

Callan



September 20, 2023

**State Teachers Retirement
System of Ohio**

Callan LLC
Investment Consulting Services

Michael Joecken
Senior Vice President

James Callahan, CFA
President

Brady O'Connell, CFA, CAIA
Senior Vice President

Callan Team Introductions

Presenters



Michael J. Joecken
Senior Vice President

- 23 years in the industry, 23 years with Callan
- MBA, Northwestern University Kellogg School of Management
- Member of Callan's Defined Contribution Committee and Diversity, Equity & Belonging Council
- Callan Shareholder



Brady O'Connell, CFA, CAIA
Senior Vice President

- 26 years in the industry, 8 years with Callan
- MBA, Northwestern University Kellogg School of Management
- Member of Callan's Client Policy Review, Alternatives Review, and Institute Advisory Committees
- Callan Shareholder



James A. Callahan, CFA
President

- 31 years in the industry & 29 years at Callan
- BA, Boston College
- Oversees DC, Alternatives, Real Assets, IAG, and Trust, Custody, and Securities Lending Consulting Groups
- Chair of Client Policy Review Committee
- Member of Callan's Management and Editorial Committees
- Callan Shareholder

An Overview of Callan

Focus, experience, resources

Independent & Focused

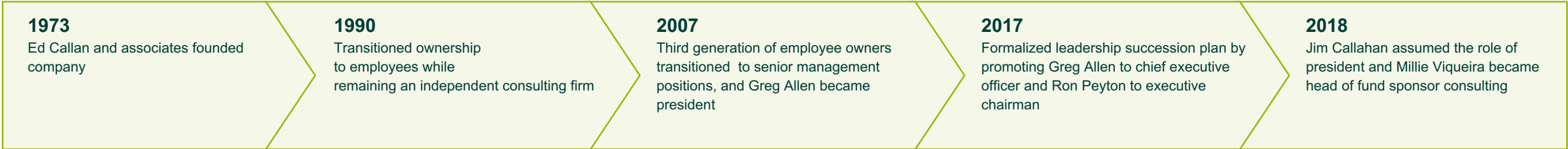
- Established in 1973
- Investment consulting is primary focus
- 100% employee-owned
- Third generation of private ownership
- 137 current owner-employees

Experienced

- Over 500 fund sponsor clients representing \$4.7 trillion in assets
- Client-focused consultants averaging 7 retainer clients each
- Consultant tenure averages 11 years Callan / 22 years industry
- Retainer client tenure averages 12 years

Fully Resourced

- Over 190 employees
- 59 CFA / CAIA / FRM Charterholders and 18 CFA / CAIA / FRM candidates
- Over 65 advanced degrees
- Over 90 specialists
- Proprietary systems and databases



As of December 31, 2022

Experience with Similar Plan Types

157 Public Fund Clients	\$2.6T Public DB Assets Under Advisement
69 Public Defined Benefit (DB) Clients	\$3.6T Total Public Fund Assets Under Advisement
33 OPEB Plan Clients	\$54M OPEB Plan Assets Under Advisement

Representative Public Defined Benefit and OPEB Plan Clients

Alameda County Employees' Retirement Association

Alaska Retirement Management Board

Arkansas Public Employees' Retirement System

Charlotte Firefighters' Retirement System

City of Norwalk

Cook County

Firemen's Annuity and Benefit Fund of Chicago

Florida State Board of Administration

Georgia Municipal Association

Indiana Public Retirement System

Lexington-Fayette Urban County Government Police & Fire Fund

MARTA (Metropolitan Atlanta Rapid Transit Authority)

Massachusetts Pension Reserves Investment Management Board

Milwaukee Employees' Retirement System

Milwaukee Public Schools

Mississippi Public Employees' Retirement System

Nevada Public Employees' Retirement System

New York City Employees' Retirement System

Mississippi Public Employees' Retirement System

Nevada Public Employees' Retirement System

New York City Employees' Retirement System

New York State Common Retirement Fund

New York State Teachers' Retirement System

North Dakota State Investment Board

Pennsylvania State Employees' Retirement System

Public Employee Retirement System of Idaho

Public School Teachers' Pension and Retirement Fund of Chicago

State Teachers Retirement System of Ohio

State Universities Retirement System of Illinois

The North Carolina Department of State Treasurer

University Health System

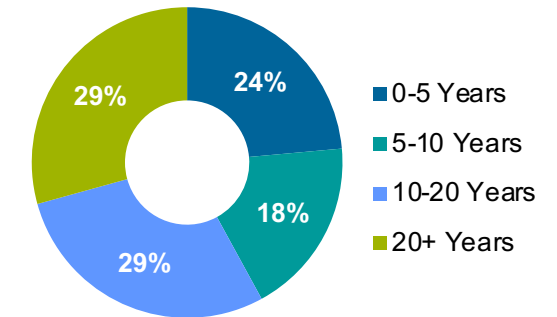
University of Puerto Rico Employees' Retirement System

US Army

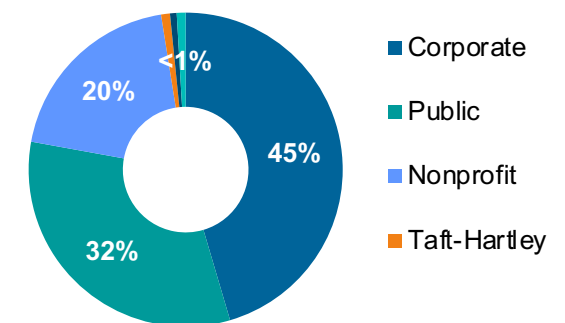
Utah Retirement Systems

Wichita Police & Fire Retirement Board

Public Fund Clients by Tenure



Callan Retainer Client Types



Data as of June 30, 2023; clients in **BOLD** have a defined benefit plan and an OPEB plan

Client-Focused Consulting Model

Proactively provide our collective expertise and experience to clients

STRS Ohio

Callan Consulting Team
 Michael Joecken Brady O’Connell, CFA, CAIA

Client Policy Review Committee
 13 Senior Professionals

Manager Search Committee
 8 Senior Professionals

Defined Contribution Committee
 13 Senior Professionals

Alternatives Review Committee
 12 Senior Professionals

Strategic Planning

Plan Implementation

Monitoring & Evaluation

Education & Research

Capital Markets Research

8 dedicated professionals
(Also significantly contributes to our global manager research efforts.)

Dedicated Manager Research

34 dedicated professionals
(56 specialists contribute to our global manager research efforts)

Defined Contribution Group

6 dedicated professionals

Implementation Solutions Group

3 dedicated professionals

**Client Report Services
 Proprietary Database**

29 dedicated performance professionals
Supported by 20 database, programming and systems professionals.

**Callan Institute and
 “Callan College”**

8 dedicated professionals
Most Callan professionals participate as instructors and research writers

