Mendocino County Employees’ Retirement Association

Additional Asset Classes for Consideration in Upcoming Asset/Liability Study

April 2019

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Senior Vice President

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Senior Vice President
Callan is preparing to conduct an Asset Liability Study for the Mendocino CERA Pension Plan. The current strategic target includes allocations to:

- U.S. Equity
- Non-U.S. Equity
- U.S. Intermediate Fixed Income
- Domestic Real Estate

Today’s discussion is intended to review other asset classes for potential inclusion in the upcoming study.

At the August 2018 MCERA Board 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. As such, today’s discussion of additional private real assets will focus on Infrastructure and will not include Timber, Agriculture or Public Real Assets.
Asset Classes for Consideration

Some public pension plans invest in these asset categories

Asset Class Weights vs Callan Public Fund Sponsor Database

<table>
<thead>
<tr>
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<th>Domestic</th>
<th>Domestic</th>
<th>Cash</th>
<th>Domestic</th>
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<td>96.38%</td>
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<td>30.43%</td>
<td>20.29%</td>
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Agenda: Asset Class Discussions

Non-U.S. Fixed Income

Alternatives
- Private Credit
- Hedge Funds
- Multi Asset Class Strategies

Private Equity

Other Real Assets
- Infrastructure
- Commodities

Global Equity
Non-U.S. Fixed Income
Fixed income investors can be categorized into three types depending on investment objectives, time horizon, liquidity needs, risk tolerance, regulatory framework among many other factors.

Mendocino CERA is a total return investor.

### Types of Fixed Income Investors

<table>
<thead>
<tr>
<th>Type of Investor</th>
<th>Objectives</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **Income Oriented Investor** | • Income Generation  
• Capital Preservation  
• Liquidity  
• Meet Solvency Requirements | • Retirees  
• Insurance Companies |
| **Total Return Investor** | • Diversification  
• Flight to Quality/Deflation Hedge  
• Liquidity  
• Additional Return | • Public Pension Plans  
• Taft-Hartley Plans  
• Corporate Pension Plans  
• Endowments  
• Foundations |
| **Liability Driven Investor (LDI)** | • Hedge Liabilities  
• Additional Return | • Corporate Pension Plans |

**Types of Investors**

- **Income Oriented Investor**
  - Retirees
  - Insurance Companies

- **Total Return Investor**
  - Public Pension Plans
  - Taft-Hartley Plans
  - Corporate Pension Plans
  - Endowments
  - Foundations

- **Liability Driven Investor (LDI)**
  - Corporate Pension Plans
The Role of Fixed Income in Portfolios

The “Anchor to Windward”

Within a total return strategy the role of fixed income is to serve as a low-risk, diversifying anchor against which an investor takes on riskier investments in assets such as equity.

Cumulative Returns for U.S. Equity Declining Periods

Bloomberg Barclays Aggregate
S&P 500
What Do You Use Now?

Bloomberg Barclays U.S. Aggregate Bond Index

The Fixed Income portfolio within the Mendocino CERA Pension Plan is currently implemented with two core plus bond managers (PIMCO and Dodge & Cox), each benchmarked to the Bloomberg Barclays U.S. Aggregate Bond Index.

The Aggregate Index covers most of the U.S. fixed income market
- Rated investment-grade by at least two ratings agencies
- Fixed rate
- Dollar-denominated
- Non-convertible
- Publicly issued

The Aggregate does not include
- Non-agency RMBS
- High yield (“junk”) bonds
- Non-U.S. developed market bonds
- Emerging market bonds

Data as of December 31, 2018
International Fixed Income

Overview

**Global/Non-U.S Fixed Income:** Broadly diversified allocations to sovereign or corporate bonds issued by Non-U.S. countries across the globe.

Can be active or passive, hedged or unhedged, with varying degrees of risk and use of non-benchmark securities.

### 2019 Callan Capital Market Projections: Risk and Return – 2019-2028

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Index</th>
<th>PROJECTED RETURN</th>
<th>PROJECTED RISK</th>
<th>2018 - 2027</th>
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<td>U.S. Fixed</td>
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<td>3.75%</td>
<td>3.75%</td>
<td>1.50%</td>
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<tr>
<td>Non-U.S. Fixed</td>
<td>Bloomberg Barclays Glbl Agg ex US</td>
<td>1.80%</td>
<td>1.40%</td>
<td>-0.85%</td>
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</table>

**Use by other Public Plan peers?**

- Percent of Public Pension Plans Invested: **16%**
- Median % of Portfolio Invested (when used): **4%**

