*Prepared by:
Nimish Vyas, Senior Associate, Market Insights, J.P. Morgan Asset Management
Sahil Gauba, Associate, Market Insights, J.P. Morgan Asset Management
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19. U.S. real estate: Industrial
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Alternatives fundraising

Global private capital fundraising
USD billions

- Natural resources*
- Infrastructure
- Real estate
- Private debt
- Private equity

Source: Preqin, J.P. Morgan Asset Management.
Fundraising categories are provided by Preqin and represent their estimate of annual capital raised in closed-end funds. Data may not sum to total due to rounding. *Natural resources include natural resources agriculture, energy, metals & mining, timberland and water. Fundraising Data are as of November 30, 2023.
Data are based on availability as of November 30, 2023.
Alternatives dry powder

Dry powder by asset class
Cumulative dry powder, USD billions

<table>
<thead>
<tr>
<th>Asset class</th>
<th>2022</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondaries</td>
<td>$163</td>
<td>5%</td>
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<tr>
<td>Fund of funds</td>
<td>$165</td>
<td>5%</td>
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<tr>
<td>Private debt</td>
<td>$434</td>
<td>13%</td>
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<tr>
<td>Real assets*</td>
<td>$635</td>
<td>19%</td>
</tr>
<tr>
<td>Venture capital</td>
<td>$574</td>
<td>17%</td>
</tr>
<tr>
<td>Private equity</td>
<td>$1,325</td>
<td>40%</td>
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<tr>
<td><strong>Total</strong></td>
<td>$3,297</td>
<td>100%</td>
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</table>

Source: PitchBook, J.P. Morgan Asset Management. Dry powder Data are as of December 31, 2022. Percentages may not sum to 100 due to rounding. *Real assets dry powder includes real estate & infrastructure. Data are based on availability as of November 30, 2023.
# Public and private market correlations

## Quarterly returns

<table>
<thead>
<tr>
<th></th>
<th>2008 - Q223</th>
<th>Global Bonds</th>
<th>Global Equities</th>
<th>U.S. Core RE</th>
<th>Europe Core RE*</th>
<th>APAC Core RE</th>
<th>Global Core Infra</th>
<th>Transport</th>
<th>Timber</th>
<th>Direct Lending</th>
<th>Venture Capital</th>
<th>Private Equity</th>
<th>Equity Long/Short</th>
<th>Relative Value</th>
<th>Macro</th>
<th>Bitcoin</th>
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<td>U.S. Core RE</td>
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<td>0.4</td>
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<td>Venture Capital</td>
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<td>Private Equity</td>
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<td>Equity Long/Short</td>
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<td>-0.1</td>
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<td>-0.1</td>
<td>0.7</td>
<td>0.7</td>
<td>0.9</td>
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<td>Relative Value</td>
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<td>-0.1</td>
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<td>0.9</td>
<td>0.5</td>
<td>0.8</td>
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<td><strong>Hedge funds</strong></td>
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<tr>
<td>Macro</td>
<td>0.0</td>
<td>0.3</td>
<td>0.0</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
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<td>0.2</td>
<td>0.2</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
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<tr>
<td>Bitcoin</td>
<td>0.1</td>
<td>0.1</td>
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<td>0.0</td>
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<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
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</tbody>
</table>

Source: MSCI, Bloomberg, Burgiss, NCREIF, Cliffwater, HFR, 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: MSCIAC World Index, Global Bonds: Bloomberg Global Aggregate Index, U.S. Core Real Estate: NCREIF Property Index – Open End Diversified Core Equity component, Europe Core Real Estate: MSCI Global Property Fund Index – Continental Europe, Asia Pacific (APAC) Core Real Estate: MSCI Global Property Fund Index – Asia-Pacific, Global Infrastructure (Infra); MSCI Global Quarterly Infrastructure Asset Index, U.S. Direct Lending: Cliffwater Direct Lending Index, Timber: NCREIF Timberland Property Index (US). 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 periods 6/30/2008 – 6/30/2023, except correlations with Bitcoin which are calculated over the period 12/31/2010 – 6/30/2023. Returns are denominated in USD.

Data are based on availability as of November 30, 2023.
Alternatives and manager selection

Public and private manager dispersion
Based on returns over a 10-year window*

Source: Burgiss, NCREIF, Morningstar, PivotalPath, J.P. Morgan Asset Management.
Global equities (large cap) and global bonds dispersion are based on the world large stock and world bond categories, respectively. *Manager dispersion is based on the annual returns for U.S. Fund Global Equities, U.S. Fund Global Bonds, Hedge Funds, and U.S. Core Real Estate are over a 10-year period ending 3Q 2023. Non-core Real Estate, Global Private Equity and Global Venture Capital are represented by the 10-year horizon internal rate of return (IRR) ending 2Q 2023. U.S. Fund Global Equities and Bonds are comprised of U.S.-domiciled mutual funds and ETFs. Data are based on availability as of November 30, 2023.
Yield alternatives

Asset class yields
Percent

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Lending</td>
<td>11.6%</td>
</tr>
<tr>
<td>U.S. High Yield</td>
<td>8.4%</td>
</tr>
<tr>
<td>Global Transport</td>
<td>8.4%</td>
</tr>
<tr>
<td>CRE - Mezz*</td>
<td>8.1%</td>
</tr>
<tr>
<td>Preferreds</td>
<td>6.4%</td>
</tr>
<tr>
<td>U.S. IG</td>
<td>5.6%</td>
</tr>
<tr>
<td>Global REITs</td>
<td>4.6%</td>
</tr>
<tr>
<td>CML - Senior</td>
<td>4.4%</td>
</tr>
<tr>
<td>U.S. 10-year</td>
<td>4.4%</td>
</tr>
<tr>
<td>APAC Real Estate</td>
<td>4.3%</td>
</tr>
<tr>
<td>Europe Real Estate</td>
<td>4.2%</td>
</tr>
<tr>
<td>U.S. Real Estate</td>
<td>3.8%</td>
</tr>
<tr>
<td>Global Infra. Eq.</td>
<td>3.3%</td>
</tr>
<tr>
<td>Euro Govt. (7-10 yr)</td>
<td>3.1%</td>
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<tr>
<td>International Equity</td>
<td>2.8%</td>
</tr>
<tr>
<td>Timber</td>
<td>2.7%</td>
</tr>
<tr>
<td>U.S. Equity</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

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 11/30/2023. Alternative yields are as of 9/30/2023, except Global Transport and Infrastructure, which are as of 6/30/2023 and CRE – Mezz, which is as of 10/31/2023. CML – Senior: Gilberto-Levy Performance Aggregate Index (unlevered), Mezzanine commercial mortgage loans yield is derived from a J.P. Morgan Survey and U.S. Treasuries of a similar duration. Global Transport levered yields for transport assets calculated as the difference between charter rates (rental income), operating expenses, debt amortization and interest expenses, as a percentage of equity value, and are based on a historical 15-year average. Yields for each of the sub-vessel types are calculated and respective weightings are applied to arrive at the current levered yields for Global Transportation; Preferreds: BAML Hybrid Preferred Securities Direct Lending; Cliffwater Direct Lending Index U.S. High Yield; Bloomberg U.S. Aggregate Corporate High Yield; Global Infrastructure; MSCI Global Infrastructure Asset Index – Low Risk U.S., Real Estate; NCREIF Property Index – ODCE; Global REITs FTSE NAREIT Global REIT Index; 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 (7-10 yr); Timber: NCREIF Timberland Index (US).
Equity market correlations and yields
Hedge adjusted yield, last 12 months

