Guide to Alternatives

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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 and timber funds. 2021 fundraising figures are as of 3Q21, Data is based on availability as of November 30, 2021.
Dry powder by asset class
Cumulative dry powder, USD billions

<table>
<thead>
<tr>
<th>Asset class</th>
<th>Current*</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondaries</td>
<td>$155</td>
<td>5%</td>
</tr>
<tr>
<td>Fund of funds</td>
<td>$147</td>
<td>4%</td>
</tr>
<tr>
<td>Private debt</td>
<td>$448</td>
<td>13%</td>
</tr>
<tr>
<td>Real assets*</td>
<td>$725</td>
<td>22%</td>
</tr>
<tr>
<td>Venture capital</td>
<td>$444</td>
<td>13%</td>
</tr>
<tr>
<td>Private equity</td>
<td>$1,421</td>
<td>43%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$3,340</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Pitchbook, J.P. Morgan Asset Management. *Dry powder data is as of March 31, 2021. Percentages may not sum to 100 due to rounding.
*Real assets dry powder includes real estate & infrastructure.
Data is based on availability as of November 30, 2021.
Public and private market correlations
Quarterly returns

2008 - 2021

|  | Global Bonds | Global Equities | U.S. Core RE | Europe Core RE* | APAC Core RE | Global Core Infra | Transport | Timber | Direct Lending | Venture Capital | Private Equity | Equity Long/Short | Relative Value | Macro | Bitcoin |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Global Bonds | 1.0 | | | | | | | | | | | | | | | |
| Global Equities | -0.3 | -0.1 | 0.1 | 0.8 | 0.7 | 1.0 | | | | | | | | | | |
| U.S. Core RE | -0.1 | -0.2 | 0.3 | 0.1 | 0.8 | 0.7 | 1.0 | | | | | | | | | |
| Europe Core RE* | -0.2 | 0.3 | -0.1 | | | | | | | | | | | | | |
| APAC Core RE | -0.1 | 0.1 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 | 1.0 | | | | | | | | |
| Global Core Infra | -0.1 | -0.1 | 0.3 | 0.0 | 0.2 | 1.0 | | | | | | | | | | |
| Transport | -0.1 | 0.0 | 0.7 | 0.6 | 0.6 | 0.1 | 1.0 | | | | | | | | | |
| Timber | -0.2 | -0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 1.0 | | | | | | | | |
| Direct Lending | 0.0 | 0.7 | 0.3 | 0.4 | 0.3 | 0.2 | 0.2 | -0.1 | 1.0 | | | | | | | |
| Venture Capital | 0.0 | 0.6 | 0.3 | 0.6 | 0.3 | 0.1 | 0.3 | 0.1 | 0.5 | 1.0 | | | | | | |
| Private Equity | 0.2 | 0.9 | 0.3 | 0.5 | 0.4 | 0.0 | 0.3 | -0.1 | 0.8 | 0.8 | 1.0 | | | | | |
| Equity Long/Short | 0.2 | 1.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.3 | -0.1 | 0.7 | 0.7 | 0.9 | 1.0 | | | | |
| Relative Value | 0.2 | 0.9 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | -0.2 | 0.9 | 0.5 | 0.8 | 0.9 | 1.0 | | | |
| Macro | 0.3 | 0.4 | -0.1 | 0.0 | -0.1 | 0.0 | -0.1 | 0.0 | 0.2 | 0.4 | 0.3 | 0.5 | 0.4 | 1.0 | | |
| Bitcoin | 0.1 | 0.1 | 0.3 | -0.2 | 0.1 | 0.5 | 0.2 | 0.0 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 1.0 | |


Data is based on availability as of November 30, 2021.
Alternatives and manager selection

Private and public manager dispersion
Based on returns over a 10 year window*

-5% 0% 5% 10% 15% 20% 25% 30% 35%

Top quartile
Global equities: 12.5%
Global bonds: 10.7%
U.S. core real estate: 10.4%
U.S. non-core real estate: 16.3%
Global private equity: 24.5%
U.S. venture capital: 32.0%
Hedge funds: 12.9%

Bottom quartile
Global equities: 1.5%
Global bonds: 2.7%
U.S. core real estate: 9.3%
U.S. non-core real estate: 5.4%
Global private equity: 1.6%
U.S. venture capital: 0.5%
Hedge funds: -1.7%


Global equities (large cap) and global bonds dispersion are based on the world large stock and world bond categories, respectively. *Manager dispersion is based on the annual returns for global equities, global bonds, and U.S. core real estate over a 10 year period ending 3Q 2021. Hedge fund returns are based on annual returns from Nov. 2011 – Oct. 2021. U.S. non-core real estate, global private equity and U.S. venture capital are represented by the 10-year horizon internal rate of return (IRR) ending 2Q 2021.

Data is based on availability as of November 30, 2021.
Manager dispersion across alternative assets
Based on returns over a 10 year window*

![Bar chart showing manager dispersion across alternative assets.](chart)

**Manager dispersion across alternative assets**
Based on returns over a 10 year window*

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Core / Core + alternatives</th>
<th>Non-core alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top quartile</td>
<td>11%</td>
<td>19%</td>
</tr>
<tr>
<td>Bottom quartile</td>
<td>8%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Based on returns over a 10 year window. U.S. Core real estate and infrastructure are represented by the 10-year horizon time-weighted return (TWR) ending 4Q20. Hedge fund returns are represented by the 10-year horizon time-weighted return (TWR) ending 1Q21. U.S. non-core real estate, global private equity and U.S. venture capital are represented by the 10-year horizon internal rate of return (IRR) ending 4Q 2020.