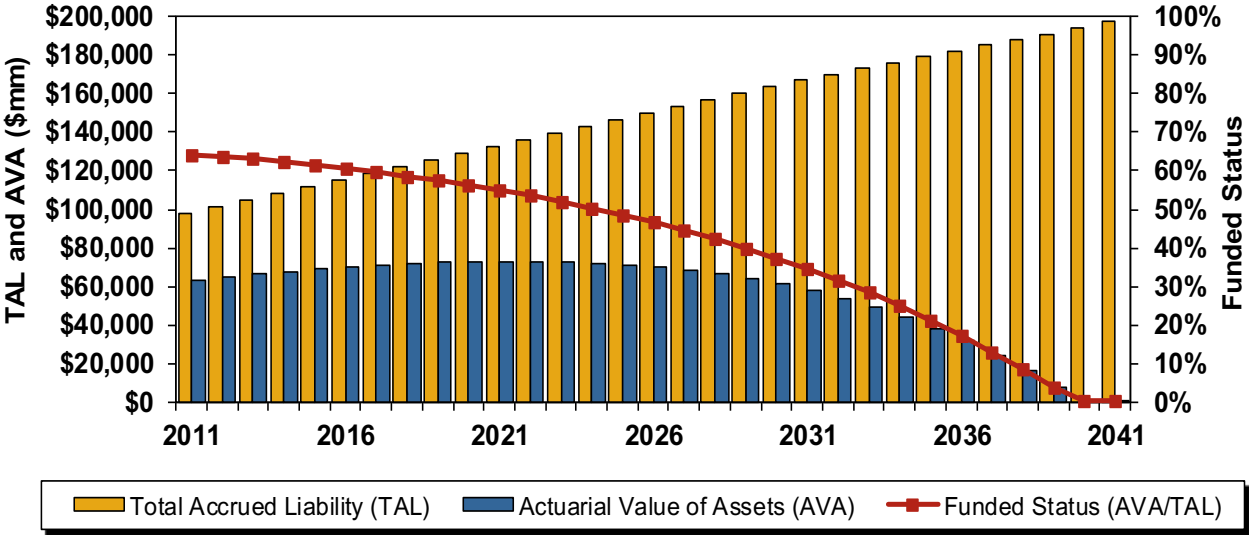
As of June 30, 2023

Looking Back

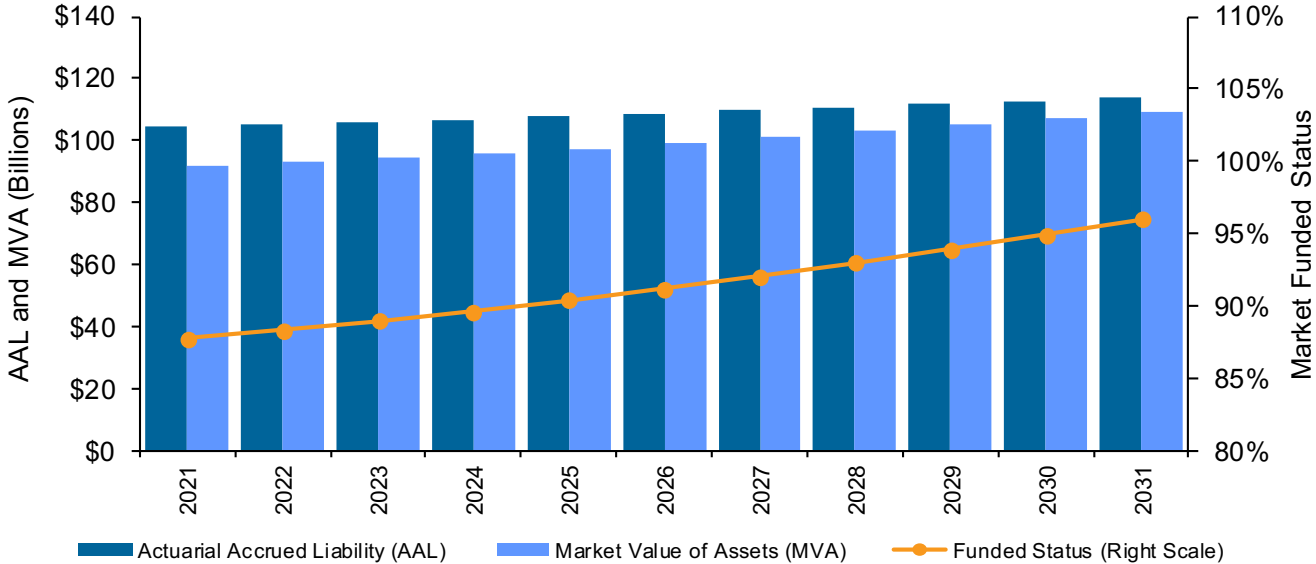
STRS Ohio Asset Liability Studies

Funded Status Projections

30-Year Funded Status Projection - 2011

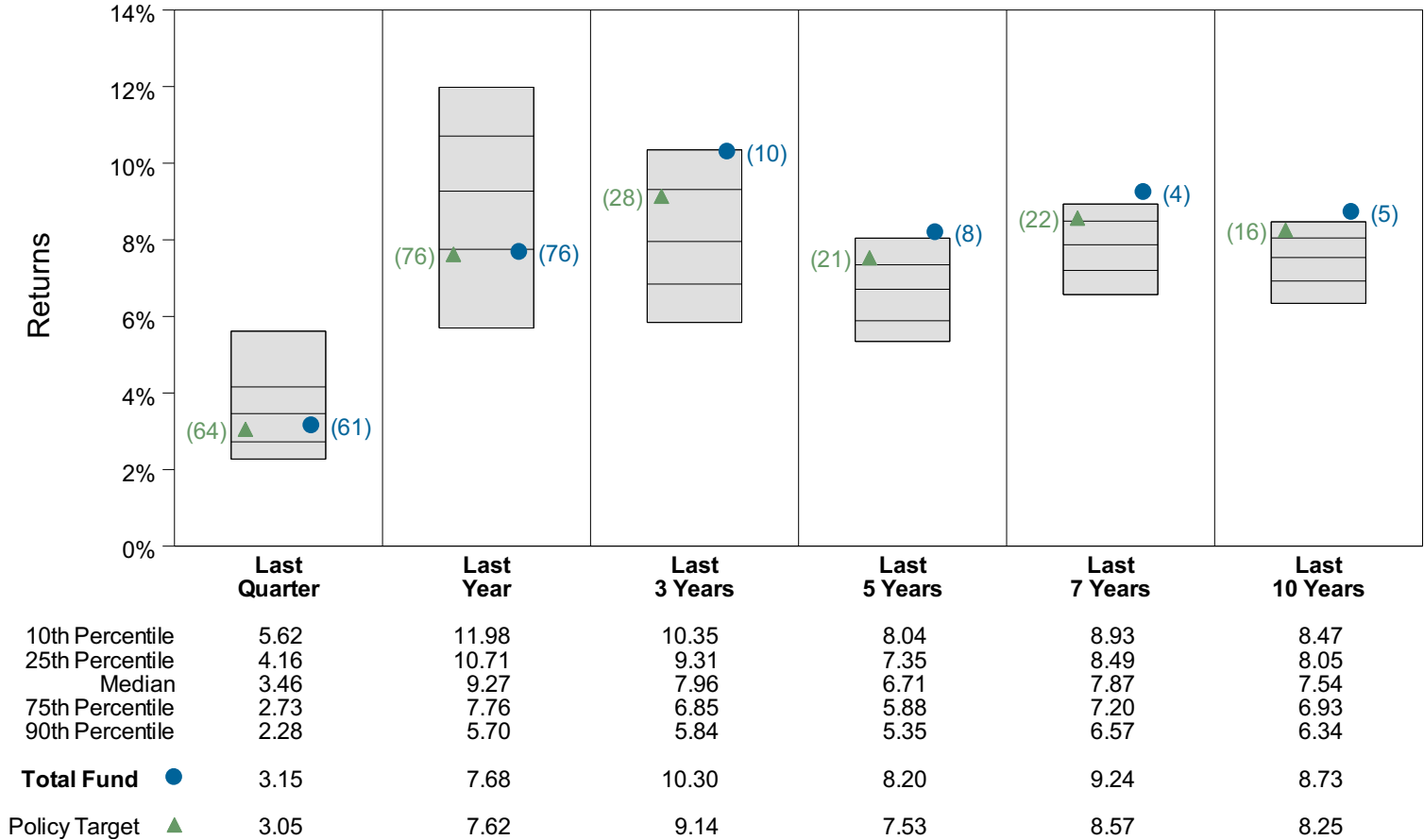


10-Year Funded Status Projection - 2021



STRS Ohio v. Callan Public Fund Sponsor Database, 6/30/23

Callan Public Fund Sponsor Database



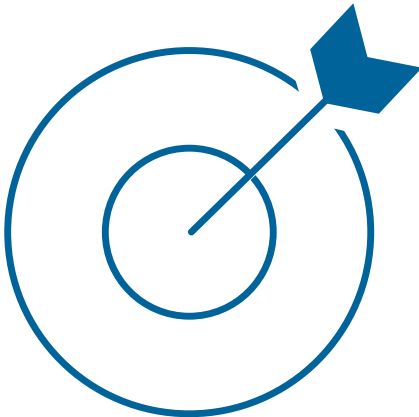
- ▶ For one-year ended 6/30/2023, STRS Ohio outperformed the benchmark by 6 basis points and ranked at the 76th percentile of the Callan Public Fund Sponsor Database.
- ▶ For the past five-years ended 6/30/2023, STRS Ohio had a 67 basis point advantage over the benchmark and ranked at the 8th percentile of the Callan Public Fund Sponsor Database.
- ▶ For 10-years ended 6/30/2023, STRS Ohio bested the benchmark by 48 basis points and ranked at the 5th percentile of the Callan Public Fund Sponsor Database.

Gross returns are illustrated, except for alternative investments & real estate where the return is net of all external investment management fees and costs, including carried interest and other fund expenses. Certain Callan returns may differ from STRS Ohio due to rounding.

Question & Answer

About Callan

One of the largest independently owned investment consulting firms in the U.S.



Our Mission

is to advance each client’s investment goals. To achieve our mission, we will apply our resources and experience to develop and implement custom solutions on behalf of our clients.

Client Collaboration

We exist because of you. Listening to your insights and closely collaborating with you make us more knowledgeable and more in tune to the needs of the beneficiaries we collectively serve.

Diverse Perspectives

We value diversity of opinion. Because we all have different backgrounds and experiences, we are open to new ideas and perspectives that help find solutions for your unique situation.

Core Values

These have been Callan’s values since the firm’s founding five decades ago and have guided everything we do for our clients.

Keep

client interests paramount

Support

the success of each associate

Commit

to quality and collaboration

Work

with integrity and inclusiveness

Honor

every commitment

How We Measure Our Own Success

2022 Client Survey

Proactively solicit feedback from clients

100% rated consultant's performance as **Very Good*** (83%) or **GOOD** (17%)

96% of clients feel **Very Comfortable*** (83%) or **Comfortable** (13%) that they can rely on their consultant's judgment—their consultant is experienced and capable

100% WOULD RECOMMEND Callan as a consultant

Executive Chairman Ron Peyton maintains ongoing client outreach through phone calls and visits

- ▶ Provides clients the opportunity to give candid feedback on your experiences with Callan
- ▶ Clients are encouraged to contact him with questions or concerns

Maintaining a work plan allows you to evaluate how well your Callan team is meeting your needs

* Highest ranking for response options

Callan's Ongoing Commitment to STRS Ohio

Strategic Partner

Providing technical expertise coupled with disciplined execution

Disciplined Governance Process

Support you as you fulfill your fiduciary responsibilities

Experienced Investment Professionals

A team of experienced consultants leading the relationship

Direct Access to Specialty Consultants

Alternatives, Defined Contribution, Capital Markets, Investment Manager Research

Benefit of Callan's Peer Review Committees

Customized, forward-looking recommendations vetted by Callan's most senior professionals

