Callan

April 2019

Mendocino County Employees' Retirement Association

Additional Asset Classes for Consideration in Upcoming Asset/Liability Study

Greg DeForrest, CFA
Senior Vice President

Claire Telleen, CFA
Senior Vice President

Introduction

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:

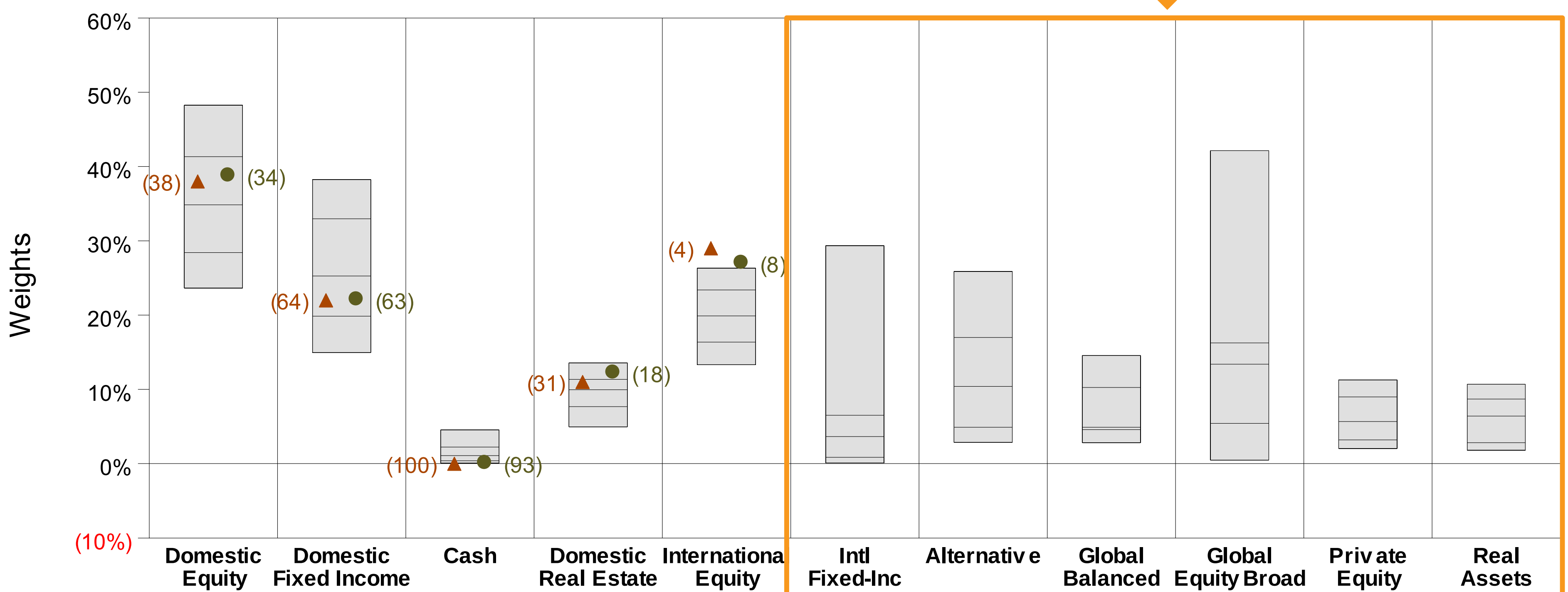
- Infrastructure
- Timber
- Agriculture
- Public Real Assets

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



	Domestic Equity	Domestic Fixed Income	Cash	Domestic Real Estate	International Equity	Intl Fixed-Inc	Alternative	Global Balanced	Global Equity Broad	Private Equity	Real Assets
10th Percentile	48.27	38.25	4.56	13.58	26.32	29.35	25.89	14.55	42.12	11.27	10.69
25th Percentile	41.33	32.95	2.22	11.35	23.39	6.51	17.01	10.25	16.25	8.99	8.70
Median	34.85	25.26	1.10	9.97	19.89	3.65	10.40	4.91	13.40	5.68	6.41
75th Percentile	28.42	19.86	0.40	7.68	16.37	0.86	4.91	4.57	5.41	3.20	2.82
90th Percentile	23.64	14.96	0.08	4.95	13.32	0.12	2.86	2.81	0.47	2.04	1.80
Fund ●	38.72	22.05	0.04	12.20	26.98	-	-	-	-	-	-
Target ▲	38.00	22.00	0.00	11.00	29.00	-	-	-	-	-	-
% Group Invested	98.55%	96.38%	78.26%	73.91%	97.10%	15.94%	39.72%	14.49%	10.87%	30.43%	20.29%

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

Callan

Non-U.S. Fixed Income

Types of Fixed Income Investors

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.

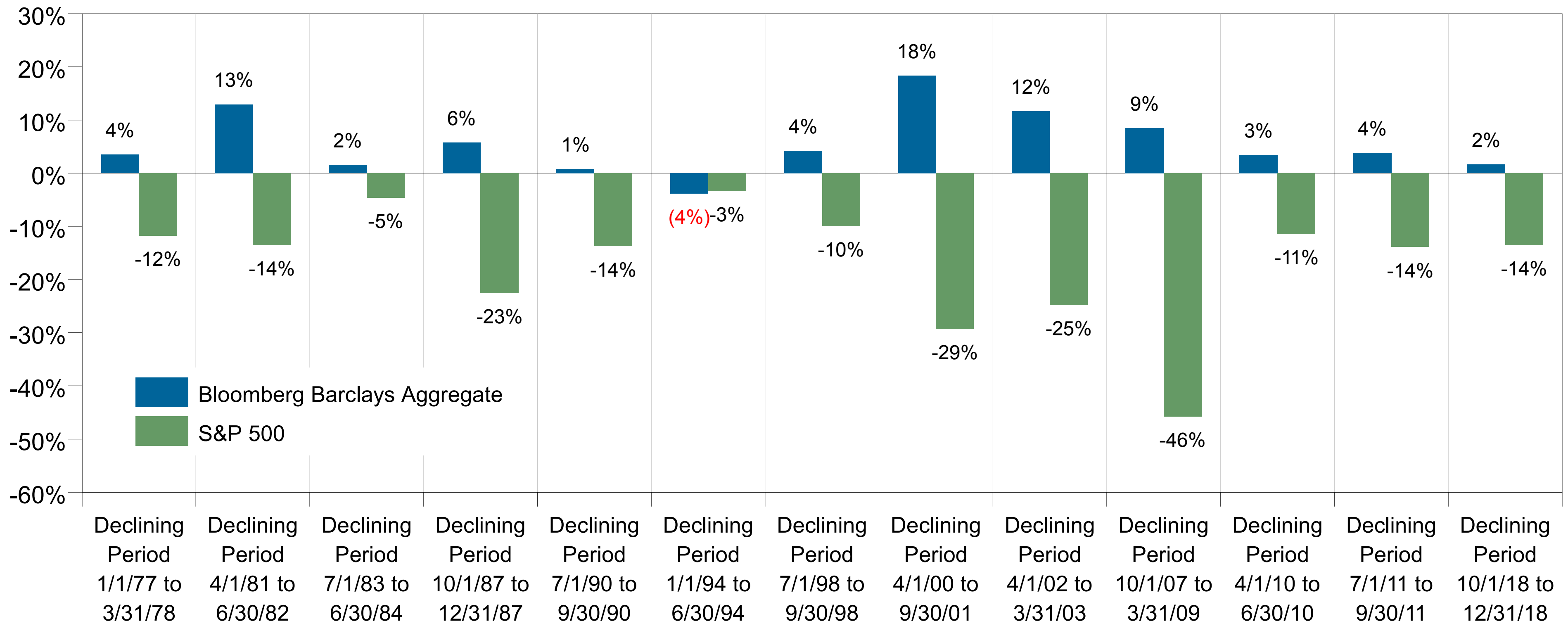
	Income Oriented Investor	**Total Return Investor**	Liability Driven Investor (LDI)
Type of Investor	• Retirees • Insurance Companies	• **Public Pension Plans** • Taft-Hartley Plans • Corporate Pension Plans • Endowments • Foundations	• Corporate Pension Plans
Objectives	• Income Generation • Capital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

