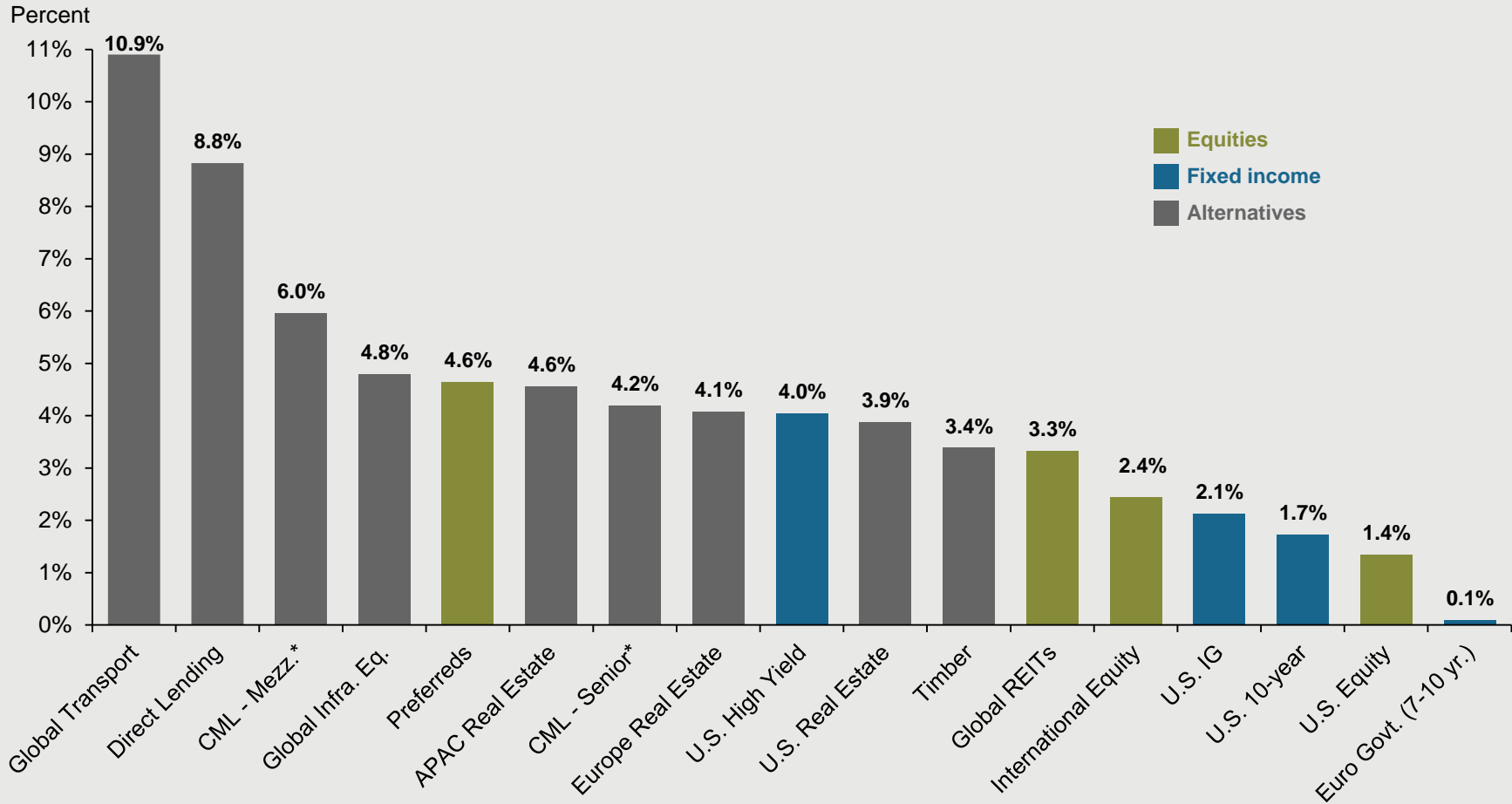
## Manager dispersion across alternative assets

Based on returns over a 10 year window\*



Sources: Lipper, NCREIF, Cambridge Associates, HFRI, J.P. Morgan Asset Management. Based on returns over a 10 year window. U.S. Core real estate and infrastructure are represented by the 10-year horizon time-weighted return (TWR) ending 4Q20. Hedge fund returns are represented by the 10-year horizon time-weighted return (TWR) ending 1Q21. U.S. non-core real estate, global private equity and U.S. venture capital are represented by the 10-year horizon internal rate of return (IRR) ending 4Q 2020. Data is based on availability as of November 30, 2021.

## Asset class yields

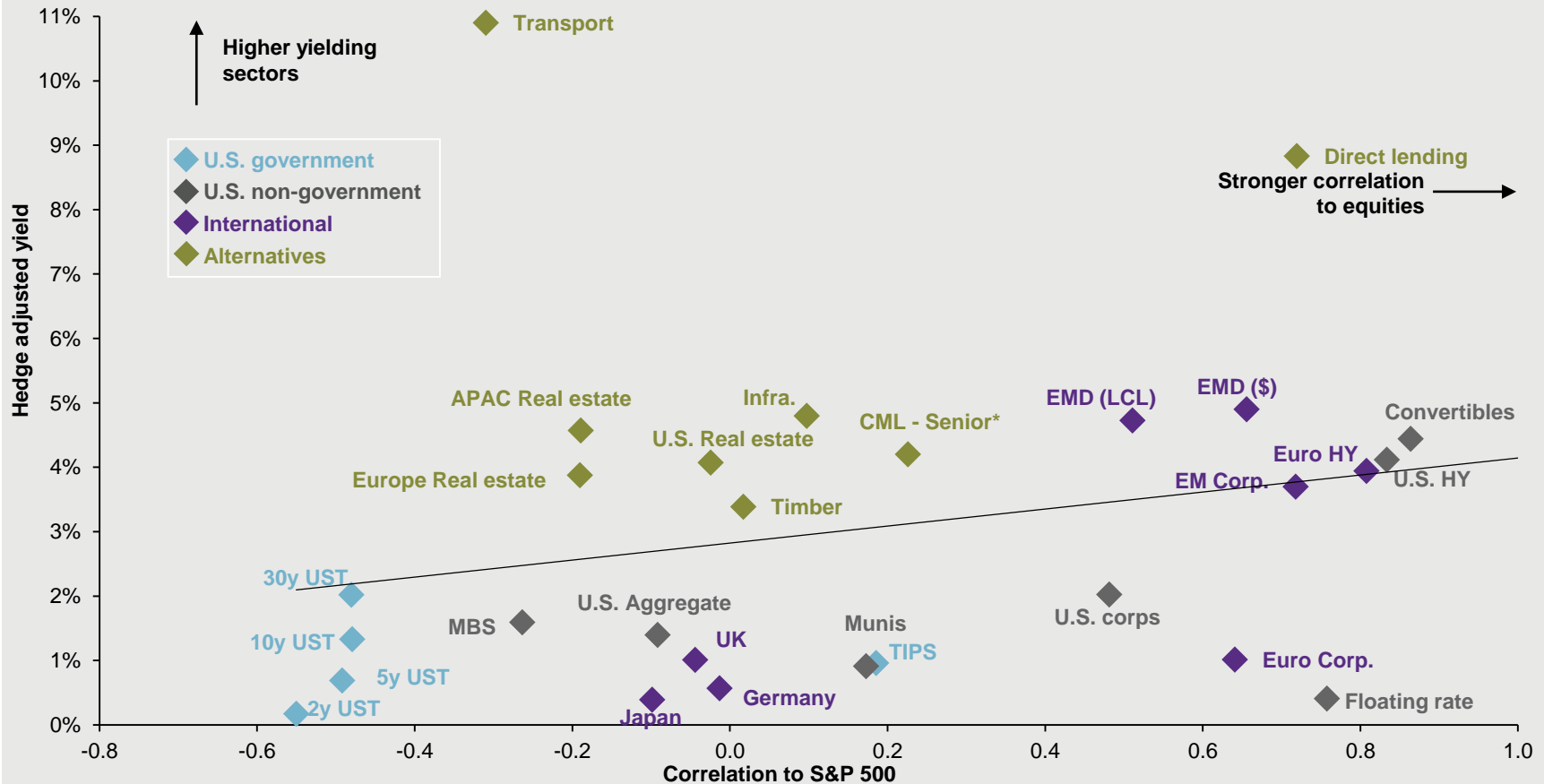


Source: BAML, Bloomberg, Clarkson, Cliffwater, Drewry Maritime Consultants, Federal Reserve, FTSE, MSCI, NCREIF, FactSet, Wells Fargo J.P. Morgan Asset Management. \*CML is commercial mortgage loans. Yields are as of 9/30/2021, except Global Infrastructure, and U.S. Europe, and APAC Real Estate which are as of 6/30/2021. 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. 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 is based on availability as of November 30, 2021.



## Equity market correlations and yields

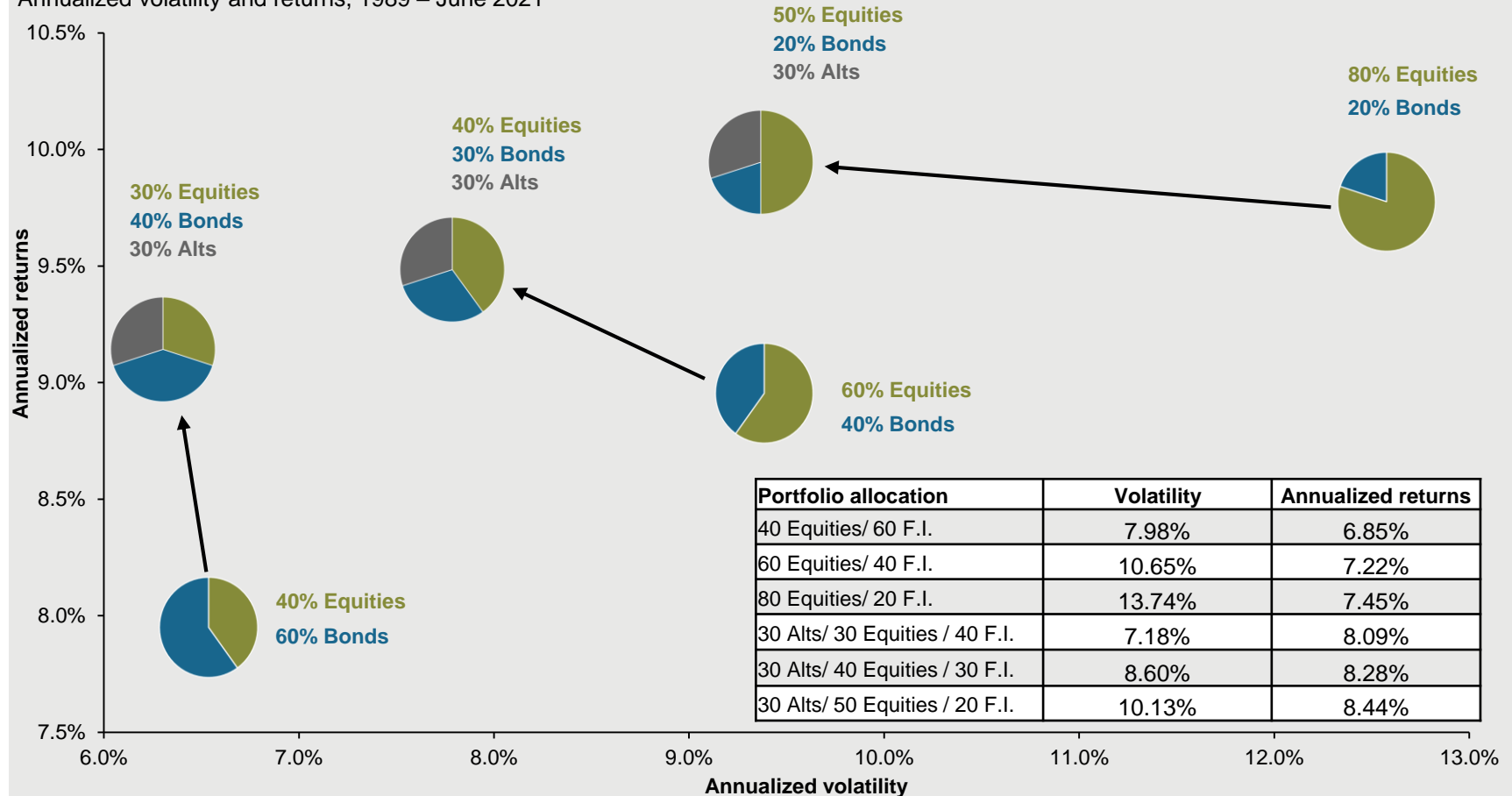
Hedge adjusted yield, last 12 months



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: Muni Bond 10-year; 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. Correlations are based on quarterly return over the past 10 years through 9/30/2021, except Infra, Transport, and Europe, and APAC Real Estate, which are through 6/30/2021. International fixed income sector correlations are in hedged U.S. dollar returns except EMD local index. All yields are as of 9/30/2021, except Direct Lending, Infrastructure and U.S. Europe, and APAC Real Estate which are as of 6/30/2021. Data is based on availability as of November 30, 2021.

## Alternatives and portfolio risk/return

Annualized volatility and returns, 1989 – June 2021



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 is based on availability as of November 30, 2021.

# Alternative asset class returns

Guide to Alternatives | 11

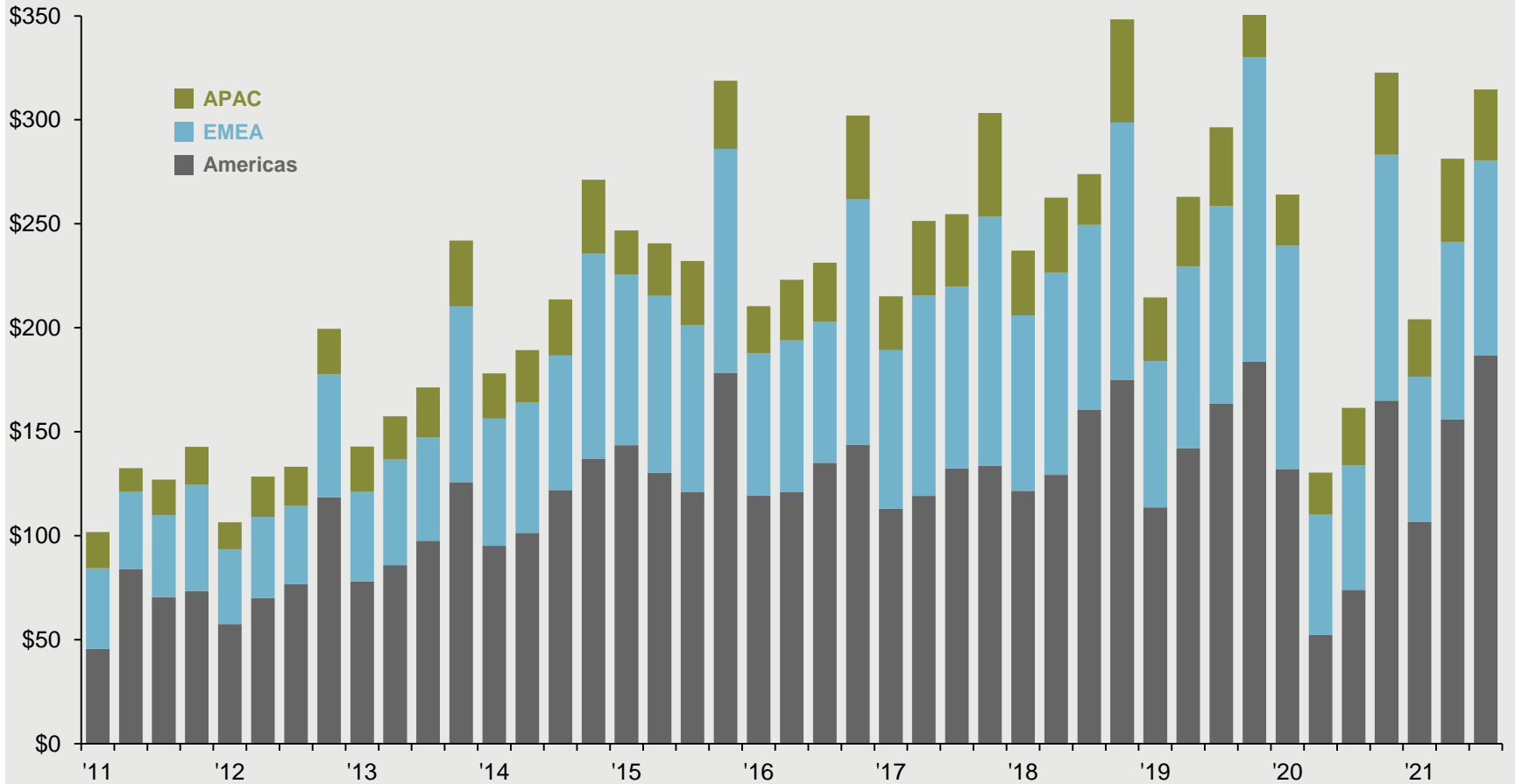
Alts in aggregate

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2Q21	2011-2020	
												Ann.	Vol.
U.S. Core RE	Private Equity	Venture Capital	Venture Capital	Transport	Infra.	Private Equity	Venture Capital	Venture Capital	Venture Capital	Venture Capital	Venture Capital	Venture Capital	Venture Capital
16.0%	14.1%	25.9%	25.8%	21.0%	15.3%	22.7%	20.6%	19.0%	55.3%	23.7%	18.9%	10.2%	
Infra.	Direct Lending	Private Equity	Infra.	Infra.	Private Equity	Venture Capital	Infra.	Private Equity	Private Equity	Private Equity	Private Equity	Private Equity	Private Equity
15.5%	14.0%	19.7%	15.5%	18.0%	11.9%	14.6%	12.3%	17.0%	23.9%	19.0%	14.4%	8.0%	
Transport	Infra.	Transport	U.S. Core RE	U.S. Core RE	Direct Lending	Infra.	APAC Core RE	Infra.	Hedge Funds	Hedge Funds	Infra.	Hedge Funds	Hedge Funds
14.9%	13.3%	18.9%	12.5%	15.0%	11.2%	13.1%	9.5%	12.6%	11.8%	10.1%	12.9%	7.7%	
Europe Core RE	U.S. Core RE	U.S. Core RE	Europe Core RE	Venture Capital	APAC Core RE	APAC Core RE	Private Equity	Hedge Funds	Asset Allocation	Asset Allocation	Transport	Transport	Transport
14.1%	10.9%	13.9%	11.5%	14.8%	10.5%	11.6%	9.2%	10.4%	11.6%	9.0%	11.1%	5.8%	
Venture Capital	Europe Core RE	Asset Allocation	Asset Allocation	Europe Core RE	U.S. Core RE	Asset Allocation	U.S. Core RE	Asset Allocation	Transport	Transport	Asset Allocation	Infra.	Infra.
12.0%	10.3%	13.6%	11.5%	12.2%	8.8%	11.1%	8.3%	10.0%	7.8%	8.7%	10.5%	3.9%	
APAC Core RE	Asset Allocation	Direct Lending	Private Equity	APAC Core RE	Transport	Transport	Transport	Direct Lending	CML - Senior*	Direct Lending	U.S. Core RE	Direct Lending	Direct Lending
10.3%	9.6%	12.7%	10.2%	11.8%	8.5%	10.8%	8.2%	9.0%	6.3%	7.3%	9.9%	3.0%	
Asset Allocation	APAC Core RE	Infra.	Transport	Asset Allocation	Asset Allocation	Direct Lending	Asset Allocation	CML - Senior*	Direct Lending	U.S. Core RE	Direct Lending	Asset Allocation	Asset Allocation
10.0%	9.0%	12.7%	9.9%	10.9%	8.4%	8.6%	8.2%	8.4%	5.5%	6.1%	9.4%	2.7%	
Direct Lending	Venture Capital	Europe Core RE	Direct Lending	Private Equity	Europe Core RE	Hedge Funds	Direct Lending	APAC Core RE	Europe Core RE	Europe Core RE	APAC Core RE	CML - Senior*	CML - Senior*
9.8%	7.5%	11.5%	9.6%	9.1%	7.8%	8.6%	8.1%	6.6%	2.3%	6.1%	8.7%	2.6%	
Private Equity	Hedge Funds	Hedge Funds	APAC Core RE	Direct Lending	Hedge Funds	U.S. Core RE	Europe Core RE	Europe Core RE	Infra.	APAC Core RE	Europe Core RE	U.S. Core RE	U.S. Core RE
7.3%	6.4%	9.1%	9.4%	5.5%	5.4%	7.6%	7.7%	6.2%	2.0%	5.0%	8.2%	2.3%	
CML - Senior*	Transport	APAC Core RE	CML - Senior*	CML - Senior*	CML - Senior*	CML - Senior*	CML - Senior*	Transport	U.S. Core RE	Infra.	CML - Senior*	APAC Core RE	APAC Core RE
5.9%	6.1%	9.1%	7.4%	2.7%	2.9%	7.4%	2.6%	5.7%	1.2%	3.0%	4.9%	2.0%	
Hedge Funds	CML - Senior*	CML - Senior*	Hedge Funds	Hedge Funds	Venture Capital	CML - Senior*	Hedge Funds	U.S. Core RE	APAC Core RE	CML - Senior*	Hedge Funds	Europe Core RE	Europe Core RE
-5.3%	4.7%	2.9%	3.0%	-1.1%	1.1%	5.7%	-4.7%	5.3%	-0.1%	1.2%	4.2%	1.7%	

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 12/31/2010 to 12/31/2020. Data is based on availability as of November 30, 2021.

**Global real estate investment**

USD billions



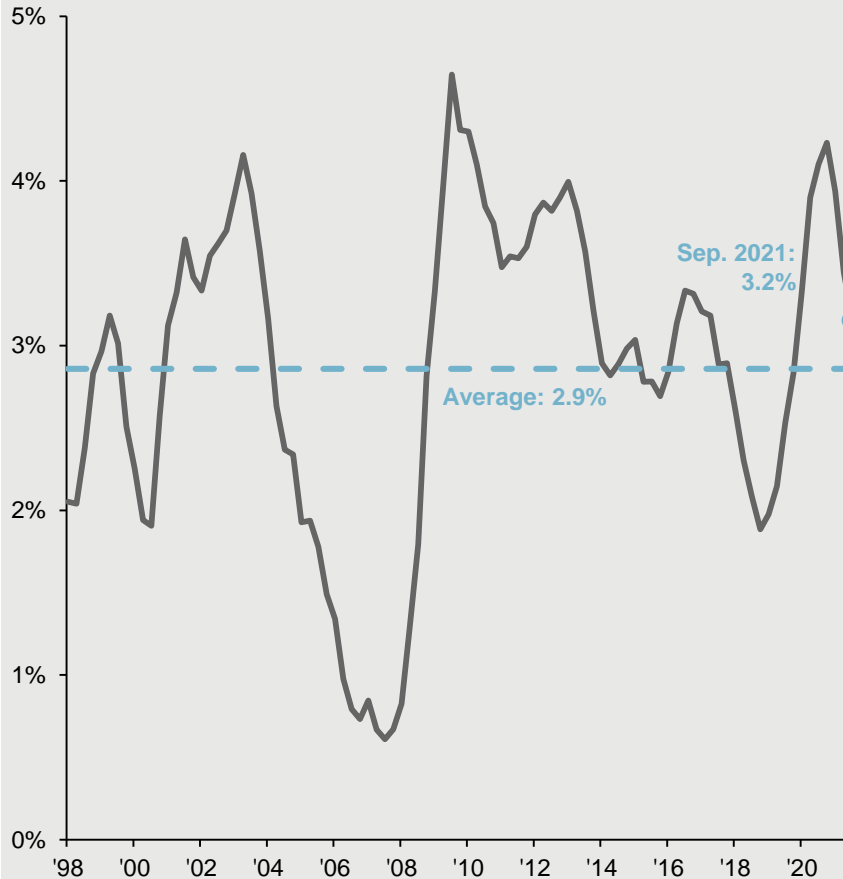
Sources: CBRE Research, RCA (Americas), J.P. Morgan Asset Management.

APAC is Asia Pacific. EMEA is Europe, Middle East and Africa. Real estate investment data is as of September 30, 2021.

Data is based on availability as of November 30, 2021.

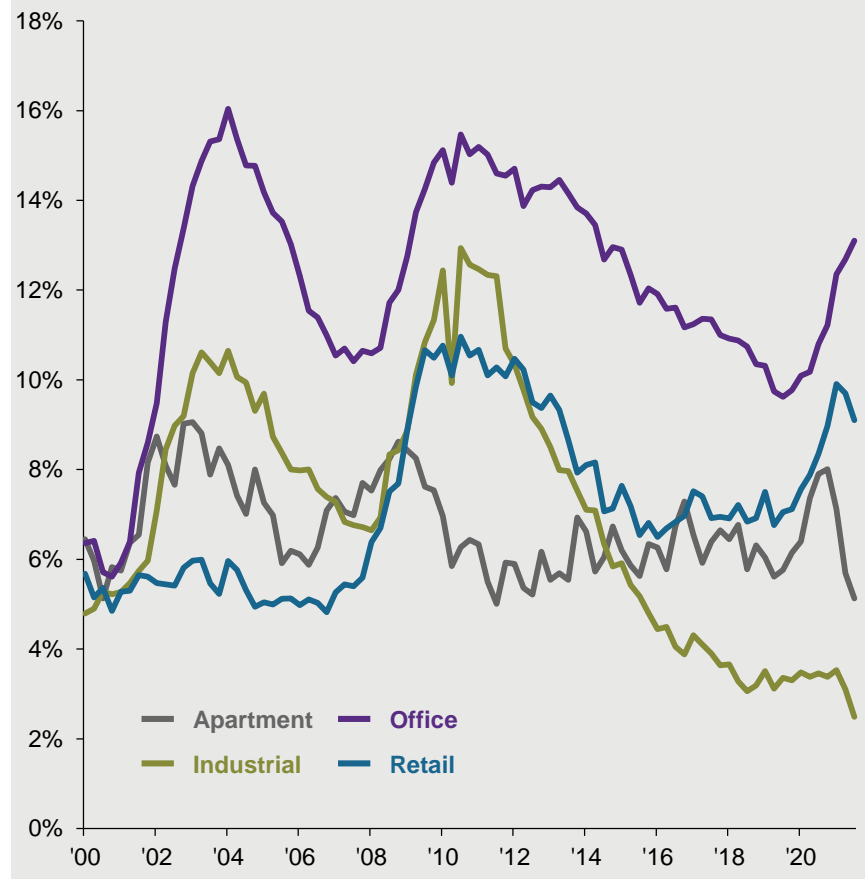
## U.S. real estate cap rate spreads

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



## U.S. vacancy rates by property type

Percent



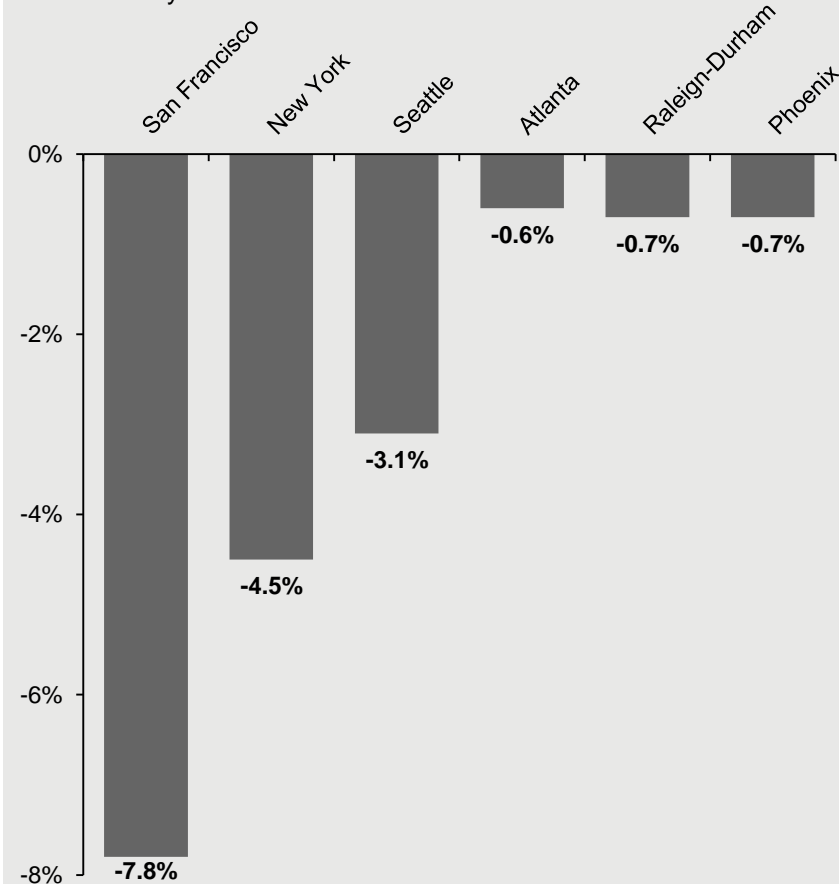
Source: NCREIF, NAREIT, Statista, J.P. Morgan Asset Management.

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 is as of September 30, 2021.

Data is based on availability as of November 30, 2021.

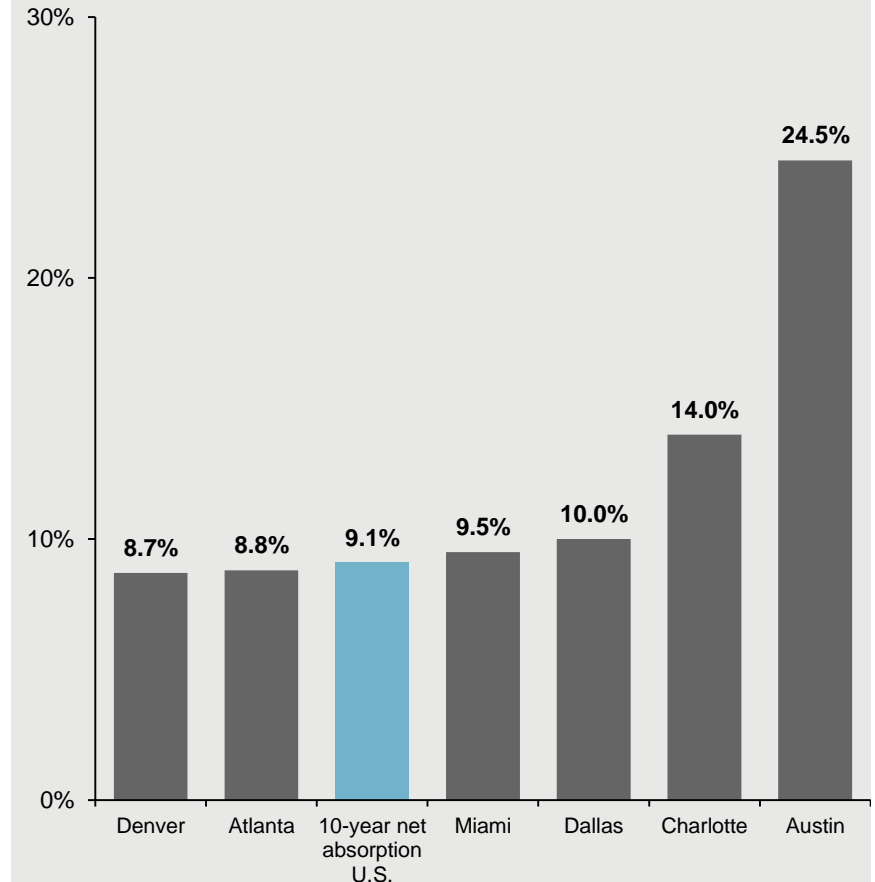
## 2020 change in office occupancy

% of inventory



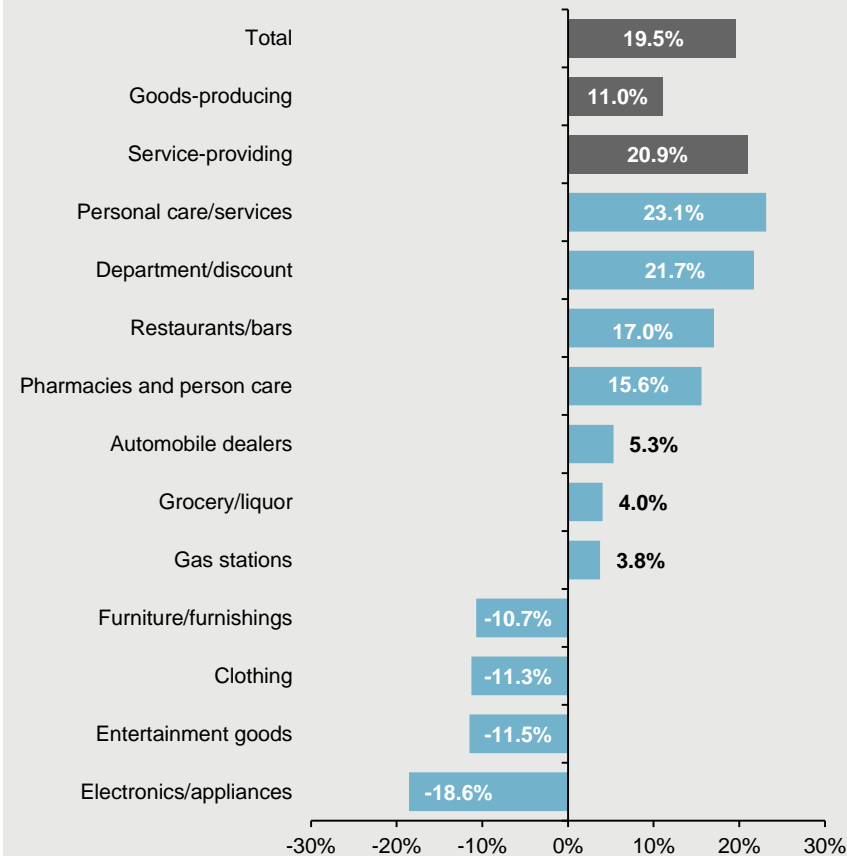
## Net absorption of office real estate by city

10-year rate

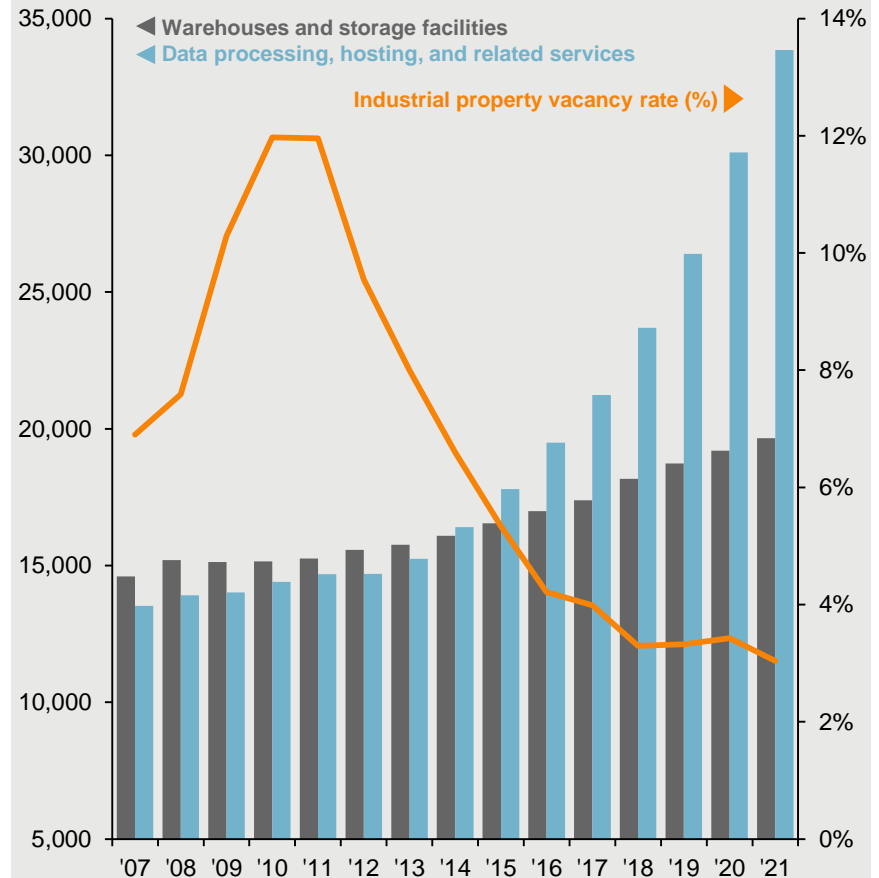


Source: Bureau of Labor Statistics, JLL, J.P. Morgan Asset Management.  
Data is based on availability as of November 30, 2021.

