Agenda

- Background
- Private Equity & Infrastructure: Benefits and Considerations
- Selected Alternative Asset Mixes Revisited
  - Overview of Alternative Asset Mixes
  - Alternative Asset Mixes: Benefits and Considerations
- Appendix: Previous educational material for Private Equity and Infrastructure
Background

- At the August meeting, the Board reviewed an Asset Liability Study where we analyzed 1) the level of risk and return and 2) whether new asset classes (Private Equity and Infrastructure) should be introduced to the Plan
- The Board agreed that a change in the overall return and risk profile is not warranted
- However, a decision was made to continue to explore the potential benefits to the total portfolio of adding private infrastructure and/or private equity
- Private infrastructure could improve the Investment Program by increasing exposure to Real Assets
  - Impact on return and risk is minor in normal environments
  - In practice private infrastructure should add a diversified source of returns with the potential for improved performance in inflationary environments
- Private equity in the Investment Program offers the opportunity for improved performance or reduced volatility
  - Private equity is expected to increase the projected return at a given volatility level or reduce volatility for a given return target
  - Private equity costs are high and decisions to invest are long-term
Private Equity & Infrastructure: Benefits and Considerations
Private Equity

Benefits and Considerations

Benefits

- Should provide a return in excess of public equity over the long term
- Provides a differentiated return stream and diversification
- Addresses a different opportunity set – private companies
- Private equity market is fragmented (no central marketplace) and partially regulated
  - Creates opportunities for GPs with skill to add value

Considerations

- Private equity is illiquid
- Implementation is a primary risk and critical to success
  - Decisions made today last 10 to 15 years
- Program complexity
  - Takes five or more years to become fully funded
  - Ongoing implementation – periodic reinvestments
- Return calculation and benchmarking methodology differ from public equity, and performance data is not publicly available
- The J-curve effect can potentially detract from short-term performance
  - Returns and asset values take time to develop (negative early returns)
- Fees are high compared to public market equity
  - Management fees including fund-of-funds fees
  - Administrative costs including Board and staff initiation, maintenance and monitoring time

Use by other Public Plan peers?

- Percent of Public Pension Plans Invested: 30%
- Median % of Portfolio Invested (when used): 6%
# Real Assets

## Potential Benefits

<table>
<thead>
<tr>
<th>Portfolio diversification</th>
<th>Real assets tend to have complementary return profiles relative to stocks and bonds.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predictable and steady streams of income</strong></td>
<td>Real assets tend to have predictable and steady cash-flow streams supported by regulated or contractual revenues and attractive operating margins.</td>
</tr>
<tr>
<td><strong>Capital appreciation potential</strong></td>
<td>As the backbone of the global economy, real estate, infrastructure and sustainable resources are all subject to long-cycle fundamental drivers. Examples include population growth, urbanization trends and periodic supply constraints that can lead to capital appreciation.</td>
</tr>
<tr>
<td><strong>Potentially higher risk-adjusted returns</strong></td>
<td>Historically, the volatility of many real asset classes has been lower than that of equities, leading to higher risk-adjusted returns.</td>
</tr>
<tr>
<td><strong>Inflation protection</strong></td>
<td>History shows that real assets have outperformed stocks and bonds in periods of unexpected inflation, based on total return. One reason is that the cash flows of the underlying assets tend to rise with inflation.</td>
</tr>
</tbody>
</table>

---

**Use by other Public Plan peers?**

- Percent of Public Pension Plans Invested in Real Assets (excluding real estate): **25%**
- Median % of Portfolio Invested (when used): **5%**
Infrastructure

Unlisted Infrastructure Investments

Benefits

● Cash flows may be durable with a measure of inflation linkage

● Access to long-lived assets which are hard to replicate and offer a range of defensive income streams, monopoly market positions with high barrier to entry or regulated markets

● Appraisal-based valuations thus reduced price volatility

● Global or non-U.S. funds provide exposure to non-dollar currencies and can serve as a further hedge against inflation as well as declines in the U.S. dollar

Considerations

● Diversification may be challenging due to large asset sizes

● Long hold periods, exit strategy may be unclear

● Appropriate benchmark undefined

● Some assets may become less-defensive as consumer demand, regulation or the competitive landscape changes

● Interest-rate movements could have significant impact on the value of assets, depending on the level of leverage

The flexibility to invest in infrastructure could offer further diversification, enhanced return opportunities, or both
Asset Liability Study:
Selected Alternative Mixes Revisited
## Asset Mix Alternatives

<table>
<thead>
<tr>
<th>Asset Classes</th>
<th>Current Target</th>
<th>Mix 4: + Infrastructure</th>
<th>Mix 4P: +Infrastructure &amp; Private Equity</th>
<th>Mix 4LP: (Low Disruption) +Infrastructure &amp; Private Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad US Equity</td>
<td>38</td>
<td>37</td>
<td>28</td>
<td>31</td>
</tr>
<tr>
<td>Global ex US Equity</td>
<td>29</td>
<td>25</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Domestic Fixed</td>
<td>22</td>
<td>21</td>
<td>33</td>
<td>25</td>
</tr>
<tr>
<td>Real Estate</td>
<td>11</td>
<td>11</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Private Infrastructure</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Private Equity</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
<tr>
<td><strong>1-Year Return</strong></td>
<td><strong>7.53</strong></td>
<td><strong>7.55</strong></td>
<td><strong>7.43</strong></td>
<td><strong>7.63</strong></td>
</tr>
<tr>
<td><strong>10-Year Compound Return</strong></td>
<td><strong>6.79</strong></td>
<td><strong>6.80</strong></td>
<td><strong>6.80</strong></td>
<td><strong>6.89</strong></td>
</tr>
<tr>
<td><strong>Risk (Standard Deviation)</strong></td>
<td><strong>13.73</strong></td>
<td><strong>13.79</strong></td>
<td><strong>12.86</strong></td>
<td><strong>13.72</strong></td>
</tr>
</tbody>
</table>

- **Public Equity** 67 62 47 52
- **Total Equity** 67 62 58 60
- **Bonds** 22 21 33 25
- **Illiquid** 11 17 20 23
- **Real Assets** 11 17 9 15

Orange: Higher allocation than current target
Blue: Lower allocation from current target

- Targeted returns are similar across all mixes, with and without private equity
- Mix 4 includes infrastructure, but not private equity
- Mix 4P is constructed with private equity at 25% of total public equity
- Low Disruption Mix 4LP is constructed with private equity implemented with 15% of total public equity
# Benefits and Considerations of Alternative Asset Mixes

<table>
<thead>
<tr>
<th>Change</th>
<th>Benefits</th>
<th>Considerations</th>
</tr>
</thead>
</table>
| **Current Target:** | • Meets desired expected return  
• High liquidity | | • High public equity beta  
• Volatile peer group comparison |
| **MIX 4:** Real Estate & Infrastructure | Equity: -1%  
Int’l Equity: -4%  
Fixed Income: -1%  
Infrastructure: +6% | • Meets desired expected return  
• Improves diversification  
• Infrastructure provides differentiated return stream  
• Increases real assets | | • Increases illiquid portion of portfolio  
• Increases complexity |
| **MIX 4P:** Real Estate, Infrastructure & Private Equity | Equity: -10%  
Int’l Equity: -10%  
Fixed Income: +11%  
Real Estate: -5%  
Infrastructure: +3%  
Private Equity: +11% | • Meets desired expected return  
• Reduces expected volatility  
• Improves diversification  
• Infrastructure & private equity provide differentiated return stream  
• Potential illiquidity premium  
• Higher fixed income allocation/less reliance on public equity | | • Increases illiquid portion of portfolio  
• Higher investment management costs  
• Increases complexity  
• Disruptive |
| **MIX 4LP:** Low Disruption Real Estate, Infrastructure & Private Equity | Equity: -7%  
Int’l Equity: -8%  
Fixed Income: +3%  
Infrastructure: +4%  
Private Equity: +8% | • Meets desired expected return  
• Improves diversification  
• Infrastructure & private equity provide differentiated return stream  
• Potential illiquidity premium  
• Less disruptive to implement than Mix 4P  
• Higher fixed income allocation/less reliance on public equity  
• Increases real assets allocation | | • Increases illiquid portion of portfolio  
• Higher investment management costs due to private equity and infrastructure  
• Increases complexity |
Asset Mix Alternatives