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



What Do You Use Now?

Bloomberg Barclays U.S. Aggregate Bond Index

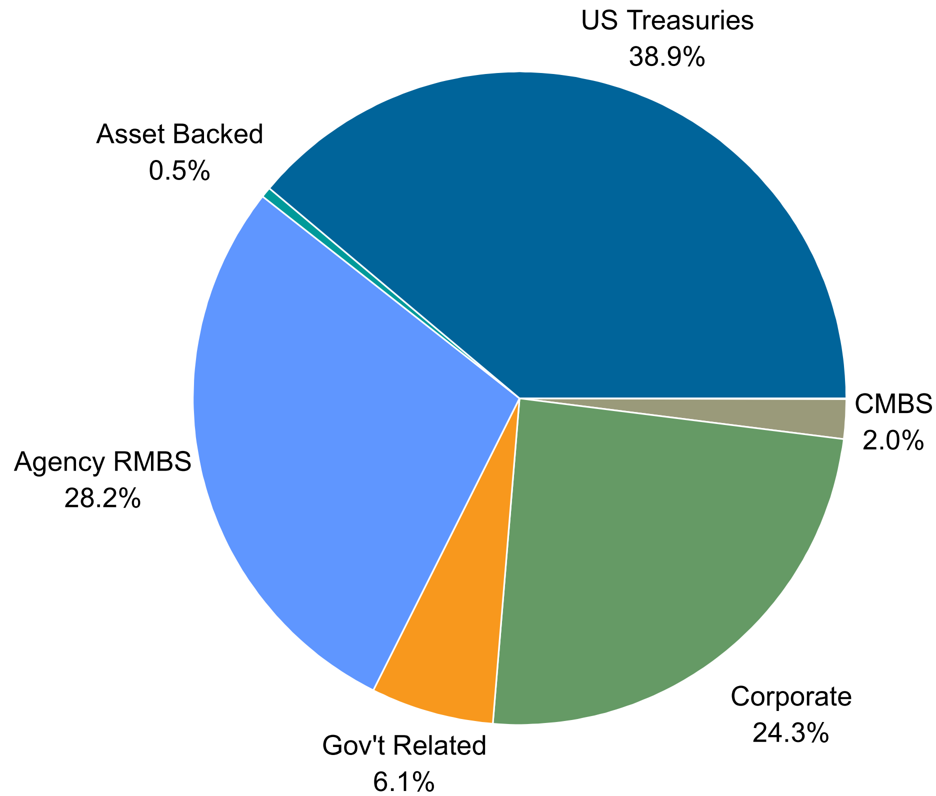
The Fixed Income portfolio within the Mendocino CERA Pension Plan is currently implemented with two core plus bond managers (PIMCO and Dodge & Cox), each benchmarked to the Bloomberg Barclays U.S. Aggregate Bond Index.

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

		PROJECTED RETURN			PROJECTED RISK		2018 - 2027	
Asset Class	**Index**	**1-Year Arithmetic**	**10-Year Geometric***	**Real**	**Standard Deviation**	**Projected Yield**	**10-Year Geometric***	**Standard Deviation**
Fixed Income								
U.S. Fixed	Bloomberg Barclays Aggregate	3.75%	3.75%	1.50%	3.75%	3.85%	3.00%	3.75%
Non-U.S. Fixed	Bloomberg Barclays Glbl Agg ex US	1.80%	1.40%	-0.85%	9.20%	2.35%	1.40%	9.20%

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

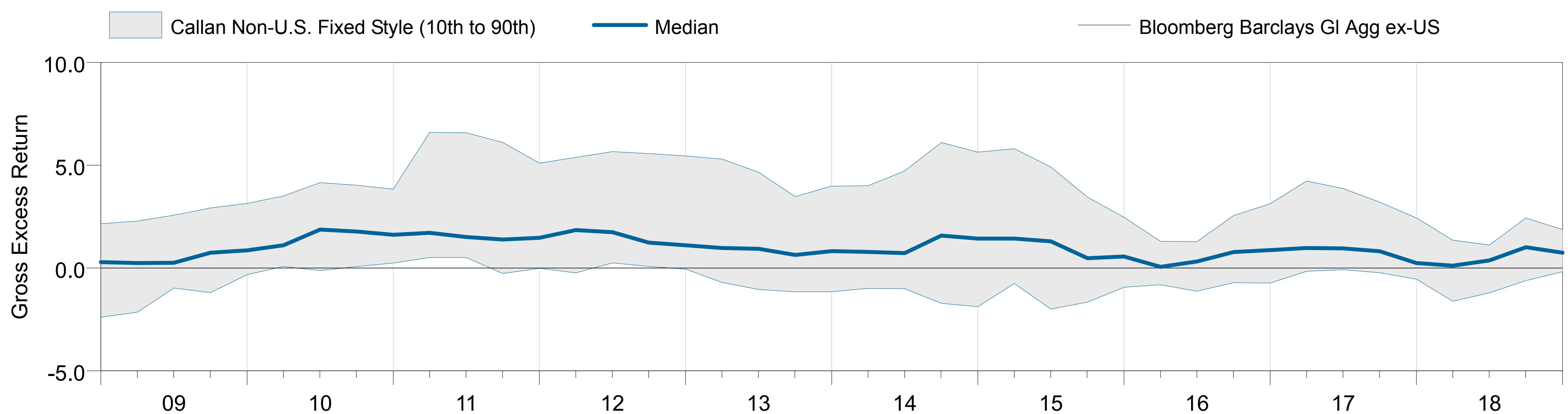
Non-U.S. Fixed Style vs. Bloomberg Barclays Global Aggregate ex-US