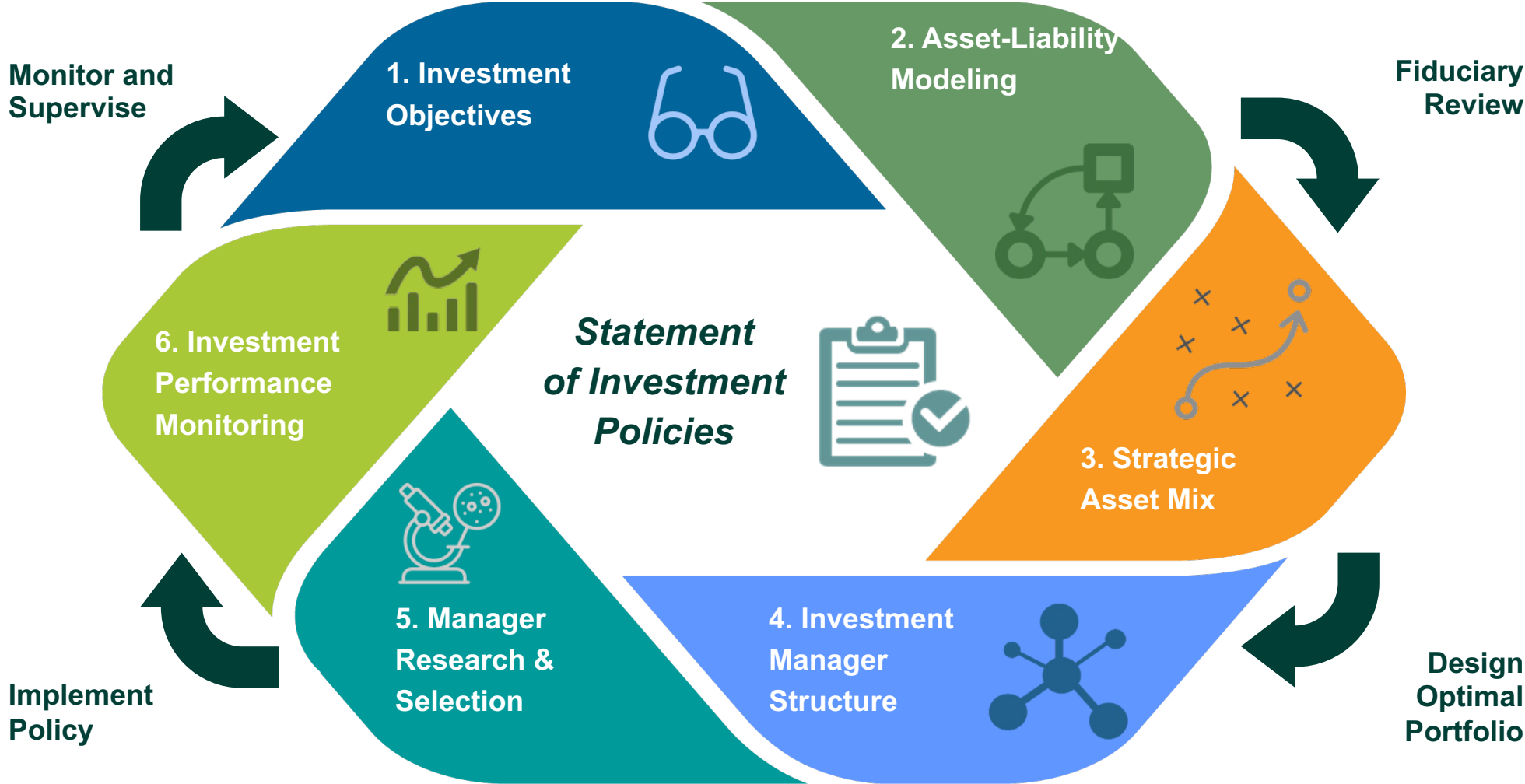
Customized Performance Analytics

Tailored for your needs and provided in a timely and meaningful format

Asset Allocation Advice

DB and HC Consulting: Investment Policy Statement

Institutional advisory governance framework



Governance - Commit to a long-term investment strategy, then stick to it



- ▶ Select a strategy that satisfies the long-term return needs and can be understood and maintained by future administrations
- ▶ Avoid making decisions based on strictly short-term inputs
- ▶ Avoid changing a good strategy to prepare for an anticipated “next crisis” when it was the original strategy that got the investor through the last one
- ▶ A poor strategy is disastrously revealed in situations like the Global Financial Crisis
- ▶ Risks to strong investment outcomes: Not knowing your true time horizon (or not being able to adhere to it), not understanding your true liquidity needs, and overreacting to short-term market developments

Governance - Attract and retain a qualified investment team



- ▶ As institutions have increasingly embraced more complex alternative investments, the need to attract and retain talent to identify, implement, and oversee these investments has grown in importance
- ▶ Stability in decision makers can help institutions stick to other best practices and increase the odds of long-term success
- ▶ Attracting and retaining a qualified investment team, as well as developing new talent, is a challenge in a very competitive industry and requires a budgetary commitment and committee support
- ▶ Talented and stable staff outside of investments to support the overall investment program is critical to organizational success

Governance - Delegate strategy & policy implementation to CIO/staff



- ▶ Investment committees are primarily responsible for:
 - setting investment strategy, policy guidelines, and asset allocation
 - monitoring results
 - overseeing the plan
 - representing the plan on behalf of the beneficiaries

- ▶ Rely on the expertise of your qualified investment team and delegate as much of the implementation of the investment program as possible

- ▶ By carefully considering what issues must have approval and what can be delegated to staff, operational efficiencies such as rebalancing and dealing with investment manager issues in a timely fashion will likely improve long-term results

Fiduciaries Must Vigorously Monitor Costs



- ▶ Tracking and managing investment-related costs is critical, particularly in an environment of modest return expectations. Institutional investors need to make sure they understand all aspects of investment costs—including those related to the administration of the investments—and manage them wherever possible.
- ▶ This is of particular importance in the alternative investment world, where costs come in different forms and are often indirectly assessed.

Understand the investment strategy



- ▶ Do not employ investment strategies the committee does not fully understand. Complexity is not a taboo, but a complex strategy should not be employed simply because it is popular.
- ▶ Perhaps even more importantly, institutions need to make sure that current and future decision-makers will be able to understand complex strategies.
- ▶ A good rule is to never employ a strategy that cannot be maintained, explained, or defended by the next CIO, investment committee, administration, or the participants at its worst possible moment.

Capital Markets Research

Dedicated Strategic Planning Resources

What makes our team great?

- Customized approach to decision-making
- Rigorous modeling and analysis
- Extensive experience with various investment pools

- Conducts all asset/liability, asset allocation, and asset spending studies for our clients
- Performs investment structure work to follow asset allocation decisions
- Provides capital market research and develops proprietary capital market assumptions for use in risk/reward modeling
- Provides custom client research and education



Gary Chang, CFA
Jason Ellement, FSA, CFA
Ric Ford, FSA, CFA, EA

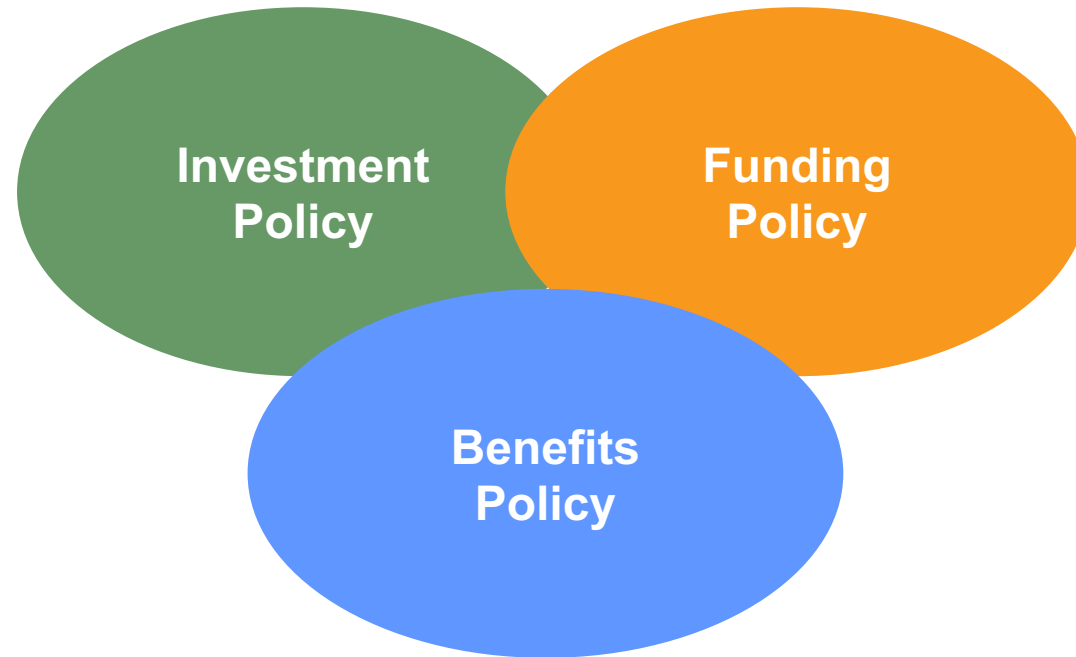
Jay Kloepfer
Adam Lozinski, CFA
Kevin Machiz, CFA, FRM

Julia Moriarty, CFA
John Pirone, CFA, FRM, CAIA

Asset Allocation and Liability Study Overview

Integration of Key Operational Policies

We evaluate the interaction of the three key policies that govern a retirement plan with the goal of establishing the best investment policy



Investment Policy

- How will the assets supporting the benefits be invested?
- What are the risk and return objectives?
- How will cash flows be managed?

Funding Policy

- How will the benefits be paid for (funded)?
- What are the forecasts for key plan parameters (actuarial assumptions)?

Benefits Policy

- What types of benefits?
- What level of benefit?
- When are they payable?
- To whom are they payable?

2023 Risk and Returns Assumptions

Summary of Callan's Long-Term Capital Markets Assumptions (2023–2032)

