



City of Milwaukee
Employees' Retirement System

Bernard J. Allen
Executive Director

David M. Silber, CFA, CAIA
Chief Investment Officer

Melody Johnson
Deputy Director

November 5, 2021

Mr. Jim Owczarski
City Clerk
Room 205, City Hall

Dear Mr. Owczarski:

Please be advised that an Investment Committee Meeting of the Annuity and Pension Board has been scheduled for **Thursday, November 11, 2021 at 9:00 a.m.** This meeting will be conducted via teleconference.

Special Notice: Instructions for the public on how to observe the meeting will be available on the ERS's website (www.cmers.com) prior to the meeting.

The agenda is as follows:

Please be advised that the Investment Committee may vote to convene in closed session on the following items (I., II., and III.) as provided in Section 19.85(1)(e), Wisconsin State Statutes, to deliberate or negotiate the purchasing of public properties, the investing of public funds, or conducting other specified public business, whenever competitive or bargaining reasons require a closed session. The Investment Committee may then vote to reconvene in open session following the closed session.

- I. Callan Real Estate Presentation.
- II. Callan Hedge Fund of Funds Manager Search Update.
- III. Approval of Hedge Fund of Funds Manager Search Finalists.
- IV. Callan Fixed Income Portfolio Structure Study Presentation.
- V. Approval of Fixed Income Structure.
- VI. Abbott Capital Due Diligence Report.
- VII. 3rd Quarter 2021 Performance Report.

Sincerely,

Bernard J. Allen
Executive Director

BJA:jmw

November 11, 2021



City of Milwaukee Employees' Retirement System

Fixed Income Portfolio Structure
Study

John Jackson, CFA

Senior Vice President, Chicago Fund Consulting

Michael Joecken

Senior Vice President, Chicago Fund Consulting

John Pirone, CFA, FRM, CAIA

Senior Vice President, Capital Markets Research

Callan

Introduction and the Role of Fixed Income

CMERS' Current Target Asset Allocation

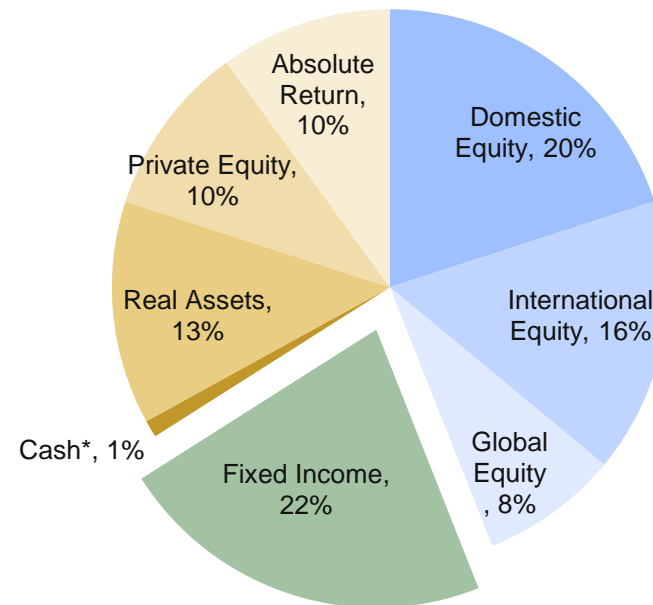
Target asset allocation is structured such that fixed income and alternatives diversify public equity exposure

Overall policy allocation to fixed income is 23%, with 1% of overall policy allocated to cash for plan liquidity purposes

Our study focuses on how to allocate the 22% fixed income policy allocation excluding cash

This fixed income allocation is benchmarked to the Bloomberg Aggregate Index

Current Target Asset Allocation



* Cash excluded from structure analysis

Callan 2021 – 2030 Capital Market Assumptions

Asset Class	Index	Expected 10-Year Return ¹	Standard Deviation
Equities			
Global Equity	55% US Equity / 45% Non-US Equity	6.85%	18.25%
Large Cap U.S. Equity	S&P 500	6.50%	17.70%
Small/Mid Cap U.S. Equity	Russell 2500	6.70%	21.20%
Developed ex-U.S. Equity	MSCI World ex USA	6.50%	19.70%
Emerging Market Equity	MSCI Emerging Markets	6.90%	25.70%
Private Equity	Cambridge Private Equity	8.00%	27.80%
Fixed Income			
CMERS Fixed Income	62.5% Aggregate / 37.5% High Yield	2.95%	4.55%
Core U.S. Fixed	Bloomberg Barclays Aggregate	1.75%	3.75%
High Yield	Bloomberg Barclays High Yield	4.55%	10.25%
Cash Equivalents	90-Day T-Bill	1.00%	0.90%
Real Assets			
CMERS Real Assets	70% Real Estate / 30% Real Assets	5.50%	12.00%
Core Real Estate	NCREIF ODCE	5.75%	14.00%
CMERS Liquid Real Assets	50% Large Cap / 35% TIPS / 15% Commod	4.55%	9.95%
TIPS	Bloomberg Barclays TIPS	1.55%	5.05%
Commodities	Bloomberg Commodity	1.50%	18.00%
Absolute Return			
CMERS Absolute Return		2.80%	4.95%
Inflation	CPI-U	2.00%	1.50%

¹ - Expected 10-year annualized return over 2021 to 2030

In the most recent asset/liability study, the CMERS' Fixed Income allocation was modeled with an expected return premium relative to the Barclays Aggregate. This expected return premium is currently 1.20%. Asset class risk (standard deviation) is higher as well than the Barclays Aggregate.