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

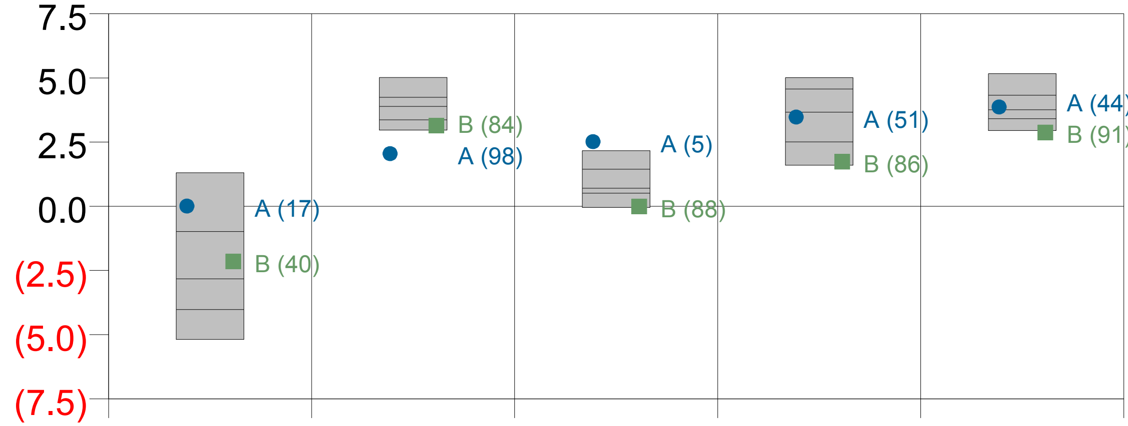
Fee Hurdle	0.20%	0.25%	0.30%	0.35%	0.40%	0.45%	0.50%	0.55%	0.60%	0.65%
Median	95%	90%	88%	85%	83%	83%	80%	80%	78%	75%
45th Percentile	95%	95%	95%	95%	88%	85%	83%	83%	83%	80%
40th Percentile	100%	98%	98%	98%	93%	90%	88%	88%	85%	85%
35th Percentile	100%	100%	100%	100%	98%	95%	90%	90%	90%	90%
30th Percentile	100%	100%	100%	100%	100%	95%	95%	95%	90%	90%
25th Percentile	100%	100%	100%	100%	100%	100%	100%	98%	95%	93%

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



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



		Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 15 Years
10th Percentile		1.32	5.02	2.17	5.01	5.17
25th Percentile		(0.98)	4.25	1.45	4.57	4.33
Median		(2.82)	3.89	0.70	3.67	3.76
75th Percentile		(4.02)	3.37	0.51	2.52	3.41
90th Percentile		(5.18)	2.97	(0.04)	1.60	2.95
Blmbg:Aggregate	● A	0.01	2.06	2.52	3.48	3.87
Blmbg:Glob Agg ex USD	■ B	(2.15)	3.15	(0.01)	1.73	2.88

Callan

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

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

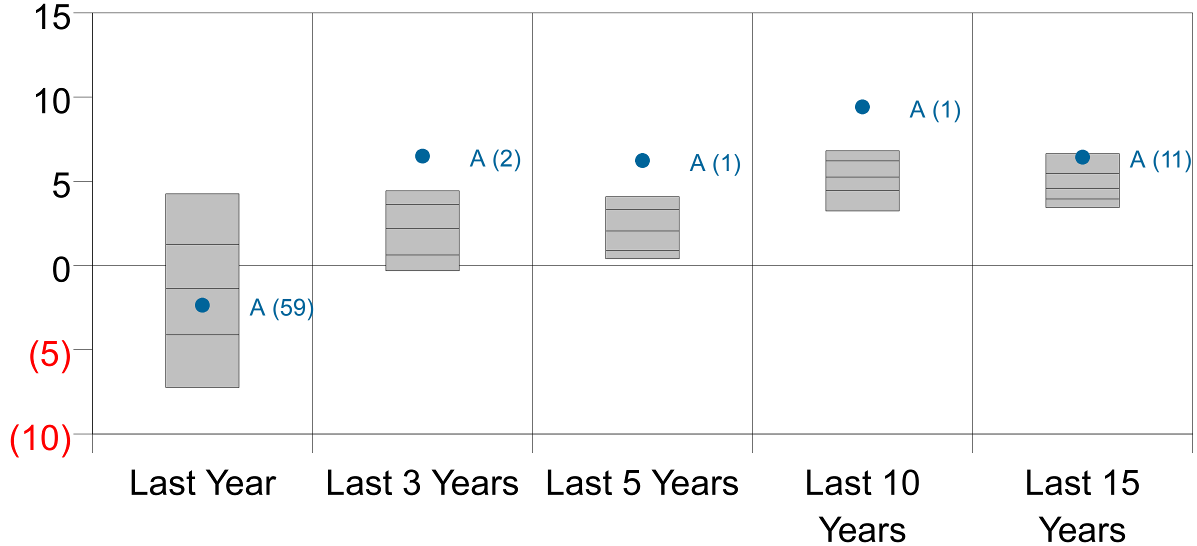
- High fees that include 20% incentive fees, often over net profits
- Less liquidity, less capacity in normal markets

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

		PROJECTED RETURN			PROJECTED RISK		2018 - 2027	
Asset Class	**Index**	**1-Year Arithmetic**	**10-Year Geometric***	**Real**	**Standard Deviation**	**Projected Yield**	**10-Year Geometric***	**Standard Deviation**
Equities								
Broad U.S. Equity	Russell 3000	8.50%	7.15%	4.90%	17.95%	2.00%	6.85%	18.25%
Global ex-U.S. Equity	MSCI ACWI ex USA	9.20%	7.25%	5.00%	21.10%	3.10%	7.00%	21.00%
U.S. Fixed	Bloomberg Barclays Aggregate	3.75%	3.75%	1.50%	3.75%	3.85%	3.00%	3.75%
Real Estate	NFI-ODCE	7.30%	6.25%	4.00%	15.70%	4.75%	5.75%	16.35%
Hedge Funds	Callan Hedge FOF Database	5.75%	5.50%	3.25%	8.85%	2.50%	5.05%	9.15%
Inflation	CPI-U		2.25%		1.50%		2.25%	1.50%

