



MARKET INSIGHTS

Guide to Alternatives®

4Q 2022

As of November 30, 2022





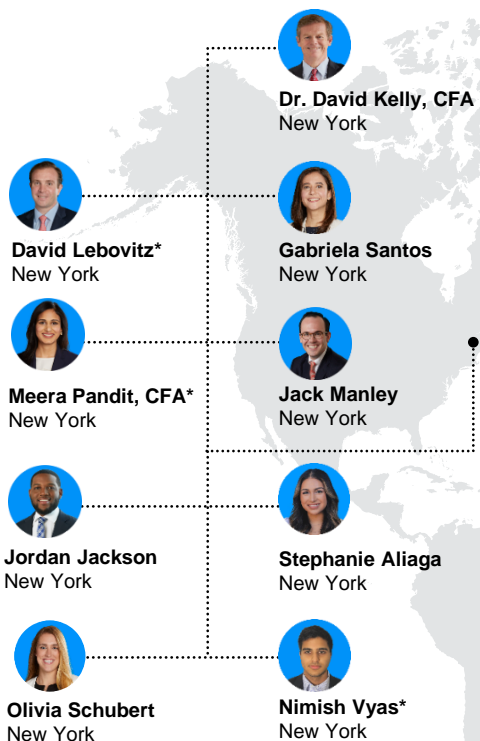
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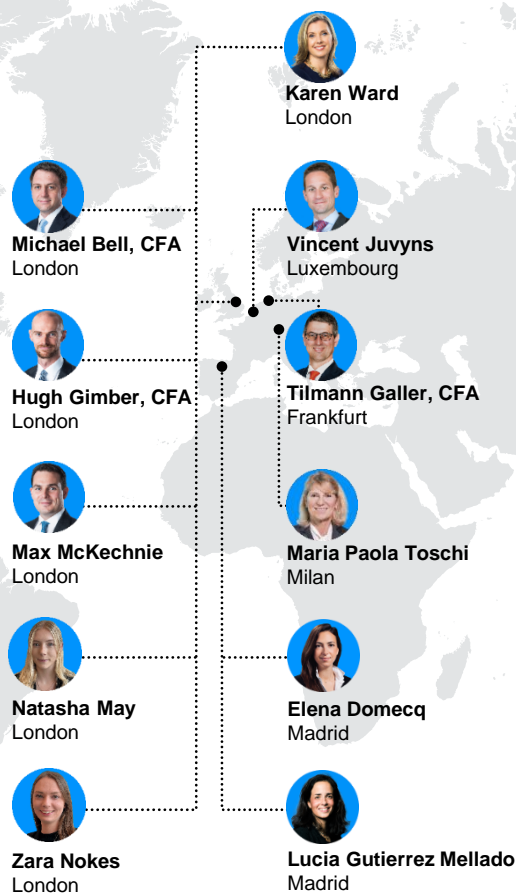
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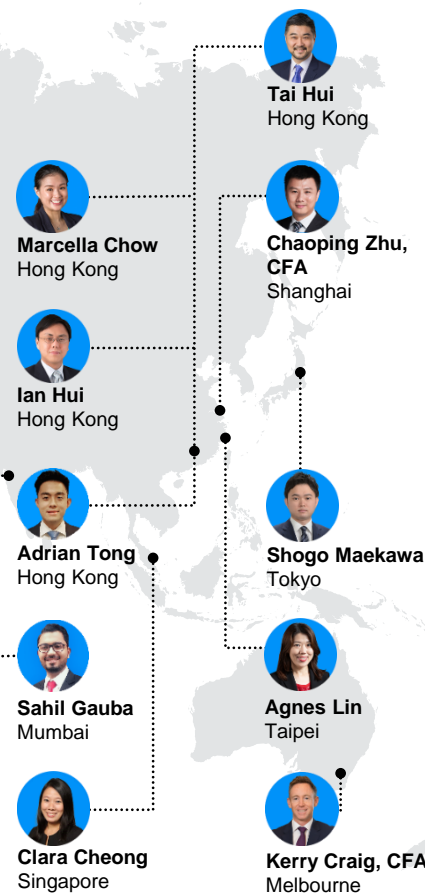
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Alternatives fundraising

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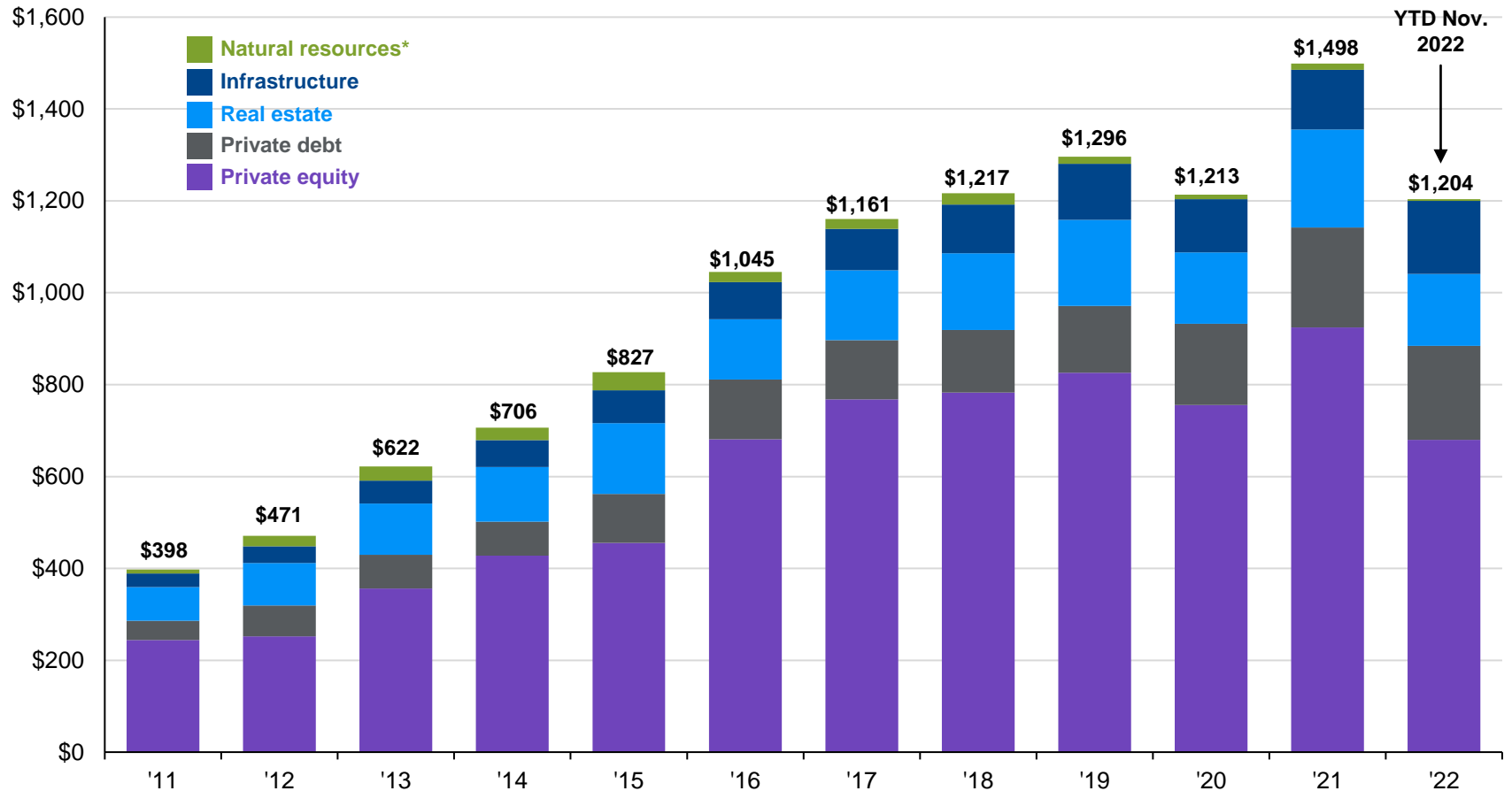
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Alts in aggregate

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 is as of November 30, 2022.

Data is based on availability as of November 30, 2022.

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Alternatives dry powder

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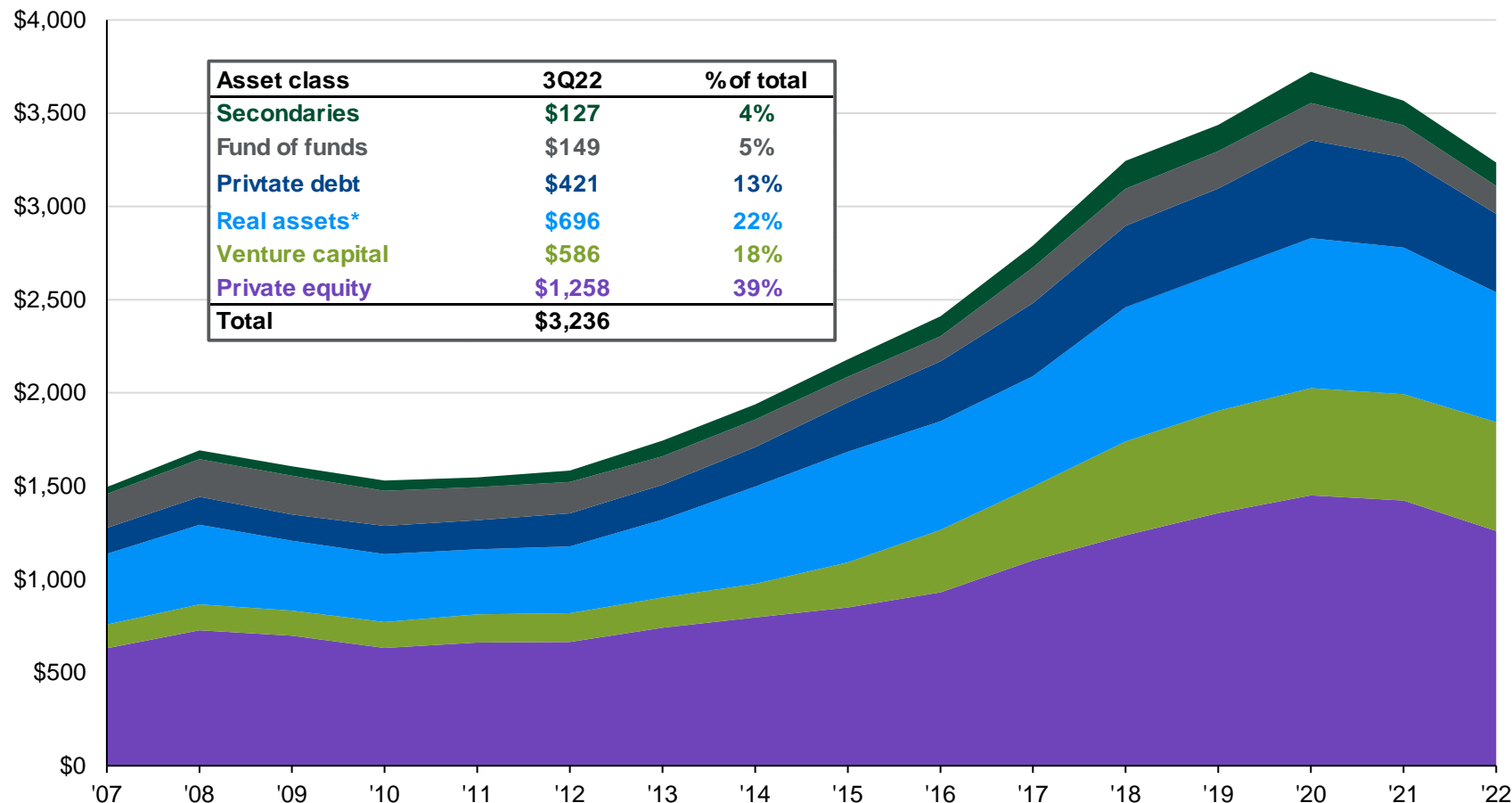
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Alts in aggregate

Dry powder by asset class

Cumulative dry powder, USD billions



Source: PitchBook, J.P. Morgan Asset Management. Dry powder data is as of June 30, 2022. 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, 2022.



Public and private market correlations

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Alts in aggregate

Public and private market correlations

Quarterly returns

| 2008 - 2Q22 | | 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* | -0.3 | 0.2 | 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 | 0.1 | 0.2 | 1.0 | | | | | | | | | |
| | Transport | -0.2 | -0.1 | 0.5 | 0.3 | 0.4 | 0.0 | 1.0 | | | | | | | | |
| | Timber | -0.2 | -0.1 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 1.0 | | | | | | | |
| Private markets | Direct Lending | 0.0 | 0.7 | 0.3 | 0.4 | 0.3 | 0.2 | 0.1 | -0.1 | 1.0 | | | | | | |
| | Venture Capital | 0.1 | 0.6 | 0.3 | 0.5 | 0.2 | 0.1 | 0.1 | 0.0 | 0.5 | 1.0 | | | | | |
| | Private Equity | 0.1 | 0.8 | 0.3 | 0.5 | 0.4 | 0.1 | 0.1 | -0.1 | 0.9 | 0.8 | 1.0 | | | | |
| Hedge funds | Equity Long/Short | 0.3 | 0.9 | -0.1 | 0.2 | 0.0 | 0.0 | 0.1 | -0.1 | 0.7 | 0.7 | 0.9 | 1.0 | | | |
| | Relative Value | 0.2 | 0.9 | -0.1 | 0.2 | 0.0 | 0.0 | -0.1 | -0.2 | 0.9 | 0.5 | 0.8 | 0.9 | 1.0 | | |
| | Macro | 0.1 | 0.3 | 0.0 | 0.1 | -0.1 | 0.0 | -0.2 | 0.1 | 0.1 | 0.2 | 0.3 | 0.4 | 0.3 | 1.0 | |
| Crypto | Bitcoin | 0.1 | 0.1 | 0.1 | -0.2 | 0.1 | 0.5 | 0.1 | 0.0 | 0.1 | 0.2 | 0.1 | 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 – 6/30/2022, except correlations with Bitcoin which are calculated over the period 12/31/2010 – 6/30/2022. Returns are denominated in USD. Data is based on availability as of November 30, 2022.



Alternatives and manager selection

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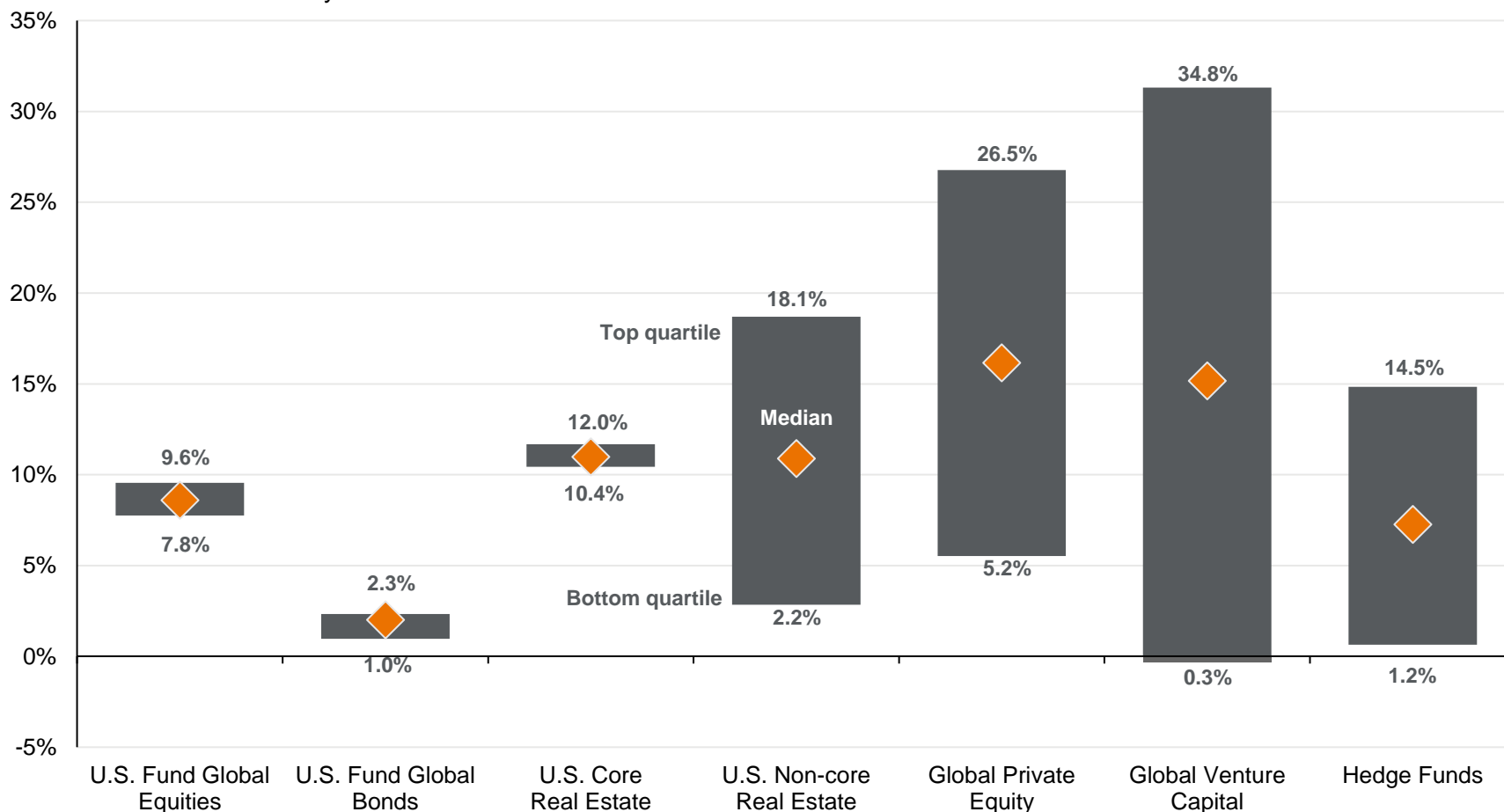
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Alts in aggregate

Private and public 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 and U.S. Fund Global Bonds over a 10-year period ending 2Q 2022. Hedge Fund returns and U.S. Core Real Estate are based on annual returns over a 10-year period ending 3Q 2022. U.S. Non-core Real Estate, Global Private Equity and Global Venture Capital are represented by the 10-year horizon internal rate of return (IRR) ending 2Q 2022. U.S. Fund Global Equities and Bonds are comprised of U.S.-domiciled mutual funds and ETFs. Data is based on availability as of November 30, 2022.

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Yield alternatives

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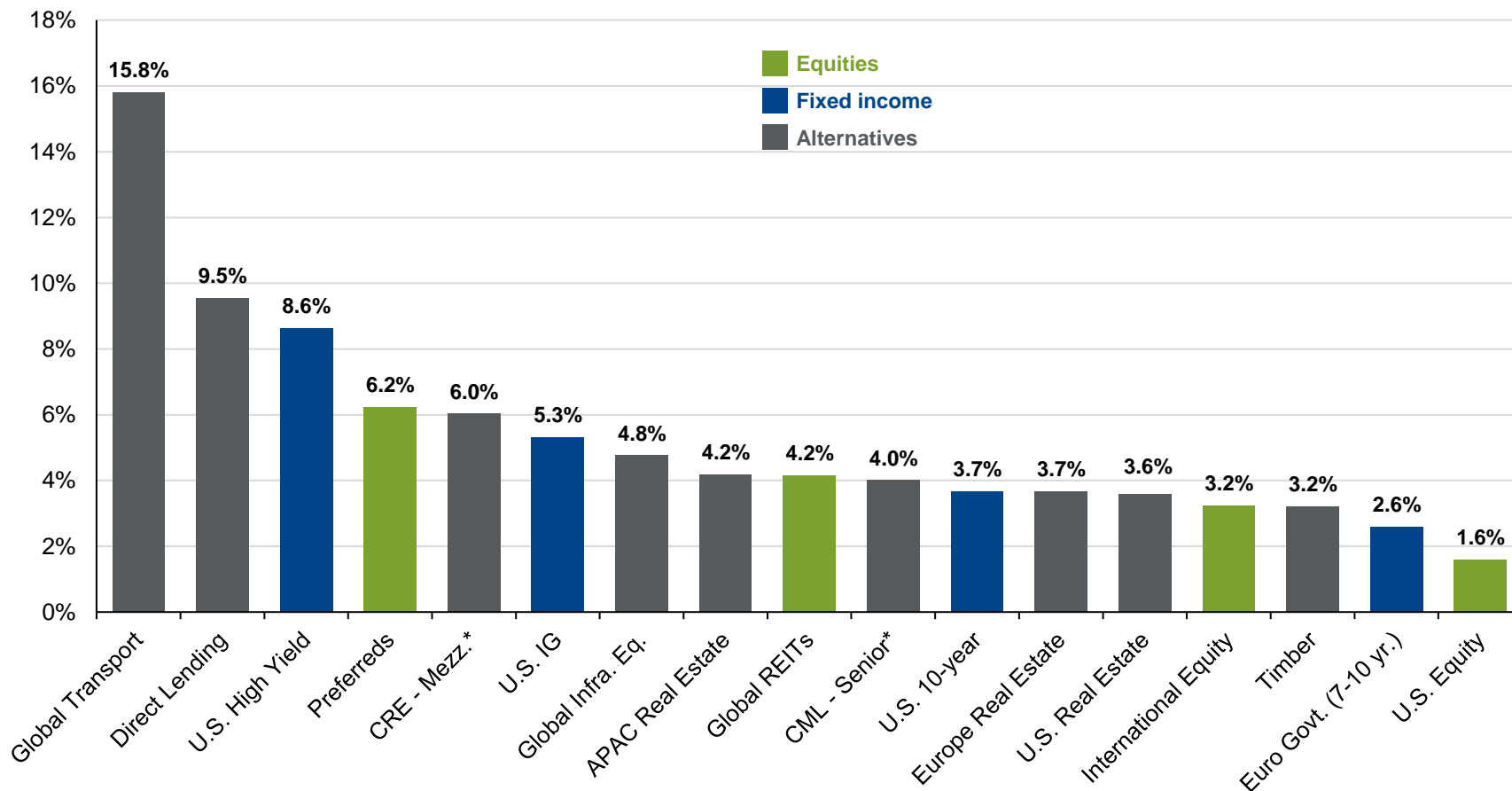
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Alts in aggregate

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 11/30/2022. Alternative yields are as of 9/30/2022 except Global Infrastructure, which is as of 6/30/2022, and CRE - Mezz, which is as of 8/31/2022. 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, 2022.

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Equity market correlations and yields

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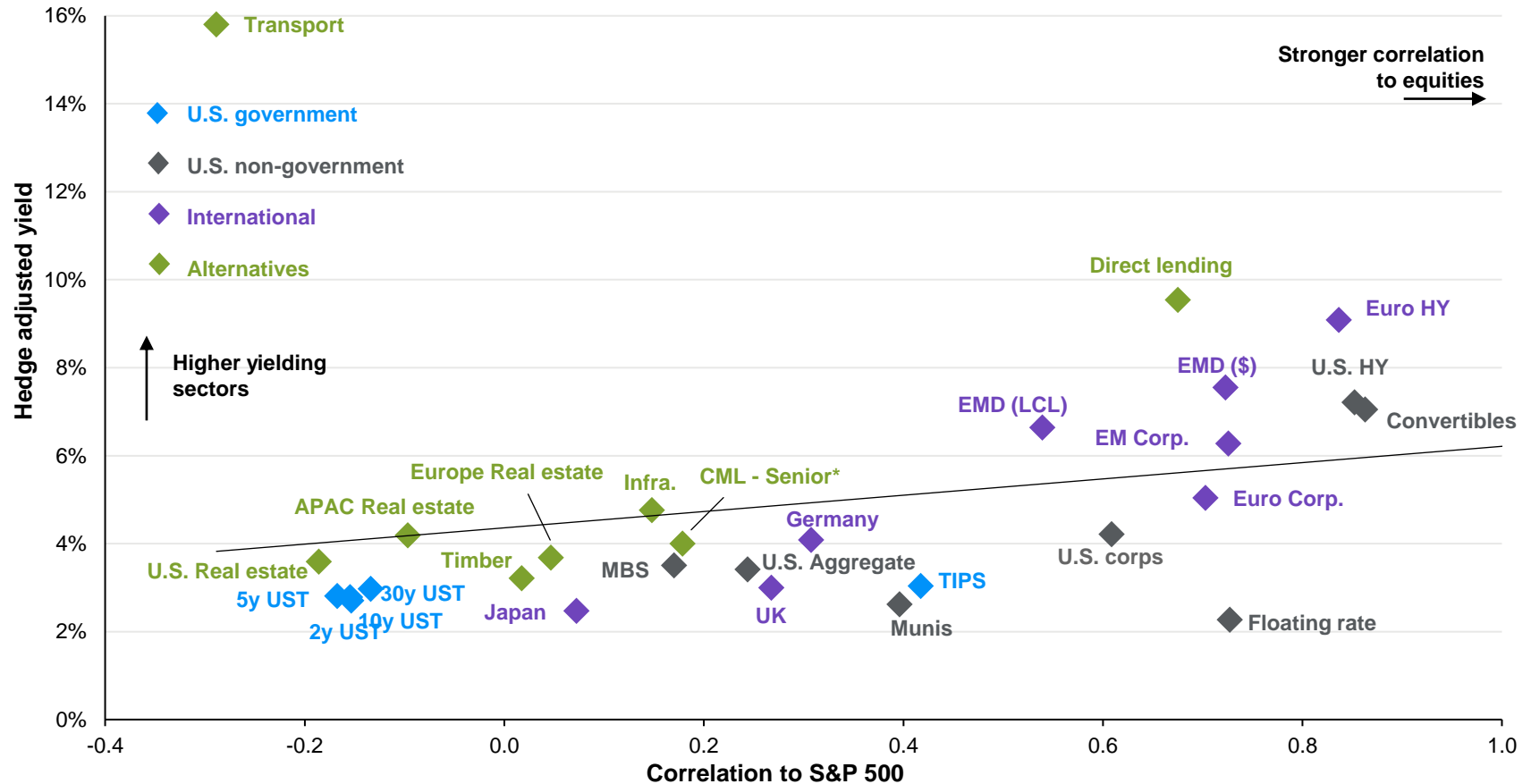
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Alts in aggregate

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. Correlations are based on quarterly return over the past 10 years through 9/30/2022. All non-alternative yields are as of 11/30/2022. Alt yields are as of 9/30/2022. Quarterly return correlations and yields for Infrastructure are as of 6/30/2022. Data is based on availability as of November 30, 2022.



Portfolio diversification

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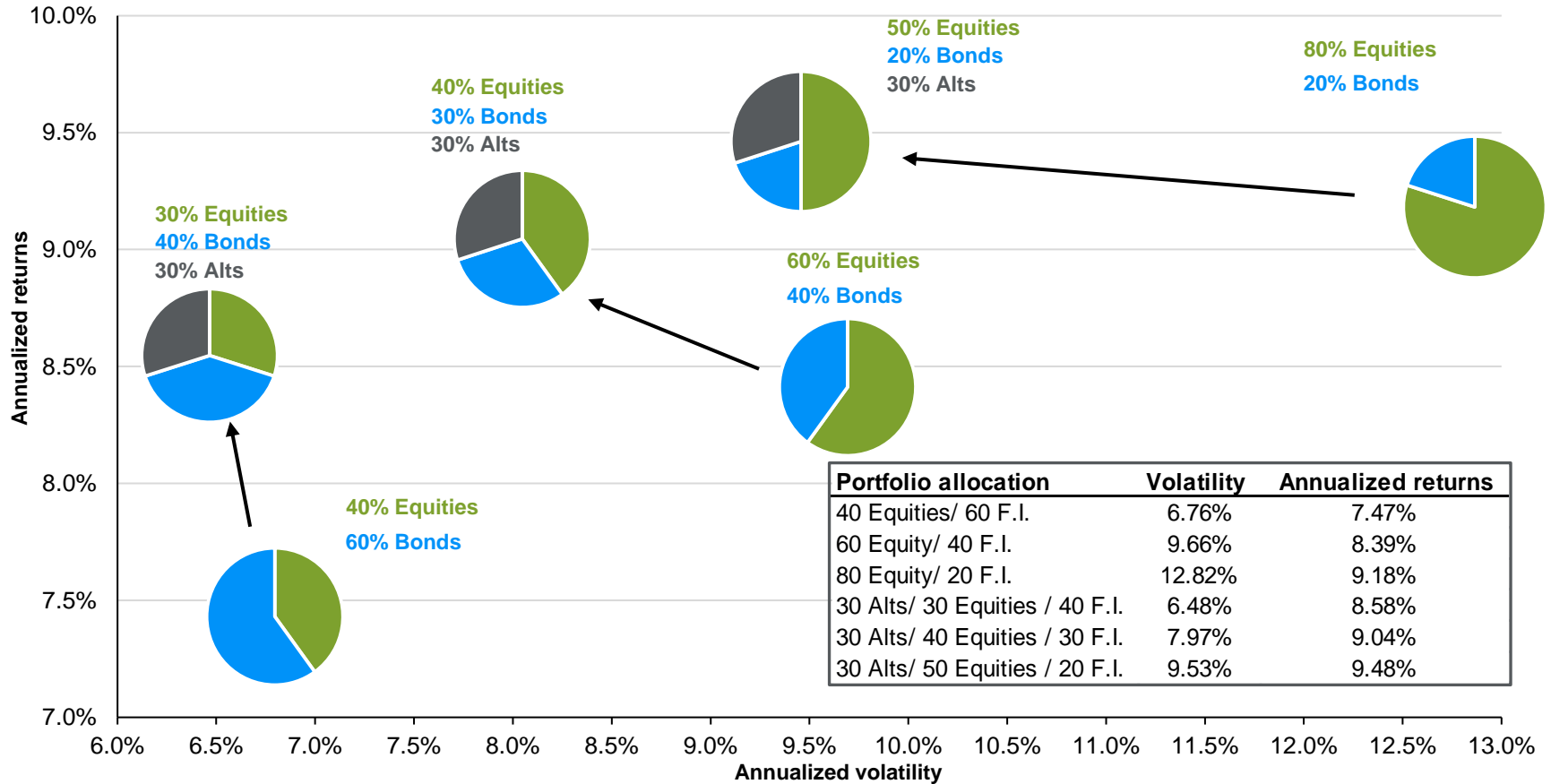
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Alts in aggregate

Alternatives and portfolio risk/return

Annualized volatility and returns, 1989 – 2Q22



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, 2022



Alternative asset class returns

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Alts in aggregate

| | | | | | | | | | | | 2012-2021 | |
|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|--------------------------|---------------------------|---------------------------|-----------------------------|---------------------------|--------------------------|
| 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2Q22 | Ann. | Vol. |
| Private Equity 14.7% | Venture Capital 26.2% | Venture Capital 26.9% | Infra. 18.0% | Infra. 15.3% | Transport 20.2% | Venture Capital 20.5% | Venture Capital 18.8% | Venture Capital 56.2% | Venture Capital 46.7% | U.S. Core RE 12.5% | Venture Capital 22.3% | Venture Capital 10.9% |
| Direct Lending 14.0% | Private Equity 20.5% | Infra. 15.5% | Transport 16.2% | Transport 13.4% | Private Equity 19.9% | Infra. 12.3% | Private Equity 17.0% | Private Equity 23.4% | Private Equity 37.7% | Transport 9.2% | Private Equity 17.6% | Transport 8.4% |
| Infra. 13.3% | Transport 18.8% | Private Equity 13.3% | Venture Capital 15.0% | Private Equity 12.3% | Venture Capital 14.3% | Private Equity 9.9% | Infra. 12.6% | Hedge Funds 11.8% | Transport 27.7% | Europe Core RE 6.8% | Infra. 12.8% | Hedge Funds 7.4% |
| Transport 11.6% | U.S. Core RE 13.9% | U.S. Core RE 12.5% | U.S. Core RE 15.0% | Direct Lending 11.2% | Infra. 13.1% | APAC Core RE 9.5% | Hedge Funds 10.4% | Asset Allocation 11.4% | U.S. Core RE 22.2% | Infra. 5.6% | Transport 12.5% | Private Equity 7.4% |
| U.S. Core RE 10.9% | Asset Allocation 13.7% | Asset Allocation 11.6% | Europe Core RE 12.2% | APAC Core RE 10.5% | Asset Allocation 11.7% | U.S. Core RE 8.3% | Asset Allocation 9.4% | CML - Senior* 6.3% | Asset Allocation 19.9% | APAC Core RE 3.9% | Asset Allocation 10.5% | Infra. 4.0% |
| Europe Core RE 10.3% | Direct Lending 12.7% | Europe Core RE 11.5% | APAC Core RE 11.8% | Asset Allocation 8.9% | APAC Core RE 11.6% | Asset Allocation 8.2% | Direct Lending 9.0% | Transport 5.9% | Europe Core RE 14.4% | Direct Lending 2.3% | U.S. Core RE 10.4% | U.S. Core RE 3.1% |
| Asset Allocation 10.2% | Infra. 12.7% | Direct Lending 9.6% | Asset Allocation 10.5% | U.S. Core RE 8.8% | Direct Lending 8.6% | Direct Lending 8.1% | CML - Senior* 8.4% | Direct Lending 5.5% | Infra. 13.9% | Asset Allocation 1.6% | Direct Lending 9.7% | Direct Lending 2.9% |
| APAC Core RE 9.0% | Europe Core RE 11.5% | APAC Core RE 9.4% | Private Equity 9.8% | Europe Core RE 7.8% | Hedge Funds 8.6% | Transport 7.7% | APAC Core RE 6.6% | Europe Core RE 2.3% | Direct Lending 12.8% | Private Equity - 2.1% | Europe Core RE 9.1% | CML - Senior* 2.7% |
| Venture Capital 7.5% | Hedge Funds 9.1% | CML - Senior* 7.4% | Direct Lending 5.5% | Hedge Funds 5.4% | U.S. Core RE 7.6% | Europe Core RE 7.7% | Europe Core RE 6.2% | Infra. 2.0% | APAC Core RE 12.0% | Hedge Funds - 5.6% | APAC Core RE 8.9% | Asset Allocation 2.7% |
| Hedge Funds 6.4% | APAC Core RE 9.1% | Transport 6.9% | CML - Senior* 2.7% | CML - Senior* 2.9% | Europe Core RE 7.4% | CML - Senior* 2.6% | U.S. Core RE 5.3% | U.S. Core RE 1.2% | Hedge Funds 10.2% | CML - Senior* - 6.3% | Hedge Funds 5.8% | APAC Core RE 2.1% |
| CML - Senior* 4.7% | CML - Senior* 2.9% | Hedge Funds 3.0% | Hedge Funds - 1.1% | Venture Capital 1.2% | CML - Senior* 5.7% | Hedge Funds - 4.7% | Transport - 0.5% | APAC Core RE - 0.1% | CML - Senior* 1.9% | Venture Capital - 10. 0% | CML - Senior* 4.5% | Europe Core RE 2.0% |

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 12/31/2011 to 12/31/2021. Data is based on availability as of November 30, 2022.