Asset Class	Index	Projected Return		Real	Projected Risk Standard Deviation	2022–2031			vs. 2022	
		1-Year Arithmetic	10-Year Geometric*			1-Year Arithmetic	10-Year Geometric*	Standard Deviation	Geometric* Delta	Std Dev Delta
Equities										
Broad U.S. Equity	Russell 3000	8.75%	7.35%	4.85%	18.05%	8.00%	6.60%	17.95%	0.75%	0.10%
Large Cap U.S. Equity	S&P 500	8.60%	7.25%	4.75%	17.75%	7.85%	6.50%	17.70%	0.75%	0.05%
Smid Cap U.S. Equity	Russell 2500	9.60%	7.45%	4.95%	22.15%	8.75%	6.70%	21.30%	0.75%	0.85%
Global ex-U.S. Equity	MSCI ACWI ex USA	9.45%	7.45%	4.95%	21.25%	8.70%	6.80%	20.70%	0.65%	0.55%
Developed ex-U.S. Equity	MSCI World ex USA	9.00%	7.25%	4.75%	20.15%	8.25%	6.50%	19.90%	0.75%	0.25%
Emerging Market Equity	MSCI Emerging Markets	10.45%	7.45%	4.95%	25.70%	9.80%	6.90%	25.15%	0.55%	0.55%
Fixed Income										
Short Duration Gov/Credit	Bloomberg 1-3 Year Gov/Credit	3.75%	3.80%	1.30%	2.30%	1.50%	1.50%	2.00%	2.30%	0.30%
Core U.S. Fixed	Bloomberg Aggregate	4.25%	4.25%	1.75%	4.10%	1.80%	1.75%	3.75%	2.50%	0.35%
Long Government	Bloomberg Long Gov	4.55%	3.70%	1.20%	13.50%	1.85%	1.10%	12.50%	2.60%	1.00%
Long Credit	Bloomberg Long Credit	5.75%	5.20%	2.70%	11.75%	2.60%	2.10%	10.50%	3.10%	1.25%
Long Government/Credit	Bloomberg Long Gov/Credit	5.25%	4.75%	2.25%	11.35%	2.30%	1.80%	10.40%	2.95%	0.95%
TIPS	Bloomberg TIPS	4.10%	4.00%	1.50%	5.30%	1.35%	1.25%	5.05%	2.75%	0.25%
High Yield	Bloomberg High Yield	6.75%	6.25%	3.75%	11.75%	4.40%	3.90%	10.75%	2.35%	1.00%
Global ex-U.S. Fixed	Bloomberg Global Agg ex US	2.70%	2.25%	-0.25%	9.80%	1.20%	0.80%	9.20%	1.45%	0.60%
Emerging Market Sov Debt	EMBI Global Diversified	6.25%	5.85%	3.35%	10.65%	4.00%	3.60%	9.50%	2.25%	1.15%
Alternatives										
Core Real Estate	NCREIF ODCE	6.60%	5.75%	3.25%	14.20%	6.60%	5.75%	14.20%	0.00%	0.00%
Private Infrastructure	MSCI GI Infra/FTSE Dev Core 50/50	7.15%	6.15%	3.65%	15.45%	7.10%	6.10%	15.45%	0.05%	0.00%
Private Equity	Cambridge Private Equity	11.95%	8.50%	6.00%	27.60%	11.45%	8.00%	27.60%	0.50%	0.00%
Private Credit	N/A	8.00%	7.00%	4.50%	15.50%	6.40%	5.50%	14.60%	1.50%	0.90%
Hedge Funds	Callan Hedge FOF Database	5.80%	5.55%	3.05%	8.45%	4.35%	4.10%	8.20%	1.45%	0.25%
Commodities	Bloomberg Commodity	5.05%	3.50%	1.00%	18.00%	4.05%	2.50%	18.00%	1.00%	0.00%
Cash Equivalents	90-Day T-Bill	2.75%	2.75%	0.25%	0.90%	1.20%	1.20%	0.90%	1.55%	0.00%
Inflation	CPI-U		2.50%		1.60%		2.25%	1.60%	0.25%	0.00%

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

2023–2032 Callan Capital Markets Assumptions Correlations

Large Cap U.S. Equity	1.00																				
Smid Cap U.S. Equity	0.88	1.00																			
Dev ex-U.S. Equity	0.73	0.79	1.00																		
Em Market Equity	0.79	0.83	0.89	1.00																	
Short Dur Gov/Credit	0.05	0.01	0.04	-0.01	1.00																
Core U.S. Fixed	0.02	-0.02	0.00	-0.04	0.80	1.00															
Long Government	-0.05	-0.06	-0.03	-0.06	0.67	0.83	1.00														
Long Credit	0.45	0.40	0.40	0.40	0.64	0.80	0.65	1.00													
TIPS	-0.07	-0.08	-0.09	-0.11	0.56	0.70	0.50	0.52	1.00												
High Yield	0.75	0.74	0.73	0.75	0.10	0.09	0.00	0.45	0.02	1.00											
Global ex-U.S. Fixed	0.10	0.07	0.13	0.12	0.50	0.60	0.50	0.55	0.45	0.18	1.00										
EM Sovereign Debt	0.65	0.65	0.65	0.69	0.16	0.19	0.10	0.47	0.08	0.62	0.21	1.00									
Core Real Estate	0.44	0.42	0.42	0.41	0.16	0.14	0.05	0.30	0.09	0.31	0.16	0.29	1.00								
Private Infrastructure	0.48	0.47	0.46	0.46	0.14	0.15	0.10	0.33	0.08	0.34	0.18	0.32	0.76	1.00							
Private Equity	0.79	0.77	0.76	0.75	-0.01	-0.09	-0.13	0.30	-0.11	0.61	0.08	0.51	0.55	0.60	1.00						
Private Credit	0.69	0.68	0.65	0.68	0.11	0.00	-0.05	0.33	-0.12	0.63	0.12	0.50	0.25	0.27	0.67	1.00					
Hedge Funds	0.67	0.63	0.63	0.63	0.23	0.29	0.20	0.55	0.20	0.60	0.25	0.54	0.28	0.30	0.48	0.51	1.00				
Commodities	0.20	0.20	0.20	0.20	-0.05	-0.04	-0.10	0.05	0.00	0.20	0.10	0.15	0.18	0.15	0.20	0.17	0.23	1.00			
Cash Equivalents	-0.06	-0.08	-0.10	-0.10	0.30	0.15	0.12	0.00	0.12	-0.09	0.05	-0.06	0.00	-0.04	0.00	-0.04	-0.04	-0.02	1.00		
Inflation	-0.02	0.02	0.00	0.03	-0.21	-0.23	-0.30	-0.20	0.25	0.00	-0.15	-0.04	0.20	0.10	0.06	-0.05	0.05	0.35	0.05	1.00	
	Large Cap	Smid Cap	Dev	Em Mkts	Short Dur	Core Fixed	Long Gov	Long Credit	TIPS	High Yield	Global ex-US Fixed	EM	Core Real Estate	Private Infra	Private Equity	Private Credit	Hedge Funds	Comm	Cash Equiv	Inflation	

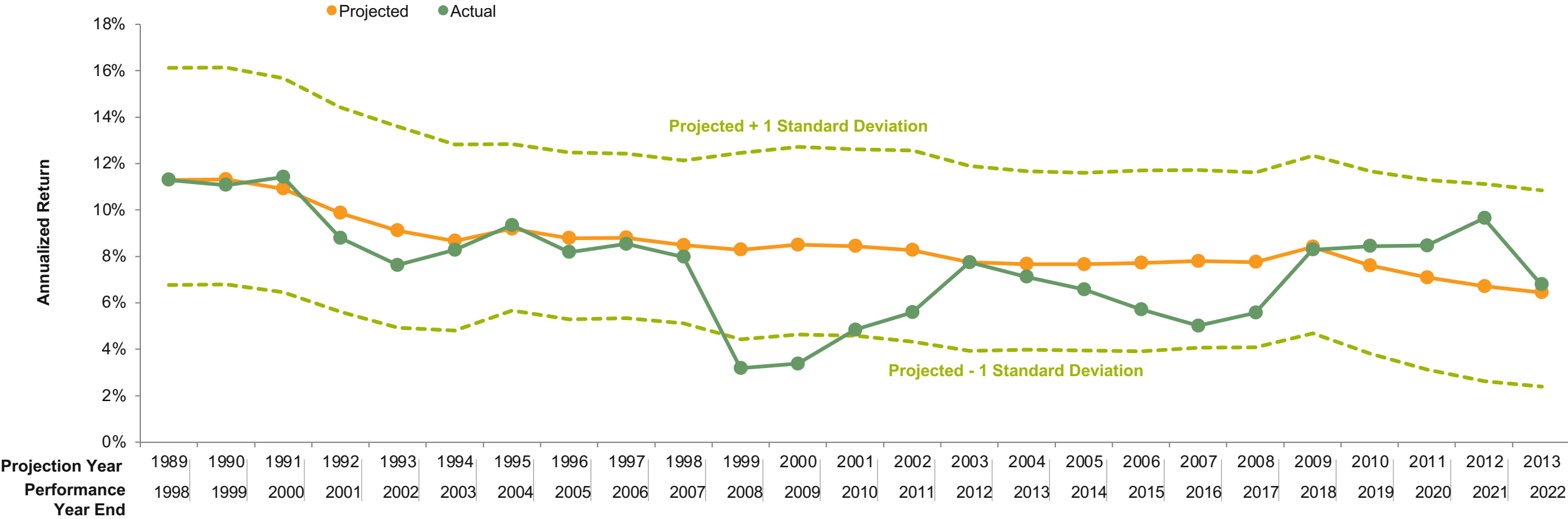
Source: Callan

Actual Returns versus Callan Projections

Projection Years 1989–2013

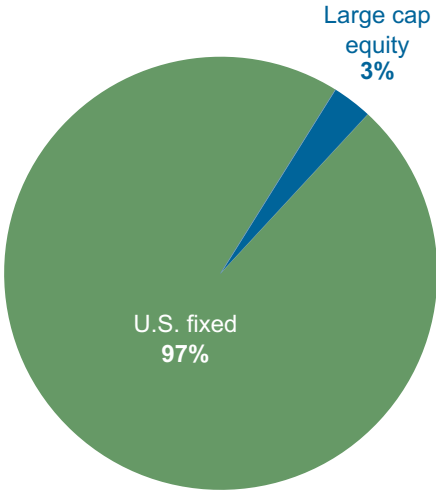
Historical Comparison: Actual Returns vs. Callan Capital Markets Projections

Portfolio (60% Equity, 30% Fixed, 10% Real Estate)

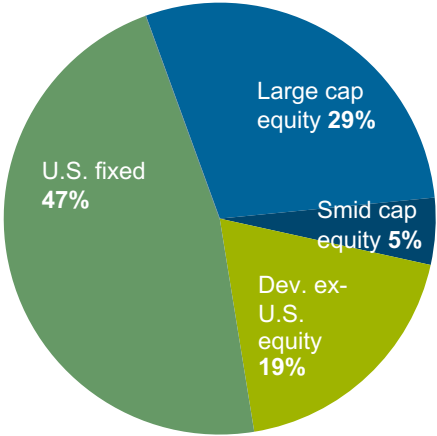


7% Expected Returns Over Past 30 Years

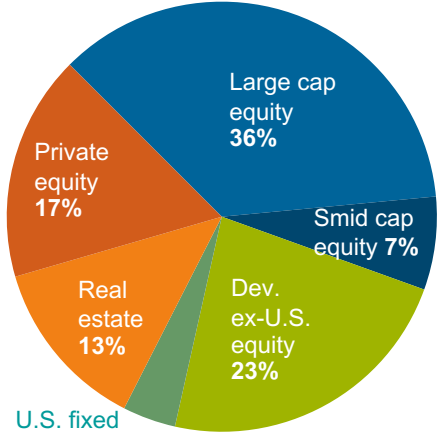
Increasing Complexity



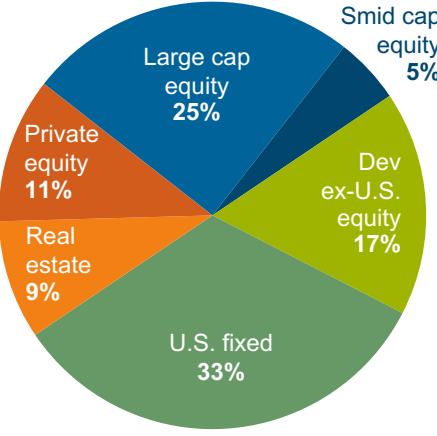
1993
Return: 7.0%
Risk: 6.2%



2008
Return: 7.0%
Risk: 9.4%



2022
Return: 7.0%
Risk: 16.8%



2023
Return: 7.0%
Risk: 11.8%

Increasing Risk

In 1993, our return expectation for broad U.S. fixed income was 6.85%.
Just 3% in return-seeking assets was required to earn a 7% projected return.