Historical Performance

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

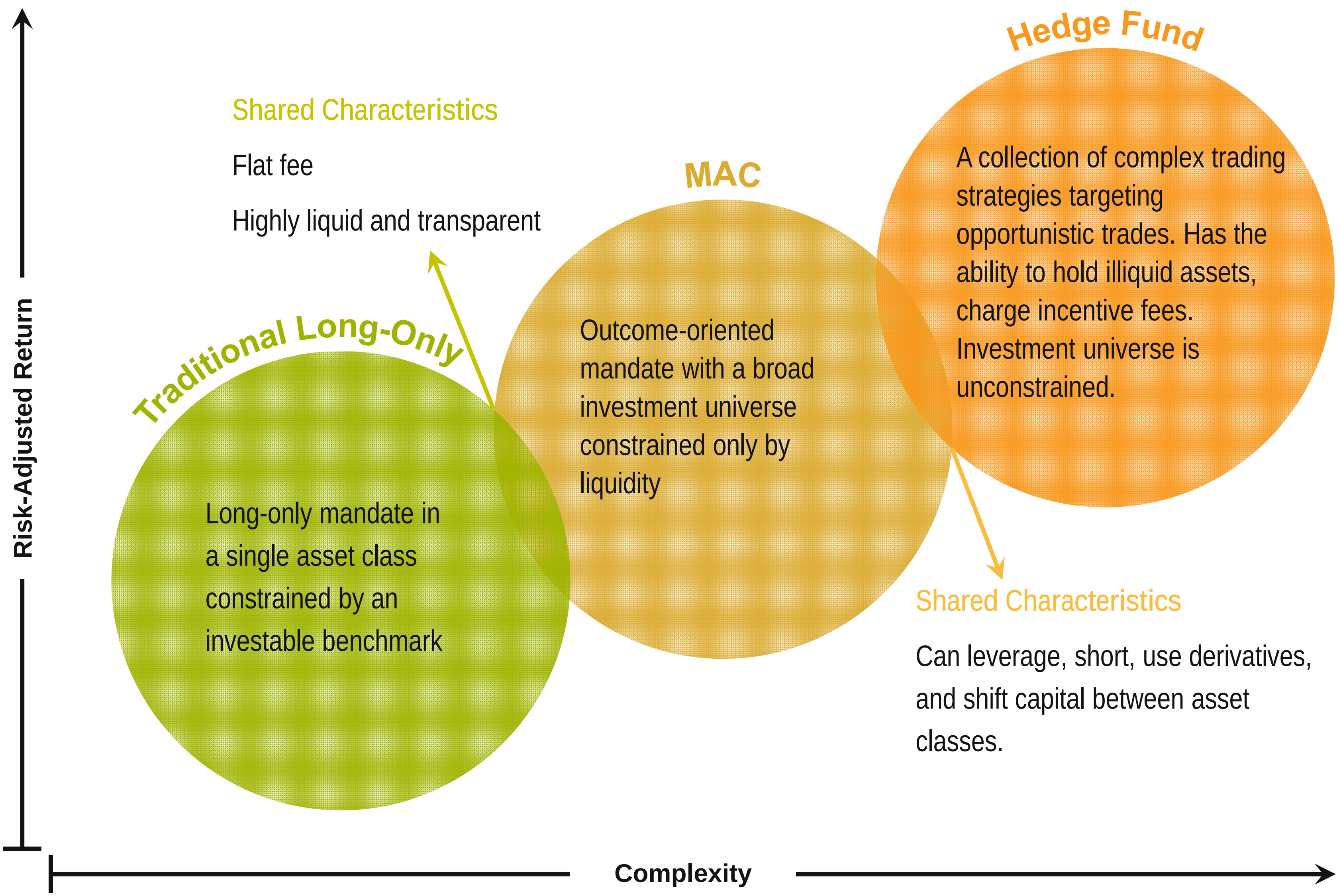


	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 15 Years
10th Percentile	4.27	4.43	4.09	6.82	6.64
25th Percentile	1.25	3.63	3.33	6.21	5.46
Median	(1.35)	2.19	2.06	5.26	4.56
75th Percentile	(4.11)	0.63	0.91	4.45	3.96
90th Percentile	(7.23)	(0.31)	0.41	3.24	3.46
60/40 Balanced Portfolio	(2.35)	6.50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

*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



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

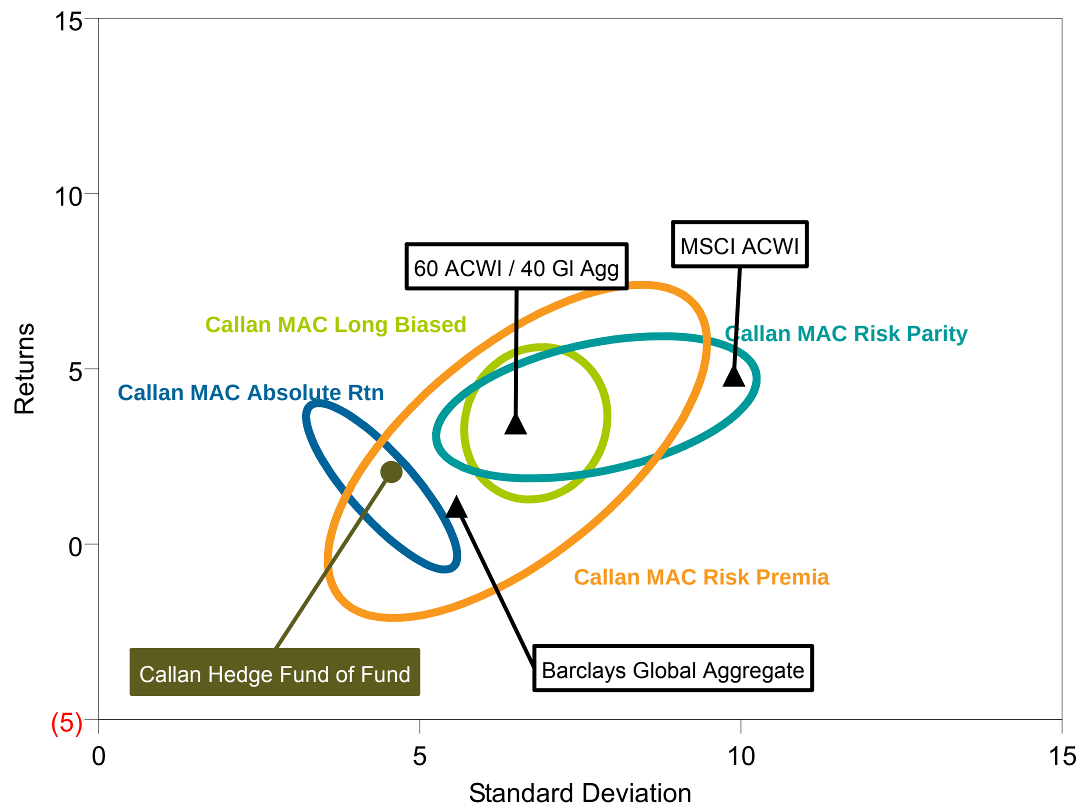
Return vs. Risk

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



Callan

Private Equity

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

		PROJECTED RETURN			PROJECTED RISK		2018 - 2027	
Asset Class	Index	1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation	Projected Yield	10-Year Geometric*	Standard Deviation
Equities								
Broad U.S. Equity	Russell 3000	8.50%	7.15%	4.90%	17.95%	2.00%	6.85%	18.25%
Global ex-U.S. Equity	MSCI ACWI ex USA	9.20%	7.25%	5.00%	21.10%	3.10%	7.00%	21.00%
U.S. Fixed	Bloomberg Barclays Aggregate	3.75%	3.75%	1.50%	3.75%	3.85%	3.00%	3.75%
Real Estate	NFI-ODCE	7.30%	6.25%	4.00%	15.70%	4.75%	5.75%	16.35%
Private Equity	Cambridge Private Equity	12.40%	8.50%	6.25%	29.30%	0.00%	7.35%	32.90%
Inflation	CPI-U		2.25%		1.50%		2.25%	1.50%

Private Equity

Historical Performance

Private Equity Performance Database – Pooled Horizon IRRs

Through March 31, 2018 – Returns are Net of Fees

Strategy	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
All Venture	15.0%	9.4%	16.8%	10.1%	10.2%	17.3%
All Buyouts	20.0%	12.5%	13.9%	10.8%	13.5%	13.3%
Mezzanine	15.8%	10.9%	10.5%	9.2%	9.9%	8.8%
All Private Equity	**18.3%**	**12.4%**	**14.0%**	**9.5%**	**13.2%**	**12.6%**
S&P 500	14.0%	10.8%	13.3%	9.5%	10.1%	6.5%

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

Use by other Public Plan peers?