## Change in number of retail establishments 1Q11-1Q21, percent



## Industrial establishments and vacancy rate Thousands of square feet, percent

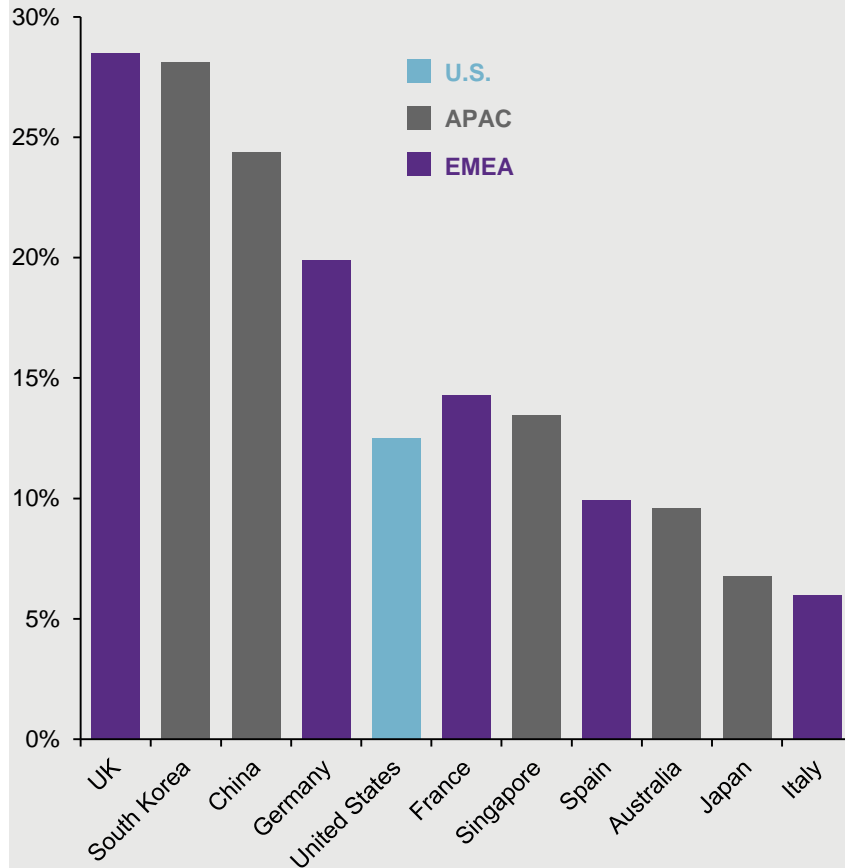


Source: Bureau of Labor Statistics, J.P. Morgan Asset Management. (Left) Personal care/services include nail salons, barber shops, etc. Entertainment goods include sports equipment, games, musical instruments, and book stores. Industrial property vacancy rates are an average from each calendar year and as of 3Q21 for 2021.

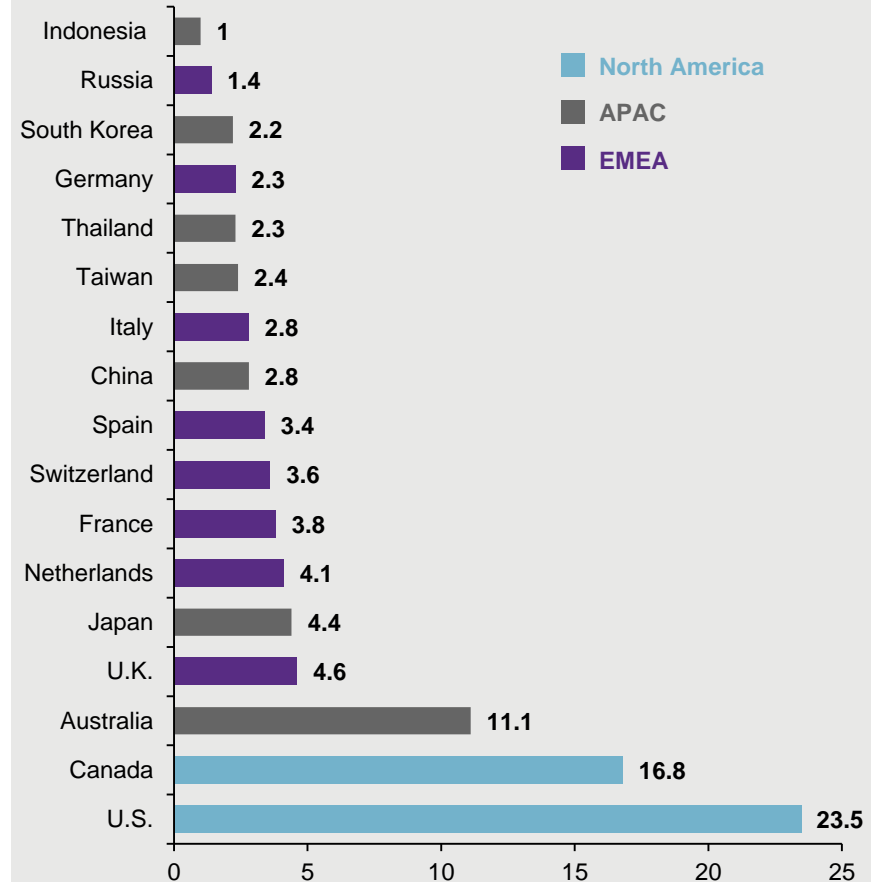
Data is based on availability as of November 30, 2021.

**Global online retail sales**

Percent of total retail sales

**Retail real estate per capita**

Square feet per person



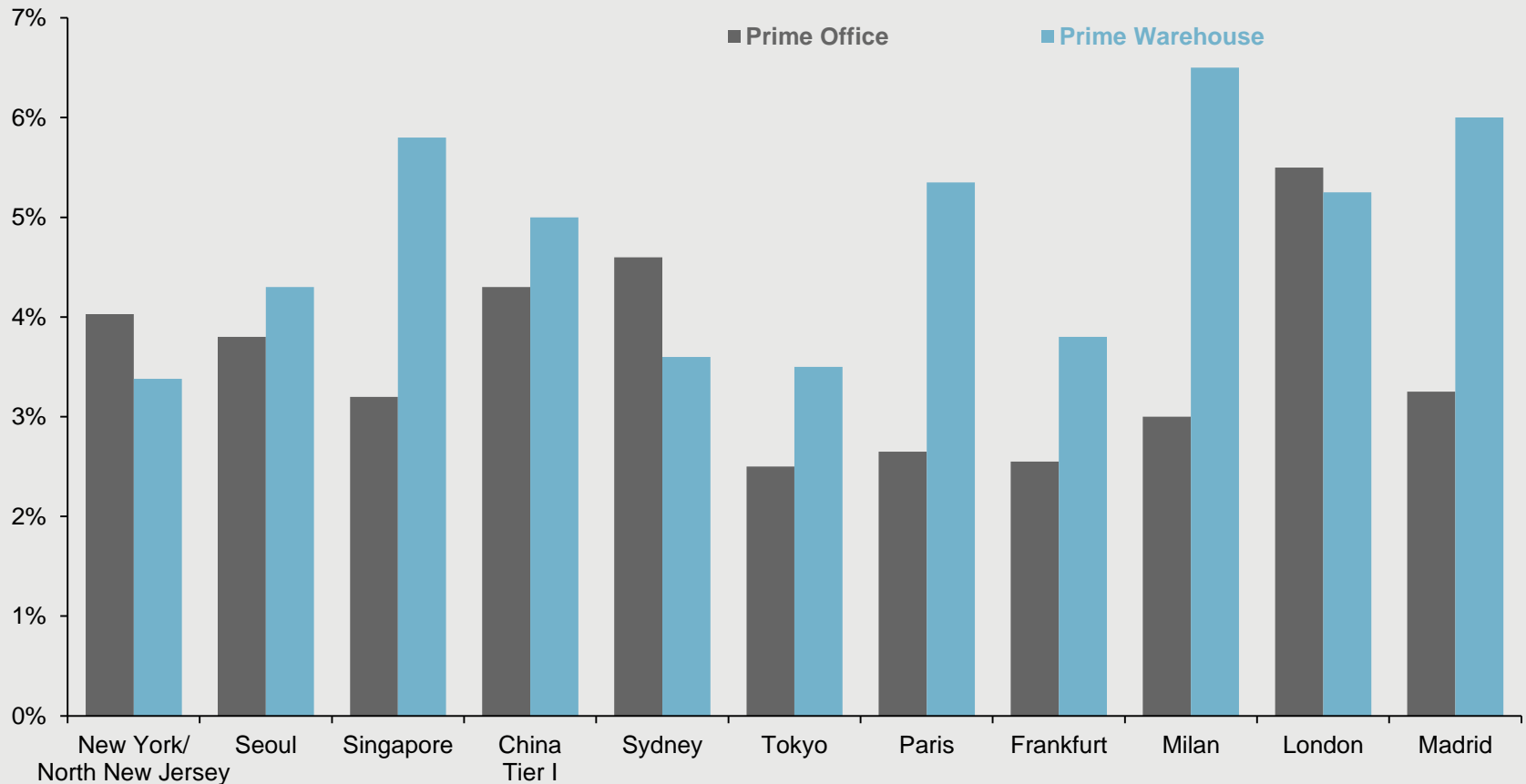
Sources: (Left) Australian Bureau of Statistics, Centre for Retail Research (Germany, France, Italy, Spain), Korean Statistical Information Service, METI (Japan), National Bureau of Statistics (China), ONS (UK), Statistics of Singapore, U.S. Census Bureau, (Right) Statista, J.P. Morgan Asset Management. Online retail sales estimates are as of 3Q21, except for European countries which are a 2020 forecast, the U.K. which is 2Q21 and Japan which is as of 2020. Retail space per capita per country data was published in November 2020 and represents retail square footage per person in 2018.

Data is based on availability as of November 30, 2021.



**Global office and industrial pricing**

Yields, 3Q 2021

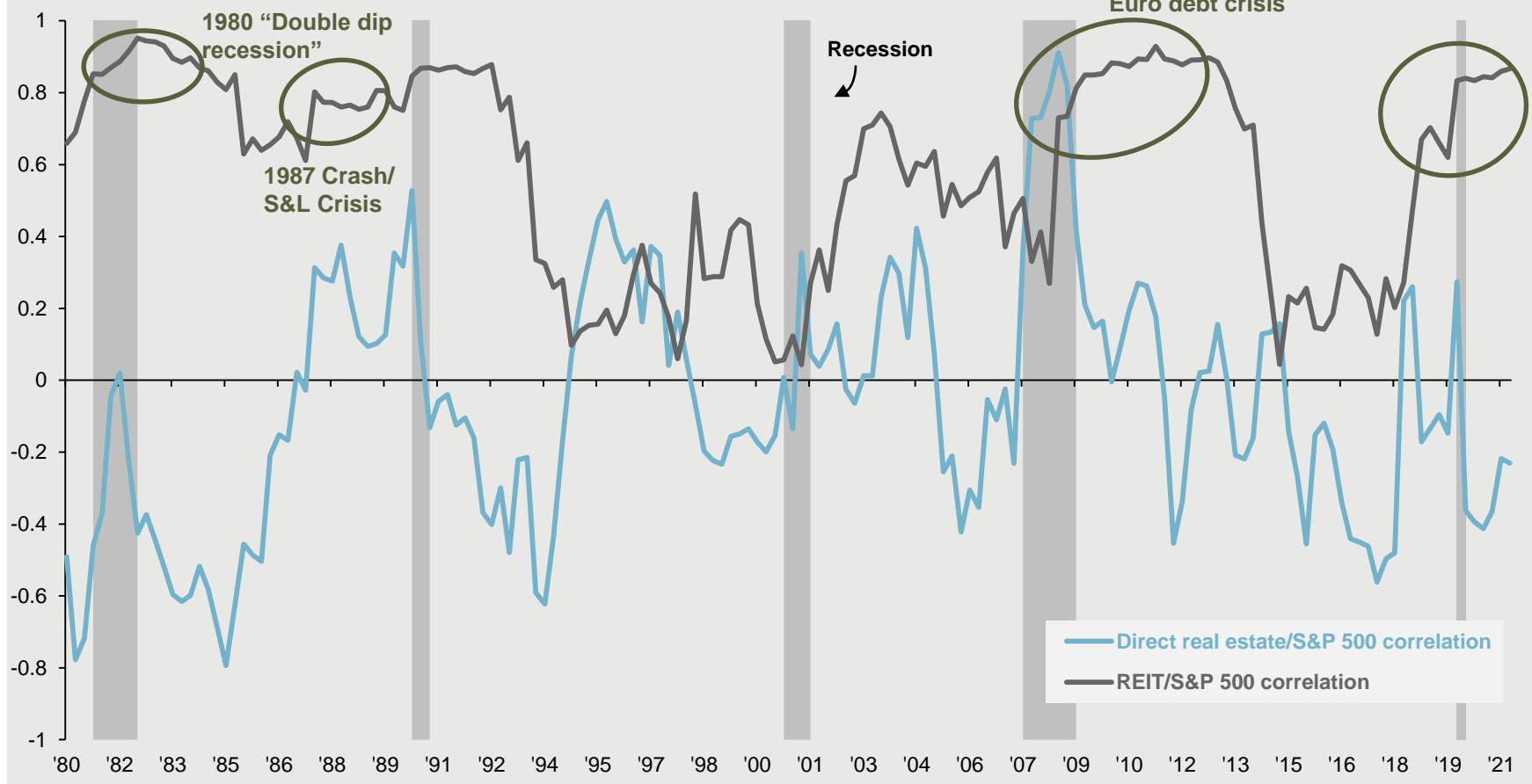


Sources: CBRE, JLL, J.P. Morgan Asset Management. London is South East for office and warehouse. Prime office for Paris is Centre West excluding CBD.

Data is based on availability as of November 30, 2021.

## 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 3Q21.

Data is based on availability as of November 30, 2021.

# U.S. REIT sector returns

## Guide to Alternatives | 19

Real estate

											2011-2020	
2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	YTD	Ann.	Vol.
Self Storage	Industrial	Lodging/ Resorts	Mfgd. Homes	Self Storage	Industrial	Data Centers	Ret. Free Standing	Mfgd. Homes	Data Centers	Regional Malls	Mfgd. Homes	Lodging/ Resorts
35.2%	31.3%	27.2%	46.2%	40.6%	30.7%	28.4%	13.9%	49.1%	21.0%	83.6%	19.8%	31.4%
Regional Malls	Regional Malls	Mfgd. Homes	Apartments	Mfgd. Homes	Lodging/ Resorts	Mfgd. Homes	Mfgd. Homes	Industrial	Self Storage	Self Storage	Industrial	Regional Malls
22.0%	28.2%	10.5%	39.6%	25.6%	24.3%	24.9%	11.4%	48.7%	12.9%	57.6%	15.6%	28.6%
Mfgd. Homes	Shopping Centers	Self Storage	Health Care	Apartments	Ret. Free Standing	Industrial	Health Care	Data Centers	Industrial	Apartments	Self Storage	Shopping Centers
20.4%	25.0%	9.5%	33.3%	16.5%	17.0%	20.6%	7.6%	44.2%	12.2%	52.0%	15.2%	26.7%
Apartments	Ret. Free Standing	Industrial	Regional Malls	Ret. Free Standing	Mfgd. Homes	All Equity	Apartments	Office	Mfgd. Homes	Shopping Centers	All Equity	Health Care
15.1%	22.5%	7.4%	32.6%	5.9%	14.2%	8.7%	3.7%	31.4%	- 1.7%	50.3%	9.3%	21.2%
Health Care	Health Care	Ret. Free Standing	Lodging/ Resorts	Shopping Centers	Office	Lodging/ Resorts	Self Storage	All Equity	All Equity	Industrial	Ret. Free Standing	Ret. Free Standing
13.6%	20.4%	7.3%	32.5%	4.7%	13.2%	7.2%	2.9%	28.7%	- 5.1%	45.4%	8.9%	20.7%
All Equity	Self Storage	Office	Self Storage	Regional Malls	All Equity	Office	Industrial	Apartments	Health Care	All Equity	Apartments	Industrial
8.3%	19.9%	5.6%	31.4%	4.2%	8.6%	5.2%	- 2.5%	26.3%	- 9.9%	28.9%	8.3%	19.6%
Ret. Free Standing	All Equity	Shopping Centers	Shopping Centers	All Equity	Health Care	Self Storage	All Equity	Shopping Centers	Ret. Free Standing	Mfgd. Homes	Health Care	Office
0.4%	19.7%	5.0%	30.0%	2.8%	6.4%	3.7%	- 4.0%	25.0%	- 10.5%	28.4%	7.1%	18.2%
Shopping Centers	Office	All Equity	All Equity	Industrial	Shopping Centers	Apartments	Regional Malls	Ret. Free Standing	Apartments	Data Centers	Office	Self Storage
- 0.7%	14.2%	2.9%	28.0%	2.6%	3.7%	3.7%	- 7.0%	24.8%	- 15.3%	20.2%	5.1%	16.7%
Office	Lodging/ Resorts	Regional Malls	Office	Office	Apartments	Ret. Free Standing	Lodging/ Resorts	Health Care	Office	Office	Lodging/ Resorts	Apartments
- 0.8%	12.5%	- 1.0%	25.9%	0.3%	2.9%	3.1%	- 12.8%	21.2%	- 18.4%	13.4%	2.3%	16.2%
Industrial	Mfgd. Homes	Apartments	Industrial	Health Care	Regional Malls	Health Care	Data Centers	Lodging/ Resorts	Lodging/ Resorts	Ret. Free Standing	Shopping Centers	All Equity
- 5.2%	7.1%	- 6.2%	21.0%	- 7.2%	- 5.2%	0.9%	- 14.1%	15.6%	- 23.6%	12.4%	2.3%	15.6%
Lodging/ Resorts	Apartments	Health Care	Ret. Free Standing	Lodging/ Resorts	Self Storage	Regional Malls	Office	Self Storage	Shopping Centers	Health Care	Regional Malls	Mfgd. Homes
- 14.3%	6.9%	- 7.1%	9.7%	- 24.4%	- 8.1%	- 2.7%	- 14.5%	13.7%	- 27.6%	7.7%	0.5%	15.0%
Data Centers	Data Centers	Data Centers	Data Centers	Data Centers	Data Centers	Shopping Centers	Shopping Centers	Regional Malls	Regional Malls	Lodging/ Resorts	Data Centers	Data Centers
N/A	N/A	N/A	N/A	N/A	N/A	- 11.4%	- 14.5%	- 9.1%	- 37.2%	6.3%	N/A	N/A

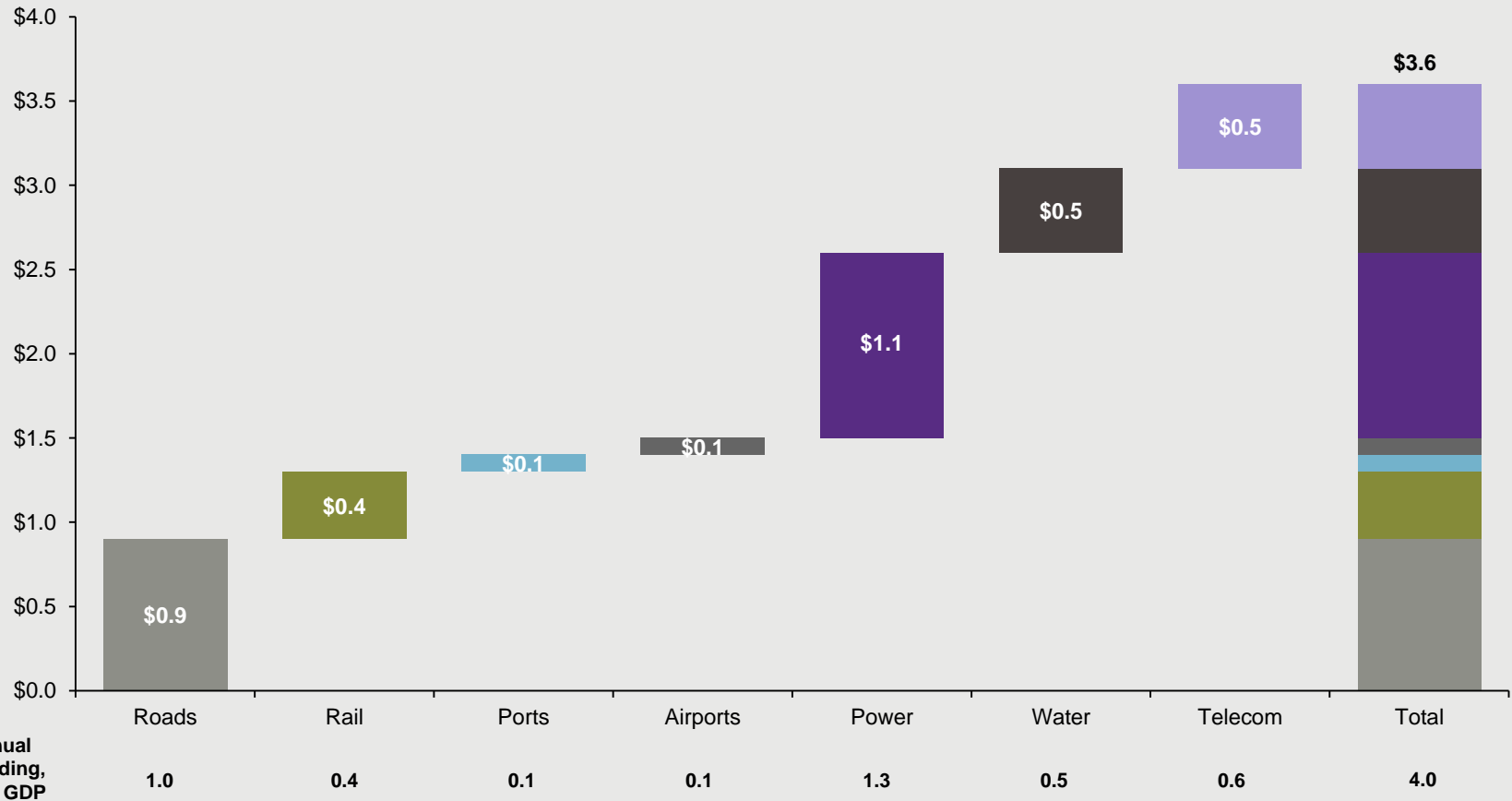
Sources: FTSE NAREIT, FactSet, J.P. Morgan Asset Management.

All indices are from FTSE NAREIT. Mfgd. Homes represents manufactured homes.

Data is based on availability as of November 30, 2021.

## Average annual infrastructure need

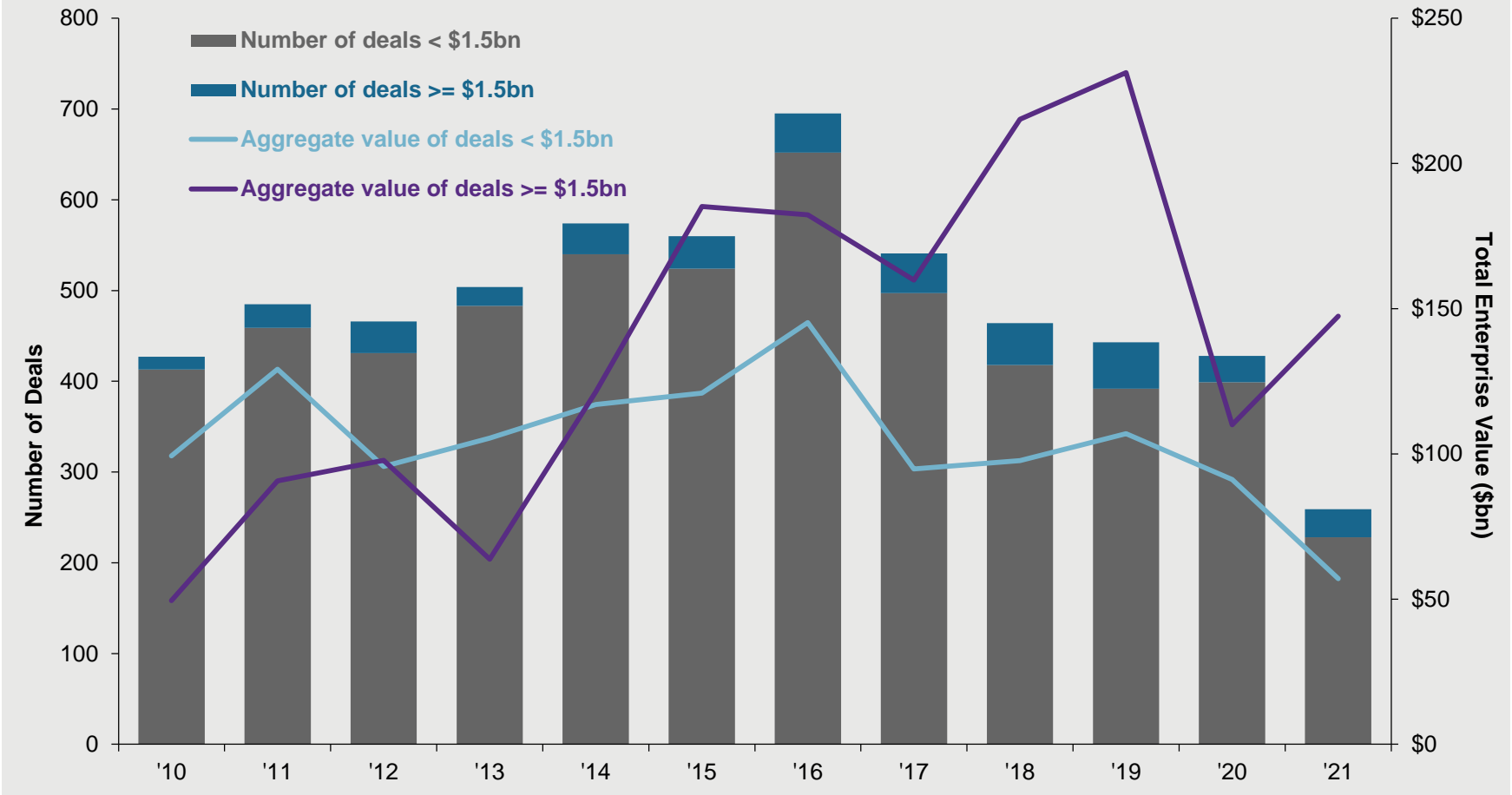
USD trillions, constant 2017 dollars



Source: McKinsey Global Institute, J.P. Morgan Asset Management.

Data is based on availability as of November 30, 2021.

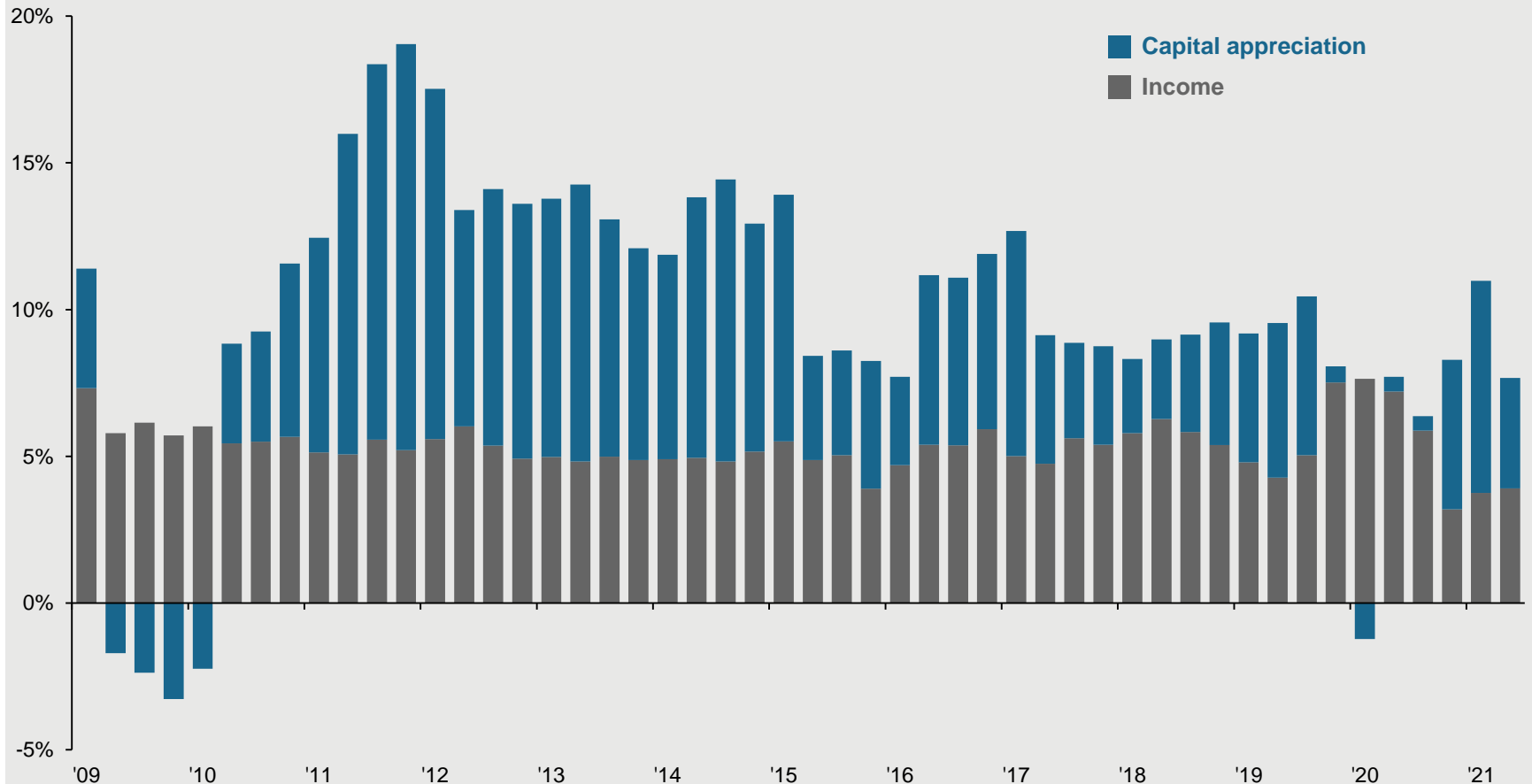
## Infrastructure deal count and value



Source: Preqin, J.P. Morgan Asset Management. Transaction data are as of September 2021.  
Data is based on availability as of November 30, 2021.

**Global core infrastructure returns**

Rolling 4-quarter returns from income and capital appreciation



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

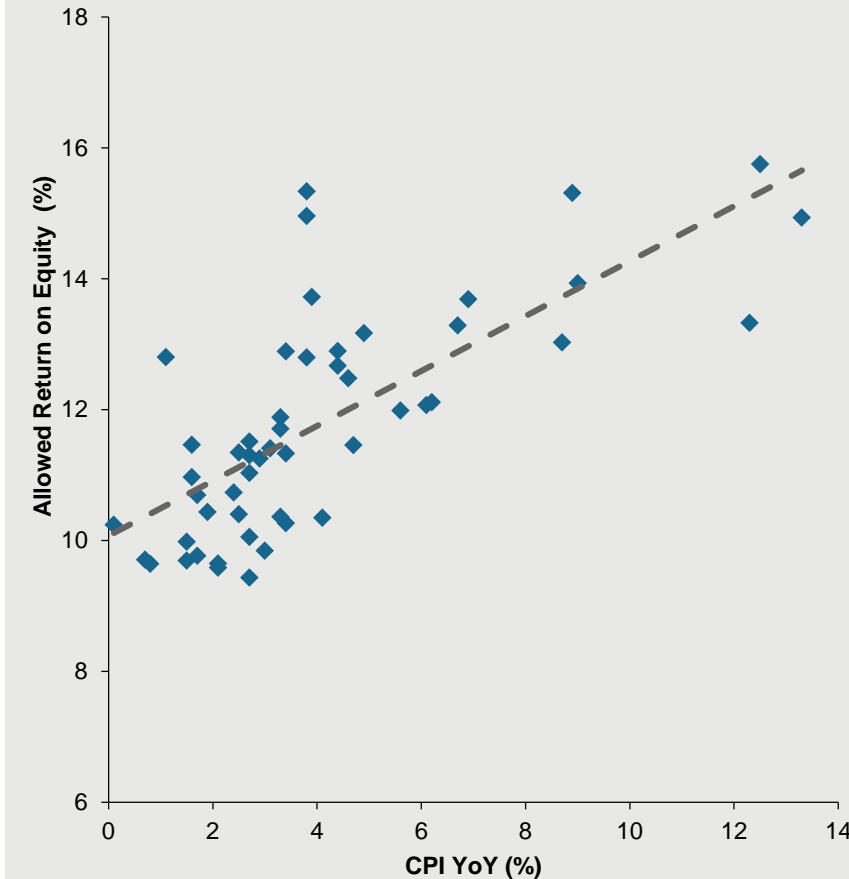
Infrastructure returns represented by the "low risk" category of the MSCI Global Quarterly Infrastructure Asset Index. Data show rolling one-year returns from income and capital appreciation. The chart shows the full index history, beginning in the first quarter of 2009, and ending in 2Q21.

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 is based on availability as of November 30, 2021.