Higher yielding sectors
- U.S. government
- U.S. non-government
- International
- Alternatives

Correlation to S&P 500
- U.S. Real estate
- APAC Real estate
- Europe Real estate
- Japan
- UK
- U.S. Aggregate
- TIPS
- Em Corp.
- EMD (LCL)
- EM Corp.
- Euro Corp.
- Euro HY
- U.S. HY
- Convertibles
- EMD ($)
- Direct lending

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; US corporates – US Corporates; Munis – Municipal Bond US; HY – Corporate High Yield; TIPS – Treasury Inflation-Protected Securities (TIPS); Floating Rate US – Floating Rate; Convertibles – U.S. Convertibles; Composites – ABS, JP Morgan ABs Index; EMD ($) – JP Morgan EMBIG Diversified Index; EMD (LCL) – JP Morgan GBI EM Global Diversified Index; EM Corp. – JP 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 – OECD; 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 – Cliftwater Direct Lending Index; Timber – NCREIF Timberland Property Index (U.S.); Transport returns and yield are derived from JP 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 benchmark returns for Treasury securities. Alternative correlations are based on quarterly returns over the past 10 years through 9/30/2023, except Infrastructure and Transport, which are as of 6/30/2023. All non-alternative yields are as of 11/30/2023. Alternative yields are as of 9/30/2023, except Infrastructure and Transport, which are as of 6/30/2023. Data are based on availability as of November 30, 2023.
Portfolio diversification

Alternatives and portfolio risk/return
Annualized volatility and returns, 1989 – 2Q23

Source: Bloomberg, Burgiss, HFRI, NCREIF, Standard & Poor’s, FactSet, J.P. Morgan Asset Management. Alts include hedge funds, real estate, and private equity, with each receiving an equal weight. Portfolios are rebalanced at the start of the year. Data are based on availability as of November 30, 2023.
### Alternative asset class returns

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</thead>
<tbody>
<tr>
<td>Venture Capital</td>
<td>26.3%</td>
<td>25.8%</td>
<td>Transport</td>
<td>16.2%</td>
<td>Infra.</td>
<td>14.2%</td>
<td>Private Equity</td>
<td>23.0%</td>
<td>Venture Capital</td>
<td>20.7%</td>
<td>Venture Capital</td>
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<td>Infra.</td>
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<td>Infra.</td>
<td>11.6%</td>
<td>Private Equity</td>
<td>16.7%</td>
<td>Private Equity</td>
<td>24.2%</td>
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<td>U.S. Core RE</td>
<td>18.8%</td>
<td>U.S. Core RE</td>
<td>12.5%</td>
<td>Private Equity</td>
<td>12.6%</td>
<td>Europe Core RE</td>
<td>14.9%</td>
<td>Europe Core RE</td>
<td>9.8%</td>
<td>Asset Allocation</td>
<td>11.5%</td>
<td>Transport</td>
<td>27.7%</td>
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<tr>
<td>APAC Core RE</td>
<td>13.9%</td>
<td>Europe Core RE</td>
<td>12.3%</td>
<td>Venture Capital</td>
<td>15.6%</td>
<td>Private Equity</td>
<td>14.9%</td>
<td>Venture Capital</td>
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<td>Direct Lending</td>
<td>6.3%</td>
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<td>Infra.</td>
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<td>Asset Allocation</td>
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<td>Private Equity</td>
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<tr>
<td>Infra.</td>
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<td>Direct Lending</td>
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<td>Asset Allocation</td>
<td>10.4%</td>
<td>Asset Allocation</td>
<td>8.5%</td>
<td>Europe Core RE</td>
<td>9.8%</td>
<td>U.S. Core RE</td>
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<td>CML - Senior*</td>
<td>8.4%</td>
</tr>
<tr>
<td>Hedge Funds</td>
<td>9.6%</td>
<td>APAC Core RE</td>
<td>9.4%</td>
<td>Private Equity</td>
<td>9.2%</td>
<td>Europe Core RE</td>
<td>8.1%</td>
<td>Direct Lending</td>
<td>8.6%</td>
<td>Direct Lending</td>
<td>8.1%</td>
<td>APAC Core RE</td>
<td>6.6%</td>
</tr>
<tr>
<td>CML - Senior*</td>
<td>9.1%</td>
<td>CML - Senior*</td>
<td>7.4%</td>
<td>Direct Lending</td>
<td>5.5%</td>
<td>Hedge Funds</td>
<td>3.2%</td>
<td>Hedge Funds</td>
<td>8.5%</td>
<td>Transport</td>
<td>7.7%</td>
<td>Hedge Funds</td>
<td>5.6%</td>
</tr>
<tr>
<td>Europe Core RE</td>
<td>5.8%</td>
<td>Transport</td>
<td>6.9%</td>
<td>CML - Senior*</td>
<td>2.7%</td>
<td>CML - Senior*</td>
<td>2.9%</td>
<td>CML - Senior*</td>
<td>7.6%</td>
<td>U.S. Core RE</td>
<td>5.3%</td>
<td>U.S. Core RE</td>
<td>2.6%</td>
</tr>
<tr>
<td>Hedge Funds</td>
<td>2.9%</td>
<td>Hedge Funds</td>
<td>4.3%</td>
<td>Hedge Funds</td>
<td>-0.2%</td>
<td>Venture Capital</td>
<td>0.9%</td>
<td>Hedge Funds</td>
<td>5.7%</td>
<td>Transport</td>
<td>-1.2%</td>
<td>APAC Core RE</td>
<td>0.1%</td>
</tr>
</tbody>
</table>


Data are based on availability as of November 30, 2023.
Alternative asset correlations, returns and yields

Correlations, returns, and yields
10-year correlations and 10-year annualized total returns, quarterly, 2013 - 2022

Source: Burgiss, Cliffwater, Gilber-t-Levy, HFRI, MSCI, NCREIF, FactSet, J.P. Morgan Asset Management. Correlations are based on quarterly returns over the past 10 years through 2022. A 60/40 portfolio is comprised of 60% stocks and 40% bonds. Stocks are represented by the S&P 500 Total Return Index. Bonds are represented by the Bloomberg U.S. Aggregate Total Return Index. 10-year annualized returns are calculated from 2013 – 2022. Indices and data used for alternative asset class returns and yields are as described on pages 8, 9, and 11 of the Guide to Alternatives. Yields are based on latest available data as described on page 8 of the Guide to Alternatives. *CML is commercial mortgage loans. Data are based on availability as of November 30, 2023.
Valuations monitor

Asset class valuations
Z-scores based on average valuations since March 2009*

- 12/31/2021
- Current

Data are based on availability as of November 30, 2023.