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

Asset class yields

<table>
<thead>
<tr>
<th>Percent</th>
<th>0%</th>
<th>1%</th>
<th>2%</th>
<th>3%</th>
<th>4%</th>
<th>5%</th>
<th>6%</th>
<th>7%</th>
<th>8%</th>
<th>9%</th>
<th>10%</th>
<th>11%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Transport</td>
<td>10.9%</td>
<td>8.8%</td>
<td>6.0%</td>
<td>4.8%</td>
<td>4.6%</td>
<td>4.6%</td>
<td>4.2%</td>
<td>4.1%</td>
<td>4.0%</td>
<td>3.9%</td>
<td>3.4%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Direct Lending</td>
<td>6.0%</td>
<td>4.8%</td>
<td>4.6%</td>
<td>4.6%</td>
<td>4.2%</td>
<td>4.1%</td>
<td>4.0%</td>
<td>3.9%</td>
<td>3.4%</td>
<td>3.3%</td>
<td>2.4%</td>
<td>2.1%</td>
</tr>
<tr>
<td>CML - Mezz</td>
<td>4.8%</td>
<td>4.6%</td>
<td>4.6%</td>
<td>4.2%</td>
<td>4.1%</td>
<td>4.0%</td>
<td>3.9%</td>
<td>3.4%</td>
<td>3.3%</td>
<td>2.4%</td>
<td>2.1%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Global Infra. Eq.</td>
<td>4.6%</td>
<td>4.6%</td>
<td>4.2%</td>
<td>4.1%</td>
<td>4.0%</td>
<td>3.9%</td>
<td>3.4%</td>
<td>3.3%</td>
<td>2.4%</td>
<td>2.1%</td>
<td>1.7%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Preferreds</td>
<td>4.6%</td>
<td>4.6%</td>
<td>4.2%</td>
<td>4.1%</td>
<td>4.0%</td>
<td>3.9%</td>
<td>3.4%</td>
<td>3.3%</td>
<td>2.4%</td>
<td>2.1%</td>
<td>1.7%</td>
<td>1.4%</td>
</tr>
<tr>
<td>APAC Real Estate</td>
<td>4.2%</td>
<td>4.1%</td>
<td>4.0%</td>
<td>3.9%</td>
<td>3.4%</td>
<td>3.3%</td>
<td>2.4%</td>
<td>2.1%</td>
<td>1.7%</td>
<td>1.4%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Europe Real Estate</td>
<td>4.1%</td>
<td>4.0%</td>
<td>3.9%</td>
<td>3.4%</td>
<td>3.3%</td>
<td>2.4%</td>
<td>2.1%</td>
<td>1.7%</td>
<td>1.4%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>U.S. High Yield</td>
<td>4.0%</td>
<td>3.9%</td>
<td>3.4%</td>
<td>3.3%</td>
<td>2.4%</td>
<td>2.1%</td>
<td>1.7%</td>
<td>1.4%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>U.S. Real Estate</td>
<td>3.9%</td>
<td>3.4%</td>
<td>3.3%</td>
<td>2.4%</td>
<td>2.1%</td>
<td>1.7%</td>
<td>1.4%</td>
<td>0.1%</td>
<td>0.1%</td>
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</tr>
<tr>
<td>Timber</td>
<td>3.4%</td>
<td>3.3%</td>
<td>2.4%</td>
<td>2.1%</td>
<td>1.7%</td>
<td>1.4%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Global REITs</td>
<td>3.3%</td>
<td>2.4%</td>
<td>2.1%</td>
<td>1.7%</td>
<td>1.4%</td>
<td>0.1%</td>
<td>0.1%</td>
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<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>International Equity</td>
<td>2.4%</td>
<td>2.1%</td>
<td>1.7%</td>
<td>1.4%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>U.S. Equity</td>
<td>2.1%</td>
<td>1.7%</td>
<td>1.4%</td>
<td>0.1%</td>
<td>0.1%</td>
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<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>U.S. 10-Year</td>
<td>1.7%</td>
<td>1.4%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
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</tr>
<tr>
<td>U.S. Trea.</td>
<td>1.4%</td>
<td>0.1%</td>
<td>0.1%</td>
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<td>0.1%</td>
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<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Euro Govt. (7-10 yr)</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.1%</td>
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</tr>
</tbody>
</table>

### Portfolio diversification

#### Alternatives and portfolio risk/return
Annualized volatility and returns, 1989 – June 2021

<table>
<thead>
<tr>
<th>Portfolio allocation</th>
<th>Volatility</th>
<th>Annualized returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 Equities/ 60 F.I.</td>
<td>7.98%</td>
<td>6.85%</td>
</tr>
<tr>
<td>60 Equities/ 40 F.I.</td>
<td>10.65%</td>
<td>7.22%</td>
</tr>
<tr>
<td>80 Equities/ 20 F.I.</td>
<td>13.74%</td>
<td>7.45%</td>
</tr>
<tr>
<td>30 Alts/ 30 Equities / 40 F.I.</td>
<td>7.18%</td>
<td>8.09%</td>
</tr>
<tr>
<td>30 Alts/ 40 Equities / 30 F.I.</td>
<td>8.60%</td>
<td>8.28%</td>
</tr>
<tr>
<td>30 Alts/ 50 Equities / 20 F.I.</td>
<td>10.13%</td>
<td>8.44%</td>
</tr>
</tbody>
</table>