Efficient Frontier

- Projected risk (standard deviation) versus projected return for each of the four mixes under consideration is plotted on the chart above.
- The risk/return profiles of the mixes are more similar than they are different.
Private Equity

Definition

Private equity: Private unlisted investments in operating companies, typically accessed through limited partnerships (not listed on a public exchange)

- Investors must be accredited to participate
- While commonly viewed as a separate asset class, it is an extension of equity
- Fewer regulatory disclosure requirements, longer investment horizon, and higher fees than publicly traded equities
- Investment is achieved through partnership structures that are less liquid than public equity

Role: capital growth

- The key goal is to achieve returns in excess of public equity
- Managed for long-term gain, not quarterly earnings


<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Index</th>
<th>PROJECTED RETURN</th>
<th>PROJECTED RISK</th>
<th>2018 - 2027</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1-Year Arithmetic</td>
<td>10-Year Geometric*</td>
<td>Real</td>
</tr>
<tr>
<td>Equities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broad U.S. Equity</td>
<td>Russell 3000</td>
<td>8.50%</td>
<td>7.15%</td>
<td>4.90%</td>
</tr>
<tr>
<td>Global ex-U.S. Equity</td>
<td>MSCI ACWI ex USA</td>
<td>9.20%</td>
<td>7.25%</td>
<td>5.00%</td>
</tr>
<tr>
<td>U.S. Fixed</td>
<td>Bloomberg Barclays Aggregate</td>
<td>3.75%</td>
<td>3.75%</td>
<td>1.50%</td>
</tr>
<tr>
<td>Real Estate</td>
<td>NFI-ODCE</td>
<td>7.30%</td>
<td>6.25%</td>
<td>4.00%</td>
</tr>
<tr>
<td>Private Equity</td>
<td>Cambridge Private Equity</td>
<td>12.40%</td>
<td>8.50%</td>
<td>6.25%</td>
</tr>
<tr>
<td>Inflation</td>
<td>CPI-U</td>
<td>2.25%</td>
<td>1.50%</td>
<td></td>
</tr>
</tbody>
</table>
Real Assets

Overview

**Real assets**: physical assets that have value due to their substance and properties.

Investments in the “real” economy (e.g. Real estate, Infrastructure, Commodities, etc.)

**Role**: to generate competitive returns with low correlations to equities and fixed income

- Real estate represents the largest allocation in the real assets allocation institutional portfolios
- Inflation protection characteristics

Primary determinants of performance

- Strategy type and the stage in the economic cycle
- Degree of leverage
- Location/sector

---

**Use by other Public Plan peers?**

- Percent of Public Pension Plans Invested in Real Assets (excluding real estate): **20%**
- Median % of Portfolio Invested (when used): **6%**
Alternative Real Assets to Complement Real Estate

August 2018 MCERA Discussions

In August of last year, Mendocino discussed expanding real asset exposure to provide a more diversified inflation hedge.

Currently, real estate is the sole “real asset” in the Mendocino investment portfolio. Mendocino has exposure to 2 core open-ended funds, plus the MCERA building in Ukiah (valued at $1,150,000), targeting 11% of the total fund.

Callan believes private real estate should continue to comprise the core of a real asset exposure:
- Provides a solid long-term hedge with a reasonably high level of short-term correlation to inflation
- During normal markets real estate provides a high level of current income, a relatively high rate of return, low observed volatility, and is a good diversifier to a stock and bond portfolio

At the August 2018 meeting, the following additional private real assets were considered as complements to real estate:
- Infrastructure
- Timber
- Agriculture
- Public Real Assets

Unlisted open-end infrastructure appears to offer the best fit to the MCERA portfolio
## Private Equity Returns: Why Bother?

<table>
<thead>
<tr>
<th>Strategy</th>
<th>1 Year</th>
<th>3 Years</th>
<th>5 Years</th>
<th>10 Years</th>
<th>15 Years</th>
<th>20 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Venture</td>
<td>18.7%</td>
<td>10.6%</td>
<td>14.3%</td>
<td>13.5%</td>
<td>11.1%</td>
<td>17.3%</td>
</tr>
<tr>
<td>All Buyouts</td>
<td>8.4%</td>
<td>14.6%</td>
<td>12.1%</td>
<td>14.3%</td>
<td>13.7%</td>
<td>12.2%</td>
</tr>
<tr>
<td>Mezzanine</td>
<td>9.7%</td>
<td>11.7%</td>
<td>10.5%</td>
<td>10.8%</td>
<td>10.0%</td>
<td>8.9%</td>
</tr>
<tr>
<td>All Private Equity</td>
<td>10.7%</td>
<td>13.1%</td>
<td>11.9%</td>
<td>14.0%</td>
<td>12.7%</td>
<td>12.7%</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>-4.4%</td>
<td>9.3%</td>
<td>8.5%</td>
<td>13.1%</td>
<td>7.8%</td>
<td>5.6%</td>
</tr>
</tbody>
</table>

Source: Refinitiv/Cambridge and Callan

There can be large return differences between strategy types over time
- Each strategy has contributed to success at various times
- MCERA would invest in a diversified fund-of-funds with exposure to the various different strategy types

“All Private Equity” outperforms public stocks in the longer horizons
- Approximately 3% or more depending on the period
Asset Mix Alternatives

Range of Returns

1 Year

<table>
<thead>
<tr>
<th>Current</th>
<th>Mix 4</th>
<th>Mix 4P</th>
<th>Low Disrupt</th>
</tr>
</thead>
<tbody>
<tr>
<td>5th Percentile</td>
<td>33.3%</td>
<td>33.0%</td>
<td>33.3%</td>
</tr>
<tr>
<td>25th Percentile</td>
<td>17.4%</td>
<td>17.3%</td>
<td>17.3%</td>
</tr>
<tr>
<td>Median</td>
<td>7.0%</td>
<td>7.0%</td>
<td>7.0%</td>
</tr>
<tr>
<td>75th Percentile</td>
<td>(2.6%)</td>
<td>(2.5%)</td>
<td>(2.4%)</td>
</tr>
<tr>
<td>95th Percentile</td>
<td>(14.9%)</td>
<td>(14.6%)</td>
<td>(14.4%)</td>
</tr>
</tbody>
</table>

10 Years

<table>
<thead>
<tr>
<th>Current</th>
<th>Mix 4</th>
<th>Mix 4P</th>
<th>Low Disrupt</th>
</tr>
</thead>
<tbody>
<tr>
<td>5th Percentile</td>
<td>14.6%</td>
<td>14.6%</td>
<td>14.6%</td>
</tr>
<tr>
<td>25th Percentile</td>
<td>9.9%</td>
<td>9.8%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Median</td>
<td>6.8%</td>
<td>6.8%</td>
<td>6.9%</td>
</tr>
<tr>
<td>75th Percentile</td>
<td>3.7%</td>
<td>3.7%</td>
<td>3.8%</td>
</tr>
<tr>
<td>95th Percentile</td>
<td>(0.4%)</td>
<td>(0.4%)</td>
<td>(0.3%)</td>
</tr>
</tbody>
</table>
Appendix: June 2019 Meeting Discussion
Mendocino County Employees’ Retirement Association