Source: Burgiss, Cliffwater, FactSet, Jay Ritter, Cordell Eminent Scholar, Eugene F. Brigham Department of Finance, Insurance, and Real Estate Warrington College of Business, University of Florida, LCD, PitchBook, MSCI, NCREIF, RCA, J.P. Morgan Markets, J.P. Morgan Asset Management. All alternative asset classes valuation measures are quarterly, except VC, which is annual. Public market asset class valuations are monthly. Equity valuations are measured using next twelve months price-to-earnings ratios. Fixed income valuations are measured using yield-to-worst and spread-to-worst. Global REITs valuations are measured using price-to-free cash (P/FCF) flow multiples. Real estate valuations are measured using the spread between transaction-based cap rates and the yield on the appropriate 10-year government bond. Private equity valuations are determined using leveraged buyout purchase price multiples (LBO PPM). Private credit valuations are measured using the spread between quarterly income returns and 3-month SOFR (LIBOR pre-2019). VC valuations measured using the median VC-backed IPO price-to-sales (P/S) ratio. Infrastructure valuations are measured using 12-month trailing infrastructure income returns. *VC average valuation is since 12/31/2008. 2023 data P/S ratio for VC is a J.P. Morgan Asset Management estimate. Global REITs average valuation is since 1/31/2010 due to data constraints. **Yields and spreads are inversely related to prices.
U.S. real estate dynamics

U.S. real estate cap rate spreads
Transaction based, spread to 10y UST, 4-quarter rolling average

Average: 2.8%

Sep. 2023: 1.2%

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. All data are as of September 30, 2023. Data are based on availability as of November 30, 2023.
U.S. real estate: NOI growth and transaction volumes

U.S. real estate transaction volumes
USD millions, seasonally adjusted, 2013 – present

Net operating income growth by property type
Rolling 4-quarter growth, 2013 – present

Source: NCREIF, RCA, J.P. Morgan Asset Management.
NOI is net operating income. Transaction volume and net operating income growth data are as of September 30, 2023.
Data are based on availability as of November 30, 2023.
U.S. real estate: Office leasing activity

U.S. office leasing activity
In million square feet, quarterly, 2016 – present

U.S. office executed rental rates
Base and effective rental rates per square foot, 2019 - present

Source: JLL, J.P. Morgan Asset Management. “U.S. Office Outlook – 3Q 2023,” JLL, November 2023. *Effective rent defined as the gross revenue from rental payments less rental concessions and tenant improvements. **Trophy rent is for the highest-quality properties, as defined by JLL, with building vintages under 10 years old. Data are based on availability as of November 30, 2023.
U.S. real estate: Office supply

U.S. office inventory
In million square feet, 1995 – present

Office real estate lease expiration and debt maturity
U.S. office commercial real estate

Data are based on availability as of November 30, 2023.
U.S. real estate: Retail

U.S. online retail sales by segment
% of total retail sales by segment, NSA

- 1Q18
- 3Q23

<table>
<thead>
<tr>
<th>Segment</th>
<th>1Q18</th>
<th>3Q23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other*</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Clothing and general merchandise</td>
<td>7%</td>
<td>9%</td>
</tr>
<tr>
<td>Furniture, building materials and electronics</td>
<td>9%</td>
<td>13%</td>
</tr>
<tr>
<td>Motor vehicle and parts</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Total online retail</td>
<td>9%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Change in number of retail establishments
1Q13 – 1Q23, percent

<table>
<thead>
<tr>
<th>Category</th>
<th>1Q23</th>
<th>3Q23</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>31.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goods-producing</td>
<td>20.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service-providing</td>
<td>33.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department/discount</td>
<td>38.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal care/services</td>
<td>29.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restaurants/bars</td>
<td>19.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacies and personal care</td>
<td>14.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grocery/liquor</td>
<td>14.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automobile dealers</td>
<td>10.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas stations</td>
<td>7.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furniture/furnishings</td>
<td>4.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronics/appliances</td>
<td>-2.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entertainment goods</td>
<td>-14.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clothing</td>
<td>-14.9%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

U.S. real estate: Industrial

U.S. industrial construction activity and vacancy rates
2022 – present

Under construction (in million s.f.)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Under Construction</th>
<th>Vacancy Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Q22</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>2Q22</td>
<td>587</td>
<td></td>
</tr>
<tr>
<td>3Q22</td>
<td>634</td>
<td></td>
</tr>
<tr>
<td>4Q22</td>
<td>633</td>
<td></td>
</tr>
<tr>
<td>1Q23</td>
<td>621</td>
<td></td>
</tr>
<tr>
<td>2Q23</td>
<td>588</td>
<td></td>
</tr>
<tr>
<td>3Q23</td>
<td>491</td>
<td></td>
</tr>
</tbody>
</table>

U.S. cities with highest industrial net absorption
Net absorption as a % of total deliveries, 3Q23

<table>
<thead>
<tr>
<th>City</th>
<th>Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savannah</td>
<td>71%</td>
</tr>
<tr>
<td>Houston</td>
<td>57%</td>
</tr>
<tr>
<td>Dallas/Fort Worth</td>
<td>55%</td>
</tr>
<tr>
<td>Eastern &amp; Central Penn.</td>
<td>50%</td>
</tr>
<tr>
<td>Phoenix</td>
<td>41%</td>
</tr>
<tr>
<td>Atlanta</td>
<td>39%</td>
</tr>
</tbody>
</table>

U.S. real estate: Residential

U.S. home price growth by city
S&P Case-Shiller Home Price Index, September 2023, y/y% change

- New York: 6.3%
- Chicago: 6.0%
- Boston: 5.3%
- Los Angeles: 5.2%
- Miami: 5.0%
- Washington D.C.: 4.4%
- Atlanta: 4.3%
- National home price: 3.9%
- Denver: 1.0%
- Seattle: 0.9%
- San Francisco: 0.5%
- Dallas: 0.3%
- Portland: 0.3%
- Phoenix: -1.2%

Investor market share by property type
2000 – 3Q23, 50 most populous U.S. metro areas

- Singe family:
  - Average: 20%
  - Min: 12%
  - Max: 35%
- Multi-family:
  - Average: 30%
  - Min: 12%
  - Current
- Condo/Co-op:
  - Average: 19%
- Townhouse:
  - Average: 19%

Source: FactSet, Standard & Poor’s, Robert Shiller, Redfin, J.P. Morgan Asset Management. Investor market share data is from Redfin and is derived using county sale records for homes purchased since January 2000. Redfin defines an investor “as any buyer whose name includes at least one of the following keywords: LLC, Inc, Trust, Corp, Homes” and as any buyer whose ownership code on a purchasing deed includes at least one of the following keywords: association, corporate trustee, company, joint venture, corporate trust. Data are based on availability as of November 30, 2023.
Europe real estate: Transaction volumes

European transaction volumes
Rolling year-over-year % change, 4Q08 – 3Q23

European transaction volumes by property type
2007 – 3Q23

Sep. 2023: -54.3%

Source: RCA, J.P. MorganAsset Management. Percentages may not sum to 100 due to rounding. Data are based on availability as of November 30, 2023.
Europe real estate: Yield and income

Prime yield by property type*
4Q87 – 3Q23

<table>
<thead>
<tr>
<th></th>
<th>3Q23</th>
<th>Avg. 4Q87 - '22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>5.0%</td>
<td>7.4%</td>
</tr>
<tr>
<td>Office</td>
<td>4.5%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Retail</td>
<td>4.3%</td>
<td>4.9%</td>
</tr>
</tbody>
</table>