**Effective yield**
- U.S Fixed: 3.28
- Non-U.S. Fixed: 1.05

**Effective duration**
- U.S Fixed: 5.87
- Non-U.S. Fixed: 7.79
## International Fixed Income

### Benefits and Considerations

#### Benefits

- Managers have the ability to move between under and over-valued markets
- Increased diversification due to interest rate, credit, currency, and economic cycles

#### Considerations

- Interest rate, credit, and default risk
  - Non U.S. fixed income has a lower yield and a longer duration than U.S. fixed income.
  - Non U.S. debt may increase the risk profile of the fixed income structure
- Similar to the U.S., yields overseas are at historic lows
- Political and economic risk
  - Government securities dominate the non-U.S. debt market
- Potential for added volatility of return due to currency exposure
- Higher manager fees than U.S. fixed income
### Non-U.S. Fixed Style vs. Bloomberg Barclays Global Aggregate ex-US

#### How often Manager Beat Benchmark by more than Fee Hurdle in Rolling 3-Year Periods over last 10 Years

<table>
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<tr>
<td>25th Percentile</td>
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<td>100%</td>
<td>98%</td>
<td>95%</td>
<td>95%</td>
<td>93%</td>
</tr>
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**Average Annualized 3-Year Excess Return (gross) – Median Manager:** 0.98%

### Rolling 3-Year Gross Excess Return relative to Bloomberg Barclays Global Agg ex-US

for 10 Years ended December 31, 2018

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**Callan Non-U.S. Fixed Style (10th to 90th)**

**Median**

**Bloomberg Barclays Gl Agg ex-US**
International Fixed Income

Historical Performance

Returns for Periods Ended December 31, 2018
Group: Callan Non US Fixed Income (Unhedged)

<table>
<thead>
<tr>
<th></th>
<th>Last Year</th>
<th>Last 3 Years</th>
<th>Last 5 Years</th>
<th>Last 10 Years</th>
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<td>(5.18)</td>
<td>2.97</td>
<td>(0.04)</td>
<td>1.60</td>
<td>2.95</td>
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</table>

Blmbg:Aggregate

- A: 0.01, 2.06, 2.52, 3.48, 3.87
- B: (2.15), 3.15, (0.01), 1.73, 2.88
Alternative Investments

Private Credit, Hedge Funds, Multi-Asset Class Strategies
Private Credit

Overview

Private Credit investing typically involves the origination or acquisition of privately-negotiated, non-traded debt or debt-like instruments. Private credit investments seek to provide a stable, income-oriented return.

Investment opportunities span global geographic regions, underlying issuer asset classes and industries, and debt structure and characteristics.

Markets where product development is institutional:
- Institutional products that focus on direct lending (making loans to small and medium sized businesses)
- Institutional products that focus on private real estate debt

Private Credit has received increased institutional investor interest
- Global hunt for adequate and appropriate risk-adjusted yield
- Contemplated implications of a rising interest rate environment
- Strategic/tactical exploitation of bank disintermediation globally
- Minimizing negative mark-to-market valuations
- Pivoting focus towards downside risks

However, a thoughtful and consistent approach to implementation remains elusive across the industry
- The private credit opportunity set is highly fragmented
- Inconsistent objectives and expectations span investment types, investment strategies, risk/return parameters and thresholds, and allocation approaches
- A narrowed focus solely on yield may push investors towards outsized, equity-like risk, without expected downside protection
Private Credit: Direct Lending Products

Benefits and Considerations

**Benefits**
- Yield premium over broadly syndicated loans
- Partial hedge against rising interest rates
- Historically higher recovery and lower default rates relative to broadly syndicated loans

**Considerations**
- Investments are highly illiquid
  - Investment vehicles generally have periods where investor capital is locked up and not accessible
- Complex strategies
- Many firms are new and thus have “unproven” track records
- Notable credit risk
  - Late stage in credit cycle
- A narrowed focus solely on yield may push investors towards outsized, equity-like risk, without expected downside protection
  - Higher correlation to equity
- Market segment has seen significant growth in assets.
  - Can investment opportunities be replicated at higher asset base?
Private Credit: Real Estate Debt Products

Benefits and Considerations

Benefits

● Sweeping regulatory changes impact traditional lending institutions
  – Banks have retrenched as new securitization requirements have constrained lending capacity

● The few well-resourced platforms benefit from greater deal flow across the real estate debt risk/return spectrum
  – Well-positioned lending platforms exhibit outperformance both within and across cycles

● Offers modest potential for manager alpha
  – Capable managers have capacity to identify pockets of illiquidity in the lending markets

● Potential for return customization; Yield vs Total Return approaches

Considerations

● Highly competitive market and may be volume driven
  – Lending platforms must navigate the constant tension between deal flow and deal quality
  – Up-front diligence requires a careful assessment of incentives and underwriting culture

● Markets are becoming fully priced

● Investments are highly illiquid
  – Capital may be locked up/inaccessible for a long time
Hedge Funds

Overview

**Hedge funds**: pools of money that take both short and long positions, buy and sell equities, initiate arbitrage, and trade bonds, currencies, convertible securities, commodities, and derivative products to generate returns at reduced risk.