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

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

Callan

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

Portfolio diversification	Real assets tend to have complementary return profiles relative to stocks and bonds.
Predictable and steady streams of income	Real assets tend to have predictable and steady cash-flow streams supported by regulated or contractual revenues and attractive operating margins.
Capital appreciation potential	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.
Potentially higher risk-adjusted returns	Historically, the volatility of many real asset classes has been lower than that of equities, leading to higher risk-adjusted returns.
Inflation protection	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.

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

Economic Infrastructure			Social Infrastructure
Transportation	**Utilities**	**Communications**	
– Bridges – Toll Roads – Tunnels – Airports – Seaports – Rail	– Gas pipelines – Electricity works – Power generation – Water and sewage – Renewable energy	– Cable systems – Wireless towers – Broadcast towers – Satellites	– Educational facilities – Hospitals – Correctional facilities – Public transportation

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

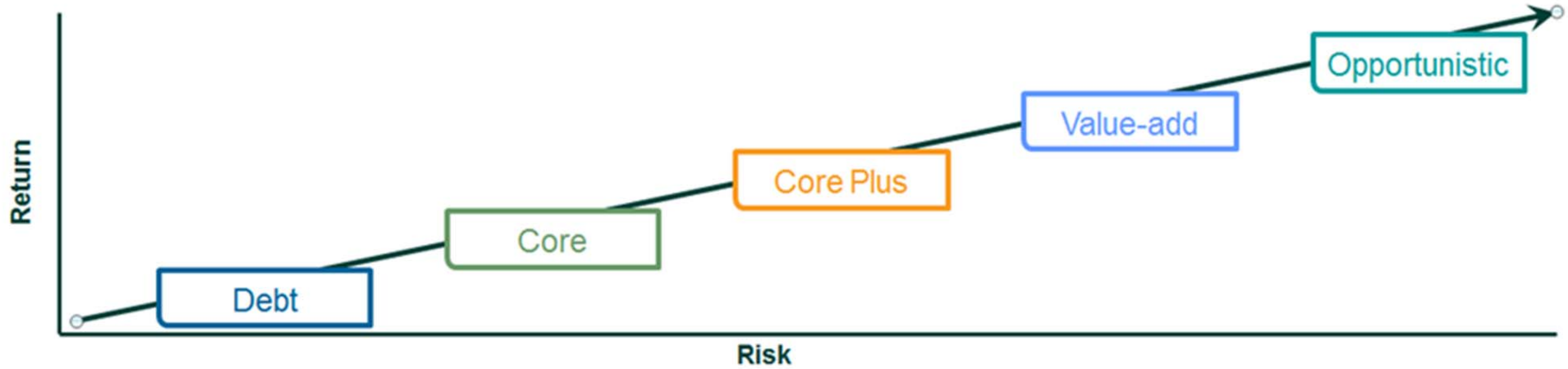
Strengths

- 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



	Debt	Core	Core Plus	Value-add	Opportunistic
Net Return estimate	Typically 3-5% over a fixed rate such as LIBOR	5-7%	8-10%	10-12%	13%+
Asset	Asset level Corporate level	Stable asset	Existing asset	Enhancement of existing asset	Development of a new asset
Cash flow to investors	Interest payments	Regular distributions from operating cash flow	Semi-regular distributions from operating cash flow	Cash flow may be reinvested into the assets and not paid to investors until the enhancement is complete	No cash flow during the development of the asset, which may take 3-10 years depending on the type of asset and complexity to develop
Investment stage	Debt	Brownfield	Brownfield	Brownfield	Greenfield

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.

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

		PROJECTED RETURN			PROJECTED RISK		2018 - 2027	
Asset Class	**Index**	**1-Year Arithmetic**	**10-Year Geometric***	**Real**	**Standard Deviation**	**Projected Yield**	**10-Year Geometric***	**Standard Deviation**
Equities								
Broad U.S. Equity	Russell 3000	8.50%	7.15%	4.90%	17.95%	2.00%	6.85%	18.25%
Global ex-U.S. Equity	MSCI ACWI ex USA	9.20%	7.25%	5.00%	21.10%	3.10%	7.00%	21.00%
U.S. Fixed	Bloomberg Barclays Aggregate	3.75%	3.75%	1.50%	3.75%	3.85%	3.00%	3.75%
Real Estate	NFI-ODCE	7.30%	6.25%	4.00%	15.70%	4.75%	5.75%	16.35%
Commodities	Bloomberg Commodity	4.75%	3.20%	0.95%	18.00%	2.50%	2.65%	18.30%
Inflation	CPI-U		2.25%		1.50%		2.25%	1.50%