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

Data is based on availability as of November 30, 2021.
### Alternative asset class returns

<table>
<thead>
<tr>
<th>Year</th>
<th>Private Equity</th>
<th>Venture Capital</th>
<th>Transport</th>
<th>Infrastructure</th>
<th>Direct Lending</th>
<th>Hedge Funds</th>
<th>APAC Core Real Estate</th>
<th>Private Equity</th>
<th>Venture Capital</th>
<th>Transport</th>
<th>Infrastructure</th>
<th>Direct Lending</th>
<th>Hedge Funds</th>
<th>Asset Allocation</th>
<th>Asset Allocation</th>
<th>Europe Core Real Estate</th>
<th>Venture Capital</th>
<th>Transport</th>
<th>Infrastructure</th>
<th>Direct Lending</th>
<th>Hedge Funds</th>
<th>Asset Allocation</th>
<th>Asset Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>16.0%</td>
<td>14.1%</td>
<td>25.9%</td>
<td>21.0%</td>
<td>15.3%</td>
<td>22.7%</td>
<td>20.6%</td>
<td>19.0%</td>
<td>55.3%</td>
<td>23.7%</td>
<td>18.9%</td>
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<td>8.0%</td>
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<td>6.0%</td>
<td>11.5%</td>
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<tr>
<td>2012</td>
<td>15.5%</td>
<td>14.1%</td>
<td>25.9%</td>
<td>21.0%</td>
<td>15.3%</td>
<td>22.7%</td>
<td>20.6%</td>
<td>19.0%</td>
<td>55.3%</td>
<td>23.7%</td>
<td>18.9%</td>
<td>10.2%</td>
<td>8.0%</td>
<td>8.0%</td>
<td>6.0%</td>
<td>11.5%</td>
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<tr>
<td>2013</td>
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<td>15.3%</td>
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<td>8.0%</td>
<td>6.0%</td>
<td>11.5%</td>
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<tr>
<td>2014</td>
<td>15.5%</td>
<td>14.1%</td>
<td>25.9%</td>
<td>21.0%</td>
<td>15.3%</td>
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<td>6.0%</td>
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<tr>
<td>2015</td>
<td>15.5%</td>
<td>14.1%</td>
<td>25.9%</td>
<td>21.0%</td>
<td>15.3%</td>
<td>22.7%</td>
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<td>19.0%</td>
<td>55.3%</td>
<td>23.7%</td>
<td>18.9%</td>
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<td>6.0%</td>
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<tr>
<td>2016</td>
<td>15.5%</td>
<td>14.1%</td>
<td>25.9%</td>
<td>21.0%</td>
<td>15.3%</td>
<td>22.7%</td>
<td>20.6%</td>
<td>19.0%</td>
<td>55.3%</td>
<td>23.7%</td>
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<td>10.2%</td>
<td>8.0%</td>
<td>8.0%</td>
<td>6.0%</td>
<td>11.5%</td>
<td>14.8%</td>
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<td>14.8%</td>
<td>14.8%</td>
<td>14.8%</td>
<td>14.8%</td>
</tr>
<tr>
<td>2017</td>
<td>15.5%</td>
<td>14.1%</td>
<td>25.9%</td>
<td>21.0%</td>
<td>15.3%</td>
<td>22.7%</td>
<td>20.6%</td>
<td>19.0%</td>
<td>55.3%</td>
<td>23.7%</td>
<td>18.9%</td>
<td>10.2%</td>
<td>8.0%</td>
<td>8.0%</td>
<td>6.0%</td>
<td>11.5%</td>
<td>14.8%</td>
<td>14.8%</td>
<td>14.8%</td>
<td>14.8%</td>
<td>14.8%</td>
<td>14.8%</td>
<td>14.8%</td>
</tr>
</tbody>
</table>

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

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

Data is based on availability as of November 30, 2021.
The cap rate, which is computed as the net operating income over sales price, is the rate of return on a real estate investment property. Vacancy rate data is as of September 30, 2021.

Data is based on availability as of November 30, 2021.
Data is based on availability as of November 30, 2021.
U.S. real estate: Retail and industrial

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

<table>
<thead>
<tr>
<th>Category</th>
<th>1Q11-1Q21, percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>19.5%</td>
</tr>
<tr>
<td>Goods-producing</td>
<td>11.0%</td>
</tr>
<tr>
<td>Service-providing</td>
<td>20.9%</td>
</tr>
<tr>
<td>Personal care/services</td>
<td>23.1%</td>
</tr>
<tr>
<td>Department/discount</td>
<td>21.7%</td>
</tr>
<tr>
<td>Restaurants/bars</td>
<td>17.0%</td>
</tr>
<tr>
<td>Pharmacies and person care</td>
<td>15.6%</td>
</tr>
<tr>
<td>Automobile dealers</td>
<td>5.3%</td>
</tr>
<tr>
<td>Grocery/liquor</td>
<td>4.0%</td>
</tr>
<tr>
<td>Gas stations</td>
<td>3.8%</td>
</tr>
<tr>
<td>Furniture/furnishings</td>
<td>-10.7%</td>
</tr>
<tr>
<td>Clothing</td>
<td>-11.3%</td>
</tr>
<tr>
<td>Entertainment goods</td>
<td>-11.5%</td>
</tr>
<tr>
<td>Electronics/appliances</td>
<td>-18.6%</td>
</tr>
</tbody>
</table>

Source: Bureau of Labor Statistics, J.P. Morgan Asset Management. (Left) Personal care/services include nail salons, barber shops, etc. Entertainment goods include sports equipment, games, musical instruments, and book stores. Industrial property vacancy rates are an average from each calendar year and as of 3Q21 for 2021. Data is based on availability as of November 30, 2021.