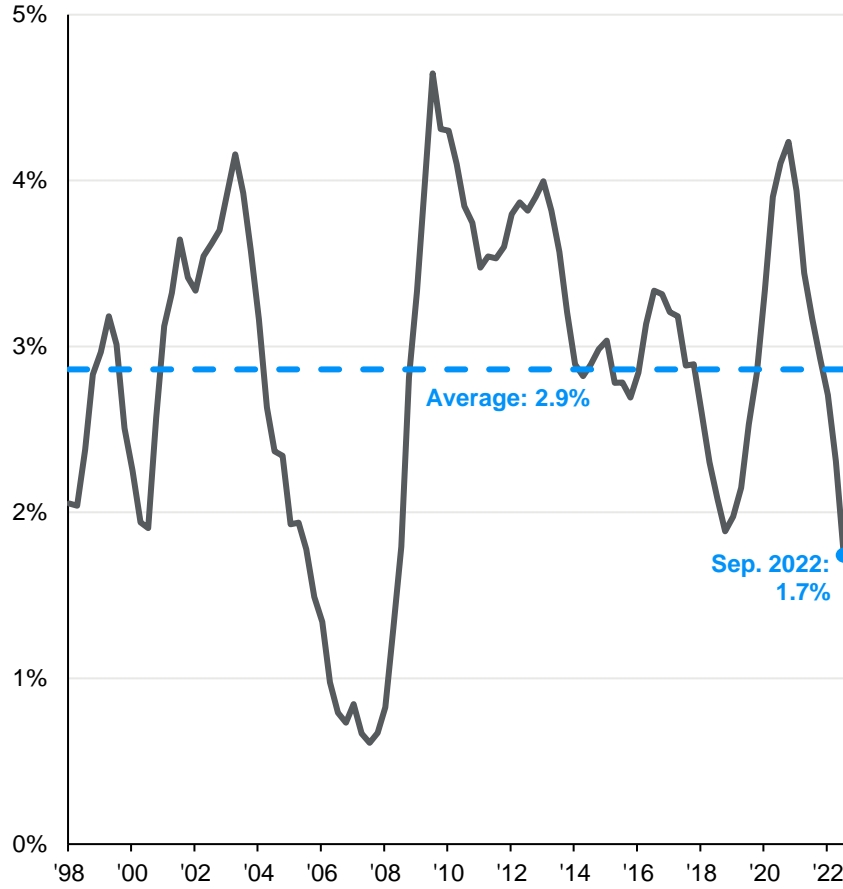
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U.S. real estate dynamics

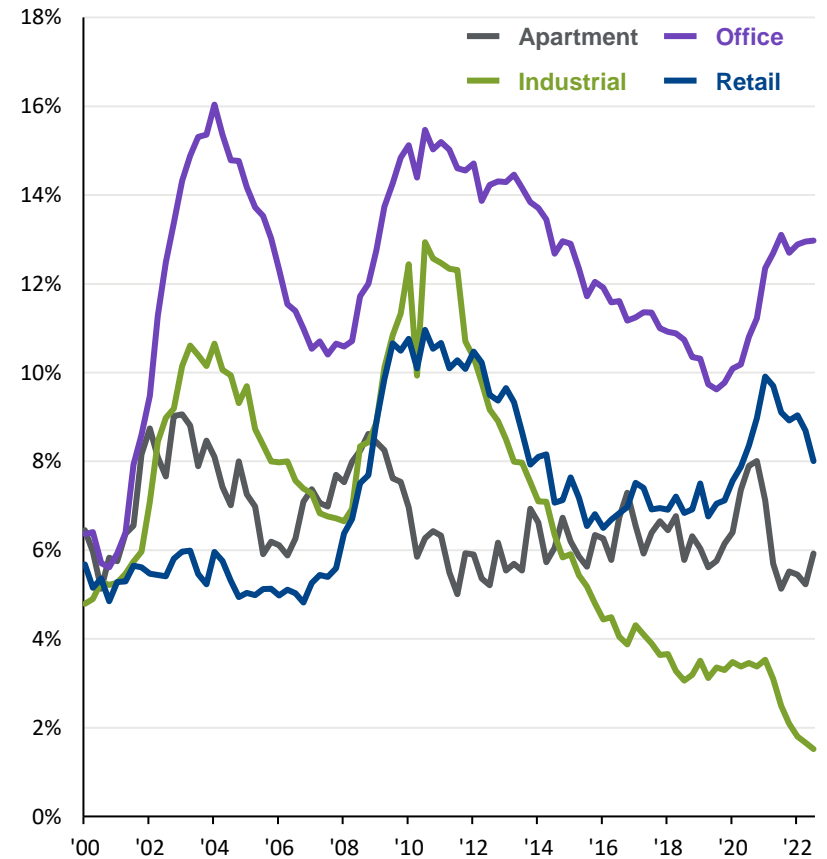
U.S. real estate cap rate spreads

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, 2022.

Data is based on availability as of November 30, 2022.



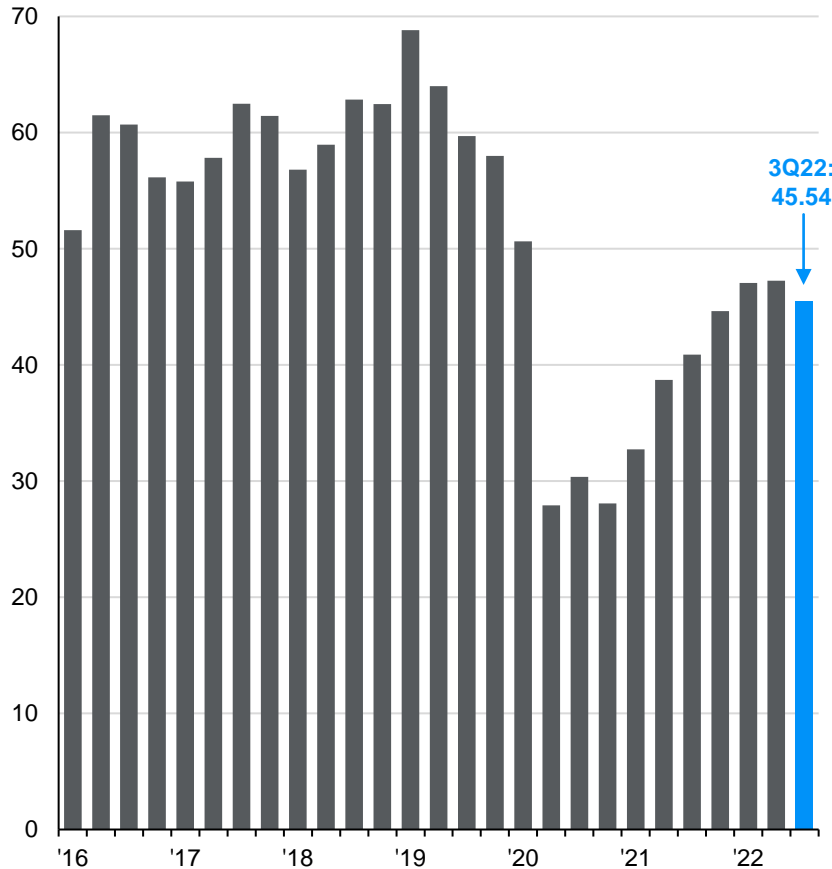
U.S. real estate: Office

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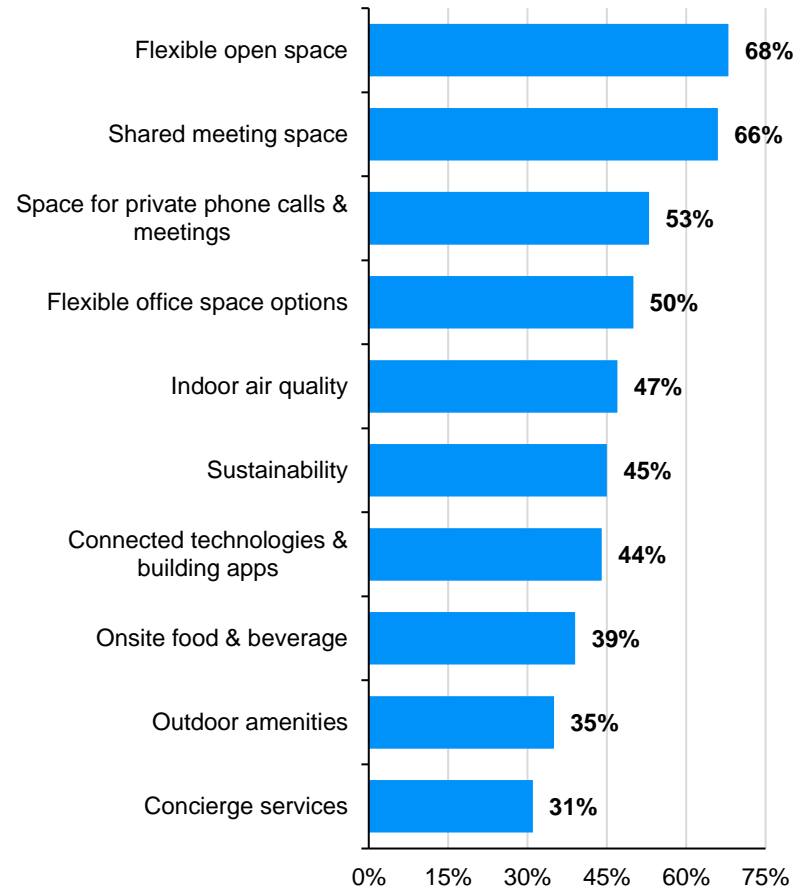
Real estate

U.S. office leasing activity

In million square feet, quarterly



Most sought-after building attributes by large companies



Source: JLL, CBRE, J.P. Morgan Asset Management. "U.S. Office Outlook – Q3 2022," JLL, October 2022. "Spring 2022 U.S. Office Occupier Sentiment Survey," CBRE, April 2022. The right-hand side illustrates survey responses to the question "What will be the most in-demand building attributes in the future?"

Data is based on availability as of November 30, 2022.



U.S. real estate: Retail

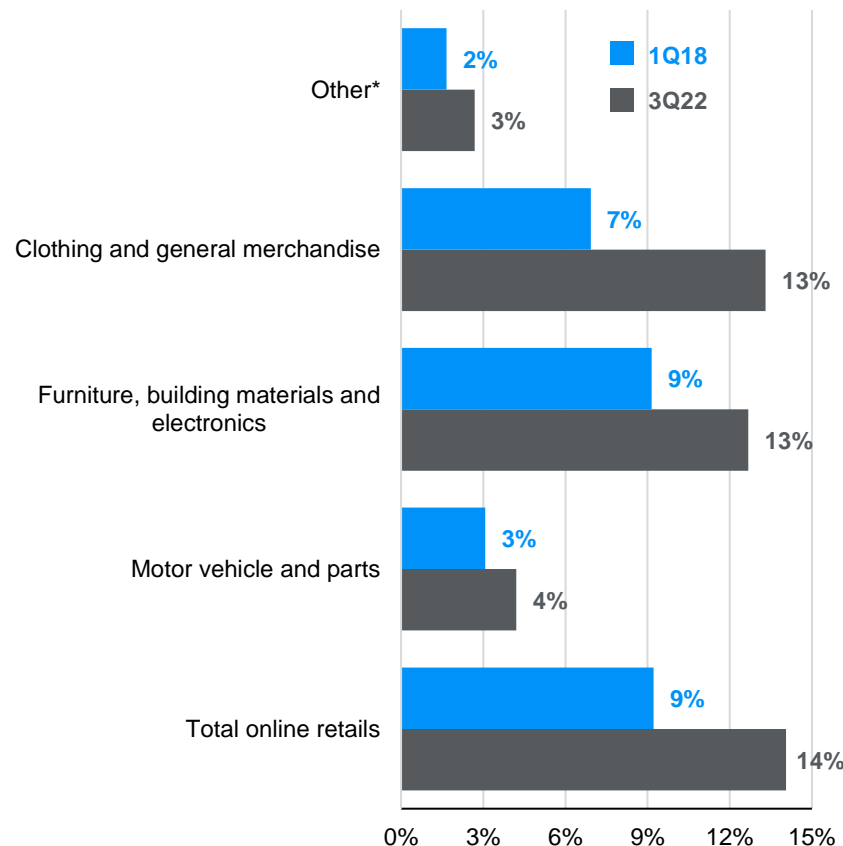
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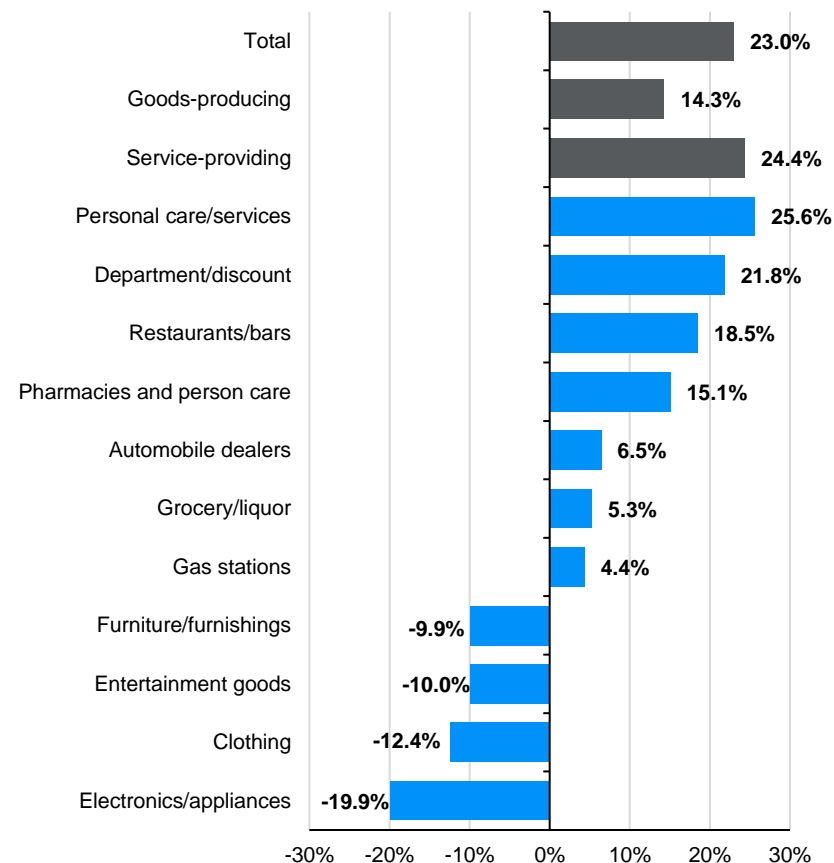
U.S. online retails sales by segment

% of total retail sales by segment, NSA



Change in number of retail establishments

4Q11 – 4Q21, percent



Source: Bureau of Labor Statistics, U.S. Census Bureau, J.P. Morgan Asset Management. Retail establishment data is through 4Q21. *Other includes food, health and entertainment. Data is based on availability as of November 30, 2022.



U.S. real estate: Industrial

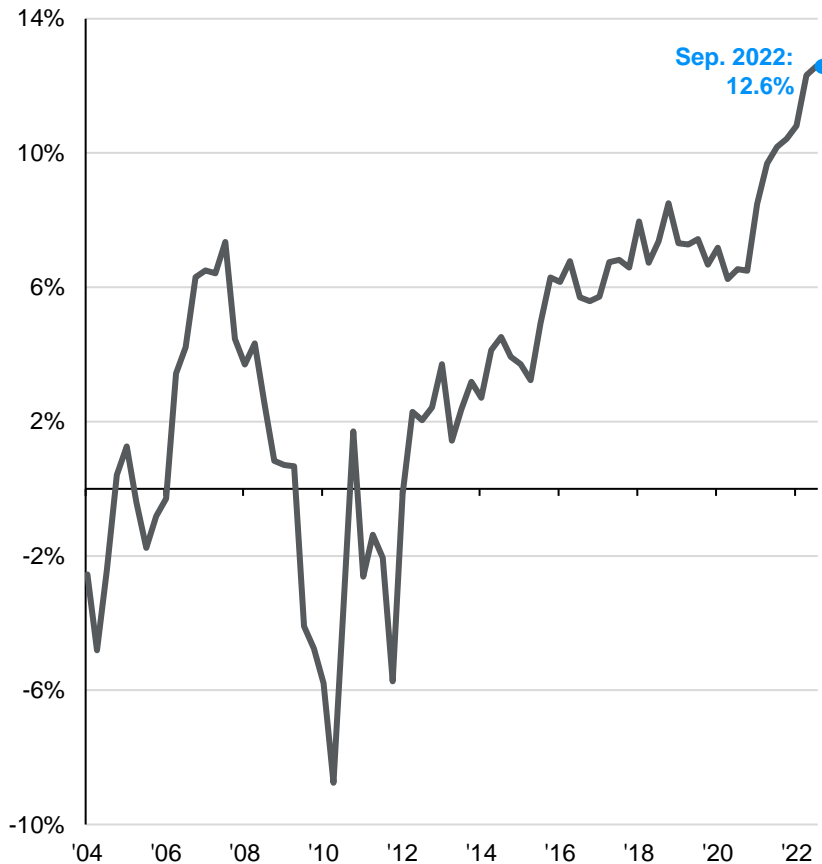
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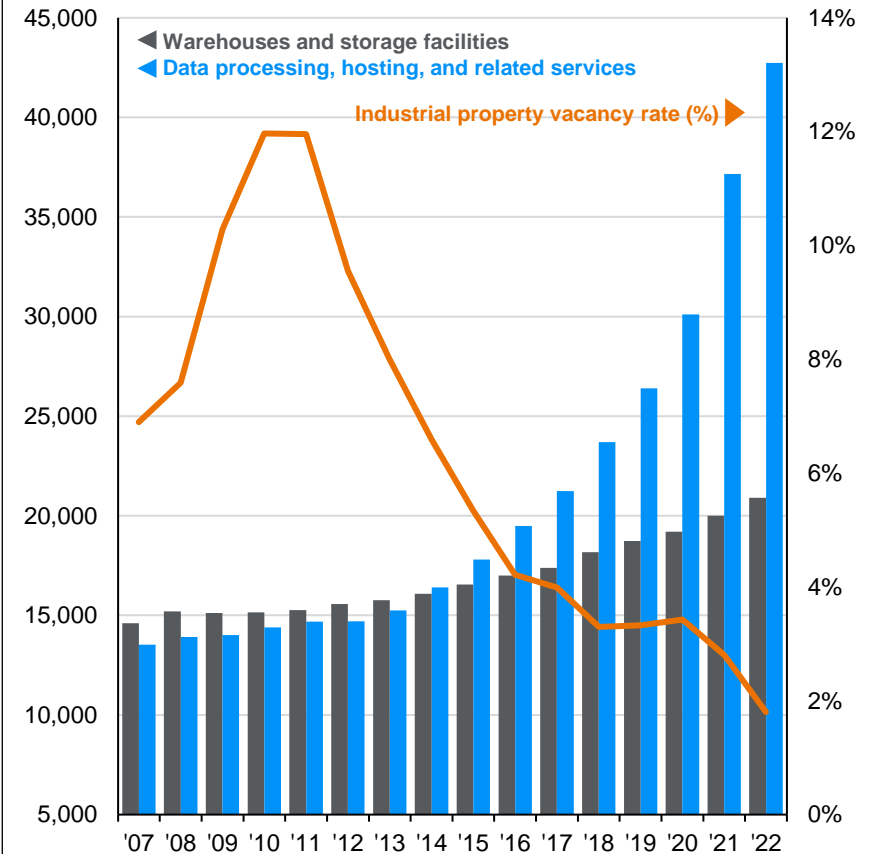
U.S. industrial rent growth

Year-over-year % change, quarterly, 2004 – present



Industrial establishments and vacancy rate

Thousands of square feet, percent



Source: Bureau of Labor Statistics, J.P. Morgan Asset Management. Rent growth data is as of September 30, 2022. Industrial property vacancy rates are an average from each calendar year. Industrial establishments data is through 1Q22. Data is based on availability as of November 30, 2022.



U.S. real estate: Residential

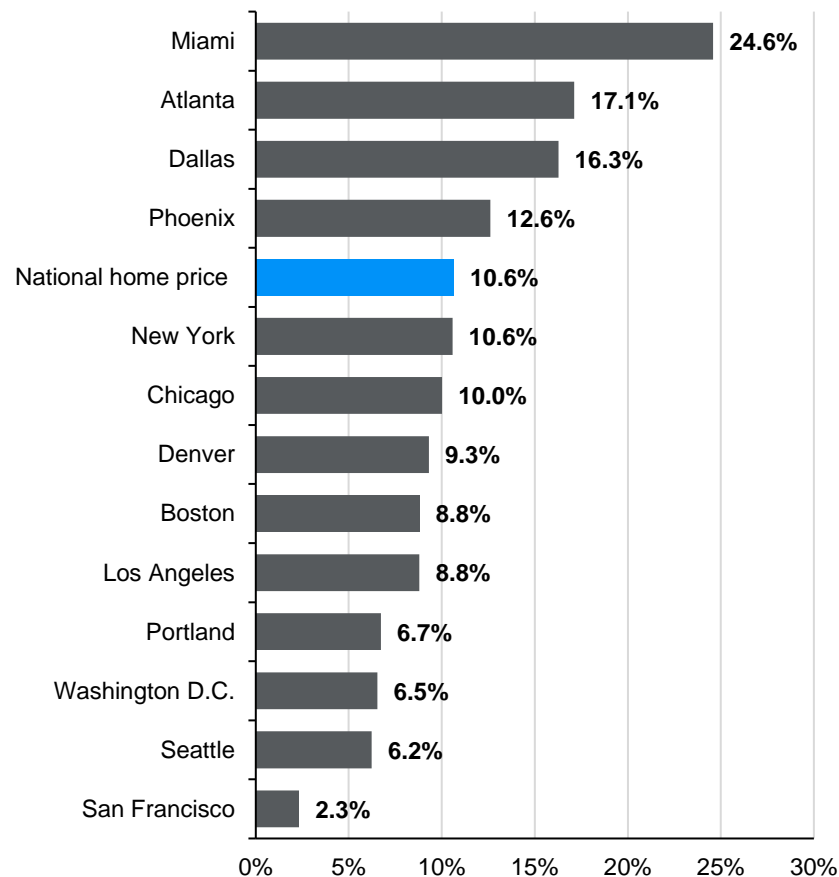
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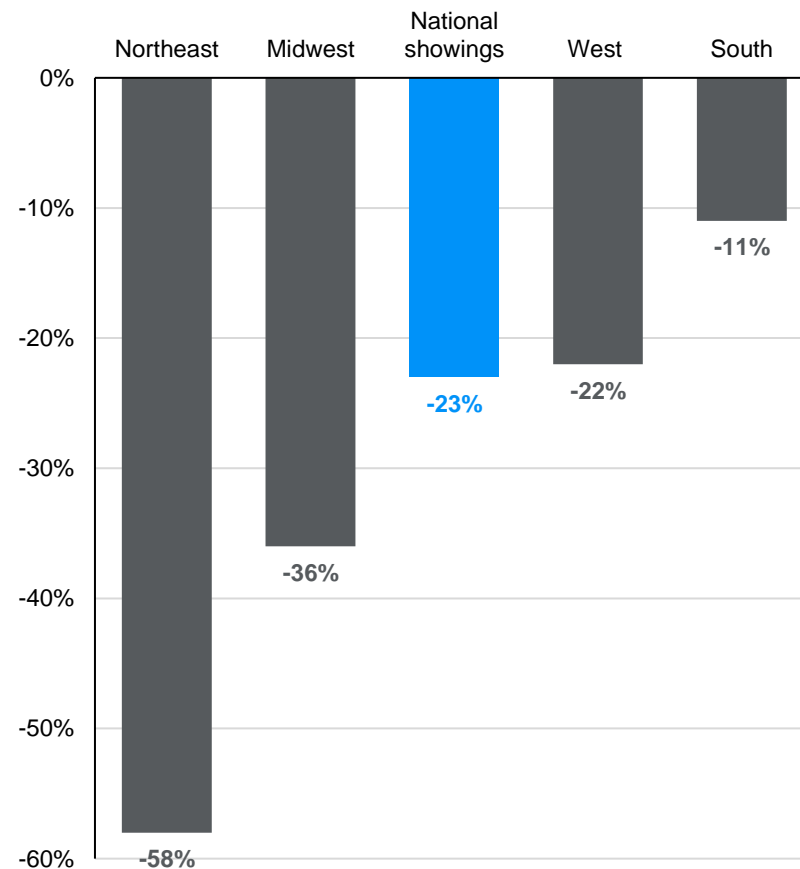
U.S. home price growth by city

S&P Case-Shiller Home Price Index, September 2022, y/y% change



U.S. residential foot traffic by region

Sentrilock home showings*, y/y% change, October 2022



Source: FactSet, National Association of Realtors, Standard & Poor's, Robert Shiller, J.P. Morgan Asset Management. *Sentrilock is the official lockbox used by the National Association of Realtors for foot traffic data. Lockboxes are used in roughly a third of home showing across the nation. Data is based on availability as of November 30, 2022.



Global real estate: Retail

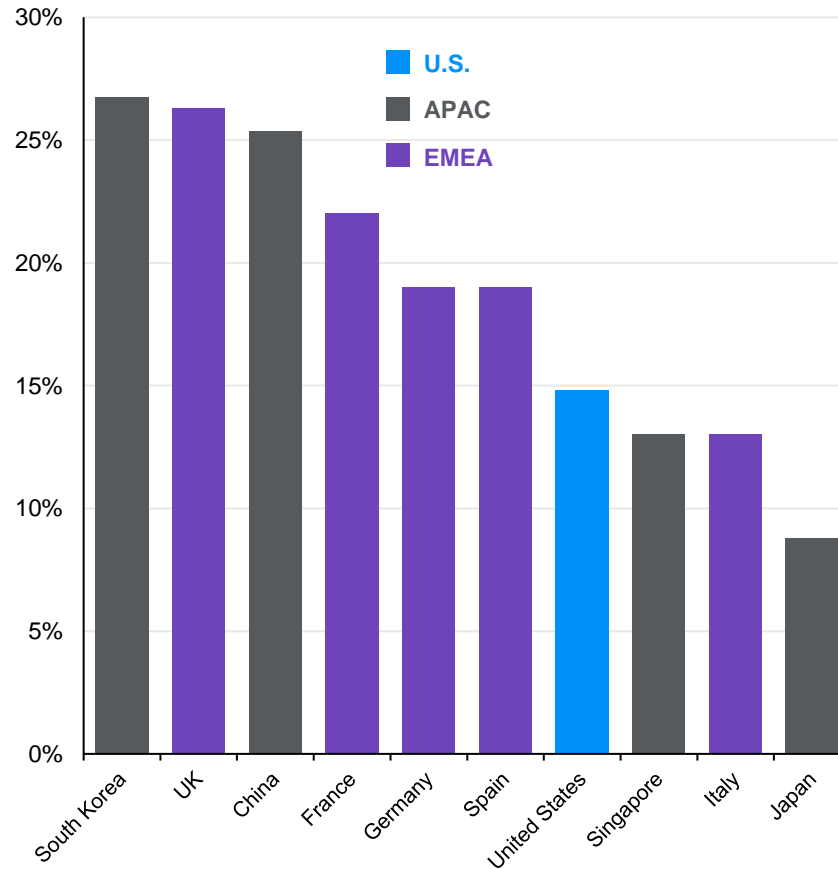
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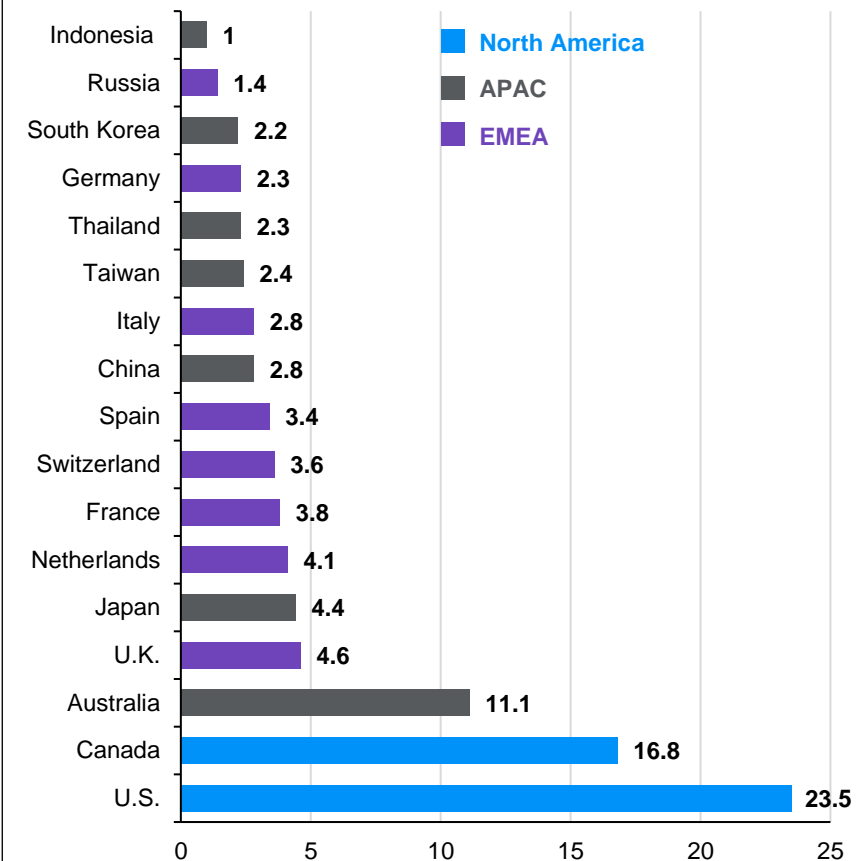
Global online retail sales

Percent of total retail sales, 3Q22*



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 2Q22 except France, Germany, Spain and Italy. (Right) Statista, J.P. Morgan Asset Management. Online retail sales estimates are as of 3Q22, except for European countries and Japan, which are as of 2021. 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, 2022.



Global real estate: Logistics

GTA

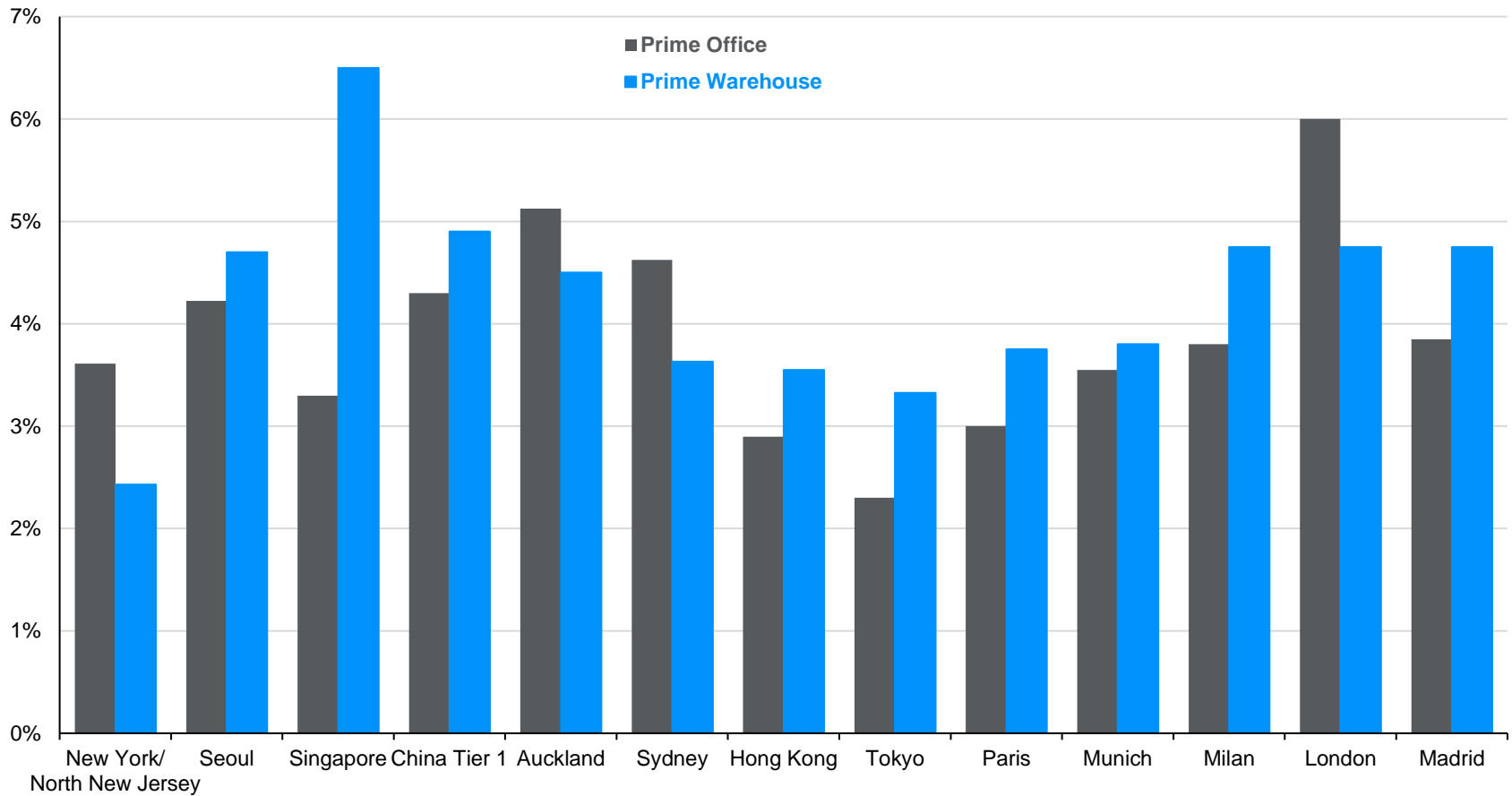
U.S.

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Real estate

Global office and logistics pricing

Yields, 3Q 2022



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, 2022.