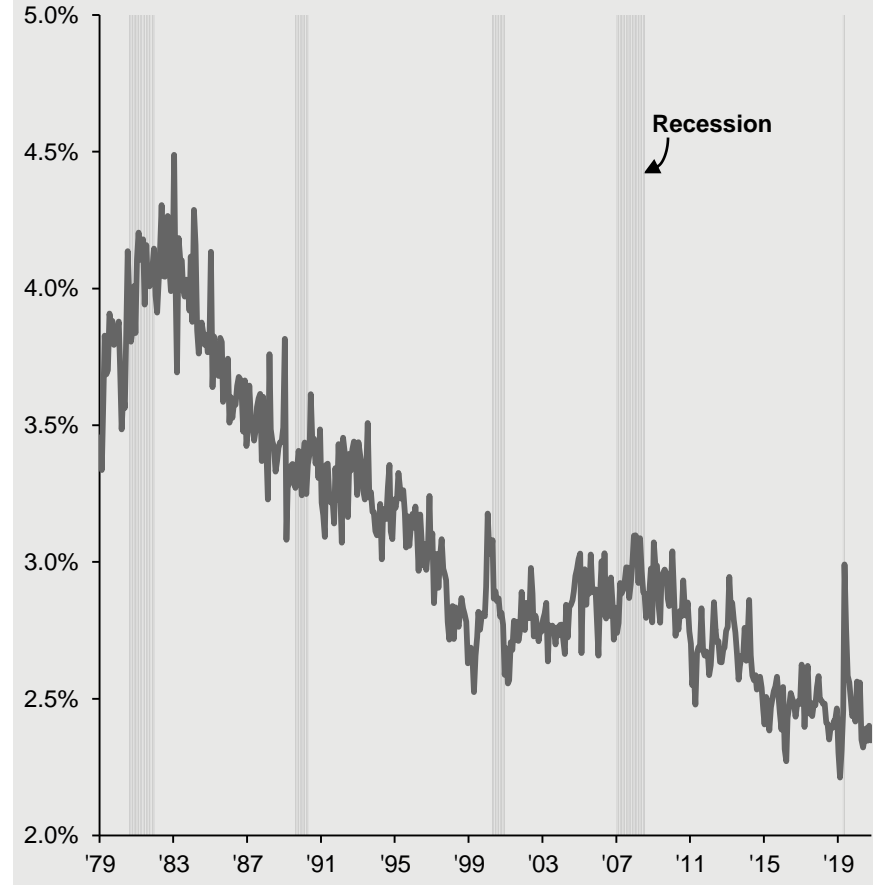
## U.S. utilities allowed returns versus inflation

Average allowed return on equity



## Household utility spending

Household utility spending % of personal consumption expenditures

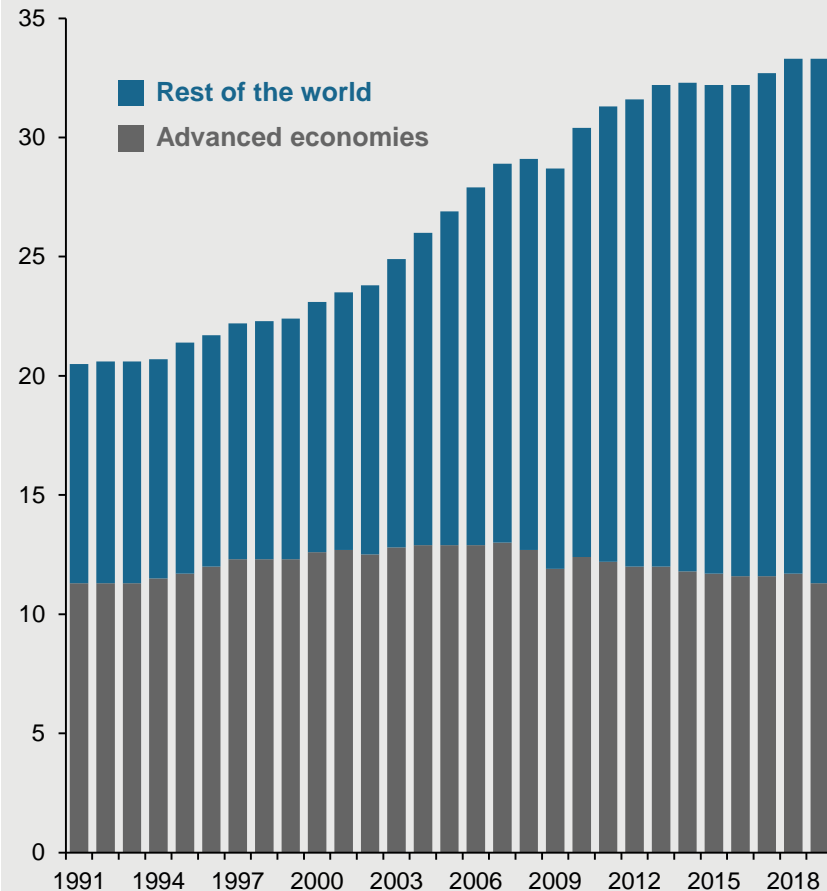
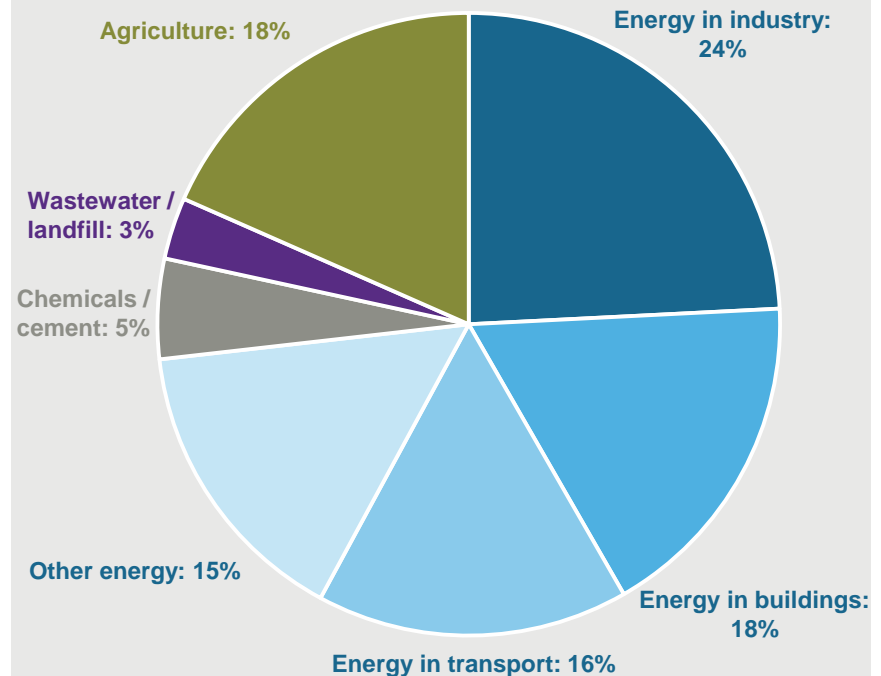


Source: Bloomberg, Bureau of Economic Analysis, SNL, AEU, J.P. Morgan Asset Management. Data represent average allowed return on equities (RoEs) for Electricity and Natural Gas Utilities, from 1970 through December 2020, and annual inflation from 1968 through 2018. Utility spending is as of 6/30/2021.

Data is based on availability as of November 30, 2021.

**Energy related CO2 emissions**

1990-2019, gigatons

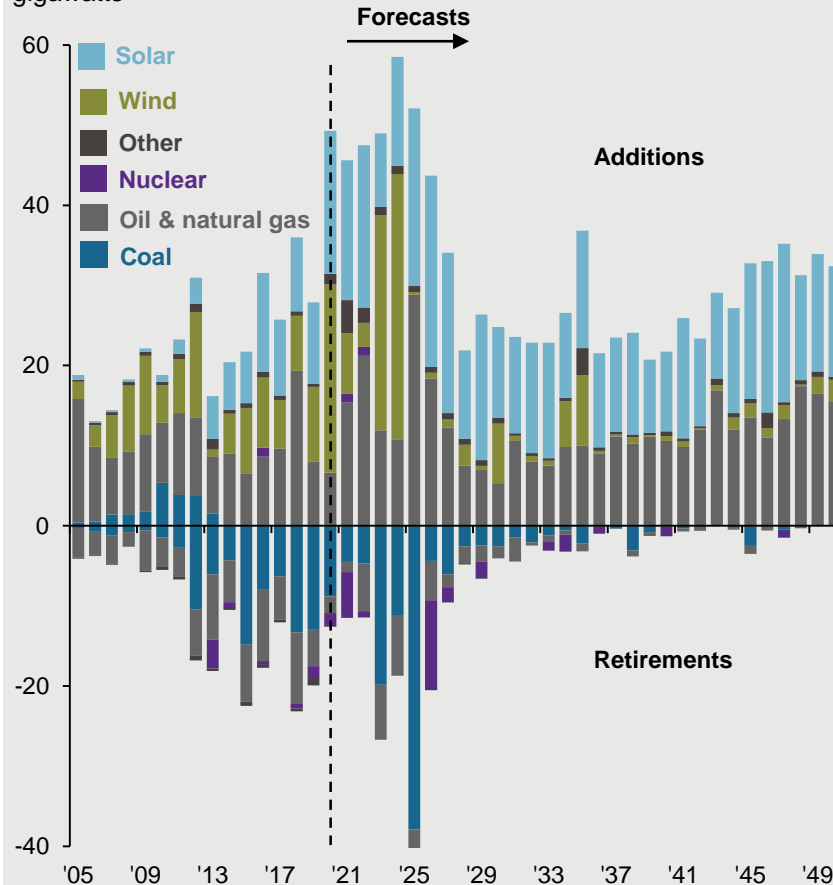
**Share of global greenhouse gas emissions by sector**% of global greenhouse gas emissions (2016), CO<sub>2</sub> equivalent tons

Source: (Left) IEA (Right) Climate Watch, Our World in Data, World Resource Institute, J.P. Morgan Asset Management. Greenhouse gas emissions include CO<sub>2</sub>, methane, nitrous oxide and fluorinated greenhouse gases. CO<sub>2</sub> equivalent tons standardize emissions to allow for comparison between gases. One equivalent ton has the same warming effect as one ton of CO<sub>2</sub> over 100 years.

Data is based on availability as of November 30, 2021.

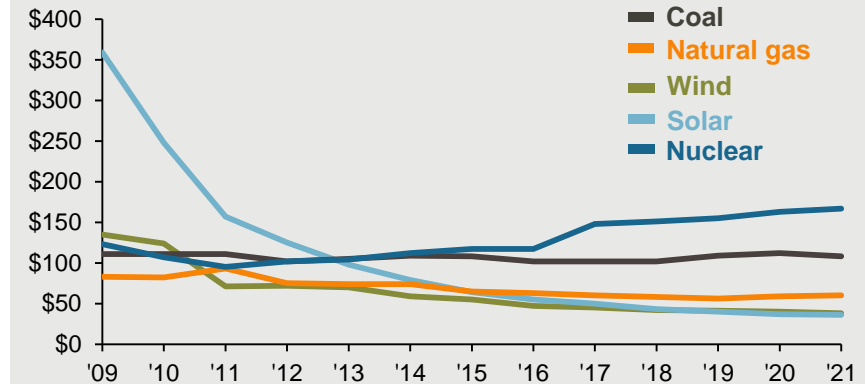


## U.S. retiring and new generating capacity gigawatts



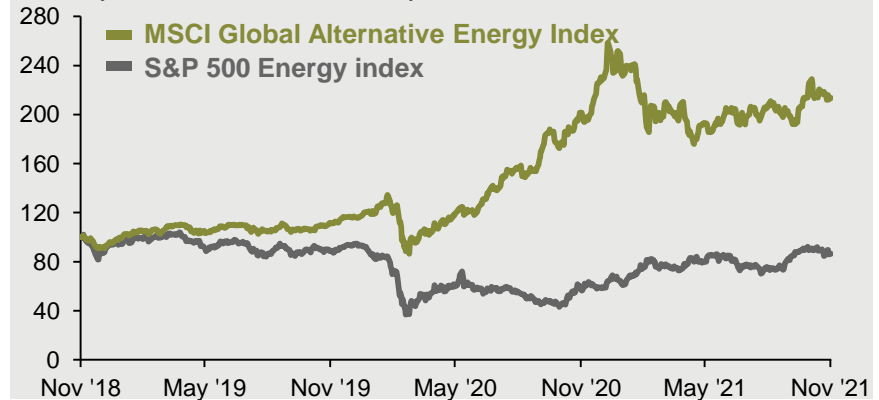
## Cost of wind, solar, natural gas and coal

Mean LCOE\*, 2021, dollar per megawatt hour



## Clean energy equity performance

Last 3 years, indexed to 100, daily



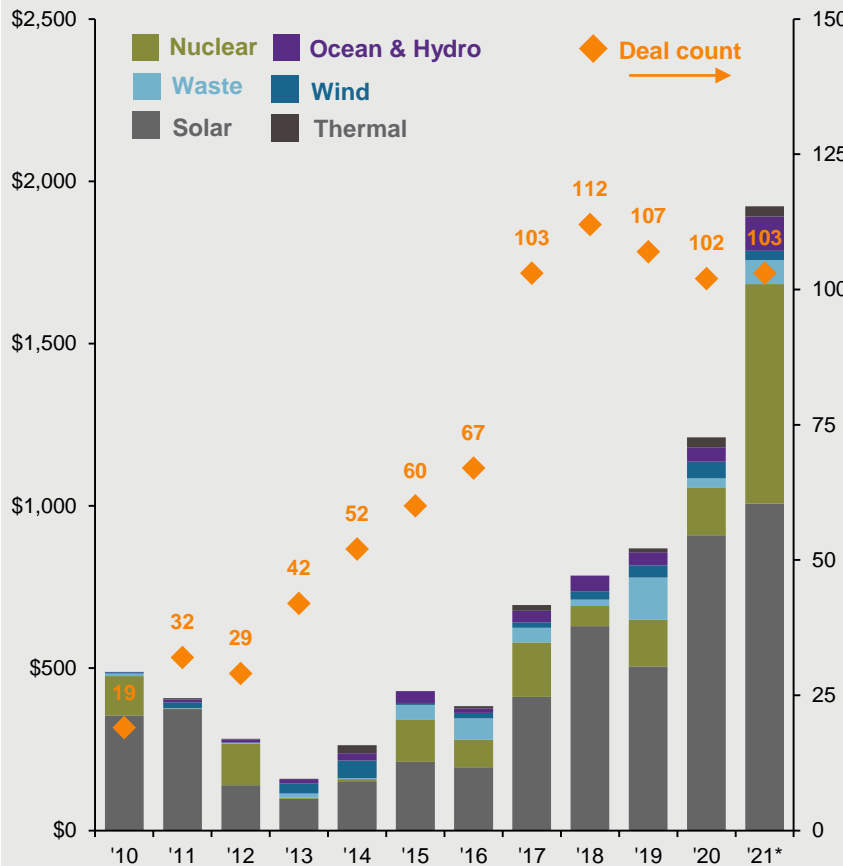
Source: EIA, Lazard, Eurostat, METI, BP Statistical, J.P. Morgan Asset Management.

2020 generating capacity is a forecast based off July 2020 data. \*\*LCOE is levelized cost of energy, the net present value of the unit-cost of electricity over the lifetime of a generating asset. It is often taken as a proxy for the average price that the generating asset must receive in a market to break even over its lifetime. The MSCI Global Alternative Energy Index includes developed and emerging market large, mid and small cap companies that derive 50% or more of their revenues from products and services from alternative energy, sustainable water, green building, pollution prevention and energy efficiency.

Data is based on availability as of November 30, 2021.

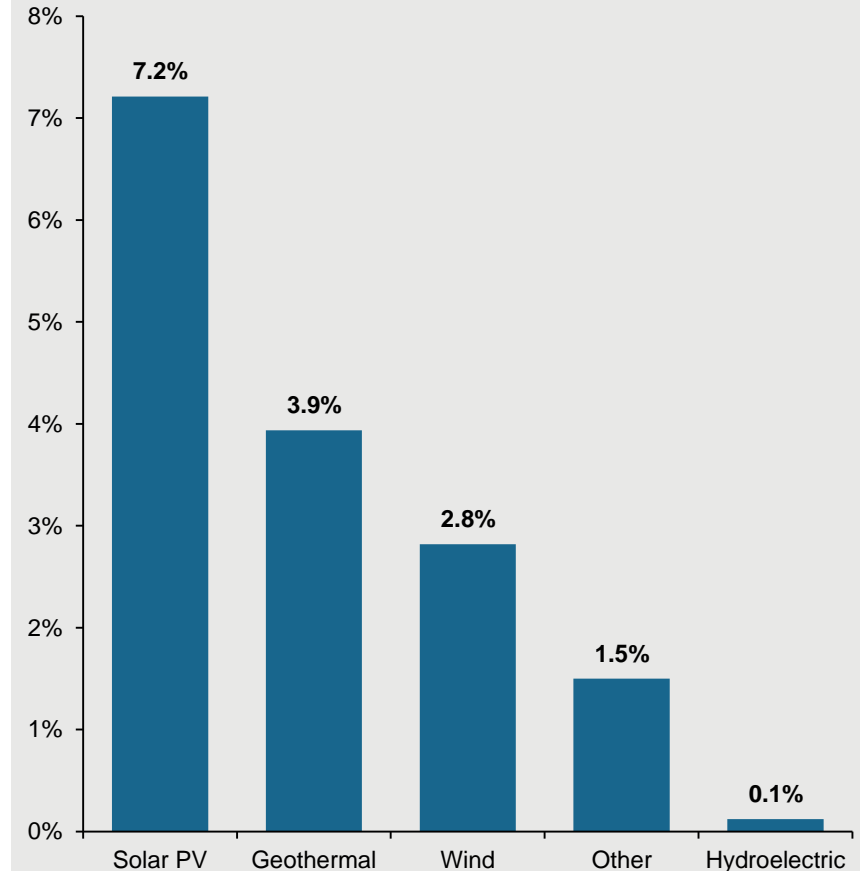
## Venture capital investment in clean energy

Deal value (USD millions) and number of deals



## Expected growth in renewable electricity generation

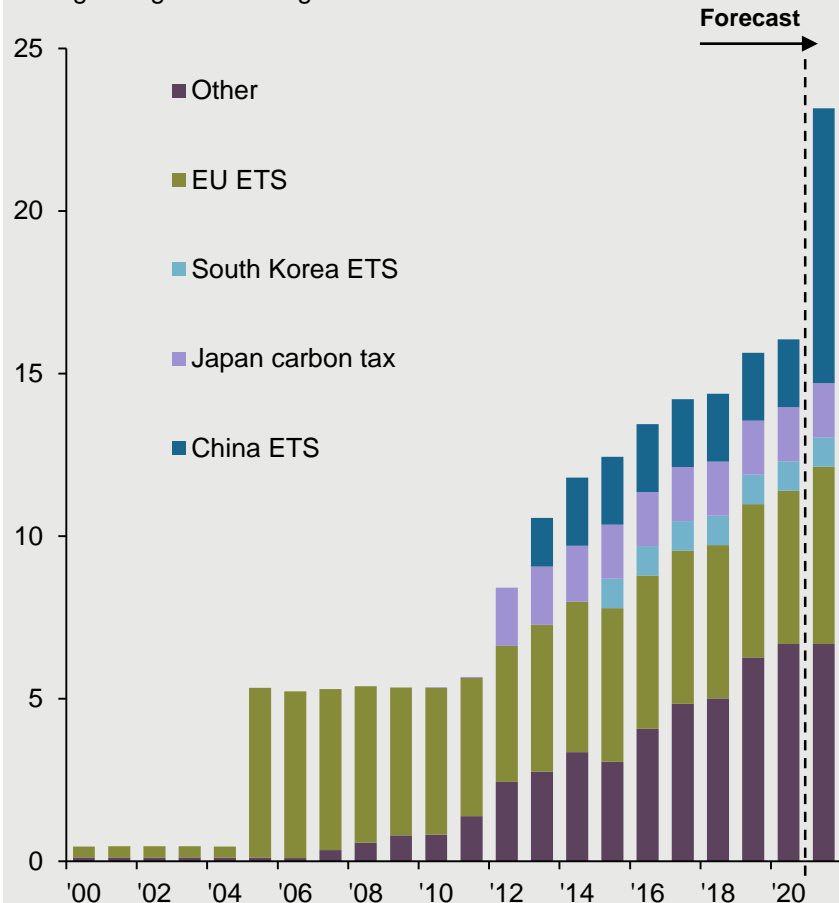
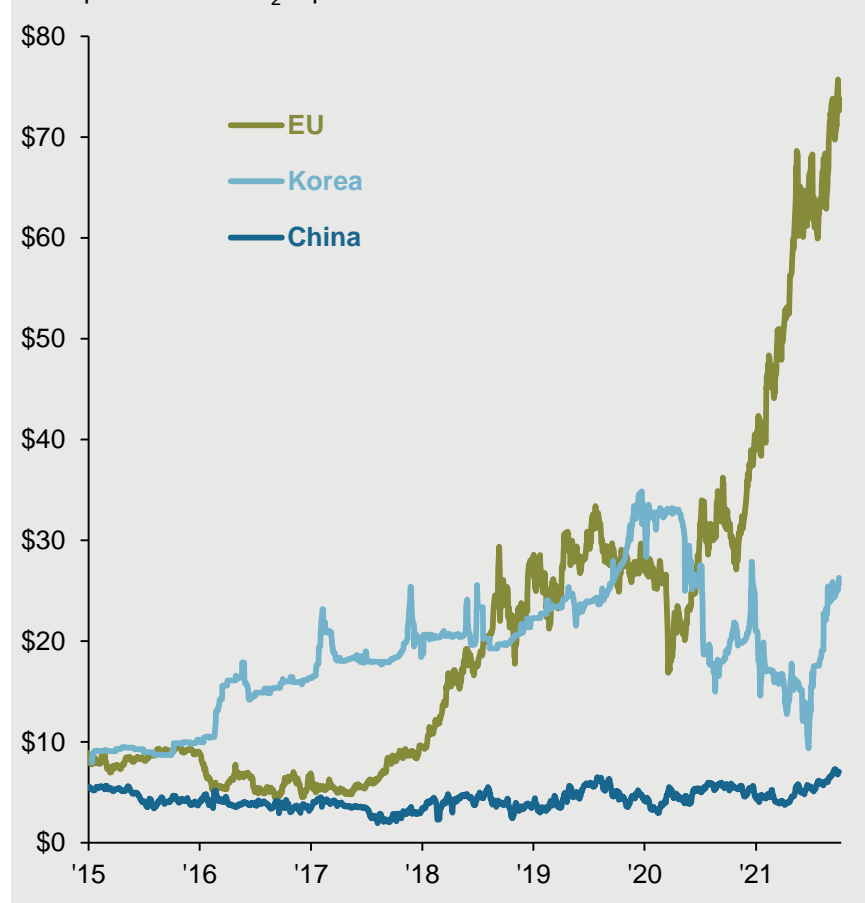
2020 – 2050, CAGR



Source: EIA, Pitchbook Data Inc., J.P. Morgan Asset Management. CAGR is compound annual growth rate. "Introduction to Climate Tech: A Taxonomy Overview", Pitchbook, October 2021. \*Data through September 30, 2021. Data is based on availability as of November 30, 2021.

**Global emissions covered by carbon pricing initiatives**

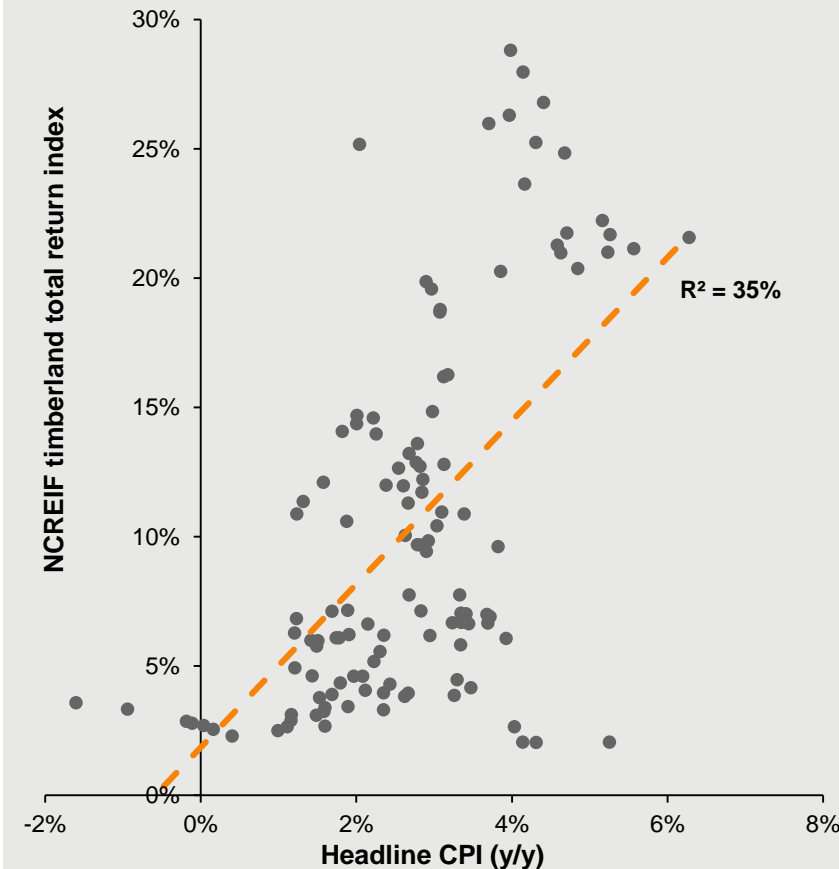
% of global greenhouse gas emissions

**Emissions trading system prices**USD per tones of CO<sub>2</sub> equivalent

Source: (Left) World Bank, J.P. Morgan Asset Management. ETS is emissions trading system. (Right) International Carbon Action Partnership, J.P. Morgan Asset Management. China ETS price is based on the average of Beijing, Chongqing, Guangdong, Hubei, Shanghai, Shenzhen and Tianjin ETS prizes. CO<sub>2</sub> equivalent tones standardize emissions to allow for comparison between gases. One equivalent tone has the same warming effect as one tone of CO<sub>2</sub> over 100 years. Past performance is not a reliable indicator of current and future results. Emissions trading system prices are as of 3Q21. Data is based on availability as of November 30, 2021.

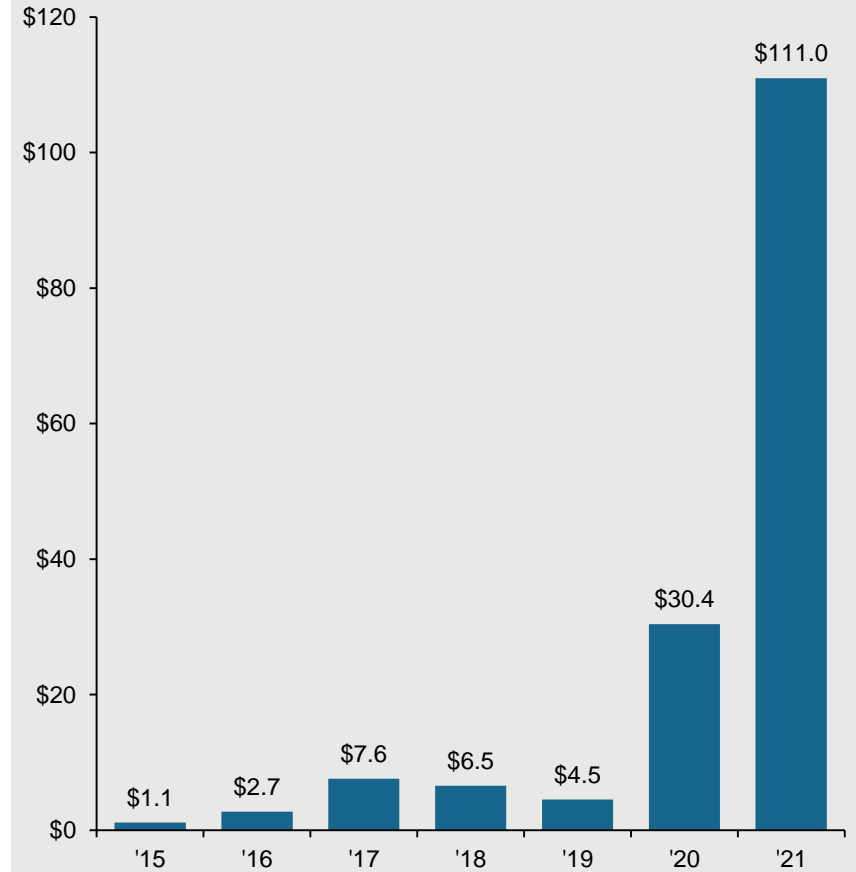
## Timber returns and inflation

CPI, y/y, NCREIF Timberland Index, 5-yr. annualized returns



## Venture capital investment in forest carbon tech

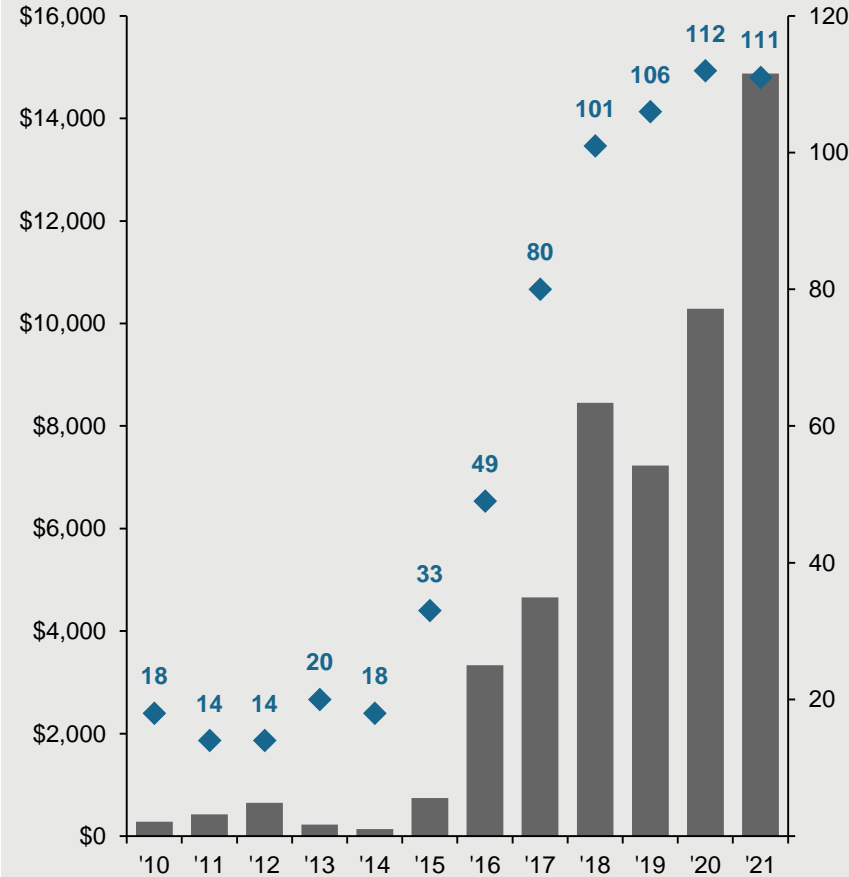
Deal value, USD millions



Source: BLS, NCREIF, Pitchbook, J.P. Morgan Asset Management. "Climate Tech", Pitchbook, October 2021. Data through September 30, 2021. Data is based on availability as of November 30, 2021.