Industrial establishments and vacancy rate
Thousands of square feet, percent

- Warehouses and storage facilities
- Data processing, hosting, and related services

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

Data is based on availability as of November 30, 2021.
Sources: CBRE, JLL, J.P. Morgan Asset Management. London is South East for office and warehouse. Prime office for Paris is Centre West excluding CBD.

Data is based on availability as of November 30, 2021.
Source: NAREIT, NCREIF, Standard & Poor’s, FactSet, J.P. Morgan Asset Management.

Real estate investment trusts (REITs). Indices do not include fees or operating expenses and are not available for actual investment. Past performance is not necessarily a reliable indicator for current and future performance. Correlations are as of 3Q21.

Data is based on availability as of November 30, 2021.
<table>
<thead>
<tr>
<th>Year</th>
<th>All Equity</th>
<th>Industrial</th>
<th>Lodging/Resorts</th>
<th>Mfgd. Homes</th>
<th>Shopping Centers</th>
<th>Self Storage</th>
<th>Regional Malls</th>
<th>Retail/Freight</th>
<th>malls</th>
<th>Data Centers</th>
<th>Sevl Storage</th>
<th>Regional Malls</th>
<th>Mfgd. Homes</th>
<th>Lodging/Resorts</th>
<th>Data Centers</th>
<th>Mfgd. Homes</th>
<th>Lodging/Resorts</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>8.3%</td>
<td>35.2%</td>
<td>27.2%</td>
<td>10.5%</td>
<td>32.6%</td>
<td>14.2%</td>
<td>16.5%</td>
<td>16.5%</td>
<td>23%</td>
<td>14.2%</td>
<td>16.5%</td>
<td>32.6%</td>
<td>14.2%</td>
<td>23%</td>
<td>14.2%</td>
<td>32.6%</td>
<td>14.2%</td>
</tr>
<tr>
<td>2012</td>
<td>8.3%</td>
<td>31.3%</td>
<td>15.1%</td>
<td>3.7%</td>
<td>3.7%</td>
<td>13.2%</td>
<td>16.5%</td>
<td>16.5%</td>
<td>23%</td>
<td>13.2%</td>
<td>16.5%</td>
<td>3.7%</td>
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<td>23%</td>
<td>13.2%</td>
<td>3.7%</td>
<td>13.2%</td>
</tr>
<tr>
<td>2013</td>
<td>8.3%</td>
<td>20.5%</td>
<td>25.0%</td>
<td>3.7%</td>
<td>3.7%</td>
<td>13.2%</td>
<td>16.5%</td>
<td>16.5%</td>
<td>23%</td>
<td>13.2%</td>
<td>16.5%</td>
<td>3.7%</td>
<td>13.2%</td>
<td>23%</td>
<td>13.2%</td>
<td>3.7%</td>
<td>13.2%</td>
</tr>
<tr>
<td>2014</td>
<td>8.3%</td>
<td>20.5%</td>
<td>25.0%</td>
<td>3.7%</td>
<td>3.7%</td>
<td>13.2%</td>
<td>16.5%</td>
<td>16.5%</td>
<td>23%</td>
<td>13.2%</td>
<td>16.5%</td>
<td>3.7%</td>
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<td>23%</td>
<td>13.2%</td>
<td>3.7%</td>
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<tr>
<td>2015</td>
<td>8.3%</td>
<td>20.5%</td>
<td>25.0%</td>
<td>3.7%</td>
<td>3.7%</td>
<td>13.2%</td>
<td>16.5%</td>
<td>16.5%</td>
<td>23%</td>
<td>13.2%</td>
<td>16.5%</td>
<td>3.7%</td>
<td>13.2%</td>
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<td>13.2%</td>
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<td>23%</td>
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<tr>
<td>2018</td>
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<td>13.2%</td>
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<td>23%</td>
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</tr>
<tr>
<td>2019</td>
<td>8.3%</td>
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<td>25.0%</td>
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<td>13.2%</td>
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<td>23%</td>
<td>13.2%</td>
<td>3.7%</td>
<td>13.2%</td>
</tr>
<tr>
<td>2020</td>
<td>8.3%</td>
<td>20.5%</td>
<td>25.0%</td>
<td>3.7%</td>
<td>3.7%</td>
<td>13.2%</td>
<td>16.5%</td>
<td>16.5%</td>
<td>23%</td>
<td>13.2%</td>
<td>16.5%</td>
<td>3.7%</td>
<td>13.2%</td>
<td>23%</td>
<td>13.2%</td>
<td>3.7%</td>
<td>13.2%</td>
</tr>
</tbody>
</table>

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

All indices are from FTSE NAREIT. Mfgd. Homes represents manufactured homes. Data is based on availability as of November 30, 2021.
Average annual infrastructure need
USD trillions, constant 2017 dollars