Current Fixed Income Structure

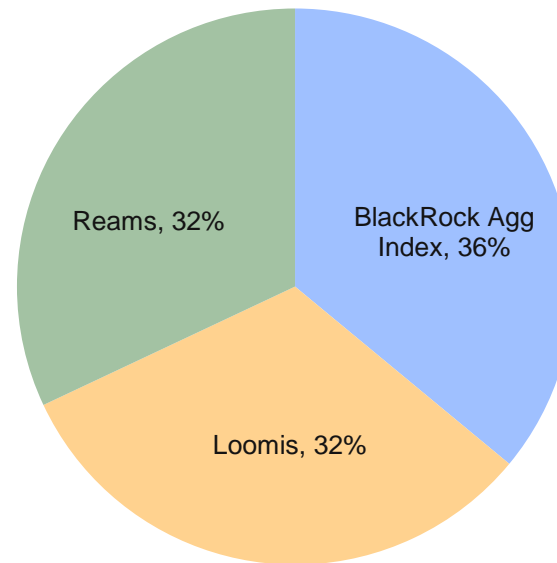
The current target structure employs two core plus active managers and a passive manager

Loomis Sayles combines top-down sector rotation with credit selection and makes large bets relative to the Bloomberg Aggregate Index

Reams has a larger emphasis on forecasting interest rate direction and is more benchmark aware than Loomis

BlackRock passively manages to the Bloomberg Aggregate Index

Current Fixed Income Structure



Fixed Income Structure Considerations

1) Is a 32% allocation to Loomis Sayles too aggressive?

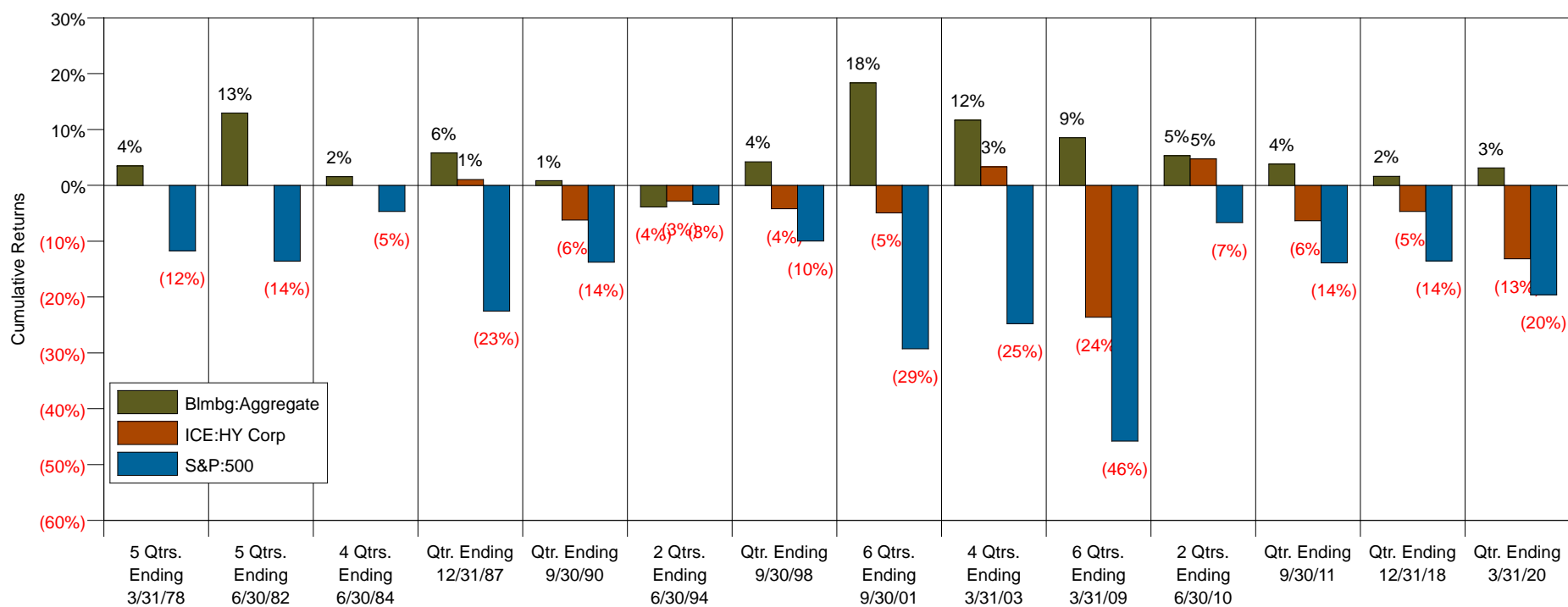
- Loomis is a higher risk manager with material credit exposure
- Its returns are highly correlated with the behavior of the equity market
- However, Loomis has been a strong driver of historical returns

2) Does the plan need to have 36% in indexing?