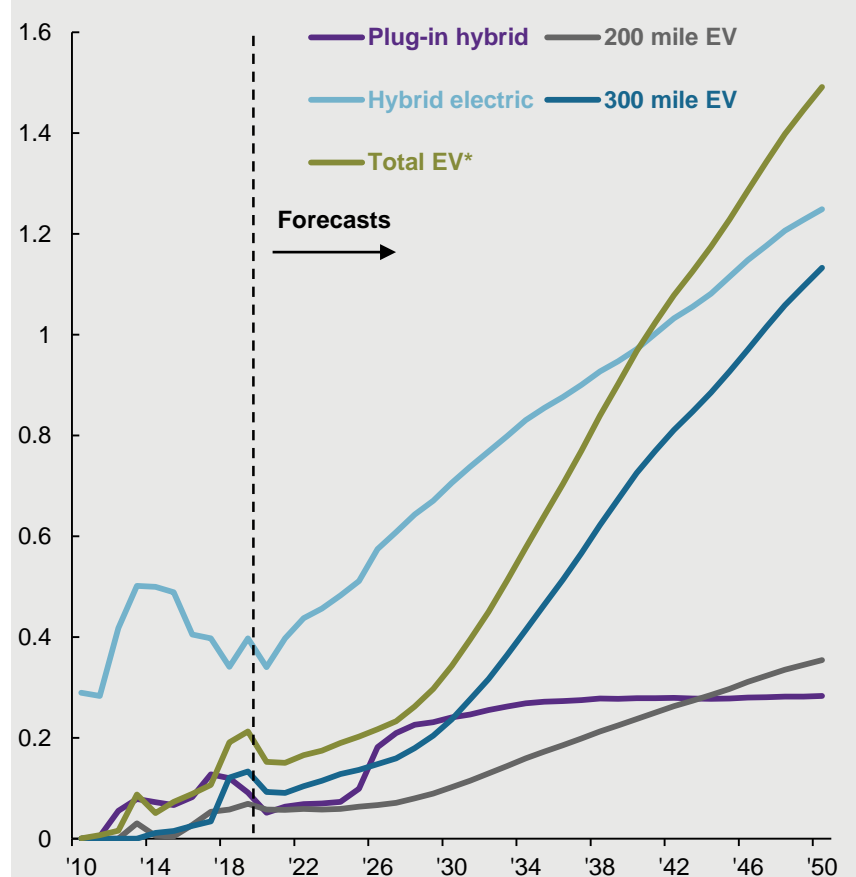
## Venture capital investment in electric transportation

Deal value (USD millions) and number of deals



## New battery-powered vehicle sales

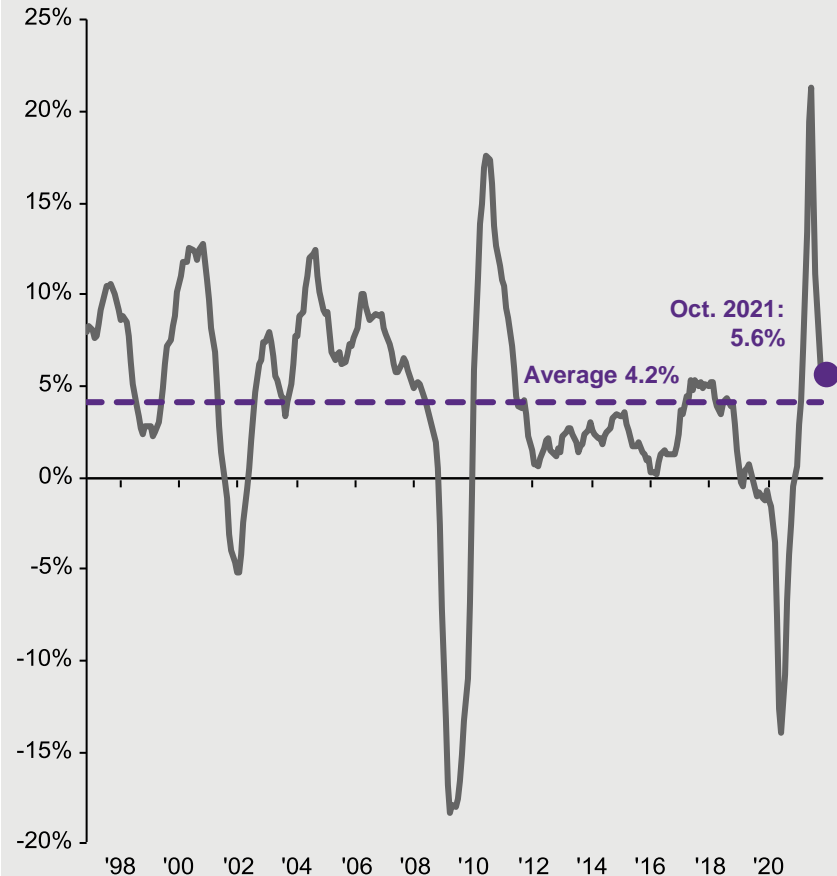
Millions of vehicles



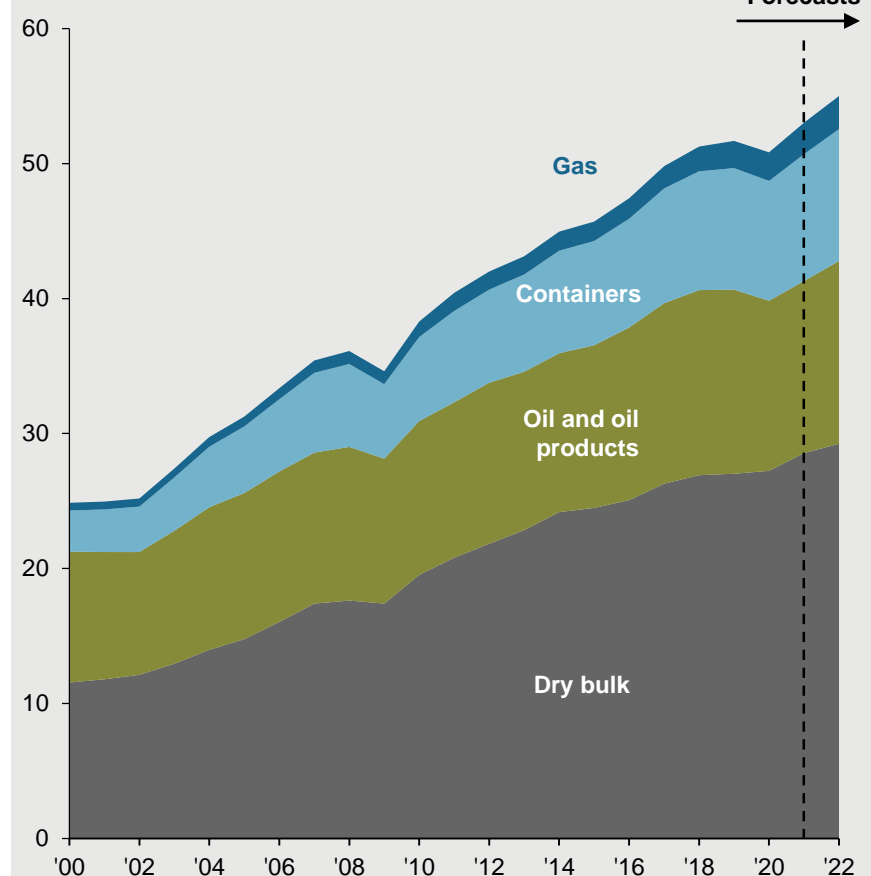
Source: EIA, PitchBook Data Inc., J.P. Morgan Asset Management.. \*Total EV includes 100-,200-, and 300-mile electric vehicles. "Introduction to Climate Tech: A Taxonomy Overview", PitchBook, October 2021. Data through September 30, 2021. Electric transportation includes aviation, road consumer (personal transport), road industry (freight), maritime, EV infrastructure, and EV battery tech. Data is based on availability as of November 30, 2021.

**World trade volume**

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

**World seaborne trade by product**

Estimated in trillion ton-miles

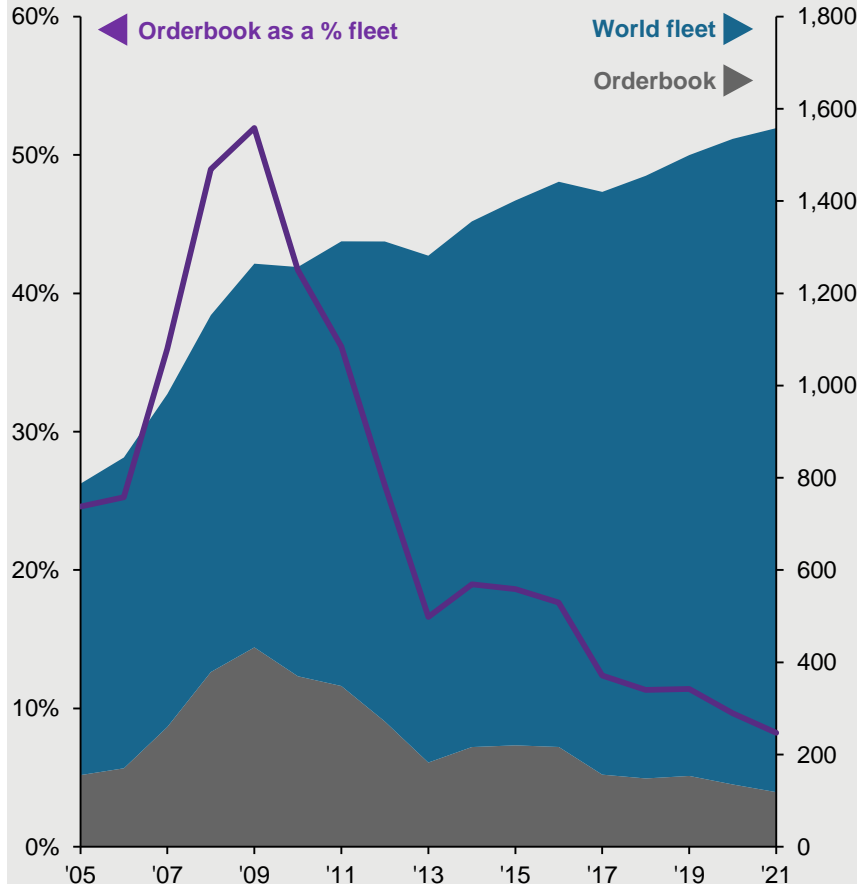


Source: CPB Netherlands Bureau for Economic Policy Analysis, Clarksons, FactSet, J.P. Morgan Asset Management.

Data is based on availability as of November 30, 2021.

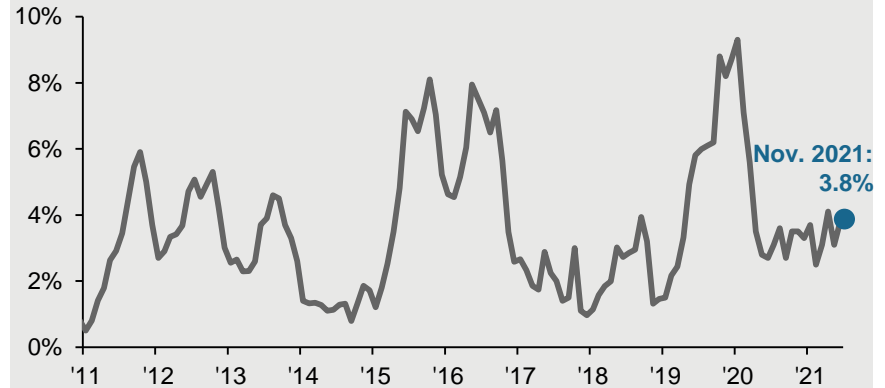
## Global fleet and orderbook

Gross tonnage



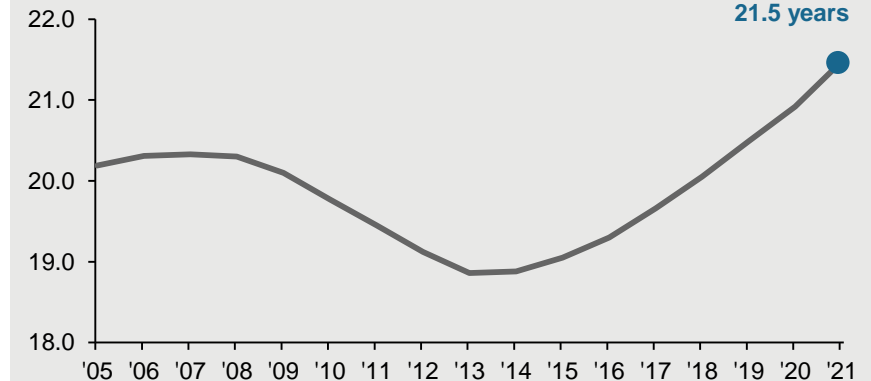
Source: Clarksons Research, MSI, Sea/net, J.P. Morgan Asset Management.  
Data is based on availability as of November 30, 2021.

## Idle containership capacity % fleet



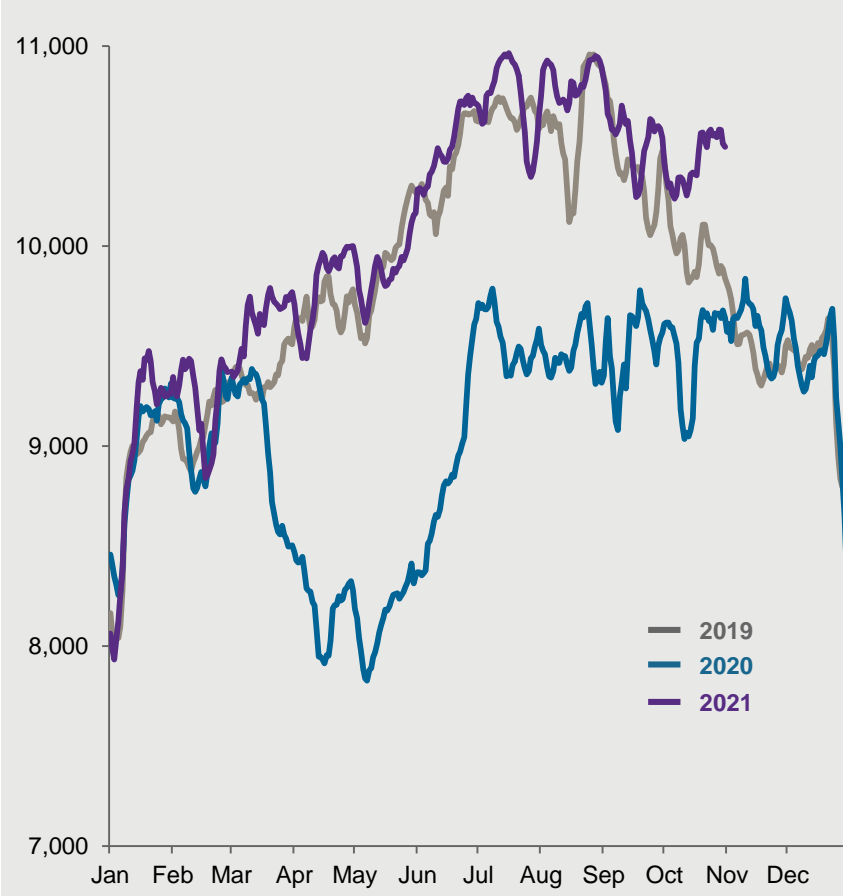
## Global fleet age

+100 gross tonnage, years

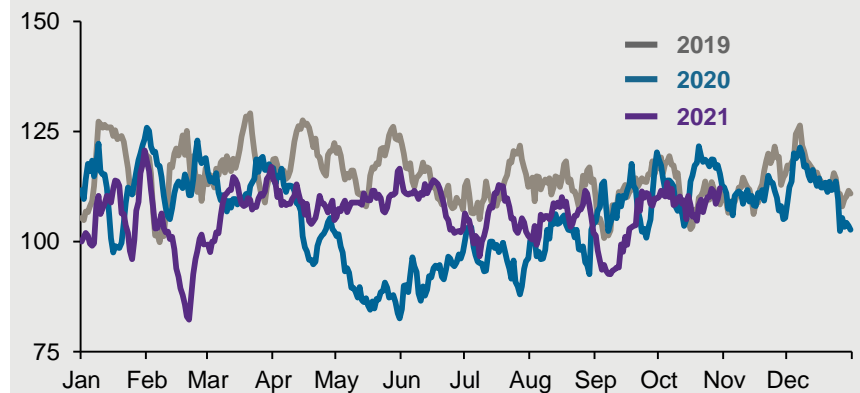


**Global port calls\***

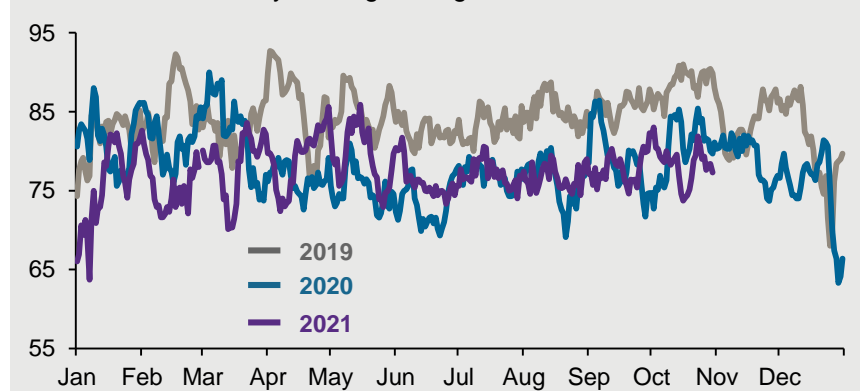
Number of calls, 7-day moving average

**U.S. port calls\*\***

Number of calls, 7-day moving average

**Europe port calls\*\*\***

Number of calls, 7-day moving average



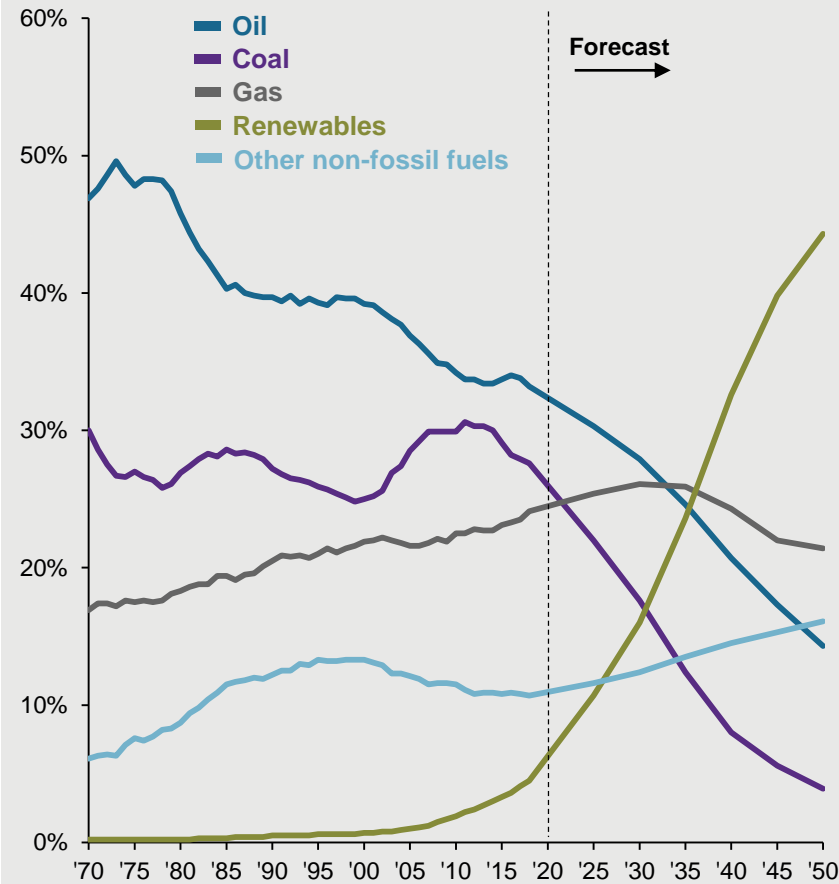
Source: Clarksons Research, MSI, Sea/net, J.P. Morgan Asset Management. Port calls defined as all instances of a vessel entering and leaving a defined port location, excluding instances where vessel not recorded as travelling at less than 1 knot, and combining multiple consecutive instances at the same 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. \*\*\*Europe includes Germany, Italy, Spain, U.K. and France.

Data is based on availability as of November 30, 2021.



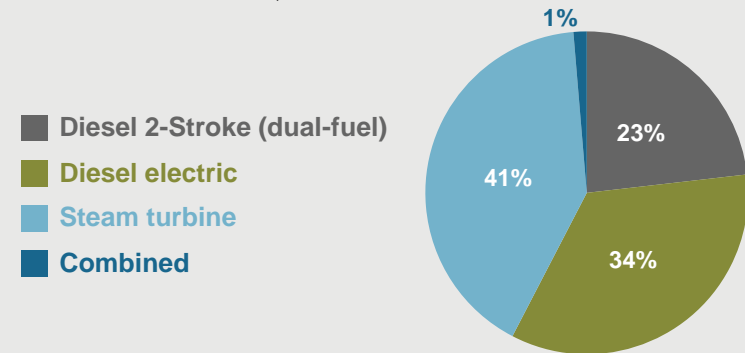
## Global energy mix

Share of primary energy



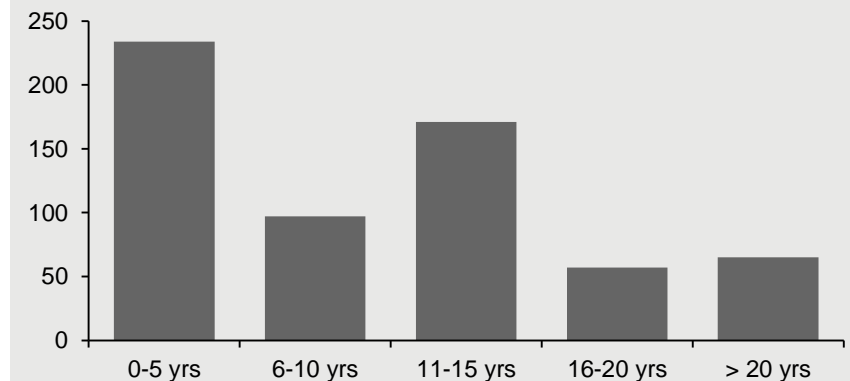
## LNG carrier engine types

Share of on-water fleet, 2020



## LNG carrier fleet age profile

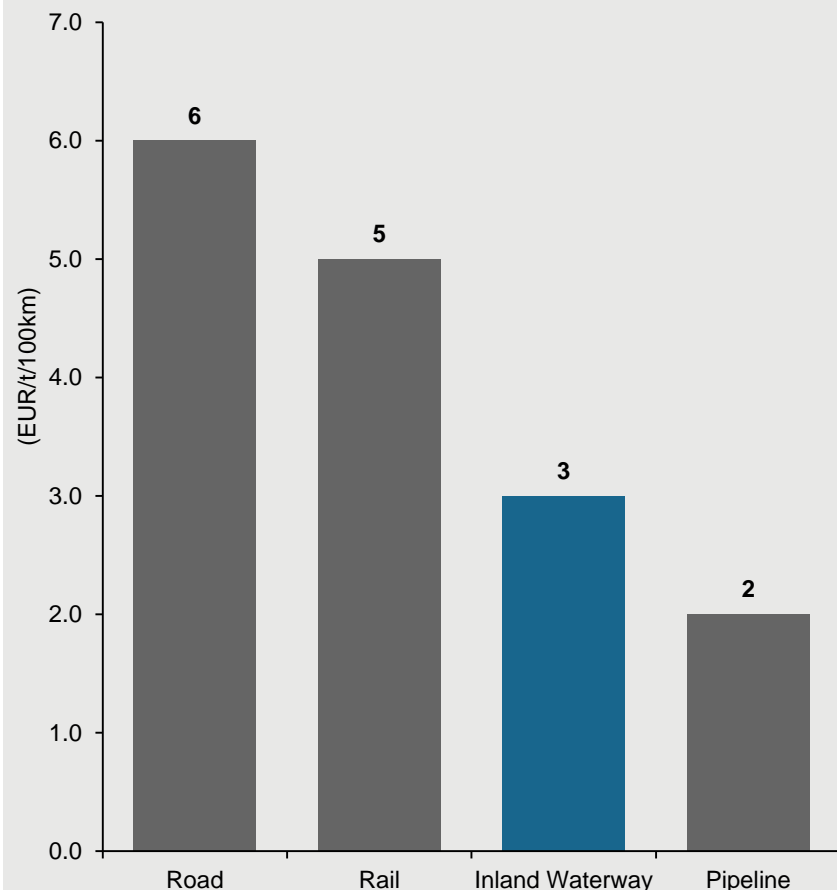
Number of vessels, 2020



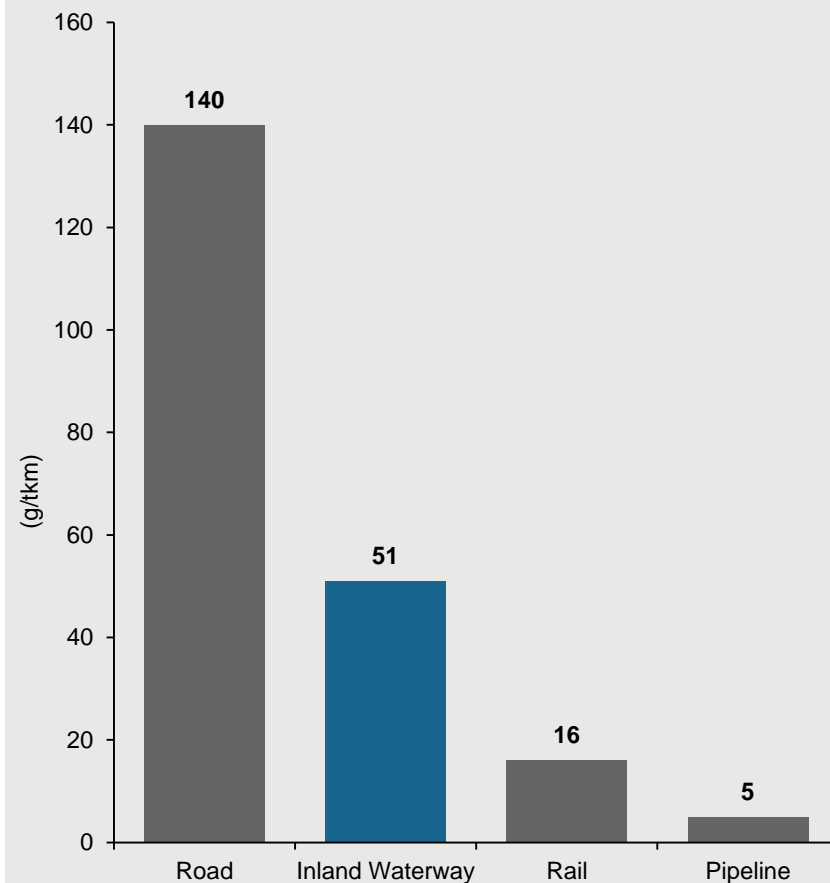
Source: BP Energy Outlook 2020, Clarkson's Research, MSI Horizon, J.P. Morgan Asset Management.

Data is based on availability as of November 30, 2021.

Average cost by mode of transportation



Average CO2 emissions by mode of transportation

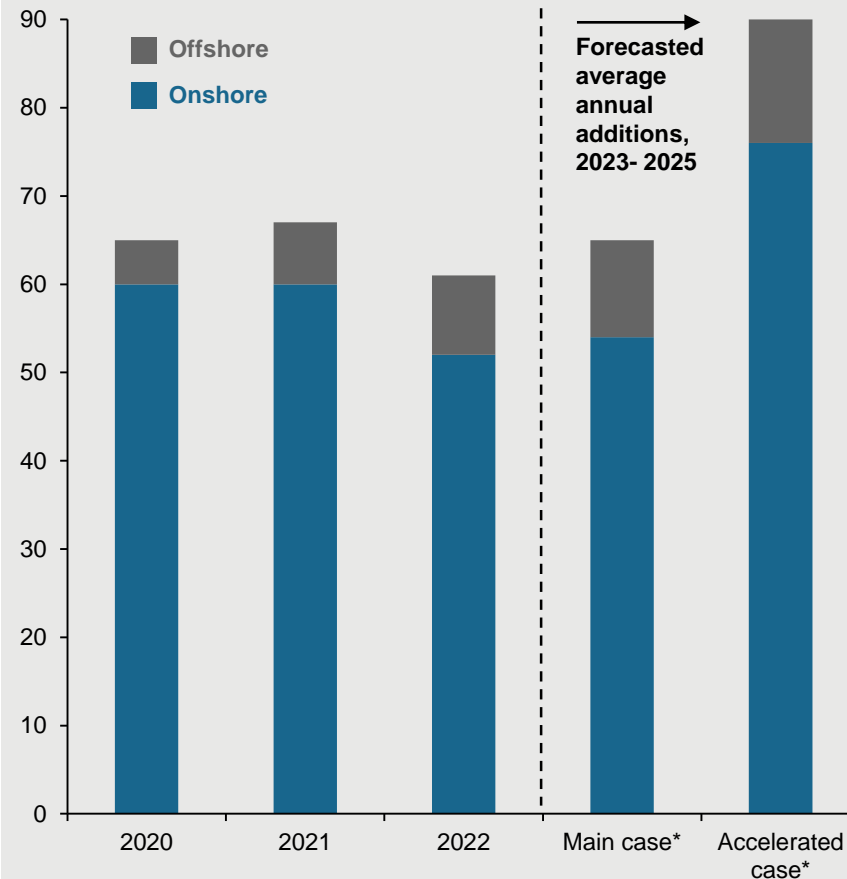


Source: European Environment Agency, Deutsche Verkehrs-Zeitung, European Chemical Transport Association, Management press, Roland Berger analysis, J.P. Morgan Asset Management.

Data is based on availability as of November 30, 2021.

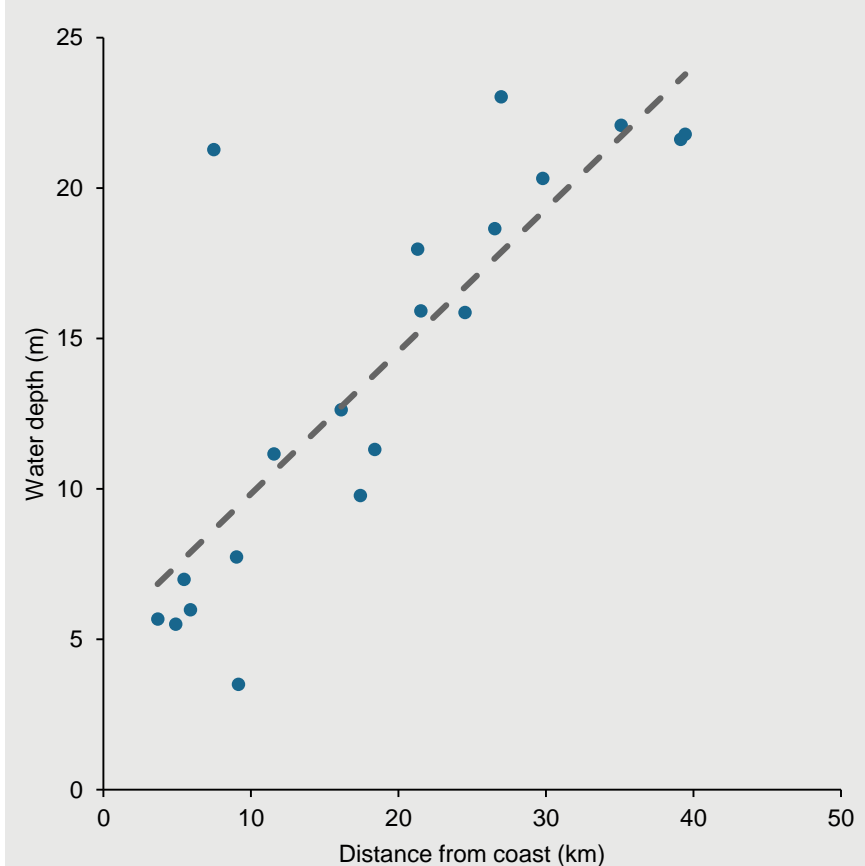
## Global wind net capacity additions

Onshore versus offshore, gigawatt



## Offshore wind project locations

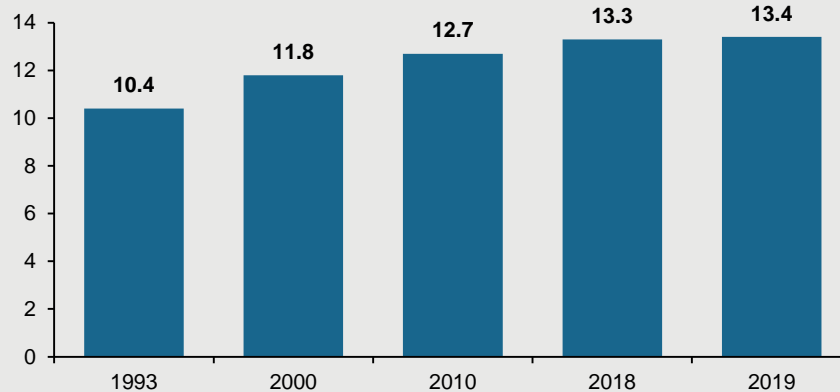
Distance from shore and water depth



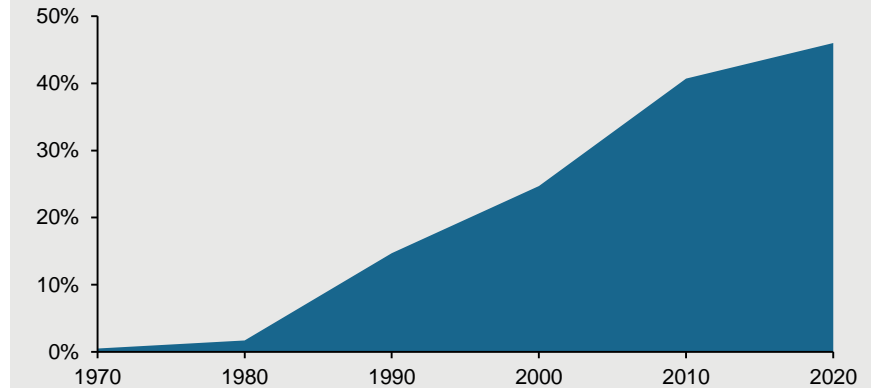
Source: IEA, The Wind Power, J.P. Morgan Asset Management. \*In its "main case" scenario, the IEA projects wind, solar, hydro, and other renewable sources of energy accounting for 95% of the increase in the world's electricity generating capacity over the next 5 years.

Data is based on availability as of November 30, 2021.

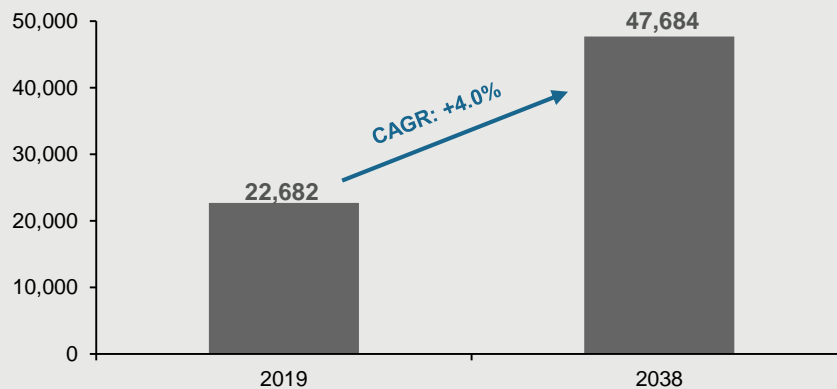
**Average age of major airline aircraft**  
Years, U.S.