Rent growth by property type
Year-over-year % change, 4Q87 – 3Q23

<table>
<thead>
<tr>
<th></th>
<th>3Q23</th>
<th>Avg. 4Q87 - '22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>8.7%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Office</td>
<td>4.9%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Retail</td>
<td>5.2%</td>
<td>4.9%</td>
</tr>
</tbody>
</table>

Source: CBRE ERIX, J.P. Morgan Asset Management. Industrial is represented by industrial logistics. Retail is represented by high street retail.
*Prime yields are absolute and weighted by property value.
Data are based on availability as of November 30, 2023.
Europe real estate: Office vacancy rates

Office vacancy rates by city
2010 – 3Q23

Office vacancy rates within cities
Total city vacancy rates vs. central business districts*, 3Q23

Source: CBRE ERIX, J.P. Morgan Asset Management. *Includes both central business districts (CBDs) and prime areas. Data are based on availability as of November 30, 2023.
Global real estate: Retail

Global online retail sales
Percent of total retail sales, 3Q23*

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 3Q23 except Japan, France, Germany, Spain and Italy, which are as of 2022. (Right) Statista, J.P. Morgan Asset Management. Retail space per capita per country data was published in November 2020 and represents retail square footage per person in 2018. Data are based on availability as of November 30, 2023.
Global real estate: Logistics

Global office and logistics pricing
Yields, 3Q 2023

Sources: CBRE, JLL, J.P. Morgan Asset Management. London is South East for Prime Office. Munich and Milan Prime Warehouse yields are based on country level aggregates. Data are based on availability as of November 30, 2023.
U.S. REITs and real estate

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 2Q23. Data are based on availability as of November 30, 2023.
### U.S. REIT sector returns

| Year | Lodging/Resorts | Mfgd. Homes | Self Storage | Industrial | Data Centers | Retail/Other | Industrial | Mfgd. Homes | Data Centers | Regional Malls | Retail/Other | Industrial | Mfgd. Homes | Data Centers | Regional Malls | Retail/Other | Industrial | Mfgd. Homes | Data Centers | Regional Malls |
|------|-----------------|-------------|-------------|------------|-------------|-------------|------------|-------------|-------------|-------------|-------------|------------|------------|-------------|-------------|-------------|------------|------------|-------------|-------------|-------------|
| 2013 | 27.2%           | 46.2%       | 40.6%       | 30.7%      | 28.4%       | 13.9%       | 49.1%      | 21.0%       | 92.1%       | -6.5%       | 32.1%       | 17.0%      | 30.1%      | 25.9%       | 0.3%        | 0.3%        | 15.4%      | 15.4%       | 15.4%       |
| 2014 | 10.5%           | 39.6%       | 25.6%       | 24.3%      | 24.9%       | 11.4%       | 48.7%      | 12.9%       | 79.4%       | -12.5%      | 11.3%       | 14.7%      | 28.5%      | 14.7%       | 14.7%       | 14.7%       | 14.7%       | 14.7%       | 14.7%       |
| 2015 | 9.5%            | 33.3%       | 16.5%       | 17.0%      | 20.6%       | 7.6%        | 44.2%      | 12.2%       | 65.1%       | 15.3%       | 10.7%       | 12.8%      | 26.0%      | 12.8%       | 12.8%       | 12.8%       | 12.8%       | 12.8%       |
| 2016 | 7.4%            | 32.6%       | 5.9%        | 14.2%      | 8.7%        | 3.7%        | 31.4%      | -1.7%       | 63.6%       | -22.2%      | 8.6%        | 7.2%       | 20.5%      | 7.2%        | 7.2%        | 7.2%        | 7.2%        | 7.2%        |
| 2017 | 5.6%            | 31.4%       | 4.2%        | 8.6%       | 5.2%        | -2.5%       | 26.3%      | -9.9%       | 42.0%       | -24.9%      | 2.7%        | 2.7%       | 20.2%      | 2.7%        | 2.7%        | 2.7%        | 2.7%        | 2.7%        |
| 2018 | 5.0%            | 30.0%       | 2.8%        | 6.4%       | 3.7%        | -4.0%       | 25.0%      | -10.5%      | 41.3%       | -26.7%      | 2.3%        | 2.3%       | 18.2%      | 2.3%        | 2.3%        | 2.3%        | 2.3%        | 2.3%        |
| 2019 | 2.9%            | 28.0%       | 2.6%        | 3.7%       | 3.7%        | -7.0%       | 24.8%      | -15.3%      | 25.5%       | -28.0%      | 0.1%        | 0.1%       | 16.4%      | 0.1%        | 0.1%        | 0.1%        | 0.1%        | 0.1%        |
| 2020 | -1.0%           | 25.9%       | 0.3%        | 2.9%       | 3.1%        | -12.8%      | 21.2%      | -18.4%      | 22.0%       | -28.3%      | -2.2%       | -2.2%      | 16.7%      | -2.2%       | -2.2%       | -2.2%       | -2.2%       | -2.2%       |
| 2021 | -6.2%           | 21.0%       | -7.2%       | -5.2%      | -6.9%       | -14.1%      | 15.6%      | -23.6%      | 19.7%       | -28.6%      | -4.7%       | -4.7%      | 15.6%      | -4.7%       | -4.7%       | -4.7%       | -4.7%       | -4.7%       |
| 2022 | -7.1%           | 9.7%        | -24.4%      | -8.1%      | -2.7%       | -14.5%      | 13.7%      | -27.6%      | 18.2%       | -32.0%      | -8.1%       | -8.1%      | 14.9%      | -8.1%       | -8.1%       | -8.1%       | -8.1%       | -8.1%       |
| 2023 | N/A             | N/A         | N/A         | N/A        | N/A         | N/A         | N/A        | N/A         | N/A         | N/A         | N/A         | N/A        | N/A        | N/A         | N/A         | N/A         | 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 are based on availability as of November 30, 2023.
Global infrastructure investment

Average annual infrastructure need
USD trillions, constant 2017 dollars

<table>
<thead>
<tr>
<th>Infrastructure Type</th>
<th>Need (USD Trillion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td>$0.9</td>
</tr>
<tr>
<td>Rail</td>
<td>$0.4</td>
</tr>
<tr>
<td>Ports</td>
<td>$0.1</td>
</tr>
<tr>
<td>Airports</td>
<td>$0.1</td>
</tr>
<tr>
<td>Power</td>
<td>$1.1</td>
</tr>
<tr>
<td>Water</td>
<td>$0.5</td>
</tr>
<tr>
<td>Telecom</td>
<td>$0.5</td>
</tr>
<tr>
<td>Total</td>
<td>$3.6</td>
</tr>
</tbody>
</table>