- The empirical results for active management in fixed income are favorable
- Transitioning index exposure into a new core manager could increase return without materially changing the plan's risk profile though this could impact liquidity in market crises
- Transitioning index exposure from the Aggregate index to the Government index would provide better flight-to-quality characteristics as well as superior liquidity which could free up capital to invest more in active management

An Illustration of the Role of Fixed Income

Role as the “Anchor to Windward” – Fixed Income Performance in Declining Equity Environments



Typically, 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

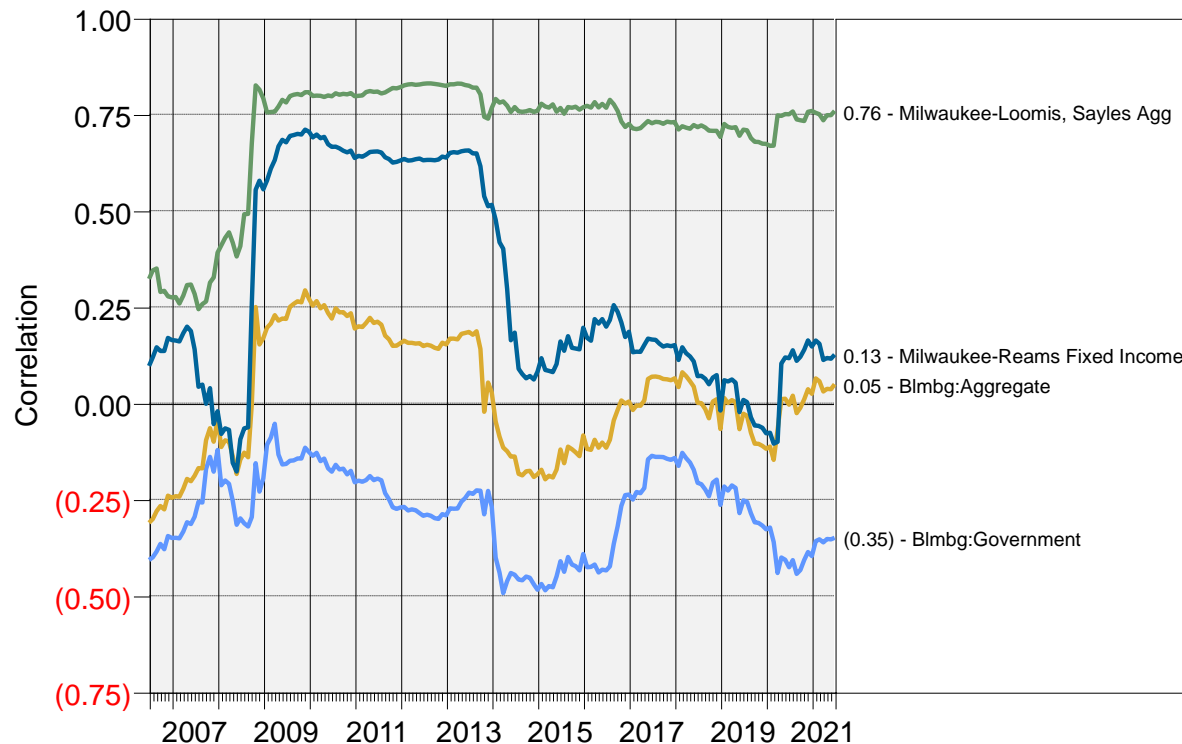
High yield credit does not fulfill the role of anchor, but can be introduced alongside the anchor to seek additional return

Inception of Merrill Lynch US High Yield Master II index is 4Q1986

A Closer Look at Fixed Income Diversification with Equity

Role as the “Anchor to Windward”

Rolling 60 Month Correlation Relative To MSCI:ACWI
for 15 Years Ended June 30, 2021



Greater
diversification
with equity

Loomis has historically had a high correlation with equity as it invests heavily in credit

Reams, in recent years, has had a modest correlation with equity, though it exhibited higher correlation during the Global Financial Crisis

The Bloomberg Government Index, which removes corporate and securitized issuance from the Bloomberg Aggregate Index, has a significantly lower correlation with equity than Aggregate which suggests it could be a superior portfolio “anchor”

Fixed Income Strategies

Descriptions, Pros and Cons

Core: Attempts to add modest amounts of value over the return of the Bloomberg Aggregate index with limited tracking error

Pros

- Expectation of value added by modest interest rate, sector, and security management
- Low tracking error

Cons

- Outperformance over the index can be difficult to achieve net of fees
- Active core managers can underperform during times of equity market stress due to low Treasury allocations