15 years later, an investor would have needed over half of the portfolio in public equities to achieve a 7% projected return.

In 2022 an investor was required to include 96% in return-seeking assets (including 30% in private market investments) to earn a 7% projected return at almost 3x the volatility compared to 1993.

Today's 7% expected return portfolio is much more reasonable than it was just a year ago. The allocation to fixed income jumps to 33%, while risk drops by 30%. Illiquid alternatives (PE and private RE) also drop by 1/3.

2023 vs. 2022

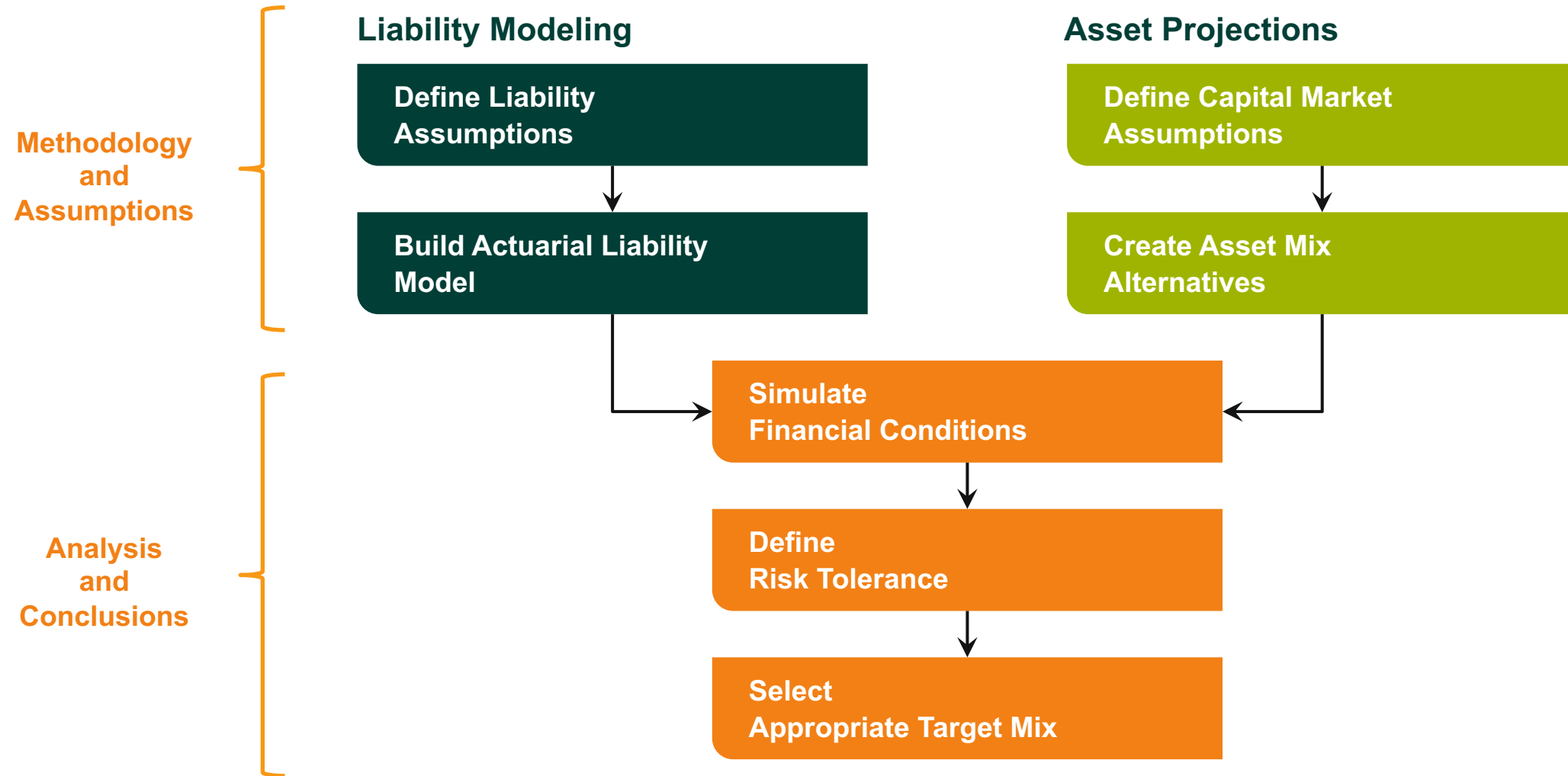
Typical public DB

- ▶ Higher risk and return improves nominal return by ~110 bps and increases risk by ~10 bps.
- ▶ Real portfolio returns are higher in 2023.

Asset Class	Allocation	2022 Returns	2023 Returns	2022 Change
Broad U.S. Equity	32%	6.60%	7.35%	0.75%
Global ex-U.S. Equity	21%	6.80%	7.45%	0.65%
Fixed Income (Agg)	25%	1.75%	4.25%	2.50%
Cash	0%	1.20%	2.75%	1.55%
Private Equity	12%	8.00%	8.50%	0.50%
Real Estate	10%	5.75%	5.75%	0.00%
Inflation (CPI-U)		2.25%	2.50%	0.25%
Mix Characteristics		2022	2023	2022 Change
Expected Return (Nominal)		6.16%	7.26%	1.10%
Expected Return (Real)		3.91%	4.76%	0.85%
Standard Deviation		13.31%	13.42%	0.11%
Sharpe Ratio		0.37	0.34	-0.04

Developing Your Long-Term Plan

Assets and liabilities are evaluated and tested separately, then integrated into a single model



Liquidity

- ▶ Liquidity is a term used to define the ease of selling or costs involved in selling an asset to raise cash. Highly liquid assets, such as US Treasury bonds, trade regularly and in high volumes and at very low costs so these are considered highly liquid and a good source of cash during times of market crisis.
- ▶ Liquidity is an important consideration for STRS Ohio given the net negative cash outflow position of the plan.
- ▶ STRS Ohio, like many public plans in the US, is a fairly mature plan paying out more in benefits than it receives in cash contributions.
- ▶ Projections of plan benefit payments and employer and employee contributions into a plan are a common part of the asset liability study process.
- ▶ The higher the cash outflow a plan has the less it can typically invest in illiquid or risky assets.
- ▶ During the 2017 Asset Liability Study, the Board adopted a new 5% allocation to a portfolio of Liquid Treasuries.
- ▶ The liquidity sleeve was a new component of the fixed income asset class designed to allow STRS Ohio a source of highly liquid and highly safe assets to use as a source of benefit payments during times of market crisis.

Investment Performance Benchmarking

Current Benchmarking Philosophy

The Research Foundation of the CFA Institute published *A Primer for Investment Trustees* that established criteria for judging performance benchmarks:

- 1) **Unambiguous** — the benchmark should be clearly understood by all parties involved in the investment program.
- 2) **Investable** — the benchmark should represent an investable alternative; that is, the trustees could choose to hold the benchmark rather than hire the particular manager.
- 3) **Measurable** — the benchmark's rate of return should be readily calculable.
- 4) **Appropriate** — the benchmark should reflect the manager's typical risk characteristics and area of expertise.
- 5) **Specified in advance** — the benchmark must be specified prior to the evaluation period and known to all interested parties.
- 6) **Owned** — the benchmark should be acknowledged and accepted as an appropriate accountability standard by the party responsible for the performance.

Observations on Current Benchmarking Practices

- ▶ Benchmark indices for each asset class and for the total fund are reviewed and established by the Board. The most recent review took place in early 2021.
- ▶ Asset class benchmarks are clear, publicly available, established in advance, and give clear direction to the investment staff and underlying managers on their performance objectives.
- ▶ Total fund benchmark is transparent and reflects the target asset allocation set by Board in the Statement of Investment Objectives and Policies (SIOP).
- ▶ Benchmarking approach for the total fund is dynamic, meaning the weights can change when the Board makes changes to the target asset allocation.
- ▶ The individual asset class benchmarks can also change, but only with Board approval.
- ▶ Recent examples include:
 - Changing Alternatives benchmarking approach in 2021.
 - Incorporating Intermediate Treasury Index into Fixed Income Blended Benchmark in 2018.
- ▶ Changes only affect the benchmark going forward, they are not applied retroactively.
- ▶ The approach is conventional and consistent with industry practices. It is used by virtually all institutional investors including public defined benefit plans, corporate pensions, endowments and foundations.