Private Infrastructure
Private Real Estate Debt
Private Equity

June 2019

Jan Mende
Real Assets Consulting

Gary Robertson
Private Equity Consulting

Claire Telleen, CFA
Fund Sponsor Consulting
Agenda

Infrastructure Definition and Market Observations

Infrastructure as an Investment

Real Estate Debt

Appendix
Infrastructure Definition and Market Observations
## What is Infrastructure

### Characteristics

- Facilitates movement of people, goods, and ideas
- Essential for the economic productivity of a society

<table>
<thead>
<tr>
<th>Economic Infrastructure</th>
<th>Utilities</th>
<th>Communications</th>
<th>Social Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transportation</strong></td>
<td>Gas</td>
<td>Cable systems</td>
<td>Educational facilities</td>
</tr>
<tr>
<td>– Bridges</td>
<td>Electric</td>
<td>Wireless towers</td>
<td>Medical facilities</td>
</tr>
<tr>
<td>– Toll Roads</td>
<td>Water</td>
<td>Broadcast towers</td>
<td>Correctional facilities</td>
</tr>
<tr>
<td>– Tunnels</td>
<td></td>
<td>Satellites</td>
<td>Public transportation</td>
</tr>
<tr>
<td>– Airports</td>
<td></td>
<td></td>
<td>Judicial facilities</td>
</tr>
<tr>
<td>– Seaports</td>
<td></td>
<td></td>
<td>Public Private Partnerships</td>
</tr>
<tr>
<td>– Rail</td>
<td></td>
<td></td>
<td>(“PPP” or “P3”)</td>
</tr>
<tr>
<td><strong>Renewable Energy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Solar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Wind</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Bio-Mass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Hydro</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Water / Waste</strong></td>
<td>Water treatment</td>
<td>Energy transmission</td>
<td></td>
</tr>
<tr>
<td>– Water desalination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Waste management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td></td>
<td>Energy storage</td>
<td></td>
</tr>
<tr>
<td>– Solar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Wind</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Bio-Mass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Hydro</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What is the Driver for Global Infrastructure Investment Today?

Aging Infrastructure, Renewable Energy Targets and U.S. Energy Discoveries

<table>
<thead>
<tr>
<th>Sector</th>
<th>Demand driver</th>
<th>Infrastructure Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>Development of oil and shale resources in the US</td>
<td>Mid-stream energy related transmission and storage</td>
</tr>
<tr>
<td>Power</td>
<td>Trend for reduced carbon emissions and non-nuclear power</td>
<td>Wind, solar, hydro, geothermal power, new transmission technology</td>
</tr>
<tr>
<td>Transport</td>
<td>Increased demand, historic under-investment and aging infrastructure</td>
<td>Airports, roads, ports, parking structures</td>
</tr>
<tr>
<td>Communications</td>
<td>Increased demand with new technology</td>
<td>Telecom, fiber optic, cellphone towers</td>
</tr>
<tr>
<td>Water</td>
<td>Increased demand, historic under-investment and aging infrastructure</td>
<td>Water utilities, wastewater systems</td>
</tr>
<tr>
<td>Social</td>
<td>Insufficient municipal budgets</td>
<td>Healthcare, judicial, education facilities, Public Private Partnerships</td>
</tr>
</tbody>
</table>
Infrastructure

Listed vs Unlisted Investments

Listed Infrastructure Investments
• Consists of publicly traded stocks of companies engaged in infrastructure-related activities
• Economic infrastructure rather than social infrastructure
• Emphasis on appreciation

Strengths
• Quickly and easily assembled
• Liquidity
• Flexibility

Weaknesses
• Shares volatility of equity markets
• Higher emphasis on capital gains rather than income
• Appropriate benchmark undefined

Unlisted Infrastructure Investments
• Asset level investments
• Leverage can range from 20-75%+ on an asset level, generally less than 60% on an overall portfolio level
• Emphasis on income or appreciation depending on strategy

Strengths
• Cash flows may be very durable and backed by stable offtake contracts, with a measure of inflation linkage
• Assets may be highly monopolistic
• Appraisal-based valuations thus reduced price volatility

Weaknesses
• Diversification may be challenging due to large asset sizes
• Long hold periods, exit strategy may be unclear
• Appropriate benchmark undefined
Listed Infrastructure Market Capitalization ($3.8 trillion, 376 companies)

Utilities and Midstream/Pipeline investments represent the bulk of investments

By Region

- 49% United States
- 18% Continental Europe
- 10% Asia
- 8% Canada
- 8% Emerging Asia
- 3% Latin America
- 2% Australia/NZ
- 2% United Kingdom

By Sector

- 22% Integrated Electric
- 19% Regulated Electric
- 16% Midstream/Pipelines
- 14% Rail
- 8% Communications
- 6% Gas Distribution
- 5% Toll Roads
- 4% Airports
- 3% Water
- 2% Renewable Energy
- 2% Ports
- 1% Diversified

Source: CBRE Clarion Securities, March 31, 2019
Infrastructure as an Investment
**Spotlight on Infrastructure**

Investment in infrastructure may offer key benefits

Access to long-lived assets which are hard to replicate and offer a range of defensive income streams, monopoly market positions with high barrier to entry or regulated markets

Typical sectors for investment: Energy, Renewables, Water/Waste, Transport, Communication and Social

Most managers focus on global developed markets, typically Organisation for Economic Co-operation and Development (“OECD”) markets

Global or non-U.S. funds provide exposure to non-dollar currencies and can serve as a further hedge against inflation as well as declines in the U.S. dollar

**Some risks to consider**

Some assets may become less-defensive as consumer demand, regulation or the competitive landscape changes

Interest-rate movements could have significant impact on the value of assets, depending on the level of leverage

Currency movements can negatively impact portfolio performance, hedging can be costly

---

**The flexibility to invest in infrastructure could offer further diversification, enhanced return opportunities, or both**
Private Infrastructure Fundraising Momentum Continues

Infrastructure strategies are raising significant capital

Open-end infrastructure managers secured substantial new commitments in 2018 and several new funds have been launched.

The variety of closed-end infrastructure products continues to increase with new offerings in debt and Emerging Markets-focused strategies.