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U.S. REITs and real estate

GTA

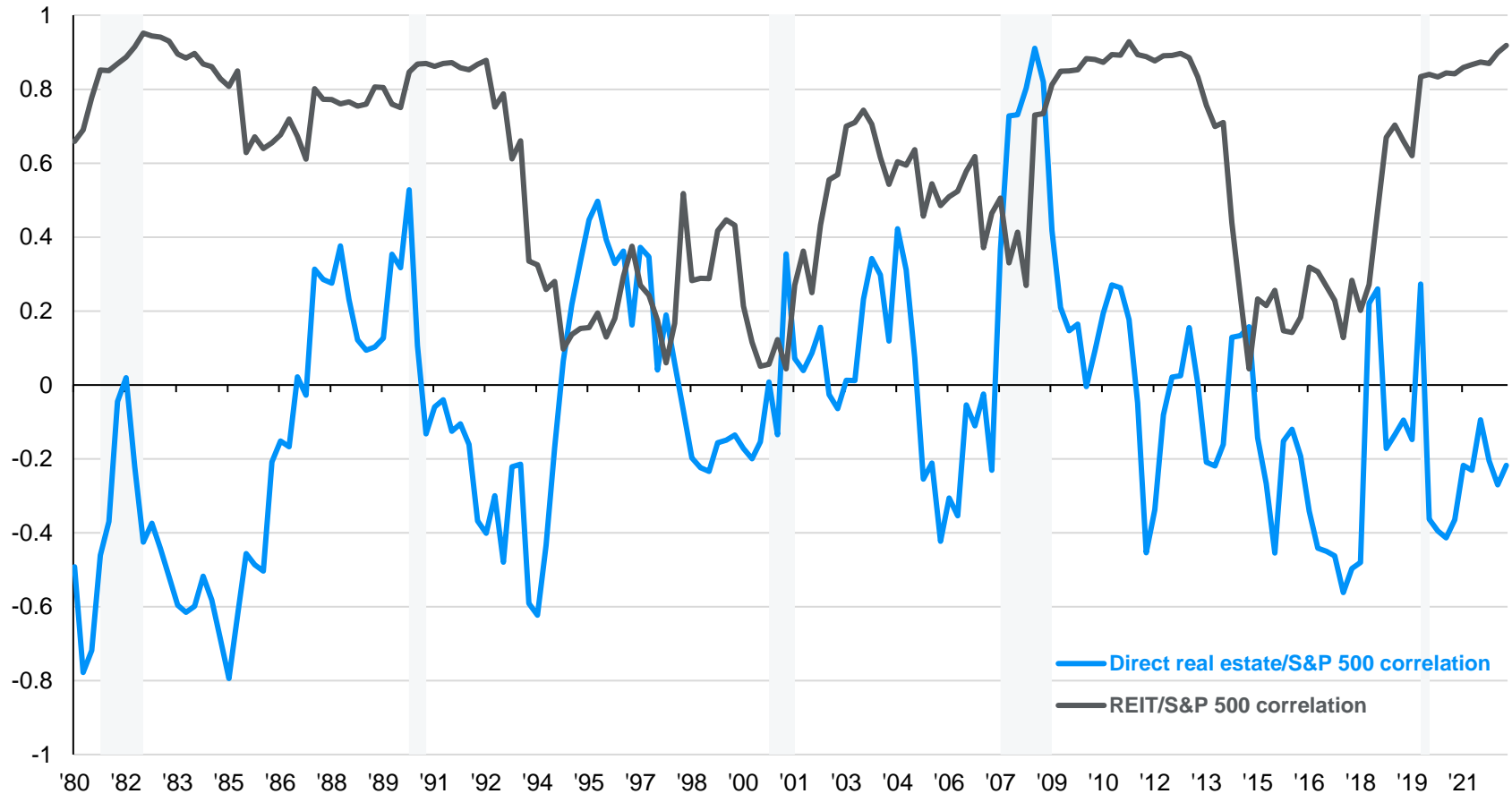
U.S.

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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 3Q22.

Data is based on availability as of November 30, 2022.

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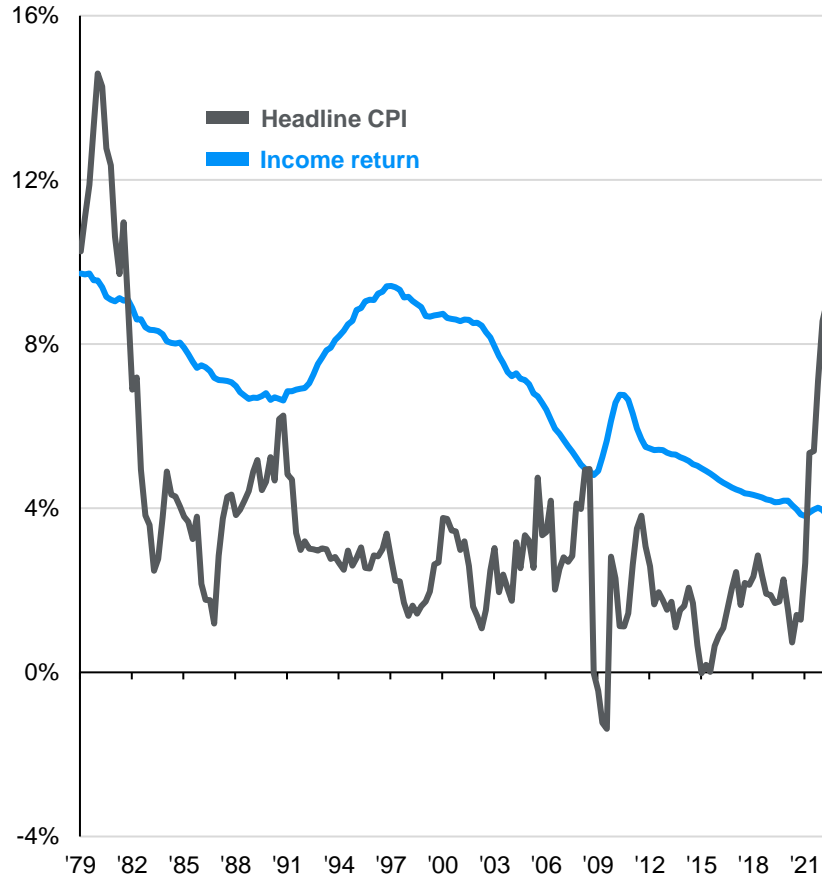
Real estate and inflation

GTA U.S. 20

Real estate

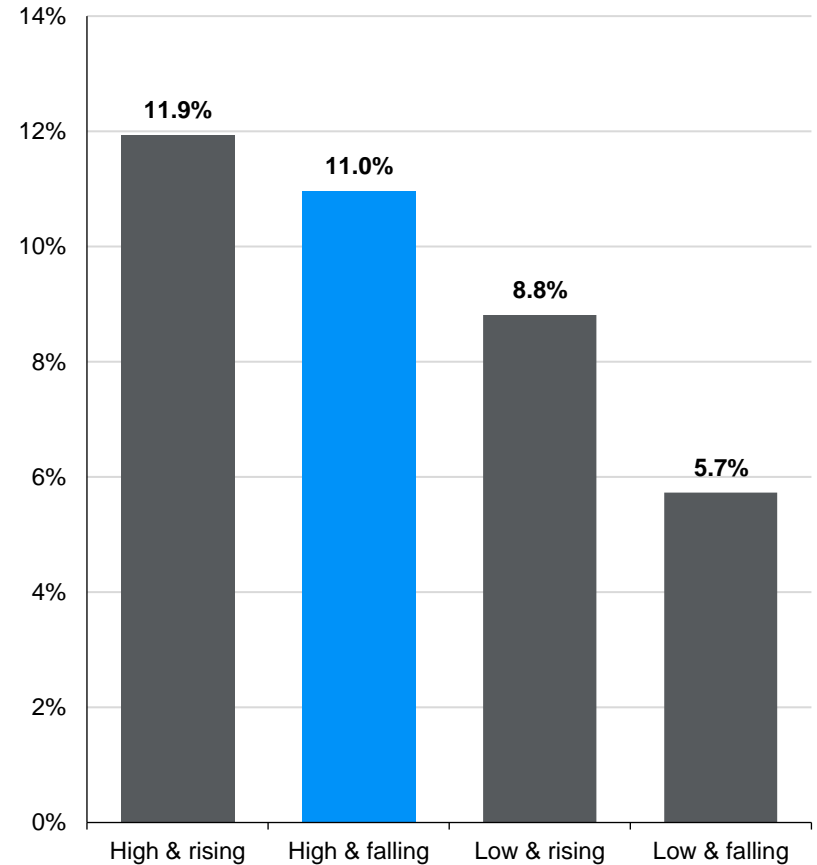
Real estate income return and inflation

1978 – 3Q22, quarterly, year-over-year (%)



Real estate performance in different inflationary regimes

1978 – 3Q22, 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 3Q22 is 2.91%. Data is based on availability as of November 30, 2022.

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U.S. REIT sector returns

GTA U.S. 21

Real estate

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | YTD | 2012-2021 | |
|--------------------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | | | | | | | | | | | | Ann. | Vol. |
| Industrial | 31.3% | Lodging/Resorts | Mfgd. Homes | Self Storage | Industrial | Data Centers | Ret. Free Standing | Mfgd. Homes | Data Centers | Regional Malls | Lodging/Resorts | Industrial | Regional Malls |
| | 31.3% | 27.2% | 46.2% | 40.6% | 30.7% | 28.4% | 13.9% | 49.1% | 21.0% | 92.1% | -4.0% | 21.9% | 30.1% |
| Regional Malls | 28.2% | Mfgd. Homes | Apartments | Mfgd. Homes | Lodging/Resorts | Mfgd. Homes | Mfgd. Homes | Industrial | Self Storage | Self Storage | Ret. Free Standing | Mfgd. Homes | Lodging/Resorts |
| | 28.2% | 10.5% | 39.6% | 25.6% | 24.3% | 24.9% | 11.4% | 48.7% | 12.9% | 79.4% | -6.7% | 21.8% | 28.5% |
| Shopping Centers | 25.0% | Self Storage | Health Care | Apartments | Ret. Free Standing | Industrial | Health Care | Data Centers | Industrial | Shopping Centers | Shopping Centers | Self Storage | Shopping Centers |
| | 25.0% | 9.5% | 33.3% | 16.5% | 17.0% | 20.6% | 7.6% | 44.2% | 12.2% | 65.1% | -7.6% | 18.5% | 27.6% |
| Ret. Free Standing | 22.5% | Industrial | Regional Malls | Ret. Free Standing | Mfgd. Homes | All Equity | Apartments | Office | Mfgd. Homes | Apartments | Health Care | All Equity | Ret. Free Standing |
| | 22.5% | 7.4% | 32.6% | 5.9% | 14.2% | 8.7% | 3.7% | 31.4% | -1.7% | 63.6% | -17.1% | 12.2% | 20.8% |
| Health Care | 20.4% | Ret. Free Standing | Lodging/Resorts | Shopping Centers | Office | Lodging/Resorts | Self Storage | All Equity | All Equity | Industrial | All Equity | Apartments | Health Care |
| | 20.4% | 7.3% | 32.5% | 4.7% | 13.2% | 7.2% | 2.9% | 28.7% | -5.1% | 62.0% | -21.0% | 12.2% | 20.5% |
| Self Storage | 19.9% | Office | Self Storage | Regional Malls | All Equity | Office | Industrial | Apartments | Health Care | Mfgd. Homes | Regional Malls | Ret. Free Standing | Self Storage |
| | 19.9% | 5.6% | 31.4% | 4.2% | 8.6% | 5.2% | -2.5% | 26.3% | -9.9% | 42.0% | -22.0% | 10.9% | 18.3% |
| All Equity | 19.7% | Shopping Centers | Shopping Centers | All Equity | Health Care | Self Storage | All Equity | Shopping Centers | Ret. Free Standing | All Equity | Self Storage | Shopping Centers | Industrial |
| | 19.7% | 5.0% | 30.0% | 2.8% | 6.4% | 3.7% | -4.0% | 25.0% | -10.5% | 41.3% | -22.2% | 7.7% | 18.2% |
| Office | 14.2% | All Equity | All Equity | Industrial | Shopping Centers | Apartments | Regional Malls | Ret. Free Standing | Apartments | Data Centers | Data Centers | Health Care | Office |
| | 14.2% | 2.9% | 28.0% | 2.6% | 3.7% | 3.7% | -7.0% | 24.8% | -15.3% | 25.5% | -22.8% | 7.3% | 16.8% |
| Lodging/Resorts | 12.5% | Regional Malls | Office | Office | Apartments | Ret. Free Standing | Lodging/Resorts | Health Care | Office | Office | Industrial | Office | Apartments |
| | 12.5% | -1.0% | 25.9% | 0.3% | 2.9% | 3.1% | -12.8% | 21.2% | -18.4% | 22.0% | -25.9% | 7.3% | 16.7% |
| Mfgd. Homes | 7.1% | Apartments | Industrial | Health Care | Regional Malls | Health Care | Data Centers | Lodging/Resorts | Lodging/Resorts | Ret. Free Standing | Mfgd. Homes | Lodging/Resorts | Mfgd. Homes |
| | 7.1% | -6.2% | 21.0% | -7.2% | -5.2% | 0.9% | -14.1% | 15.6% | -23.6% | 19.7% | -26.7% | 5.7% | 15.6% |
| Apartments | 6.9% | Health Care | Ret. Free Standing | Lodging/Resorts | Self Storage | Regional Malls | Office | Self Storage | Shopping Centers | Lodging/Resorts | Apartments | Regional Malls | All Equity |
| | 6.9% | -7.1% | 9.7% | -24.4% | -8.1% | -2.7% | -14.5% | 13.7% | -27.6% | 18.2% | -27.3% | 5.1% | 14.9% |
| Data Centers | N/A | Data Centers | Data Centers | Data Centers | Data Centers | Shopping Centers | Shopping Centers | Regional Malls | Regional Malls | Health Care | Office | Data Centers | Data Centers |
| | N/A | N/A | N/A | N/A | N/A | -11.4% | -14.5% | -9.1% | -37.2% | 16.3% | -32.3% | 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, 2022.

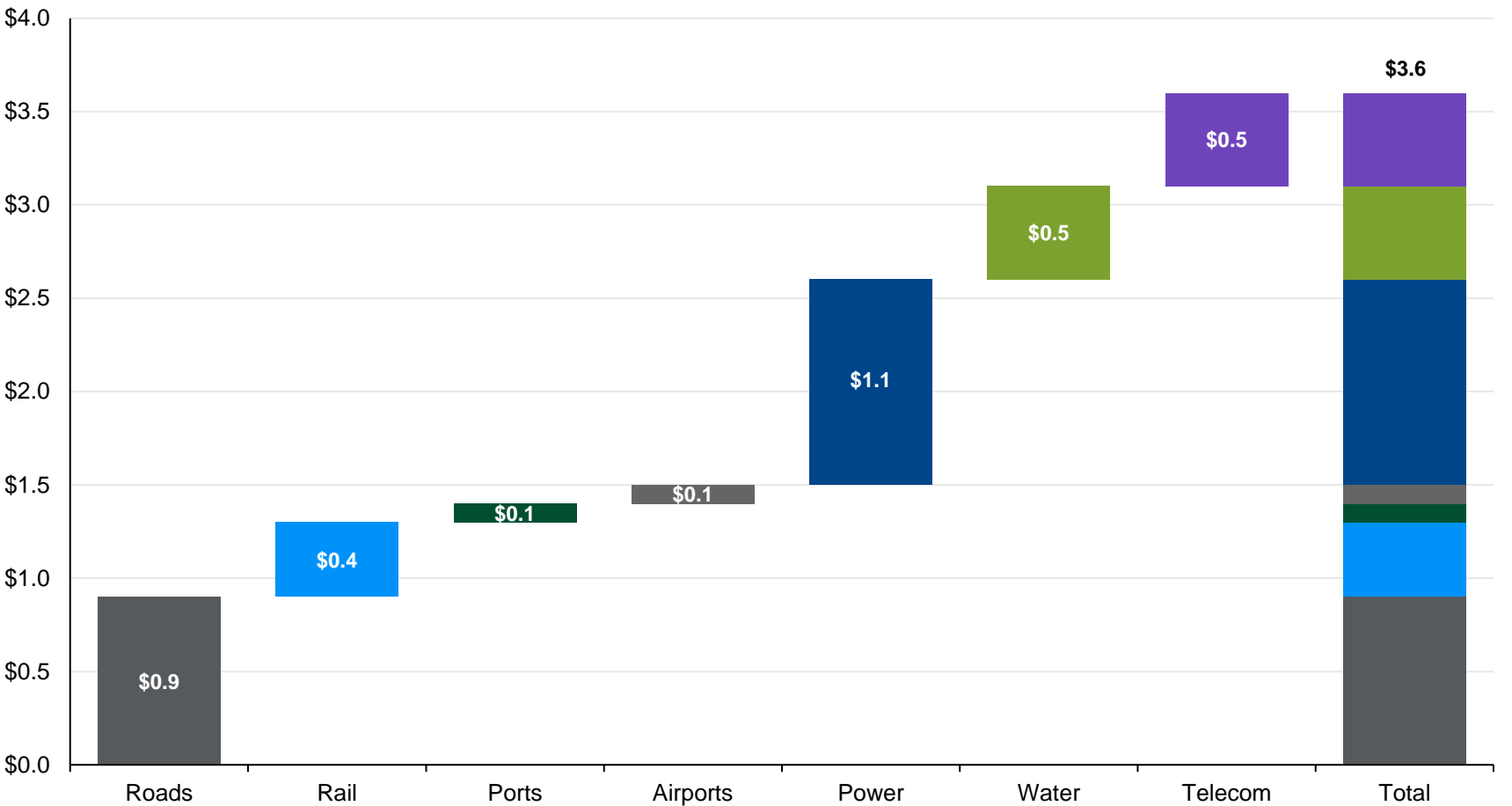


Global infrastructure investment

GTA U.S. 22

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, 2022.

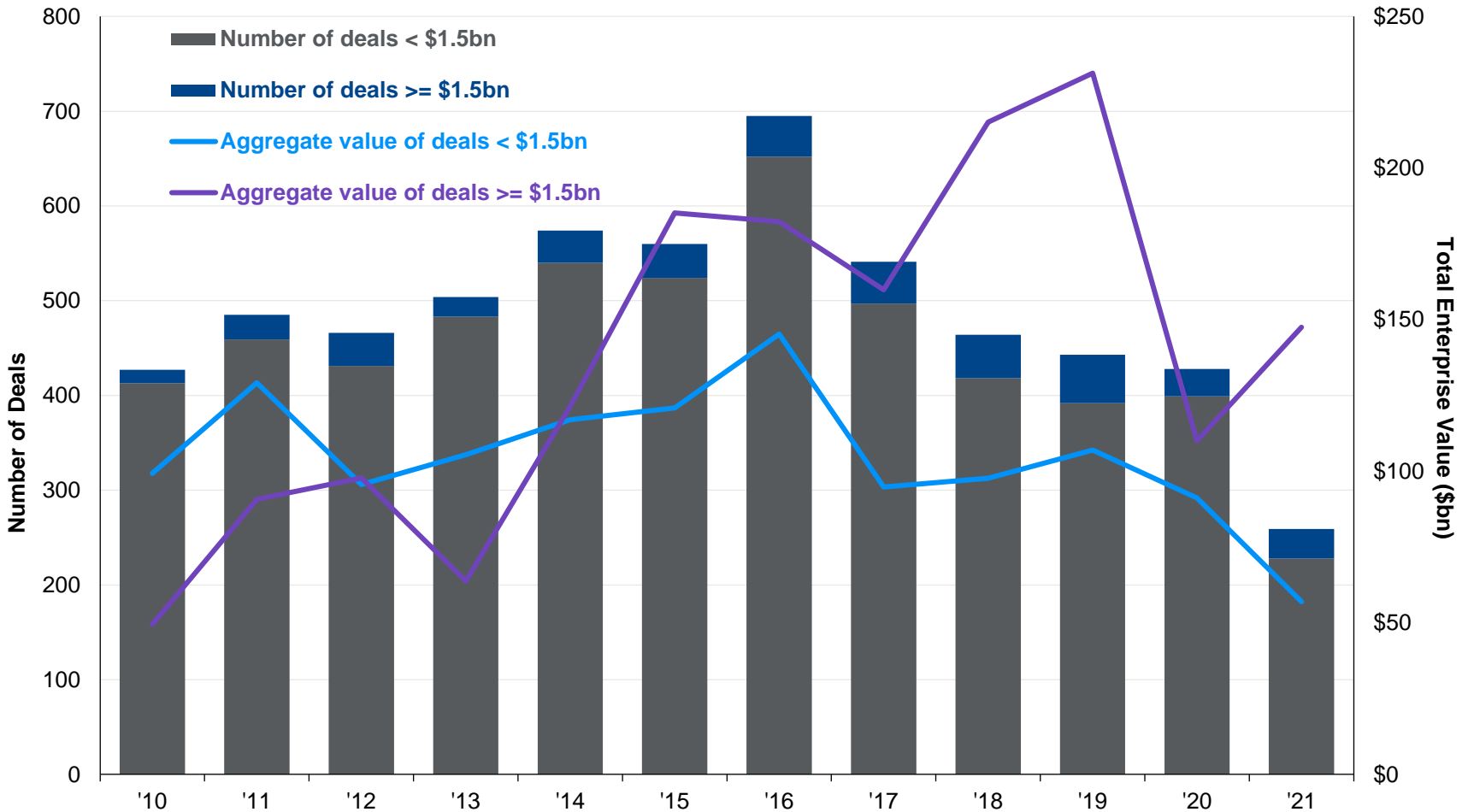


Infrastructure transactions

GTA U.S. 23

Infrastructure

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, 2022.



Sources of global infrastructure returns

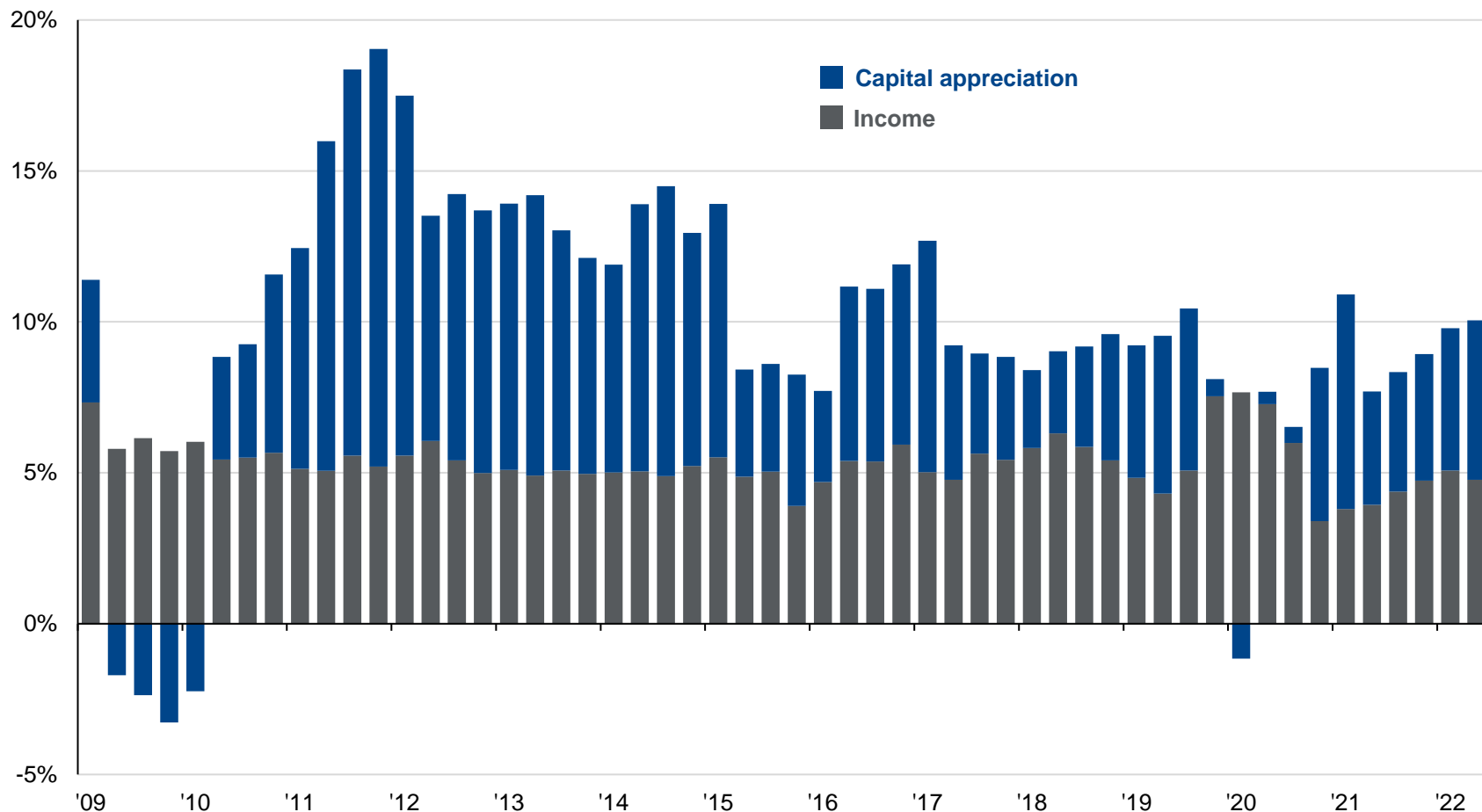
GTA

U.S.

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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 1Q09, and ending in 2Q22. 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, 2022.

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Utility profitability and household spending

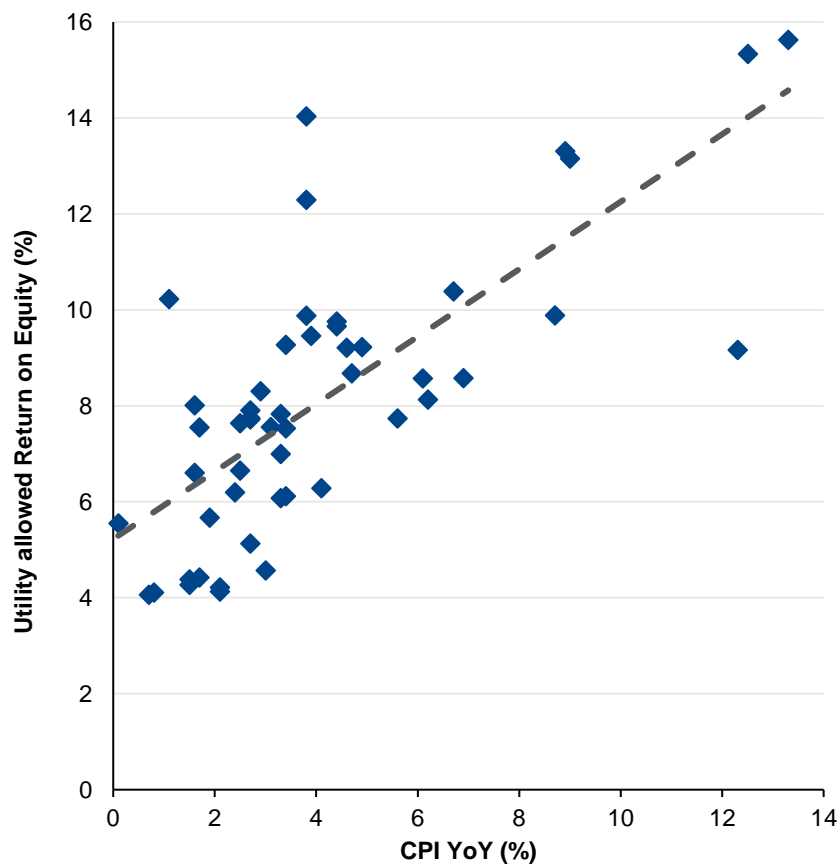
GTA

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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 March 2022. Data is based on availability as of November 30, 2022.

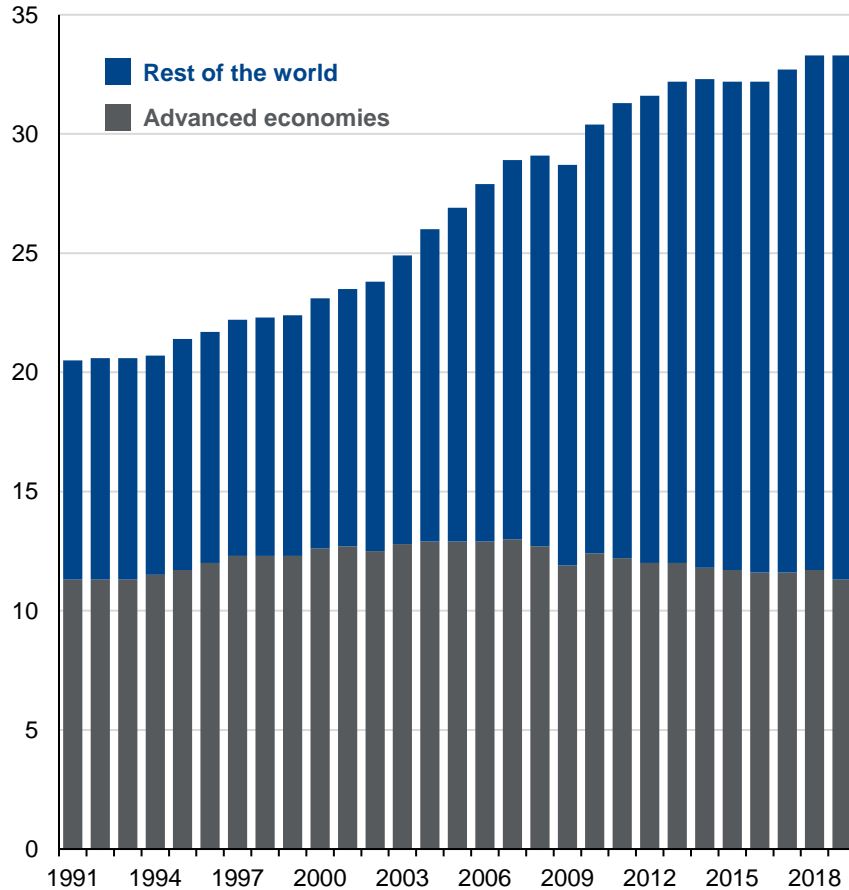


Sources of carbon emissions

GTA U.S. 26

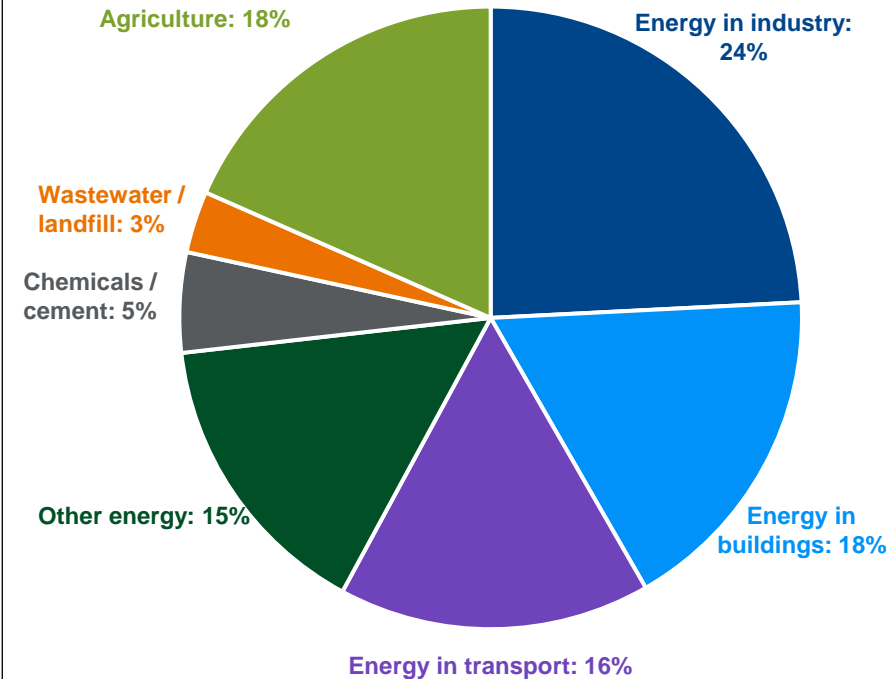
Energy related CO2 emissions

1990-2019, gigatons



Share of global greenhouse gas emissions by sector

% of global greenhouse gas emissions (2016), CO₂ equivalent tons

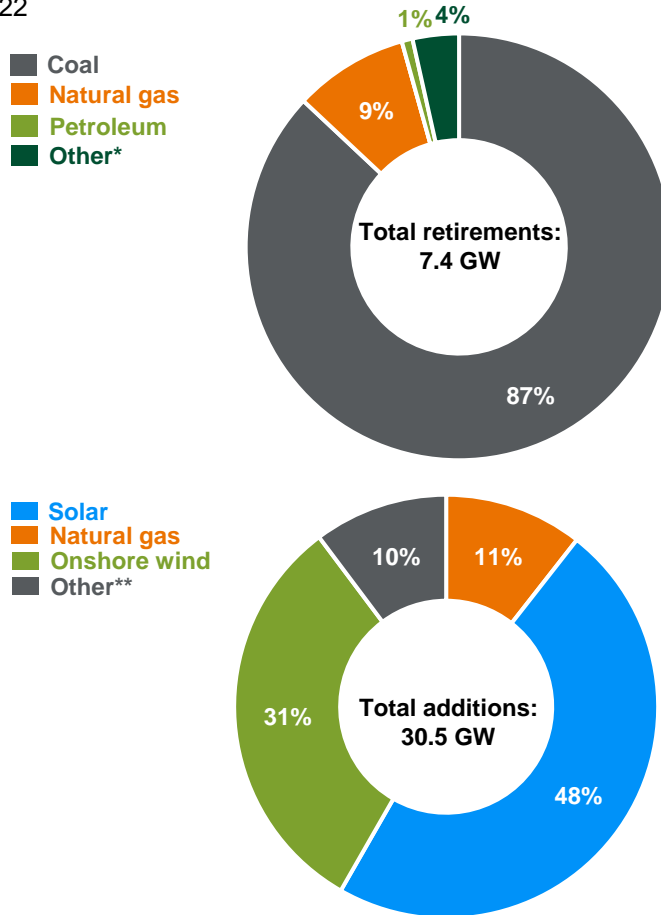


Source: (Left) IEA (Right) Climate Watch, Our World in Data, World Resource Institute, J.P. Morgan Asset Management. Greenhouse gas emissions include CO₂, methane, nitrous oxide and fluorinated greenhouse gases. CO₂ equivalent tons standardize emissions to allow for comparison between gases. One equivalent ton has the same warming effect as one ton of CO₂ over 100 years. Data is based on availability as of November 30, 2022.