Current STRS Ohio Performance Benchmarks

Asset Class	Benchmark	Target Weight	Benchmark Components	Standard or Custom Index?
Domestic Equity	Russell 3000 Index	26%	Russell 3000 Index	Standard
International Equity	International Blended Benchmark	22%	MSCI World ex-U.S. Index-Net (50% hedged currency)	Custom (due to hedging)
			MSCI Emerging Markets Index-Net	Standard
Fixed Income	Fixed Income Blended Benchmark	22%	Bloomberg U.S. Universal Index	Standard
			Bloomberg U.S. Intermediate Treasury Index	Standard
Real Estate	Real Estate Blended Benchmark	10%	NCREIF Property Index	Standard
			FTSE NAREIT Equity REITs Index	Standard
Alternative Investments	Alternative Investments Blended Benchmark	19%	Cambridge Associates Private Equity and Venture Capital Index	Standard
			Cambridge Associates Private Credit Index	Standard
			HFRI Fund of Funds Composite Index	Standard
Liquidity Reserves	90-day Treasury Bill	1%	90 Day Treasury Bills	Standard

Total Fund

STRS Ohio Total Fund Policy Return (Blended Benchmark):
weighted average based on Target Weights and Benchmark Components and rebalanced monthly

Investment Manager Research

Callan's Research Resources

As of June 30, 2023

Research Team by the Numbers

- 56** Specialty consultants
- 80%** Callan shareholders
- 29** CFA and/or CAIA charterholders
- 21** Master's degrees

Searches and Database by the Numbers

- 1,115** Manager searches completed over the last five years
- \$222bn** Assets represented by these searches
- 2,000+** Average number of manager meetings per year
- 2,400+** Organizations tracked in proprietary database
- 16,000+** Strategies tracked in proprietary database

Commitment to dedicated resources

- Sole focus is research
- Highly valued, high-profile, career positions
- Original research, in-depth due diligence

Proprietary database and analytics

- Full control over data collection and due diligence
- Clean, detailed, and continuous data

Searches are client-driven and customized

- No buy-list
- Emphasis on both quantitative and qualitative analysis
- Thorough documentation of entire process

Oversight committee for manager searches

- Best thinking across the firm
- Ensures quality control and adherence to well-defined and robust process

Dedicated Resources

Public Market Research

U.S. Equity

Corey Schier
Mark Stahl, CFA
David Wang

Mark Wood, CFA
Nicole Wubbena



Fixed Income

Kristin Bradbury, CFA
Dario Buechi

Kyle Fekete, CFA
David Zee, CFA



*Discretionary only

Global ex-U.S. Equity

Paul Choi, CFA
Lauren Mathias, CFA

Tim Pollard
Fanglue Zhou



Diversified Real Return

Mark Andersen**
Kyle Fekete, CFA



Dedicated Resources

Emerging Managers and Diverse-, Women-, and Disabled-Owned (EM/DWDO)

Bernie Bazile, CAIA
Catherine Beard, CFA

Ashley Kahn, CAIA
Lauren Mathias, CFA

Gary Robertson
Avery Robinson, CAIA



Environmental, Social, and Governance (ESG)

Amit Bansal
Kristin Bradbury, CFA
Citlali Cuevas

Aidan Davison
Aaron Quach

Tom Shingler
Hannah Vieira

Mark Wood, CFA
Nicole Wubbena



Manager Research

Callan's Manager Database

You can use Callan data with confidence – we stand behind the data because we own and control it.

Investment Manager Database			Multiple Manager Touchpoints	
	No. Products	No. Managers		
U.S.				
Equity	3,962	977	-	402 DWDO firms in database
Fixed Income	2,954	487	-	2,000+ manager meetings/onsites annually
Balanced	269	132	-	- ~135 meetings with DWDO firms
			-	- 1650+ video calls during 2021
Non-U.S./Global/Emerging			-	200 manager searches per year
Equity	3,320	1,255	-	- DWDO firms included in each search
Fixed Income	645	261	-	Hundreds of managers analyzed/year via client performance measurement
Balanced	135	80		
Real Estate				
Private	2,084	600		
Public	188	83		
Real Assets				
Private	380	171		
Public	121	72		
Hedge Funds	901	261		
Multi Asset Class	169	92		
Other (currency, derivatives, etc.)	192	136		
Target Date Funds	1,139	58		
Total	16,459	2,626*		

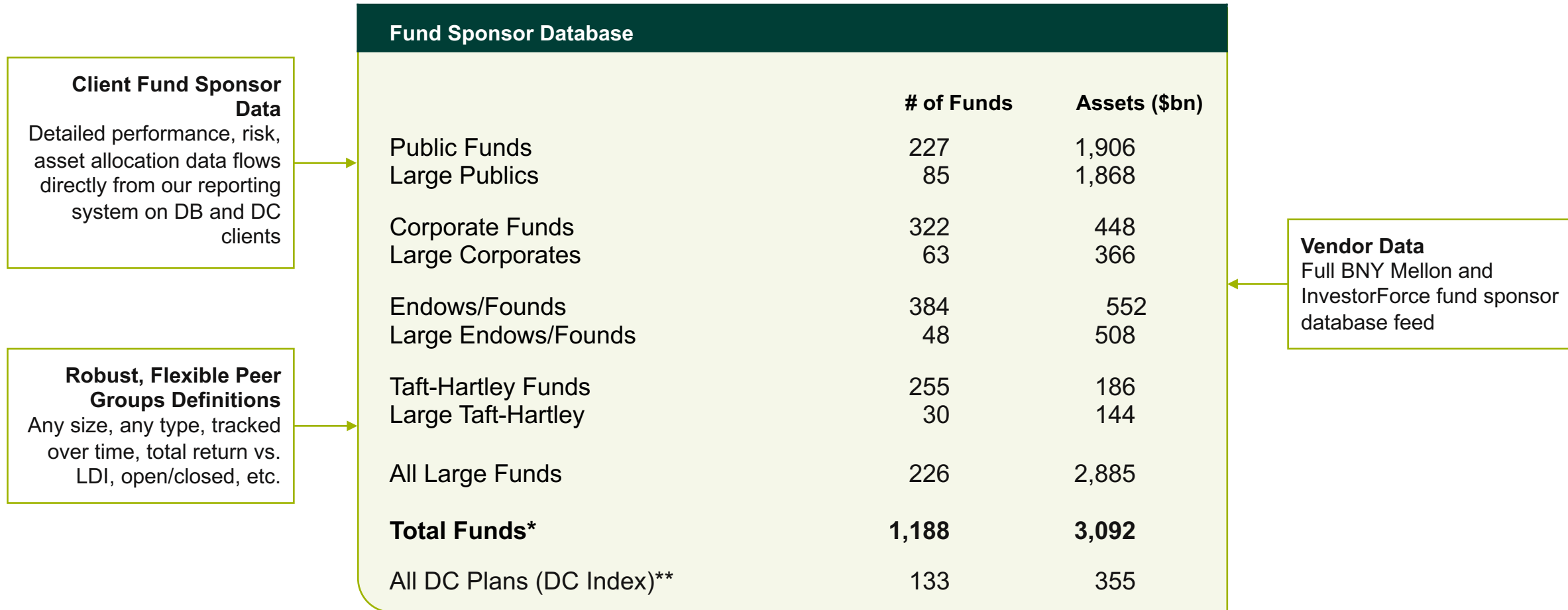
Private Equity Database	
4,719 products	
3,705 managers	

Private Credit Database	
279 products	
175 managers	

Managers are never charged a fee to be in Callan's database.
*Represents Unique Organizations

Proprietary Fund Sponsor Database

Callan has a huge, detailed fund sponsor database with a long history of tracking return, risk, and asset allocation data on a vast array of fund types and sizes.



As of June 30, 2023

Callan's Database of Diverse Managers

Diverse-, women-, and disabled-owned (DWDO) firms

DWDO Firms

By the Numbers

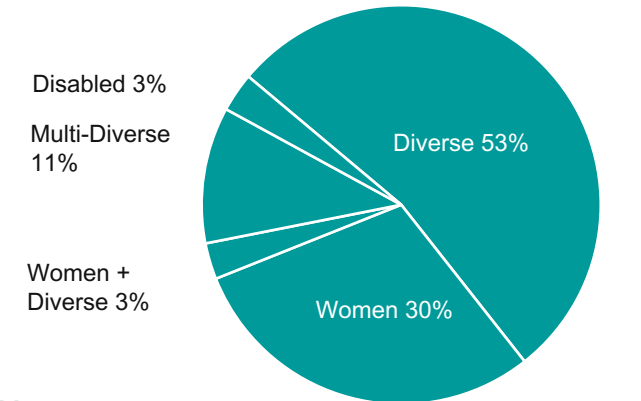
\$41bn	Assets managed by DWDO firms for Callan clients	518	Number of Callan Connects meetings since the program's inception*
55 (28%)	Number of Callan clients utilizing DWDO firms	1282	Number of DWDO strategies within Callan's database
182	Number of Callan meetings with DWDO firms	443**	Number of firms classified as DWDO in Callan's database

As of December 31, 2022, unless another date is indicated.

*Since inception in May 2010

**240+ firms are currently active

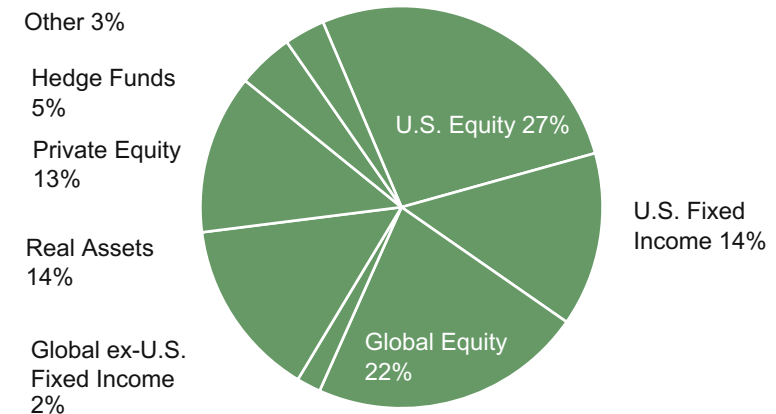
DWDO Firms by Ownership Type*



Diverse

Asian	35%
African American	29%
Hispanic or Latino	20%
Undefined	8%
Two or more races	5%
American Indian & Alaska Native	1%
Native Hawaiian & Pacific Islander	<1%

DWDO Firm Offerings by Broad Asset Class



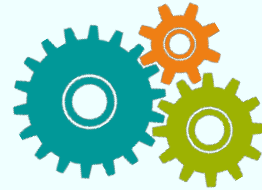
*Can include overlap. Numbers may not sum to 100% due to rounding.