Purpose: Stability of Income/Diversification vs. Equity/Low Default Risk

Core Plus: Attempts to add value over the Bloomberg Aggregate with relatively high tracking error due in part to the use of non-index securities such as low quality credit or global bonds

Pros

- Managers have generally added value net of fees
- Use tactical allocation when valuations are attractive

Cons

- Higher tracking error than Core
- Non-index securities tend to have higher correlations to equities limiting potential diversification vs. equities

Purpose: Total Return

Loomis, as a more aggressive manager with material credit exposure, is core plus
Reams has historically been somewhat more conservative, but still considered core plus
Adding a core manager could make the portfolio more “anchor-like”

Callan

CMERS Fixed Income Structure Analysis

Introduction to the Proposed Mixes

Manager	6/30 MV (\$mm)	Current	Mix 1: Agg	Mix 1: Govt	Mix 2	Mix 3
BLK Agg Index	\$478	36%	25%			
Reams	\$397	32%	25%	25%	35%	45%
Loomis	\$410	32%	25%	25%	15%	30%
Govt Index				25%	25%	25%
New Core Manager			25%	25%	25%	
	\$1,285	100%	100%	100%	100%	100%

Mix 1 Agg: Includes a new core manager to diversify the structure and equally weights the four managers

Mix 1 Govt: Shifts index exposure to the Government Index to provide improved flight-to-quality characteristics, and includes a new core manager to the diversify the structure

Mix 2: Seeks to improve risk-adjusted returns by reducing Loomis, incorporating a new core manager, and shifting index exposure to the Government Index

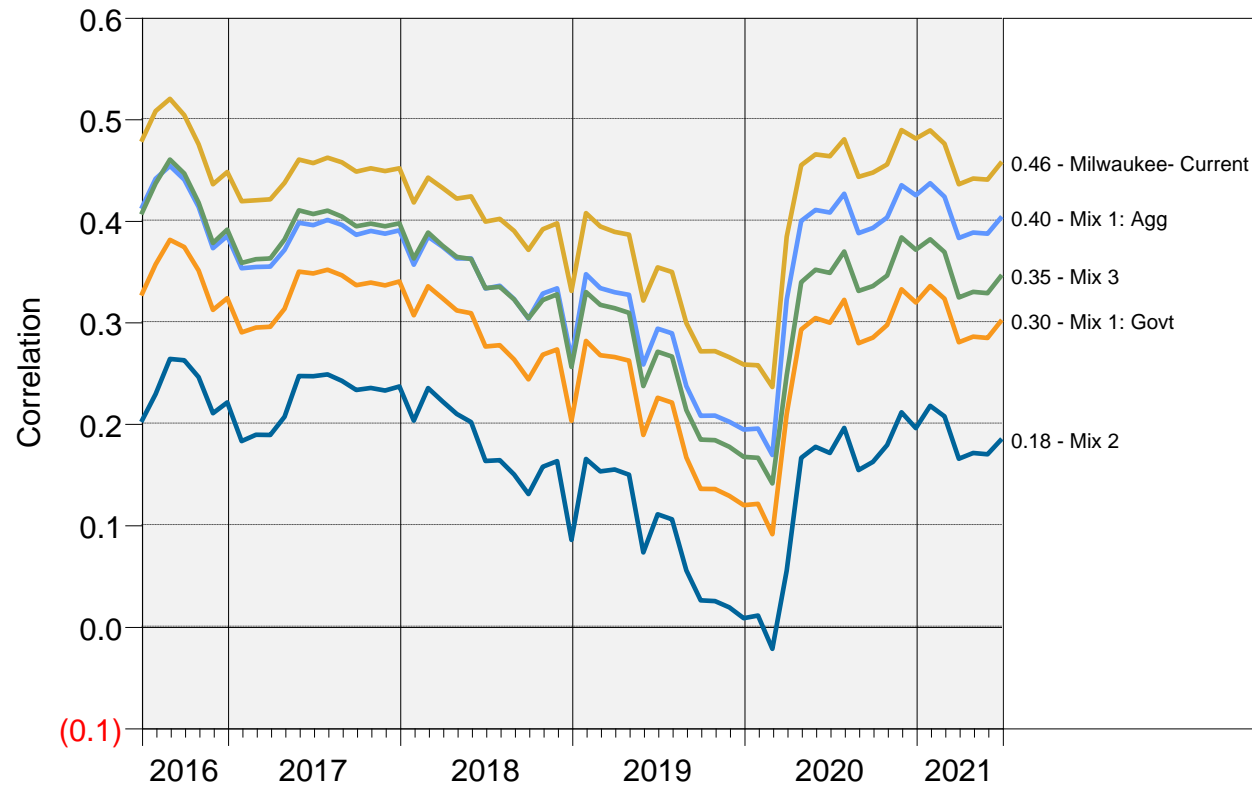
Mix 3: Allocates 75% to the two current active managers with a 25% anchor to the Government Index