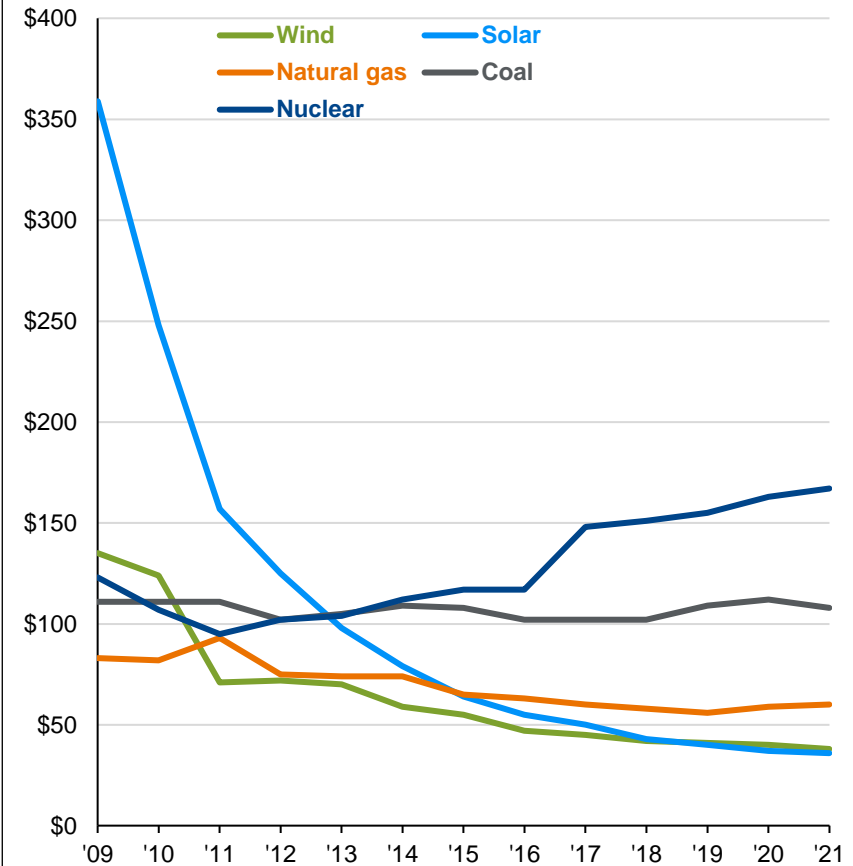


Global renewable energy

Planned U.S. electricity generating capacity 2022



Cost of wind, solar, natural gas and coal
Mean LCOE*, 2021, dollar per megawatt hour

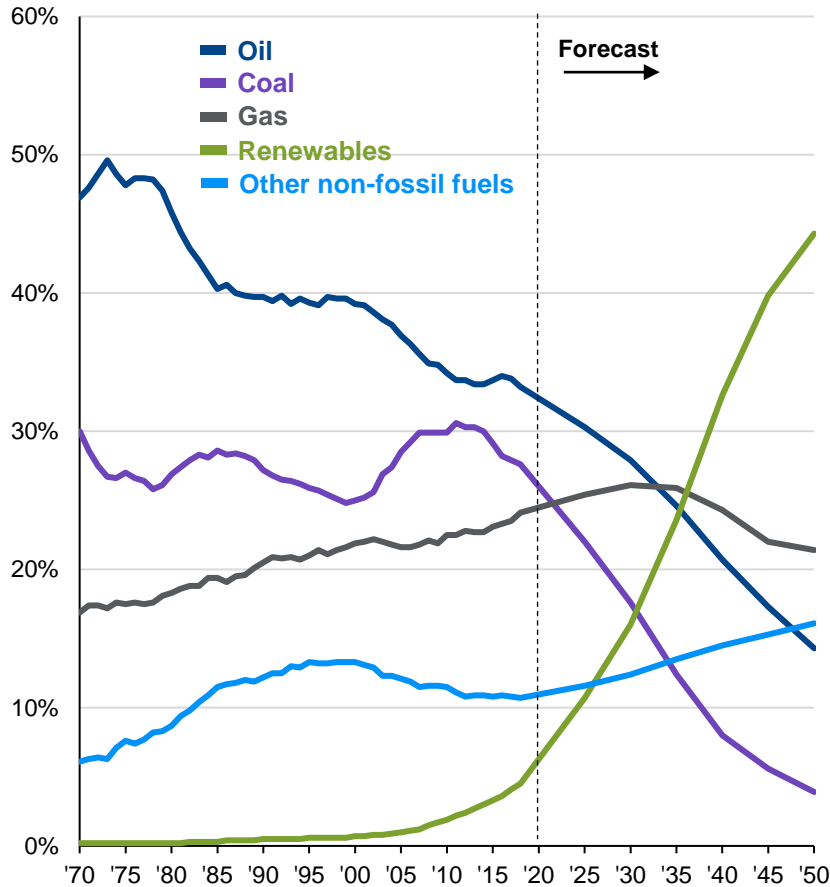


Source: EIA, Lazard, Eurostat, METI, BP Statistical, J.P. Morgan Asset Management.
2022 planned capacity retirements and additions are from the October 2022 Monthly Electric Generator Inventory report published by the EIA.
*Other retirements include conventional hydroelectric, wood/wood/ waste biomass, landfill gas, onshore wind turbine and other gases. *Other additions include batteries, geothermal, conventional hydroelectric, petroleum, biomass and landfill gas. **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. Data is based on availability as of November 30, 2022.

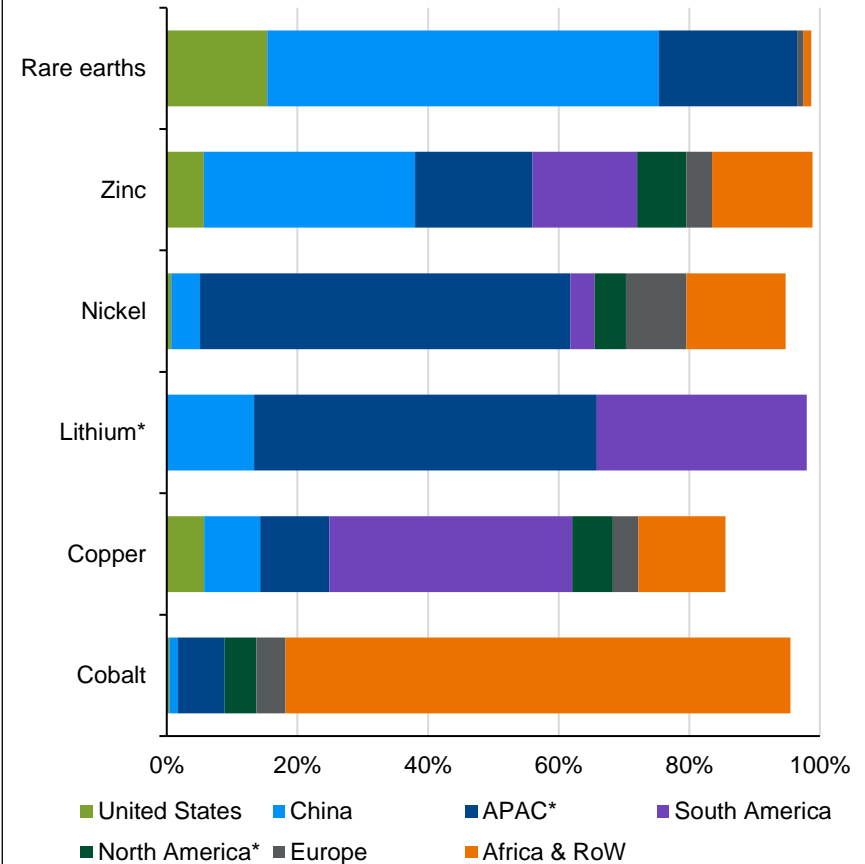


Clean energy usage and supply chain

Global energy mix
Share of primary energy



Share of global commodities mining production by region
2021



Source: BP Energy Outlook 2020, U.S. Geological Survey, J.P. Morgan Asset Management. U.S. electricity generation data is from the EIA's *Annual Energy Outlook 2022*. *U.S. lithium mining production is excluded in this analysis in order to protect individual company information. Data is based on availability as of November 30, 2022.



Renewable energy infrastructure

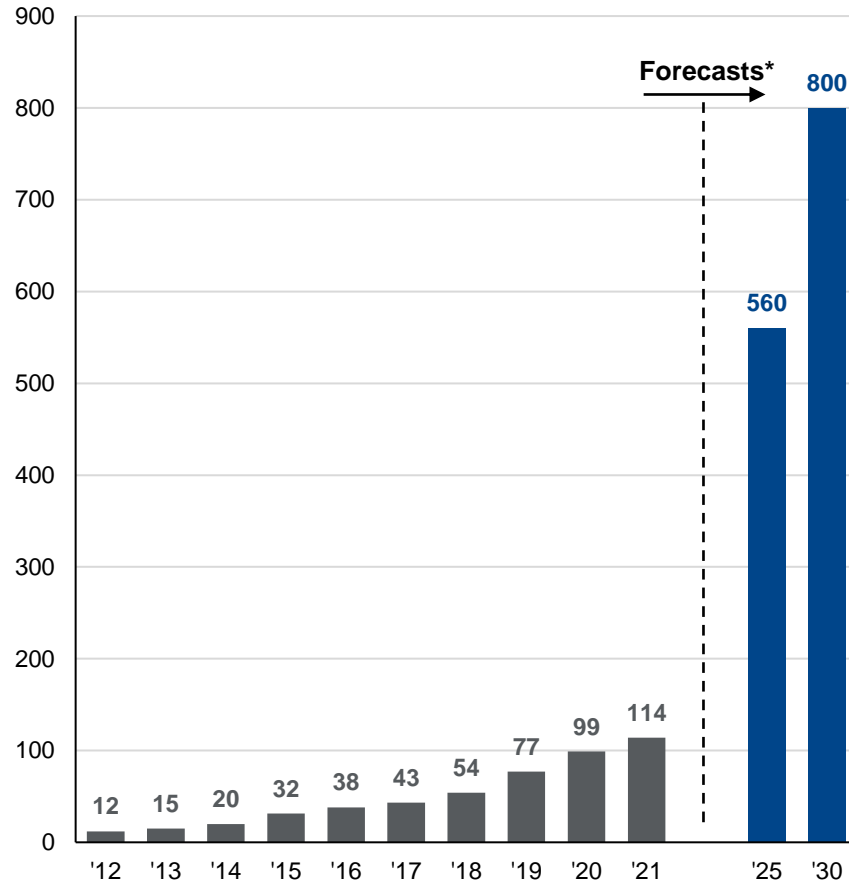
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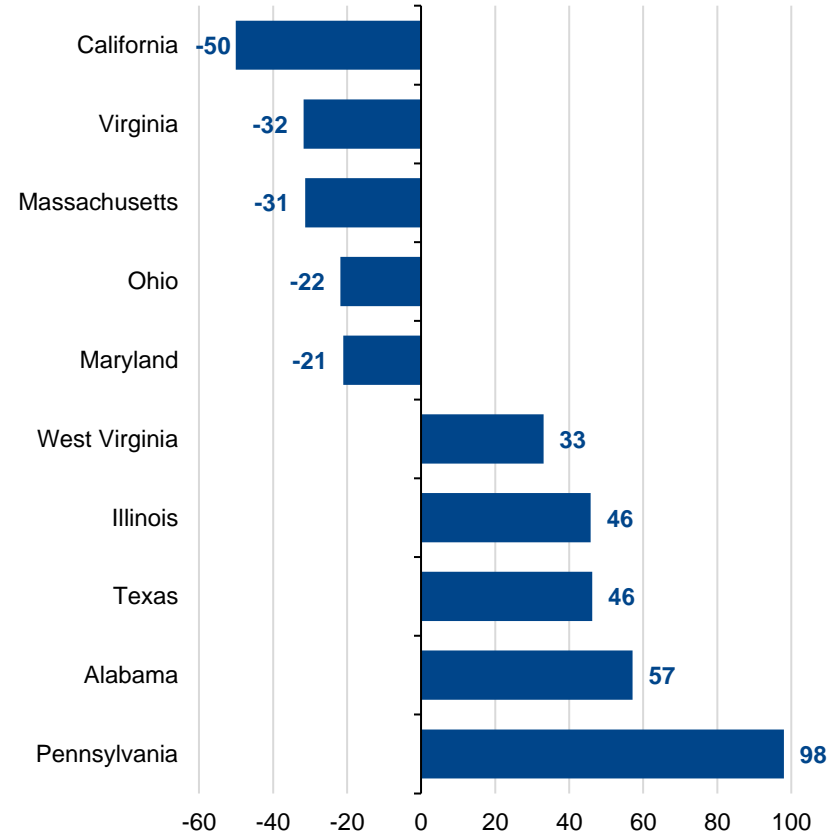
Infrastructure

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 calculation as total electricity generation minus total retail sales of electricity.

Data is based on availability as of November 30, 2022.



Forestry, inflation and carbon offsets

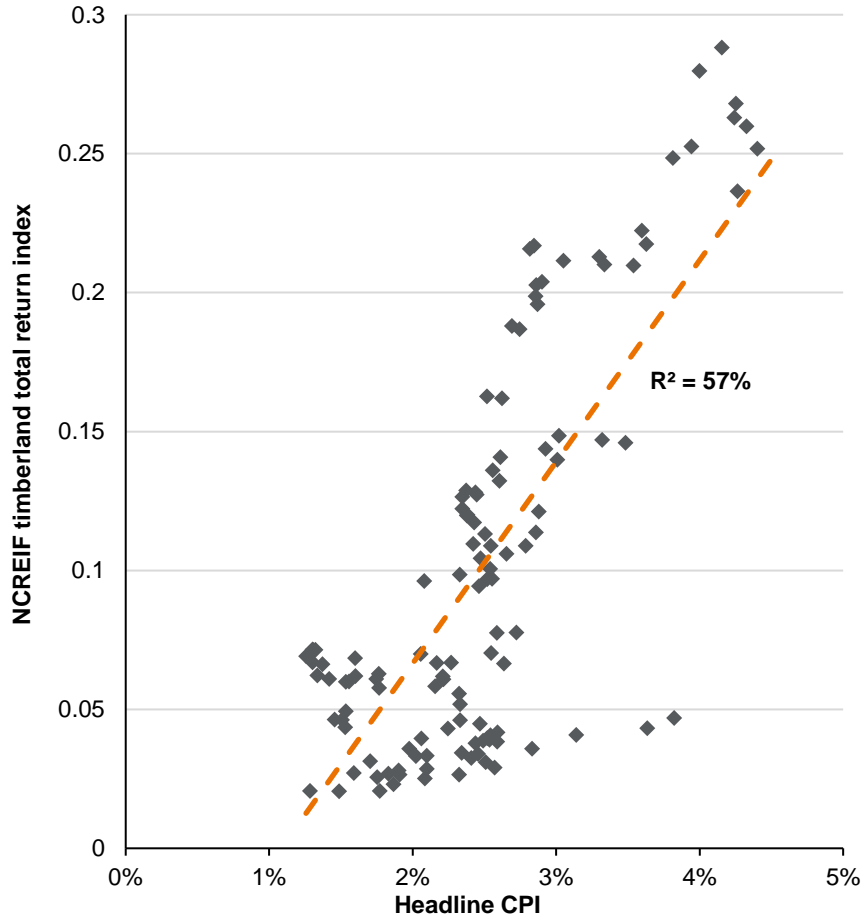
GTA

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Timber returns and inflation

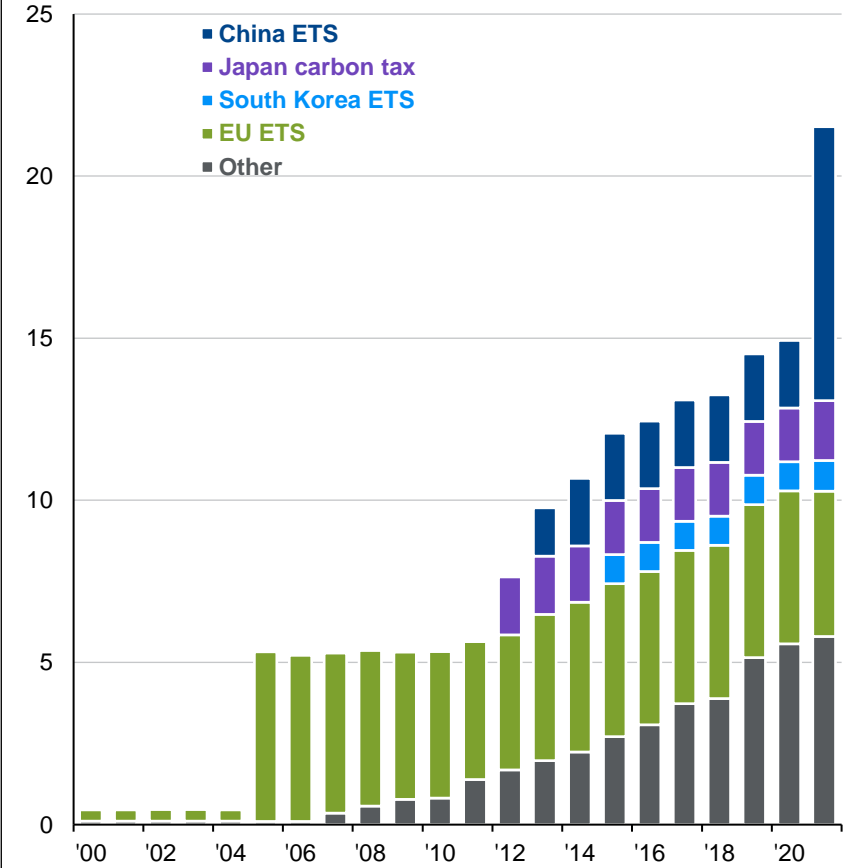
Headline CPI, NCREIF Timberland Index, 5-yr. annualized change



Source: BLS, NCREIF, World Bank, J.P. Morgan Asset Management.
Data is based on availability as of November 30, 2022.

Global emissions covered by carbon pricing initiatives

% of global greenhouse gas emissions

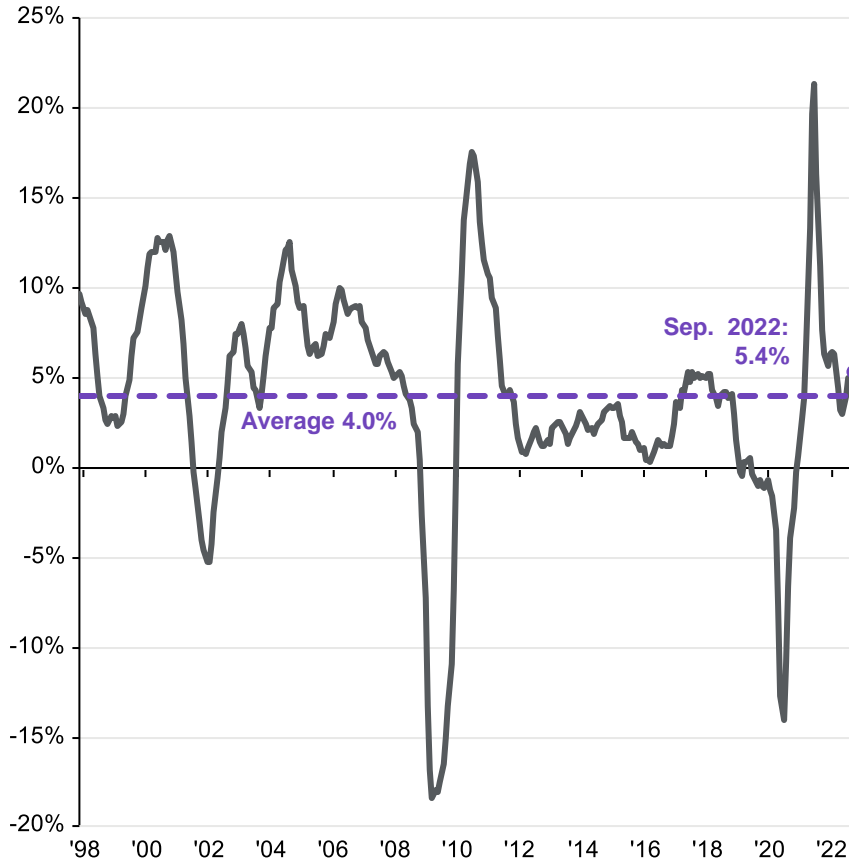




Global trade

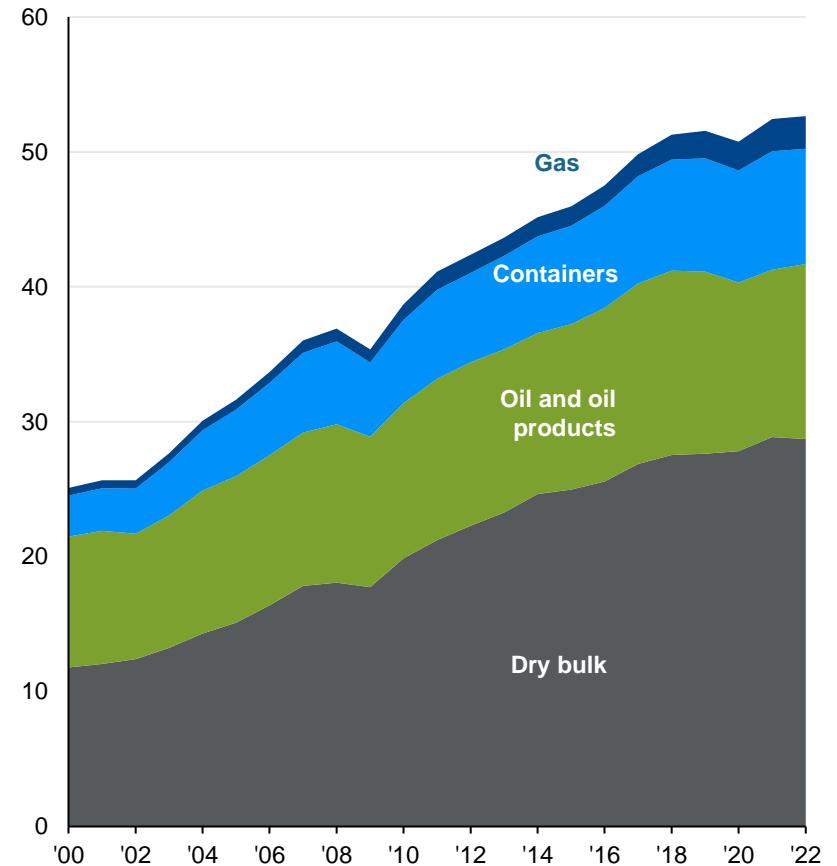
World trade volume

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 November 2022.

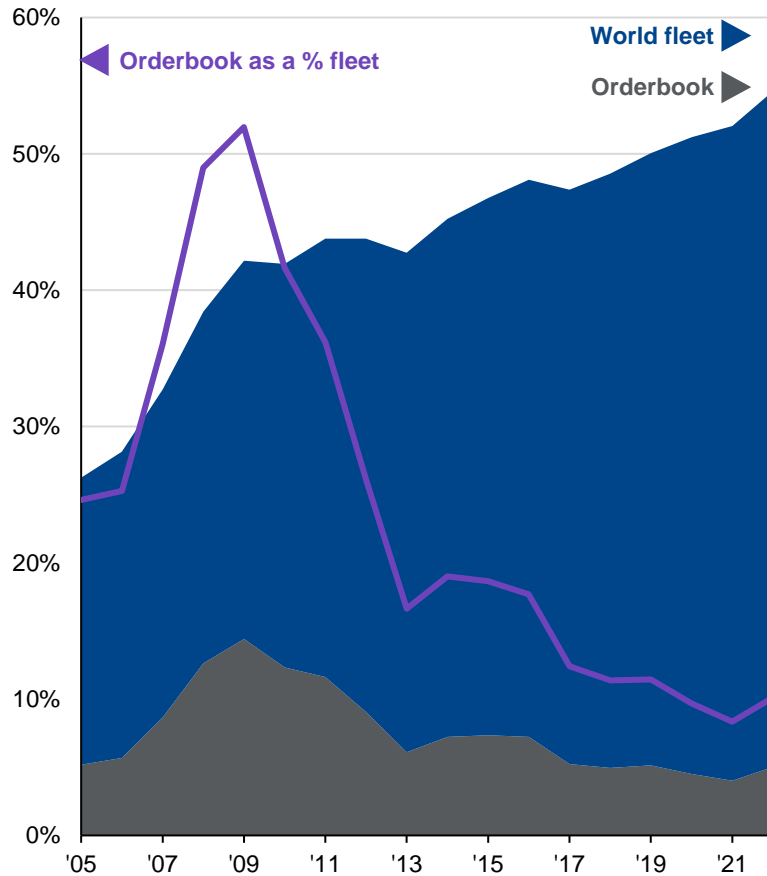
Data is based on availability as of November 30, 2022.



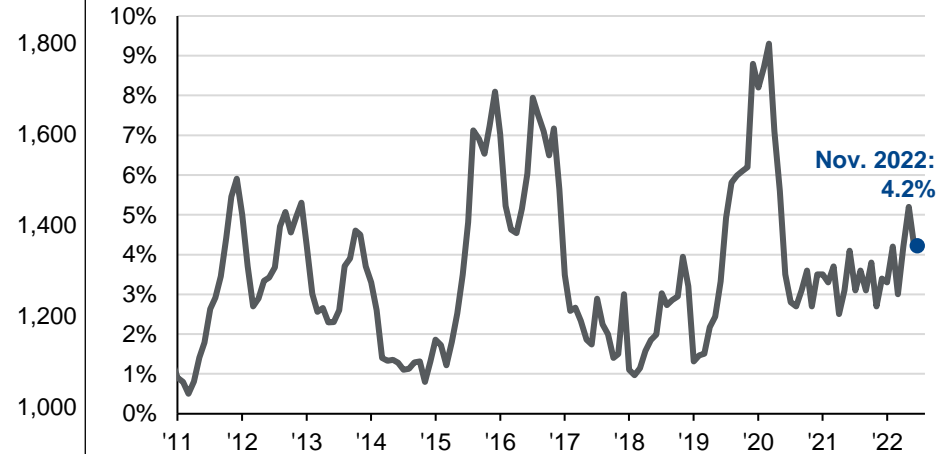
Shipping trends: Orderbook

Global fleet and orderbook

Gross tonnage

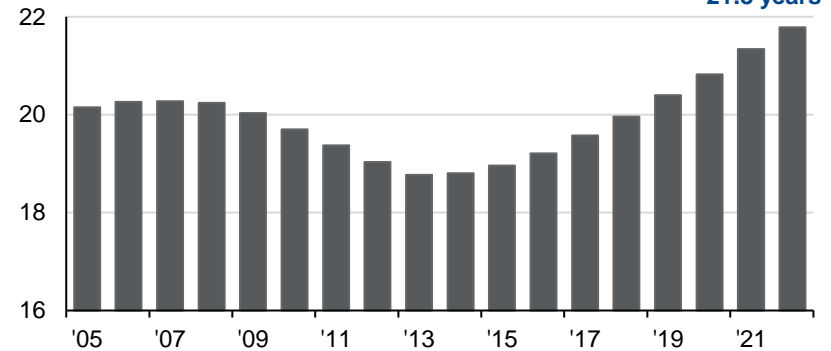


Idle containership capacity as % of fleet



Global fleet age

+100 gross tonnage, years



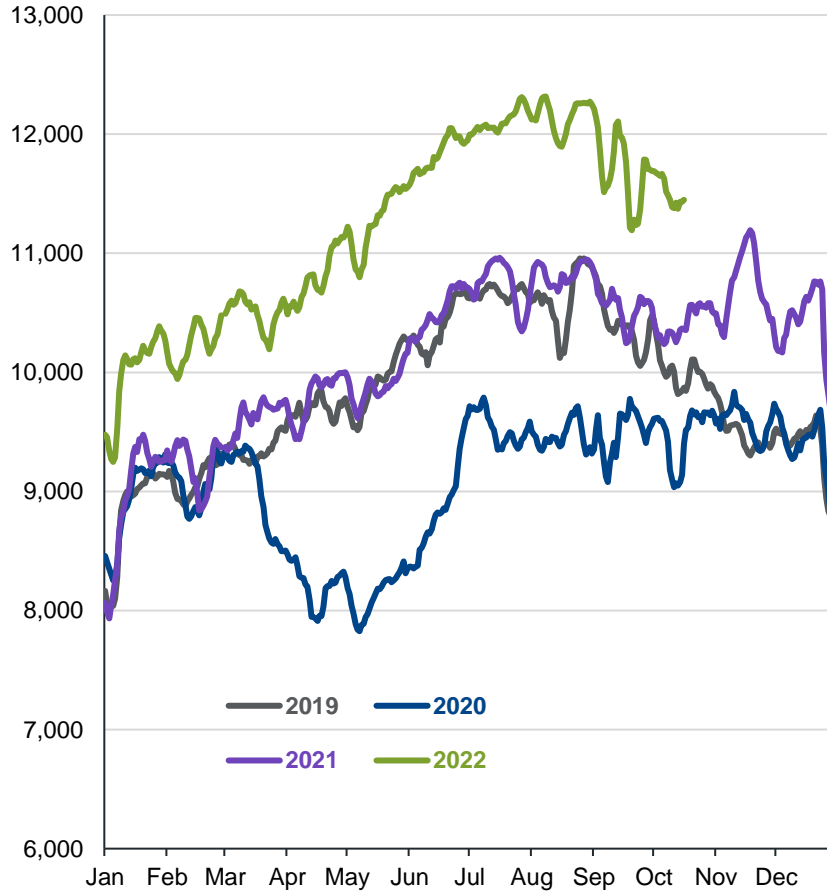
Source: Clarksons Research, MSI, Sea/net, J.P. Morgan Asset Management.
Data is based on availability as of November 30, 2022.



Shipping trends: Port calls

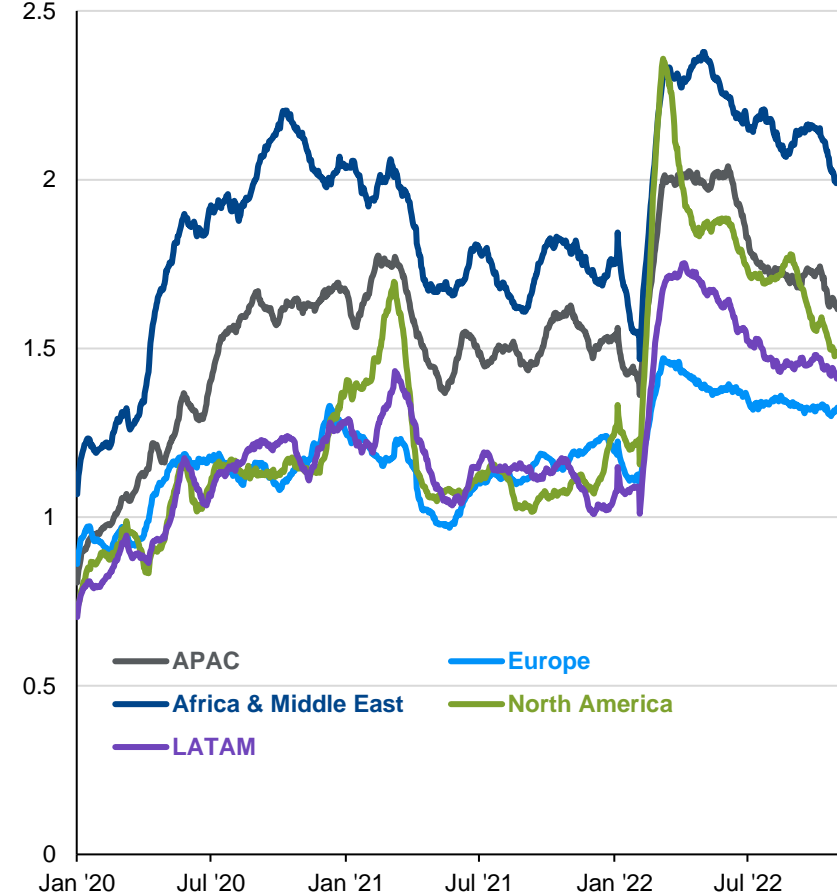
Global port calls*

Number of calls, 7-day moving average



Global port call duration**

Number of days, 30-day moving average



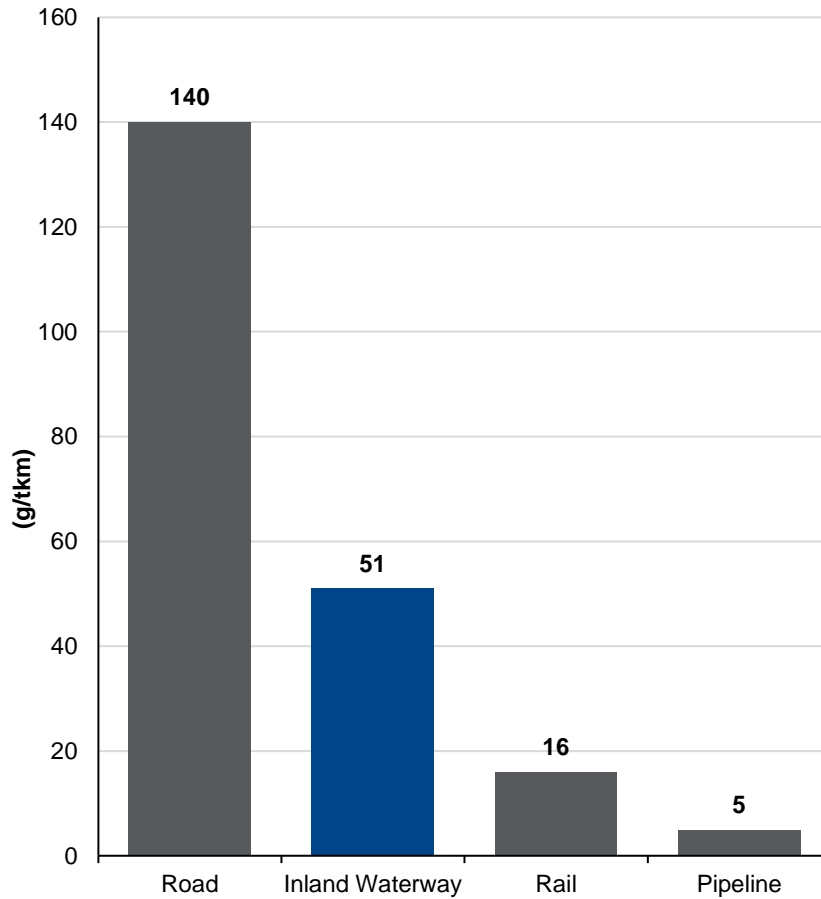
Source: Bloomberg, Clarksons Research, MSI, Sea/net, J.P. Morgan Asset Management. Port calls defined as all instances of a vessel entering and leaving a defined port location, excluding instances where vessel not recorded as travelling at less than 1 knot, and combining multiple consecutive instances 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 is based on availability as of November 30, 2022.