<table>
<thead>
<tr>
<th>Category</th>
<th>Annual Spending, % of GDP</th>
<th>Annual Spending, USD trillions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td>1.0</td>
<td>$0.9</td>
</tr>
<tr>
<td>Rail</td>
<td>0.4</td>
<td>$0.4</td>
</tr>
<tr>
<td>Ports</td>
<td>0.1</td>
<td>$0.1</td>
</tr>
<tr>
<td>Airports</td>
<td>0.1</td>
<td>$0.1</td>
</tr>
<tr>
<td>Power</td>
<td>1.3</td>
<td>$1.1</td>
</tr>
<tr>
<td>Water</td>
<td>0.5</td>
<td>$0.5</td>
</tr>
<tr>
<td>Telecom</td>
<td>0.6</td>
<td>$0.5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$3.6</td>
</tr>
</tbody>
</table>

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

Data is based on availability as of November 30, 2021.
Global core infrastructure returns
Rolling 4-quarter returns from income and capital appreciation

Source: MSCI, J.P. Morgan Asset Management.
Infrastructure returns represented by the “low risk” category of the MSCI Global Quarterly Infrastructure Asset Index. Data show rolling one-year returns from income and capital appreciation. The chart shows the full index history, beginning in the first quarter of 2009, and ending in 2Q21.
Past performance is not indicative of future results. Alternative investments carry more risk than traditional investments and are recommended only for long-term investment. Some alternative investments may be highly leveraged and rely on speculative investments that can magnify the potential for loss or gain. Diversification does not guarantee investment returns or eliminate the risk of loss.
Data is based on availability as of November 30, 2021.
U.S. utilities allowed returns versus inflation
Average allowed return on equity

Household utility spending
Household utility spending % of personal consumption expenditures


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

Energy related CO2 emissions
1990-2019, gigatons

- Rest of the world
- Advanced economies

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

- Agriculture: 18%
- Energy in industry: 24%
- Wastewater / landfill: 3%
- Chemicals / cement: 5%
- Other energy: 15%
- Energy in buildings: 18%
- Energy in transport: 16%

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, 2021.

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

Data is based on availability as of November 30, 2021.
**Venture capital investment in clean energy**

Deal value (USD millions) and number of deals


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

**Expected growth in renewable electricity generation**

2020 – 2050, CAGR


Data is based on availability as of November 30, 2021.
Source: (Left) World Bank, J.P. Morgan Asset Management. ETS is emissions trading system. (Right) International Carbon Action Partnership, J.P. Morgan Asset Management. China ETS price is based on the average of Beijing, Chongqing, Guangdong, Hubei, Shanghai, Shenzhen and Tianjin ETS prizes. CO₂ equivalent tones standardize emissions to allow for comparison between gases. One equivalent tone has the same warming effect as one tone of CO₂ over 100 years. Past performance is not a reliable indicator of current and future results. Emissions trading system prices are as of 3Q21. Data is based on availability as of November 30, 2021.
Timber returns and inflation
CPI, y/y, NCREIF Timberland Index, 5-yr. annualized returns

Venture capital investment in forest carbon tech
Deal value, USD millions

Data is based on availability as of November 30, 2021.
Electric transportation investment and vehicle sales

Venture capital investment in electric transportation
Deal value (USD millions) and number of deals

New battery-powered vehicle sales
Millions of vehicles

Data is based on availability as of November 30, 2021.
Global fleet and orderbook
Gross tonnage

Idle containership capacity % 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, 2021.
Shipping trends: Port calls

Global port calls*
Number of calls, 7-day moving average

U.S. port calls**
Number of calls, 7-day moving average

Europe port calls***
Number of calls, 7-day moving average

Source: Clarksons Research, MSI, Sea/net, J.P. Morgan Asset Management. Port calls defined as all instances of a vessel entering and leaving a defined port location, excluding instances where vessel not recorded as travelling at less than 1 knot, and combining multiple consecutive instances at the same port where the vessel has not left a buffered shape around the port. Data basis date vessel last recorded in port location. *Global Port Calls excludes calls at ports by tugs. **U.S. and Europe port calls are of deep sea cargo vessels, which only includes larger bulkers. ***Europe includes Germany, Italy, Spain, U.K. and France.

Data is based on availability as of November 30, 2021.
Global energy mix
Share of primary energy

LNG carrier engine types
Share of on-water fleet, 2020

LNG carrier fleet age profile
Number of vessels, 2020

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

Average cost by mode of transportation

Average CO2 emissions by mode of transportation


Data is based on availability as of November 30, 2021.
Source: IEA, The Wind Power, J.P. Morgan Asset Management. *In its “main case” scenario, the IEA projects wind, solar, hydro, and other renewable sources of energy accounting for 95% of the increase in the world’s electricity generating capacity over the next 5 years.

Data is based on availability as of November 30, 2021.
36

**Aircraft trends**

Average age of major airline aircraft

- Years, U.S.
- Global

Percent of industry wide aviation fleet leased*

- Global

Aircraft demand **

- Global

U.S. major airline fleet by status

Source: Ascend, Airbus, U.S. Bureau of Transportation Statistics, Cirium, Statista, J.P. Morgan Asset Management. *Includes parked and in-service regional, single-aisle and widebody aircraft. ** Demand includes both passenger and freight aircrafts. Passenger aircrafts are 100+ seaters.

Freighters are 10 tones+.