Structures are evaluated across variety of criteria important to CMERS including:

- Ability to diversify the plan's equity exposure
- Tracking error relative to the Aggregate Index. Tracking error assesses the magnitude of the structure's potential out- or underperformance.
- Historical outperformance relative to the Aggregate Index
- Information ratio assesses the risk-adjusted return of the structure. Information ratio is defined as historical outperformance divided by tracking error.
- Ability to provide liquidity in periods of market stress

Mix Diversification with Equity

Rolling 60 Month Correlation Relative To MSCI:ACWI
for 5 Years Ended June 30, 2021

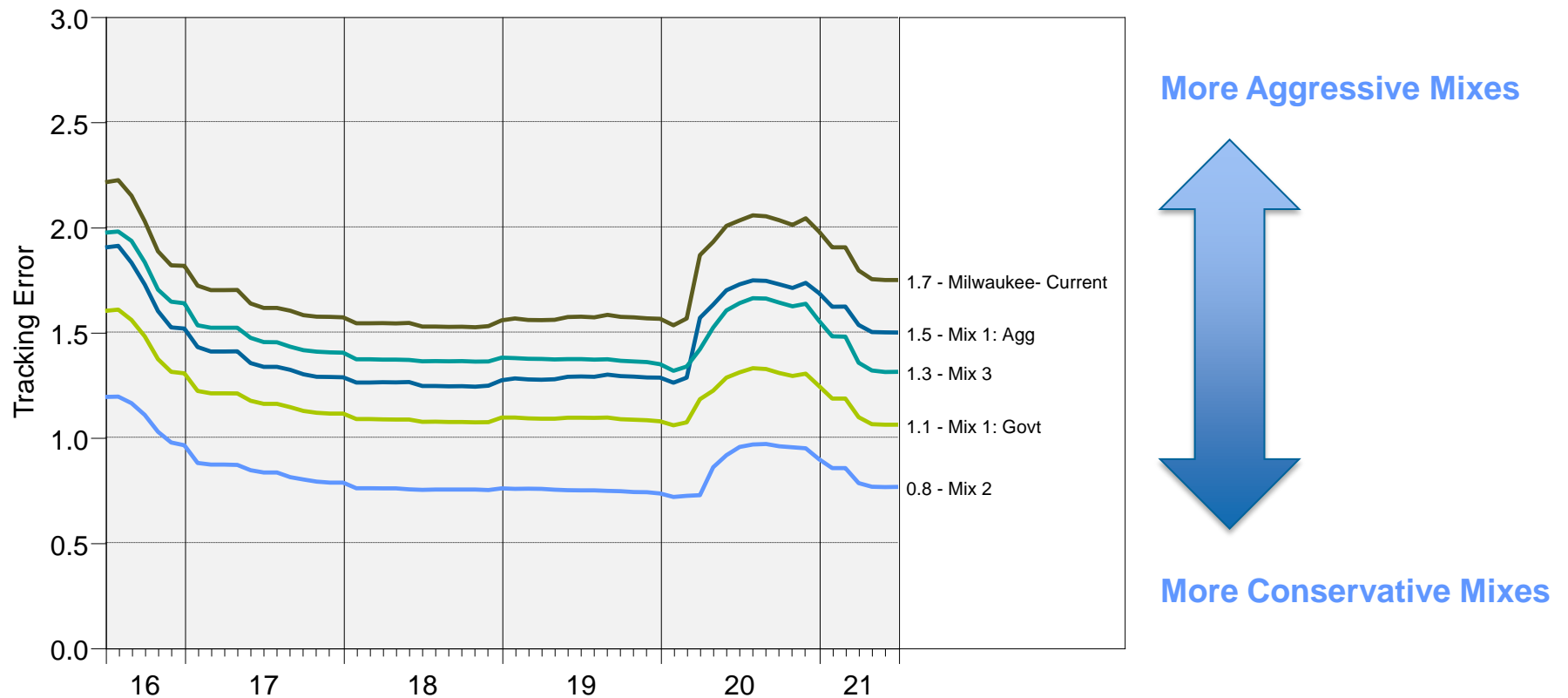


All candidate mixes provide greater equity diversification than the current structure

- Mix 2 is the most diversifying as Loomis is reduced to 15%
- Transitioning the Aggregate index to the Government index (Mix 1) provides greater equity diversification
- In Mix 3, transition of Aggregate index to the Government index also improves equity diversification

Tracking Error of the Mixes

Rolling 60 Month Tracking Error Relative To Blmbg:Aggregate
for 5 Years Ended June 30, 2021