Natural gas trends

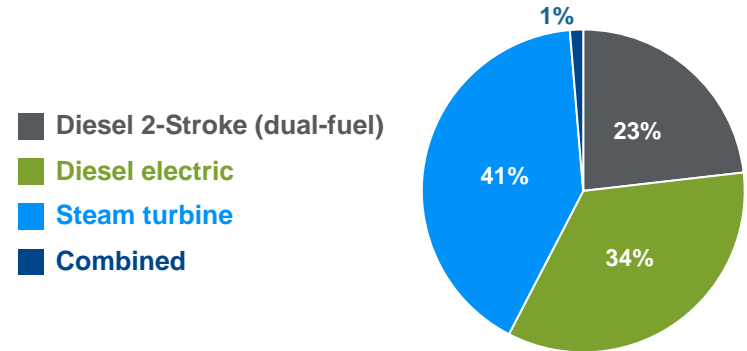
Transport

Average CO2 emissions by mode of transportation



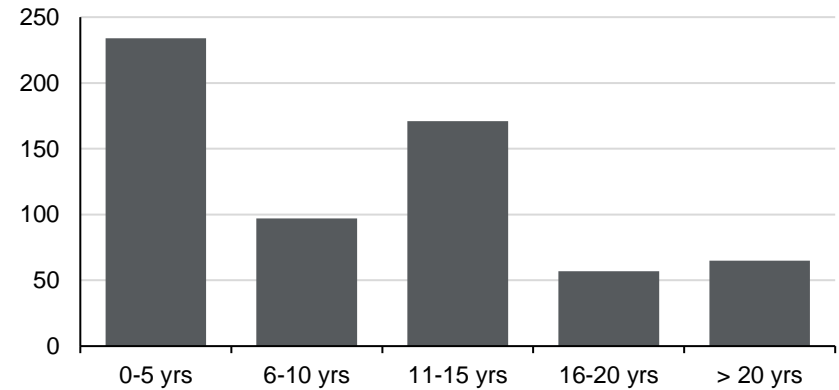
LNG carrier engine types

Share of on-water fleet, 2020



LNG carrier fleet age profile

Number of vessels, 2020



Source: BP Energy Outlook 2020, Clarkson's Research, Deutsche Verkehrs-Zeitung, European Environment Agency, European Chemical Transport Association, Management press, Roland Berger analysis, MSI Horizon, J.P. Morgan Asset Management.
Data is based on availability as of November 30, 2022.



Wind power

GTA

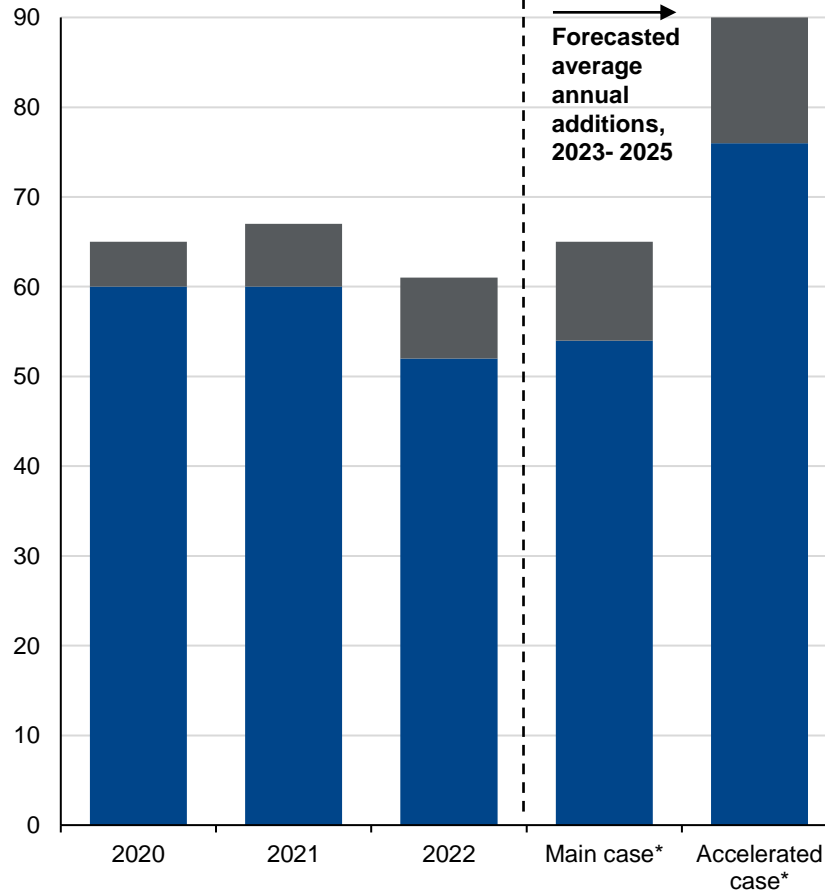
U.S.

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Transport

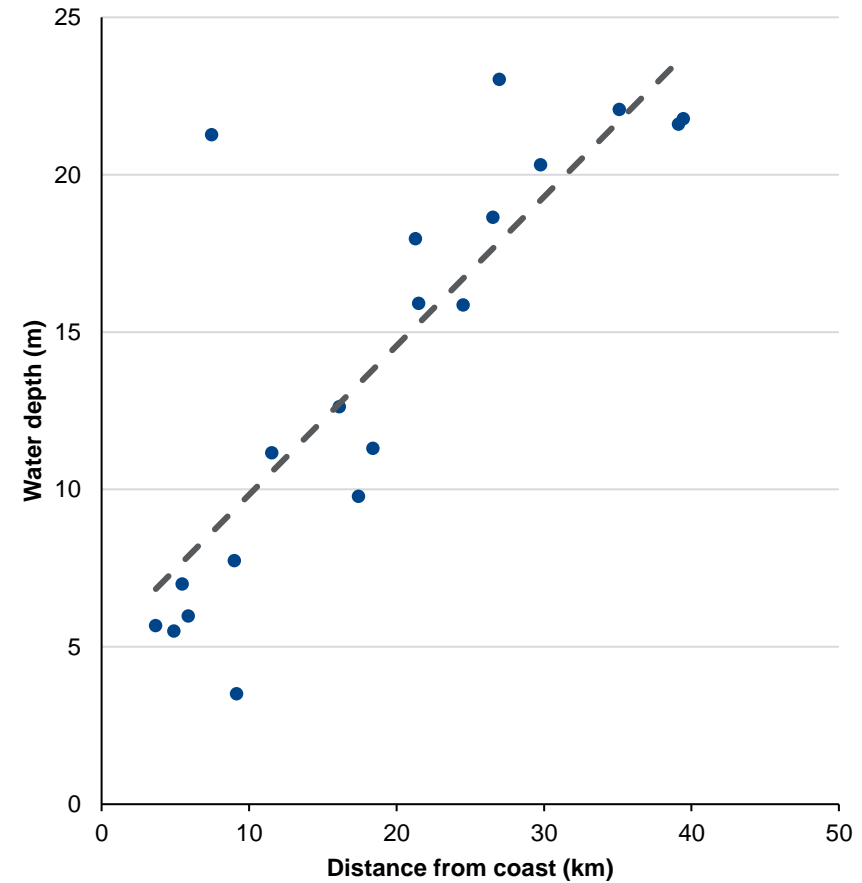
Global wind net capacity additions

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 is based on availability as of November 30, 2022.



Aircraft trends

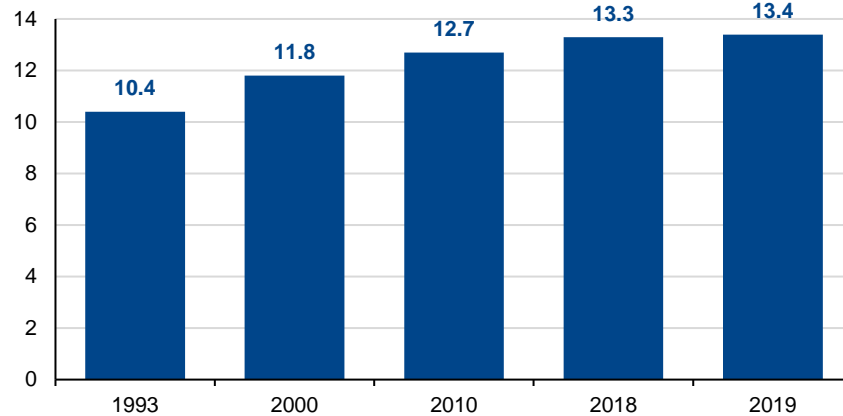
GTA

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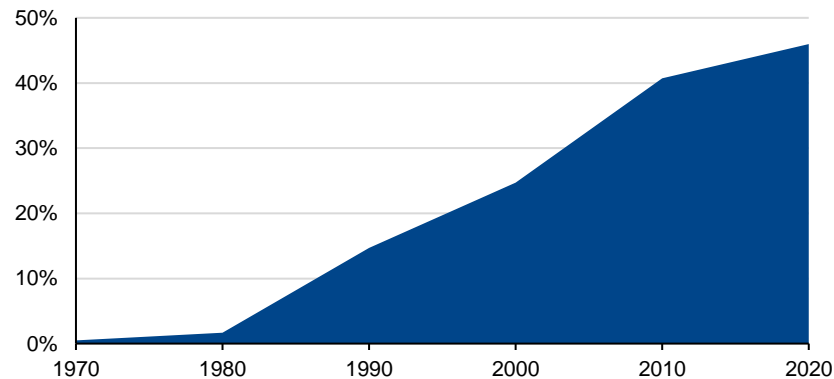
Average age of major airline aircraft

Years, U.S.



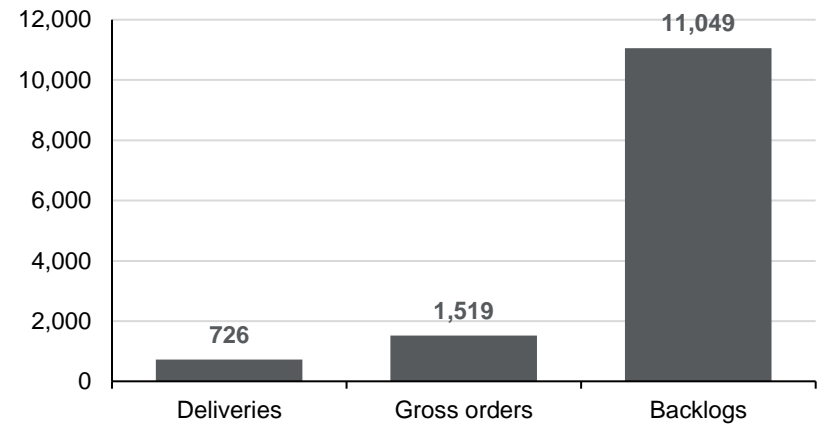
Percent of industry wide aviation fleet leased*

Global



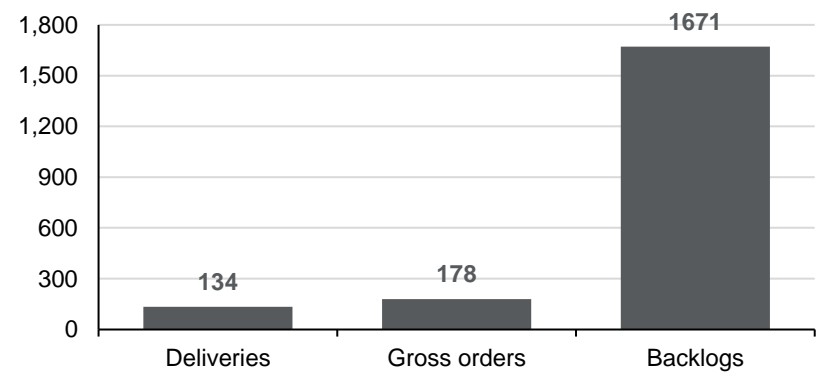
Narrow-body aircraft demand**

Year-to-date October 2022, number



Wide-body aircraft demand**

Year-to-date October 2022, 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 is based on availability as of November 30, 2022.



U.S. public vs. private equity

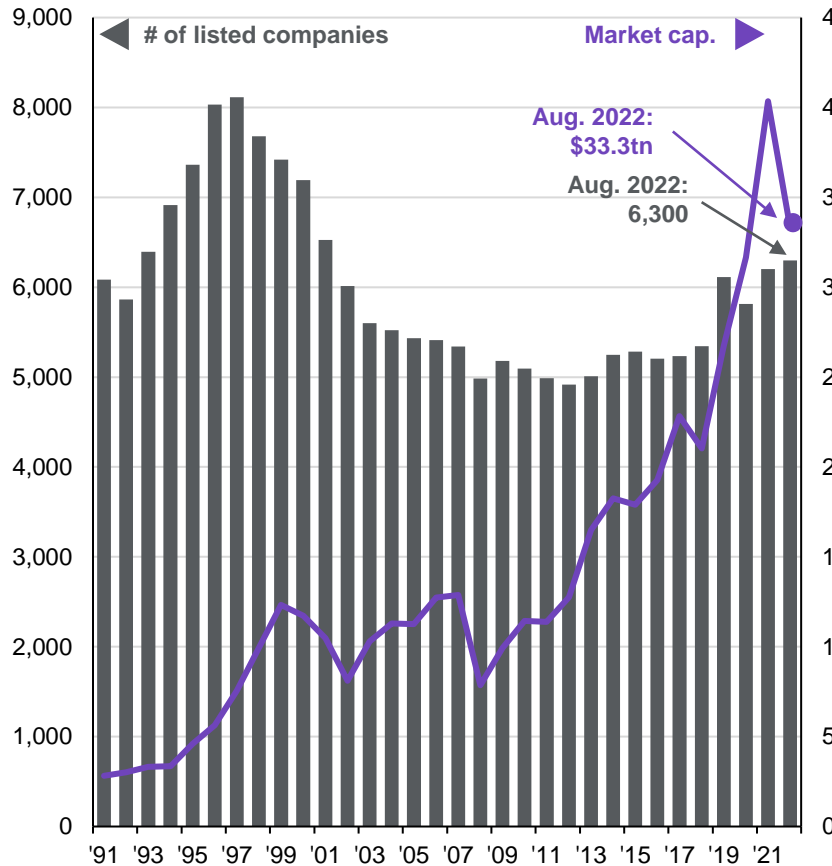
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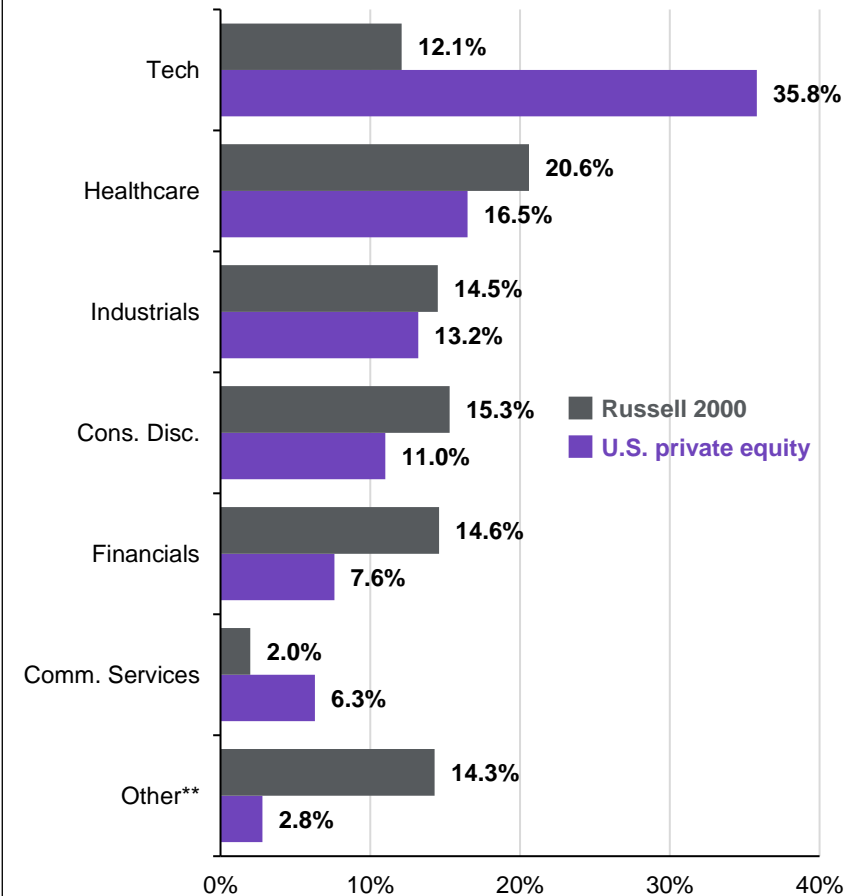
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Number of listed U.S. companies* and market cap.

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 is based on availability as of November 30, 2022.



Business activity

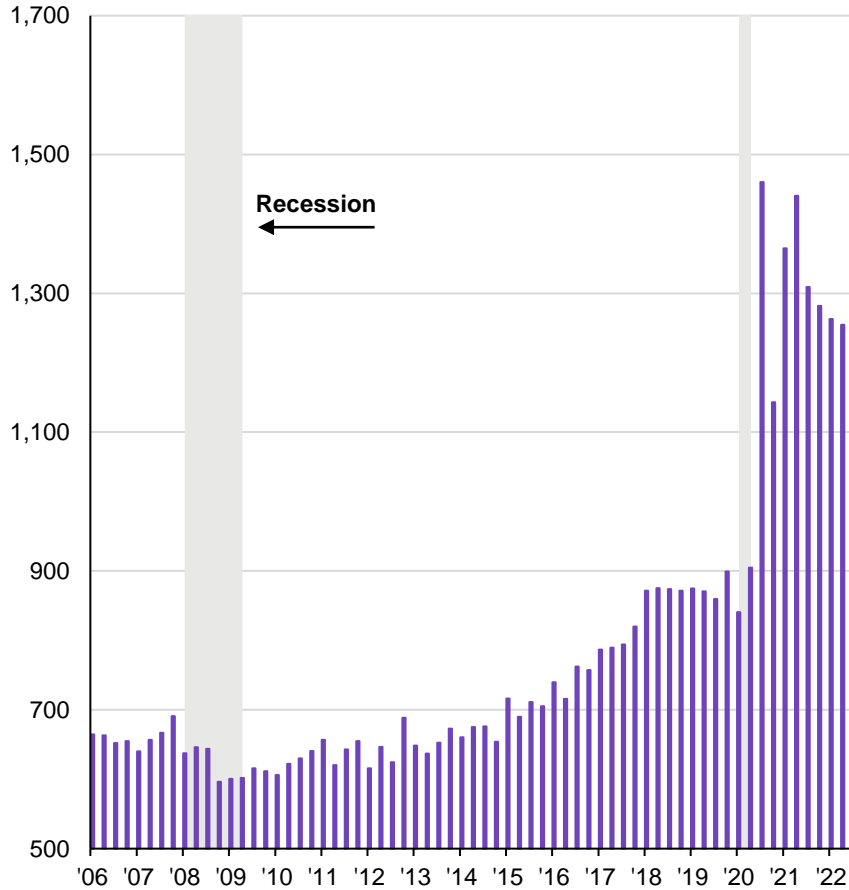
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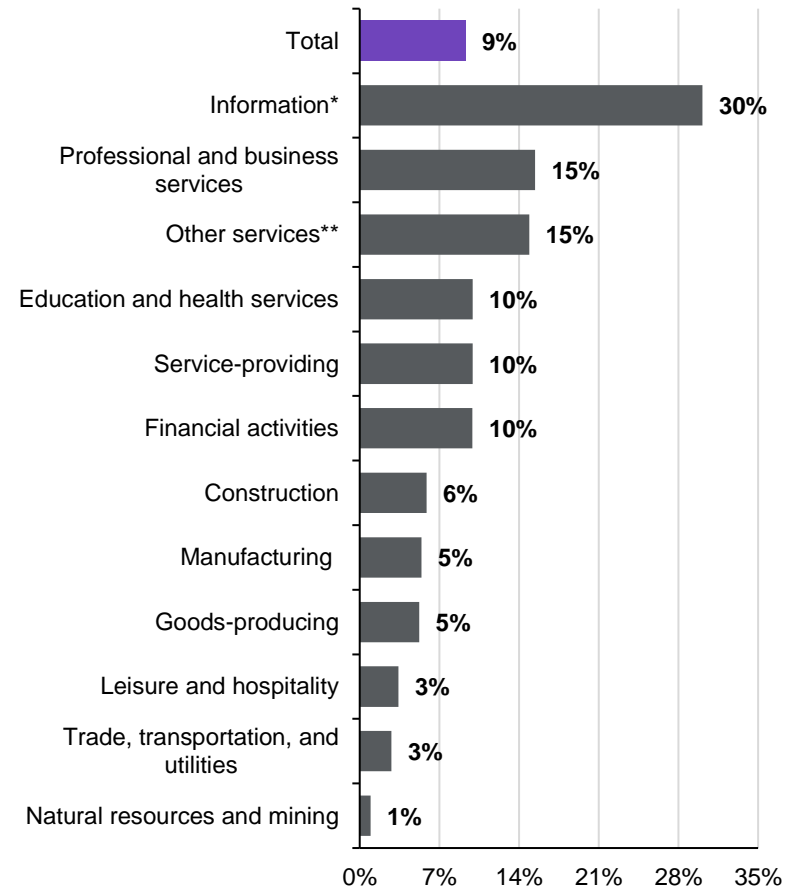
U.S. applications for business formation

Seasonally adjusted, thousands



Growth in business establishments by private industry

December 2019 – March 2022



Source: Bureau of Labor Statistics, U.S. Census Bureau, J.P. Morgan Asset Management. Business formation data are as of 3Q22. *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, 2022.



Private equity valuations

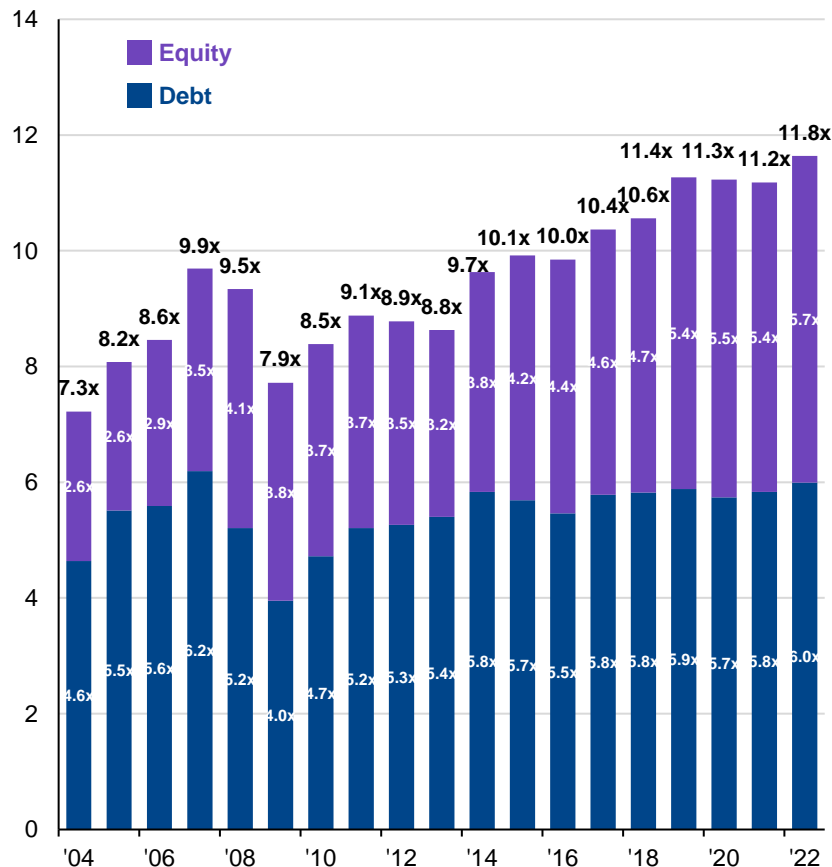
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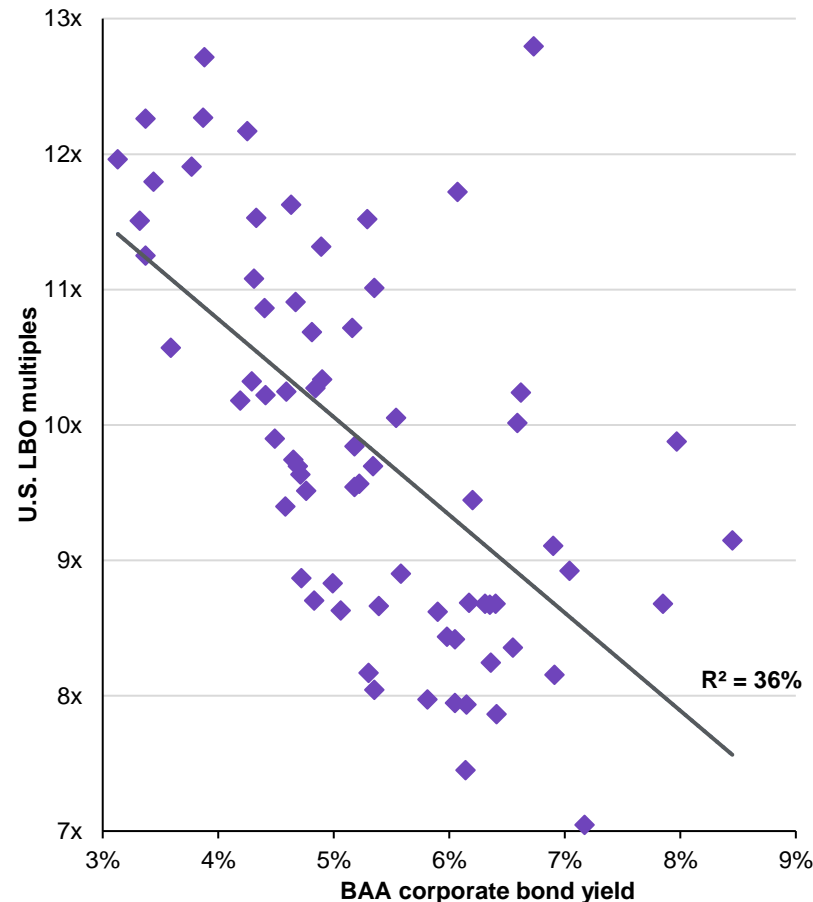
U.S. LBOs: purchase price multiples

Equity and debt over trailing EBITDA



U.S. LBO multiples and BAA corporate bond yields

Quarterly, 2005 – 3Q22



Source: PitchBook, LCD, J.P. Morgan Asset Management. Purchase price multiples are as of September 30, 2022. Data is based on availability as of November 30, 2022.



Private equity deals and exits

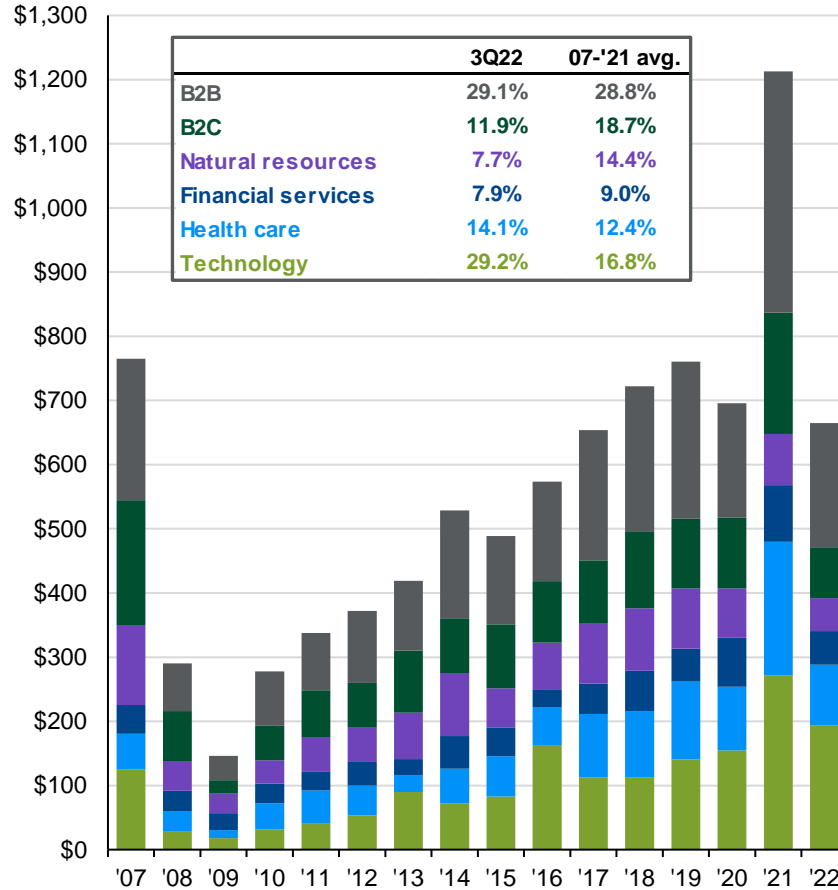
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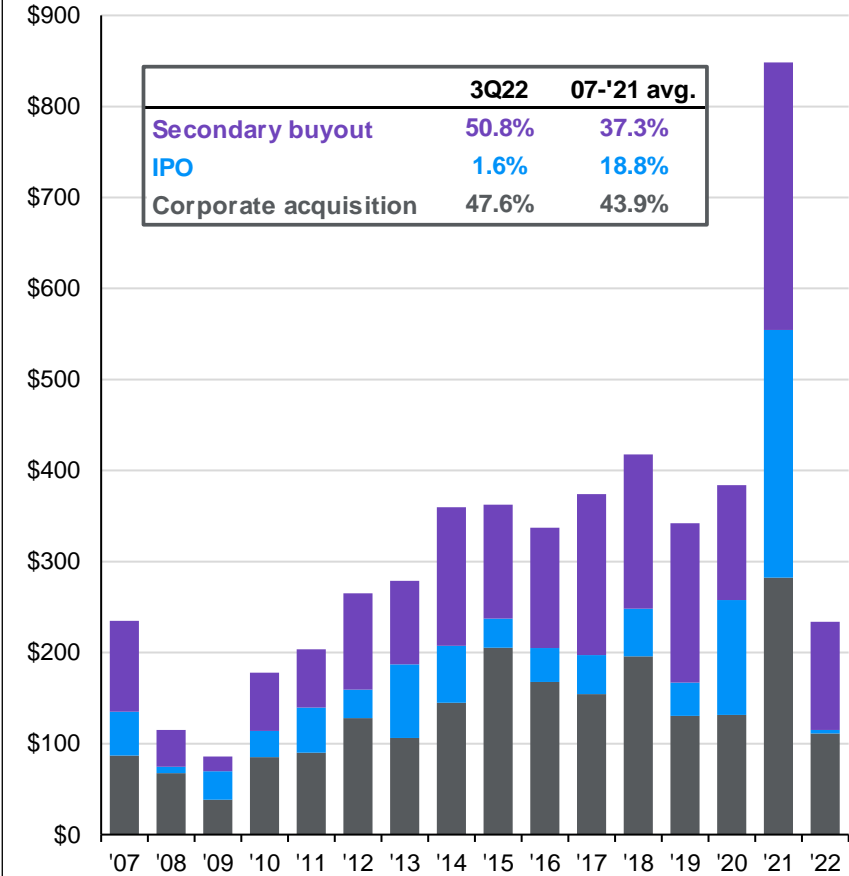
U.S. private equity deals

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 September 30, 2022.

Data is based on availability as of November 30, 2022.

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Energy deal trends, spending and consumption

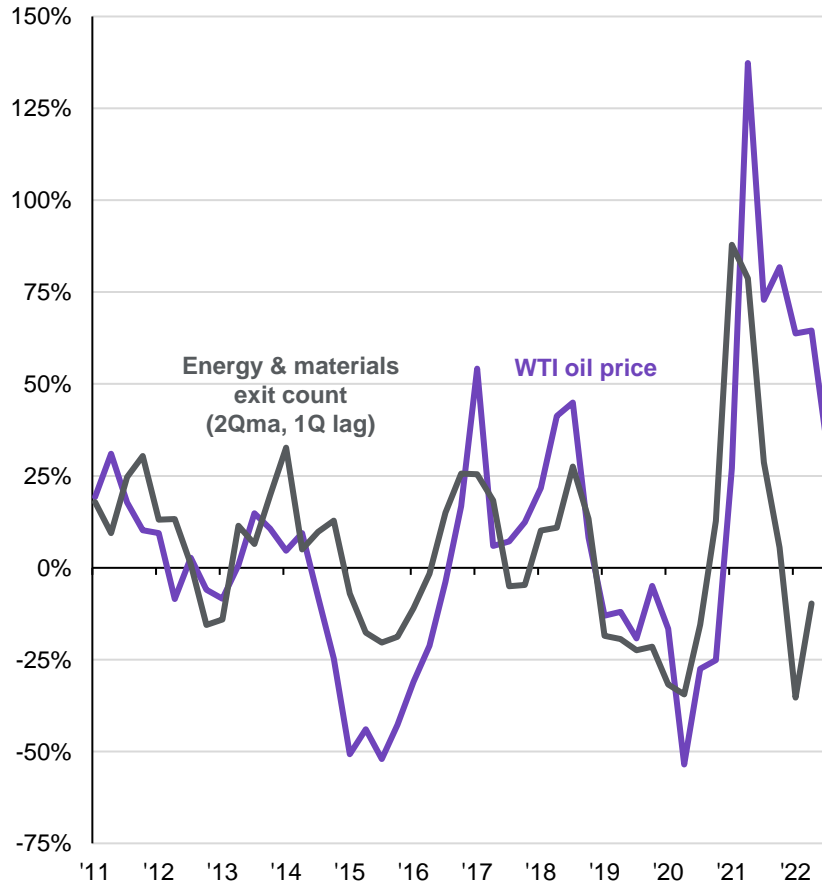
GTA

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41

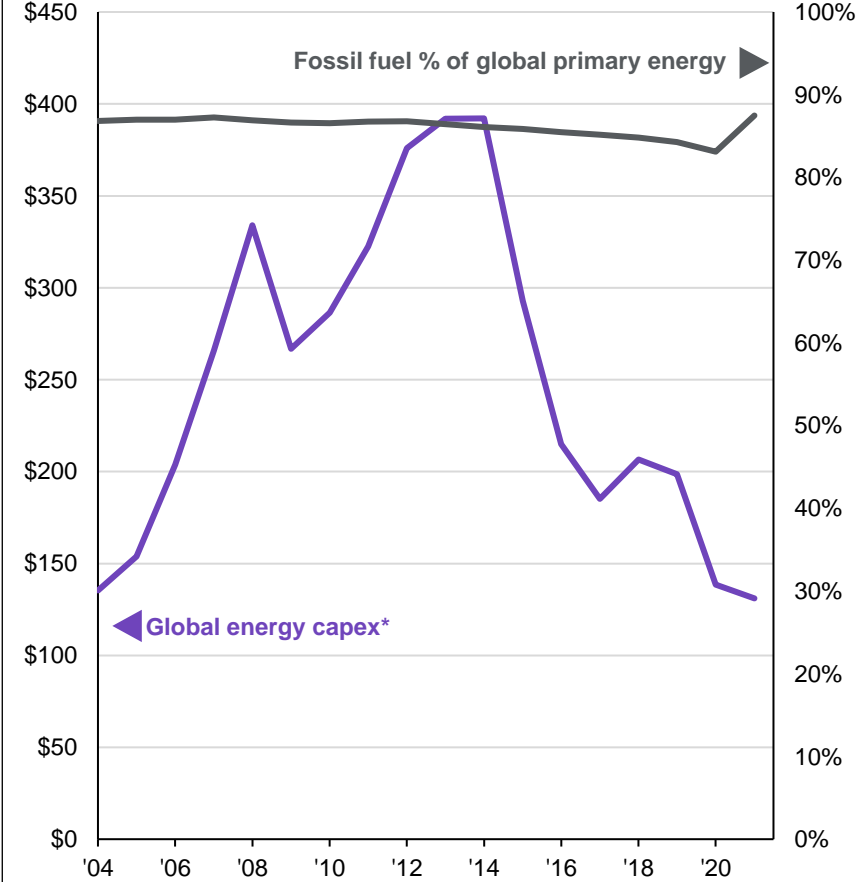
Oil prices and natural resource exits

Energy & material exits count, WTI oil price, y/y % change



Global primary energy use and energy capex

USD billions, fossil fuel use as % of global primary energy



Source: BP, 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, 2022. *Global capex is represented by aggregate capital expenditures for the S&P Global 1200 Energy Index. 2021 global primary energy data is a forecasted value.