Data is based on availability as of November 30, 2021.
Number of listed U.S. companies* and market cap.
Number (left), S&P 500 market capitalization in USD trillions (right)

Private vs. public equity sector weights


*Number of listed U.S. companies is represented by the sum of number of companies listed on the NYSE and the NASDAQ.
**Other includes real estate, utilities, energy, consumer staples, and materials. Percentages may not sum due to rounding. Sector weights are as of December 31, 2020.
Data is based on availability as of November 30, 2021.
**Business activity**

**U.S. applications for business formation**
Seasonally adjusted, thousands

**Growth in business establishments by private industry**
March 2017 – March 2021


Business formation data are as of 3Q21. *Information includes broadcasting (excluding internet), data processing, hosting and related services, motion picture and sound recording industries, publishing industries (excluding internet) and telecommunications.**Other services includes unclassified businesses.

Data is based on availability as of November 30, 2021.
Private equity deals and multiples

B2B is business to business. B2C is business to consumer. Natural resources = Materials and resources and energy. Private equity and multiple data are as of September 30, 2021.
Data is based on availability as of November 30, 2021.
Oil prices and natural resource exits
Energy & materials exit count, WTI oil price, y/y % change

Software investment and private equity
% U.S. PE deals targeting software companies, software inv. % GDP

Source: BEA, Pitchbook, FactSet, J.P. Morgan Asset Management.
WTI oil price is a quarterly average. Software investment is represented by nonresidential fixed investment in software. Deal, exit and investment data are as of September 30, 2021.
Data is based on availability as of November 30, 2021.
Bankruptcies are business bankruptcies across all chapters. Current middle market deal data are as of June 30, 2021. *Pitchbook defines the middle market (MM) as US-based deals with an enterprise value between $25 million and $1 billion. Data is based on availability as of November 30, 2021.

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

Data is based on availability as of November 30, 2021.
Private equity exit activity and IPOs

Private equity exits by type
USD billions

<table>
<thead>
<tr>
<th>Type</th>
<th>3Q21</th>
<th>06-'20 avg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary buyout</td>
<td>24.2%</td>
<td>38.2%</td>
</tr>
<tr>
<td>IPO</td>
<td>44.8%</td>
<td>19.4%</td>
</tr>
<tr>
<td>Corporate acquisition</td>
<td>31.0%</td>
<td>42.5%</td>
</tr>
</tbody>
</table>

Number of SPAC and traditional IPOs
Count (left), USD millions (right)

Sources: Pitchbook, SPACInsider, J.P. Morgan Asset Management.
Private equity exit and IPO data are as of September 30, 2021.
Data is based on availability as of November 30, 2021.
Venture capital exits by type
USD billions

- **Type**
- **% of total exits**
- **Avg. '06 - 20**

<table>
<thead>
<tr>
<th>Type</th>
<th>% of total exits</th>
<th>Avg. '06 - 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buyout</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>Acquisition</td>
<td>11%</td>
<td>51%</td>
</tr>
<tr>
<td>Public listing</td>
<td>87%</td>
<td>44%</td>
</tr>
</tbody>
</table>

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

Change in share of VC investments by industry
2016 – 2021* vs. 2006 – 2010

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Goods &amp; Services</td>
<td>6.8%</td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>6.0%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>5.3%</td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td>4.9%</td>
<td></td>
</tr>
<tr>
<td>HC Services &amp; Systems</td>
<td>3.2%</td>
<td></td>
</tr>
<tr>
<td>Pharma &amp; Biotech</td>
<td>-1.3%</td>
<td></td>
</tr>
<tr>
<td>Media</td>
<td>-1.4%</td>
<td></td>
</tr>
<tr>
<td>Commercial Services</td>
<td>-2.4%</td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>-5.5%</td>
<td></td>
</tr>
<tr>
<td>HC Devices &amp; Supplies</td>
<td>-6.1%</td>
<td></td>
</tr>
<tr>
<td>IT Hardware</td>
<td>-9.5%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Pitchbook, J.P. Morgan Asset Management.
Global M&A

**Global M&A by acquirer type**

<table>
<thead>
<tr>
<th></th>
<th>Deal count</th>
<th>3Q21</th>
<th>07-'20 avg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate M&amp;A</td>
<td>62%</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td>Sponsor-backed</td>
<td>38%</td>
<td>27%</td>
<td></td>
</tr>
</tbody>
</table>

**M&A deal value**

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

- Japan
- UK
- Europe
- US

**Share of global M&A deal value by payment type**

- Stock & cash
- Stock
- Cash

Private debt fundraising

Private debt fundraising by type
USD billions

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

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

Data is based on availability as of November 30, 2021.
Credit market participants and sources of financing

U.S. leveraged loan market participants
Share of total market, percent

<table>
<thead>
<tr>
<th>Participant</th>
<th>LTM Sep. 2021</th>
<th>Avg. '00 - '20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-banks*</td>
<td>88%</td>
<td>78%</td>
</tr>
<tr>
<td>Banks &amp; securities firms</td>
<td>12%</td>
<td>28%</td>
</tr>
</tbody>
</table>

2021 U.S. leveraged loan market participants data is last twelve months September 2021. *Non-banks included institutional investors and finance companies. Participant data excludes left and right agents. Percentages may not sum 100 due to rounding. Direct lending industry composition is based on the Cliffwater Direct Lending Index.
Data is based on availability as of November 30, 2021.