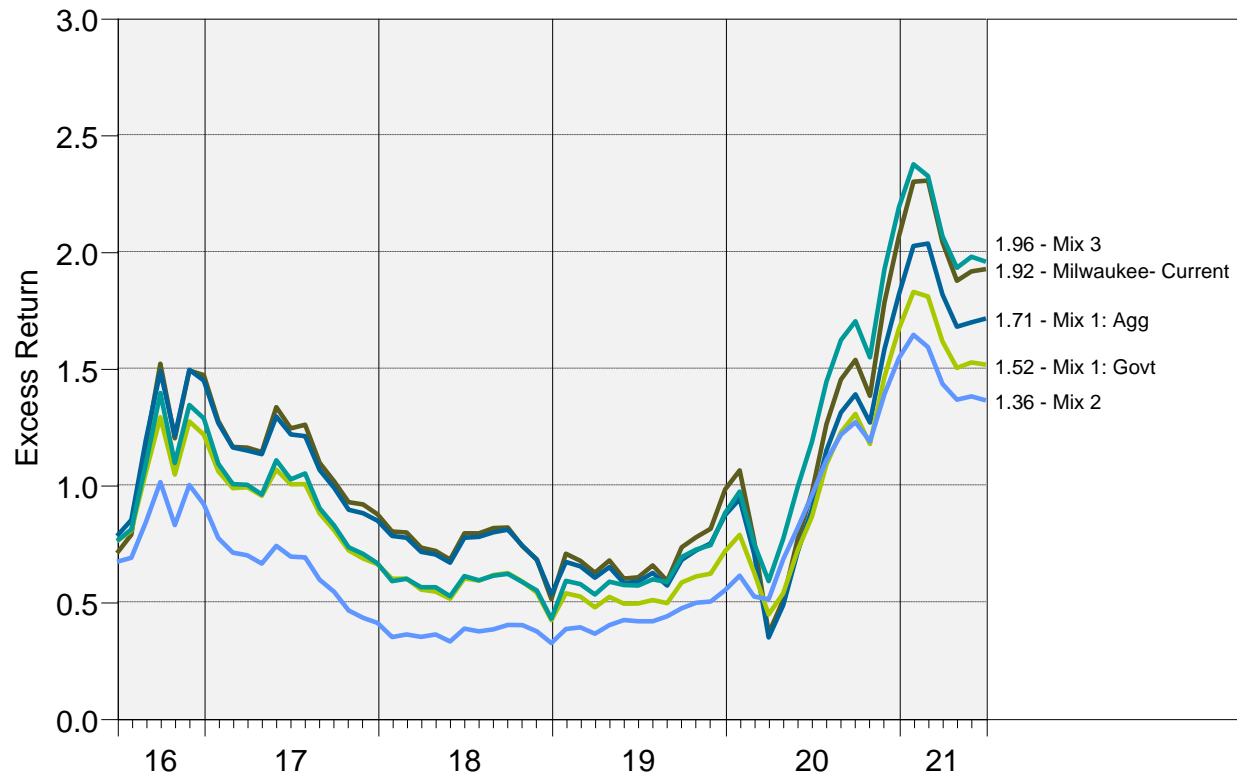


All candidate mixes have a lower tracking error than the current structure

- Equal weighting (Mixes 1 Agg and Gov't) lowers the core plus allocation to 50%. The Government index provides superior risk reduction than the Aggregate index
- Mix 2 is the most conservative, with core plus reallocated to 35% Reams and 15% Loomis
- Mix 3 reduces index to 25% while still lowering tracking error

Mix Historical Performance

Rolling 60 Month Excess Return Relative To Blmbg:Aggregate
for 5 Years Ended June 30, 2021



Lowering the core plus allocation has impacted return on an historical basis

- Mix 2 is most conservative and has the lowest outperformance relative to the plan's Aggregate benchmark
- Mix 3's historical performance is line with the current structure in recent years
- Focusing on Mix 1, transitioning from the Aggregate index to the Government index has incrementally reduced performance because the Government index does not have credit or securitized bonds

Summary of Mix Characteristics and the Case for Each Mix

Manager	6/30 MV (\$mm)	Current	Mix 1: Agg	Mix 1: Govt	Mix 2	Mix 3
BLK Agg Index	\$478	36%	25%			
Reams	\$397	32%	25%	25%	35%	45%
Loomis	\$410	32%	25%	25%	15%	30%
Govt Index				25%	25%	25%
New Core Manager			25%	25%	25%	
	\$1,285	100%	100%	100%	100%	100%

Historical Excess Rtn vs. Agg	2.0%	1.7%	1.5%	1.4%	2.0%
Tracking Error vs. Agg	1.8%	1.5%	1.1%	0.8%	1.3%
Historical Information Ratio	1.1	1.1	1.4	1.8	1.5

Estimated Tier 1 Liquidity (\$mm)	377	280	391	391	391
Correlation with Equity (ACWI)	0.46	0.40	0.30	0.18	0.35

The current mix has performed very well historically and remains a solid choice.

All the candidate mixes have a lower correlation with equity than the current portfolio, and so can be expected to provide greater equity diversification.