Hedge funds can serve different roles in the portfolio:
- Absolute return (fixed income alternative)
- Long/short equity (equity alternative) and other hedged directional strategies
- Core diversified (balanced alternative)

Hedge funds are usually private placement vehicles (e.g., limited partnerships or limited liability companies) that are exempt from SEC registration and therefore not readily available to the public.

**Implementation approaches**: Fund-of-funds or direct fund

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**Use by other Public Plan peers?**

- Percent of Public Pension Plans Invested in “Alternatives” (including Hedge Funds): 40%
- Median % of Portfolio Invested (when used): 10%
Hedge Funds

Benefits

● Should provide higher risk-adjusted returns than public equity during more volatile or dislocating markets

● Hedge fund managers typically have significant alignment of interests with investors via side-by-side capital and incentive fee structures based on performance.

Considerations

● High fees that include 20% incentive fees, often over net profits

● Less liquidity, less capacity in normal markets


<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Index</th>
<th>1-Year Arithmetic</th>
<th>10-Year Geometric*</th>
<th>Real</th>
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<td>7.15%</td>
<td>4.90%</td>
<td>17.95%</td>
<td>2.00%</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>
<td>21.10%</td>
<td>3.10%</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>
<td>3.75%</td>
<td>3.85%</td>
</tr>
<tr>
<td>Real Estate</td>
<td>NFI-ODCE</td>
<td>7.30%</td>
<td>6.25%</td>
<td>4.00%</td>
<td>15.70%</td>
<td>4.75%</td>
</tr>
<tr>
<td>Hedge Funds</td>
<td>Callan Hedge FOF Database</td>
<td>5.75%</td>
<td>5.50%</td>
<td>3.25%</td>
<td>8.85%</td>
<td>2.50%</td>
</tr>
<tr>
<td>Inflation</td>
<td>CPI-U</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.25% 1.50%</td>
</tr>
</tbody>
</table>
Hedge Funds

Historical Performance

Returns for Periods Ended December 31, 2018
Group: Callan Hedge Fund of Funds

<table>
<thead>
<tr>
<th></th>
<th>Last Year</th>
<th>Last 3 Years</th>
<th>Last 5 Years</th>
<th>Last 10 Years</th>
<th>Last 15 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>10th Percentile</td>
<td>4.27</td>
<td>4.43</td>
<td>4.09</td>
<td>6.82</td>
<td>6.64</td>
</tr>
<tr>
<td>25th Percentile</td>
<td>1.25</td>
<td>3.63</td>
<td>3.33</td>
<td>6.21</td>
<td>5.46</td>
</tr>
<tr>
<td>Median</td>
<td>(1.35)</td>
<td>2.19</td>
<td>2.06</td>
<td>5.26</td>
<td>4.56</td>
</tr>
<tr>
<td>75th Percentile</td>
<td>(4.11)</td>
<td>0.63</td>
<td>0.91</td>
<td>4.45</td>
<td>3.96</td>
</tr>
<tr>
<td>90th Percentile</td>
<td>(7.23)</td>
<td>(0.31)</td>
<td>0.41</td>
<td>3.24</td>
<td>3.46</td>
</tr>
<tr>
<td>60/40 Balanced Portfolio</td>
<td>(2.35)</td>
<td>6.50</td>
<td>6.24</td>
<td>9.42</td>
<td>6.44</td>
</tr>
</tbody>
</table>

*The 60/40 Balanced Portfolio represents a hypothetical portfolio consisting of 60% S&P 500/40% Bloomberg Barclays Aggregate*
Multi Asset Class Strategies

Bridging the Gap

**MAC**
- Outcome-oriented mandate with a broad investment universe constrained only by liquidity
- Can leverage, short, use derivatives, and shift capital between asset classes.

**Hedge Fund**
- A collection of complex trading strategies targeting opportunistic trades. Has the ability to hold illiquid assets, charge incentive fees. Investment universe is unconstrained.

**Traditional Long-Only**
- Long-only mandate in a single asset class constrained by an investable benchmark
- Can leverage, short, use derivatives, and shift capital between asset classes.