Direct lending industry composition
June 2021

- Industrials: 18%
- Info. Tech.: 21%
- Financials: 9%
- Healthcare: 14%
- Cons. Discretionary: 15%
- Materials: 3%
- Energy: 3%
- Real Estate: 3%
- Utilities: 1%
- Other: 5%
- Telecomm. Services: 4%
- Cons. Staples: 4%
- Materials: 3%
New-issue U.S. loans by rating*
Total leveraged loan volume, USD billions

- B/CCC
- B+/B/B-
- BB/B
- BB+/BB/BB-
- BBB/BB or higher

Spread between BB and CCC rated U.S. HY loans
Bps, last 10 years

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

Average: 645 bps
Nov. 30, 2021: 442.5 bps
**Expansion**

Manufacturing ISM > 50 and rising

- 10y UST: 0.3%
- 2y UST: 0.8%
- U.S. IG: 2.6%
- U.S. HY: 1.8%
- U.S. direct lending: 2.8%

**Recession**

Manufacturing ISM < 50 and falling

- 10y UST: 2.6%
- 2y UST: 1.2%
- U.S. IG: 0.8%
- U.S. HY: -1.5%
- U.S. direct lending: -1.9%

**Late cycle cooling**

Manufacturing ISM > 50 and falling

- 10y UST: 2.2%
- 2y UST: 0.6%
- U.S. IG: 1.6%
- U.S. HY: 1.5%
- U.S. direct lending: 0.9%

**Turnaround**

Manufacturing ISM < 50 and rising

- 10y UST: -1.9%
- 2y UST: -0.1%
- U.S. IG: 4.6%
- U.S. HY: 9.4%
- U.S. direct lending: 8.1%

The ISM Manufacturing Index is a nationwide survey of purchasing executives. A reading greater than 50 indicates increased economic activity and a reading less than 50 indicates decreased economic activity. 10y UST: Bloomberg U.S. Treasury Bellwethers (10y), 2y UST: Bloomberg U.S. Treasury Bellwethers (2y), U.S. IG: Bloomberg U.S. Aggregate Corporate Investment Grade, U.S. HY: Bloomberg U.S. Aggregate Corporate High Yield, U.S. leveraged loans: Credit Suisse Leveraged Loan Index, U.S. direct lending: Cliffwater Direct Lending Index. All returns are from 12/31/2004 through 9/30/2021, except for U.S. direct lending which is through 6/30/2021.

Data is based on availability as of November 30, 2021.
Public and private credit drawdown dispersion
Maximum – minimum drawdown, quarterly

<table>
<thead>
<tr>
<th>Category</th>
<th>Minimum Drawdown</th>
<th>Maximum Drawdown</th>
<th>Average Drawdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leveraged loans</td>
<td>-0.3%</td>
<td>-27.5%</td>
<td>-8.7%</td>
</tr>
<tr>
<td>Investment grade</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>High yield</td>
<td>-0.1%</td>
<td>-25.2%</td>
<td>-9.8%</td>
</tr>
<tr>
<td>Direct lending</td>
<td>-0.2%</td>
<td>-9.8%</td>
<td>-9.8%</td>
</tr>
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</table>

Corporate debt recovery rates
1987 – 2020, average discounted recovery rates

- First-lien: 75%
- Senior secured: 65%
- Second-lien: 51%
- Senior unsecured: 52%

Leveraged loans: Credit Suisse Leveraged Loans Total Return Index. Investment grade: Bloomberg U.S. Corporate Investment Grade Total Return Index. Bloomberg U.S. Corporate High Yield Total Return Index. Direct Lending: Cliffwater Direct Lending Index. Drawdowns are cumulative. All returns analyzed are from 12/31/2004 through 9/30/2021, except for U.S. direct lending which is through 6/30/2021.
Data is based on availability as of November 30, 2021.
Loan issuance and EBITDA

New loan issuance by purpose
12-months ending September 30, 2021, leveraged loans

- Corporate finance*: 7%
- Recap & dividend: 12%
- Refinancing: 31%
- Aquisition: 23%
- LBO: 24%
- Other**: 5%

Transactions with EBITDA adjustments
Share of total transactions

Covenant-lite loan issuance
Percent of total leveraged loans issuance

Number of companies with negative EBITDA
Bloomberg U.S. Corporate HY index

Transactions with EBITDA adjustments
Share of total transactions

Source: Bloomberg, S&P LCD, Moody’s, J.P. Morgan Markets Research, J.P. Morgan Asset Management. Media and telecom loans excluded prior to 2011. EBITDA adjusted for prospective cost savings or synergies. Covenant-lite loans are a type of financing that is issued with fewer restrictions on the borrower with regard to collateral, level of income, and loan payment terms, and fewer protections for the lender, including financial maintenance tests that measure the debt-service capabilities of the borrower. All EBITDA data are based on 12-month trailing data. Negative EBITDA company count is based on companies included in the Bloomberg U.S. Corporate HY index that publicly disclose EBITDA.

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

Average LTM EBITDA purchase multiple

Average annual revenue growth rate

Average annual EBITDA growth rate

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

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

Source: Bloomberg, Gilberto-Levy, FactSet, J.P. Morgan Asset Management. All spreads are as of September 30, 2021. *Aggregate: Gilberto-Levy Commercial Mortgage Loans Performance Index. **U.S. Corp. IG: Bloomberg U.S. Corporate Investment Grade Index. Commercial mortgage spreads are from a J.P. Morgan survey and are calculated as the difference between the average yield as indicated by the survey and the yield of a U.S. Treasury security with a similar duration. Commercial mortgage yields are as of June 30, 2021. U.S. IG yields are as of September 30, 2021.