All candidate mixes also have greater liquidity than the current portfolio, with the exception of Mix 1: Agg

- **Mix 1 Agg** adds a new core manager to further diversify the structure and improves equity diversification. It is more conservative than the current structure and therefore may not generate as much outperformance.
- **Mix 1 Govt** increases equity diversification and improves liquidity but may slightly underperform Mix 1: Agg
- **Mix 2** is the most conservative mix with the best historical risk-adjusted return (information ratio) and best equity diversification. It has the lowest historical outperformance relative to the plan's Aggregate benchmark.
- **Mix 3** has attractive characteristics across all dimensions. 75% core plus active and 25% index in the Gov't index.

Statistics based on past five years. See the Appendix for detail on estimated Tier 1 liquidity calculation.

Callan

Appendix

Detail on Estimated Tier 1 Liquidity Calculation

Blackrock Aggregate Index: Tier 1 assets assumed to be 2/3 of market value, consistent with the 2020 asset/liability study.

Reams and Loomis: These core plus managers are modeled as having 0% Tier 1 assets, consistent with the 2020 asset/liability study.

Government Index: Tier 1 assets assumed to be 100% of market value. Using the Government Index allows for the portfolio to retain its current Tier 1 liquidity at a lower overall allocation to indexing.

Core Manager: Currently modeled as 0% Tier 1 given ideally do not want to liquidate when credit spreads are wide. In practice this is likely a conservative assumption.

Each manager's contribution to Tier 1 liquidity is calculated by multiplying \$1,323mm (22% fixed income ex-cash policy target * 6/30 plan size of \$6,013mm) by the manager's percentage weight and the Tier 1 liquidity factor

The strategic cash allocation of \$60mm (1% of the plan's \$6B MV) is also added to each mix's Tier 1 liquidity calculation

Example: Current policy portfolio estimated liquidity of \$377mm is calculated as:

$(\$1,323\text{mm}) * (36\% \text{ Allocation}) * (2/3 \text{ Tier 1 liquidity factor}) + \$60\text{m from cash allocation} = \377mm

Fee Calculations

Manager	Current	Mix 1: Agg	Mix 1: Govt	Mix 2	Mix 3
BLK Agg Index	\$ 80,955	\$ 56,219	\$ -	\$ -	\$ -
Reams	561,200	471,250	471,250	599,750	728,250
Loomis	666,800	531,875	531,875	339,125	628,250
Govt Index	\$ -	\$ -	\$ 56,219	\$ 56,219	\$ 56,219
New Core Manager		\$ 385,500	\$ 385,500	\$ 385,500	\$ -
Annual fees	\$ 1,308,955	\$ 1,444,844	\$ 1,444,844	\$ 1,380,594	\$ 1,412,719
Fees/assets	0.10%	0.11%	0.11%	0.11%	0.11%

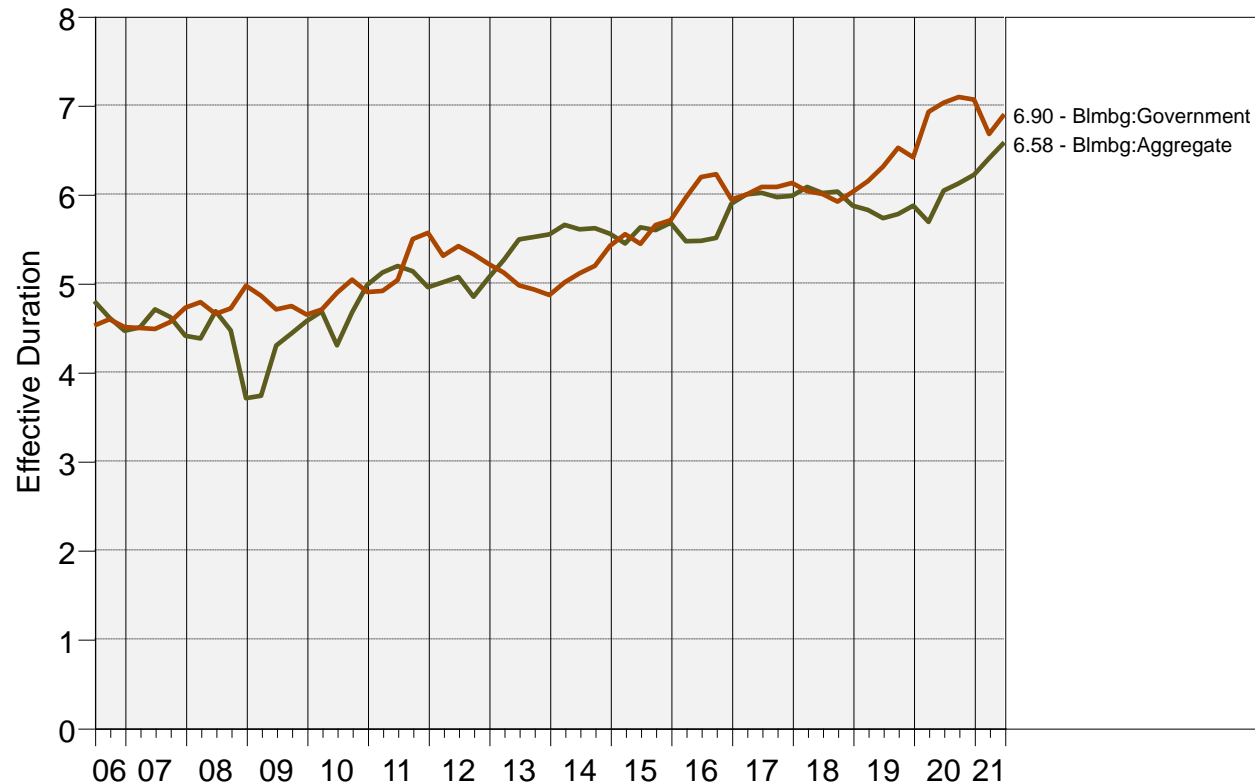
Management fees for current managers based on CMERS actual fee schedules