**Shared Characteristics**
- Flat fee
- Highly liquid and transparent

**Risk-Adjusted Return**

**Complexity**
Multi Asset Class Strategies

Benefits
● Dynamic investment process
  – Leverage, shorting, and derivatives
● Outcome oriented objectives
  – Helps determine role in portfolio
  – Focus on drawdown protection
● Many applications depending on objectives and risk tolerance
● Liquid (vs. Hedge Funds)
● Transparency (vs. Hedge Funds)
● Flat fees (lower than hedge funds)
  – Typically 70-120 bps

Considerations
● Short track records
  – Few have faced a prolonged distressed market environment
● Downside protection is not guaranteed
  – High manager risk
  – Execution is key
● More complex than long-only strategies
  – Benchmarking is difficult
  – Performance evaluations are focused on years, not quarters
Return vs. Risk

Outcomes are dispersed for different categorizations of MAC strategies

What causes dispersion:
- Varying investment approaches – amount of leverage, dynamic asset allocation, wide opportunity set
- Manager skill
- Few constituents

Scatter Chart for 5 Years ended December 31, 2018
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

### 2019 Callan Capital Market Projections: Risk and Return – 2019-2028

<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><strong>Equities</strong></td>
<td></td>
<td>1-Year Arithmetic</td>
<td>10-Year Geometric*</td>
<td>Real</td>
</tr>
<tr>
<td>Broad U.S. Equity</td>
<td>Russell 3000</td>
<td>8.50%</td>
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<td>4.00%</td>
</tr>
<tr>
<td><strong>Private Equity</strong></td>
<td>Cambridge Private Equity</td>
<td>12.40%</td>
<td>8.50%</td>
<td>6.25%</td>
</tr>
<tr>
<td><strong>Inflation</strong></td>
<td>CPI-U</td>
<td>2.25%</td>
<td>1.50%</td>
<td>2.25%</td>
</tr>
</tbody>
</table>
Private Equity

Historical Performance

Private Equity Performance Database – Pooled Horizon IRRs
Through March 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>
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</thead>
<tbody>
<tr>
<td>All Venture</td>
<td>15.0%</td>
<td>9.4%</td>
<td>16.8%</td>
<td>10.1%</td>
<td>10.2%</td>
<td>17.3%</td>
</tr>
<tr>
<td>All Buyouts</td>
<td>20.0%</td>
<td>12.5%</td>
<td>13.9%</td>
<td>10.8%</td>
<td>13.5%</td>
<td>13.3%</td>
</tr>
<tr>
<td>Mezzanine</td>
<td>15.8%</td>
<td>10.9%</td>
<td>10.5%</td>
<td>9.2%</td>
<td>9.9%</td>
<td>8.8%</td>
</tr>
<tr>
<td>All Private Equity</td>
<td><strong>18.3%</strong></td>
<td><strong>12.4%</strong></td>
<td><strong>14.0%</strong></td>
<td><strong>9.5%</strong></td>
<td><strong>13.2%</strong></td>
<td><strong>12.6%</strong></td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>14.0%</td>
<td>10.8%</td>
<td>13.3%</td>
<td>9.5%</td>
<td>10.1%</td>
<td>6.5%</td>
</tr>
</tbody>
</table>

Source: Thomson ONE

- Historically, private equity has outperform public stocks in the longer horizons.
  - Approximately 6% over 20 years
- There can be large return differences between strategy types over time.
  - Each strategy has contributed to success at various times.
- Venture Capital returns lagged broad private equity after the technology bust (15-year horizon) but have recovered strongly since the financial crisis (5-year horizon).
- Private equity has provided a competitive return with public markets since the recession, but private equity does not decline as much during downturns.
  - During the financial crisis, PE declined about 25% versus 35% to 40% for public stocks.
## 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 are required
- 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

### Use by other Public Plan peers?
- Percent of Public Pension Plans Invested: 30%
- Median % of Portfolio Invested (when used): 6%
Other Real Assets

Infrastructure, Commodities
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
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%**
# Potential Benefits of Real Assets

<table>
<thead>
<tr>
<th><strong>Portfolio diversification</strong></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>
**Infrastructure**

**Overview**

*The basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, post offices, and prisons.*

- Provides essential economic or social services
- Monopolistic or near-monopolistic in nature
- High barriers to entry
- Low demand elasticity
- Long-life assets
- Stable cash flow
- Illiquidity
- High leverage