Diversity, Equity & Belonging (DEB)

Education and outreach to diverse and emerging managers

Callan Connects

Launched in 2010, first-of-its-kind program developed by an investment consulting firm



Open to:

- Firms >50% owned by a minority, woman, or disabled-person; no AUM limit
- Emerging firms (<\$3bn in AUM or raising Funds I, II, or III <\$1bn)

30-minute meeting with Callan professionals

- Held quarterly in major U.S. cities (virtual as of March 2020)
 - 518** meetings since inception
 - 247** diverse-owned, **271** emerging
- Representing public equity, fixed income, private equity/debt, hedge funds, real assets and multi-asset class strategies
- Formal research notes maintained for all Callan Connects meetings

Open-door policy for diverse managers



Promoting diverse-, women, and disabled-owned (DWDO) managers is a key tenet of the firm

- Callan has dedicated resources in each asset class to cover diverse and emerging firms
- We actively identify and encourage managers to participate in our database
- Callan includes a DWDO in every client search, where available

182 meetings with diverse managers in 2022

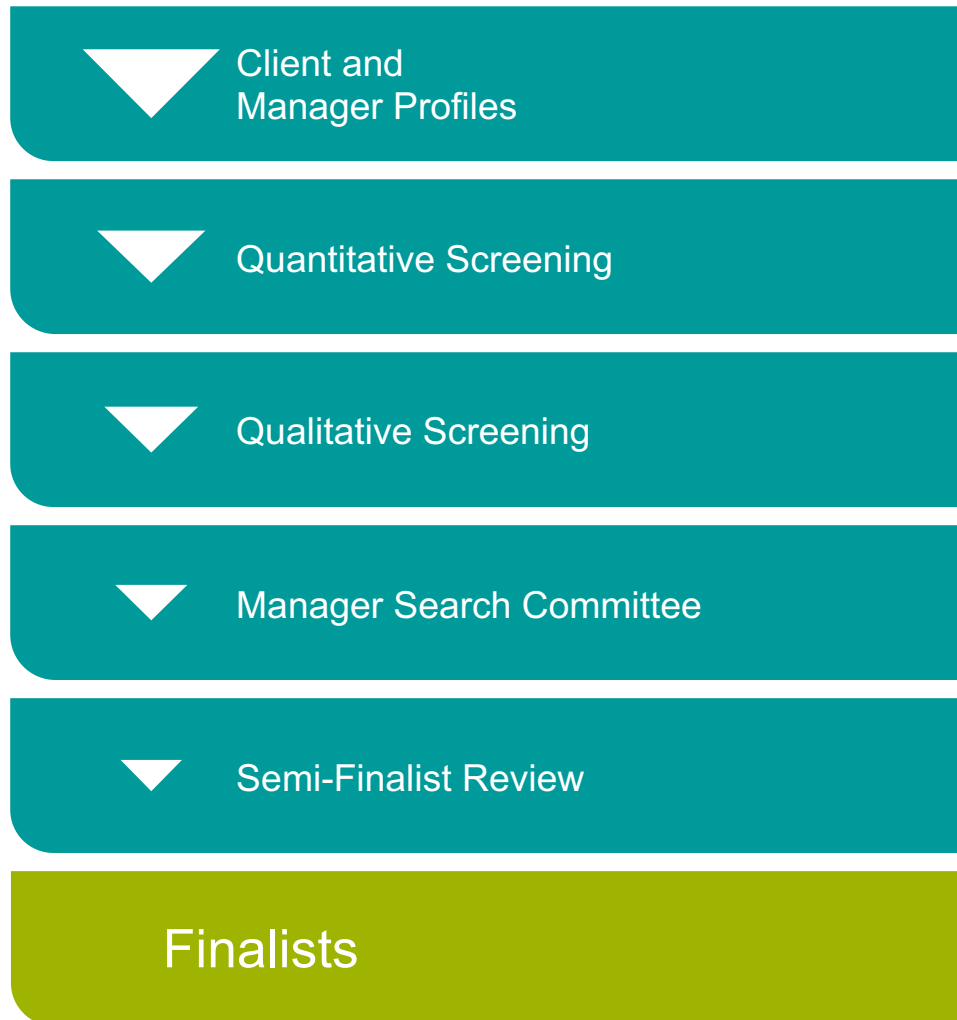
30 diverse firms advanced as semifinalists in our manager search process in 2022

DWDO-focused, free annual workshops on industry best practices

Callan-sponsored attendees at “Callan College”

Manager Search Process Overview

Manager Search Process



The Process:

- Every search starts from scratch, no pre-determined “approved” or “buy” lists
- Backed by extensive due diligence and accumulated knowledge of specialist and generalist consultants
- Disciplined and consistent
- Client driven, customized
- Utilizes peer review—Manager Search Committee to ensure quality control

The Outcome:

- The identification of the managers and products that are the best fit for the investment program and the specific mandate

Client Participation:

- All parts of this process are transparent
- Any part of this process can be used to supplement a client’s existing search process

Public Markets Manager Search and Due Diligence

Qualitative Analysis

Philosophy/Process

What is the firm's investment philosophy and process? Has it remained consistent over time?

How is research conducted and incorporated into the investment process?

Performance

Is there a rational explanation for periods of large out/underperformance?

People/Organization

What are the investment professionals' qualifications and experience?

Have there been any significant changes in ownership, personnel or assets under management?

Portfolio Construction

How are portfolios constructed and what are the parameters?

Quantitative Analysis

Historical Performance

How has strategy performed relative to peers and benchmarks over various measures and time periods? (cumulative, calendar year, rolling periods, rising/declining markets, stylistically extreme periods)

Risk Adjusted Returns

Have the returns generated by the portfolio been in line with the risks being taken?

Portfolio Characteristics

Has the managers' holdings been consistent with their stated style over time?

How do these characteristics compare to peers and to stated benchmarks? Does this help explain historical performance patterns given market environment?

Attribution

What are the sources of relative performance? Is this consistent with stated philosophy, process, and objectives?

Active v. Passive

Active and Passive Management Overview

Passive Management

Passive management offers cheap, broad, diversified exposure to asset classes, typically defined by market-capitalization weighted benchmark indices. Passive portfolios hold securities in the same weight as they represent in the benchmark index and try to minimize any divergences from the benchmark weight.

Passive, or index, exposure makes the most sense in the efficient segments of the capital markets where success with active management has been hard to achieve.

Active Management

Active management seeks to outperform a specified benchmark through active managers deviating from market-capitalization weighted benchmarks.

Callan believes active strategies can provide potential for value-added in less efficient segments of the markets, such as small cap and emerging markets equity, and in fixed income segments such as high yield, as well as where passive is not an option.

Active managers charge fees well in excess of passive mandates.

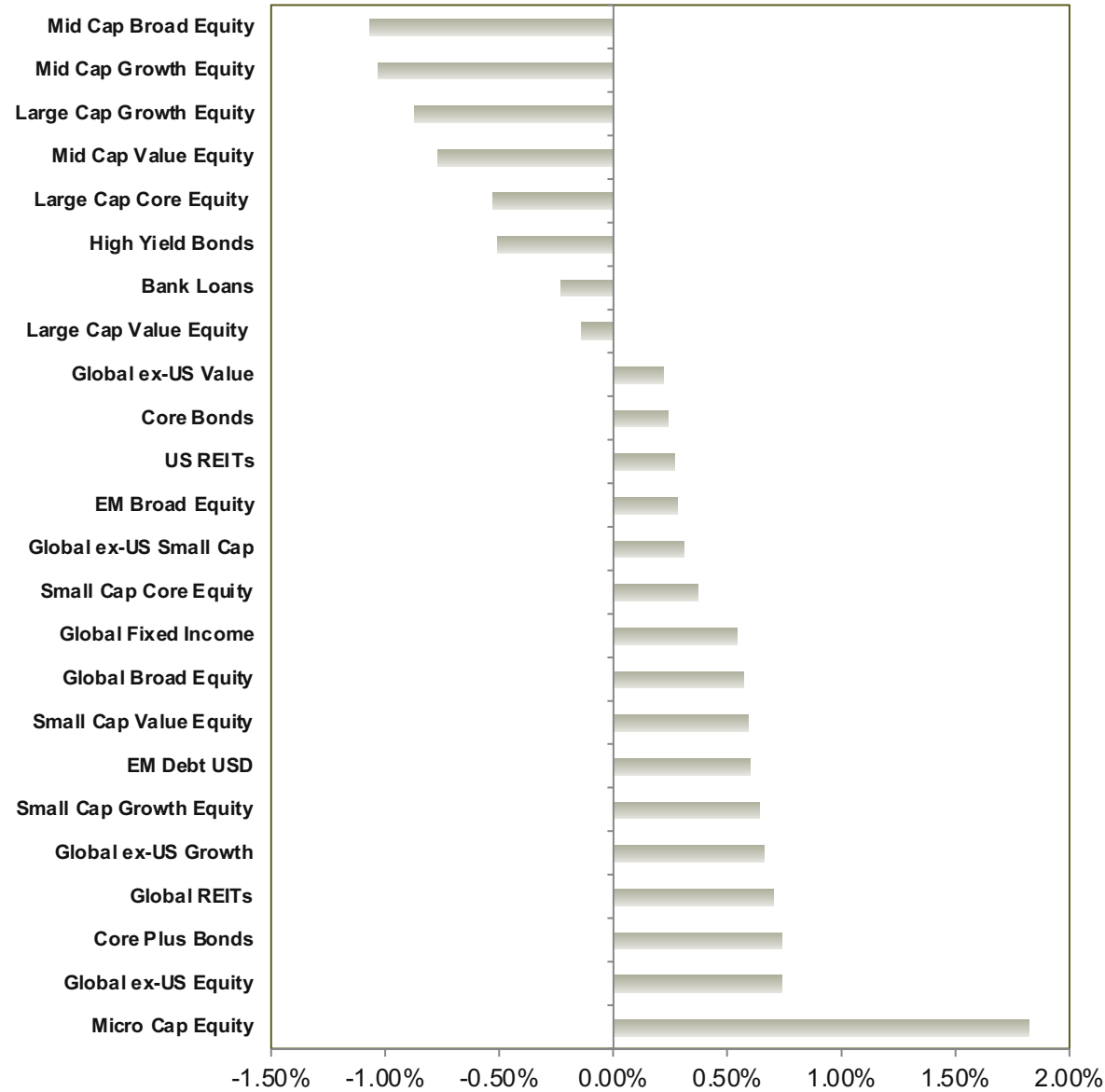
Active and Passive Management Overview

Considerations When Deciding Between Active and Passive Management

- **Size of the asset commitment**
 - **Cost differentials between active and passive management**
 - **Efficiency and liquidity of the market**
 - **Conviction in and the availability of institutional investment products**
 - **Forecasted performance of active and passive management**
- **The exhibit on the following page illustrates how success with active management can differ across asset classes based on data from Callan's manager database.**
 - **This chart shows the average 3-year value added by the median active manager in each asset class over the past 20 years based in Callan's research and peer manager universes through the end of the second quarter of 2023. We then subtract the median active manager fee for each asset class based on what large investors are typically charged for each mandate.**