Source: Preqin
Key Asset Characteristics To Evaluate Infrastructure Assets

Hard asset
Long-life asset
Provides essential economic or social services

Monopolistic or near-monopolistic in nature
High barriers to entry
Low demand elasticity

Stable cash flow
Illiquid underlying assets
High leverage
# Infrastructure – Relative Risk/Return

<table>
<thead>
<tr>
<th>Return</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt</td>
<td>Core</td>
</tr>
<tr>
<td>Net Return estimate</td>
<td>Typically 3-5% over a fixed rate such as LIBOR. Higher return strategies too</td>
</tr>
<tr>
<td>Asset</td>
<td>Asset level</td>
</tr>
<tr>
<td>Cash flow to investors</td>
<td>Interest payments</td>
</tr>
<tr>
<td>Investment stage</td>
<td>Debt</td>
</tr>
</tbody>
</table>
### Infrastructure Investing Structures

Similar vehicle types as equity real estate

<table>
<thead>
<tr>
<th></th>
<th>Open-End Funds</th>
<th>Closed-End Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategy</strong></td>
<td>Core, Core Plus</td>
<td>Core Plus Value Add Value Add Opportunistic</td>
</tr>
<tr>
<td><strong>Investor Control</strong></td>
<td>Limited</td>
<td>Limited</td>
</tr>
<tr>
<td><strong>Liquidity</strong></td>
<td>Moderate - Quarterly Liquidity</td>
<td>Low Fund Terms of 10+ Years</td>
</tr>
<tr>
<td><strong>Diversification by Sector Type and Geography</strong></td>
<td>Moderate - High</td>
<td>Varying depending on strategy and market-focus</td>
</tr>
<tr>
<td><strong>Diversification by Number of Assets</strong></td>
<td>Moderate - High</td>
<td>Varies based on size of fund and strategy</td>
</tr>
<tr>
<td><strong>Monitoring by the Investor</strong></td>
<td>Low – Moderate</td>
<td>Moderate - High</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td>Moderate - High 0.75% – 1.25% of NAV Most have incentive fees</td>
<td>Moderate - High 1.25%-1.75% on committed or invested equity plus an incentive fee (typically 15-20% over a hurdle rate)</td>
</tr>
<tr>
<td><strong>Returns</strong></td>
<td>7-10+% p.a. Primarily from yield</td>
<td>10%+ IRR Primarily from appreciation. Yield may be available after the end of the investment period</td>
</tr>
<tr>
<td><strong>Diversification Benefit to Overall Portfolio</strong></td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Institutional Infrastructure Markets

More developed in non-U.S. markets, more U.S. investor products being created

<table>
<thead>
<tr>
<th>North America only</th>
<th>Global / non-U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Open-End Fund Universe</strong></td>
<td>5-7</td>
</tr>
<tr>
<td><strong>Closed-End Fund Universe</strong></td>
<td>30 – 40+</td>
</tr>
<tr>
<td><strong>Markets &amp; Market Quality</strong></td>
<td>Most common: OECD markets, Europe-focused Less common: Emerging markets</td>
</tr>
<tr>
<td><strong>Sector Types</strong></td>
<td>Renewables, transport, communication, utilities, water and waste, social</td>
</tr>
<tr>
<td><strong>Key Drivers</strong></td>
<td>Global demand for clean power, historic public sector underinvestment, need for increased communications assets, greater history of public-private partnerships outside the U.S.</td>
</tr>
<tr>
<td><strong>Key Risk Considerations</strong></td>
<td>Political instability; Currency fluctuations &amp; stability; Variations in legal, tax, language, culture, etc.</td>
</tr>
</tbody>
</table>

- Expanding universe of managers and funds, including new product offerings and increased variety of products from existing managers
- Increasing number of infrastructure debt fund offerings following changes to banking regulations
Real Estate Debt
**Spotlight on Real Estate Debt**

**Investment in real estate debt may offer key benefits**

Potential downside protection relative to equity real estate interests

Potential for income-oriented return profile, primarily derived from property cash flows

Debt investments can provide a differentiated risk/return profile which can complement the equity capital stack

Inflation protection as floating-rate loans may track rising interest rates for well-positioned, well-located investments

**Some risks to consider**

No ability to participate in appreciation of the real estate value

Potential for non-payment and/or delayed payment of the loan

Debt investment performance can be varied, depending on the position in the capital stack and market timing

Fixed-rate loans will not track interest rate movements, which can be significant depending on the loan duration

---

A well-constructed debt investment could offer equity-like real estate returns with downside protection
Real Estate Debt Overview

The four quadrants of real estate investment

**Private**

- **Debt**
  - Senior mortgages, B-notes, mezzanine loans, preferred equity

- **Equity**
  - Individual property ownership, unlisted funds and syndicates

**Public**

- **Debt**
  - Commercial Mortgage-Backed Securities ("CMBS"), Collateralized Debt Obligations ("CDOs") and Mortgage REITs

- **Equity**
  - Real Estate Investment Trusts ("REITs") and Real Estate Operating Companies ("REOCs")
**Illustrative Real Estate Capital Stack Alternatives**

Each position in the capital stack has distinct characteristics and rights.

<table>
<thead>
<tr>
<th>Whole Loan</th>
<th>B-Note</th>
<th>Mezzanine Loan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Whole Loan:</strong></td>
<td><strong>B-Note:</strong></td>
<td><strong>Senior Loan:</strong></td>
</tr>
<tr>
<td>75%</td>
<td>55% to 75%</td>
<td>0% to 65%</td>
</tr>
<tr>
<td><strong>Mezzanine Loan:</strong></td>
<td><strong>Equity:</strong></td>
<td><strong>Mezz. Loan:</strong></td>
</tr>
<tr>
<td>15%</td>
<td>25%</td>
<td>65% to 85%</td>
</tr>
<tr>
<td><strong>Mezzanine Loan:</strong></td>
<td><strong>Equity:</strong></td>
<td><strong>Equity:</strong></td>
</tr>
<tr>
<td>65% to 85%</td>
<td>15%</td>
<td></td>
</tr>
</tbody>
</table>

Effective selection of the position in the capital stack is based on a variety of factors.
1 Characteristics of Investment Types – Whole Loan

- A Whole Loan is a debt instrument collateralized by a first mortgage or deed of trust that encumbers an income producing property
- The whole loan is typically the senior-most position in the capital stack
- Investments receive a priority claim for interest income and repayment proceeds
- The primary source of income is rent paid by tenants that occupy the income producing property, enhanced by fee and servicing income

<table>
<thead>
<tr>
<th>Typical Characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Stack Position</td>
<td>From 0% to ~65%-75% LTV</td>
</tr>
<tr>
<td>Priority of Claim</td>
<td>Highest</td>
</tr>
<tr>
<td>Capital Requirement</td>
<td>High</td>
</tr>
<tr>
<td>Pay Structure</td>
<td>Interest income, fees</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>Floating- or fixed-rate</td>
</tr>
<tr>
<td>Investment Term</td>
<td>Typically up to 10 years</td>
</tr>
</tbody>
</table>
A B-Note is created by originating a whole loan and selling a senior interest in that loan.

The B-Note holds a relatively senior position in the capital stack.

Investments receive an enhanced return by selling an A-Note at a lower yield.

The primary source of income is rent paid by tenants that occupy the income producing property; however, the A-Note holder receives income first.
A Mezzanine Loan is a debt instrument collateralized by a pledge of ownership interests in a property.

The mezzanine loan holds a relatively junior position in the capital stack and typically finances a transitional property that needs to be repositioned.

Higher return from income from rent paid by tenants and proceeds from a sale/refinancing.

Performance driven by market environment and success of repositioning.