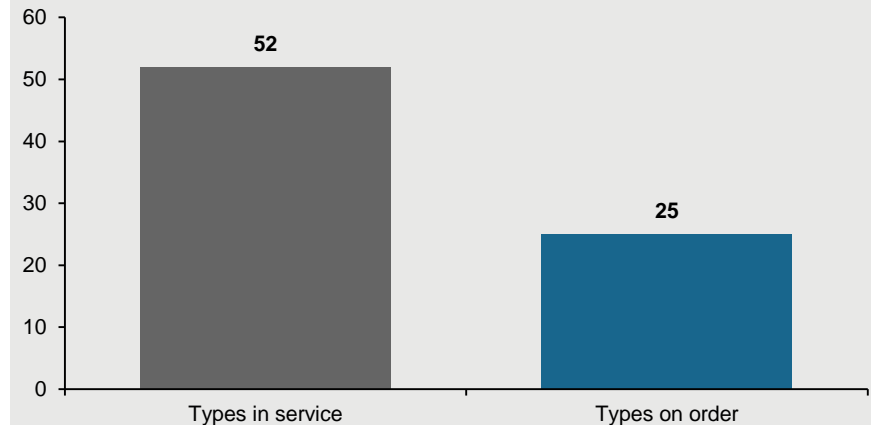
**Percent of industry wide aviation fleet leased\***  
Global



**Aircraft demand \*\***  
Global



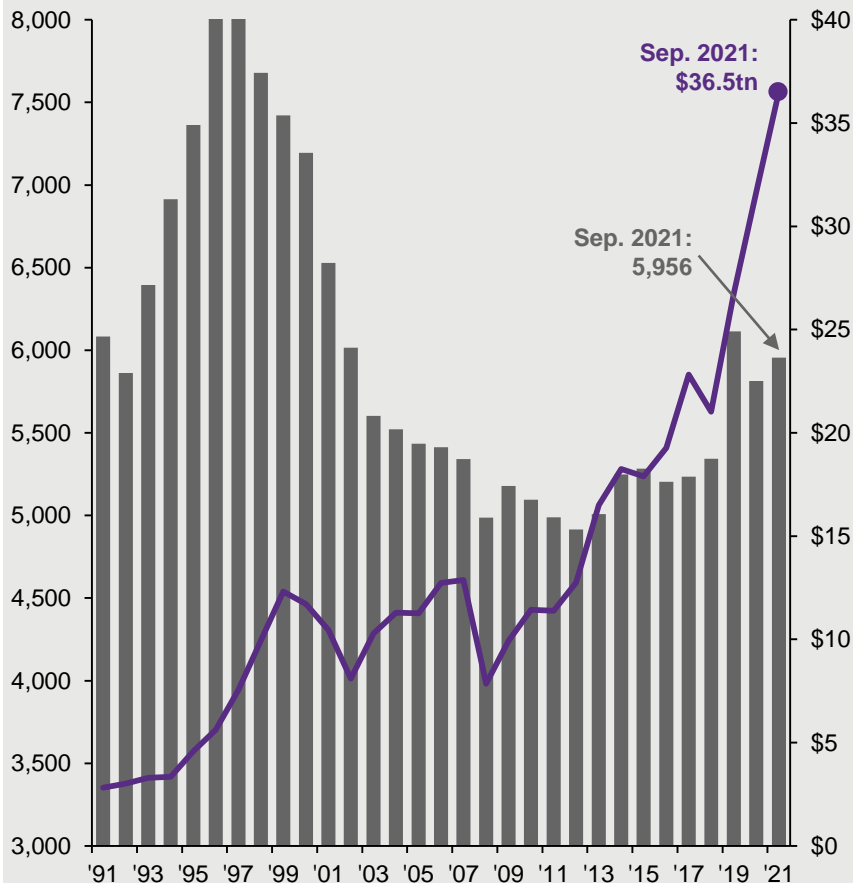
**U.S. major airline fleet by status**



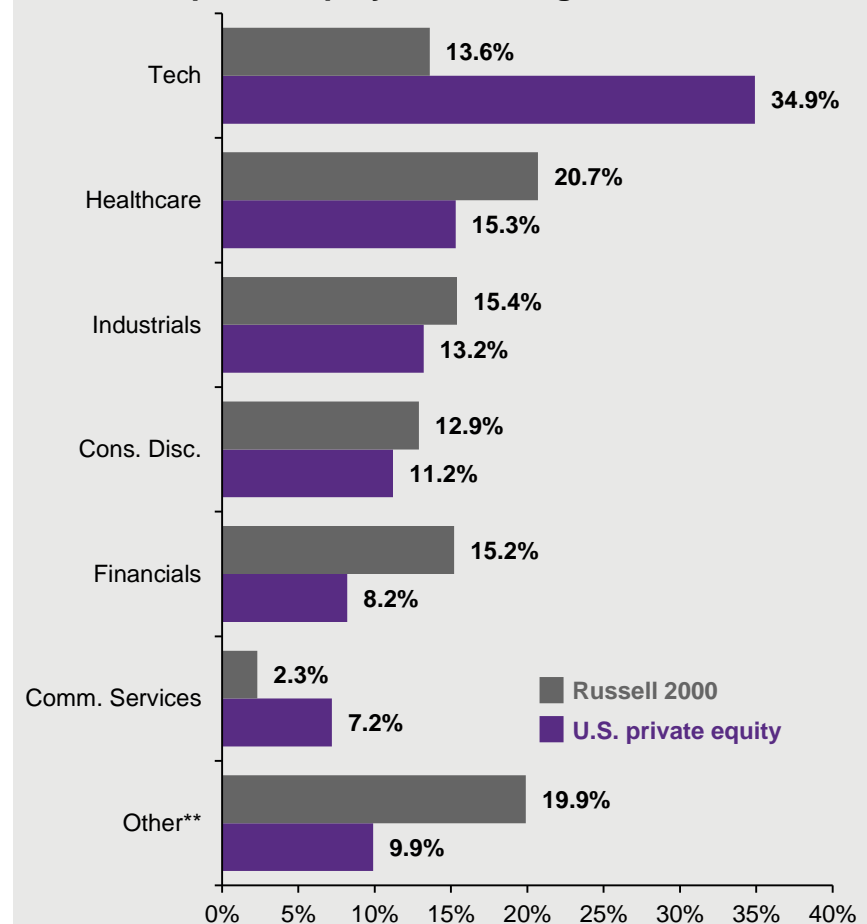
Source: Ascend, Airbus, U.S. Bureau of Transportation Statistics, Cirium, Statista, J.P. Morgan Asset Management. \*Includes parked and in-service regional, single-aisle and widebody aircraft. \*\* Demand includes both passenger and freight aircrafts. Passenger aircrafts are 100+ seaters. Freighters are 10 tones+. Data is based on availability as of November 30, 2021.

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

Number (left), S&P 500 market capitalization in USD trillions (right)



## Private vs. public equity sector weights



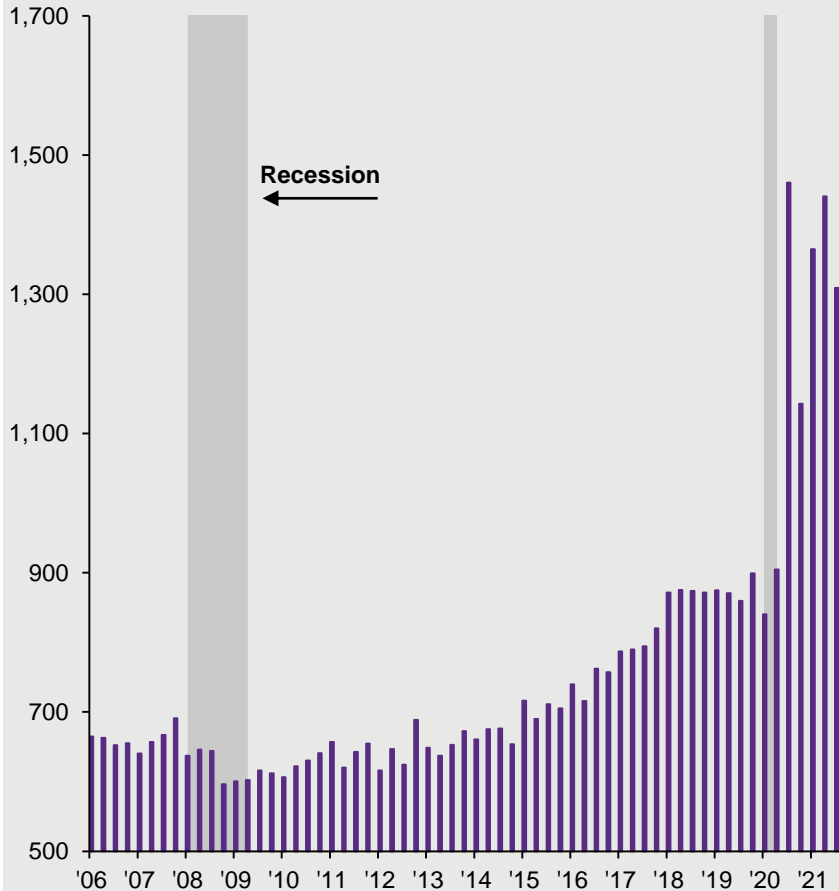
Sources: Cambridge Associates, Russell, World Federation of Exchanges, J.P. Morgan Asset Management.

\*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, energy, consumer staples, and materials. Percentages may not sum due to rounding. Sector weights are as of December 31, 2020.

Data is based on availability as of November 30, 2021.

## U.S. applications for business formation

Seasonally adjusted, thousands



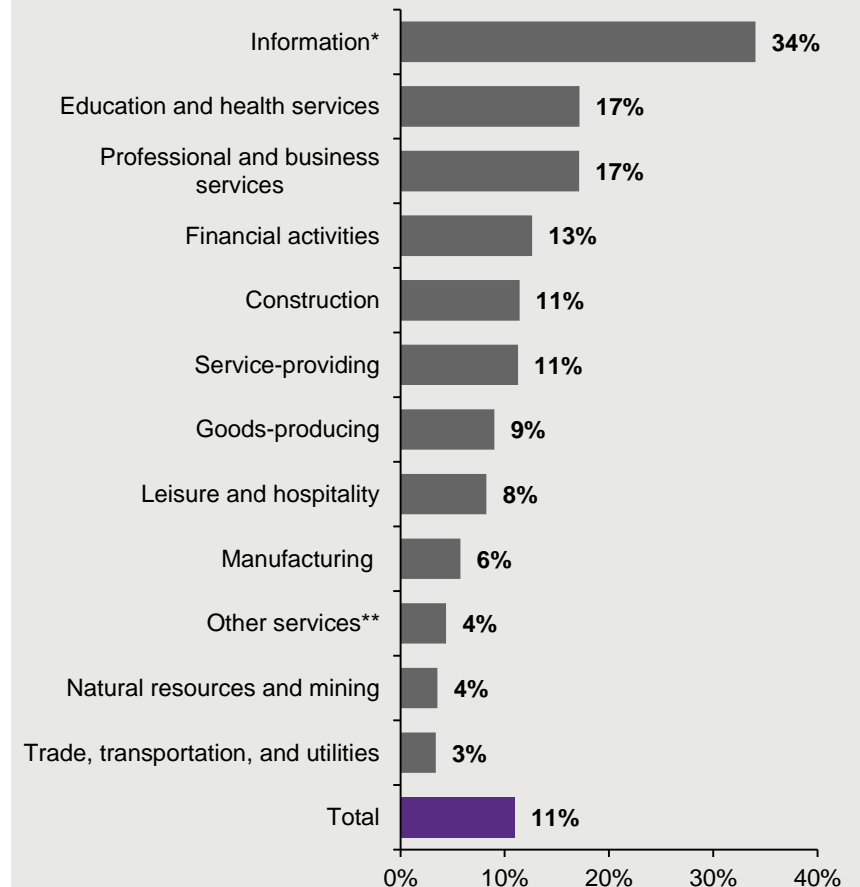
Source: Bureau of Labor Statistics, U.S. Census Bureau, J.P. Morgan Asset Management.

Business formation data are as of 3Q21. \*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 is based on availability as of November 30, 2021.

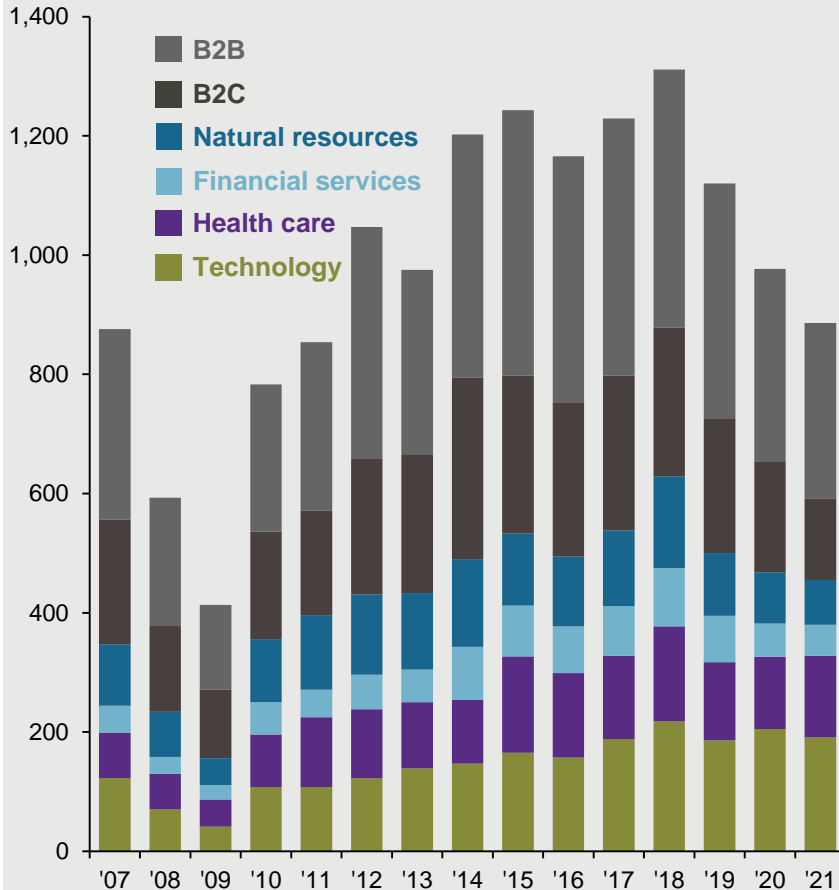
## Growth in business establishments by private industry

March 2017 – March 2021



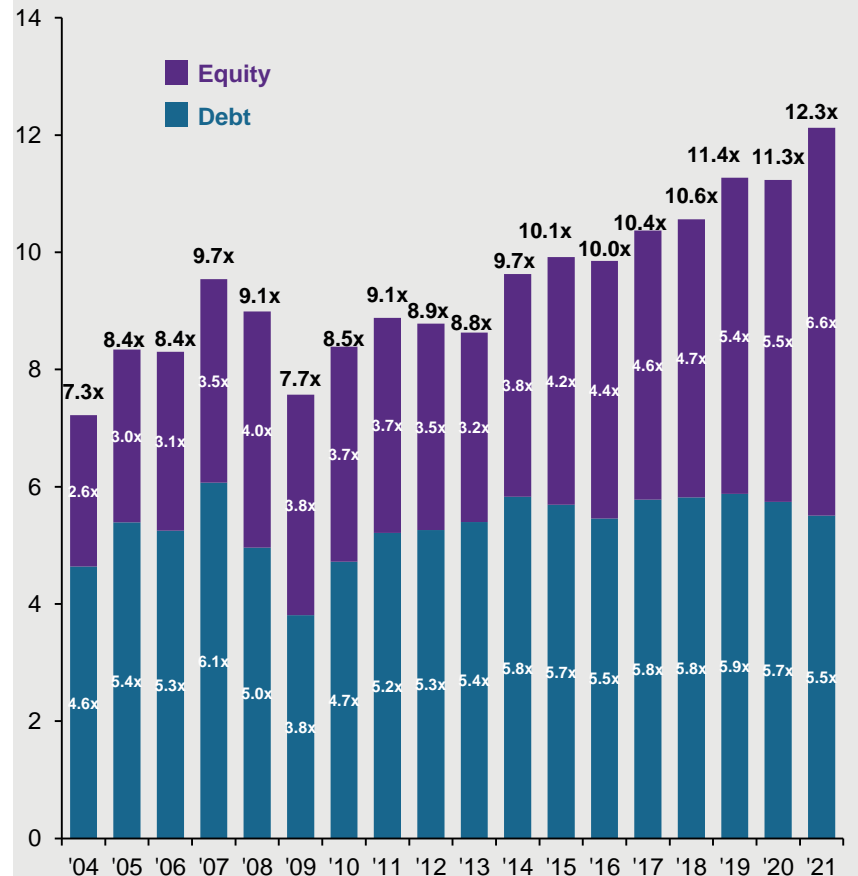
## U.S. private equity deals

Number



## U.S. LBOs: purchase price multiples

Equity and debt over trailing EBITDA



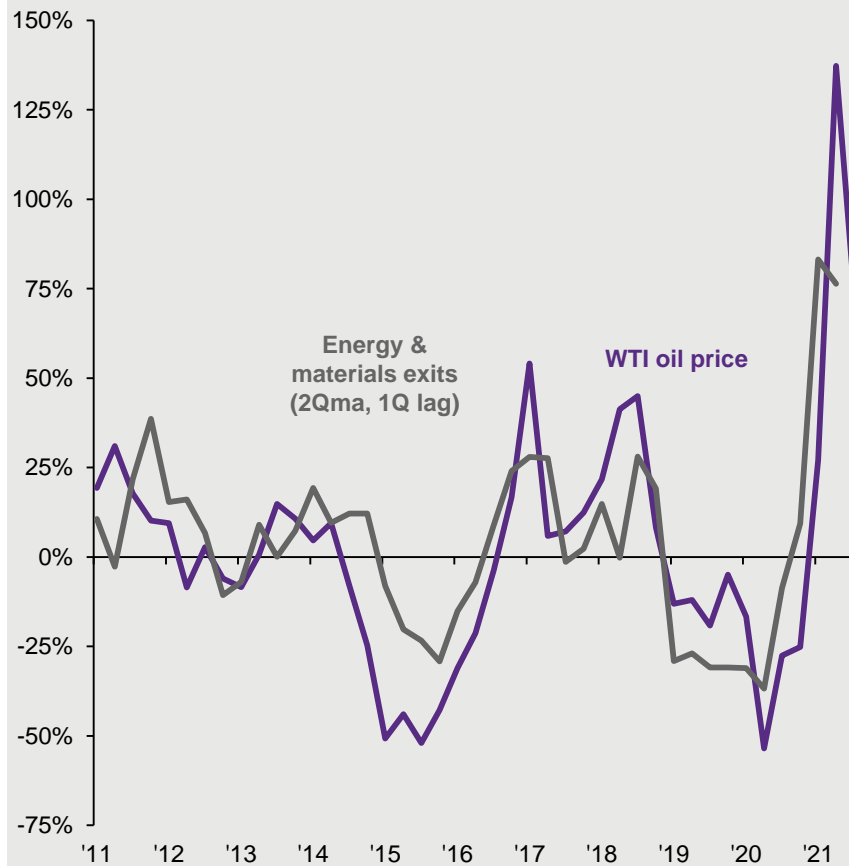
Source: Pitchbook, S&P LCD, J.P. Morgan Asset Management.

B2B is business to business. B2C is business to consumer. Natural resources = Materials and resources and energy. Private equity and multiple data are as of September 30, 2021.

Data is based on availability as of November 30, 2021.

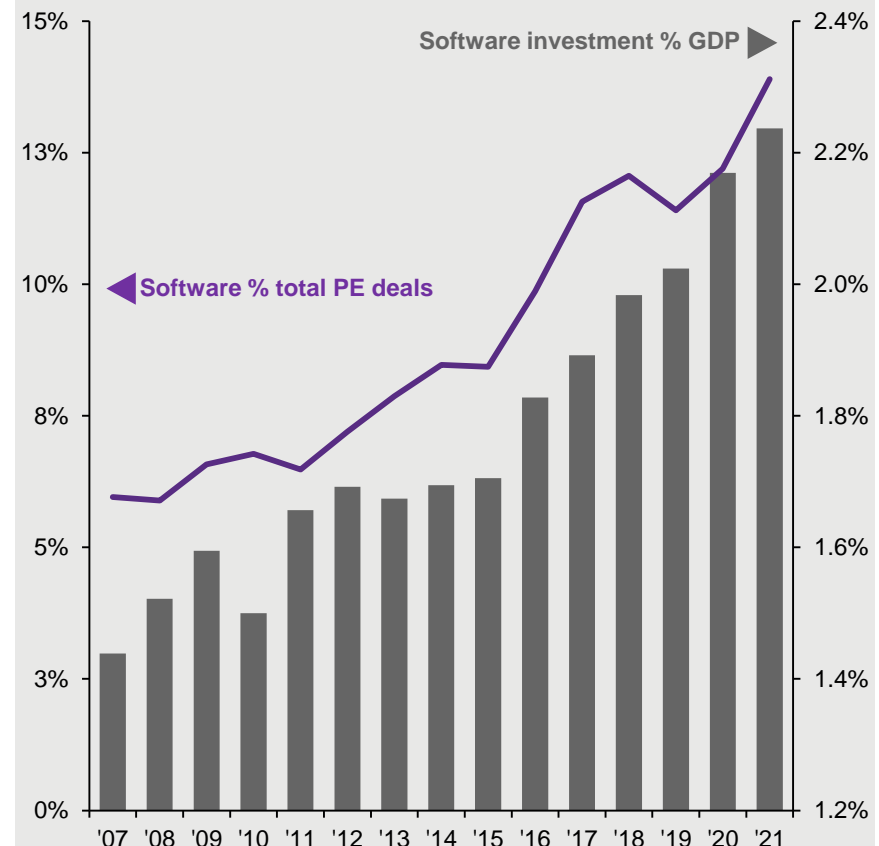
## Oil prices and natural resource exits

Energy & materials exit count, WTI oil price, y/y % change



## Software investment and private equity

% U.S. PE deals targeting software companies, software inv. % GDP



Source: BEA, Pitchbook, FactSet, J.P. Morgan Asset Management.

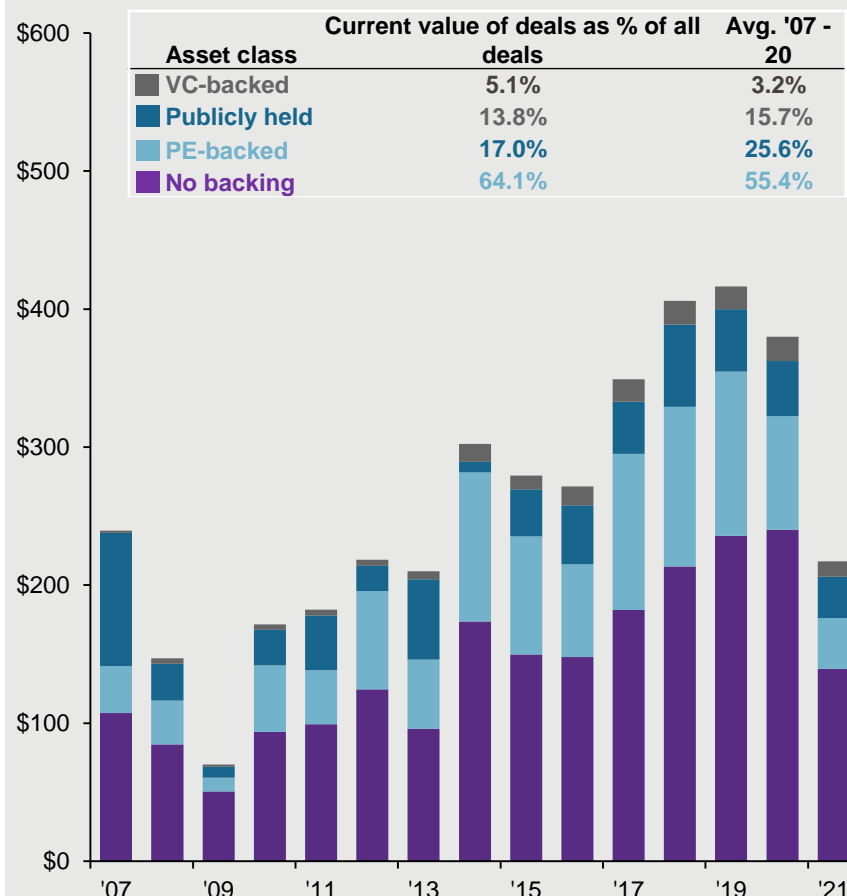
WTI oil price is a quarterly average. Software investment is represented by nonresidential fixed investment in software. Deal, exit and investment data are as of September 30, 2021.

Data is based on availability as of November 30, 2021.



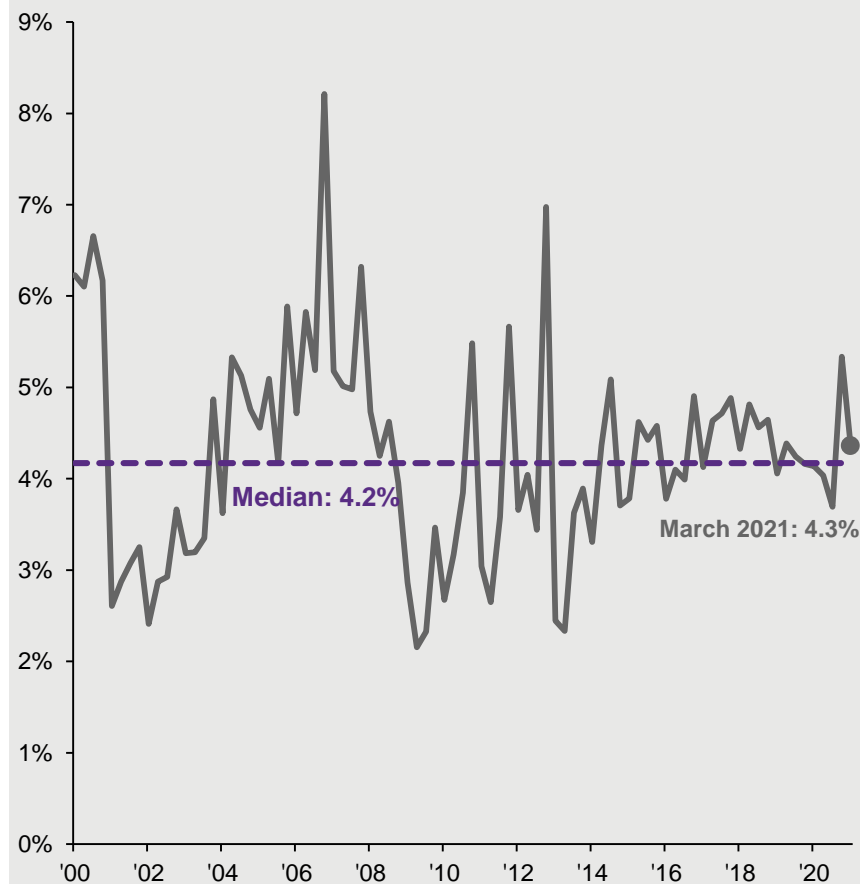
## PE middle-market\* deals by backing

USD billions



## Average capital called by middle market PE funds

% of fund size, March 2000 – March 2021



Source: Bureau of Labor Statistics, Pitchbook, U.S. Census Bureau, J.P. Morgan Asset Management.

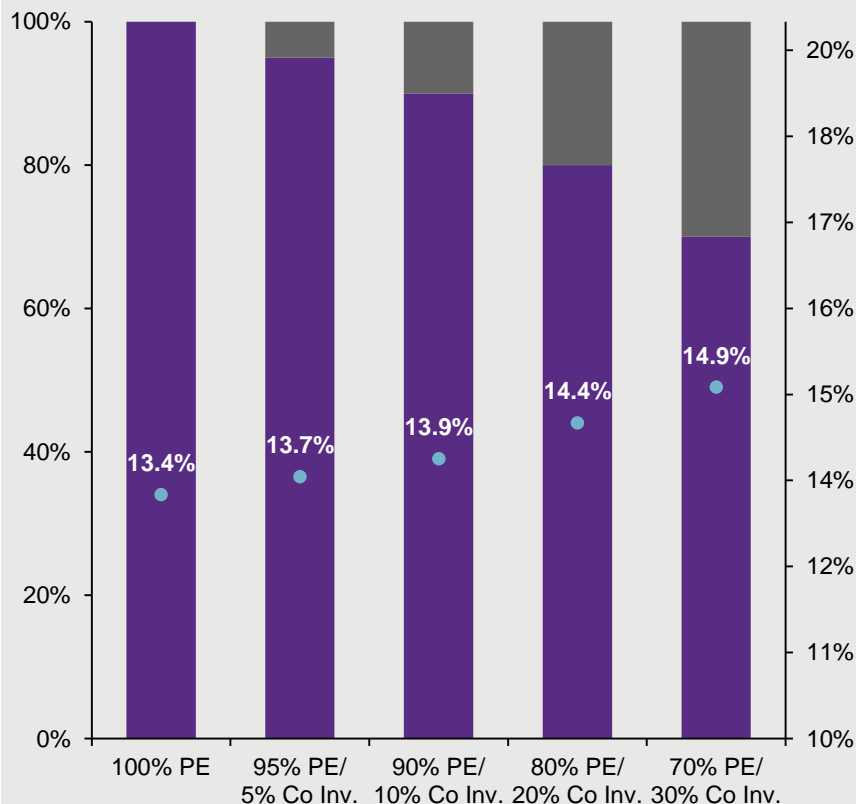
Bankruptcies are business bankruptcies across all chapters. Current middle market deal data are as of June 30, 2021. \*Pitchbook defines the middle market (MM) as US-based deals with an enterprise value between \$25 million and \$1 billion.

Data is based on availability as of November 30, 2021.

## Private co-investments and portfolio construction

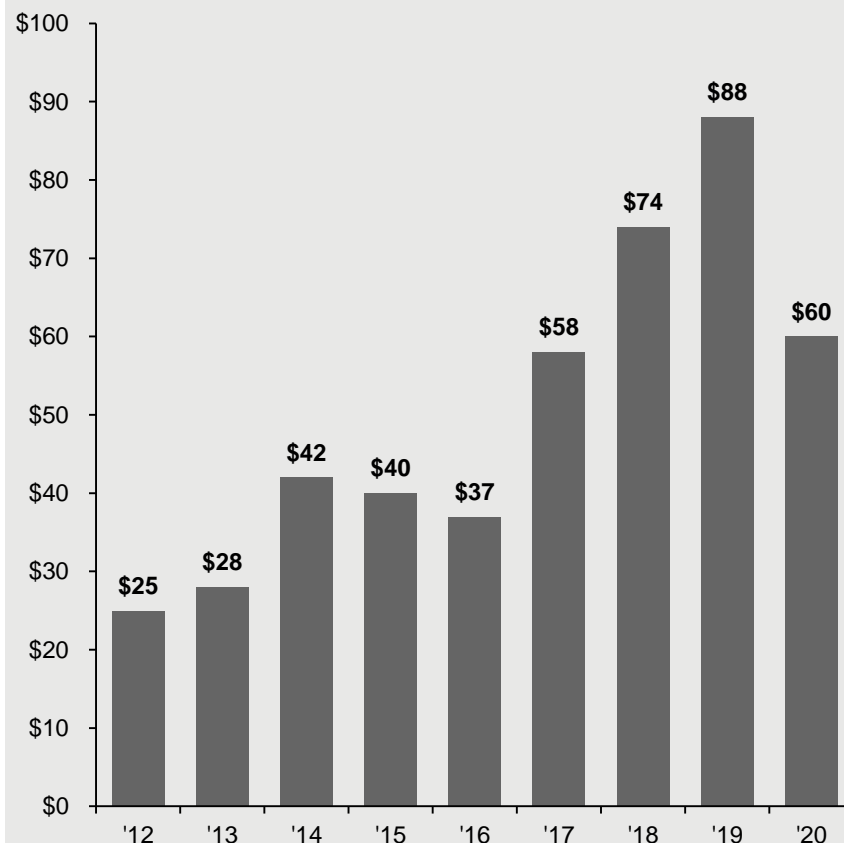
Portfolio allocation, total return

■ U.S. Private equity (% LHS) ● Projected program return (% RHS)  
■ U.S. Co-investment (% LHS)



## Secondary market volume

USD billions



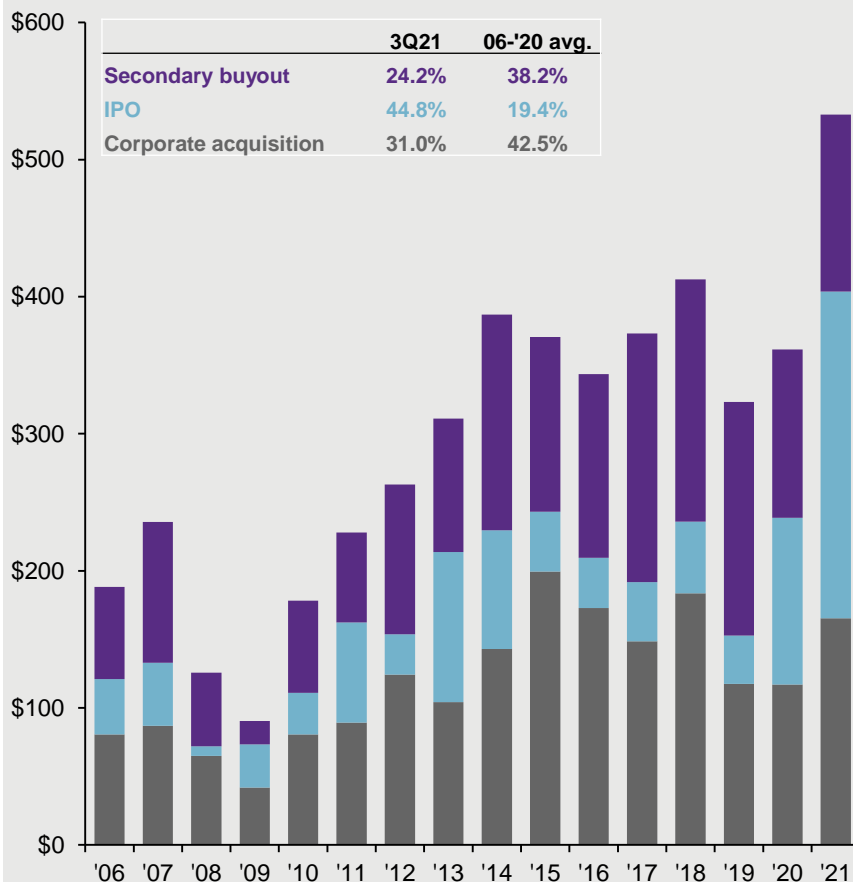
Source: London Business School, Greenhill, J.P. Morgan Asset Management.

To calculate the weighted projected program return, the 25-year periodic return for US private equity through third quarter 2018 was used, equal to a 13.4% net IRR, and co-investment returns were projected to be 500 bps higher. Weighted portfolio returns are calculated by applying the strategy weights to long-term returns. Secondary market fundraising activity data are as of June 30, 2021.

Data is based on availability as of November 30, 2021.