Infrastructure transactions

Infrastructure deal count and value

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of deals &lt; $1.5bn</th>
<th>Number of deals &gt;= $1.5bn</th>
<th>Aggregate value of deals &lt; $1.5bn</th>
<th>Aggregate value of deals &gt;= $1.5bn</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>400</td>
<td>100</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>2011</td>
<td>450</td>
<td>150</td>
<td>150</td>
<td>30</td>
</tr>
<tr>
<td>2012</td>
<td>500</td>
<td>200</td>
<td>200</td>
<td>50</td>
</tr>
<tr>
<td>2013</td>
<td>550</td>
<td>250</td>
<td>250</td>
<td>75</td>
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<td>2014</td>
<td>600</td>
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<td>2015</td>
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<td>2016</td>
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<td>2017</td>
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<td>2019</td>
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</tr>
<tr>
<td>2020</td>
<td>900</td>
<td>600</td>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td>2021</td>
<td>950</td>
<td>650</td>
<td>650</td>
<td>450</td>
</tr>
</tbody>
</table>

Source: Preqin, J.P. Morgan Asset Management. Transaction data are as of September 2021. Data are based on availability as of November 30, 2023.
Global core infrastructure returns
Rolling 4-quarter returns from income and capital appreciation

<table>
<thead>
<tr>
<th>Segment</th>
<th>Weight in index*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>45%</td>
</tr>
<tr>
<td>Water</td>
<td>15%</td>
</tr>
<tr>
<td>Communication</td>
<td>8%</td>
</tr>
<tr>
<td>Transport</td>
<td>29%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
</tr>
</tbody>
</table>

Source: MSCI, J.P. Morgan Asset Management. Infrastructure returns represented by the MSCI Global Quarterly Infrastructure Asset Index. Data show rolling one-year returns from income and capital growth. The chart shows the full index history, beginning in 1Q09, and ending in 1Q23. *Weights are based on enterprise value. Past performance is not indicative of future results. Alternative investments carry more risk than traditional investments and are recommended only for long-term investment. Some alternative investments may be highly leveraged and rely on speculative investments that can magnify the potential for loss or gain. Diversification does not guarantee investment returns or eliminate the risk of loss. Data are based on availability as of November 30, 2023.
Utility profitability and household spending

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 2022, and annual inflation from 1968 through 2020. *Return on equity is lagged by 2 years. Utility spending is as of June 2023. Data are based on availability as of November 30, 2023.
U.S. electricity and the energy transition

Planned U.S. electricity generating capacity 2023

- **Total retirements:** 3.1GW
  - Coal: 57%
  - Natural gas: 0.1%
  - Petroleum*: 14%
  - Other*: 2.1%
  - Solar: 6%
  - Wind: 18%
  - Batteries: 19%
  - Nuclear: 48%
- **Total additions:** 20.5 GW
  - Coal: 19%
  - Natural gas: 6%
  - Petroleum*: 18%
  - Other*: 6%
  - Solar: 57%
  - Wind: 14%
  - Batteries: 20%
  - Nuclear: 2%
  - Other**: 0%

Share of global commodities mining production by region 2022

- Rare earths
- Zinc
- Nickel
- Lithium*
- Copper
- Cobalt


(Left) 2023 planned capacity retirements and additions are from the October 2023 Monthly Electric Generator Inventory report published by the EIA and uses net summer capacity to illustrate share of retirements and additions. *Other retirements include conventional hydroelectric, wood/wood/ waste biomass, landfill gas, onshore wind turbine, batteries, and other gases. **Other additions include batteries, geothermal, conventional hydroelectric, petroleum, biomass, and landfill gas. (Right) *U.S. lithium mining production is excluded in this analysis in order to protect individual company information. North America excludes the U.S. APAC excludes China. Data are based on availability as of November 30, 2023.
Renewable energy infrastructure

Number of electricity vehicle charging points
In thousands, U.S.

State power balances
Net electricity generation**, in million MWh, 2022

Source: EIA, IEA, J.P. Morgan Asset Management. *Forecasts are from the IEA and are made assuming their "STEPS" outlook. The State Policies Scenario (STEPS) outlook from the IEA does not assume governments will meet announced policy goals and instead looks at what the IEA considers feasible given current progress. **Net electricity generation is calculated as total electricity generation minus total retail sales of electricity. Data are based on availability as of November 30, 2023.
Forestry, inflation and carbon offsets

Timber returns and inflation
Headline CPI, NCREIF Timberland Index, 5-yr. annualized change

Global emissions covered by carbon pricing initiatives
% of global greenhouse gas emissions

Source: BLS, NCREIF, World Bank, J.P. Morgan Asset Management.
Data are based on availability as of November 30, 2023.
Shipping trends: Orderbook

Global fleet and orderbook
Gross tonnage

Orderbook as a % fleet

World fleet
Orderbook

Idle containership capacity as % of fleet

Global fleet age
+100 gross tonnage, years

Source: Clarksons Research, MSI, Sea/Net, J.P. Morgan Asset Management.
Data are based on availability as of November 30, 2023.
Shipping trends: Pricing and port calls

Global shipping costs
USD per 40-foot container, weekly

Global port call duration*
Number of days, 30-day moving average

Source: Bloomberg, Clarksons Research, MSI, Sea/net, J.P. Morgan Asset Management. Port calls defined as all instances of a vessel entering and leaving a defined port location, excluding instances where vessel not recorded as travelling at less than 1 knot, and combining multiple consecutive instances at the same port where the vessel has not left a buffered shape around the port. Data basis date vessel last recorded in port location. *Global Port Calls excludes calls at ports by tugs. **U.S. and Europe port calls are of deep-sea cargo vessels, which only includes larger bulkers. Port call duration is defined as the average number of days spent by the vessels seen at a location. The duration is calculated using the total number of hours a vessel spent at location to complete the visit based on the time arrival and time of departure. Data are based on availability as of November 30, 2023.
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. In its “accelerated case” scenario, the IEA projects renewable capacity increases more quickly due to countries addressing policy, regulatory, and financial challenges. Data are based on availability as of November 30, 2023.
Aircraft trends

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

<table>
<thead>
<tr>
<th>Year</th>
<th>1993</th>
<th>2000</th>
<th>2010</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>10.4</td>
<td>11.8</td>
<td>12.7</td>
<td>13.3</td>
<td>13.4</td>
</tr>
</tbody>
</table>

Percent of industry wide aviation fleet leased*
Global

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lease</td>
<td>0%</td>
<td>10%</td>
<td>20%</td>
<td>30%</td>
<td>40%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Narrow-body aircraft demand**
Year-to-date October 2023, number

- Deliveries: 797
- Gross orders: 1,906
- Backlogs: 11,796

Wide-body aircraft demand**
Year-to-date October 2023, number

- Deliveries: 167
- Gross orders: 464
- Backlogs: 1,994

**U.S. public vs. private equity**

**Number of listed U.S. companies* and market cap.**
Number, S&P 500 market capitalization in USD trillions

**Private vs. public equity sector weights**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Russell 2000</th>
<th>U.S. private equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tech</td>
<td>12.7%</td>
<td>37.1%</td>
</tr>
<tr>
<td>Healthcare</td>
<td>16.4%</td>
<td>14.1%</td>
</tr>
<tr>
<td>Industrials</td>
<td>14.7%</td>
<td>15.1%</td>
</tr>
<tr>
<td>Cons. Disc.</td>
<td>9.9%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Financials</td>
<td>17.1%</td>
<td></td>
</tr>
<tr>
<td>Comm. Services</td>
<td>2.9%</td>
<td>5.9%</td>
</tr>
<tr>
<td>Other**</td>
<td>3.2%</td>
<td>18.6%</td>
</tr>
</tbody>
</table>

*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, 2022.