Active Management Performance Across Asset Classes

Average Net Value Added by Asset Class



Based on June 30, 2023, Callan Active vs Passive analysis; 2021 Investment Management Fee Survey

- **Active management has been a challenge for those asset classes listed at the top of the chart where the average active manager has not exceeded the asset class-specific benchmark on a net-of-fee basis.**
- **Those mandates listed towards the bottom of the chart indicate the average manager has been able to achieve value-added over benchmarks and net of a median fee.**
- **Fixed income, international equity, and small cap US equity are generally viewed as asset classes where active management has had more success.**

Appendix

Education & Research

Education & Research

A Complete Listing of Research is Available at www.callan.com

Research Papers and Quarterly Newsletters

Fixed Income in a Low-Yield Environment
A Roundtable Discussion with Callan's Bond Experts

The headlines on credit and fixed income markets are everywhere. But in reality, the likelihood of a meaningful decline in interest rates is far less than that of an increase. In this roundtable, experts discuss the historical significance of the low yield environment, the impact of QE on government and corporate bond markets, and the implications for investors across the U.S. Fixed income experts also discuss the impact of the Fed's actions on a global scale.

Callan's research, our analysis and roundtable discussion provides investors with the latest insights on fixed income markets and how to navigate the current environment. Roundtable participants include: Brian Dunbar, Managing Director, Fixed Income; Kevin O'Brien, Managing Director, Fixed Income; and John G. Smith, Managing Director, Fixed Income.

What did 2015 mean for investors seeking "meaningful" allocations?

The 2015 market environment has been a challenging one for investors. While many have seen their portfolios in a state of flux, the market has shown signs of recovery. This report provides insights on how to navigate the current environment and what to expect for the future.

Tight Spreads
As a result of the Fed's actions, spreads have tightened significantly. This report discusses the implications of this trend and how investors should adjust their portfolios.

Direct Market Quarterly Returns
This report provides a detailed analysis of quarterly returns for various asset classes, including equities, fixed income, and alternatives.

Global Outlook
This report provides a comprehensive overview of the global economic landscape, including key trends and forecasts for major economies.

U.S. Equities Boost
This report discusses the factors driving the recent rally in U.S. equities and provides insights on how to capitalize on this trend.

Conference/Workshop Presentations and Event Summaries

Strategically Tactical Investing
Thirty-Third National Conference

January 28 - 30, 2013
San Francisco, CA

Greg Allen, President and Director of Research
Kevin O'Brien, CFA, Senior Vice President and Head of Chicago Fund Sponsor Cores

Event Summary

Thirty-Third National Conference
January 28 - January 30, 2013
Palms Hotel
San Francisco

Callan Insights

Callan Insights

Insight Investment Announces Senior PM Departure

Insight Investment has announced the departure of Senior Portfolio Manager Jesse Fogarty. Fogarty was responsible for the US investment grade corporate sector while serving as lead portfolio manager for US-focused credit mandates.

Fogarty's direct portfolio management responsibilities will transition to Andrew Catalan, Senior Credit Portfolio Manager and Head of Long Duration.

Dario Buechi

Charticles and Periodic Tables

Going Global?
How do U.S. Pension Plans Invest? Investable Universe (\$50 Billion)

How Do U.S. Pension Plans Invest?
85% Domestic, 15% Other

How Do Others Invest?
85% Domestic, 15% Other

Country Concentration of Investments (in a percentage)

The Callan Periodic Table of Investment Returns
Annual Returns for Key Indices Ranked in Order of Performance (1993-2012)

The Callan Periodic Table of Investment Returns displays the strong case for alternative assets. Most classes (other than bonds) investment style (growth vs. value), capitalization (large vs. small), and region (US vs. International). The Table highlights the consistency of returns in all major markets. Rankings change every year. Also, it reveals the difference between absolute and relative performance. We return for the top performing asset class (over a 20-year period).

Surveys and Quarterly Data Reports

Defined Contribution Trends
Retiree Rg. and Looking

Inside Callan's Database
Fund Sponsor Allocations and Active Manager Comparisons

Third Quarter 2013

Client Specific Notification

Memorandum

To: Investment Staff Florida Prepaid College Board
From: Winston Lewis, CFA, CAA & Brian Smith, CFA
Date: May 15, 2013
Subject: US Mid Cap Opportunistic Value Equity - The Boston Company

The purpose of this memo is to provide an update on US Mid Cap Opportunistic Value Equity including the announced organizational merger, presentation of One Capital's Active Equity (OC) model performance and outlook. On April 27, 2013 Winston Lewis and Brian Smith conducted an on-site due diligence visit with the Opportunistic Investment team in Boston, Massachusetts. Participants included One Capital, James Boyd, Dale Dulin, Brian Duncan, Raphael Lewis, Michael Arends, and Kristen Fontana (consultant relations).

Callan Opinion

- Callan believes the consolidation of The Boston Company and Standish into Mellon Capital to form BNY Mellon Asset Management North America warrants caution.
- Team leadership across business and investment management functions combined with organizational integration and cost rationalization creates uncertainty.
- An Active Equity OC One Capital's additional management responsibilities combined with local decision-making authority across multiple investment strategies could prove to be a distraction and weigh on performance results.
- Today, One Capital is supported by a well-resourced, experienced and talented investment team, and we believe the Opportunistic investment process is disciplined and repeatable.
- Although Florida Prepaid's trailing three- and five-year gross of fee results rank bottom-quartile relative to peers and lag the peer Active Equity fund to CFAI and CFAI peers, respectively, the magnitude of short-term relative underperformance is within historical norms of the composite.

Pros

- Despite weak relative performance in 2012, US Mid Cap Opportunistic Value's long term results remain strong. Over the five periods, the composite ranks top-quartile versus peers and has added 60 basis points relative to the S&P 500 Mid Cap Index per annum. Over the last 15 years, it ranks top-quartile and has generated 222 basis points in annualized excess return. Stock selection has been the primary contributor of relative performance.
- US Mid Cap Opportunistic Value is actively managed (conviction-weighted, 70-90% turnover) which results in a large amount of tracking error versus the index. A high risk tolerance and long time horizon is required to realize the strategy's long term excess return potential.

Cons

- US Mid Cap Opportunistic Value is actively managed (conviction-weighted, 70-90% turnover) which results in a large amount of tracking error versus the index. A high risk tolerance and long time horizon is required to realize the strategy's long term excess return potential.

Options for Consideration

- Include an ITN with the option to waive
- Contract and control agreement

Summary Conclusion

BNY Mellon M&A's action of organizational and personnel change alone could justify taking action. However, Callan is confident that One Capital remains a talented and skilled investment professional, and that the investment process is disciplined and repeatable, consistent with requirements and a commitment to the long term on the product side and focus through bouts of short-term performance cycles.

Published Research Highlights from 2Q23

2023 Private Credit Fees and Terms Study



The Critical Underlying Technology Behind Digital Assets: A Primer for Institutional Investors



Understanding the DNA of the U.S. Life Sciences Sector



Research Café: ESG Interview Series Session



Recent Blog Posts

Biodiversity: A Relatively New Theme for ESG-focused Investors

Kristin Bradbury

How Your Public DB Plan's Returns Compare

Public DB Plan Focus Group

How to Improve DC Plans with DEI

Jana Steele

Additional Reading

Alternatives Focus quarterly newsletter

Active vs. Passive quarterly charts

Capital Markets Review quarterly newsletter

Monthly Updates to the Periodic Table

Market Pulse Flipbook quarterly markets update

Real Estate Indicators market outlook

Callan Institute Events

Upcoming conferences, workshops, and webinars

Callan College

Intro to Alternatives

This course is for institutional investors, including trustees and staff members of public plans, corporate plans, and nonprofits. This session familiarizes trustees and staff with alternative investments like private equity, hedge funds, and real estate and how they can play a key role in any portfolio. You will learn about the importance of allocations to alternatives and how to consider integrating, evaluating, and monitoring them.

- February 15-16, 2023 – Virtual Session via Zoom

Intro to Investments—Learn the Fundamentals

This course is for institutional investors, including trustees and staff members of public plans, corporate plans, and nonprofits. This session familiarizes trustees and staff with basic investment theory, terminology, and practices.

- March 1–2, 2023 – In-Person Session – Chicago

- May 23–25, 2023 – Virtual Session via Zoom

Please visit our website at callan.com/events-education as we add dates to our 2023 calendar!

Mark Your Calendar

2023 National Conference

April 2–4, 2023
Scottsdale, Arizona

2023 Regional Workshops

June 27, 2023 – Denver
June 29, 2023 – San Francisco

October 24, 2023 – New York
October 26, 2023 - Chicago

Watch your email for further details and an invitation.

Webinars & Research Café Sessions

Research Café: ESG Interview Series

February 23 , 2023 – 9:30am (PT)

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