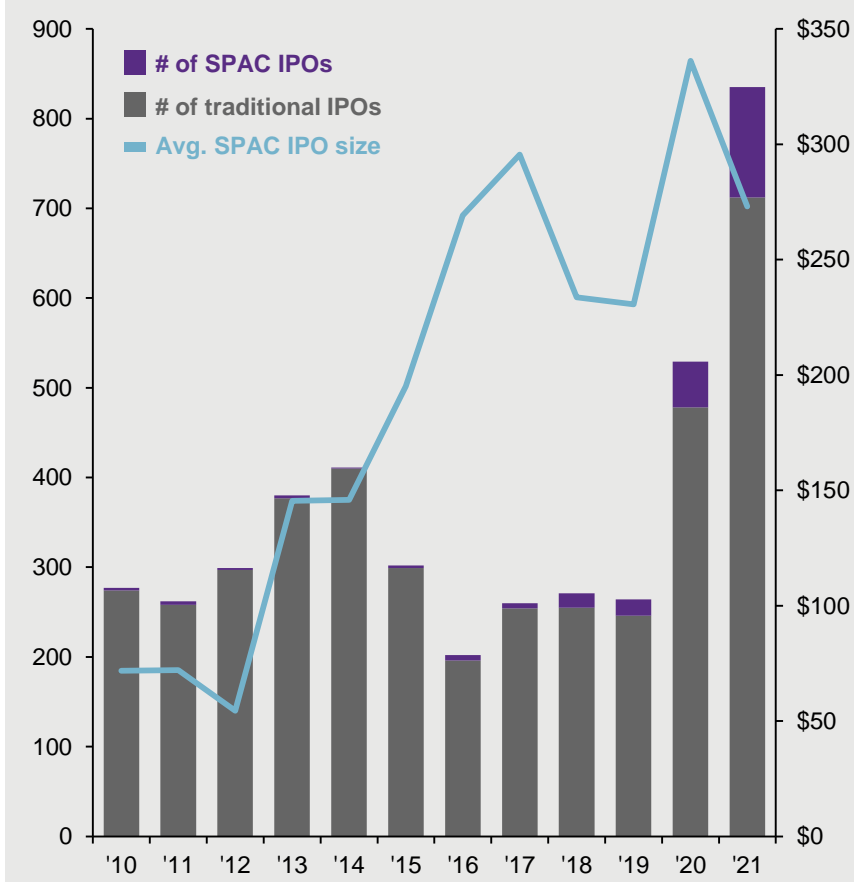
## Private equity exits by type

USD billions



## Number of SPAC and traditional IPOs

Count (left), USD millions (right)



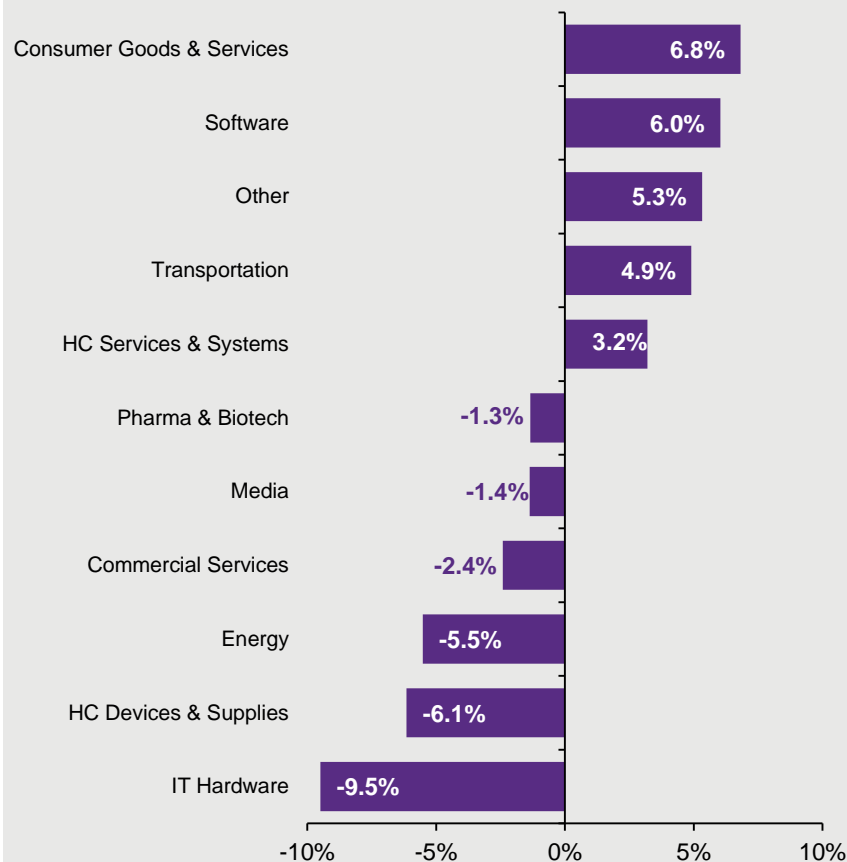
Sources: Pitchbook, SPACInsider, J.P. Morgan Asset Management.

Private equity exit and IPO data are as of September 30, 2021.

Data is based on availability as of November 30, 2021.

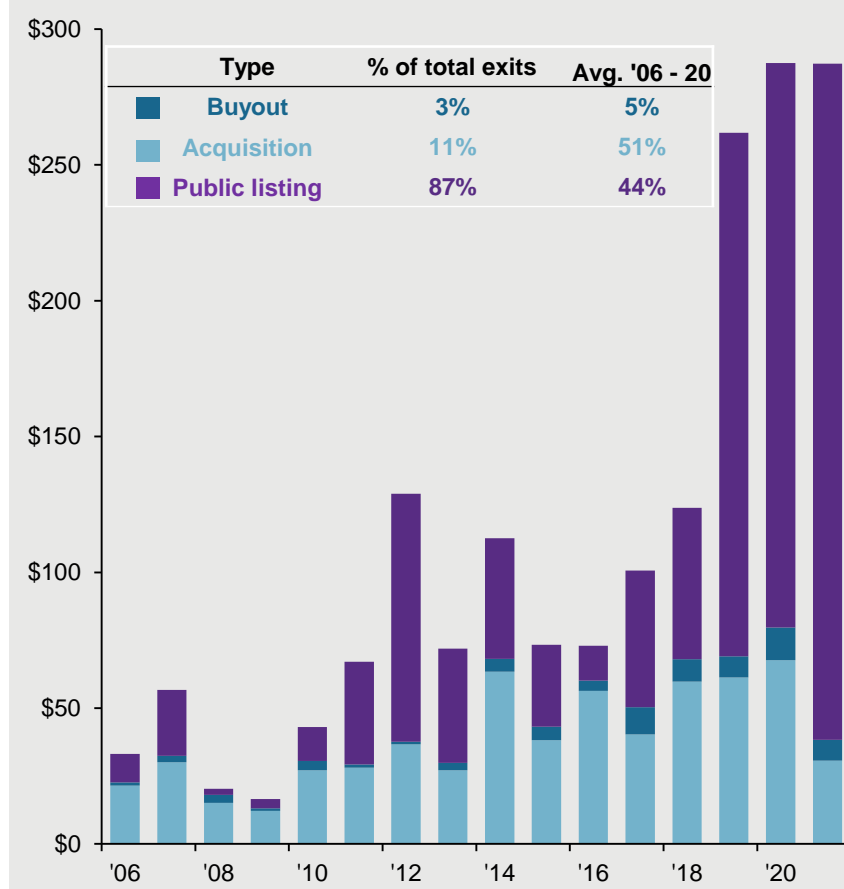
## Change in share of VC investments by industry

2016 – 2021\* vs. 2006 – 2010



## Venture capital exits by type

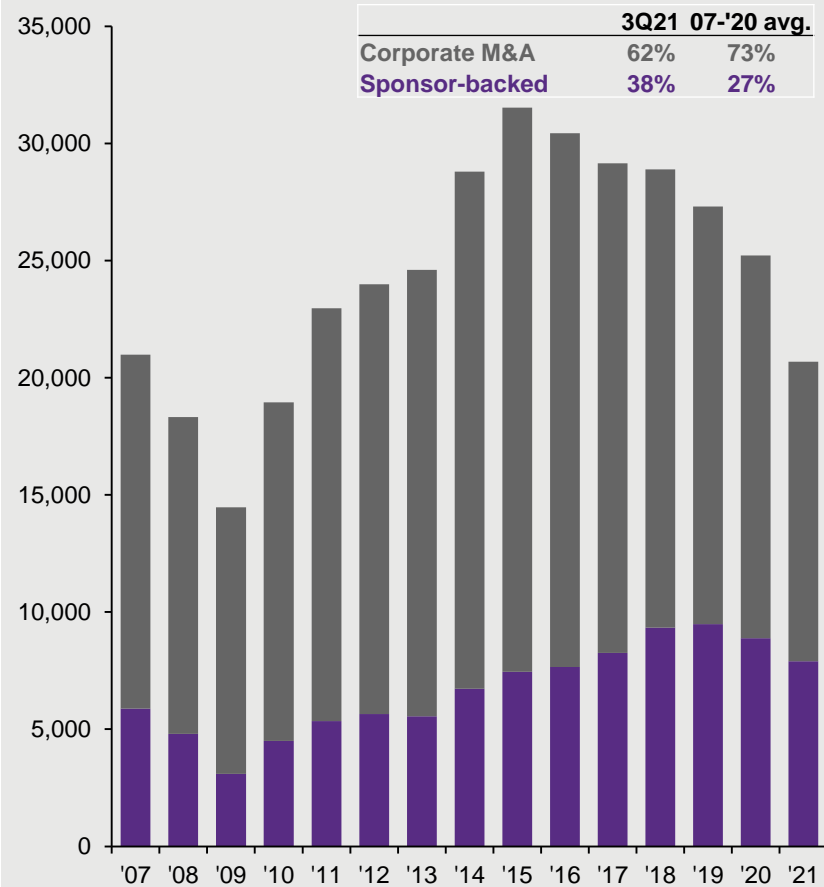
USD billions



Source: Pitchbook, J.P. Morgan Asset Management. Venture capital data is as of June 30, 2021. Percentages may not sum to 100 due to rounding. Data is based on availability as of November 30, 2021.

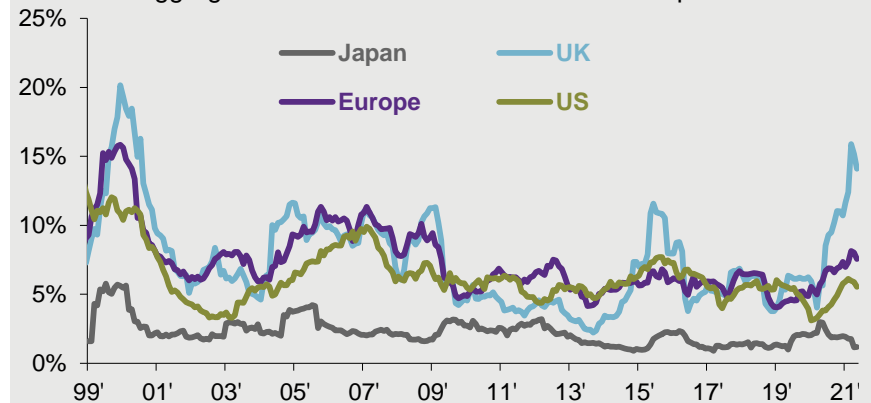
## Global M&amp;A by acquirer type

Deal count

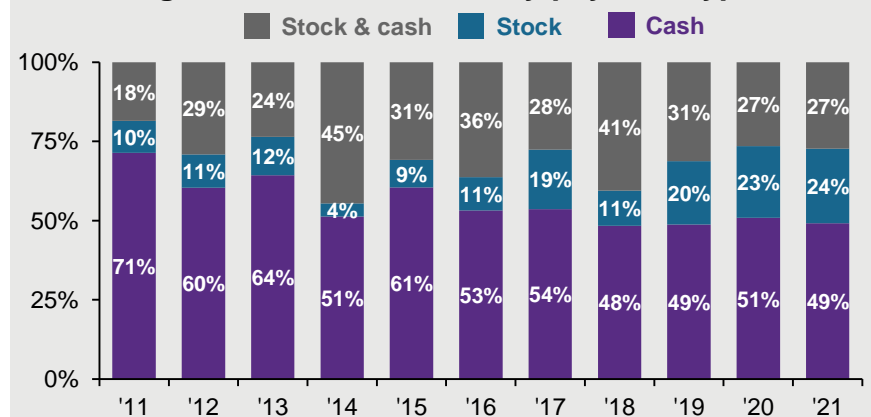


## M&amp;A deal value

12-month aggregate deal value as % of index market cap



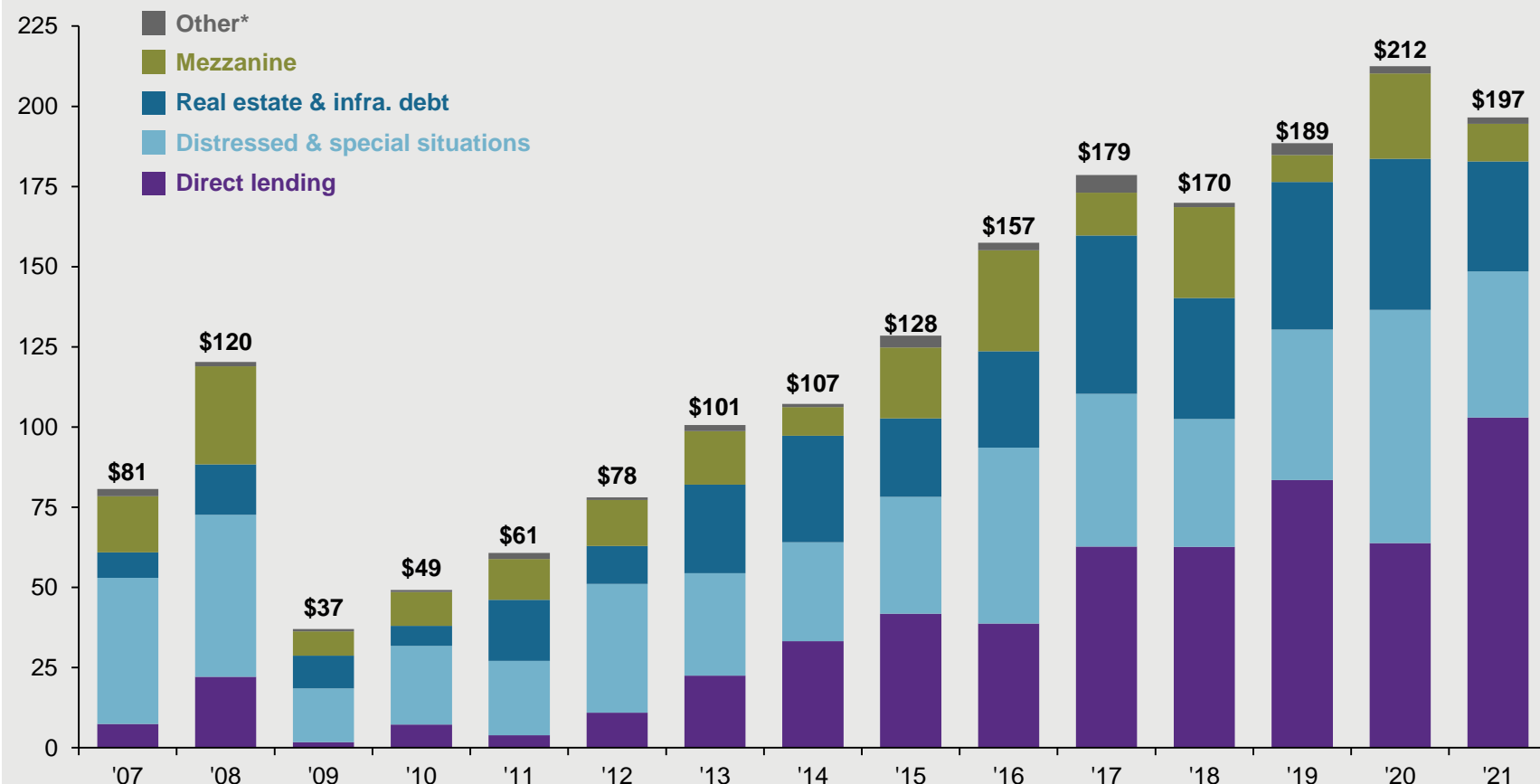
## Share of global M&amp;A deal value by payment type



Source: Datastream, Eurostat, ECB, LCD, MSCI, Markit, Moody's, Morgan Stanley Research, NBER, Pitchbook, The Yield book, Thomson Financial, J.P. Morgan Asset Management. M&A deal data by acquirer and payment type areas of 3Q21. M&A deal value by region data are as of October 2021. Percentages may not sum to 100 due to rounding. Data is based on availability as of November 30, 2021.

## Private debt fundraising by type

USD billions

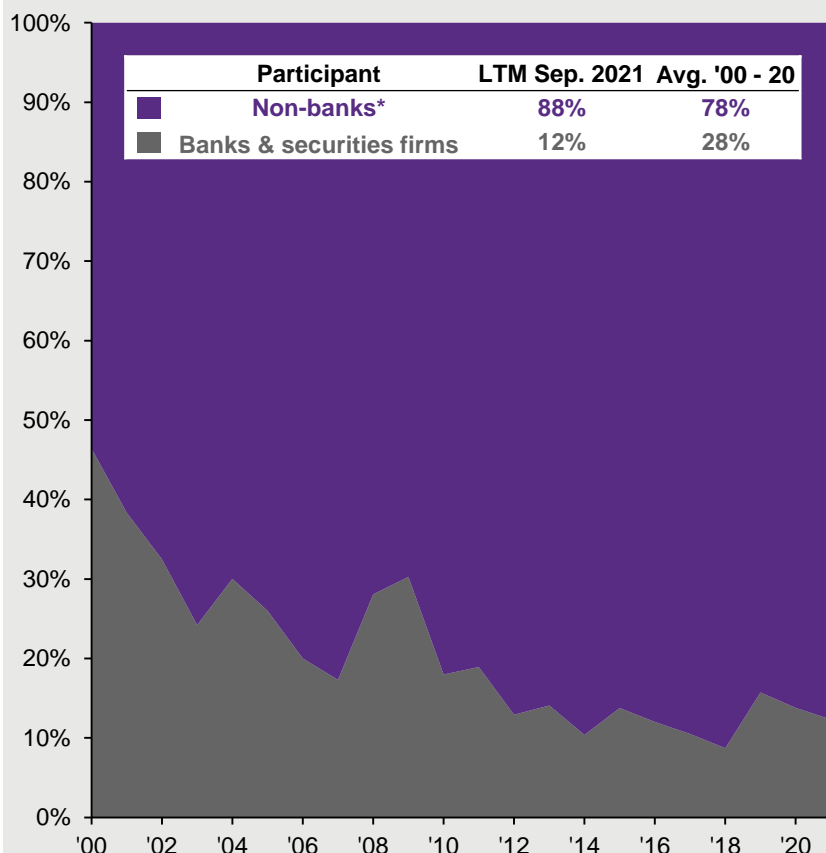


Sources: Preqin, J.P. Morgan Asset Management. Other includes venture debt and fund of funds. 2021 fundraising figures are year-to-date and based on availability as of November 2021.

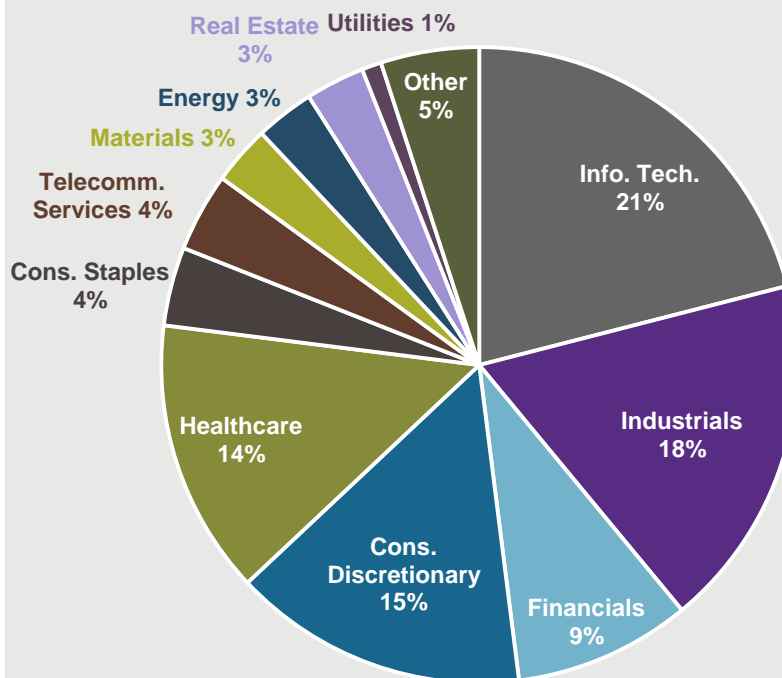
Data is based on availability as of November 30, 2021.

**U.S. leveraged loan market participants**

Share of total market, percent

**Direct lending industry composition**

June 2021



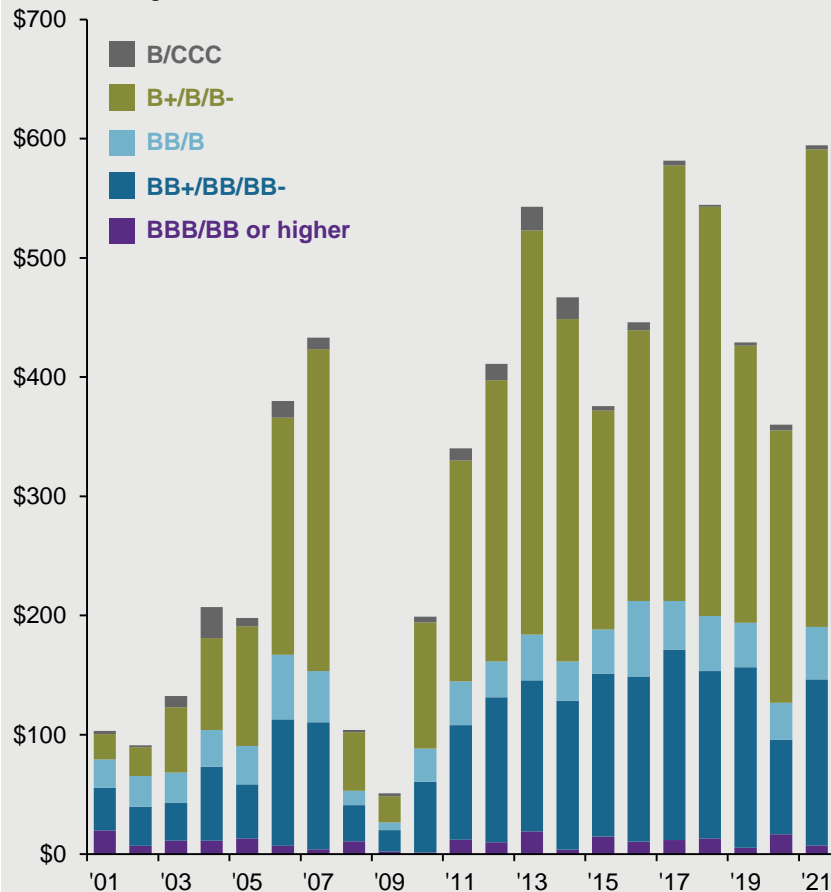
Source: S&amp;P LCD, Cliffwater, J.P. Morgan Asset Management.

2021 U.S. leveraged loan market participants data is last twelve months September 2021. \*Non-banks included institutional investors and finance companies. Participant data excludes left and right agents. Percentages may not sum 100 due to rounding. Direct lending industry composition is based on the Cliffwater Direct Lending Index.

Data is based on availability as of November 30, 2021.

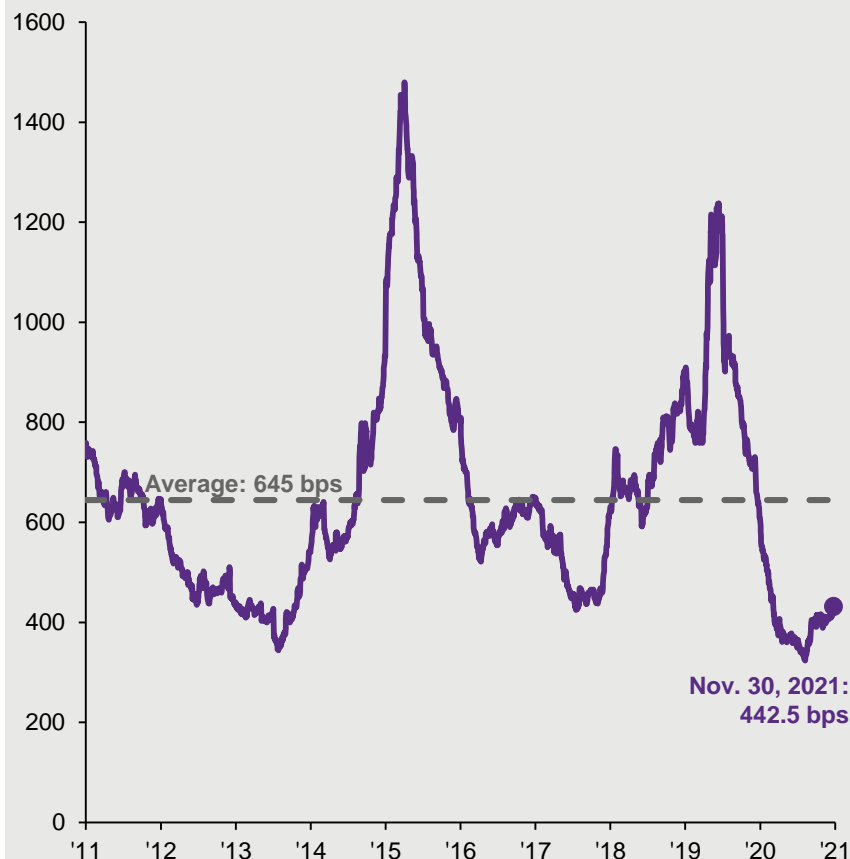
## New-issue U.S. loans by rating\*

Total leveraged loan volume, USD billions



## Spread between BB and CCC rated U.S. HY loans

Bps, last 10 years

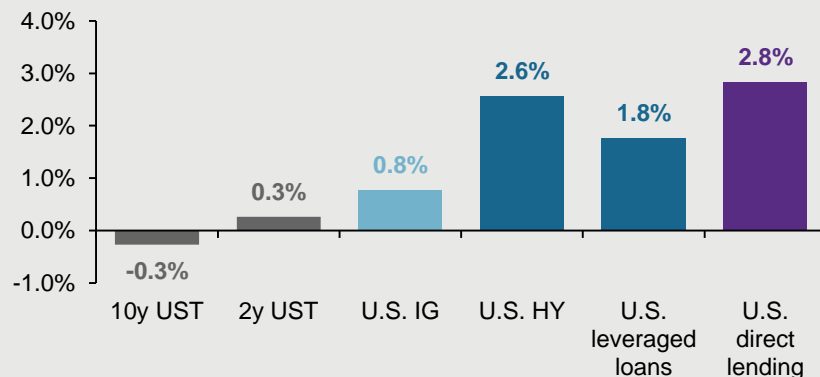


Source: Bank of America, ICE, S&P LCD, J.P. Morgan Asset Management. Excludes existing tranches of add-ons, amendments & restatements with no new money. These numbers comprise loans denominated in all currencies, converted to USD, and are subject to revision as LCD collects additional data. Spread is calculated using the difference in yield-to-worst of the CCC and BB U.S. high yield loan indices. Data is based on availability as of November 30, 2021.



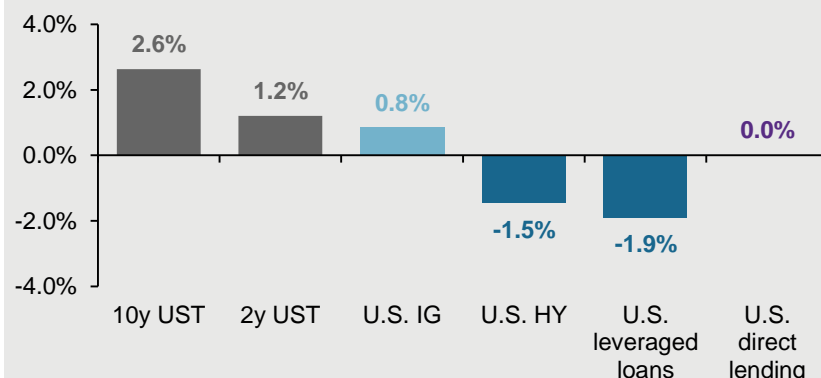
## Expansion

Manufacturing ISM > 50 and rising



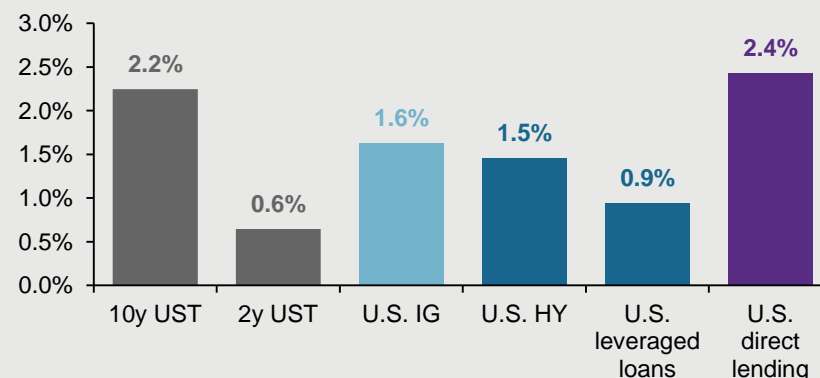
## Recession

Manufacturing ISM < 50 and falling



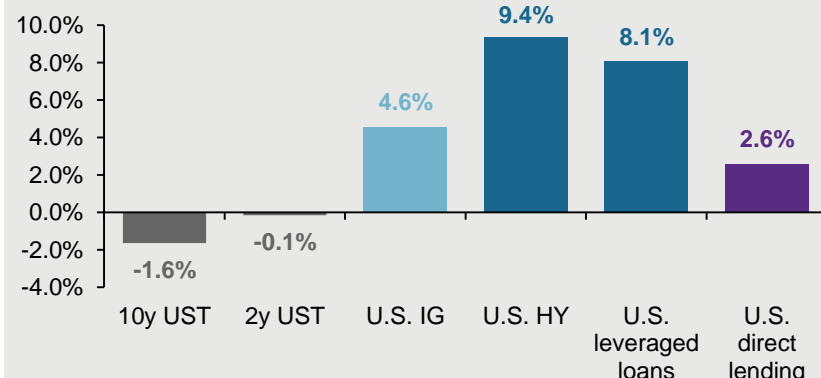
## Late cycle cooling

Manufacturing ISM > 50 and falling



## Turnaround

Manufacturing ISM < 50 and rising



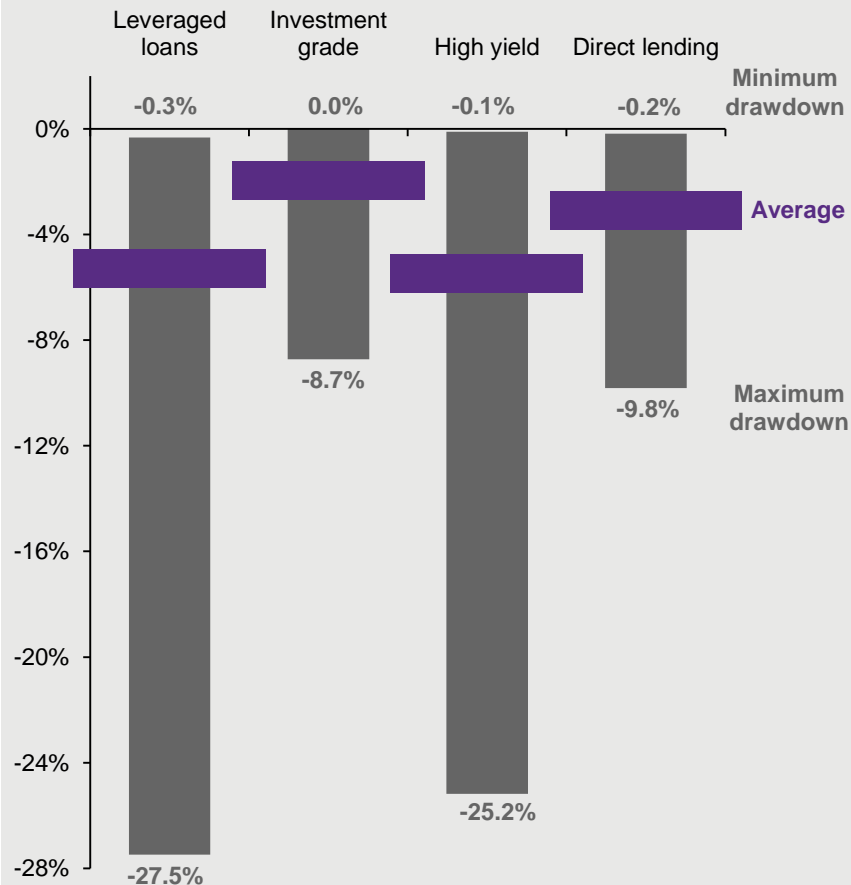
Source: Institute for Supply Management, Bloomberg, Credit Suisse, Cliffwater, J.P. Morgan Asset Management.

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 9/30/2021, except for U.S. direct lending which is through 6/30/2021.

Data is based on availability as of November 30, 2021.

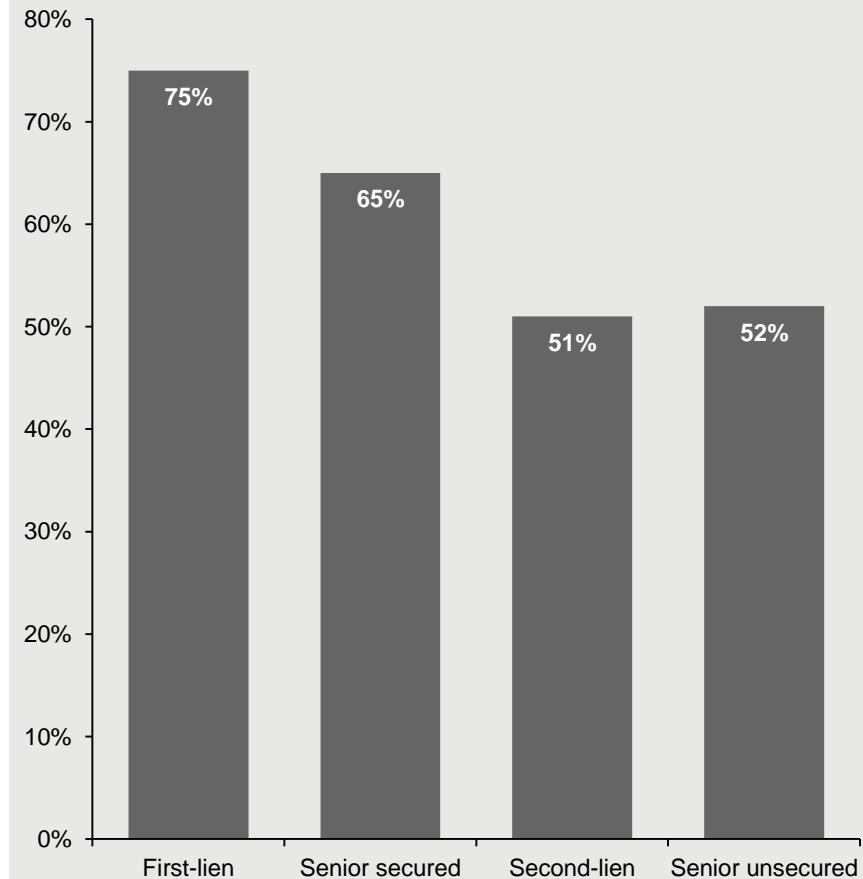
## Public and private credit drawdown dispersion

Maximum – minimum drawdown, quarterly



## Corporate debt recovery rates

1987 – 2020, average discounted recovery rates



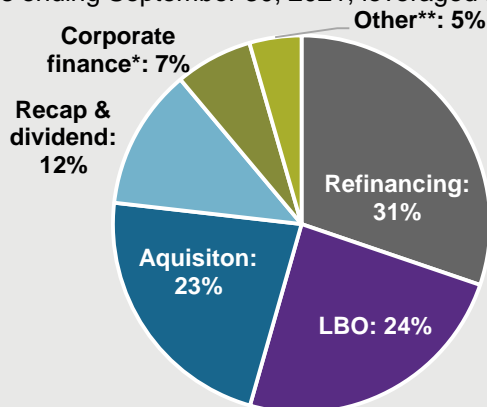
Source: Federal Reserve, Bloomberg, S&P LCD, J.P. Morgan Asset Management.

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 9/30/2021, except for U.S. direct lending which is through 6/30/2021.

Data is based on availability as of November 30, 2021.