Data are based on availability as of November 30, 2023.
U.S. applications for business formation
Seasonally adjusted, thousands

Recession

Growth in business establishments by private industry
December 2019 – March 2023

Total 15%
Information* 46%
Other services** 26%
Professional and business services 24%
Education and health services 17%
Service-providing 16%
Financial activities 14%
Construction 9%
Manufacturing 9%
Goods-producing 8%
Leisure and hospitality 7%
Trade, transportation, and utilities 5%
Natural resources and mining 2%

Business formation data are as of 3Q23. *Information includes broadcasting (excluding internet), data processing, hosting and related services, motion picture and sound recording industries, publishing industries (excluding internet) and telecommunications.**Other services includes unclassified businesses.
Data are based on availability as of November 30, 2023.
Private equity valuations

U.S. LBOs: purchase price multiples
Equity and debt over trailing EBITDA

U.S. middle market private company revenues by sector
3Q23, year-over-year growth

U.S. middle market private company earnings by sector
3Q23, year-over-year growth

Source: Golub Capital, PitchBook, LCD, J.P. Morgan Asset Management. Purchase price multiples are as of September 30, 2023. Middle market revenue and earnings data are from the Golub Capital Altman Index. “The Golub Capital Altman Index measures the actual revenue and EBITDA (earnings before interest, taxes, depreciation and amortization) growth of US middle market private companies for the first two months of each calendar quarter and provides insight into anticipated quarterly performance of US public companies. The index is based on aggregated data from approximately 150 companies in the loan portfolio of Golub Capital, a leading middle market lender.” Data are based on availability as of November 30, 2023.
Private equity deals and exits

U.S. private equity deals
USD billions

<table>
<thead>
<tr>
<th>Sector</th>
<th>YTD</th>
<th>Avg. '07 - '22</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2B</td>
<td>35.0%</td>
<td>28.6%</td>
</tr>
<tr>
<td>B2C</td>
<td>9.7%</td>
<td>18.4%</td>
</tr>
<tr>
<td>Natural resources</td>
<td>8.8%</td>
<td>13.7%</td>
</tr>
<tr>
<td>Financial services</td>
<td>16.1%</td>
<td>8.6%</td>
</tr>
<tr>
<td>Health care</td>
<td>11.2%</td>
<td>12.5%</td>
</tr>
<tr>
<td>Technology</td>
<td>19.1%</td>
<td>18.1%</td>
</tr>
</tbody>
</table>

Private equity exits by type
USD billions

<table>
<thead>
<tr>
<th>Type</th>
<th>YTD</th>
<th>Avg. '07 - '22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary buyout</td>
<td>42.5%</td>
<td>37.2%</td>
</tr>
<tr>
<td>Public listing</td>
<td>3.0%</td>
<td>17.9%</td>
</tr>
<tr>
<td>Corporate acquisition</td>
<td>54.5%</td>
<td>44.9%</td>
</tr>
</tbody>
</table>

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, 2023.
Data are based on availability as of November 30, 2023.
Private equity deals by size and type

U.S. private equity deals by size
% of total deals, 2007 – 3Q23

Max: 56.7%
Median: 46.3%
Min: 37.4%

Current

0% 10% 20% 30% 40% 50% 60%
<$25M $25-100M $100-500M >$500M

U.S. private equity deals by type
% of total deals, 2007 – 3Q23

Max: 41.5%
Median: 31.4%
Min: 18.8%

Current

0% 10% 20% 30% 40% 50% 60% 70%
Buyout/LBO Add-on PE growth/expansion

Max: 62.2%
Median: 47.6%

Current

Max: 40.5%
Median: 31.4%
Min: 19.1%

6.4% 3.9% 2.3%
22.7% 15.8% 15.4%

Source: PitchBook J.P. Morgan Asset Management. Private equity deal size and type activity are as September 30, 2023. Data are based on availability as of November 30, 2023.
Private equity returns

Global private equity return dispersion by vintage year
2000 - 2020, Internal rate of return (IRR)

Secondary market

Secondary market volume
USD billions

Secondary pricing*
Percent of net asset value (NAV), 1H23

**Investment and exit activity**

Number of investments/number of exits

<table>
<thead>
<tr>
<th>Year</th>
<th>Venture capital</th>
<th>Private equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>'23</td>
<td>13.5x</td>
<td>6.5x</td>
</tr>
<tr>
<td>'22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'20</td>
<td></td>
<td></td>
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<tr>
<td>'19</td>
<td></td>
<td></td>
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<td>'18</td>
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<tr>
<td>'17</td>
<td></td>
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<tr>
<td>'16</td>
<td></td>
<td></td>
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<tr>
<td>'15</td>
<td></td>
<td></td>
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<tr>
<td>'14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Average: 10.7x

**Venture capital IPO price-to-sales**

1980 – 2022, market price

<table>
<thead>
<tr>
<th>Year</th>
<th>Average: 8.0x</th>
</tr>
</thead>
<tbody>
<tr>
<td>'22</td>
<td>6.0x</td>
</tr>
<tr>
<td>'07</td>
<td>5.0x</td>
</tr>
<tr>
<td>'02</td>
<td>4.0x</td>
</tr>
<tr>
<td>'80</td>
<td>3.0x</td>
</tr>
</tbody>
</table>

Source: PitchBook, Cordell Eminent Scholar, Eugene F. Brigham Department of Finance, Insurance, and Real Estate Warrington College of Business, University of Florida, J.P. Morgan Asset Management. *Number of investments is defined as deal count. Investment and exit activity data are as of 3Q23. Data are based on availability as of November 30, 2023.
Global M&A

Global M&A by acquirer type
USD billions

<table>
<thead>
<tr>
<th></th>
<th>YTD</th>
<th>Avg. '07 - '22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate M&amp;A</td>
<td>58%</td>
<td>69%</td>
</tr>
<tr>
<td>Sponsor-backed</td>
<td>42%</td>
<td>31%</td>
</tr>
</tbody>
</table>

North America and Europe M&A multiples by sector
Enterprise value/EBITDA, 3Q23

<table>
<thead>
<tr>
<th>Sector</th>
<th>Trailing 12-month multiples</th>
<th>Average: 2010 - 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>7.8x</td>
<td>8.6x</td>
</tr>
<tr>
<td>Materials &amp; Resources</td>
<td>6.9x</td>
<td>8.3x</td>
</tr>
<tr>
<td>B2B</td>
<td>5.0x</td>
<td>8.2x</td>
</tr>
<tr>
<td>B2C</td>
<td>5.0x</td>
<td>8.2x</td>
</tr>
<tr>
<td>Financial Services</td>
<td>9.9x</td>
<td>10.4x</td>
</tr>
<tr>
<td>Technology</td>
<td>10.5x</td>
<td>11.3x</td>
</tr>
<tr>
<td>Health Care</td>
<td>12.3x</td>
<td>12.5x</td>
</tr>
</tbody>
</table>

Source: PitchBook, J.P. Morgan Asset Management. M&A deal data are as of September 30, 2023. Percentages may not sum to 100 due to rounding. Data are based on availability as of November 30, 2023.
Private debt fundraising by type
USD billions