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

Callan

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

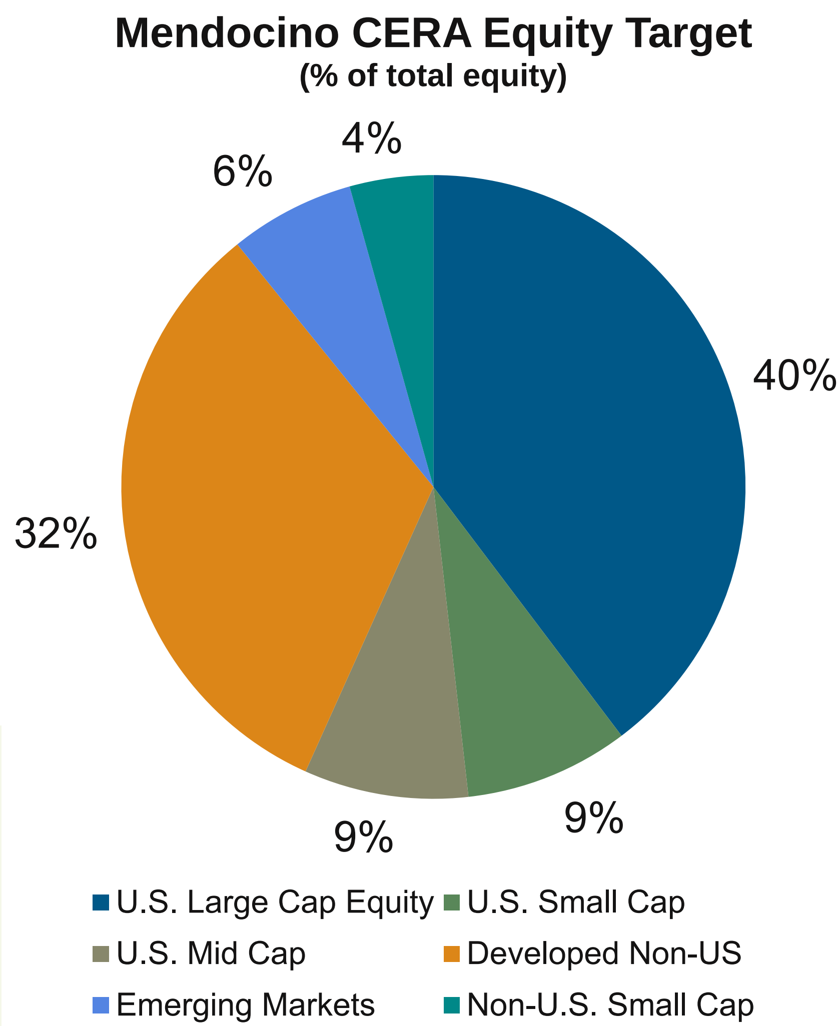
- Different sources of alpha

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%

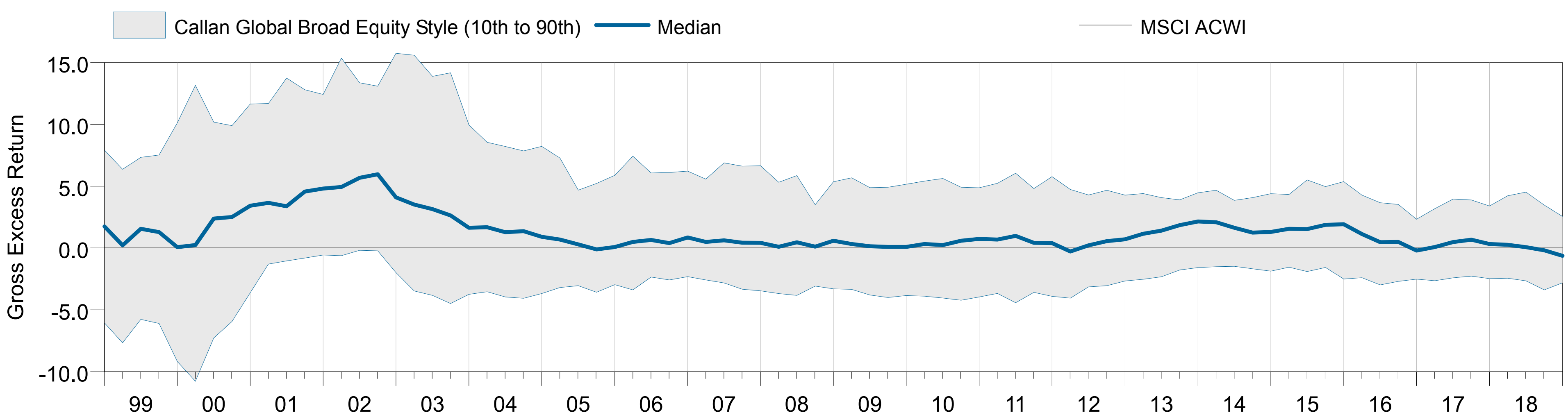
Global Broad Equity Style vs. MSCI ACWI

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

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

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

Broadest 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

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

		PROJECTED RETURN			PROJECTED RISK	
Asset Class	Index	1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation	Projected Yield
Equities						
Broad U.S. Equity	Russell 3000	8.50%	7.15%	4.90%	17.95%	2.00%
Global ex-U.S. Equity	MSCI ACWI ex USA	9.20%	7.25%	5.00%	21.10%	3.10%
Global Equity	MSCI ACWI	8.86%	7.35%	5.10%	18.8%	2.55%
Inflation	CPI-U		2.25%		1.50%	

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)*

APPENDIX

2019 Callan Capital Market Projections

Risk and return: 2019–2028

Asset Class	Index	PROJECTED RETURN			PROJECTED RISK		2018 - 2027	
		1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation	Projected Yield	10-Year Geometric*	Standard Deviation
Equities								
Broad U.S. Equity	Russell 3000	8.50%	7.15%	4.90%	17.95%	2.00%	6.85%	18.25%
Large Cap	S&P 500	8.25%	7.00%	4.75%	17.10%	2.10%	6.75%	17.40%
Small/Mid Cap	Russell 2500	9.55%	7.25%	5.00%	22.65%	1.55%	7.00%	22.60%
Global ex-U.S. Equity	MSCI ACWI ex USA	9.20%	7.25%	5.00%	21.10%	3.10%	7.00%	21.00%
Non-U.S. Equity	MSCI World ex USA	8.70%	7.00%	4.75%	19.75%	3.25%	6.75%	19.70%
Emerging Markets Equity	MSCI Emerging Markets	10.70%	7.25%	5.00%	27.45%	2.65%	7.00%	27.45%
Fixed Income								
Short Duration	Bloomberg Barclays 1-3 Yr G/C	3.40%	3.40%	1.15%	2.10%	3.25%	2.60%	2.10%
U.S. Fixed	Bloomberg Barclays Aggregate	3.75%	3.75%	1.50%	3.75%	3.85%	3.00%	3.75%
Long Duration	Bloomberg Barclays Long G/C	4.25%	3.75%	1.50%	10.65%	4.80%	3.00%	10.95%
TIPS	Bloomberg Barclays TIPS	3.80%	3.75%	1.50%	5.05%	3.90%	3.00%	5.25%
High Yield	Bloomberg Barclays High Yield	5.75%	5.35%	3.10%	10.35%	7.75%	4.75%	10.35%
Non-U.S. Fixed	Bloomberg Barclays Glbl Agg ex US	1.80%	1.40%	-0.85%	9.20%	2.35%	1.40%	9.20%
Emerging Market Debt	EMBI Global Diversified	5.40%	5.05%	2.80%	9.50%	6.00%	4.50%	9.60%
Other								
Real Estate	NFI-ODCE	7.30%	6.25%	4.00%	15.70%	4.75%	5.75%	16.35%
Private Equity	Cambridge Private Equity	12.40%	8.50%	6.25%	29.30%	0.00%	7.35%	32.90%
Hedge Funds	Callan Hedge FOF Database	5.75%	5.50%	3.25%	8.85%	2.50%	5.05%	9.15%
Commodities	Bloomberg Commodity	4.75%	3.20%	0.95%	18.00%	2.50%	2.65%	18.30%
Cash Equivalents	90-Day T-Bill	2.50%	2.50%	0.25%	0.90%	2.50%	2.25%	0.90%
Inflation	CPI-U		2.25%		1.50%		2.25%	1.50%

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

	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	Comm	Cash Equiv	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