Data is based on availability as of November 30, 2022.

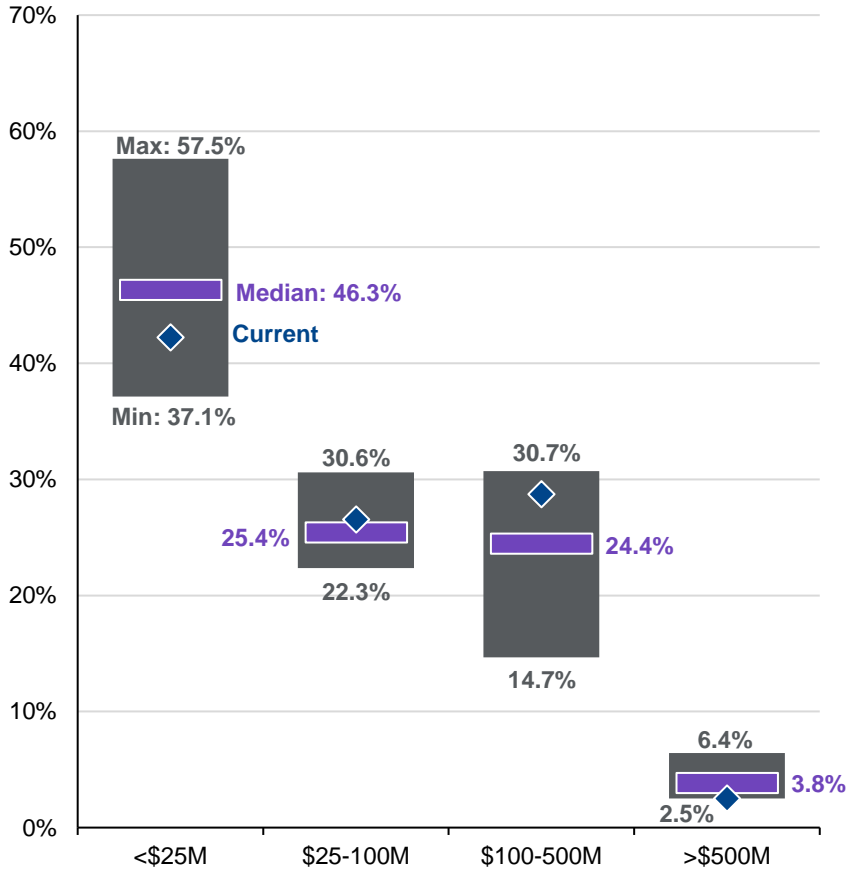


Private equity deals by size and type

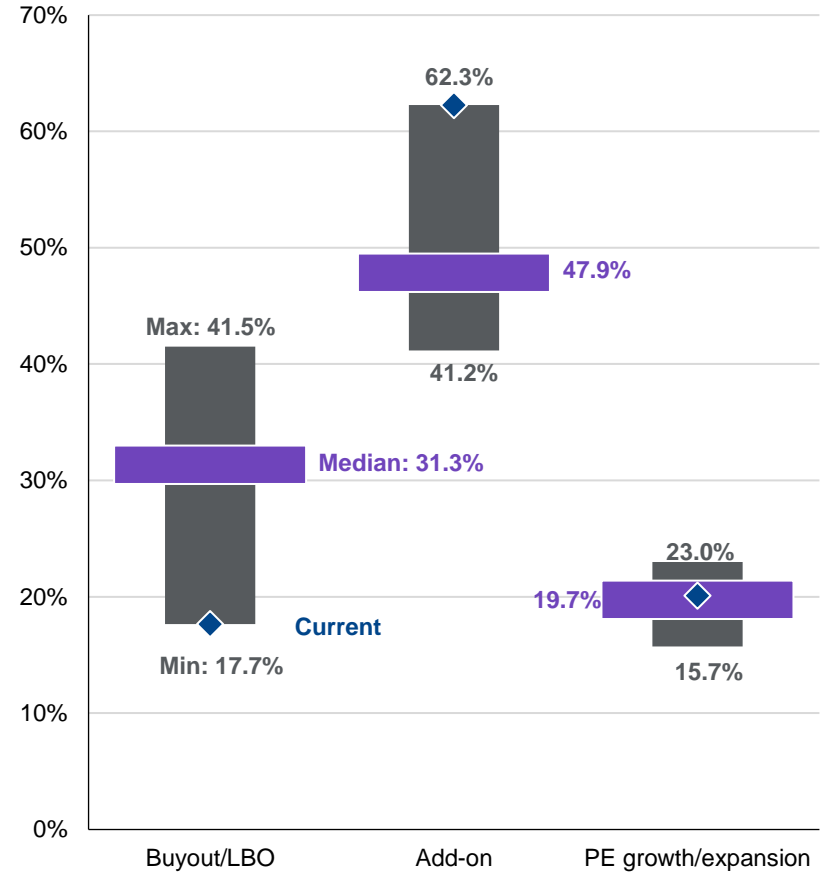
GTA U.S. 42

Private markets

U.S. private equity deals by size
% of total deals, 2007 – 3Q22



U.S. private equity deals by type
% of total deals, 2007 – 3Q22



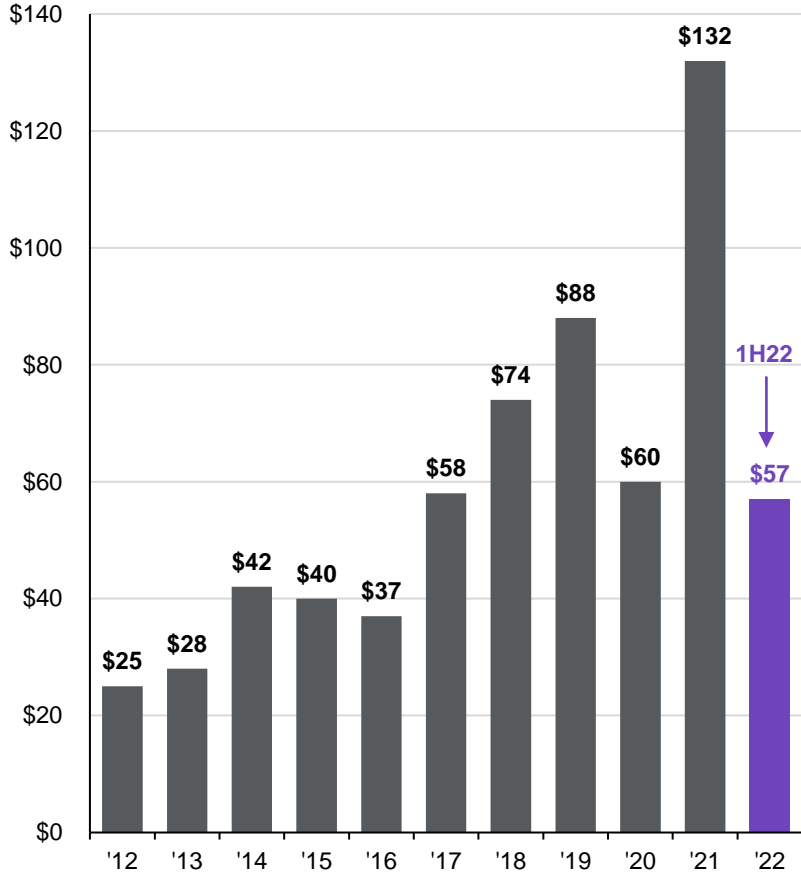
Source: PitchBook, J.P. Morgan Asset Management.
Private equity deal size and type activity are as September 30, 2022.
Data is based on availability as of November 30, 2022.



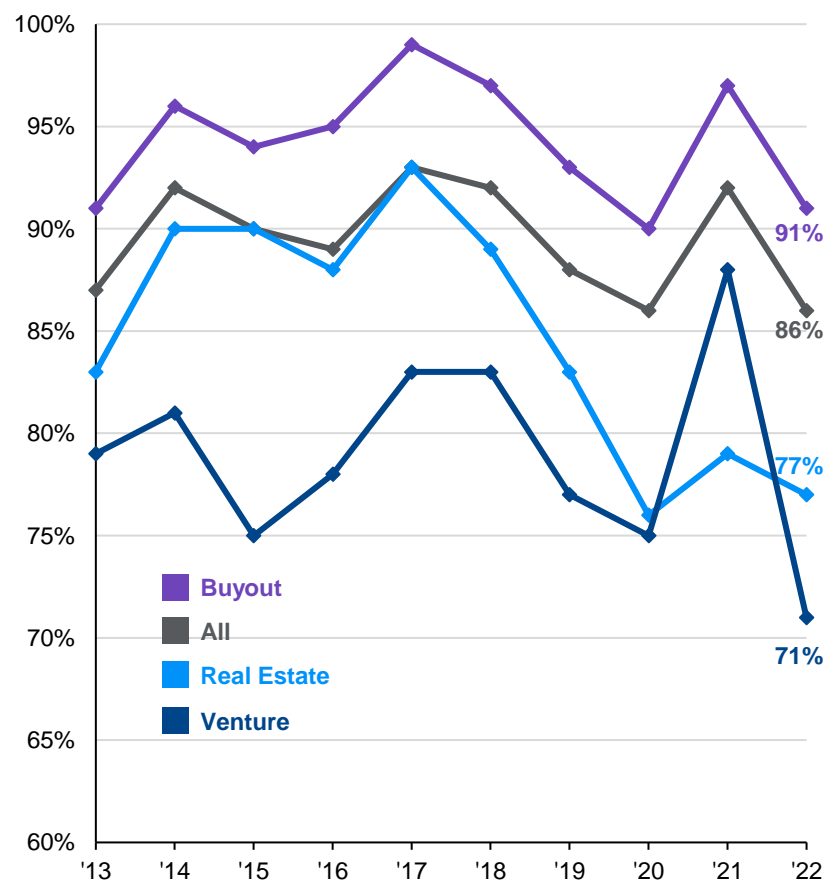
Secondary market

Private markets

Secondary market volume
USD billions



Secondary pricing*
Percent of net asset value (NAV)



Source: Greenhill, Jefferies, J.P. Morgan Asset Management. 2022 secondary data is through 1H2022. *Secondary pricing of LP portfolios. Data is based on availability as of November 30, 2022.



Venture capital

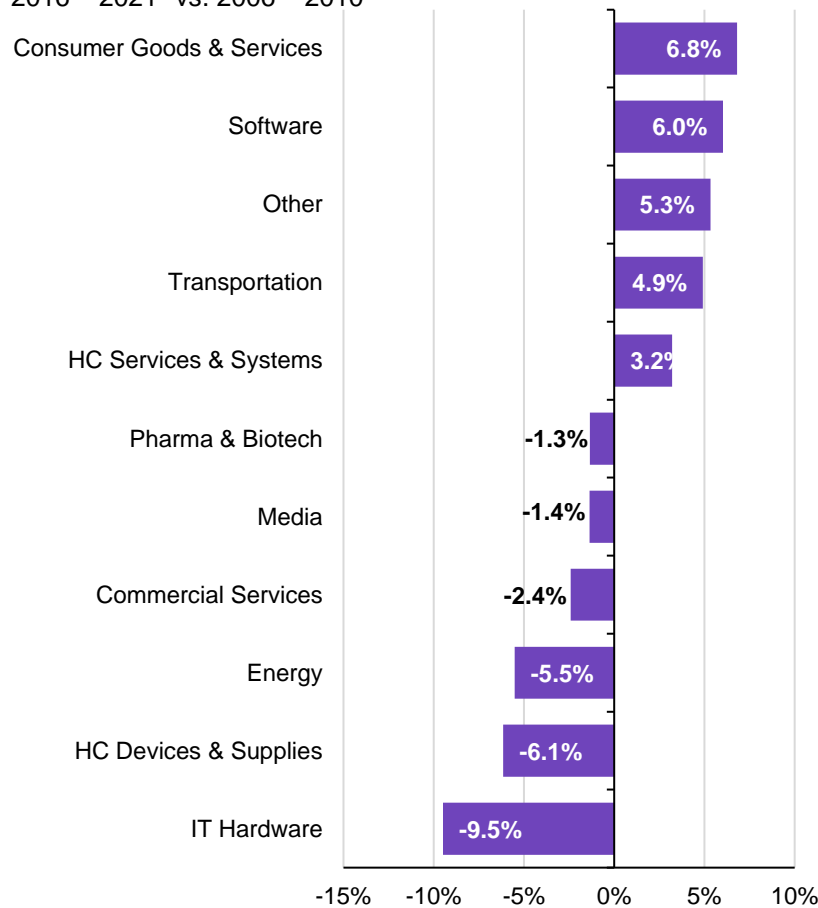
GTA

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44

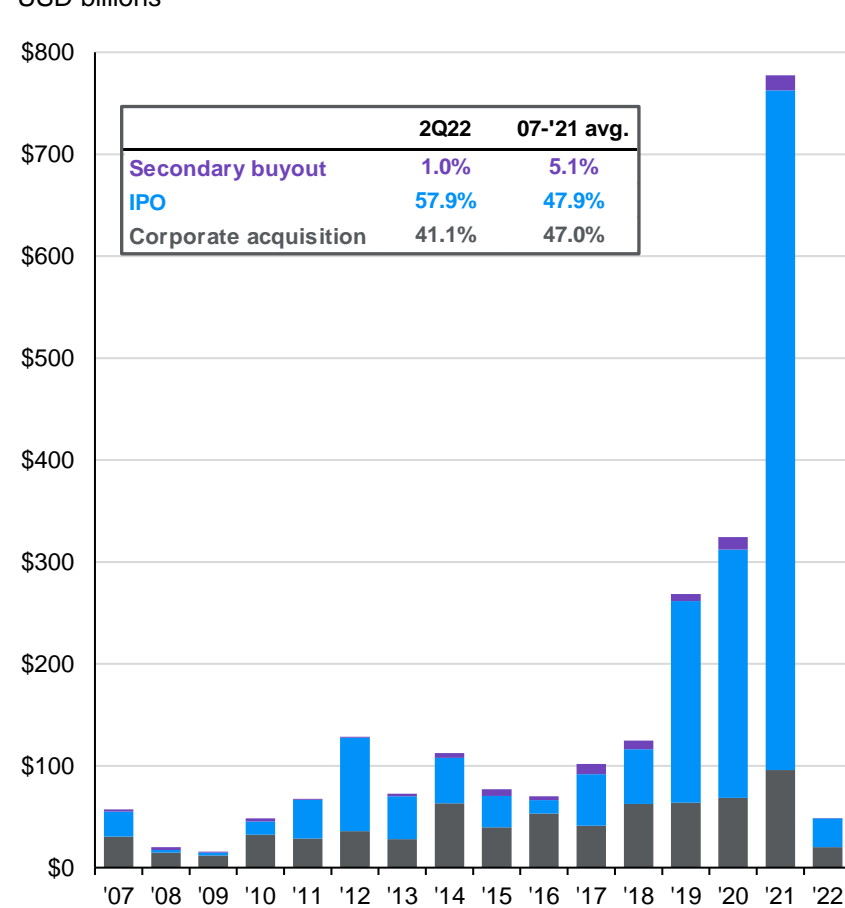
Change in share of VC investments by industry

2016 – 2021* vs. 2006 – 2010



Venture capital exits by type

USD billions



Source: PitchBook, J.P. Morgan Asset Management. *Venture capital investment by industry data is as of June 30, 2021. Venture capital exit data is as of June 30, 2022. Percentages may not sum to 100 due to rounding. Data is based on availability as of November 30, 2022.



Global M&A

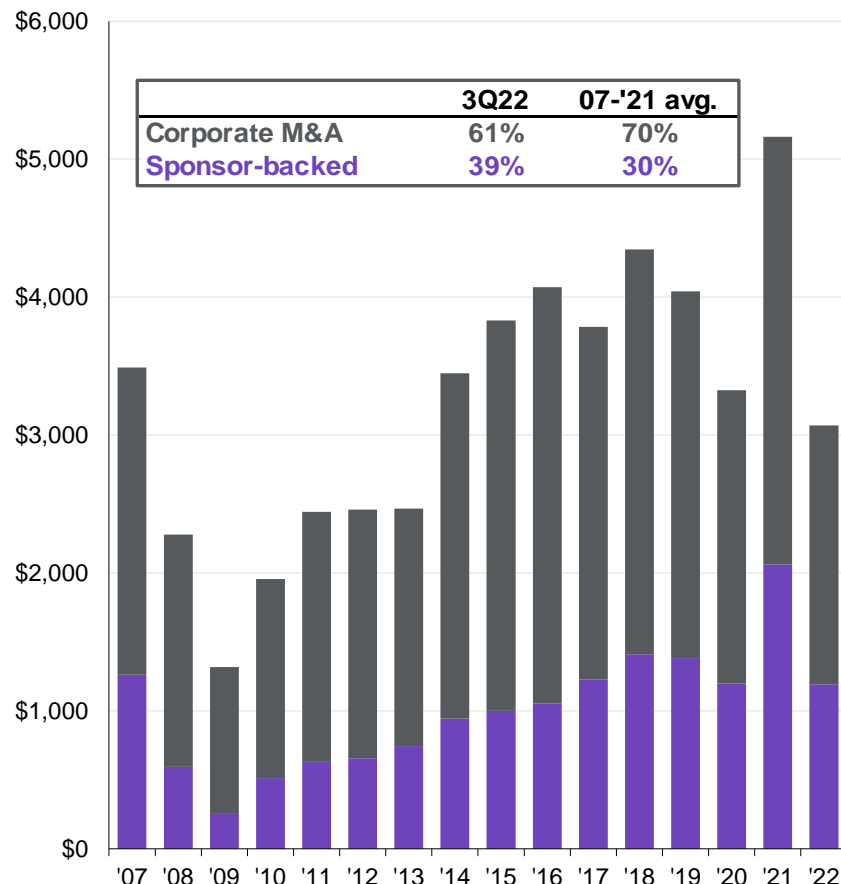
GTA

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45

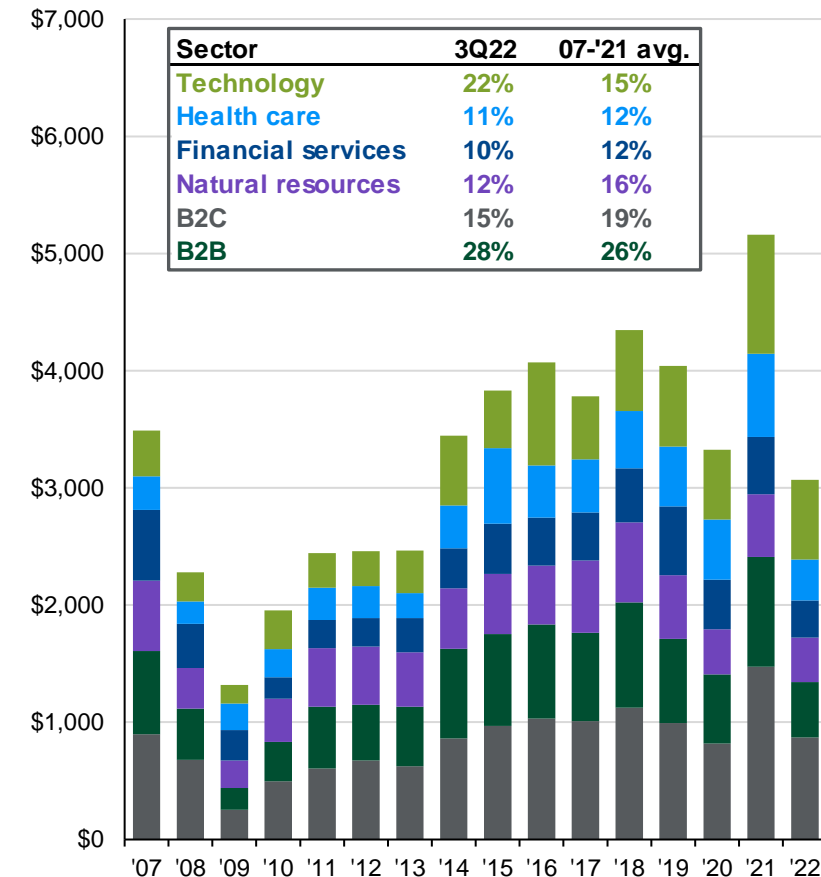
Global M&A by acquirer type

USD billions



Global M&A by sector

USD billions



Source: PitchBook, J.P. Morgan Asset Management. M&A by sector data are as of September 30, 2022. M&A deal data by acquirer type are as of September 30, 2022. Percentages may not sum to 100 due to rounding. Data is based on availability as of November 30, 2022.



Growth equity

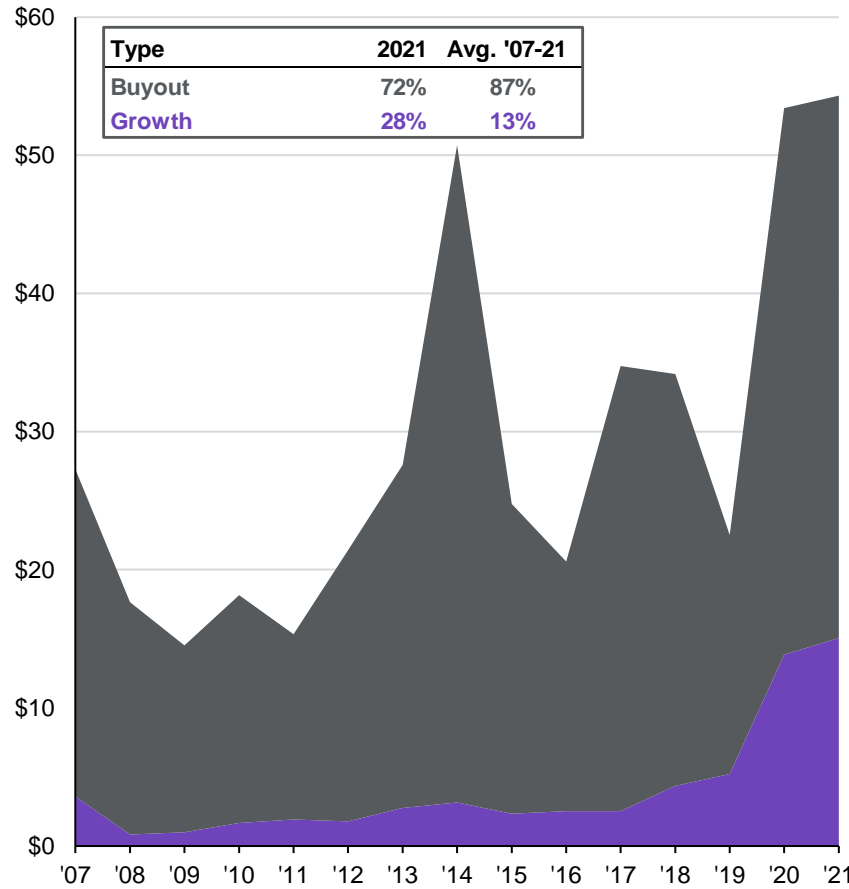
GTA

U.S.

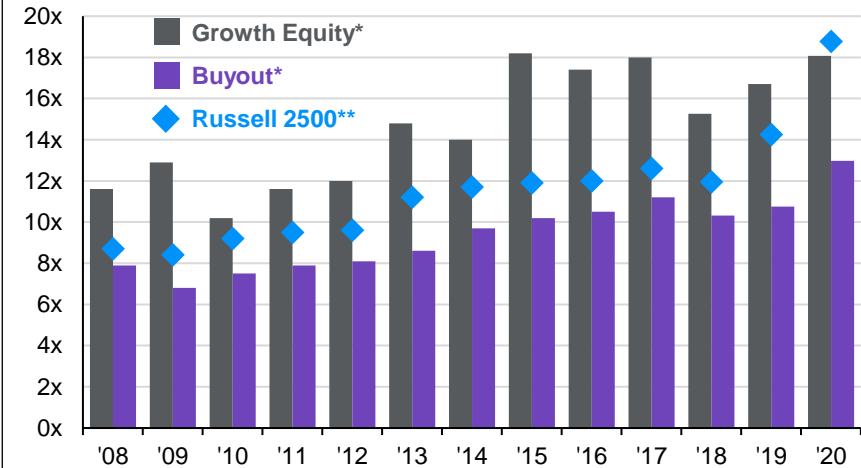
46

U.S. growth equity deal activity by investor type

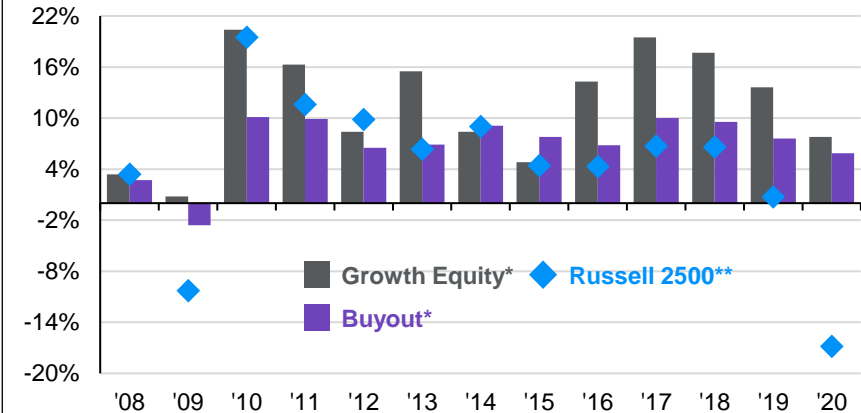
Total deal value, USD billions



Average LTM EBITDA purchase multiple



Average annual EBITDA growth rates



Source: Cambridge Associates, FactSet, Frank Russell Company, PitchBook, J.P. Morgan Asset Management. (Left) U.S. growth equity activity data is through 12/31/2021. (Right) 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. (Top right) The analysis includes 1,408 buyout companies and 393 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, 2022.

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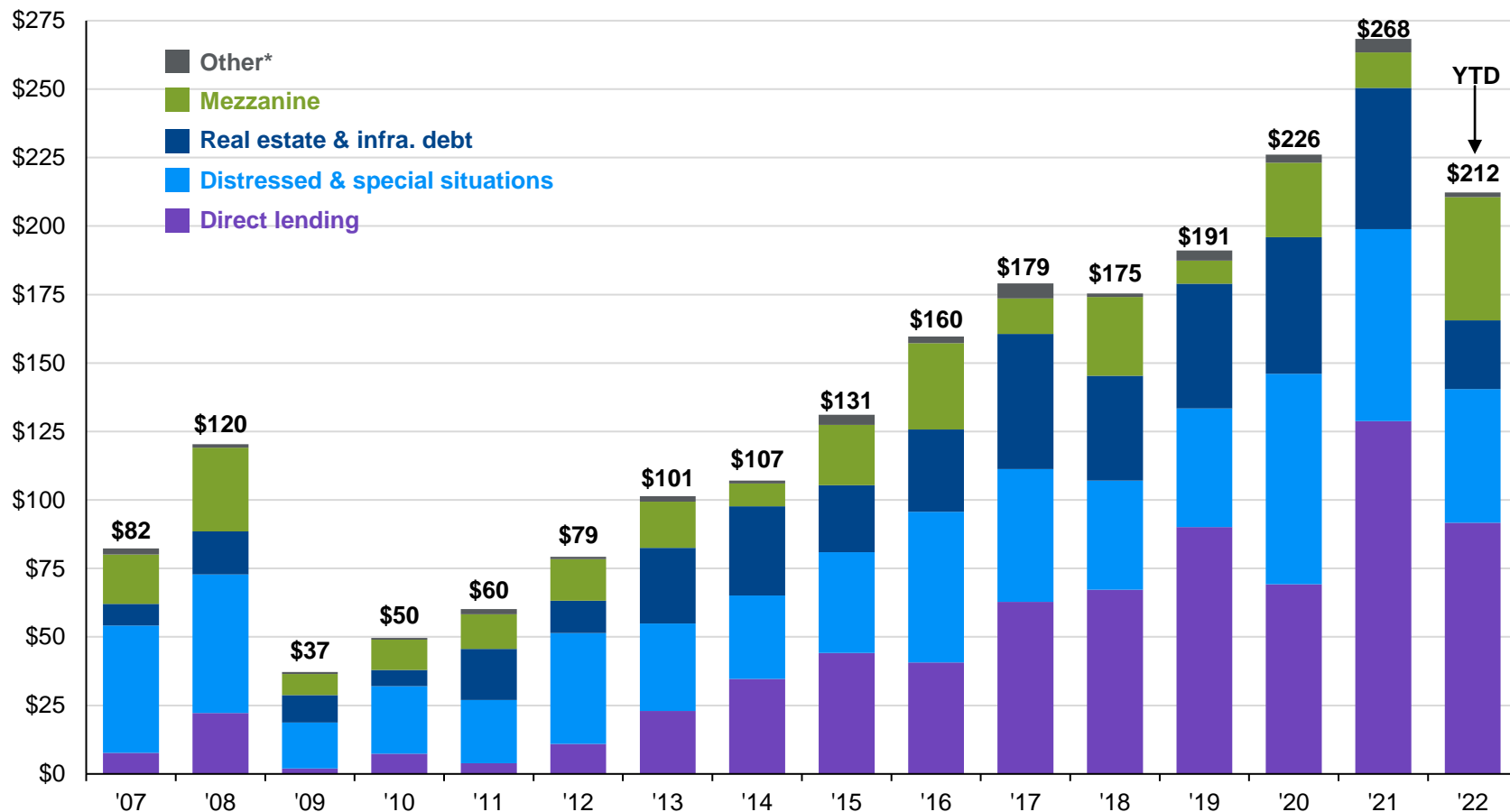


Private debt fundraising

GTA U.S. 47

Private debt fundraising by type

USD billions



Sources: Preqin, J.P. Morgan Asset Management. *Other includes venture debt and fund of funds. 2022 fundraising figures are year-to-date and based on availability as of November 2022.
Data is based on availability as of November 30, 2022.



Credit market participants and sources of financing

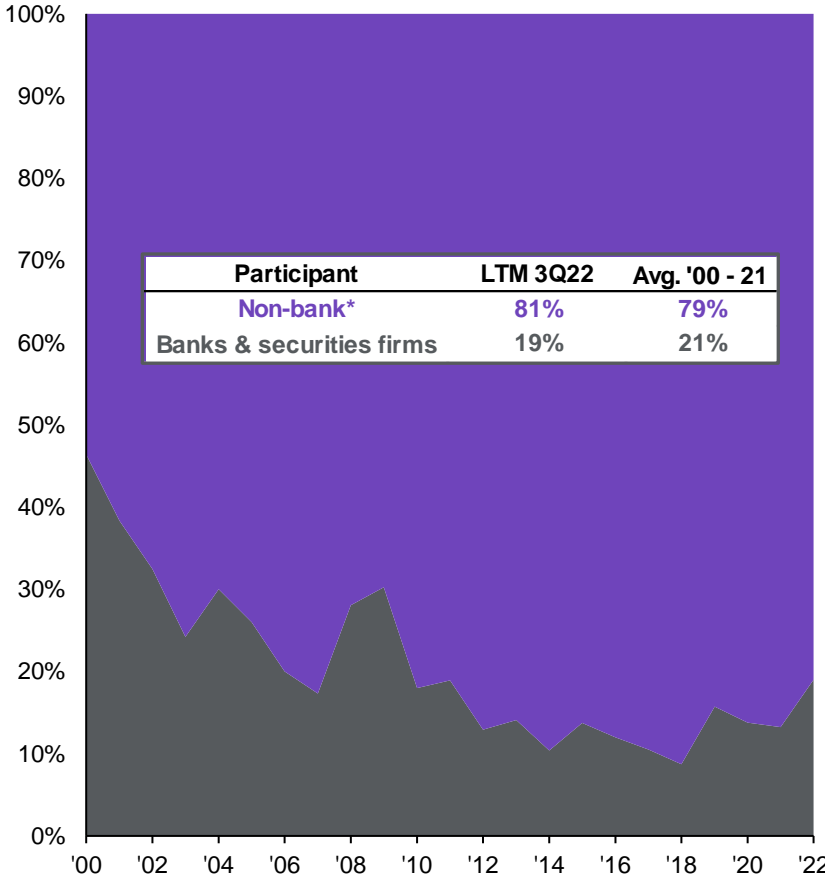
GTA

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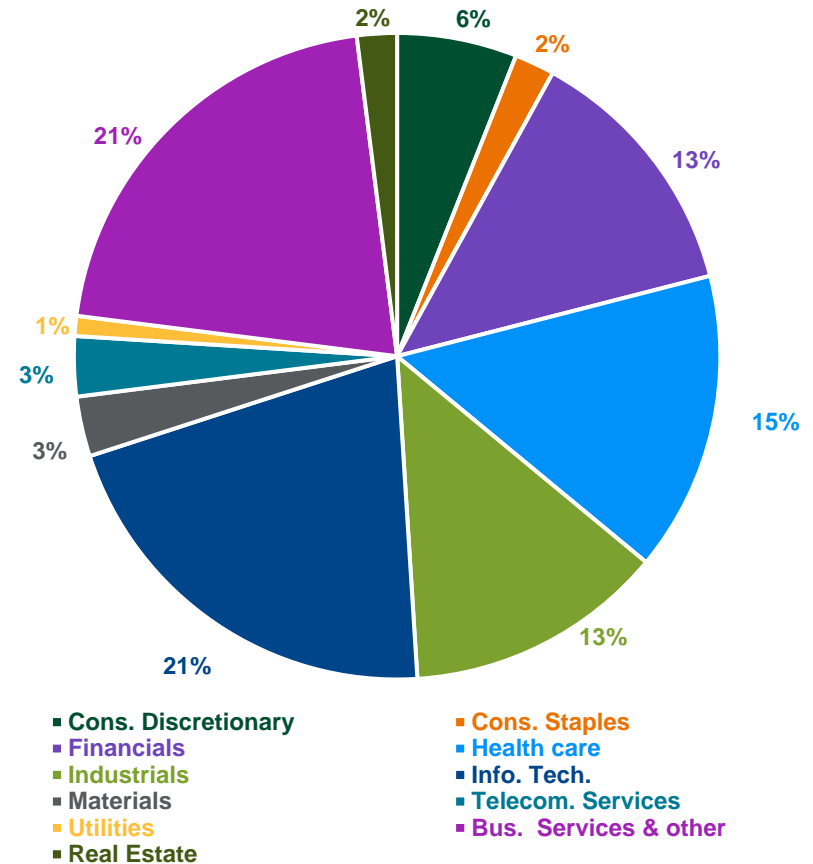
U.S. leveraged loan market participants

Share of total market, percent



Direct lending industry composition

3Q22



Source: LCD, Cliffwater, J.P. Morgan Asset Management.