Data is based on availability as of November 30, 2021.
### Hedge fund strategy returns

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<tbody>
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<td>2011</td>
<td>5.6%</td>
<td>16.8%</td>
<td>23.4%</td>
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<td>15.1%</td>
<td>24.6%</td>
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<td>17.9%</td>
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<td>7.2%</td>
<td>18.2%</td>
<td>10.6%</td>
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<tr>
<td>2012</td>
<td>- 8.4%</td>
<td>- 2.6%</td>
<td>- 0.1%</td>
<td>- 1.4%</td>
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<td>2.7%</td>
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<td>1.7%</td>
<td>11.1%</td>
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<td>2014</td>
<td>- 0.6%</td>
<td>- 4.7%</td>
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<td>- 6.3%</td>
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<td>2015</td>
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<td>2016</td>
<td>- 1.8%</td>
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<td>2019</td>
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<td>2020</td>
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<tr>
<td>YTD</td>
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</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 is based on availability as of November 30, 2021.
Hedge funds and manager selection

Hedge fund manager dispersion
Based on returns from February 2011 – January 2021

-16%
-14%
-12%
-10%
-8%
-6%
-4%
-2%
0%
2%
4%
6%
8%
10%
12%
14%
16%
15.4%
9.9%
9.6%
9.2%
10.6%
11.9%
12.9%
10.0%
8.6%
1.5%
0.2%
-1.3%
-1.7%
-3.9%
-1.5%
-1.8%
All hedge funds
Fixed income
Equity market neutral
Event driven
Relative value total
Relative value multi-strategy
Macro total
Equity hedge
Emerging markets

Sources: HFRI, J.P. Morgan Asset Management.
Manager dispersion is based on: November 2011 to October 2021 monthly returns for hedge funds. Blue bar denotes median. All hedge funds: Fund Weighted Composite Index, Equity market neutral: Equity hedge – equity market neutral, Event-driven: Event-Driven (Total), Relative value: Relative Value (Total), Relative value multi-strategy: Relative Value Multi-Strategy, Macro total: Macro (Total), Equity hedge: Equity Hedge (Total), Emerging markets: Emerging Markets Global.
Data is based on availability as of November 30, 2021.
**Hedge fund flows and exposures**

**Hedge fund net asset flow**

USD billions

$200

$150

$100

$50

$0

-$50

-$100

-$150

-$200

'91 '93 '95 '97 '99 '01 '03 '05 '07 '09 '11 '13 '15 '17 '19 '21

3Q21: $24.0bn

**Sector exposure of top 50 hedge funds**

% of total portfolio

26.7%

13.3%

10.8%

8.1%

7.7%

5.1%

4.5%

3.1%

2.4%

2.3%

Technology Services

Finance

Health Technology

Retail Trade

Electronic Technology

Consumer Services

Producer Manufacturing

Consumer Non-Durables

Consumer Durables

Energy Minerals

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 is based on availability as of November 30, 2021.
Hedge funds and volatility

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

Macro hedge fund relative performance & volatility
VIX index level, y/y change in rel. perf. of HFRI Macro index

Source: HFRI, CBOE, MSCI, FactSet, J.P. Morgan Asset Management.
Historical beta is based on regression analysis, where the HFRI is the dependent variable and the MSCI AC World Index is the independent variable.
Monthly VIX reading is an average. Numbers may not sum to 100% due to rounding.
Data is based on availability as of November 30, 2021.
**S&P 500 valuation dispersion by sector**

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

**Credit spread dispersion**

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

---

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

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

Data is based on availability as of November 30, 2021.
S&P 500 E-Mini and 10-yr. U.S. Treasury Note positioning
Net noncommercial futures positions as a percent of open interest

Source: CFTC, FactSet, J.P. Morgan Asset Management.
Data is based on availability as of November 30, 2021.
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. Volatility data is as of August 2021. (Right) Based on company filings, SEC 606 disclosures. Data is based on availability as of November 30, 2021.
Cryptocurrencies and electricity consumption

**Bitcoin and annual energy consumption by country**
Terawatt-hours per year, log scale

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

<table>
<thead>
<tr>
<th>Number</th>
<th>Visa</th>
<th>Mastercard</th>
<th>PayPal</th>
<th>Bitcoin</th>
<th>Ether</th>
<th>Litecoin</th>
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<tr>
<td>0-500</td>
<td>3526</td>
<td>2061</td>
<td>241</td>
<td>3.3</td>
<td>3.18</td>
<td>0.26</td>
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</tbody>
</table>

Breakdown of hasher costs per region

<table>
<thead>
<tr>
<th>Region</th>
<th>Capital equipment</th>
<th>Maintenance</th>
<th>Utilities</th>
<th>Employees**</th>
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</thead>
<tbody>
<tr>
<td>Asia-Pacific</td>
<td>37%</td>
<td>49%</td>
<td>41%</td>
<td>5%</td>
</tr>
<tr>
<td>Europe</td>
<td>38%</td>
<td>43%</td>
<td>52%</td>
<td>5%</td>
</tr>
<tr>
<td>Latin America*</td>
<td>52%</td>
<td>52%</td>
<td>52%</td>
<td>5%</td>
</tr>
<tr>
<td>North America</td>
<td>52%</td>
<td>52%</td>
<td>52%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Sources: BIS, BitInfoCharts, University of Cambridge, J.P. Morgan Asset Management. *Latin America includes Caribbean. **Includes contractors.

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


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.

High water mark – 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 water mark, 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 finance.

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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