<table>
<thead>
<tr>
<th>Economic Infrastructure</th>
<th>Social Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transportation</strong></td>
<td><strong>Utilities</strong></td>
</tr>
<tr>
<td>– Bridges</td>
<td>– Gas pipelines</td>
</tr>
<tr>
<td>– Toll Roads</td>
<td>– Electricity works</td>
</tr>
<tr>
<td>– Tunnels</td>
<td>– Power generation</td>
</tr>
<tr>
<td>– Airports</td>
<td>– Water and sewage</td>
</tr>
<tr>
<td>– Seaports</td>
<td>– Renewable energy</td>
</tr>
<tr>
<td>– Rail</td>
<td></td>
</tr>
</tbody>
</table>

*Callan*  
*Knowledge. Experience. Integrity.*
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
Unlisted Infrastructure Offers a Range of Risk and Return

Note: return assumptions are representative of manager expectations in each space. These expectations differ from those used by Callan in our optimization model.
Summary Conclusions from August Discussion of Alternative Real Assets

Infrastructure offers the greatest appeal to the Mendocino real assets portfolio

- Timber and farmland are complex, very long-term commitments with few institutional offerings suitable for a fund the size of Mendocino
- Public real assets include many factor exposures already present in the total portfolio (equity, interest rates); less diversifying than private strategies

Private or unlisted infrastructure through an open-end commingled fund offers the most appealing access point

- Listed infrastructure offers less diversification benefit to the total fund; equity return, risk and correlation
- Unlisted infrastructure diversifies the real estate exposure in the real asset bucket
- Better diversifies the rest of the investments in the total portfolio
- More conservative return/risk profile than listed infrastructure, more consistent with the intent of the anchor real estate exposure
- Offers suitable minimum required investments
- Limited number of open-end funds on the market, but the opportunity set is growing; existing and soon-to-be opened funds could be appropriate for Mendocino
- Callan has recently completed two searches in this area
Commodities

Overview

Commodities are basic goods used in commerce that are interchangeable with other commodities of the same type.

Commodities are most often used as inputs in the production of other goods or services.

- Commodities include agricultural products such as wheat and cattle, energy products such as oil and gasoline, and metals such as gold, silver and aluminum.

- There are also “soft” commodities, or those that cannot be stored for long periods of time, which include sugar, cotton, cocoa and coffee.

The value of a commodity is set by the market, i.e. the supply-demand dynamic, based on near-term inventories and the long-term cost of marginal production.

Institutional investors typically invest in commodity futures contracts because of the difficulties of owning and storing physical commodities. Alternatively, commodity related equities are the equity securities of commodity producers, generating returns from two sources: dividend income and capital appreciation.


<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>10-Year Geometric*</td>
</tr>
<tr>
<td>Equities</td>
<td></td>
<td>Real</td>
<td>Standard Deviation</td>
<td>Projected Yield</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>
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<tr>
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<tr>
<td>Real Estate</td>
<td>NFI-ODCE</td>
<td>7.30%</td>
<td>6.25%</td>
<td>4.00%</td>
</tr>
<tr>
<td>Commodities</td>
<td>Bloomberg Commodity</td>
<td>4.75%</td>
<td>3.20%</td>
<td>0.95%</td>
</tr>
<tr>
<td>Inflation</td>
<td>CPI-U</td>
<td>2.25%</td>
<td>1.50%</td>
<td></td>
</tr>
</tbody>
</table>
Commodity Futures

The commodities market trades nearly 100 different commodities. Institutional investors typically invest in commodity futures contracts because of the difficulties of owning and storing physical commodities.

● For futures, the sources of return include the spot price, roll return, and the interest on underlying collateral. Commodities provide a direct hedge to inflation since spot commodity prices can be a major driver of inflation.

● Investments can be fully collateralized to avoid leverage.

Benefits
● Low to negative correlation to stocks and bonds
● Rise in price with inflation providing a natural hedge against equity and debt losses

Considerations
● Highly volatile with a steep downside and should be actively rebalanced with uncorrelated assets
Commodity Related Equities

Commodity related equities are the equity securities of commodity producers, generating returns from two sources: dividend income and capital appreciation. Commodity producers have an indirect hedge to inflation from exposure to the underlying spot commodities.

Benefits
- Solid correlation with inflation while having equity-like risk/reward characteristics.
- Eliminates the negative “roll return” often faced by commodity futures.

Considerations
- More correlated with equity markets, at times, than direct commodity exposure.
- Many of the producers enter into hedging arrangement, which can minimize the commodity link.
- Susceptible to “catastrophe risk”, e.g. the gulf oil spill
Global Equity
Global Equity

Are we already Global?

MCERA’s current policy covers the globe

Non U.S. exposure is in line with global market cap

- MCERA Non U.S. target is 43% of equity
- Non U.S. exposure of MSCI ACWI is 46%

Regional Silos vs. Globally Integrated

- Different sources of alpha

Are we already Global with regional silos?