### Characteristics of Investment Types – Mezzanine Loan

- **Capital Stack Position**: From ~65% to ~85% LTV
- **Priority of Claim**: Moderate to low
- **Capital Requirement**: Moderate to low
- **Pay Structure**: Interest income, PIK, fees
- **Interest Rate**: Transaction specific
- **Investment Term**: Typically 2 to 5 years
## Debt Investing Structures

Similar vehicle types as equity real estate; different underlying assets

<table>
<thead>
<tr>
<th></th>
<th>Open End Funds</th>
<th>Closed End Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategy</strong></td>
<td>Low to Medium risk profile</td>
<td>Medium to High risk profile</td>
</tr>
<tr>
<td><strong>Investor Control</strong></td>
<td>Limited</td>
<td>Limited</td>
</tr>
<tr>
<td><strong>Liquidity</strong></td>
<td>Moderate Quarterly Liquidity</td>
<td>Low Fund Terms of 10+ Years</td>
</tr>
<tr>
<td><strong>Diversification by Property Type and Geography</strong></td>
<td>Moderate</td>
<td>Varies based on size of fund and strategy</td>
</tr>
<tr>
<td></td>
<td>Moderate - High</td>
<td>Varies based on size of fund and strategy</td>
</tr>
<tr>
<td></td>
<td>Varies based on tenure of investment vehicle</td>
<td>Varies based on size of fund and strategy</td>
</tr>
<tr>
<td><strong>Monitoring by the Investor</strong></td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td>Moderate 0.65% -1% of NAV No incentive fee</td>
<td>Moderate - High 1.0%-1.5% on committed or invested equity plus an incentive fee (typically 15-20% over a hurdle rate) Core Plus may not have an incentive fee</td>
</tr>
<tr>
<td><strong>Returns</strong></td>
<td>5-10%+ p.a. Primarily from yield</td>
<td>8-12%+ IRR Combination of yield and payoff at debt maturity</td>
</tr>
<tr>
<td><strong>Diversification Benefit to Overall Portfolio</strong></td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Real Asset Appendix
State of Global Infrastructure

$3.3 trillion of global annual investment is required, only $2.5 trillion is invested

Since 2009, infrastructure declined as a share of GDP in 11 of the G20 economies.

$1 of infrastructure investment can raise GDP by 20 cents by increasing employment (construction) and ultimately productivity.

According to the American Society of Civil Engineers, there is a $2 trillion investment gap and they believe the U.S. must increase investment from all levels of government and the private sector from 2.5% to 3.5% of U.S. Gross Domestic Product (GDP) by 2025.

The Sector is Still Developing, Benchmarking is Inconsistent

Absolute Return targets have gained ground in 2017 and 2018

Absolute return benchmarks remain most popular, with significant numbers of investors also using a publicly traded securities index.

Source: Probitas, 2017 and 2018 Infrastructure Investor Survey
Commercial Mortgage-Backed Securities (CMBS) Overview

CMBS offers investors a relatively liquid alternative to real estate debt investment.

CMBS investing requires careful analysis of the composition of the underlying loan pools.

1. Loans Originated
2. B-Piece Buyer Picks Pool
3. Selected Loans Pooled
4. Bonds Rated & Issued

- Loans 1-100
- Loans 1-75
- Commercial Mortgage Loan Portfolio
- AAA 70%
- AA/A/BBB 22%
- B-Piece BB/B/NR 8%
- Mezz. Debt / Equity
- Mezz. Debt / Equity
## Loan Terminology

### Speaking the language of debt

<table>
<thead>
<tr>
<th>Loan Type</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Bridge Loan**            | • Short-term loan with a three to five year term.  
• Rates may be fixed or floating.                                                                                                                                                                      |
| **Construction Loan**      | • A loan to fund up to 100% of construction costs of a property.  
• May be made in conjunction with a commitment by the lender for a permanent loan upon completion                                                                                                     |
| **Conduit Loan**           | • Commercial real estate loan made to ultimately be securitized via CMBS.                                                                                                                                 |
| **Conduit Lender**         | • Makes conduit loans and holds the loans until they can be securitized as CMBS.  
• Can be insurance companies, banks, pension funds, financial services firms, investment banks, and other types of lenders.                                                                               |
| **Permanent Loan**         | • Senior loan, whole loan, conduit loan, participating mortgage, or otherwise long-term financing of a property.                                                                                          |
| **Repurchase Loans**       | • Repo loan.  
• A short-term loan, often made overnight, in which the lender lends cash to a borrower in exchange for bonds with the borrower agreeing to repurchase the bonds later at a higher price.   |
| **Whole Loan Commercial Mortgage** | • Debt instrument collateralized by a first mortgage or deed or trust that encumbers an income producing property.  
• Whole loans are not securitized.                                                                                                                                                                       |
### Loan Terminology

**Speaking the language of debt**

<table>
<thead>
<tr>
<th>Loan Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Rate Loan</strong></td>
<td>• Rate of interest is fixed and remains the same for the entire term of the loan</td>
</tr>
</tbody>
</table>
| **Floating Rate Loan**           | • Rate of interest fluctuate over the term of the loan and is based on a spread over a benchmark  
                                |   • E.g. LIBOR plus 200 basis points                                                                                                  |
| **Interest Only Mortgage (I/O)**| • A loan where the borrower’s periodic payments are only interest payments.  
                                |   • Principal is paid when the loan is paid off or amortization with interest and principal payments may begin during the loan term after the I/O period. |
| **LIBOR**                        | • London Interbank Offered Rate  
                                |   • Rate banks charge each other for short-term loans.  
                                |   • Interest rates on real estate loans can be based on a spread over LIBOR.                                                         |
| **Loan to Value (LTV)**          | • Loan amount divided by the property value.  
                                |   • Used by lenders to judge the safety of the loan.  
                                |   • Property value may be measured by appraised value, as determined by a rating agency or the lender.  
                                |   • A LTV of less than 100 can reduce the borrower’s motivation to continue making mortgage payments.                                   |
| **Debt Service Coverage Ratio (DSCR)** | • Measures the ability of a property to pay for all mortgage related payments.  
                                |   • Calculated as Net Operating Income divided by Total Debt Service.  
                                |   • A key metric used by lenders, along with LTV, to judge the safety of a loan.  
                                |   • Breaching a minimum DSCR is a condition of default in many loan documents.                                                        |
## Loan Terminology

**Speaking the language of debt**

<table>
<thead>
<tr>
<th><strong>Payment in Kind (PIK)</strong></th>
<th>• Represents interest that may be deferred at the option of the borrower. For example: a loan with an interest rate of 8% comprised of 5% current pay and 3% deferred interest (the PIK)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transitional Asset</strong></td>
<td>• A property undergoing a value-add program, such as leasing, renovation, or repositioning, or a property in a location where fundamentals are weaker than prime markets.</td>
</tr>
<tr>
<td><strong>Collateral</strong></td>
<td>• Security pledged for the payment of a loan.</td>
</tr>
<tr>
<td><strong>Fannie Mae</strong></td>
<td>• Federal National Mortgage Association is a public government sponsored enterprise that provides financing in the housing sector.</td>
</tr>
<tr>
<td></td>
<td>• Securitizes mortgage loans</td>
</tr>
<tr>
<td></td>
<td>• Referred to as an Agency Lender</td>
</tr>
<tr>
<td><strong>Freddie Mac</strong></td>
<td>• Federal Home Loan Mortgage Corporation</td>
</tr>
<tr>
<td></td>
<td>• A public government sponsored enterprise that provides financing in the housing sector.</td>
</tr>
<tr>
<td></td>
<td>• Securitizes mortgage loans</td>
</tr>
<tr>
<td></td>
<td>• Referred to as an Agency Lender</td>
</tr>
<tr>
<td><strong>Foreclose</strong></td>
<td>• The process of taking possession of a mortgage property as a result of the mortgagor’s failure to make mortgage payments.</td>
</tr>
</tbody>
</table>
Private Equity
Agenda

Private Equity Discussion Topics

Private Equity Definition
Benefits and Challenges
Institutional Investor Usage
Strategy Types
Market Size and Composition
Investment Structure and Cash Flows
Return Characteristics
Program Implementation
Summary

Appendix
Introducing Private Equity:

Rationale, Pros, and Cons

Definition: Private unlisted investments in operating companies, typically accessed through limited partnerships

Private equity is an additional tool that investors can employ to finance a future payment stream

It provides a differentiated return stream and diversification

Addresses a different opportunity set – private companies

While commonly viewed as a separate asset class, it is an extension of equity

The key benefit sought from private equity is to earn a rate of return in excess of the returns of publicly stocks and bonds

The primary drawbacks are illiquidity and program complexity
Private Equity is Different from Public Equity—a Plus

Rationale, Pros, and Cons

Similarity: Revenues - Expenses = Earnings

Control over value-improvement is the key differentiator from public equities

Private equity market is fragmented (no central marketplace) and partially regulated
- Creates opportunities for GPs with skill to add value

Active execution and control of value-creation plans
- Grow companies fast, use leverage to the degree applicable
- Bring best resources to companies, management, boards, and customers

Investors and management in partnership
- Substantial investment, opportunity for financial independence

Managed for long-term gain, not quarterly earnings
- Different objectives and incentives from public companies

Privately negotiated pricing and financing structures
- Private pricing is generally lower than public pricing
- Companies are financed to maximize equity value (e.g., more debt)
Challenges of Private Equity

Private equity is illiquid

Implementation is a primary risk and critical to success

- Inefficiencies can work for or against investors, below median returns are not adequate
- Mistakes are long-lasting, cannot be easily liquidated
- Professionally managed portfolios mitigate much of this risk

Program complexity

- Takes five or more years to become fully funded
- Ongoing implementation – periodic reinvestments are required

Return calculation and benchmarking methodology differs from public securities, and performance data is not publicly available

- Minor learning curve for investors

The J-curve effect can potentially detract from short-term performance

- Returns and asset values take time to develop (negative early returns)
- Risk: Individual company investments fail

Fees are high in relation to the fees for managing portfolios of publicly traded securities

- Fund-of-Funds fees are 65 basis points to 85 basis point based on commitments
- Underlying partnership fees and carried interests are approximately 230 basis points based on commitments
Public pension plans are the largest investors in private equity being over 25%

Tax-exempt plans constitute about half the market, and institutional investors make up approximately 80%
Five Types of Private Equity Strategies

Private Equity Addresses a Full Spectrum of Corporate Financing Needs

Venture Capital
- Nascent growing companies in technology, health care, retail and other large market sectors
- Early-, Multi-, Late-Stage

Buyouts
- Mature businesses in traditional industries
- Mega, Large, Middle-Market, Small

Special Situations
- Tend to be larger company corporate finance funds that fall outside other categories (“Other” segment)
- Industry-Focused, Multiple-Strategy, Secondary

Subordinated Debt
- Private high yield debt with equity participation
- Large, Small / Captive, Independent

Distressed Debt/Restructuring
- Rejuvenate good companies that have financial woes, generally large traditional mature companies
- Senior Secured, Equity Infusion
Corporate Growth & Private Finance Cycle

- Early Stage
  - Venture Capital
  - Private

- Entrepreneurial Growth
  - Special Situations

- Established Growth
  - Buyouts, Subdebt
  - Restructuring

- Maturity Cyclical
  - Mostly Public
# Annual U.S. Private Equity Fund Formation

## Historical Commitments to U.S. Private Equity Funds

### Number of Funds

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Venture</td>
<td>150</td>
<td>123</td>
<td>119</td>
<td>135</td>
<td>154</td>
<td>205</td>
<td>307</td>
<td>281</td>
<td>439</td>
<td>531</td>
<td>535</td>
<td>2,979</td>
<td>42%</td>
</tr>
<tr>
<td>Buyouts</td>
<td>114</td>
<td>104</td>
<td>110</td>
<td>154</td>
<td>167</td>
<td>224</td>
<td>305</td>
<td>263</td>
<td>298</td>
<td>373</td>
<td>357</td>
<td>2,469</td>
<td>35%</td>
</tr>
<tr>
<td>Subdebt</td>
<td>17</td>
<td>20</td>
<td>27</td>
<td>29</td>
<td>26</td>
<td>33</td>
<td>33</td>
<td>28</td>
<td>25</td>
<td>86</td>
<td>88</td>
<td>412</td>
<td>6%</td>
</tr>
<tr>
<td>Restructuring</td>
<td>29</td>
<td>30</td>
<td>28</td>
<td>21</td>
<td>25</td>
<td>43</td>
<td>33</td>
<td>37</td>
<td>36</td>
<td>31</td>
<td>34</td>
<td>347</td>
<td>5%</td>
</tr>
<tr>
<td>Other/FOF</td>
<td>53</td>
<td>58</td>
<td>52</td>
<td>65</td>
<td>54</td>
<td>87</td>
<td>87</td>
<td>73</td>
<td>74</td>
<td>134</td>
<td>122</td>
<td>859</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td>363</td>
<td>335</td>
<td>336</td>
<td>404</td>
<td>426</td>
<td>592</td>
<td>765</td>
<td>682</td>
<td>872</td>
<td>1,155</td>
<td>1,136</td>
<td>7,066</td>
<td>100%</td>
</tr>
</tbody>
</table>

### $ Amount (in millions)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Venture</td>
<td>24,729</td>
<td>13,162</td>
<td>11,636</td>
<td>16,216</td>
<td>20,273</td>
<td>19,661</td>
<td>32,968</td>
<td>34,274</td>
<td>44,030</td>
<td>37,371</td>
<td>55,474</td>
<td>309,793</td>
<td>12%</td>
</tr>
<tr>
<td>Buyouts</td>
<td>130,884</td>
<td>39,552</td>
<td>34,955</td>
<td>75,286</td>
<td>92,798</td>
<td>125,544</td>
<td>174,783</td>
<td>169,694</td>
<td>184,538</td>
<td>227,387</td>
<td>246,902</td>
<td>1,502,322</td>
<td>59%</td>
</tr>
<tr>
<td>Subdebt</td>
<td>40,202</td>
<td>3,262</td>
<td>6,224</td>
<td>4,729</td>
<td>10,775</td>
<td>14,502</td>
<td>8,663</td>
<td>12,535</td>
<td>22,481</td>
<td>36,721</td>
<td>31,089</td>
<td>191,182</td>
<td>8%</td>
</tr>
<tr>
<td>Restructuring</td>
<td>49,978</td>
<td>14,206</td>
<td>18,364</td>
<td>11,462</td>
<td>21,510</td>
<td>36,644</td>
<td>22,613</td>
<td>22,573</td>
<td>29,093</td>
<td>30,466</td>
<td>23,524</td>
<td>280,432</td>
<td>11%</td>
</tr>
<tr>
<td>Other/FOF</td>
<td>19,675</td>
<td>25,733</td>
<td>15,160</td>
<td>14,699</td>
<td>15,083</td>
<td>20,205</td>
<td>27,175</td>
<td>17,597</td>
<td>32,015</td>
<td>30,134</td>
<td>35,077</td>
<td>252,553</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>265,468</td>
<td>95,915</td>
<td>86,339</td>
<td>122,392</td>
<td>160,439</td>
<td>216,556</td>
<td>266,201</td>
<td>256,673</td>
<td>312,156</td>
<td>362,078</td>
<td>392,065</td>
<td>2,536,282</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Private Equity Analyst

- The domestic institutional private equity investment opportunity set averaged about 577 partnerships and $222 billion annually over the last decade.
- International partnerships represent about 35% of the global opportunity set.