- Real estate & infra. debt
- Mezzanine
- Distressed & special situations
- Direct lending
- Other*

YTD Nov. 2023

Sources: Preqin, J.P. Morgan Asset Management. *Other includes venture debt and fund of funds. Data are based on availability as of November 30, 2023.
Credit returns across recent economic cycles

**Expansion**
Manufacturing ISM > 50 and rising

<table>
<thead>
<tr>
<th>10y UST</th>
<th>2y UST</th>
<th>U.S. IG</th>
<th>U.S. HY</th>
<th>U.S. leveraged loans</th>
<th>U.S. direct lending</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0%</td>
<td>0.3%</td>
<td>0.9%</td>
<td>2.5%</td>
<td>1.7%</td>
<td>2.9%</td>
</tr>
</tbody>
</table>

**Recession**
Manufacturing ISM < 50 and falling

<table>
<thead>
<tr>
<th>10y UST</th>
<th>2y UST</th>
<th>U.S. IG</th>
<th>U.S. HY</th>
<th>U.S. leveraged loans</th>
<th>U.S. direct lending</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4%</td>
<td>0.6%</td>
<td>2.0%</td>
<td>1.2%</td>
<td>0.6%</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

**Late cycle cooling**
Manufacturing ISM > 50 and falling

<table>
<thead>
<tr>
<th>10y UST</th>
<th>2y UST</th>
<th>U.S. IG</th>
<th>U.S. HY</th>
<th>U.S. leveraged loans</th>
<th>U.S. direct lending</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3%</td>
<td>0.4%</td>
<td>0.6%</td>
<td>0.6%</td>
<td>0.7%</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

**Turnaround**
Manufacturing ISM < 50 and rising

<table>
<thead>
<tr>
<th>10y UST</th>
<th>2y UST</th>
<th>U.S. IG</th>
<th>U.S. HY</th>
<th>U.S. leveraged loans</th>
<th>U.S. direct lending</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1.0%</td>
<td>-1.0%</td>
<td>0.8%</td>
<td>0.9%</td>
<td>4.5%</td>
<td>4.3%</td>
</tr>
</tbody>
</table>

Credit market stress

U.S. leveraged loans downgrade/upgrade ratio
Rolling 3-month average

Oct. 2023: 1.6x

U.S. leveraged loans amendments and extensions by year
Count

Data are based on availability as of November 30, 2023.
U.S. regional banks and credit market participants

**Tier 1 risk-based capital ratios by asset size**
Percentage, quarterly, 4Q96 – 2Q23

- $1 billion - $10 billion
- $10 billion - $250 billion
- > $250 billion

**Primary market sources of financing**
1999 - 2022

<table>
<thead>
<tr>
<th>Participant</th>
<th>2022</th>
<th>Avg. '00 - 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-bank*</td>
<td>75%</td>
<td>79%</td>
</tr>
<tr>
<td>Banks &amp; securities firms</td>
<td>25%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Direct lending and the bank loan market

**Leveraged loans vs. private credit sector exposure**

- **Leveraged loans**
  - Industrials: 18%
  - Info. Tech: 4%
  - Health care: 8%
  - Consumer discretionary: 11%
  - Communication services: 11%
  - Materials: 22%

- **Private credit**
  - Industrials: 3%
  - Info. Tech: 22%
  - Financials: 6%
  - Real estate: 12%
  - Consumer staples: 42%
  - Energy: 16%
  - Utilities: 13%

**Covenant-lite loans**

% of total loans, 4Q10 – 3Q23, quarterly

- Large middle market ($501M+)
- Middle market

**Private credit and leverage loans default rate**

Quarterly, 2Q20 – 3Q23

- Private Credit
- Leveraged loans

Source: Cliffwater, LCD, Standard & Poor’s, Proskauer, J.P. Morgan Markets Research, J.P. Morgan Asset Management. *For private credit, information technology includes business services. Private credit sector exposure as of September 30, 2023. Leveraged loans sector exposure as of October 2023. **Covenant-lite loans are a type of financing that is issued with fewer restrictions on the borrower regarding collateral, level of income, and loan payment terms, and fewer protections for the lender, including financial maintenance tests that measure debt-service capabilities of the borrower. All leveraged loans data are from the Morningstar LSTSA U.S. Leveraged Loan Index. The leveraged loans default rate is calculated using the LTM number of defaults as a % of total issuers. The private credit default rate is calculated by dividing the number of defaulted loans by the aggregate number of loans in the Index. Data are based on availability as of November 30, 2023.
U.S. distressed loans

U.S. distressed loan volume
In USD billions, last-twelve-months

Bankruptcy filings by year
U.S., 2008 – 3Q23, in thousands

Share of leveraged loan defaults by industry
U.S., October 2023, last twelve months, % of total default volume

Source: Pitchbook, LCD, Morningstar, United States Courts, J.P. Morgan Asset Management. Distressed and default leveraged loan data are from the Morningstar LSTSA U.S. Leveraged Loan Index, which defines distressed loans as performing leveraged loans priced below 80 cents on the dollar. *Health care includes providers and services.

Data are based on availability as of November 30, 2023.
Sources of LBO financing
Bank syndicated loan and private credit markets, quarterly

Sponsored and non-sponsored leveraged loan spreads
Weighted average nominal spreads, monthly, since 1997

Current Long-term average*
Sponsored 402.2 353.9
Non-sponsored 312.2 309.4
Difference 90.0 44.5

Source: Pitchbook, LCD, Morningstar LSTSA U.S. Leveraged Loan Index. LBO financing and Sponsored and non-sponsored leveraged loan data are as of September 30, 2023. *Averages are since 1997. Data are based on availability as of November 30, 2023.
Commercial mortgage loans

Commercial mortgage spreads
Spreads over Treasury, basis points, senior loans

<table>
<thead>
<tr>
<th>Asset class</th>
<th>Current spread</th>
<th>Avg. '14 - '22</th>
</tr>
</thead>
<tbody>
<tr>
<td>CML index</td>
<td>254.4</td>
<td>211.2</td>
</tr>
<tr>
<td>A-rated CML</td>
<td>235.0</td>
<td>194.6</td>
</tr>
<tr>
<td>BBB-rated CML</td>
<td>273.8</td>
<td>227.7</td>
</tr>
<tr>
<td>U.S. Corp. IG**</td>
<td>106.4</td>
<td>126.8</td>
</tr>
</tbody>
</table>

Commercial mortgage yields
12-month income return, unlevered, senior loans, 3Q23

Source: Bloomberg, Gilberto-Levy, FactSet, J.P. Morgan Asset Management. All spreads are as of August 2023. *Aggregate: Gilberto-Levy Commercial Mortgage Loans Performance Index. **Other sectors includes hotels, motels, mixed-use, and miscellaneous. ***U.S. Corp. IG: Bloomberg U.S. Corporate Investment Grade Index. The income return shown for U.S. Corp. IG is the last 12-month average yield to worst as of September 30, 2023. Commercial mortgage spreads are from a J.P. Morgan survey and are calculated as the difference between the average yield as indicated by the survey and the yield of a U.S. Treasury security with a similar duration. Data are based on availability as of November 30, 2023.
## Hedge fund strategy returns