U.S. leveraged loan market participants data is as of September 30, 2022. *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, 2022.



Credit returns across recent economic cycles: 2004 – 3Q22

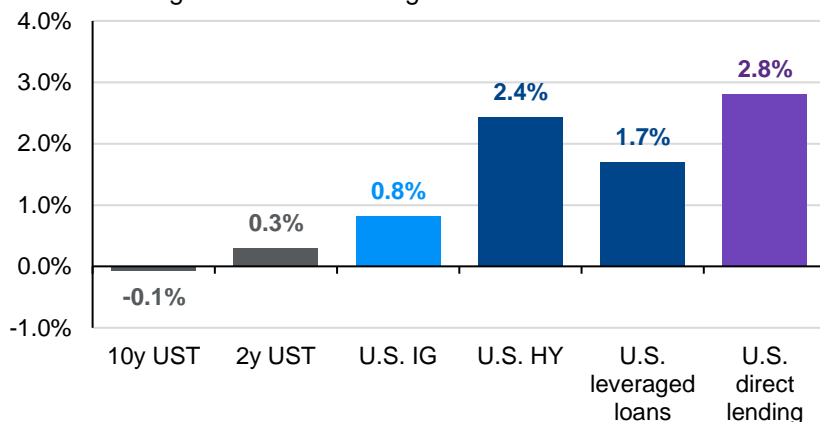
GTA

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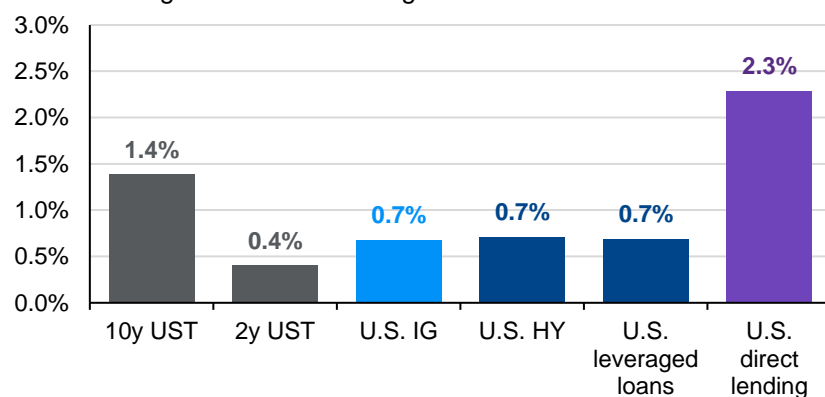
Expansion

Manufacturing ISM > 50 and rising



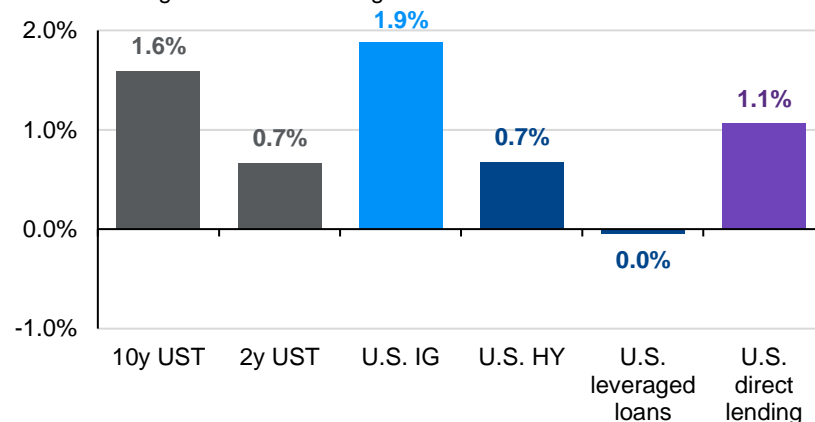
Late cycle cooling

Manufacturing ISM > 50 and falling



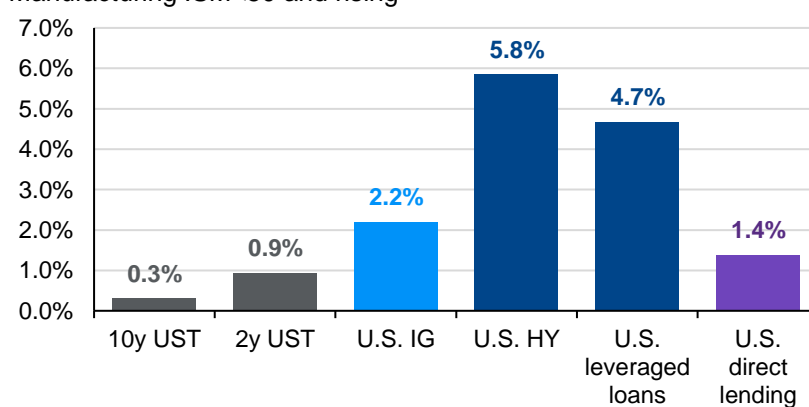
Recession

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 9/30/2022.

Data is based on availability as of November 30, 2022.



Drawdown dispersion and recovery rates

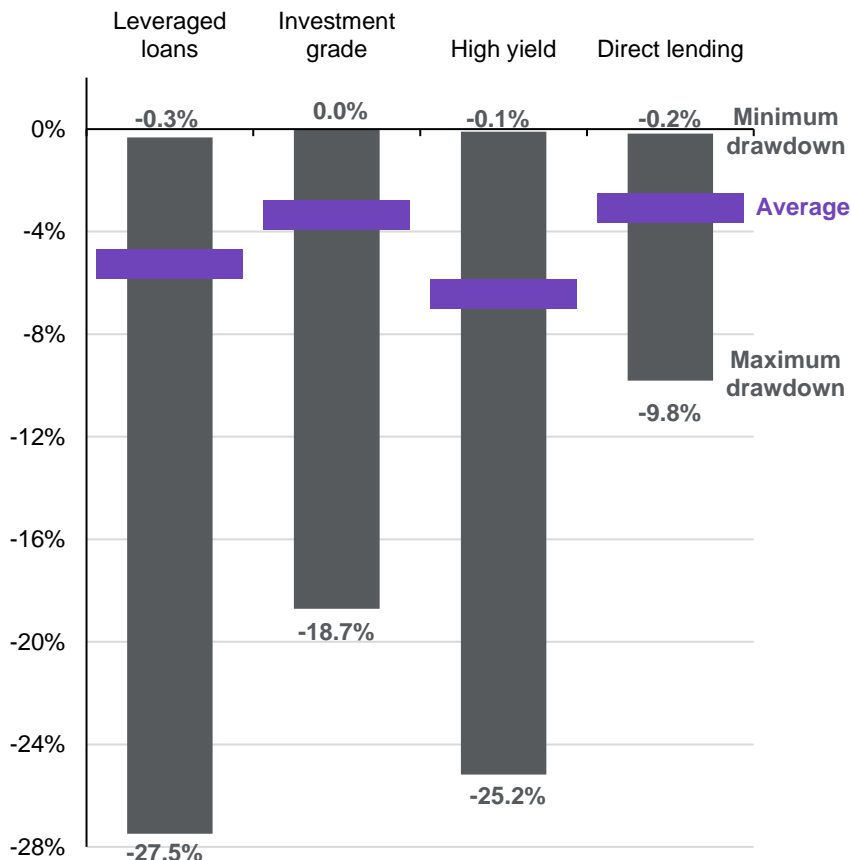
GTA

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50

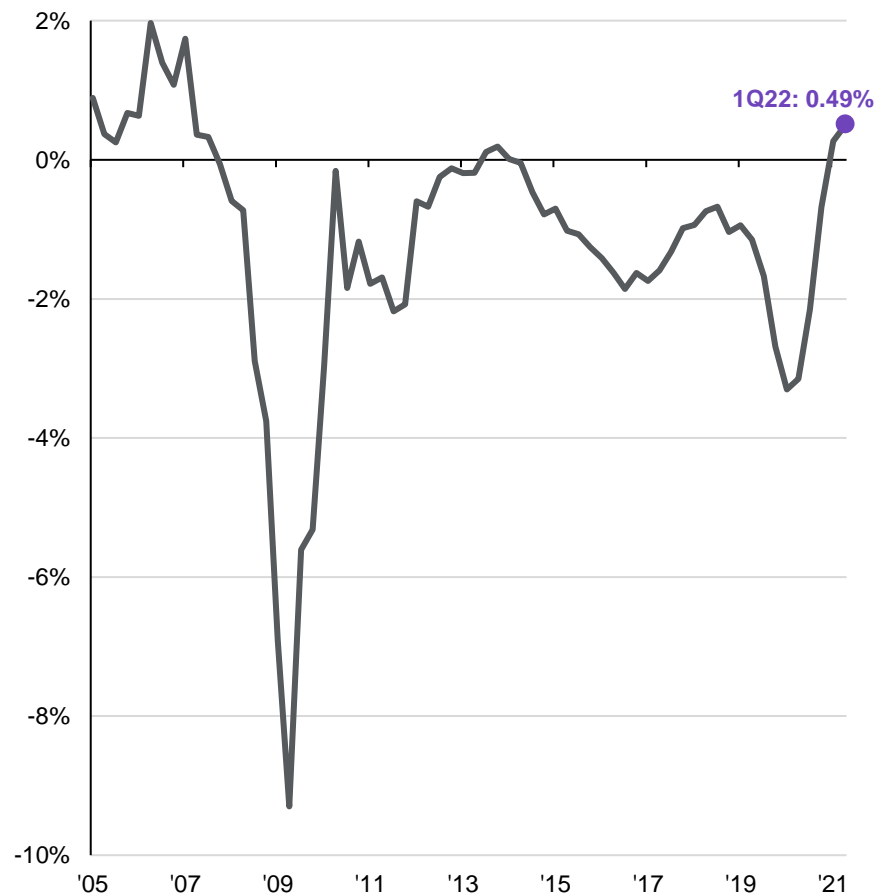
Public and private credit drawdown dispersion

Maximum – minimum drawdown, quarterly



Direct lending: Net realized gains (loss)*

Trailing 4-quarter realized gain (loss), 2006 – 1Q22



Source: Federal Reserve, Bloomberg, 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. *Net realized gains (loss) represent the component of valuation change for completed transactions. In the case of a portfolio of loans, such as the CDLI, realized gains (losses) mostly come in the form of realized losses generated by write-downs of loan principal that result from borrower default.

All returns analyzed are from 12/31/2004 through 9/30/2022.

Data is based on availability as of November 30, 2022

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Loan issuance by purpose and quality

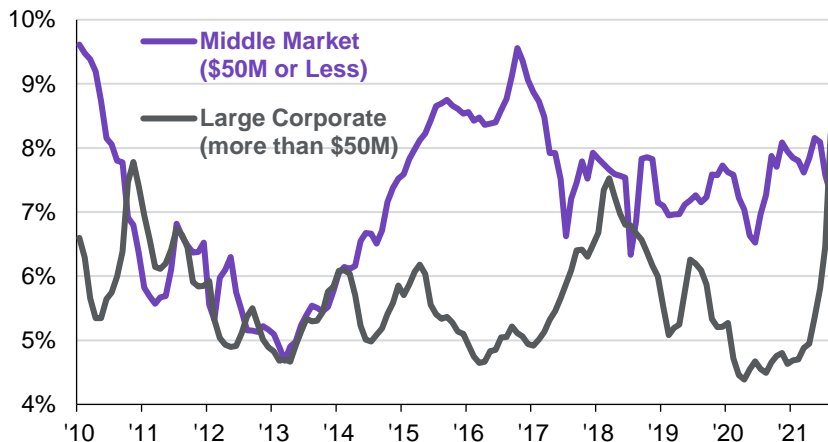
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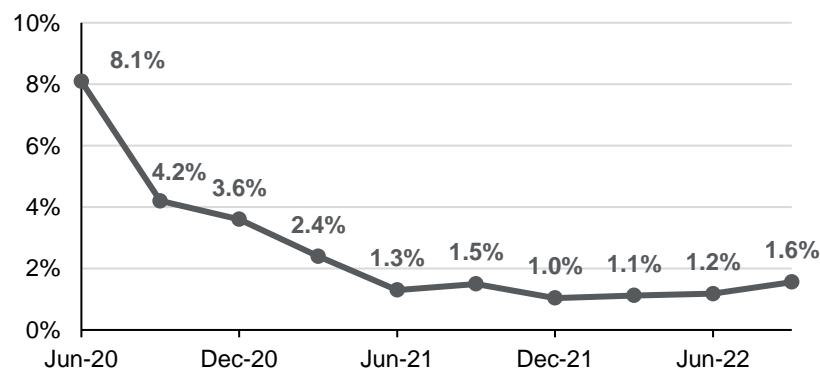
New issue yields

December 2010 – July 2022*, monthly, by EBITDA



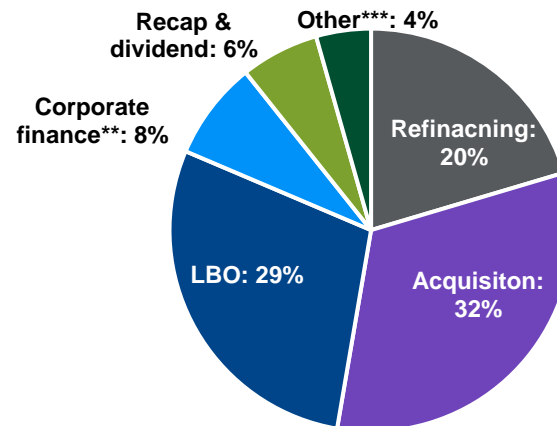
Private credit default rate

Quarterly, 2Q20 – 3Q22



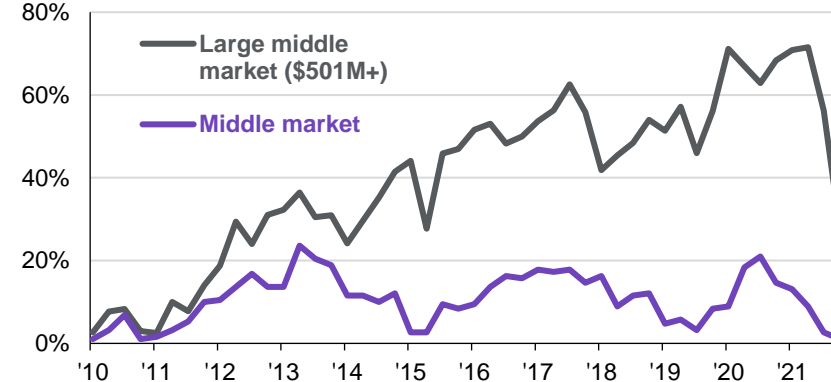
New loan issuance by purpose

12-months ending September 30, 2022, leveraged loans



Covenant-lite loans

% of total loans, 4Q10– 3Q22, quarterly



Source: LCD, Proskauer, J.P. Morgan Markets Research, J.P. Morgan Asset Management. 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. *Middle market yields from April 2020 to January 2021 are estimated using a 12-month trailing average due to lack of data availability over that time period. **Corporate finance includes corporate purpose, spinoff and merger. ***Other includes recap, stock repurchases, exit financing, expansion, capital expenditures, equity infusion, IPO, IDS and DIP. Percentages may not sum to 100 due to rounding. Data is based on availability as of November 30, 2022.



U.S. distressed loans

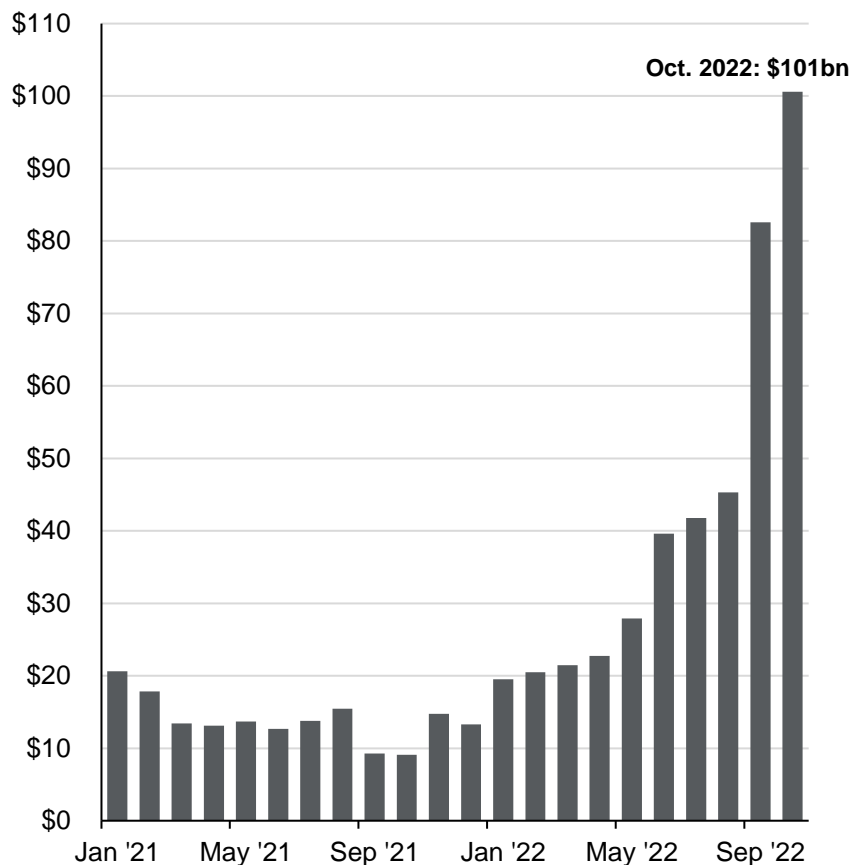
GTA

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52

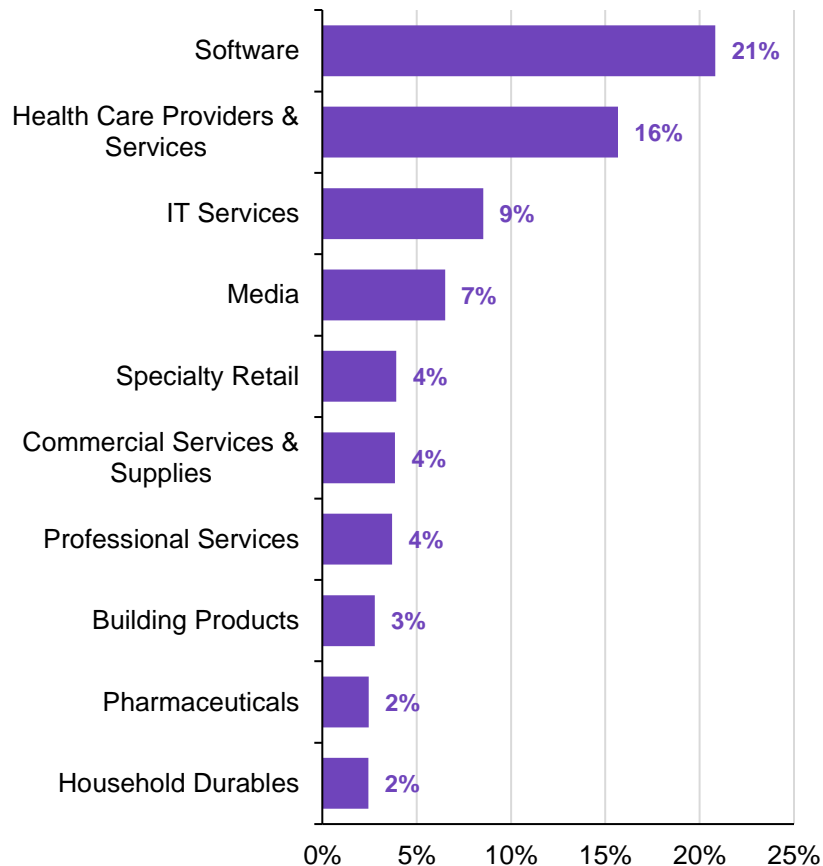
U.S. distressed loan volume

In USD billions



Share of distressed leveraged loans by industry

U.S., October 2022



Source: Pitchbook, LCD, Morningstar, Morgan Asset Management. Distressed loan data is 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 is based on availability as of November 30, 2022.



Sponsored versus non-sponsored leveraged loans

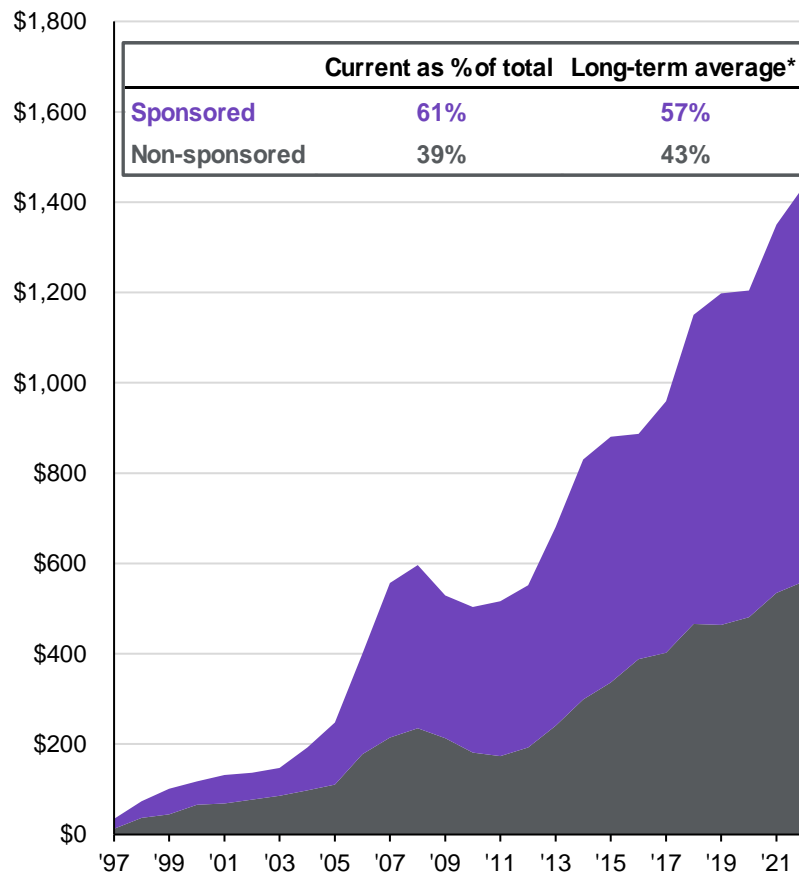
GTA

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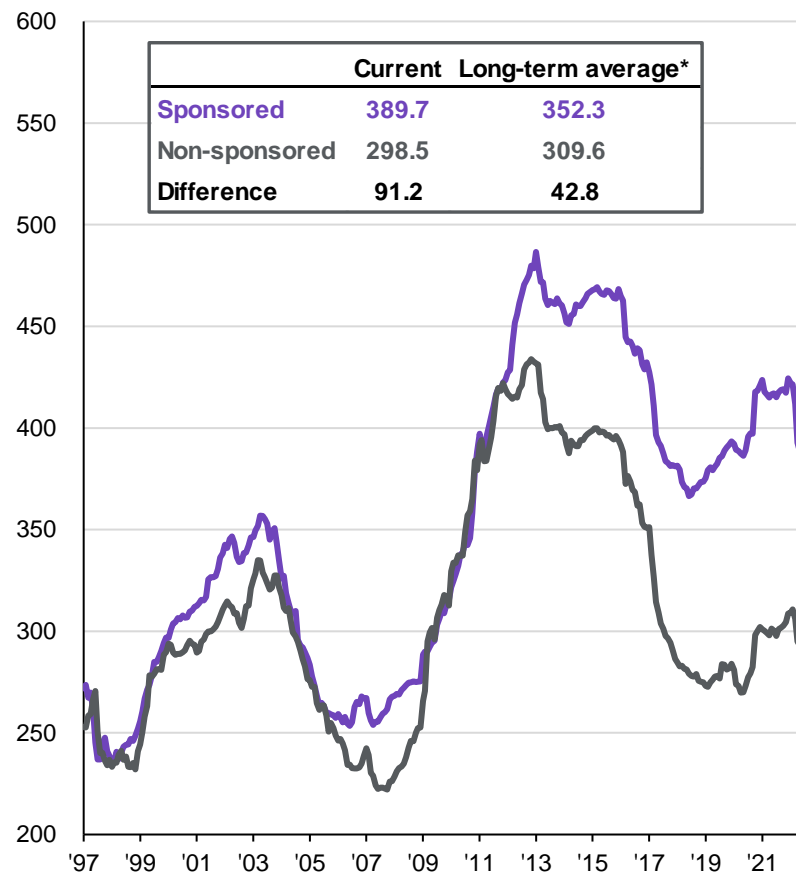
U.S. leveraged loans: Par amount outstanding

Sponsored vs. non-sponsored, in USD billions



Sponsored and non-sponsored leveraged loan spreads

Weighted average nominal spreads, monthly, since 1997



Source: Pitchbook, LCD, Morningstar LSTSA U.S. Leveraged Loan Index. Sponsored and non-sponsored leveraged loan data are as of September 30, 2022. *Averages are since 1997.

Data is based on availability as of November 30, 2022.



Commercial mortgage loans

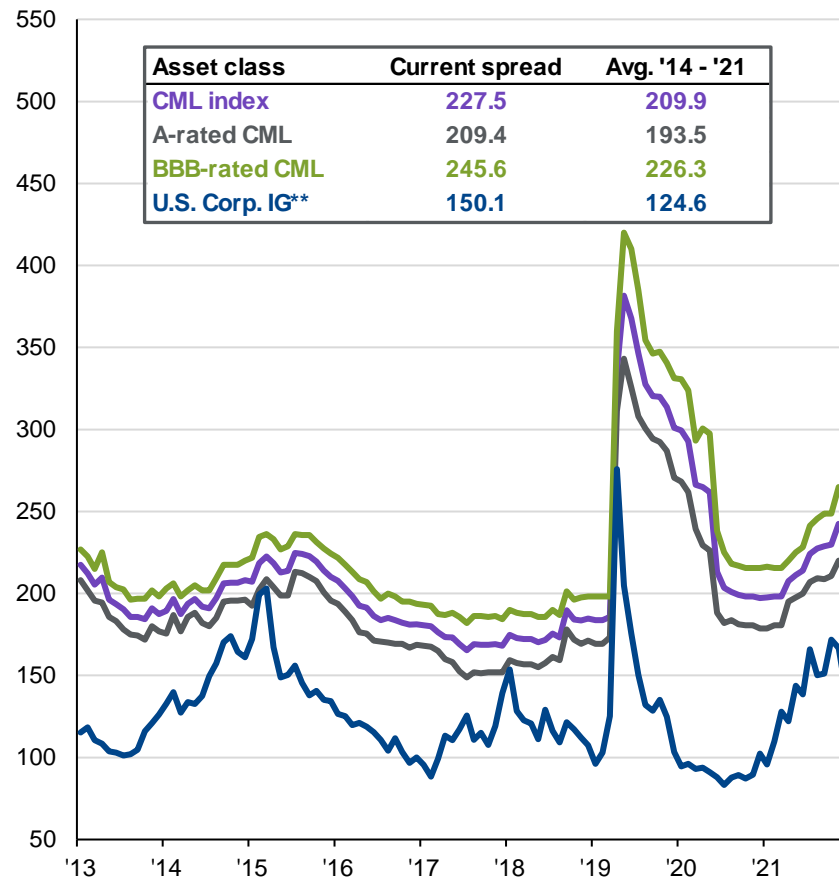
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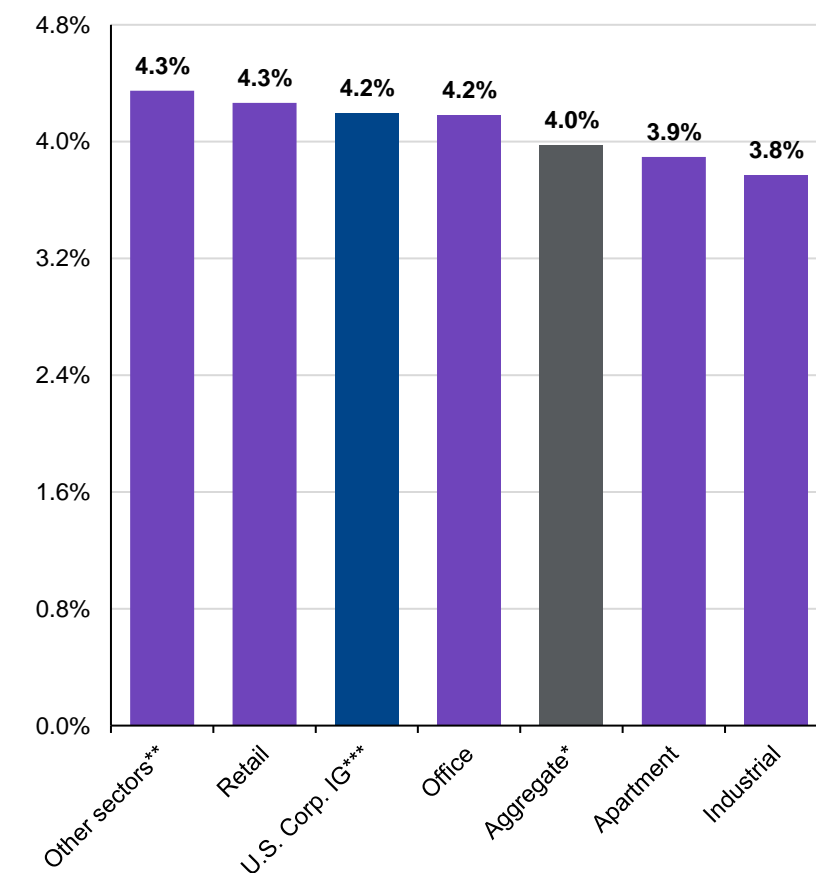
Commercial mortgage spreads

Spreads over Treasury, basis points, senior loans



Commercial mortgage yields

12-month income return, unlevered, senior loans, 3Q22



Source: Bloomberg, Gilberto-Levy, FactSet, J.P. Morgan Asset Management. All spreads are as of November 2022. *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. 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 and U.S. IG yields are as of March 31, 2022. Data is based on availability as of November 30, 2022



Hedge fund strategy returns

GTA

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| | | | | | | | | | | | 2002-2021 | |
|----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|------------------------------|----------------------------|------------------------------|----------------------------|------------------------------|----------------------------|----------------------------|
| 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | YTD | Ann. | Vol. |
| 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 19.0% | Global Macro 10.5% | Global Equities 8.5% | Global Equities 17.5% |
| 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 15.6% | Eq. Market Neutral 0.4% | Distressed 7.3% | Equity Long/Short 10.5% |
| 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 11.7% | Merger Arbitrage 0.3% | Equity Long/Short 6.0% | Distressed 9.3% |
| 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% | Merger Arbitrage 10.6% | Relative Value - 2.1% | HFRI Composite 5.8% | HFRI Composite 7.8% |
| 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% | HFRI Composite 10.2% | Distressed - 5.0% | Relative Value 5.7% | Relative Value 6.0% |
| 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 7.7% | HFRI Composite - 6.3% | Merger Arbitrage 4.8% | Global Bonds 5.8% |
| 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 7.6% | Equity Long/Short - 13.8% | Global Macro 4.6% | Global Macro 4.7% |
| 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 7.1% | Global Equities - 14.6% | Global Bonds 4.4% | Merger Arbitrage 4.7% |
| 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 - 4.7% | Global Bonds - 16.7% | Eq. Market Neutral 2.7% | Eq. Market Neutral 3.0% |

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, 2022.