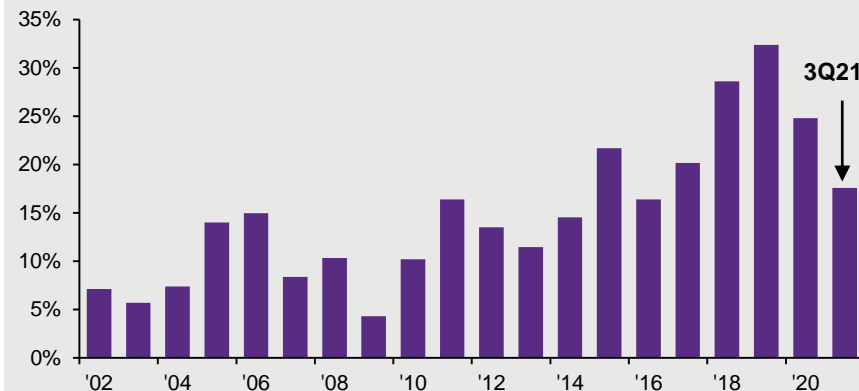
## New loan issuance by purpose

12-months ending September 30, 2021, leveraged loans



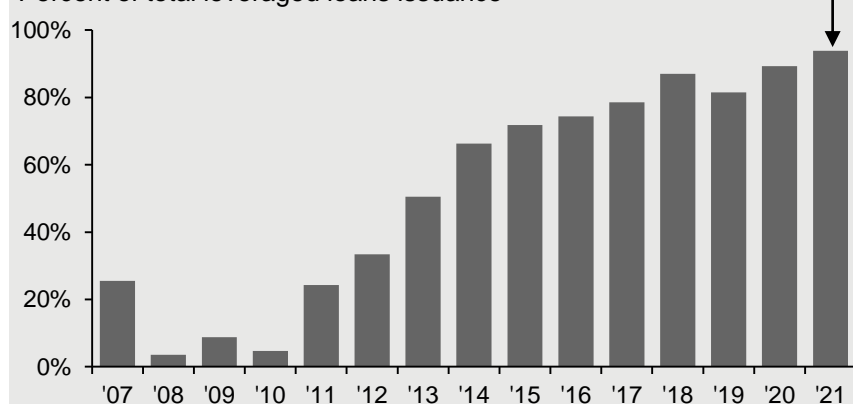
## Transactions with EBITDA adjustments

Share of total transactions



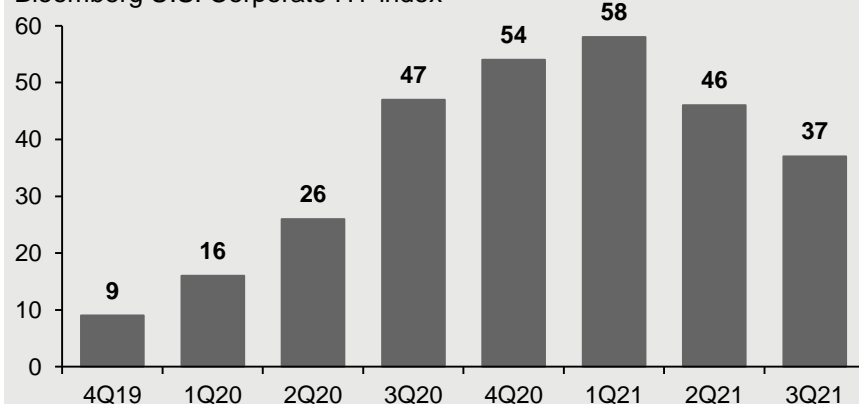
## Covenant-lite loan issuance

Percent of total leveraged loans issuance



## Number of companies with negative EBITDA

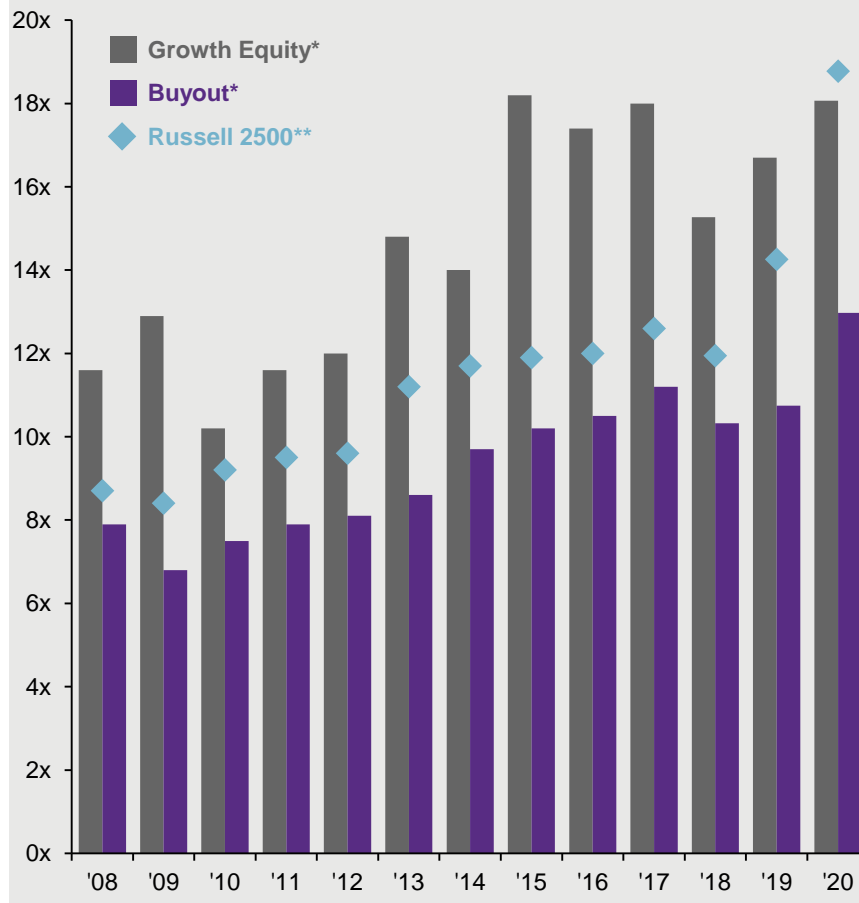
Bloomberg U.S. Corporate HY index



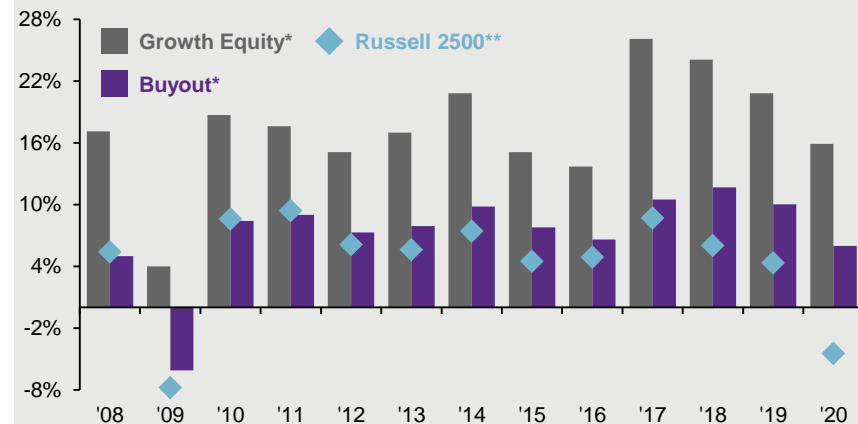
Source: Bloomberg, S&P LCD, Moody's, J.P. Morgan Markets Research, J.P. Morgan Asset Management. Media and telecom loans excluded prior to 2011. EBITDA adjusted for prospective cost savings or synergies. Covenant-lite loans are a type of financing that is issued with fewer restrictions on the borrower with regard to 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 EBITDA data are based on 12-month trailing data. Negative EBITDA company count is based on companies included in the Bloomberg U.S. Corporate HY index that publicly disclose EBITDA.

Data is based on availability as of November 30, 2021.

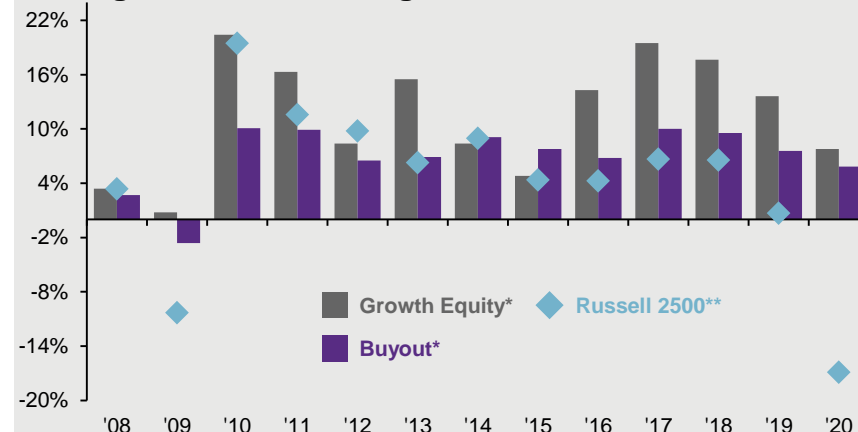
## Average LTM EBITDA purchase multiple



## Average annual revenue growth rate



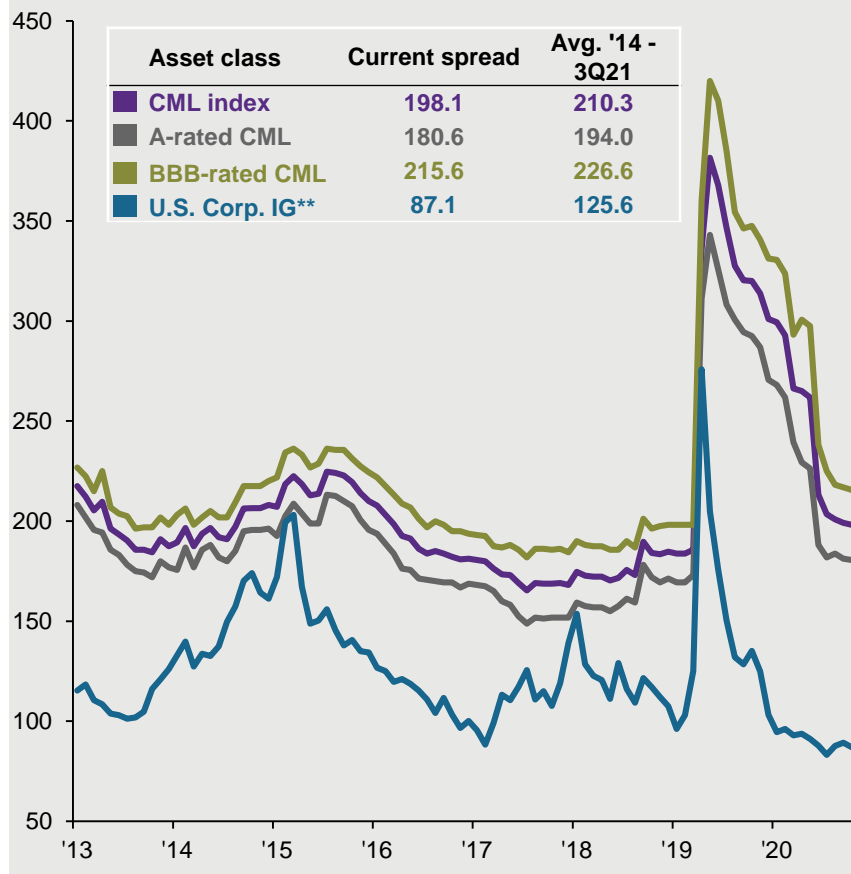
## Average annual EBITDA growth rate



Source: Cambridge Associates, FactSet, Frank Russell Company, J.P. Morgan Asset Management. Growth Equity and Buyout represent PE-owned companies. Outlier for both private and public companies were identified and removed from the analysis. \*Growth Equity and Buyout growth rates post-2017 are derived using a linear regression that utilizes S&P 500, S&P 500 Information Technology and Russell Indices. \*\*Russell 2500 data post-2017 is calculated using FactSet estimates. (Left) The analysis includes 1,408 buyout companies and 393 growth equity deals. (Top right) The analysis includes 1,383 buyout companies and 600 growth equity deals. (Bottom right) The analysis includes 1,321 buyout companies and 395 growth equity deals. Data is based on availability as of November 30, 2021.

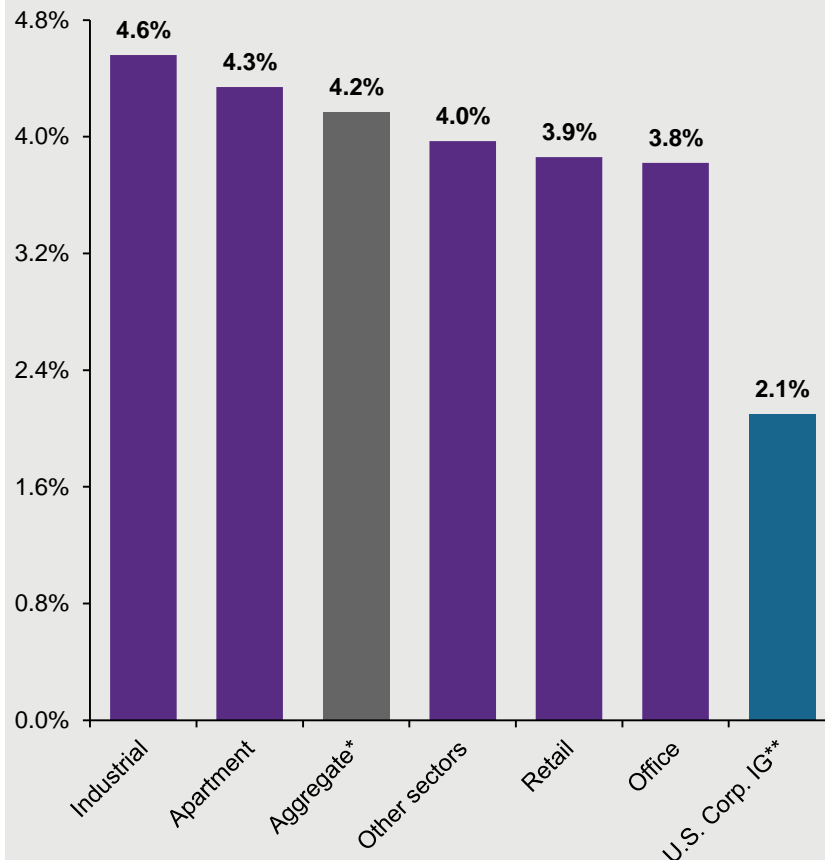
## Commercial mortgage spreads

Spreads over Treasury, basis points, senior loans



## Commercial mortgage yields

12 month trailing, unlevered, senior loans



Source: Bloomberg, Gilberto-Levy, FactSet, J.P. Morgan Asset Management. All spreads are as of September 30, 2021. \*Aggregate: Gilberto-Levy Commercial Mortgage Loans Performance Index. \*\*U.S. Corp. IG: Bloomberg U.S. Corporate Investment Grade Index. 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. Commercial mortgage yields are as of June 30, 2021. U.S. IG yields are as of September 30, 2021. Data is based on availability as of November 30, 2021

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	YTD	2001-2020	
												Ann.	Vol.
Global Bonds	5.6%	Global Equities 16.8%	Global Equities 23.4%	Global Macro 5.6%	Eq. Market Neutral 4.3%	Distressed 15.1%	Global Equities 24.6%	Merger Arbitrage 3.3%	Global Equities 27.3%	Equity Long/Short 17.9%	Global Equities 16.2%	Distressed 7.2%	Global Equities 18.2%
Merger Arbitrage	1.5%	Relative Value 10.6%	Equity Long/Short 14.3%	Global Equities 4.7%	Merger Arbitrage 3.3%	Global Equities 8.5%	Equity Long/Short 13.3%	Relative Value -0.4%	Equity Long/Short 13.7%	Global Equities 16.8%	Distressed 16.2%	Global Equities 6.7%	Equity Long/Short 10.6%
Relative Value	0.1%	Distressed 10.1%	Distressed 14.0%	Relative Value 4.0%	Relative Value -0.3%	Relative Value 7.7%	HFRI Composite 8.6%	Eq. Market Neutral -1.0%	HFRI Composite 10.4%	HFRI Composite 11.8%	Equity Long/Short 12.9%	Relative Value 5.7%	Distressed 9.2%
Distressed	-1.8%	Equity Long/Short 7.4%	HFRI Composite 9.1%	Eq. Market Neutral 3.1%	Equity Long/Short -1.0%	Equity Long/Short 5.5%	Global Bonds 7.4%	Global Bonds -1.2%	Relative Value 7.4%	Distressed 11.8%	HFRI Composite 11.1%	HFRI Composite 5.5%	HFRI Composite 7.9%
Eq. Market Neutral	-2.1%	HFRI Composite 6.4%	Relative Value 7.1%	HFRI Composite 3.0%	HFRI Composite -1.1%	HFRI Composite 5.4%	Distressed 6.3%	Distressed -1.7%	Global Bonds 6.8%	Global Bonds 9.2%	Merger Arbitrage 10.1%	Equity Long/Short 5.4%	Relative Value 6.0%
Global Macro	-4.2%	Global Bonds 4.3%	Eq. Market Neutral 6.5%	Equity Long/Short 1.8%	Global Macro -1.3%	Merger Arbitrage 3.6%	Relative Value 5.1%	Global Macro -4.1%	Merger Arbitrage 6.8%	Global Macro 5.4%	Global Macro 9.3%	Global Bonds 4.8%	Global Bonds 5.9%
HFRI Composite	-5.3%	Eq. Market Neutral 3.0%	Merger Arbitrage 4.7%	Merger Arbitrage 1.7%	Global Equities -1.8%	Eq. Market Neutral 2.2%	Eq. Market Neutral 4.9%	HFRI Composite -4.7%	Global Macro 6.5%	Merger Arbitrage 5.2%	Relative Value 7.9%	Global Macro 4.6%	Global Macro 4.6%
Global Equities	-6.9%	Merger Arbitrage 2.8%	Global Macro -0.4%	Global Bonds 0.6%	Global Bonds -3.2%	Global Bonds 2.1%	Merger Arbitrage 4.3%	Equity Long/Short -7.1%	Distressed 2.9%	Relative Value 3.4%	Eq. Market Neutral 6.5%	Merger Arbitrage 4.4%	Merger Arbitrage 4.6%
Equity Long/Short	-8.4%	Global Macro -0.1%	Global Bonds -2.6%	Distressed -1.4%	Distressed -8.1%	Global Macro 1.0%	Global Macro 2.2%	Global Equities -8.9%	Eq. Market Neutral 2.3%	Eq. Market Neutral -0.1%	Global Bonds -4.8%	Eq. Market Neutral 2.7%	Eq. Market Neutral 3.1%

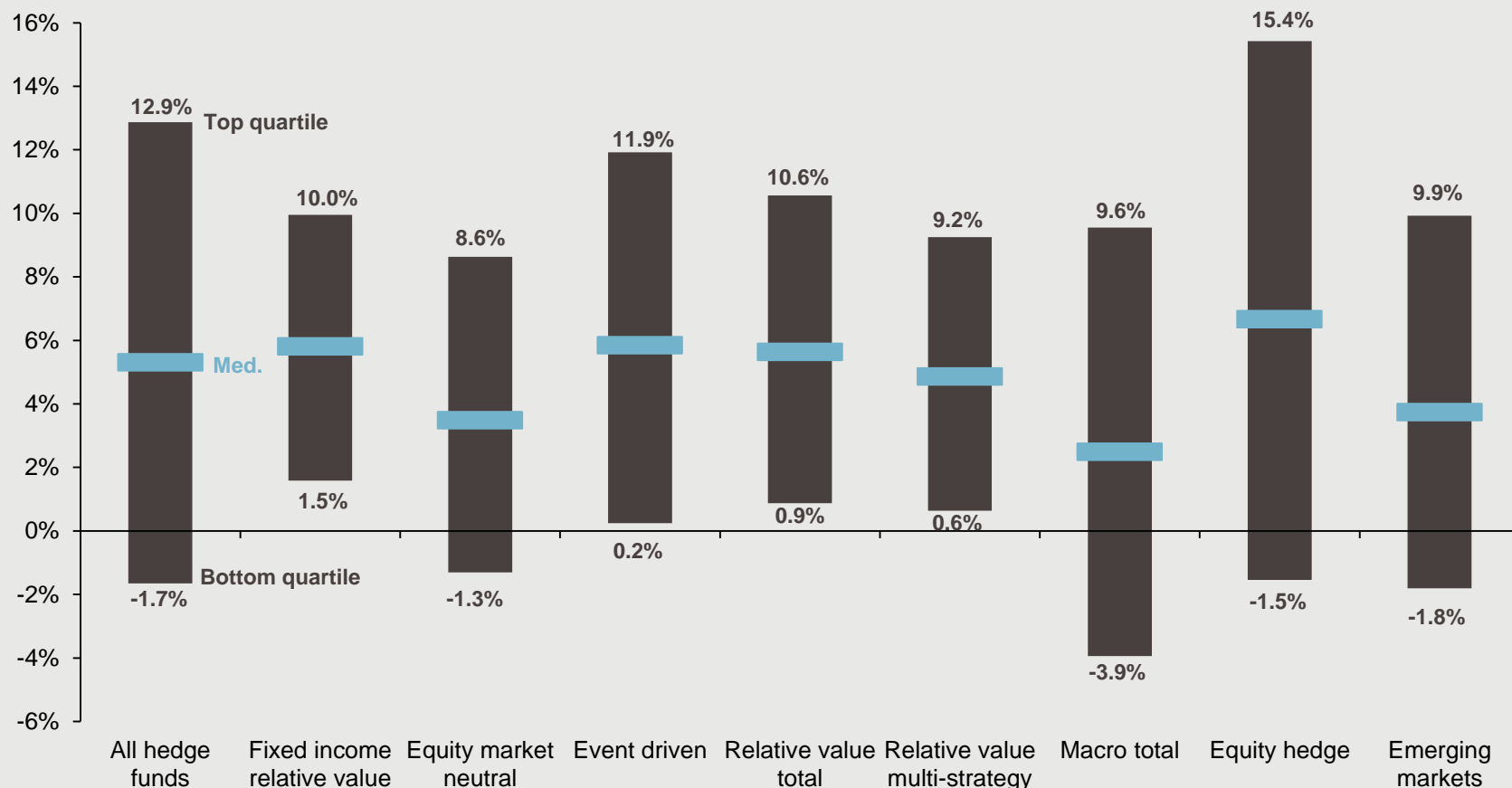
Source: MSCI, Bloomberg, HFRI, FactSet, J.P. Morgan Asset Management.

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 is based on availability as of November 30, 2021.

## Hedge fund manager dispersion

Based on returns from February 2011 – January 2021



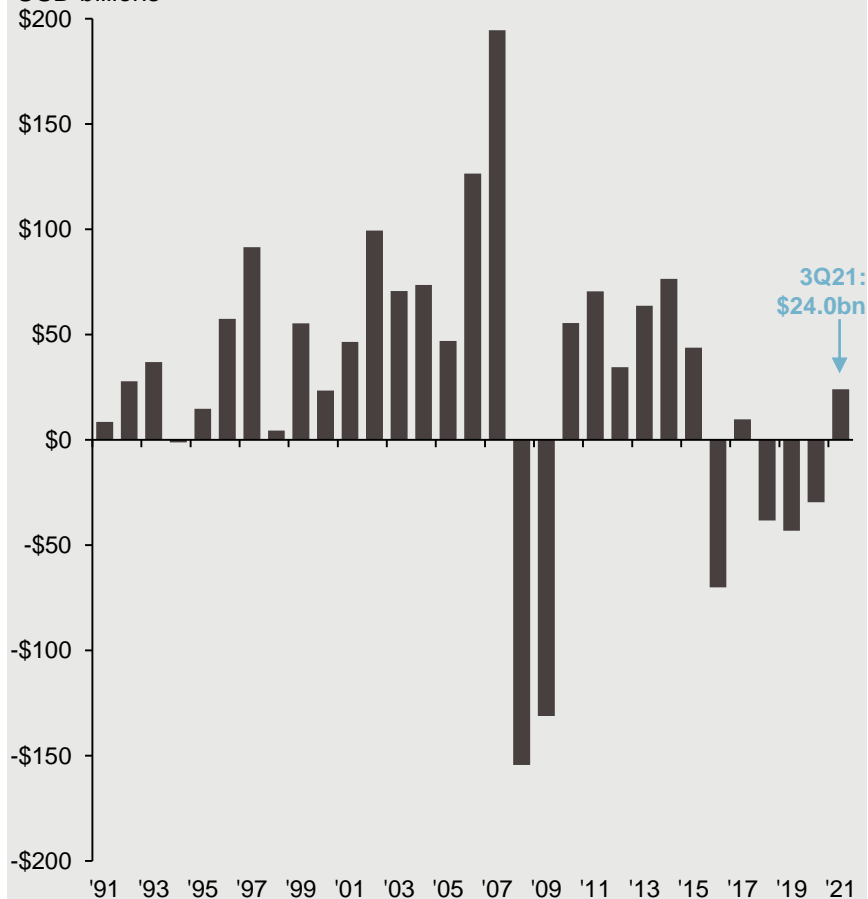
Sources: HFRI, J.P. Morgan Asset Management.

Manager dispersion is based on: November 2011 to October 2021 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.

Data is based on availability as of November 30, 2021.

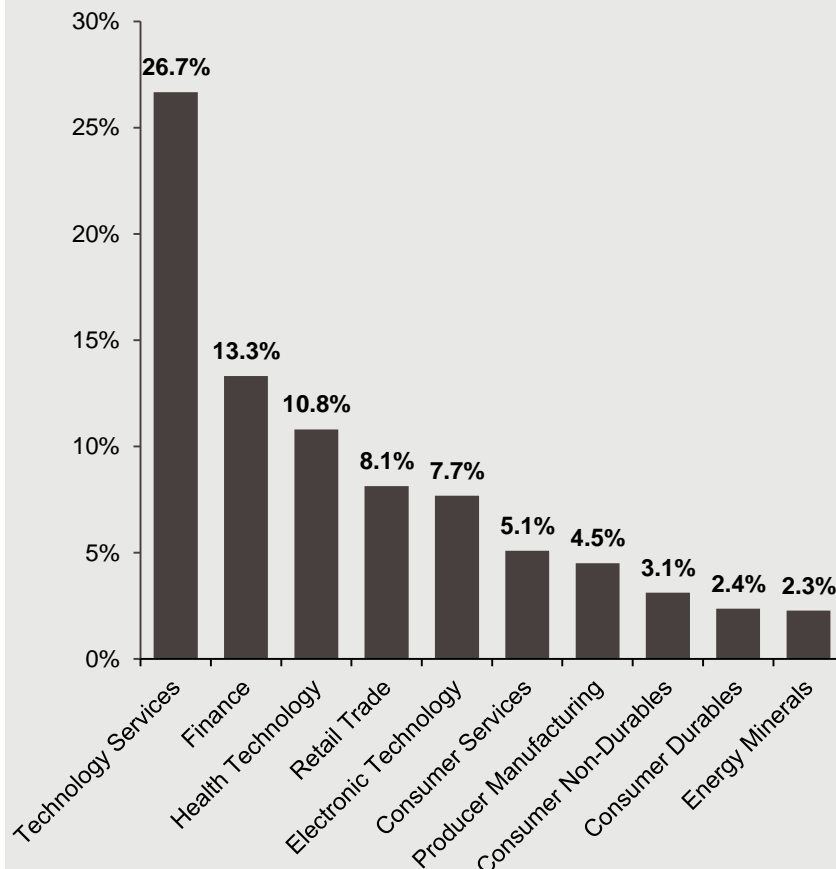
## Hedge fund net asset flow

USD billions



## Sector exposure of top 50 hedge funds

% of total portfolio

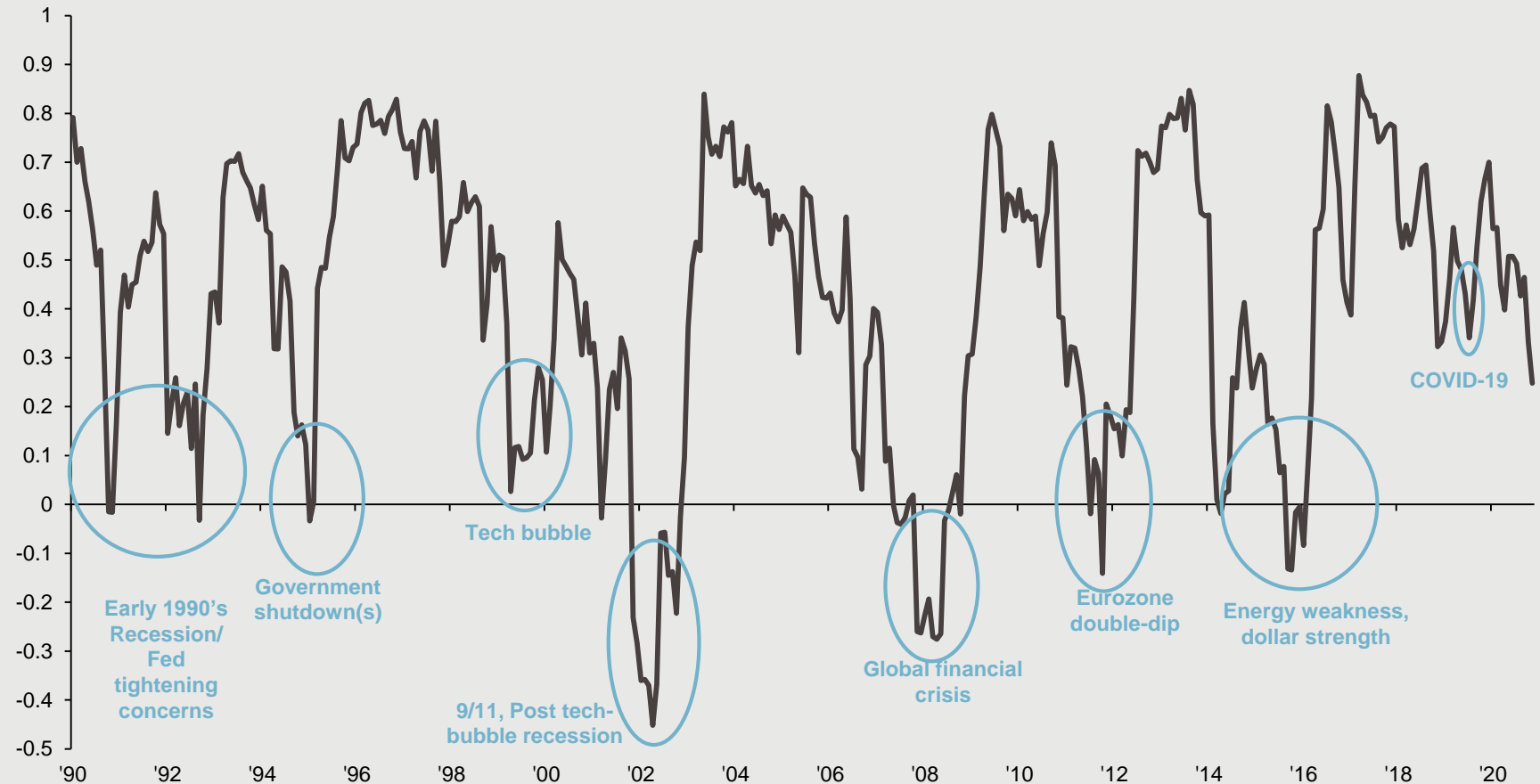


Source: HFRI, FactSet, J.P. Morgan Asset Management. Flow data is as of September 30, 2021. Sector exposure data is as of November 2021. Data is based on availability as of November 30, 2021.



## Hedge fund correlation with a 60/40 stock-bond portfolio\*

1990 – present, monthly



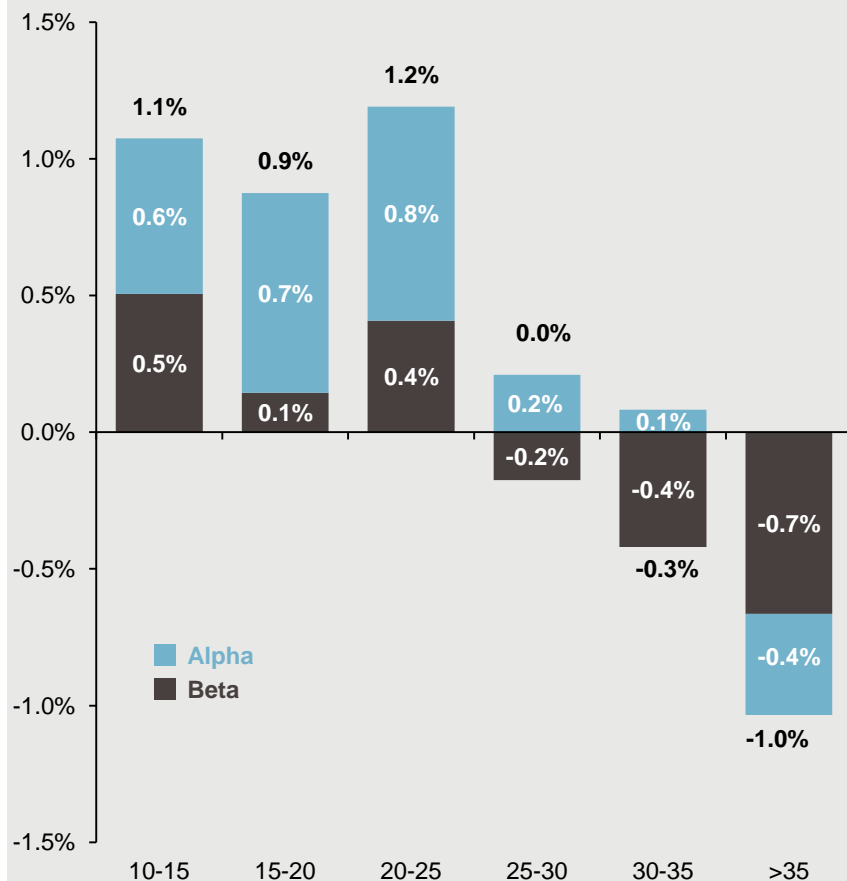
Sources: HFRI, Standard & Poor's, Bloomberg, FactSet, J.P. Morgan Asset Management.

\*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 is based on availability as of November 30, 2021.