Source: Callan

Fixed Income Diversification

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Long Treasury 20.3%	Interm Credit 9.8%	Long Treasury 16.8%	High Yield 28.1%	Em Mkt Debt 11.6%	Em Mkt Debt 10.2%	High Yield 11.8%	Long Treasury 9.8%	Long Treasury 24.0%	High Yield 57.5%	High Yield 15.2%	Long Treasury 29.9%	Em Mkt Debt 17.4%	High Yield 7.4%	Long Treasury 25.1%	Em Mkt Debt 1.2%	High Yield 17.5%	Em Mkt Debt 10.3%	Gl Fixed (Hdg) 1.8%
Em Mkt Debt 12.7%	Em Mkt Debt 9.7%	Global Fixed 16.5%	Em Mkt Debt 22.2%	High Yield 10.9%	Long Treasury 6.5%	Em Mkt Debt 9.9%	Global Fixed 9.5%	Gl Fixed (Hdg) 5.6%	Bank Loans 44.9%	Em Mkt Debt 12.2%	Barclays Agg 7.8%	High Yield 15.6%	Bank Loans 6.1%	Gl Fixed (Hdg) 7.6%	Gl Fixed (Hdg) 1.0%	Em Mkt Debt 10.2%	Long Treasury 8.5%	Short Duration 1.6%
Barclays Agg 11.6%	Short Duration 8.8%	Em Mkt Debt 13.7%	Global Fixed 12.5%	Global Fixed 9.3%	Bank Loans 5.7%	Bank Loans 7.3%	Barclays Agg 7.0%	Barclays Agg 5.2%	Em Mkt Debt 29.8%	Bank Loans 10.0%	Em Mkt Debt 7.3%	Bank Loans 8.7%	Short Duration 0.6%	Em Mkt Debt 7.4%	Interm Credit 0.9%	Bank Loans 9.9%	High Yield 7.5%	Bank Loans 1.1%
Gl Fixed (Hdg) 10.3%	Barclays Agg 8.4%	Barclays Agg 10.3%	Bank Loans 11.0%	Long Treasury 7.7%	Gl Fixed (Hdg) 4.3%	Global Fixed 6.6%	Short Duration 6.8%	Short Duration 5.0%	Interm Credit 15.9%	Long Treasury 9.4%	Global Fixed 5.6%	Interm Credit 8.1%	Gl Fixed (Hdg) (0.1%)	Barclays Agg 6.0%	Short Duration 0.7%	Gl Fixed (Hdg) 3.9%	Global Fixed 7.4%	Interm Credit 0.0%
Interm Credit 9.5%	Gl Fixed (Hdg) 7.2%	Interm Credit 10.1%	Interm Credit 6.9%	Bank Loans 5.6%	High Yield 2.7%	Interm Credit 4.5%	Em Mkt Debt 6.2%	Global Fixed 4.8%	Global Fixed 6.9%	Interm Credit 7.8%	Gl Fixed (Hdg) 5.4%	Gl Fixed (Hdg) 5.7%	Interm Credit (0.2%)	Interm Credit 4.2%	Barclays Agg 0.5%	Interm Credit 3.7%	Bank Loans 4.2%	Barclays Agg 0.0%
Short Duration 8.1%	High Yield 4.5%	Gl Fixed (Hdg) 8.5%	Barclays Agg 4.1%	Gl Fixed (Hdg) 4.9%	Barclays Agg 2.4%	Barclays Agg 4.3%	Interm Credit 5.6%	Interm Credit (2.8%)	Barclays Agg 5.9%	Barclays Agg 6.5%	Interm Credit 5.4%	Global Fixed 4.3%	Barclays Agg (2.0%)	High Yield 2.5%	Bank Loans (0.4%)	Barclays Agg 2.6%	Interm Credit 3.7%	Global Fixed (1.2%)
Bank Loans 4.9%	Long Treasury 4.2%	Short Duration 6.3%	Gl Fixed (Hdg) 3.1%	Barclays Agg 4.3%	Short Duration 1.8%	Short Duration 4.3%	Gl Fixed (Hdg) 5.3%	Em Mkt Debt (12.0%)	Gl Fixed (Hdg) 5.1%	Global Fixed 5.5%	High Yield 4.4%	Barclays Agg 4.2%	Global Fixed (2.6%)	Bank Loans 2.1%	Long Treasury (1.2%)	Global Fixed 2.1%	Barclays Agg 3.5%	Long Treasury (1.8%)
Global Fixed 3.2%	Bank Loans 2.7%	Bank Loans 1.1%	Short Duration 2.8%	Interm Credit 4.1%	Interm Credit 1.4%	Gl Fixed (Hdg) 3.6%	High Yield 2.2%	High Yield (26.4%)	Short Duration 3.8%	Gl Fixed (Hdg) 4.6%	Bank Loans 1.8%	Long Treasury 3.6%	Em Mkt Debt (5.2%)	Short Duration 0.8%	Global Fixed (3.2%)	Long Treasury 1.3%	Gl Fixed (Hdg) 3.0%	High Yield (2.3%)
High Yield (5.1%)	Global Fixed 1.6%	High Yield (1.9%)	Long Treasury 2.5%	Short Duration 1.3%	Global Fixed (4.5%)	Long Treasury 1.9%	Bank Loans 1.9%	Bank Loans (28.8%)	Long Treasury (12.9%)	Short Duration 2.8%	Short Duration 1.6%	Short Duration 1.3%	Long Treasury (12.7%)	Global Fixed 0.6%	High Yield (4.6%)	Short Duration 1.3%	Short Duration 0.8%	Em Mkt Debt (4.3%)

– 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.

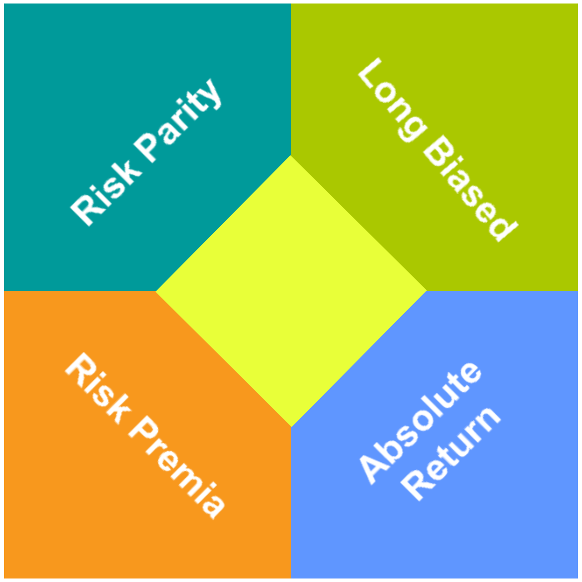
Callan Categorization of MAC Strategies

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

Absolute Return Mandate	Hedge Funds – Absolute Return Mandate	MACs – Absolute Return Mandate
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