Source: Private Equity Analyst
Typical Fund-of-Funds Portfolio

Institutional Baseline Portfolio Structure

- An adjusted-market portfolio reflects the most common approach for manager-of-managers vehicles
- Diversification provides greater portfolio return stability as individual strategies have cycles
- International component is typically between 25% to 40%

<table>
<thead>
<tr>
<th>Strategy</th>
<th>% Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venture Capital</td>
<td>20 - 30%</td>
</tr>
<tr>
<td>Acquisition/Buyouts</td>
<td>30 - 45%</td>
</tr>
<tr>
<td>Special Situations</td>
<td>20 - 30%</td>
</tr>
<tr>
<td>Subordinated Debt</td>
<td>0 - 20%</td>
</tr>
<tr>
<td>Distressed Debt</td>
<td>0 - 20%</td>
</tr>
</tbody>
</table>
How Private Equity Works

Private Equity Partnerships Program Structure

Policy
Strategic Planning
Performance Evaluation

Proactive Security Selection
Active Management
Reporting

Mini-Conglomerate (Security)

Divisions

Plan Sponsor

Fund-of-Funds Managers

LTD PTRSHP 1
LTD PTRSHP 2
LTD PTRSHP 3
ETC.

7 to 30 Companies
Private equity is illiquid and requires a long-time horizon
Decisions made today last 15 years or more

Source: Private Equity Analyst
Private Equity Cash Flows and Net Asset Value

Yearly cash flow and NAV for a $1 million partnership (or vintage year) commitment

Investment period

Maturity / Liquidation period

Legend:
- Capital Calls
- Distributions
- Net Invested (NAV Proxy)
## Private Equity Returns: Why Bother?

**Private Equity Performance Database – Pooled Horizon IRRs Through December 31, 2018 – Returns are net of fees**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>1 Year</th>
<th>3 Years</th>
<th>5 Years</th>
<th>10 Years</th>
<th>15 Years</th>
<th>20 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Venture</td>
<td>18.7%</td>
<td>10.6%</td>
<td>14.3%</td>
<td>13.5%</td>
<td>11.1%</td>
<td>17.3%</td>
</tr>
<tr>
<td>All Buyouts</td>
<td>8.4%</td>
<td>14.6%</td>
<td>12.1%</td>
<td>14.3%</td>
<td>13.7%</td>
<td>12.2%</td>
</tr>
<tr>
<td>Mezzanine</td>
<td>9.7%</td>
<td>11.7%</td>
<td>10.5%</td>
<td>10.8%</td>
<td>10.0%</td>
<td>8.9%</td>
</tr>
<tr>
<td>All Private Equity</td>
<td><strong>10.7%</strong></td>
<td><strong>13.1%</strong></td>
<td><strong>11.9%</strong></td>
<td><strong>14.0%</strong></td>
<td><strong>12.7%</strong></td>
<td><strong>12.7%</strong></td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>-4.4%</td>
<td>9.3%</td>
<td>8.5%</td>
<td>13.1%</td>
<td>7.8%</td>
<td>5.6%</td>
</tr>
</tbody>
</table>

Source: Refinitiv/Cambridge and Callan

There can be large return differences between strategy types over time

- Each strategy has contributed to success at various times

Venture Capital struggled for about 10 years following the technology bust, but it has recently experienced a resurgence

“All Private Equity” outperforms public stocks in the longer horizons

- Approximately 3% or more depending on the period
Proper Implementation is Critical

Dispersion of returns is high

Returns below median are unattractive

Poor choices last a long time

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Median IRR</th>
<th>Upper Quartile IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venture Capital</td>
<td>8.0%</td>
<td>19.1%</td>
</tr>
<tr>
<td>Buyouts</td>
<td>11.9%</td>
<td>19.9%</td>
</tr>
<tr>
<td>All Private Equity</td>
<td>9.8%</td>
<td>18.6%</td>
</tr>
</tbody>
</table>

**Public Index Comparables**

<table>
<thead>
<tr>
<th>Index</th>
<th>IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500 Stock Index</td>
<td>10.9%</td>
</tr>
<tr>
<td>Bloomberg Barclays Aggregate Bond Index</td>
<td>6.8%</td>
</tr>
</tbody>
</table>

Source: Refinitiv/Cambridge and Callan
Private Equity Returns

Time-Weighted Horizon Periods

Private Equity versus Public Equity Performance as of December 31, 2018

- Time-weighted return premium is attractive typically over longer time periods
Private Equity Standard Deviation

Private Equity versus Public Equity Standard Deviations as of December 31, 2018

Volatility dampening effect can be significant, particularly in declining markets

PE’s relative risk-adjusted return (return / standard deviation) is positive in all periods except one year
Implementation/Search

Fund-of-Funds

Starting universe of about 100 “gatekeeping” organizations
● Smaller institutional “oligopoly” (approximately 15 firms)

Mandates can be broad or specialty

Evaluation is both Quantitative and Qualitative

Access to established partnerships and amount of venture capital is an important differentiator

Objective screening criteria:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Investment breadth and experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td>Investment strategy</td>
</tr>
<tr>
<td>Staffing</td>
<td>Investment process</td>
</tr>
<tr>
<td>Asset base</td>
<td>Allocation process</td>
</tr>
<tr>
<td>Client base</td>
<td>Performance track record</td>
</tr>
<tr>
<td>Access to top-tier partnerships</td>
<td>Fees</td>
</tr>
<tr>
<td></td>
<td>Vehicle, terms and conditions</td>
</tr>
</tbody>
</table>
Private Equity Overview Summary

Defined Private Equity as private corporate finance investments

Key benefit sought is high rate of return, other benefits are secondary

Reviewed benefits and challenges

Usage by institutional investors is becoming very common, especially among public funds

Examined five key strategies:
- Venture Capital, Buyouts, Special Situations, Subordinated Debt, Distressed Debt

Market is large and robust with accessible pool of attractive investments across strategies

Reviewed institutional portfolio structure and cash flow characteristics

Examined return history which has delivered a return premium

Discussed manager universe and implementation
Private Equity Appendix
## Sample Range of Private Equity Allocations

<table>
<thead>
<tr>
<th>Plan Sponsor</th>
<th>% Target</th>
<th>$ Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>CALPERS</td>
<td>15%</td>
<td>$33.6 billion</td>
</tr>
<tr>
<td>Washington S/B</td>
<td>25%</td>
<td>$16.7 billion</td>
</tr>
<tr>
<td>NY State Common</td>
<td>10%</td>
<td>$12.7 billion</td>
</tr>
<tr>
<td>Utah Retirement Systems</td>
<td>7%</td>
<td>$1.5 billion</td>
</tr>
<tr>
<td>General Electric Pension Trust</td>
<td>7%</td>
<td>$3.5 billion</td>
</tr>
<tr>
<td>Boeing Company Pension Plan</td>
<td>6%</td>
<td>$4.4 billion</td>
</tr>
<tr>
<td>Indiana Public Retirement System</td>
<td>25%</td>
<td>$5.3 billion</td>
</tr>
<tr>
<td>Texas ERS</td>
<td>7%</td>
<td>$1.7 billion</td>
</tr>
<tr>
<td>Regions Bank Pension</td>
<td>5%</td>
<td>$72 million</td>
</tr>
<tr>
<td>Dartmouth College Endowment</td>
<td>27%</td>
<td>$22 million</td>
</tr>
<tr>
<td>The Clayton Foundation</td>
<td>8%</td>
<td>$17 million</td>
</tr>
</tbody>
</table>

64% of institutional investors have private equity allocations per the 2012 Russell Global Survey of Alternative Investing.