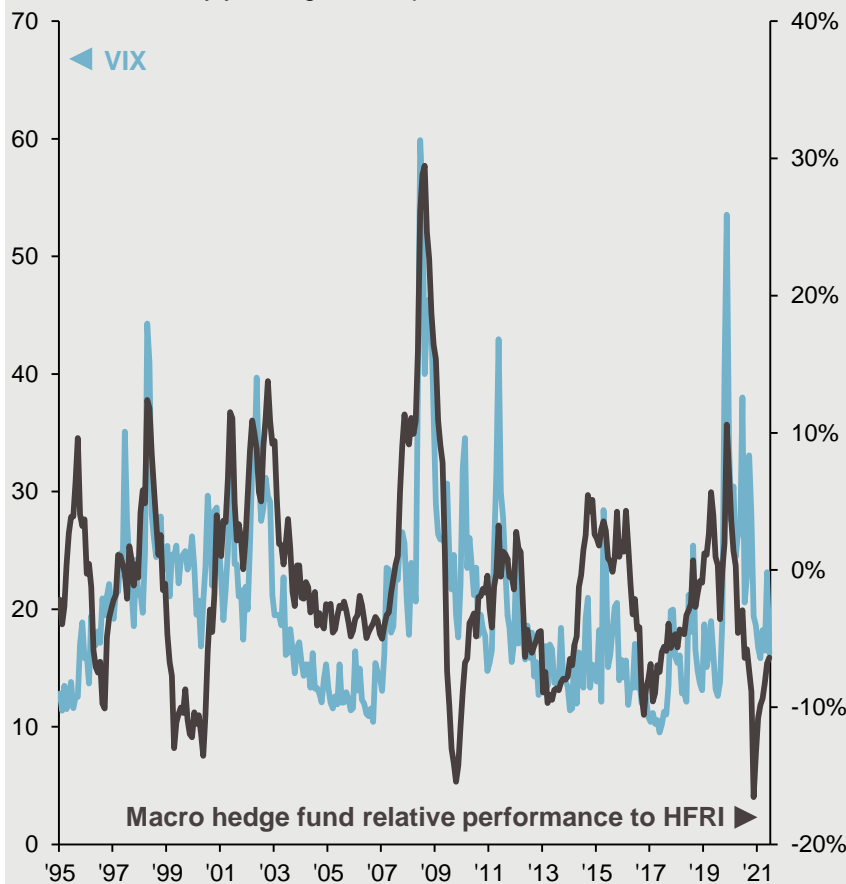
## Hedge funds and volatility

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.

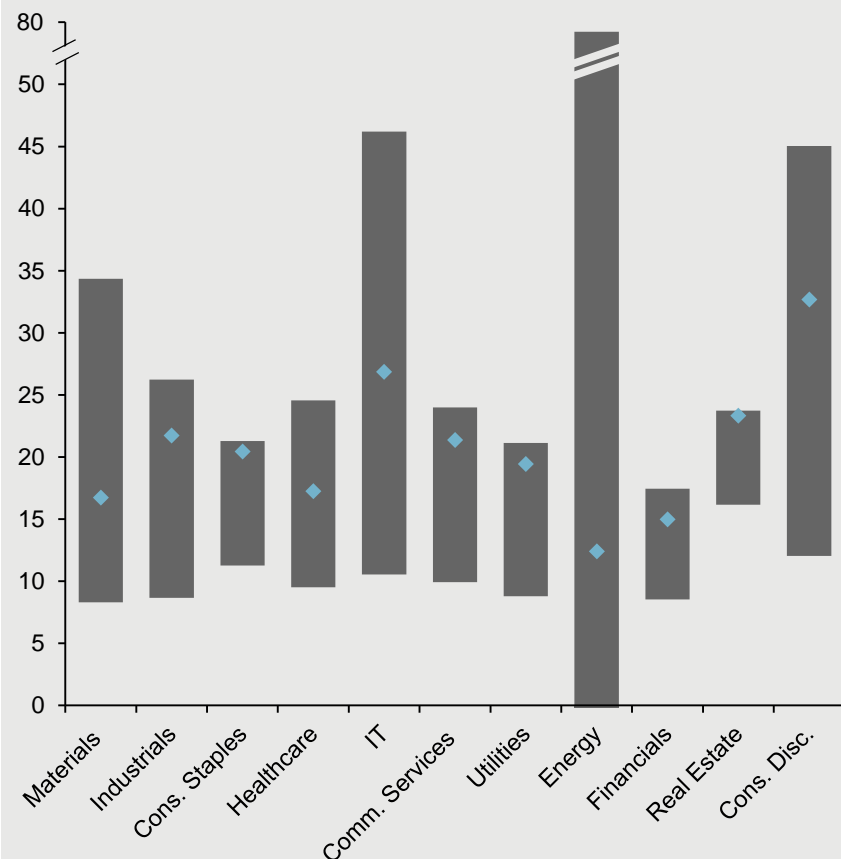
Historical beta is based on regression analysis, where the HFRI is the dependent variable and the MSCI AC World Index is the independent variable.

Monthly VIX reading is an average. Numbers may not sum to 100% due to rounding.

Data is based on availability as of November 30, 2021.

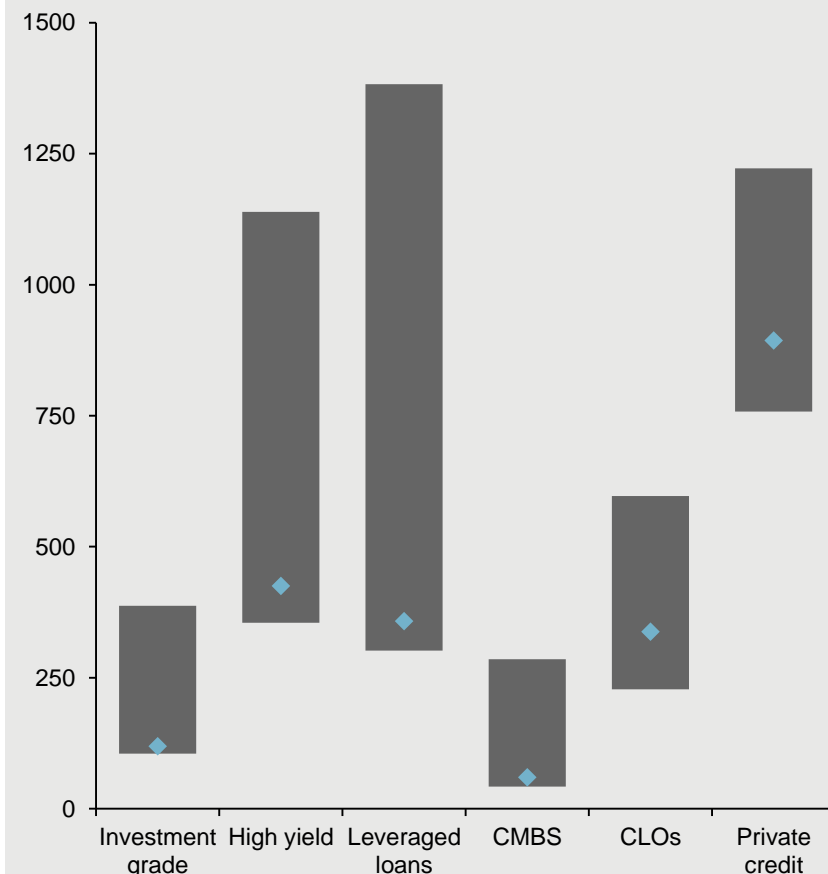
## S&P 500 valuation dispersion by sector\*

Historical range vs. current fwd. P/E ratio spreads, last 20 years



## Credit spread dispersion

Historical range vs. current spreads, bps, last 10 years



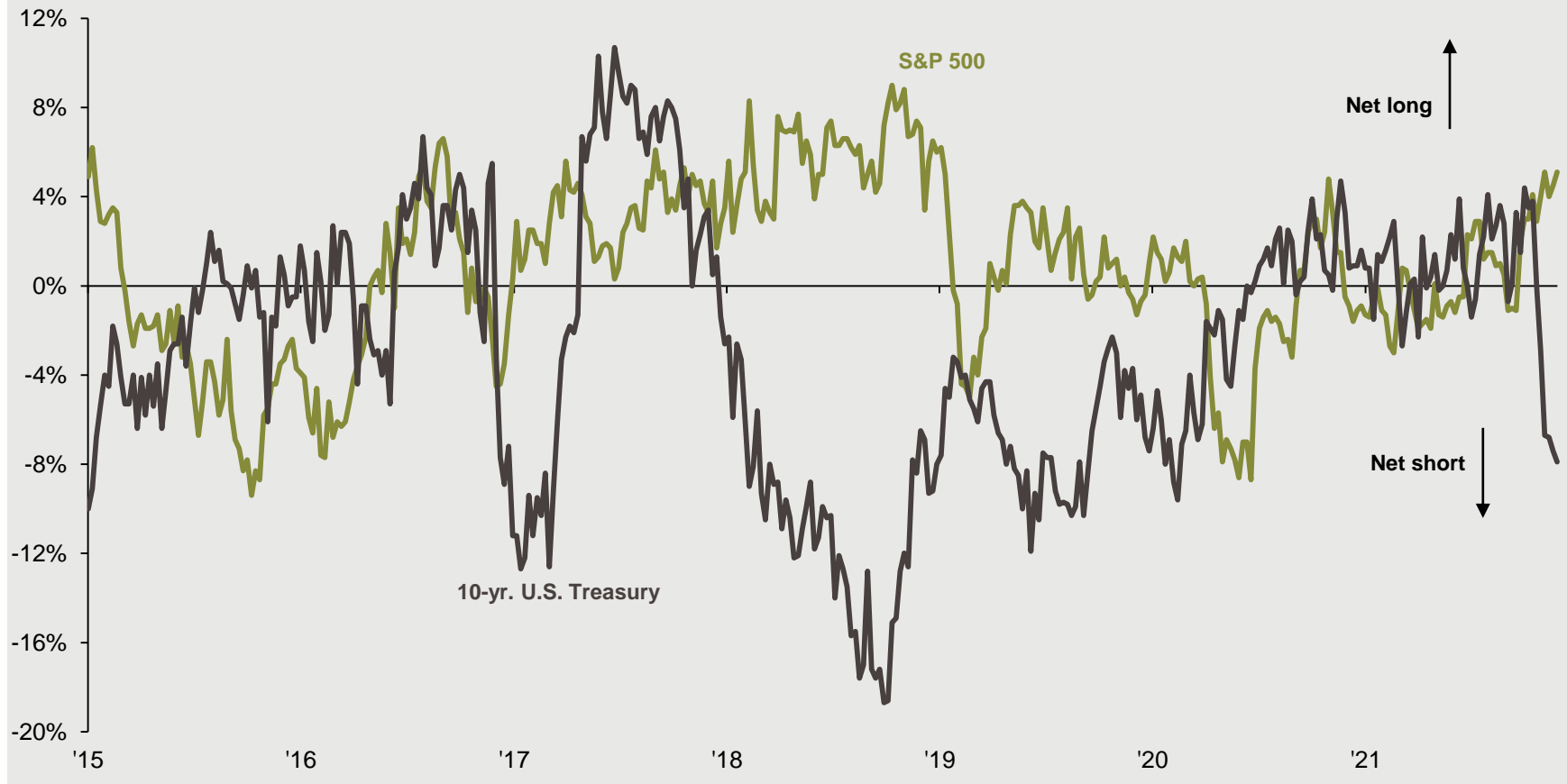
Sources: S&P Global, HFRI, FactSet J.P. Morgan Asset Management.

\*Dispersion is represented by the range. For equity dispersion, the Energy sector has a negative minimum P/E ratio; however, the chart only displays positive values. Private credit spreads are as of June 30, 2021.

Data is based on availability as of November 30, 2021.

**S&P 500 E-Mini and 10-yr. U.S. Treasury Note positioning**

Net noncommercial futures positions as a percent of open interest

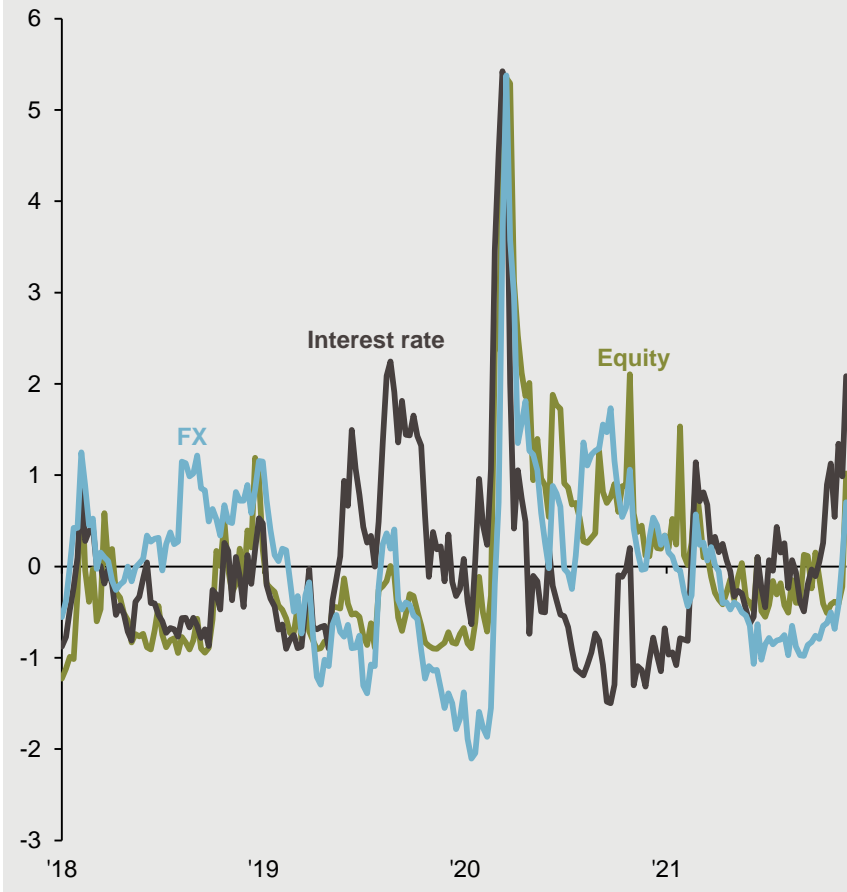


Source: CFTC, FactSet, J.P. Morgan Asset Management.

Data is based on availability as of November 30, 2021.

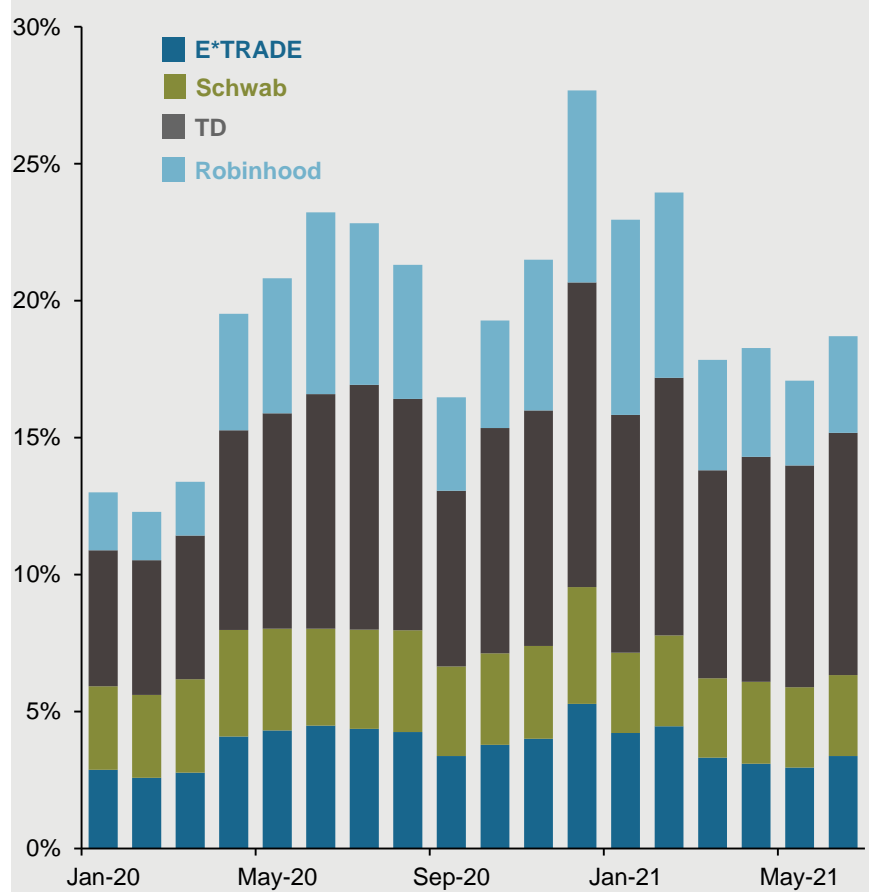
## Equity, interest rate and foreign exchange volatility

Z-score, weekly



## Flow by firm as % of total U.S. equity market volume

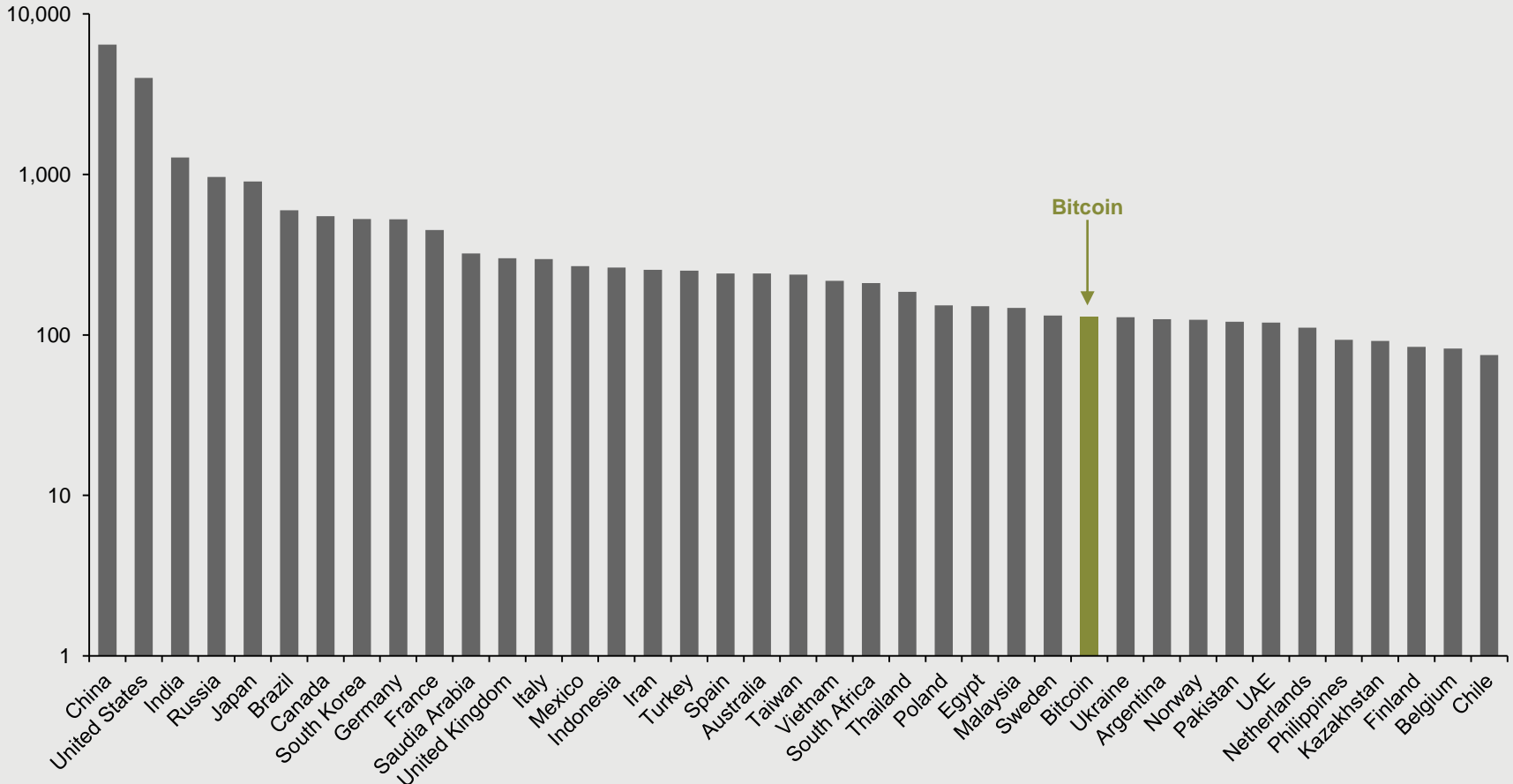
2020 – 2Q21



Source: CBOE, ICE BofA, J.P. Morgan Index Research, FactSet, J.P. Morgan Asset Management. (Left) 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. (Right) Based on company filings, SEC 606 disclosures. Data is based on availability as of November 30, 2021.

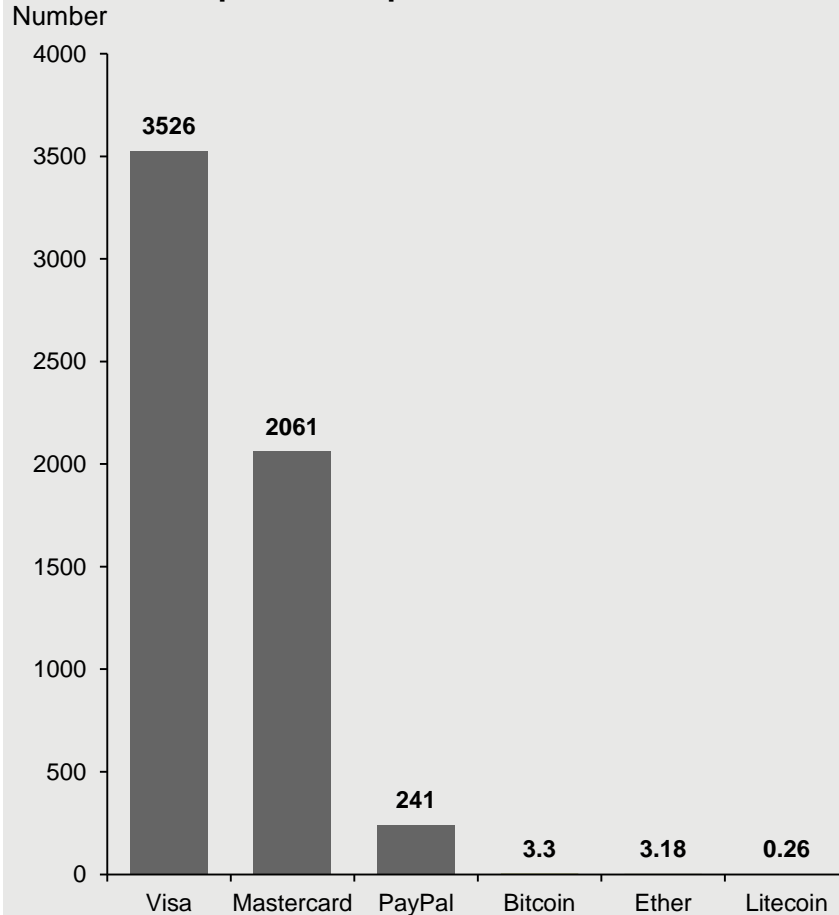
**Bitcoin and annual energy consumption by country**

Terawatt-hours per year, log scale



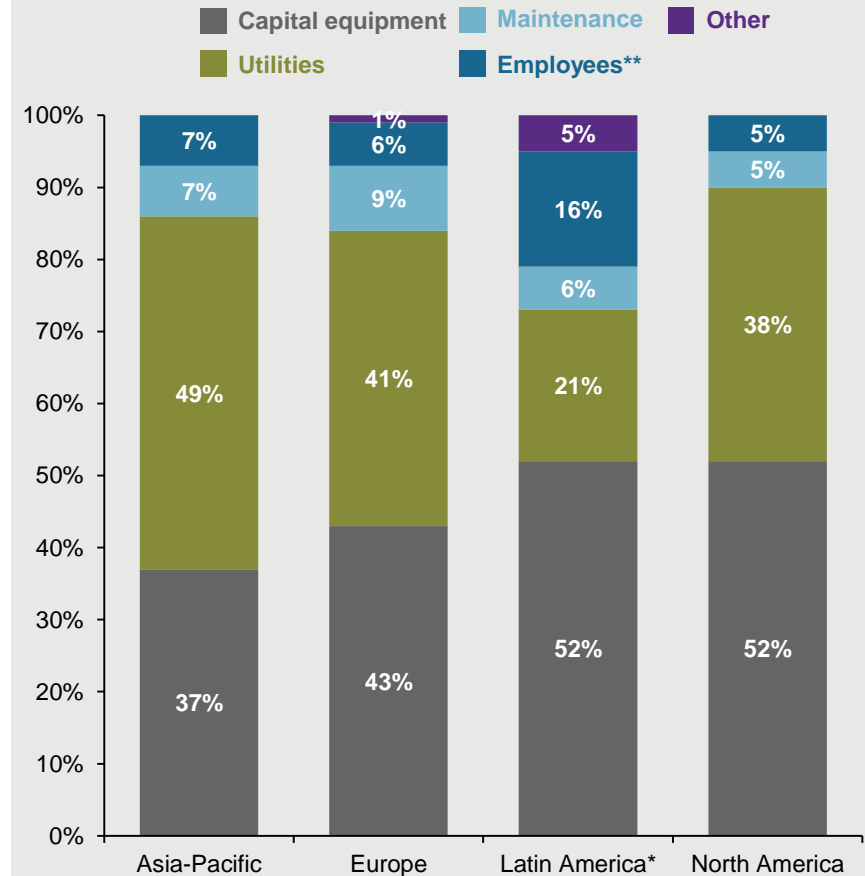
Sources: Bloomberg, J.P. Morgan Asset Management  
 Data is based on availability as of November 30, 2021.

## Transactions processed per second



## Breakdown of hasher costs per region

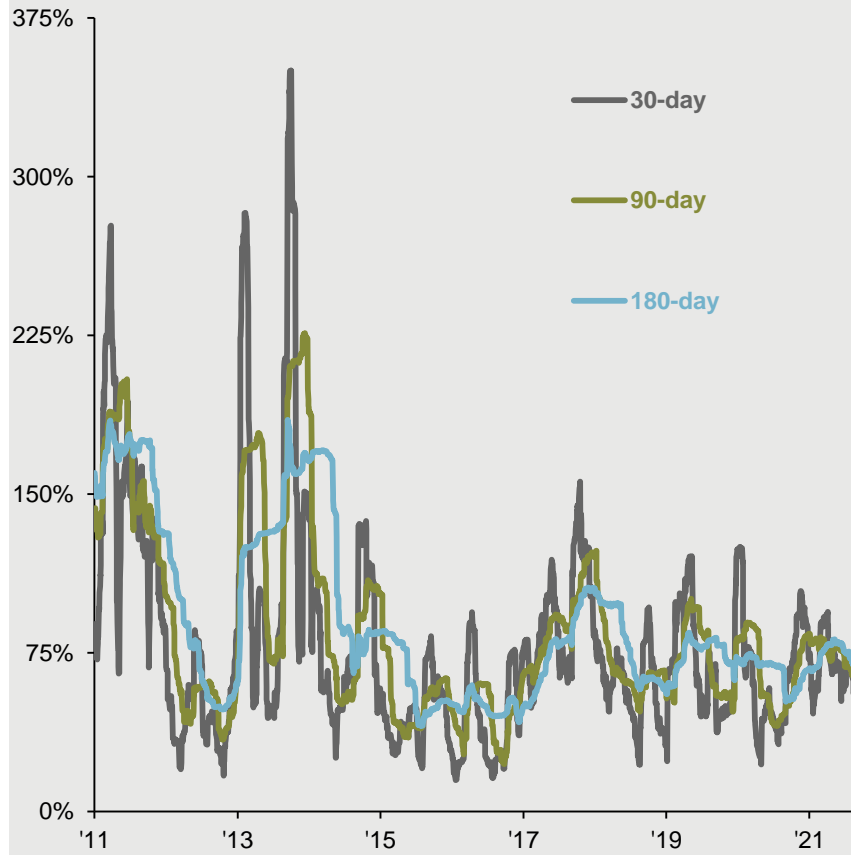
Percentage of total costs



Sources: BIS, BitInfoCharts, University of Cambridge, J.P. Morgan Asset Management. \*Latin America includes Caribbean. \*\*Includes contractors.  
Data is based on availability as of November 30, 2021.

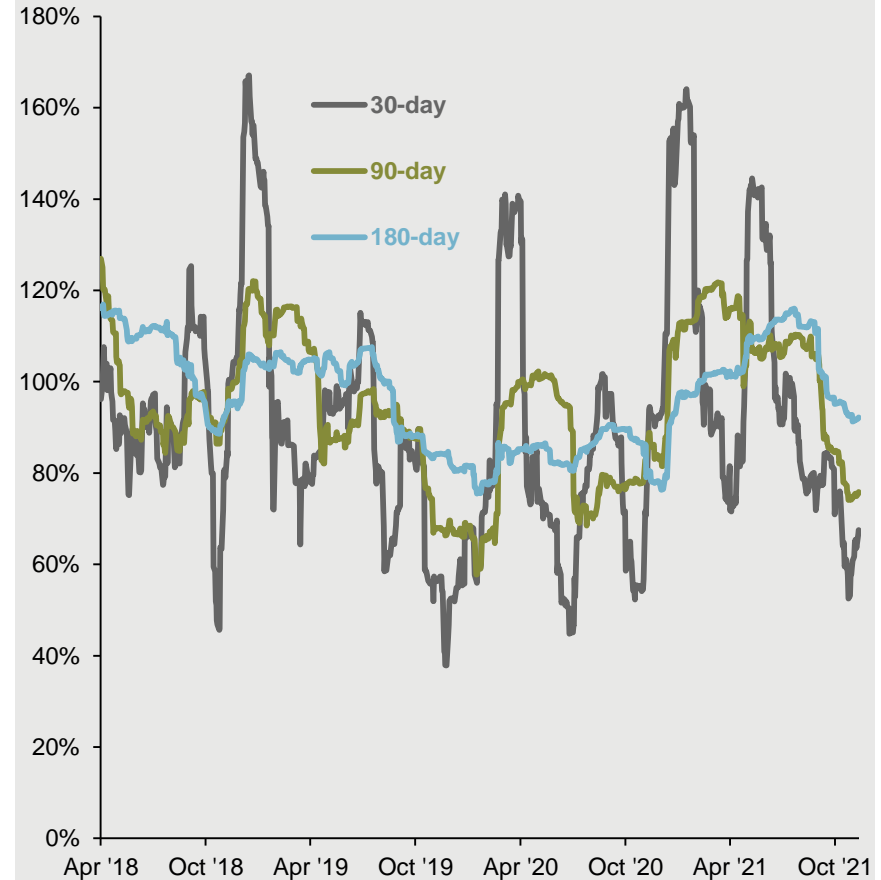
## Bitcoin rolling volatilities

Annualized



## Ether rolling volatilities

Annualized



Sources: Bloomberg, J.P. Morgan Asset Management.  
Data is based on availability as of November 30, 2021



**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.

**The Market Insights program provides comprehensive data and commentary on global markets without reference to products. Designed as a tool to help clients understand the markets and support investment decision-making, the program explores the implications of current economic data and changing market conditions.**

For the purposes of MiFID II, the JPM Market Insights and Portfolio Insights programs are marketing communications and are not in scope for any MiFID II / MiFIR requirements specifically related to investment research. Furthermore, the J.P. Morgan Asset Management Market Insights and Portfolio Insights programs, as non-independent research, have not been prepared in accordance with legal requirements designed to promote the independence of investment research, nor are they subject to any prohibition on dealing ahead of the dissemination of investment research.

This document is a general communication being provided for informational purposes only. It is educational in nature and not designed to be taken as advice or a recommendation for any specific investment product, strategy, plan feature or other purpose in any jurisdiction, nor is it a commitment from J.P. Morgan Asset Management or any of its subsidiaries to participate in any of the transactions mentioned herein. Any examples used are generic, hypothetical and for illustration purposes only. This material does not contain sufficient information to support an investment decision and it should not be relied upon by you in evaluating the merits of investing in any securities or products. In addition, users should make an independent assessment of the legal, regulatory, tax, credit, and accounting implications and determine, together with their own financial professional, if any investment mentioned herein is believed to be appropriate for their personal goals. Investors should ensure that they obtain all available relevant information before making any investment. Any forecasts, figures, opinions or investment techniques and strategies set out are for information purposes only, based on certain assumptions and current market conditions and are subject to change without prior notice. All information presented herein is considered to be accurate at the time of production, but no warranty of accuracy is given and no liability in respect of any error or omission is accepted. It should be noted that investment involves risks, the value of investments and the income from them may fluctuate in accordance with market conditions and taxation agreements and investors may not get back the full amount invested. Both past performance and yields are not reliable indicators of current and future results.

J.P. Morgan Asset Management is the brand for the asset management business of JPMorgan Chase & Co. and its affiliates worldwide.

To the extent permitted by applicable law, we may record telephone calls and monitor electronic communications to comply with our legal and regulatory obligations and internal policies. Personal data will be collected, stored and processed by J.P. Morgan Asset Management in accordance with our privacy policies at <https://am.jpmorgan.com/global/privacy>.

This communication is issued by the following entities:

In the United States, by J.P. Morgan Investment Management Inc. or J.P. Morgan Alternative Asset Management, Inc., both regulated by the Securities and Exchange Commission; in Latin America, for intended recipients' use only, by local J.P. Morgan entities, as the case may be.; in Canada, for institutional clients' use only, by JPMorgan Asset Management (Canada) Inc., which is a registered Portfolio Manager and Exempt Market Dealer in all Canadian provinces and territories except the Yukon and is also registered as an Investment Fund Manager in British Columbia, Ontario, Quebec and Newfoundland and Labrador. In the United Kingdom, by JPMorgan Asset Management (UK) Limited, which is authorized and regulated by the Financial Conduct Authority; in other European jurisdictions, by JPMorgan Asset Management (Europe) S.à r.l. In Asia Pacific ("APAC"), by the following issuing entities and in the respective jurisdictions in which they are primarily regulated: JPMorgan Asset Management (Asia Pacific) Limited, or JPMorgan Funds (Asia) Limited, or JPMorgan Asset Management Real Assets (Asia) Limited, each of which is regulated by the Securities and Futures Commission of Hong Kong; JPMorgan Asset Management (Singapore) Limited (Co. Reg. No. 197601586K), which this advertisement or publication has not been reviewed by the Monetary Authority of Singapore; JPMorgan Asset Management (Taiwan) Limited; JPMorgan Asset Management (Japan) Limited, which is a member of the Investment Trusts Association, Japan, the Japan Investment Advisers Association, Type II Financial Instruments Firms Association and the Japan Securities Dealers Association and is regulated by the Financial Services Agency (registration number "Kanto Local Finance Bureau (Financial Instruments Firm) No. 330"); in Australia, to wholesale clients only as defined in section 761A and 761G of the Corporations Act 2001 (Commonwealth), by JPMorgan Asset Management (Australia) Limited (ABN 55143832080) (AFSL 376919). For all other markets in APAC, to intended recipients only.

In APAC, distribution is for Hong Kong, Taiwan, Japan and Singapore. For all other countries in APAC, to intended recipients only.

For U.S. only: If you are a person with a disability and need additional support in viewing the material, please call us at 1-800-343-1113 for assistance.

Copyright 2021 JPMorgan Chase & Co. All rights reserved.

Unless otherwise stated, all data are as of November 30, 2021 or most recently available.

0903c02a8233e721