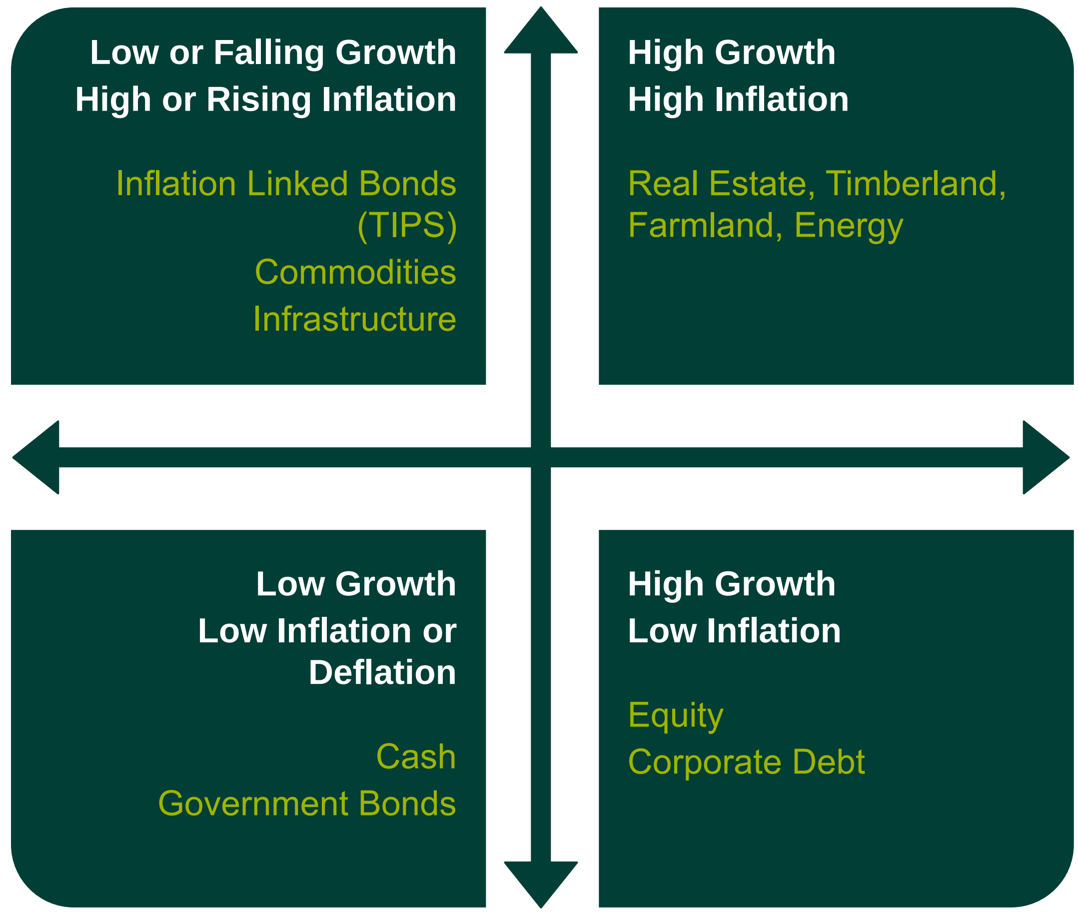
Defining Real Assets

Grouping asset classes by economic roles

Investments in the "real" economy

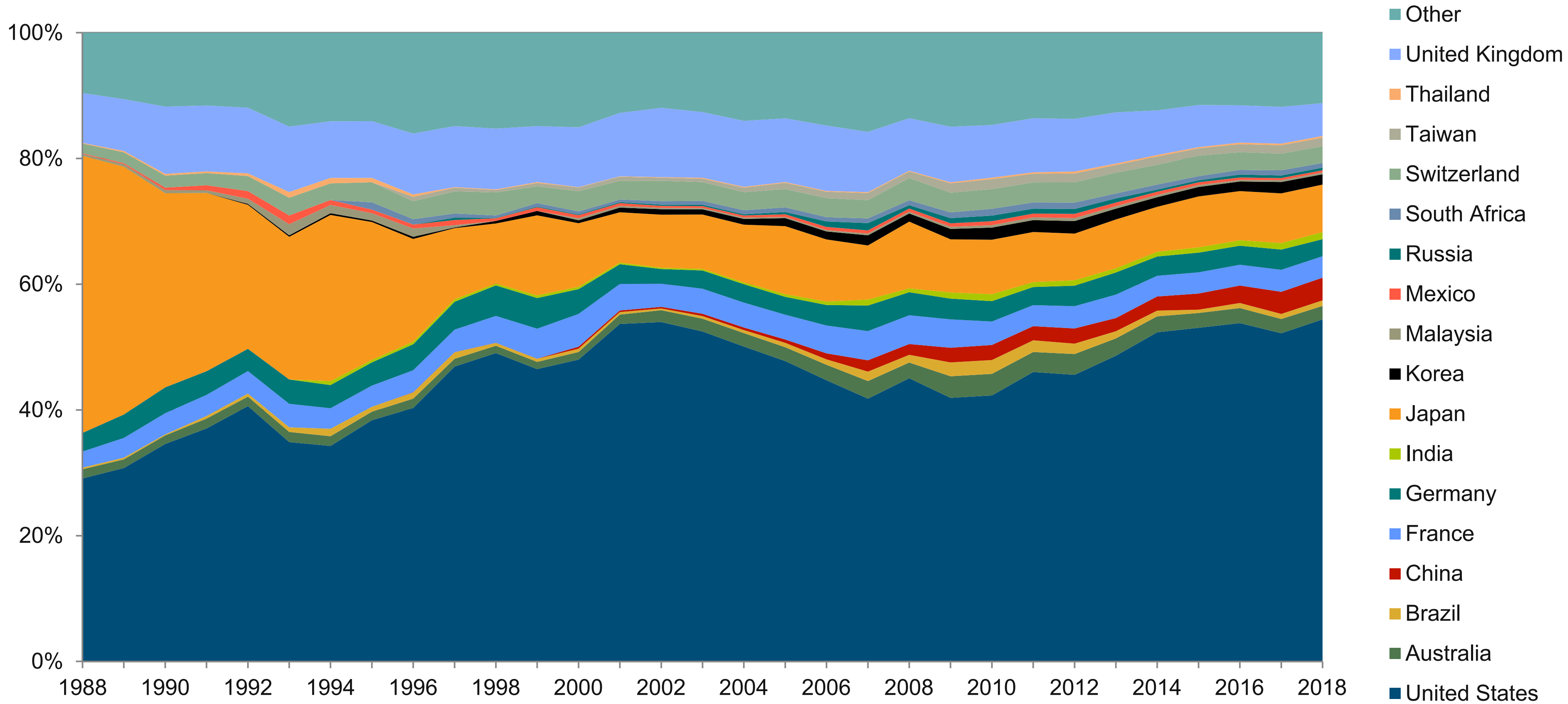
- Real estate
- Infrastructure
- Commodities

A strategic allocation to real assets can provide economic diversification and inflation hedging as investors seek diversification to a range of economic scenarios



MSCI ACWI Index Evolution

Historical ACWI Country Weights



U.S. market cap weights have historically been between 45% and 55% of global

Source: MSCI

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.