Source: Money Market Directory and Callan Associates
Private Equity Returns

Diversification Matters


Ranked in order of performance (Best to Worst)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Buyouts</td>
<td>25.3%</td>
<td>Buyouts</td>
<td>29.3%</td>
<td>Buyouts</td>
<td>27.6%</td>
<td>Buyouts</td>
<td>39.1%</td>
<td>Buyouts</td>
<td>29.4%</td>
<td>Mezzanine</td>
<td>-3.1%</td>
<td>All Private Equity</td>
<td>17.3%</td>
<td>Buyouts</td>
<td>19.6%</td>
</tr>
<tr>
<td>All Private Equity</td>
<td>18.5%</td>
<td>All Private Equity</td>
<td>24.3%</td>
<td>All Private Equity</td>
<td>21.7%</td>
<td>All Private Equity</td>
<td>32.1%</td>
<td>All Private Equity</td>
<td>26.7%</td>
<td>Venture Capital</td>
<td>-19.9%</td>
<td>Buyouts</td>
<td>16.5%</td>
<td>All Private Equity</td>
<td>18.8%</td>
</tr>
<tr>
<td>Mezzanine</td>
<td>15.1%</td>
<td>Venture Capital</td>
<td>14.8%</td>
<td>Mezzanine</td>
<td>13.3%</td>
<td>Venture Capital</td>
<td>19.6%</td>
<td>Venture Capital</td>
<td>19.9%</td>
<td>Venture Capital</td>
<td>-26.7%</td>
<td>All Private Equity</td>
<td>9.1%</td>
<td>Venture Capital</td>
<td>18.2%</td>
</tr>
<tr>
<td>Venture Capital</td>
<td>1.9%</td>
<td>Mezzanine</td>
<td>8.9%</td>
<td>Venture Capital</td>
<td>11.0%</td>
<td>Mezzanine</td>
<td>16.3%</td>
<td>Mezzanine</td>
<td>13.7%</td>
<td>Buyouts</td>
<td>-29.4%</td>
<td>Mezzanine</td>
<td>6.8%</td>
<td>Mezzanine</td>
<td>9.2%</td>
</tr>
</tbody>
</table>

Source: Thomson/Cambridge

Each strategy takes its turn at the top, middle, and bottom

Venture has produced the highest returns but is the most volatile

Buyouts has less volatility, but returns are lower than venture capital

Mezzanine has proven a good defensive strategy and contributed to returns

The market-weighted “All Private Equity” portfolio has been most consistently strong
**Implementation**

**Search Process**

Develop Search Package
- Profile of Client and Mandate, Search Criteria, Callan Questionnaire, Draft Guidelines
- Reviewed by Staff and Callan Consultants

Callan and Staff review Callan’s universe of providers
- Select appropriate roster of firms to receive search package
- Can advertise in P&I and elsewhere if desired

Managers have four weeks to respond to questionnaire

Review responses and select firms to interview
- Can be a one step or two step process and may include on-sites
- Callan can work with Staff or independently throughout the process, as desired

Review by Callan Manager Search Committee

Schedule finalist candidate presentations to the Investment Committee

Legal review and closing

Process usually takes four months to finalist presentations
Private Equity Returns

Manager Selection and Vintage Year Matter

**THOMSON/CAMBRIDGE PRIVATE EQUITY UNIVERSE**
All Private Equity Database (All Regions)
IRRs by Vintage Year Through December 31, 2018

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 5%</td>
<td>40.5</td>
<td>37.6</td>
<td>34.0</td>
<td>21.4</td>
<td>28.1</td>
<td>32.3</td>
<td>36.2</td>
<td>37.5</td>
<td>40.0</td>
<td>37.2</td>
<td>37.5</td>
<td>40.0</td>
<td>44.8</td>
<td>48.7</td>
<td>74.0</td>
<td>34.5</td>
</tr>
<tr>
<td>Upper Qtl</td>
<td>17.8</td>
<td>14.2</td>
<td>12.8</td>
<td>13.1</td>
<td>14.7</td>
<td>16.4</td>
<td>21.3</td>
<td>18.8</td>
<td>20.2</td>
<td>19.3</td>
<td>19.7</td>
<td>24.3</td>
<td>22.6</td>
<td>21.7</td>
<td>23.8</td>
<td>-1.0</td>
</tr>
<tr>
<td>Median</td>
<td>9.7</td>
<td>7.5</td>
<td>7.4</td>
<td>7.5</td>
<td>8.8</td>
<td>9.5</td>
<td>13.1</td>
<td>12.2</td>
<td>13.4</td>
<td>13.7</td>
<td>13.0</td>
<td>14.5</td>
<td>13.4</td>
<td>10.5</td>
<td>7.6</td>
<td>-8.2</td>
</tr>
<tr>
<td>Lower Qtl</td>
<td>2.2</td>
<td>0.3</td>
<td>1.9</td>
<td>1.6</td>
<td>2.9</td>
<td>3.8</td>
<td>7.8</td>
<td>6.5</td>
<td>6.6</td>
<td>6.5</td>
<td>8.1</td>
<td>8.5</td>
<td>6.7</td>
<td>3.2</td>
<td>-2.5</td>
<td>-19.7</td>
</tr>
<tr>
<td>Bottom 5%</td>
<td>-13.8</td>
<td>-16.2</td>
<td>-9.0</td>
<td>-11.0</td>
<td>-12.5</td>
<td>-7.4</td>
<td>-0.9</td>
<td>-2.2</td>
<td>-5.1</td>
<td>-3.9</td>
<td>-0.6</td>
<td>-1.1</td>
<td>-6.5</td>
<td>-15.5</td>
<td>-32.5</td>
<td>-61.4</td>
</tr>
<tr>
<td>Pooled</td>
<td>16.0</td>
<td>11.6</td>
<td>8.7</td>
<td>7.2</td>
<td>9.3</td>
<td>13.3</td>
<td>14.3</td>
<td>13.8</td>
<td>15.9</td>
<td>16.1</td>
<td>13.6</td>
<td>17.1</td>
<td>17.9</td>
<td>15.3</td>
<td>10.6</td>
<td>-5.3</td>
</tr>
</tbody>
</table>

Size
- 108
- 151
- 242
- 278
- 292
- 251
- 119
- 146
- 193
- 204
- 192
- 216
- 248
- 199
- 153
- 179

Note: Returns are net of all partnership fees, expenses.
Source: Refinitiv/Cambridge

Significant dispersion within vintage years (10% to 30%).
- Above median returns are targeted.
- Successful individual managers have return persistence.

Large differences between adjacent vintage years.
- Cannot market-time, need to invest consistently.

J-curve effect is evident in newer vintage years.
- Return reduction is shorter and shallower with higher qualities.
Disclaimers

This report is for informational purposes only and should not be construed as legal or tax advice on any matter. Any decision you make on the basis of this content is your sole responsibility. You should consult with legal and tax advisers before applying any of this information to your particular situation.

This report may consist of statements of opinion, which are made as of the date they are expressed and are not statements of fact.

Reference to or inclusion in this report of any product, service or entity should not be construed as a recommendation, approval, affiliation or endorsement of such product, service or entity by Callan.

Past performance is no guarantee of future results.

The statements made herein may include forward-looking statements regarding future results. The forward-looking statements herein: (i) are best estimations consistent with the information available as of the date hereof and (ii) involve known and unknown risks and uncertainties such that actual results may differ materially from these statements. There is no obligation to update or alter any forward-looking statement, whether as a result of new information, future events or otherwise. Undue reliance should not be placed on forward-looking statements.