<table>
<thead>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Equities</td>
<td>23.4%</td>
<td>Global Macro</td>
<td>5.8%</td>
<td>Eq. Market Neutral</td>
<td>4.5%</td>
<td>Distressed</td>
<td>9.8%</td>
<td>Global Equities</td>
<td>24.6%</td>
<td>Merger Arbitrage</td>
<td>4.3%</td>
<td>Global Equities</td>
</tr>
<tr>
<td>Distressed</td>
<td>15.1%</td>
<td>Relative Value</td>
<td>5.3%</td>
<td>Merger Arbitrage</td>
<td>2.6%</td>
<td>Global Equities</td>
<td>8.5%</td>
<td>Equity Long/Short</td>
<td>12.8%</td>
<td>Relative Value</td>
<td>2.1%</td>
<td>Global Bonds</td>
</tr>
<tr>
<td>Equity Long/Short</td>
<td>14.5%</td>
<td>Global Equities</td>
<td>4.7%</td>
<td>Global Macro</td>
<td>0.4%</td>
<td>Relative Value</td>
<td>5.4%</td>
<td>HFRI Composite</td>
<td>8.5%</td>
<td>Distressed</td>
<td>2.1%</td>
<td>Equity Long/Short</td>
</tr>
<tr>
<td>HFRI Composite</td>
<td>9.6%</td>
<td>HFRI Composite</td>
<td>4.3%</td>
<td>Relative Value</td>
<td>0.2%</td>
<td>Merger Arbitrage</td>
<td>3.5%</td>
<td>Distressed</td>
<td>7.7%</td>
<td>Eq. Market Neutral</td>
<td>0.6%</td>
<td>Global Macro</td>
</tr>
<tr>
<td>Relative Value</td>
<td>7.5%</td>
<td>Equity Long/Short</td>
<td>3.6%</td>
<td>Equity Long/Short</td>
<td>-0.2%</td>
<td>Global Bonds</td>
<td>7.4%</td>
<td>Global Bonds</td>
<td>-1.2%</td>
<td>Global Bonds</td>
<td>-1.2%</td>
<td>HFRI Composite</td>
</tr>
<tr>
<td>Eq. Market Neutral</td>
<td>6.4%</td>
<td>Eq. Market Neutral</td>
<td>3.2%</td>
<td>HFRI Composite</td>
<td>3.2%</td>
<td>Relative Value</td>
<td>5.5%</td>
<td>Merger Arbitrage</td>
<td>-1.2%</td>
<td>Merger Arbitrage</td>
<td>5.3%</td>
<td>Global Macro</td>
</tr>
<tr>
<td>Merger Arbitrage</td>
<td>5.3%</td>
<td>Merger Arbitrage</td>
<td>1.9%</td>
<td>Global Equities</td>
<td>-1.8%</td>
<td>Global Bonds</td>
<td>2.1%</td>
<td>Merger Arbitrage</td>
<td>5.0%</td>
<td>Equity Long/Short</td>
<td>-2.2%</td>
<td>Relative Value</td>
</tr>
<tr>
<td>Global Macro</td>
<td>0.1%</td>
<td>Distressed</td>
<td>1.2%</td>
<td>Global Bonds</td>
<td>-3.2%</td>
<td>Eq. Market Neutral</td>
<td>1.6%</td>
<td>Eq. Market Neutral</td>
<td>4.9%</td>
<td>Eq. Market Neutral</td>
<td>4.9%</td>
<td>Global Macro</td>
</tr>
<tr>
<td>Global Bonds</td>
<td>-2.6%</td>
<td>Global Bonds</td>
<td>0.6%</td>
<td>Distressed</td>
<td>-7.4%</td>
<td>Global Macro</td>
<td>-1.3%</td>
<td>Global Macro</td>
<td>2.5%</td>
<td>Distressed</td>
<td>-0.7%</td>
<td>Eq. Market Neutral</td>
</tr>
</tbody>
</table>

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

Global equities reflect the MSCI AC World Index and global bonds reflect the Bloomberg Global Aggregate Index. All hedge fund returns are from HFRI, HFRI Composite, HFRI FW Composite Index. Returns may fluctuate as hedge fund reporting occurs on a lag. Please see disclosure pages for index definitions.

Data are based on availability as of November 30, 2023.
Hedge funds and manager selection

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 are as of 3Q23.
Data are based on availability as of November 30, 2023.
Hedge funds and traditional portfolios

Hedge fund correlation with a 60/40 stock-bond portfolio*
1990 – present, monthly

Sources: HFRI, Standard & Poor’s, Bloomberg, FactSet, J.P. Morgan Asset Management.
*60/40 portfolio is 60% S&P 500 and 40% Bloomberg U.S. Aggregate. Hedge funds are represented by HFRI Macro. Correlation is calculated on a 12-month rolling basis.
Data are based on availability as of November 30, 2023.
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 aggregate total return due to rounding. Macro hedge fund relative performance volatility is over the last 30 years.

Data are based on availability as of November 30, 2023.
Equity market dispersion and positioning

S&P 500 Index dispersion*
Monthly, 1991 – present

Hedge fund sector exposure relative to S&P 500
3Q23

Source: Standard & Poor’s, SEC, HFRI, FactSet J.P. Morgan Asset Management.
* S&P 500 Index dispersion is calculated as the annualized, index-weighted standard deviation of the index constituent’s’ full-month total returns.
Hedge fund positioning relative to the S&P is compiled using aggregated data from the SEC Form 13F and Standard & Poor’s.
Data are based on availability as of November 30, 2023.
Volatility, rates, and hedge fund returns

Equity, interest rate and foreign exchange volatility
Z-score, 4-week moving average

Hedge fund returns and short-term rates
December 1990 – present, monthly, year-over-year total returns

Source: CBOE, ICE BofA, J.P. Morgan Index Research, HFRI, FactSet, J.P. Morgan Asset Management. Equity volatility is represented by the VIX Index, interest rate volatility is represented by the MOVE Index and foreign exchange volatility is represented by the J.P. Morgan Global FX Volatility Index. Data are based on availability as of November 30, 2023.
J.P. Morgan Asset Management – Definitions

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 underlining 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.


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 (H/S) Equity involves long and/or short positions in equity securities deemed to be under- or overvalued, respectively. Exposures to sectors, geography, or 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 below the initial value, and later returns show profits above the initial level.

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

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

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

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

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

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

Net IRR – The dollar-weighted internal rate of return, net of management fees and carried interest generated by the fund. This return considers the daily timing of all cash flows and the cumulative fair stated value, as of the end of the reported period.
Open-ended fund – As it relates to private alternatives (not mutual fund structure), an open-ended fund is a fund that has no stated term or maturity and allows clients to invest and redeem on an ongoing basis. The frequency of investments (aka subscriptions) and/or redemptions may vary. Redemptions from open-ended private alternative funds generally require advance notice in writing.

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

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

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

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

Preferred return – Also known as Hurdle Rate.

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

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

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

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

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

Return on equity (RoE) – Amount of net income returned as a percentage of shareholders’ equity.

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

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

Tax documents – See K-1.

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

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

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

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

Write-down – A reduction in the value of an investment.
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Guide to Alternatives

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