- Yes, global exposure exists
- No, nature of exposure is not global. Global mandates give managers the freedom to allocate between countries, including the U.S.

Use by other Public Plan peers?

- Percent of Public Pension Plans Invested: 11%
- Median % of Portfolio Invested (when used): 13%
Global Equity

Implementation Considerations

Level of risk

● Will active global equity compliment passive U.S. and Non U.S.

● “Go Anywhere Best Ideas”

● Allocation effect (and risk) can be significant

Source of funds

● Pro rata from U.S. and Non U.S.

Regional allocation

● Typically increases Non U.S. allocation

● Does policy have stated U.S. and Non U.S. targets (may require higher tolerance ranges)

Structure

● Compliment or replace U.S. and Non U.S.
  – In the upcoming Asset Liability study we can come up with amount to allocate to equity overall, and then have a global equity carve out while keeping passive large cap, active small cap, active international managers.

● May increase overall market capitalization of equity allocation

Fees

● Higher fees for active management

● Macro allocation without 2% & 20%
Global Broad Equity Style vs. MSCI ACWI

How often Manager Beat Benchmark by more than Fee Hurdle in Rolling 3-Year Periods over last 20 Years

<table>
<thead>
<tr>
<th>Fee Hurdle</th>
<th>0.45%</th>
<th>0.50%</th>
<th>0.55%</th>
<th>0.60%</th>
<th>0.65%</th>
<th>0.70%</th>
<th>0.75%</th>
<th>0.80%</th>
<th>0.85%</th>
<th>0.90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>65%</td>
<td>60%</td>
<td>58%</td>
<td>54%</td>
<td>51%</td>
<td>48%</td>
<td>45%</td>
<td>45%</td>
<td>45%</td>
<td>44%</td>
</tr>
<tr>
<td>45th Percentile</td>
<td>88%</td>
<td>85%</td>
<td>84%</td>
<td>84%</td>
<td>81%</td>
<td>78%</td>
<td>74%</td>
<td>70%</td>
<td>65%</td>
<td>63%</td>
</tr>
<tr>
<td>40th Percentile</td>
<td>96%</td>
<td>95%</td>
<td>95%</td>
<td>93%</td>
<td>93%</td>
<td>90%</td>
<td>90%</td>
<td>88%</td>
<td>88%</td>
<td>86%</td>
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<tr>
<td>35th Percentile</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>96%</td>
<td>95%</td>
<td>95%</td>
<td>95%</td>
<td>95%</td>
<td>95%</td>
</tr>
<tr>
<td>30th Percentile</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>96%</td>
<td>96%</td>
</tr>
<tr>
<td>25th Percentile</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
</tr>
</tbody>
</table>

Average Annualized 3-Year Excess Return (gross) – Median Manager: 1.26%

Rolling 3-Year Gross Excess Return relative to MSCI ACWI for 20 Years ended December 31, 2018
Global Equity

Benefits and Considerations

Benefits

Broatest opportunity set

Multiple alpha sources
- Regional
- Country
- Global sector
- Security
- Currency

Good compliment to regional specialists
- Which are typically bottom up focused

Best opportunity set for Thematic
- Long-term structural changes
- Intermediate term indicator driven

Good use of active risk budget

Manager expertise determines regional allocation

Manager research as resource (macro)

Considerations

Overlap with existing U.S. and Non U.S. exposure

Larger cap bias
- Global managers have tended to overweight small cap, so they are in some cases just higher beta

Less specialization (EM & small cap)

Higher risk
- Regional allocation
- Currency effect
- Concentration

Lack of regional allocation control (policy)
# Global Equity


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<td>Broad U.S. Equity</td>
<td>Russell 3000</td>
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<tr>
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Conclusions
Conclusion and Discussion

What Next?

Callan is preparing to conduct an Asset Liability Study for the Mendocino CERA Pension Plan.

The current strategic target includes allocations to:

- U.S. Equity
- Non-U.S. Equity
- U.S. Intermediate Fixed Income
- Domestic Real Estate

Are there other asset classes that the Committee would like to include in the study or investigate further?

Callan recommends considering those highlighted below:

- Non-U.S Fixed Income
- Alternatives
  - Private Credit
  - Hedge Funds
  - Multi Asset Class Strategies
- Private Equity
- Other Real Assets:
  - Infrastructure
  - Commodities
  - Global Equity – potentially as part of implementation discussions (following the Asset/Liability study)
### 2019 Callan Capital Market Projections

**Risk and return: 2019–2028**

<table>
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<tr>
<th>Asset Class</th>
<th>Index</th>
<th>1-Year Arithmetic</th>
<th>10-Year Geometric*</th>
<th>Real</th>
<th>2018 - 2027</th>
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</table>

Note that return projections for public markets assume index returns with no premium for active management.

* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

Source: Callan
# 2019 Callan Capital Market Projections

## Correlation: 2019–2028

| Asset Class         | Broad U.S. Eq | Large Cap | Small/Mid Cap | Global ex-U.S. Eq | Non-U.S. Eq | Em Market Eq | Short Duration | U.S. Fixed | Long Duration | TIPS | High Yield | Non-U.S. Fixed | Em Market Debt | Real Estate | Private Equity | Hedge Funds | Commodities | Cash Equivalent | Inflation | Broad U.S. Eq | Large Cap | Small/Mid Cap | Global ex-U.S. Eq | Non-U.S. Eq | Em Market Eq | Short Duration | U.S. Fixed | Long Duration | TIPS | High Yield | Non-U.S. Fixed | Em Market Debt | Real Estate | Private Equity | Hedge Funds | Commodities | Cash Equivalent | Inflation |
|---------------------|---------------|-----------|---------------|------------------|--------------|--------------|----------------|------------|---------------|------|------------|----------------|----------------|-------------|----------------|-------------|-------------|----------------|-----------|---------------|-------------|-------------|----------------|-------------|-------------|----------------|-------------|-------------|----------------|-------------|-------------|----------------|-------------|-------------|----------------|-------------|-------------|----------------|-------------|-------------|----------------|-------------|-------------|
| Broad U.S. Eq       | **1.00**      |           |               |                  |              |              |                |            |               |      |            |                |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |
| Large Cap           | 1.00          | **1.00**  |               |                  |              |              |                |            |               |      |            |                |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| Small/Mid Cap       | 0.96          | 0.93      | **1.00**      |                  |              |              |                |            |               |      |            |                |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| Global ex-U.S. Eq   | 0.85          | 0.84      | 0.84          | **1.00**         |              |              |                |            |               |      |            |                |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| Non-U.S. Eq         | 0.81          | 0.80      | 0.80          | 0.99            | **1.00**     |              |                |            |               |      |            |                |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| Em Market Eq        | 0.87          | 0.86      | 0.86          | 0.94            | 0.88         | **1.00**     |                |            |               |      |            |                |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| Short Duration      | -0.23         | -0.22     | -0.26         | -0.25           | -0.23        | -0.28        | **1.00**       |            |               |      |            |                |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| U.S. Fixed          | -0.11         | -0.10     | -0.15         | -0.14           | -0.12        | -0.17        | 0.88           | **1.00**   |               |      |            |                |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| Long Duration       | 0.11          | 0.11      | 0.10          | 0.08            | 0.09         | 0.04         | 0.74           | 0.93        | **1.00**     |      |            |                |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| TIPS                | -0.05         | -0.04     | -0.08         | -0.06           | -0.05        | -0.09        | 0.56           | 0.64        | 0.53         | **1.00** |            |                |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| High Yield          | 0.64          | 0.63      | 0.62          | 0.63            | 0.61         | 0.62         | -0.13          | 0.02        | 0.19         | 0.06      | **1.00**     |                |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| Non-U.S. Fixed      | 0.01          | 0.01      | 0.00          | 0.07            | 0.05         | 0.10         | 0.48           | 0.53        | 0.54         | 0.40      | 0.12        | **1.00**     |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| Em Market Debt      | 0.57          | 0.57      | 0.55          | 0.57            | 0.54         | 0.58         | -0.04          | 0.10        | 0.20         | 0.18      | 0.60        | 0.01         | **1.00**     |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |                |             |             |
| Real Estate         | 0.74          | 0.73      | 0.72          | 0.71            | 0.68         | 0.70         | -0.13          | 0.04        | 0.17         | 0.00      | 0.56        | -0.05        | 0.47         | **1.00**     |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |
| Private Equity      | 0.92          | 0.92      | 0.88          | 0.88            | 0.86         | 0.86         | -0.30          | -0.23       | -0.01        | -0.14     | 0.55        | 0.06         | 0.45         | 0.66         | **1.00**     |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |
| Hedge Funds         | 0.76          | 0.76      | 0.74          | 0.74            | 0.72         | 0.73         | -0.08          | 0.09        | 0.29         | 0.09      | 0.57        | -0.05        | 0.54         | 0.64         | 0.62         | **1.00**     |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |                |             |             |
| Commodities         | 0.15          | 0.15      | 0.15          | 0.16            | 0.16         | 0.16         | -0.22          | -0.10       | -0.04        | 0.12      | 0.10        | 0.15         | 0.19         | 0.20         | 0.18         | 0.21         | **1.00**     |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |
| Cash Equivalent     | -0.04         | -0.03     | -0.08         | -0.04           | -0.01        | -0.10        | 0.30           | 0.10        | -0.04        | 0.12      | -0.11       | 0.00         | -0.07        | -0.06        | 0.00         | -0.07        | 0.07         | **1.00**     |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |
| Inflation           | -0.01         | -0.02     | 0.02          | 0.01            | 0.00         | 0.03         | -0.20          | -0.28       | -0.29        | 0.10      | 0.07        | -0.10        | 0.00         | 0.10         | 0.06         | 0.20         | 0.40         | 0.00         | **1.00**     |                |             |                |             |             |                |            |               |             |             |                |            |             |                |             |             |                |             |             |