Hedge funds and manager selection

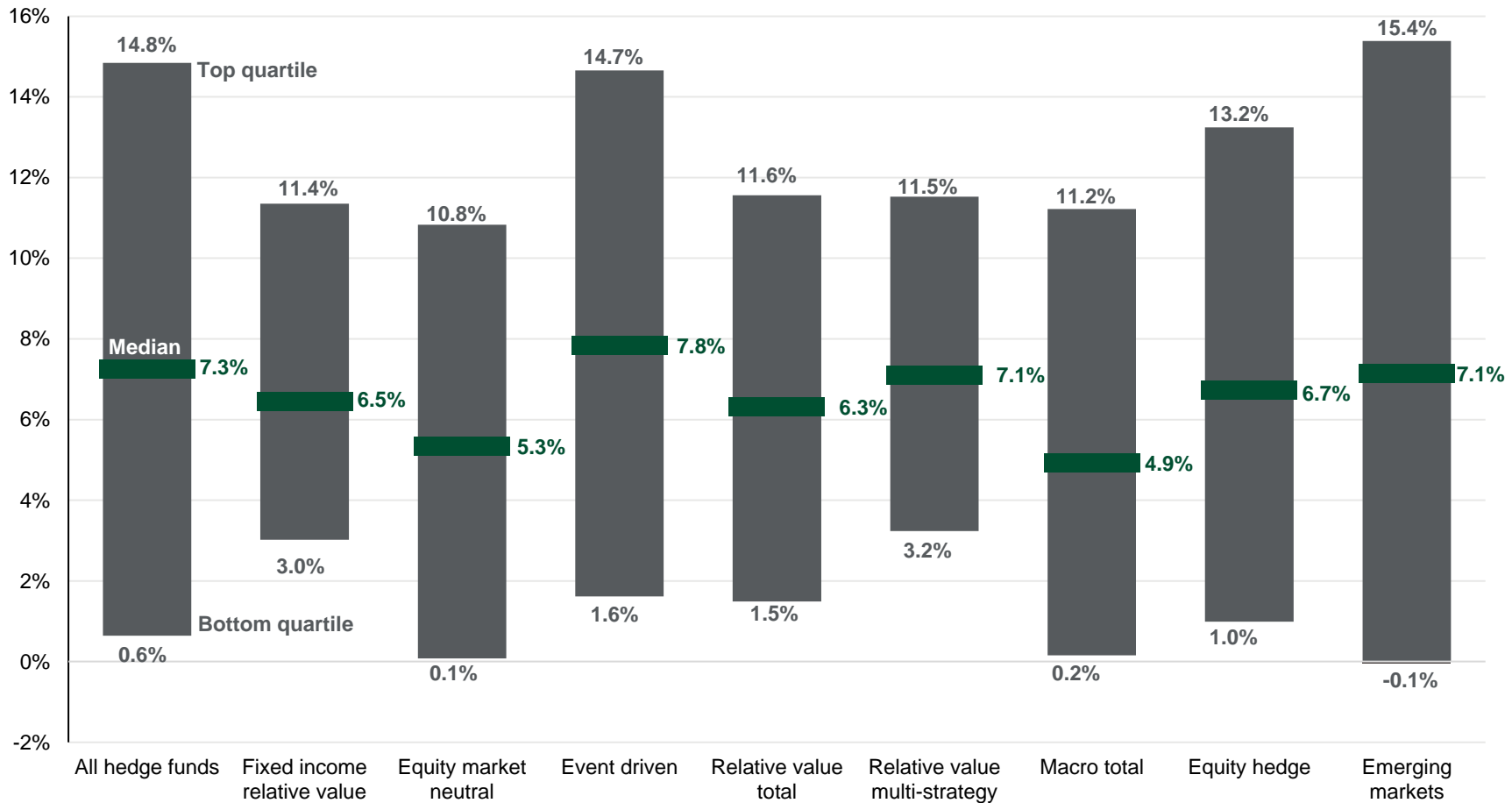
GTA

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Hedge fund manager dispersion

Based on 10-year trailing returns



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 is as of 3Q22.

Data is based on availability as of November 30, 2022.



Hedge funds and traditional portfolios

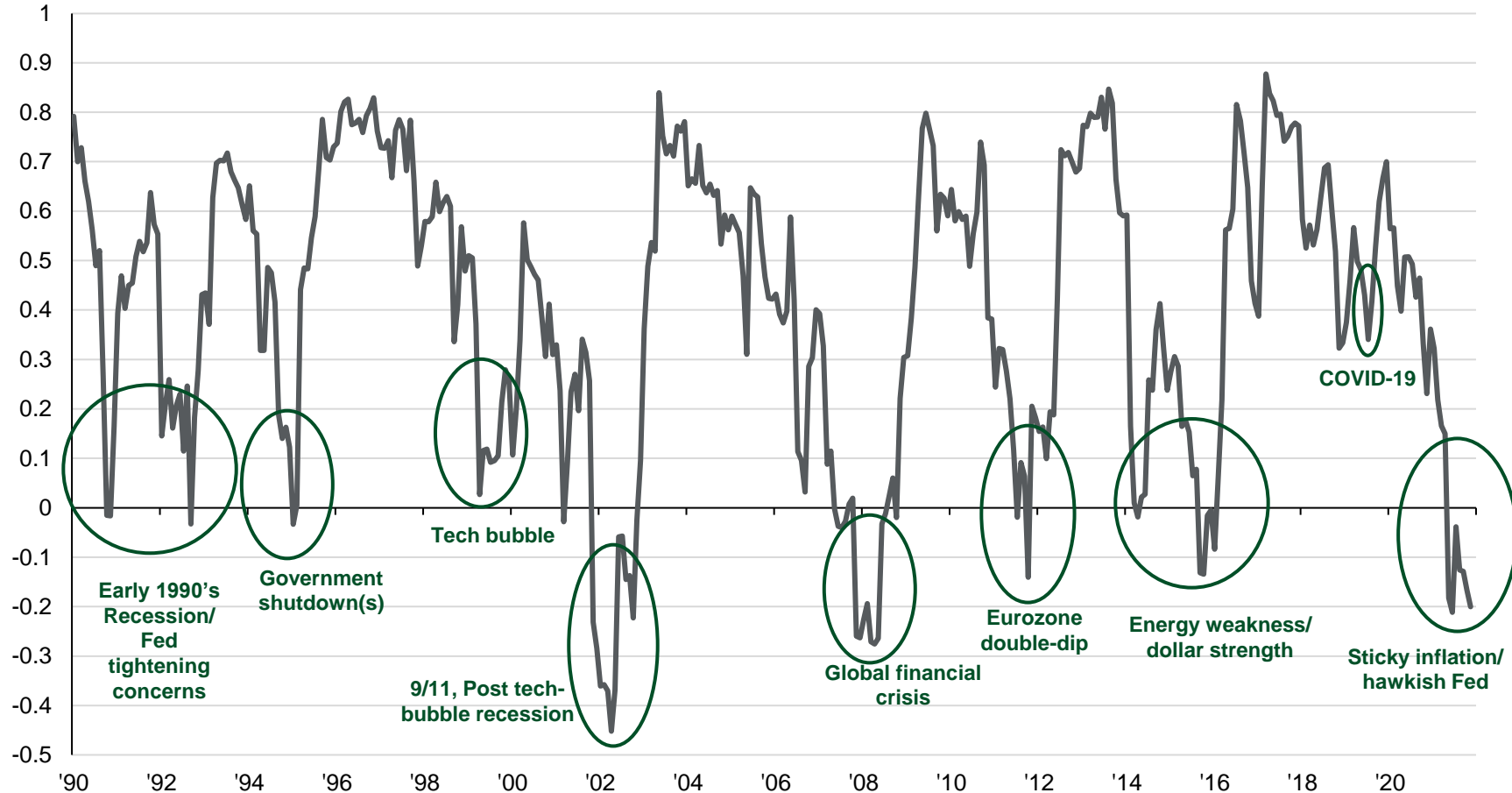
GTA

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

1990 – August 2022, 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, 2022.

Hedge funds

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Hedge funds and volatility

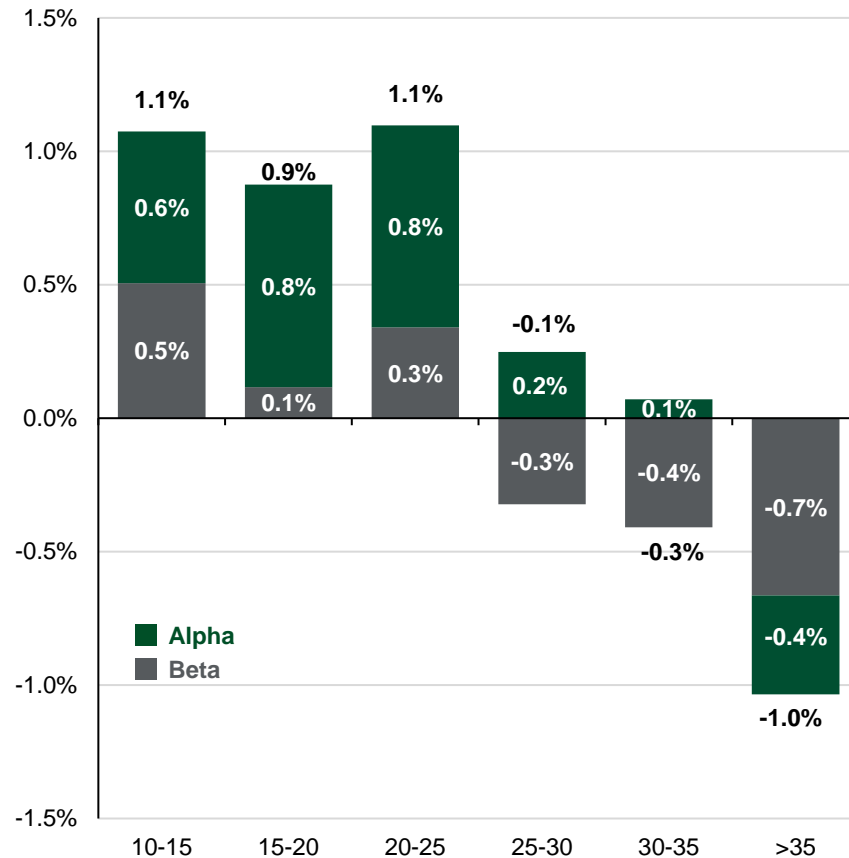
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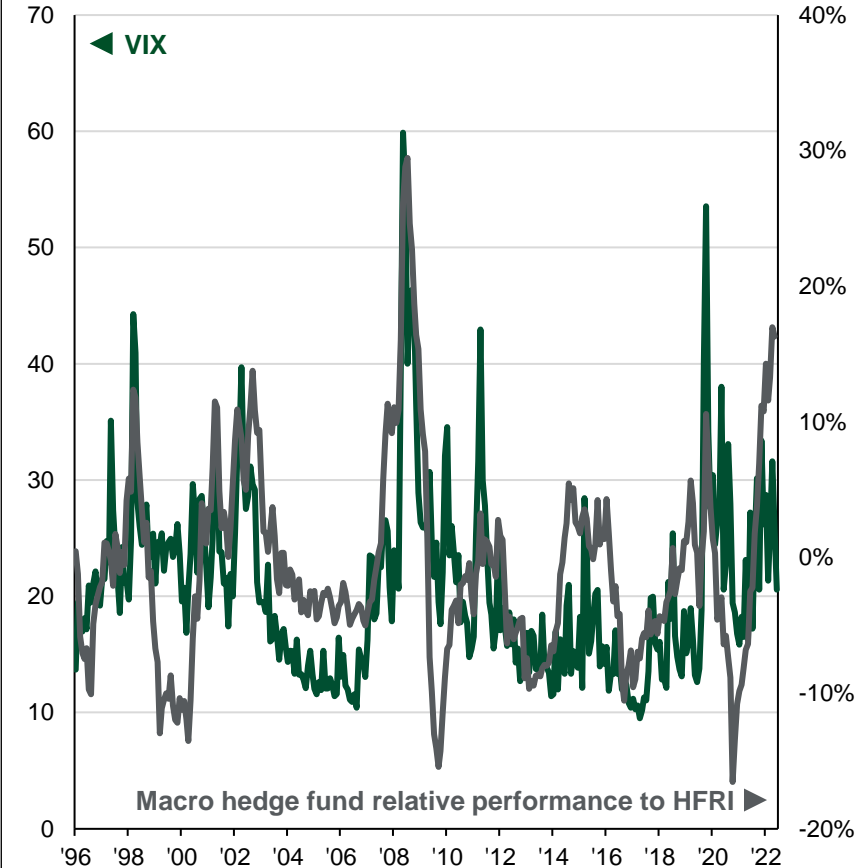
Hedge funds and volatility

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, 2022

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Hedge fund returns across inflationary regimes

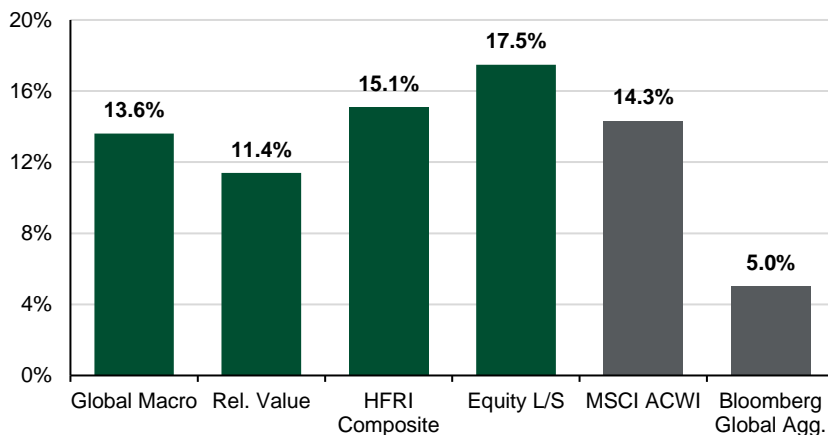
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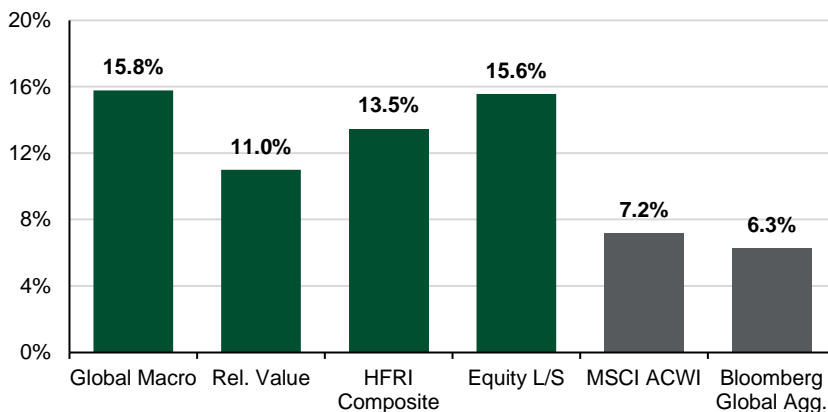
High and rising

Average year-over-year returns



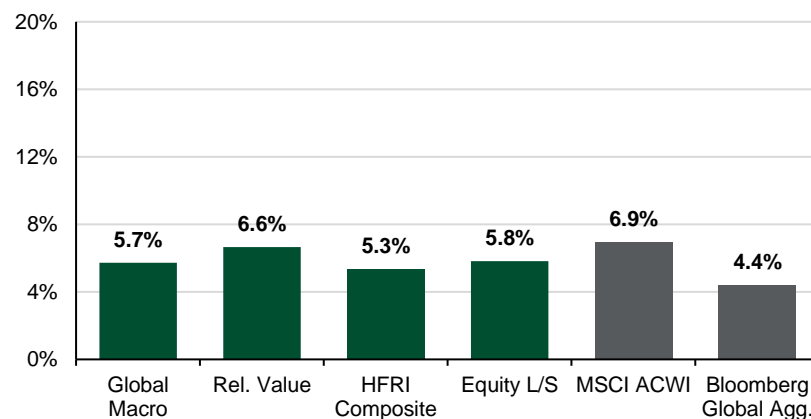
High and falling

Average year-over-year returns



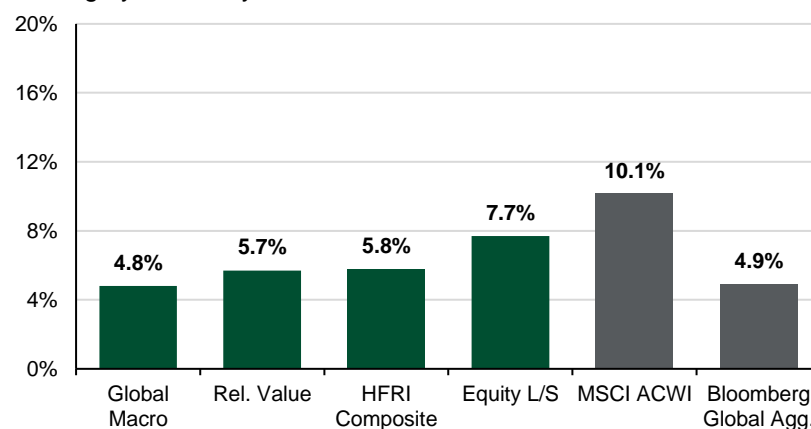
Low and falling

Average year-over-year returns



Low and rising

Average year-over-year returns



Source: FactSet, HFRI, U.S. Department of Labor, J.P. Morgan Asset Management.
All hedge fund returns are from HFRI. HFRI Composite: HFRI FW Composite Index. "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 1991 through October 2022 is 2.46%.
Data is based on availability as of November 30, 2022.



Equity and credit dispersion

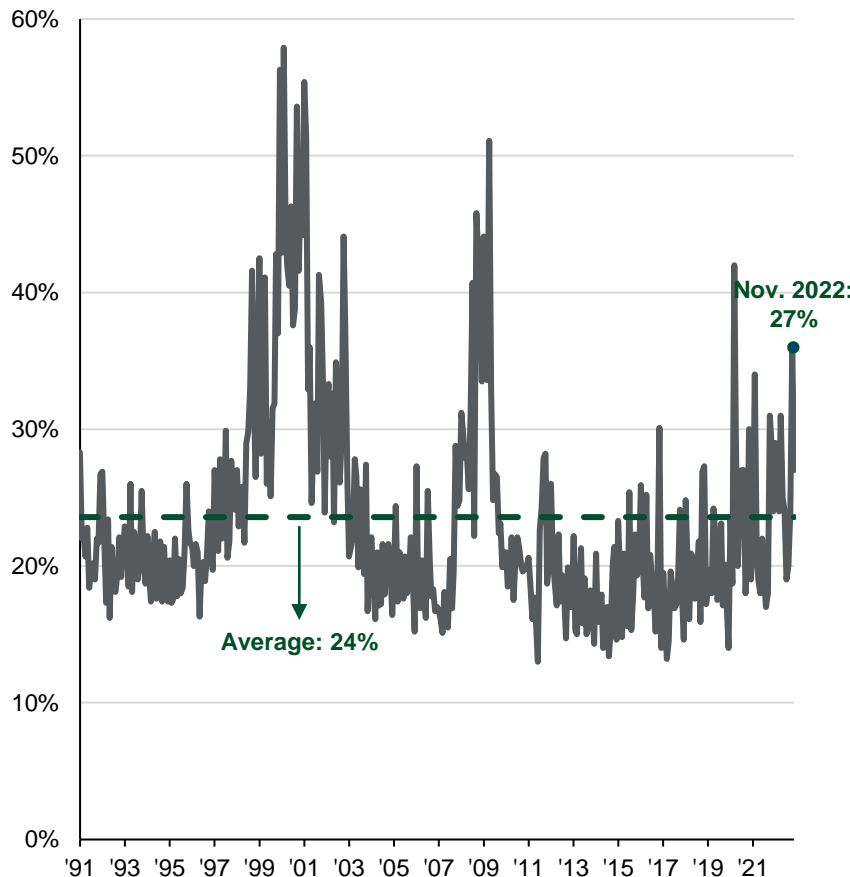
GTA

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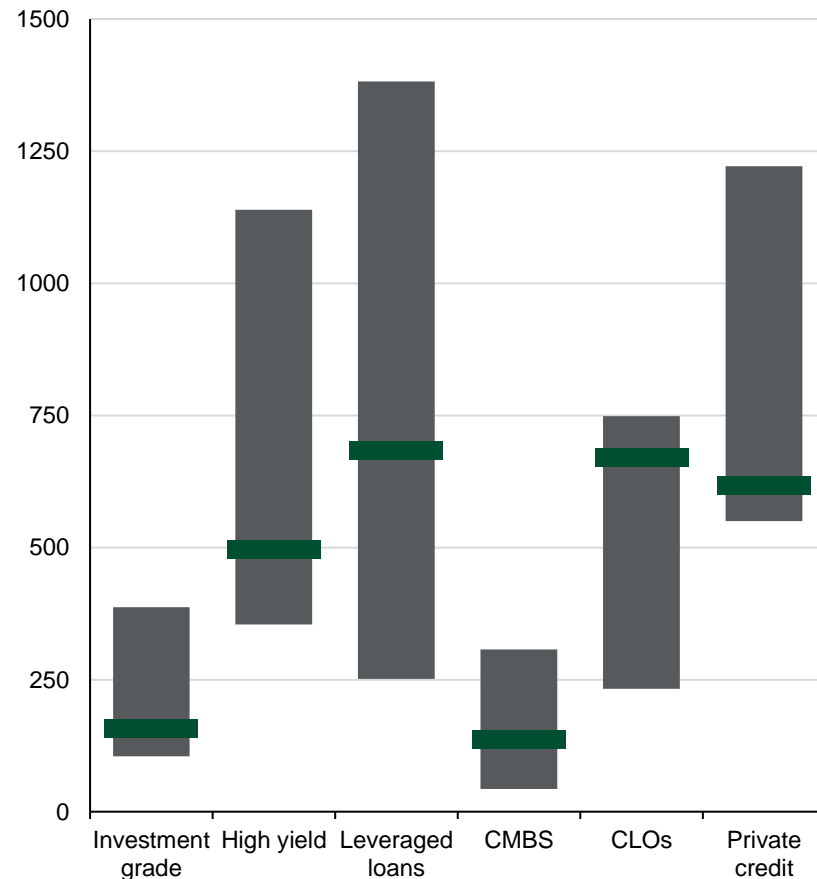
S&P 500 Index dispersion*

Monthly, 1991 – present



Credit spread dispersion**

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



Source: S&P Global, 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.

**Credit spread dispersion is represented by the historical range. Private credit spreads are as of September 30, 2022.

Data is based on availability as of November 30, 2022



Asset class volatility

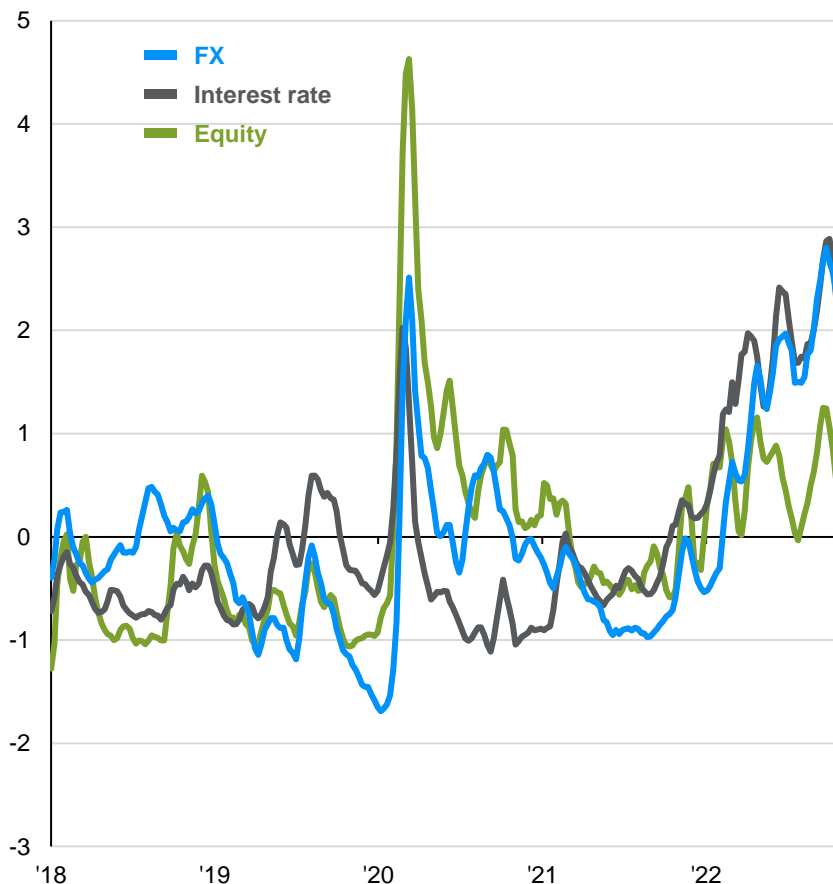
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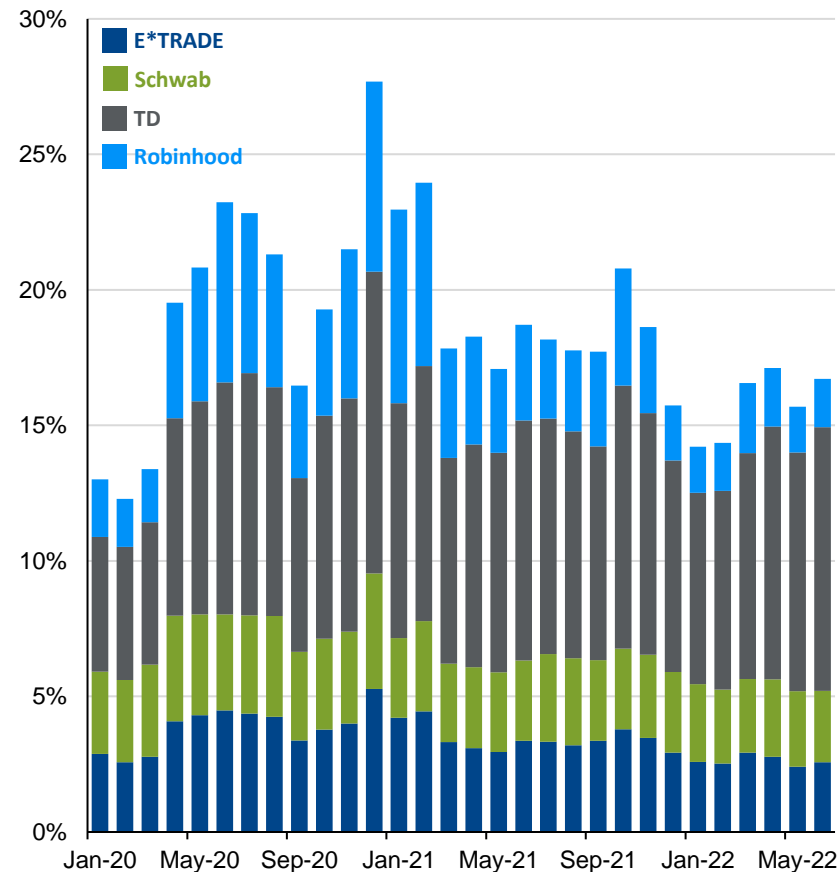
Equity, interest rate and foreign exchange volatility

Z-score, 4-week moving average



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

2020 – 2Q22



Hedge funds

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) Data is from J.P. Morgan Markets' "Flows & Liquidity" publication and based on company filings, SEC 606 disclosures. Data is based on availability as of November 30, 2022.

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Cryptocurrency transactions and block sizes

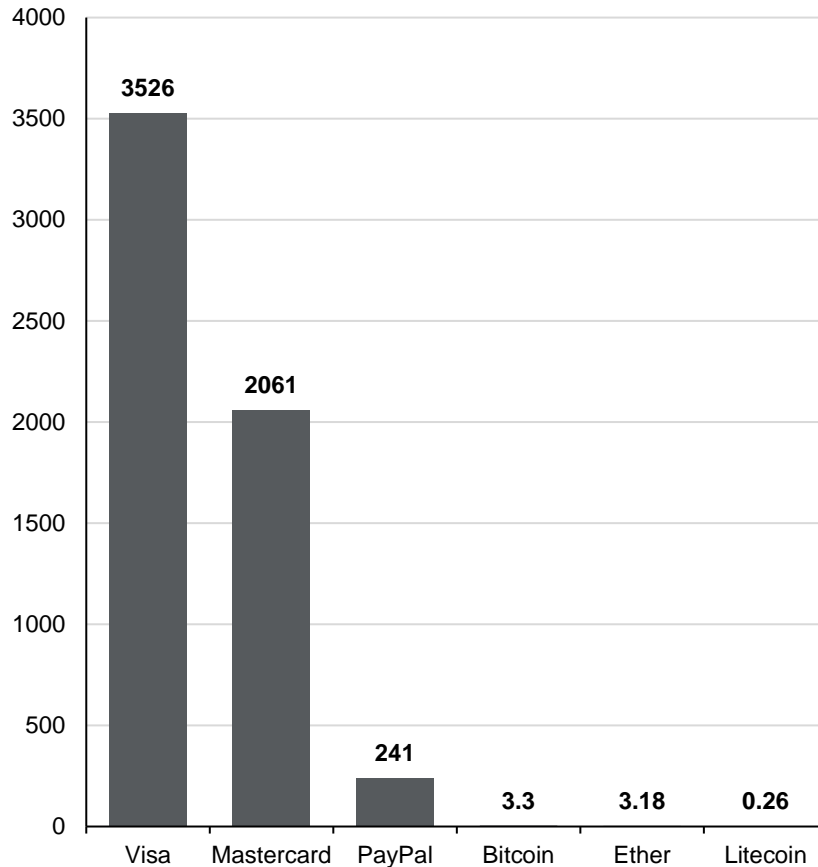
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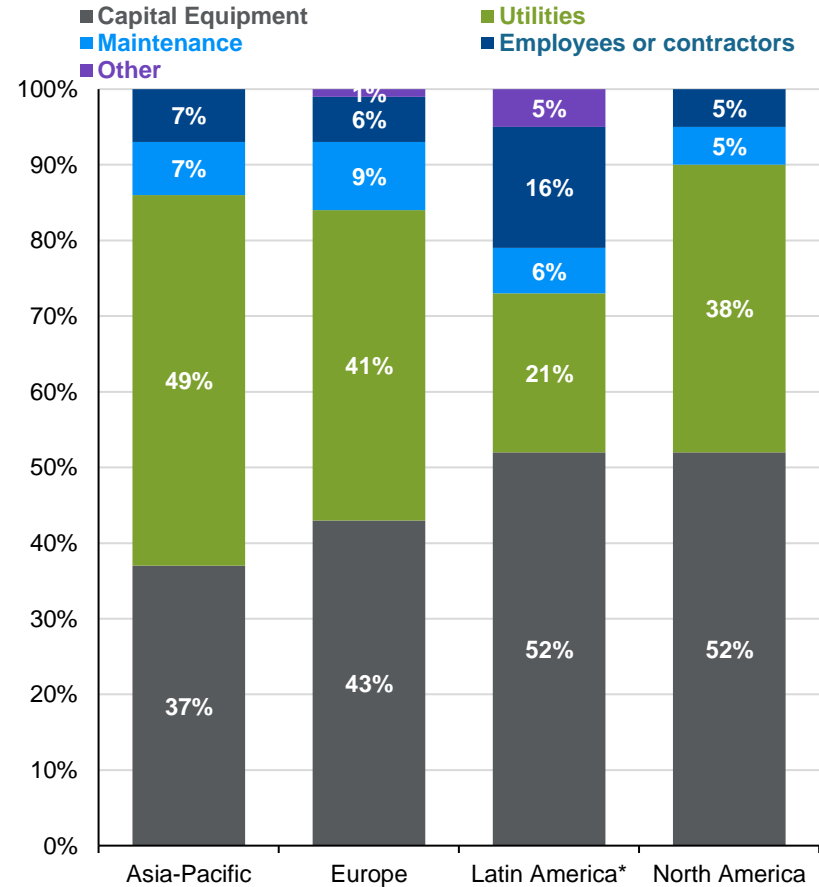
62

Hedge funds

Transactions processed per second
Number



Breakdown of hasher costs per region
Percentage of total costs



Source: 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, 2022.



Cryptocurrency correlations

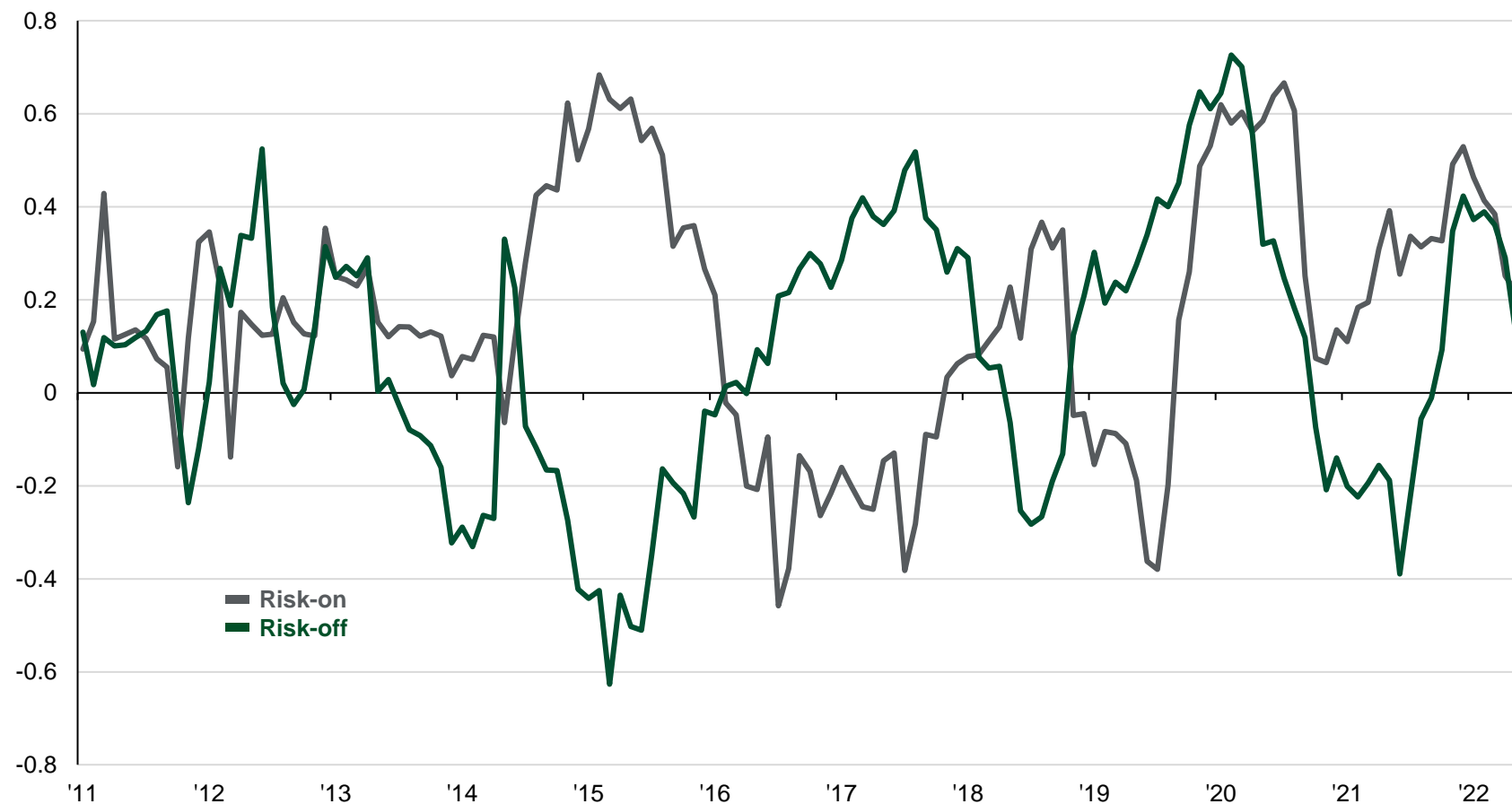
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Risk-on and risk-off assets

12-month rolling correlations, monthly



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 is based on availability as of November 30, 2022.



J.P. Morgan Asset Management – Definitions

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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.



J.P. Morgan Asset Management – Definitions

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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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Unless otherwise stated, all data are as of November 30, 2022 or most recently available.

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