- Relationships between asset classes are as important as standard deviation
- To determine portfolio mixes, Callan employs mean-variance optimization
- Return, standard deviation and correlation determine the composition of efficient asset mixes
## Fixed Income Diversification

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<td>(4.5%)</td>
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<td>(4.3%)</td>
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</table>

- No fixed income asset class consistently outperforms on a year by year basis.
- Highly volatile asset classes tend to oscillate from top to bottom (e.g., EM Debt).
- Less volatile asset classes don’t place in the top spot but deliver positive returns most of the time.
Callan Categorization of MAC Strategies

**Risk Parity**
- Equal risk-weighted (or close to) exposure to major asset classes/risk factors/economic regimes
- Exposure implemented through long positions with lower volatility holdings levered to meet desired risk target
- Common benchmarks: T-bills + 5-8%, Global 60/40, Risk Parity Index

**Long Biased**
- Bias to directional asset class exposure
- Higher volatility than absolute return
- Shorting and derivatives may be employed but to a lesser extent
- Macroeconomic forecasting central to idea generation and portfolio positioning
- Dynamic risk management
- Common benchmarks: T-bills + 5-8%; CPI + 4-6%

**Risk Premia**
- Exposure to academic and behavioral risk factors
- Often with risk balancing between factors
- Implemented through market neutral positions with leverage applied to reach volatility target between 5-15%.
- Common benchmarks: T-bills + 3-8%, Global 60/40, Various ARP Indices
  - Targeted volatility must be considered in benchmarking

**Absolute Return**
- Bias to relative value exposures
- Emphasis on downside protection via derivatives and diversifying positions
- Macroeconomic forecasting central to idea generation and portfolio positioning
- Common benchmarks: T-bills + 3-7%; CPI + 3-5%
# Hedge Funds versus MACs

## Summary Comparison

<table>
<thead>
<tr>
<th>Absolute Return Mandate</th>
<th>Hedge Funds – Absolute Return Mandate</th>
<th>MACs – Absolute Return Mandate</th>
</tr>
</thead>
</table>
| **Strategies Employed** | Bottom-up security selection strategies  
- Event-driven (e.g., merger arb, bankruptcy, restructuring)  
- Relative value (e.g., market neutral equity, convertible arb, fixed income arb)  
- Macro, primarily for hedging purposes | Top-down risk allocation strategies to capture:  
- Risk premia (e.g., value, momentum, carry factors)  
- Absolute return (e.g., long cheap markets, short expensive ones) |
| **Portfolio Characteristics** | Primarily individual securities  
- Higher tactical exposure to idiosyncratic risks, or alpha potential  
- Can be relatively liquid to very illiquid  
- Leverage ranging from none to moderate levels (e.g., ~5x gross)  
- High cash allocations in adverse markets | Primarily index derivatives or baskets  
- Higher strategic exposure to systematic risks, or alternative beta  
- Typically very liquid in normal markets  
- Leverage ranging from moderate to high levels (e.g., ~2x to ~10x gross)  
- Fully invested across market cycles |
| **Pros** | Likely higher risk-adjusted returns during more volatile or dislocating markets  
Typically more alignment of interest due to more manager-related capital beside investors as well as incentive fees. | Likely higher risk-adjusted returns during normal, less volatile markets  
More liquid, scalable strategies  
Lower fees |
| **Cons** | Higher fees that include 20% incentive fees, often over net profits  
Less liquidity, less capacity in normal markets | More risk from leverage and counterparties  
Typically less alignment of interest due to less manager-related capital beside investors and no incentive fees |
Defining Real Assets

Grouping asset classes by economic roles

Investments in the “real” economy
- Real estate
- Infrastructure
- Commodities

A strategic allocation to real assets can provide economic diversification and inflation hedging as investors seek diversification to a range of economic scenarios.
U.S. market cap weights have historically been between 45% and 55% of global

Source: MSCI
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