Management fees for Government index same as Aggregate index per CMERS fee schedule

Management fees for Candidate Core manager estimated at 12 bps

Duration Comparison of the Aggregate and Government Indices

Effective Duration
for 15 Years Ended June 30, 2021

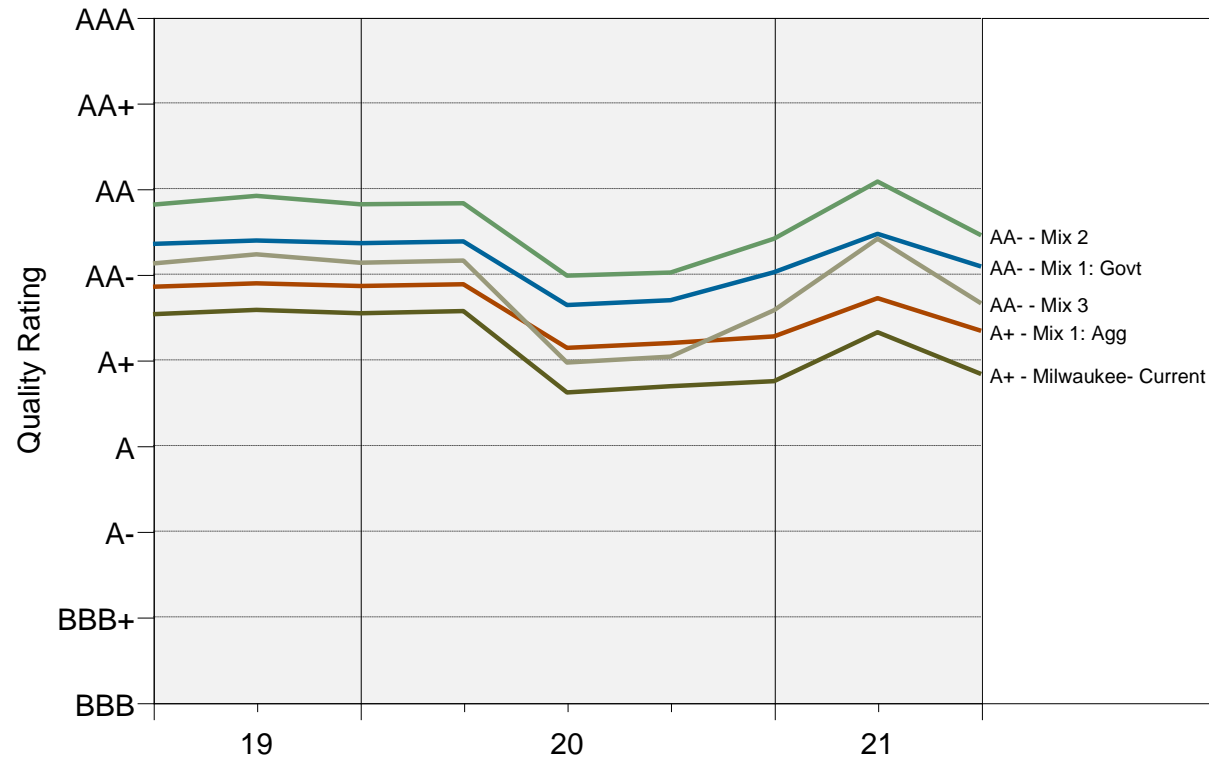


The two indices have very similar duration profiles over time

As all mixes have only a modest percentage allocation in indexing, the impact of an index transition on overall portfolio interest rate sensitivity is minimal

Comparison of Mix Credit Quality

Quality Rating
for 2 Years Ended June 30, 2021



The current portfolio has the lowest credit quality, though still well within investment grade territory

Moving from the Agg to the Gov't index in Mix 1 improves portfolio credit quality from A+ to AA-, as the Government index is 100% AAA

Active vs. Passive Management Historical Results

Fixed Income Style	20-Year Rolling Average Annualized 3-Year Excess Return (gross-of-fees) - Median Manager
Core	0.37%
Core Plus	0.78%

Active management should be considered when it is believed that the investor will be compensated for the added risk, net of fees

Period ending 6/30/21

Core Bond Style vs. Bloomberg Barclays Aggregate

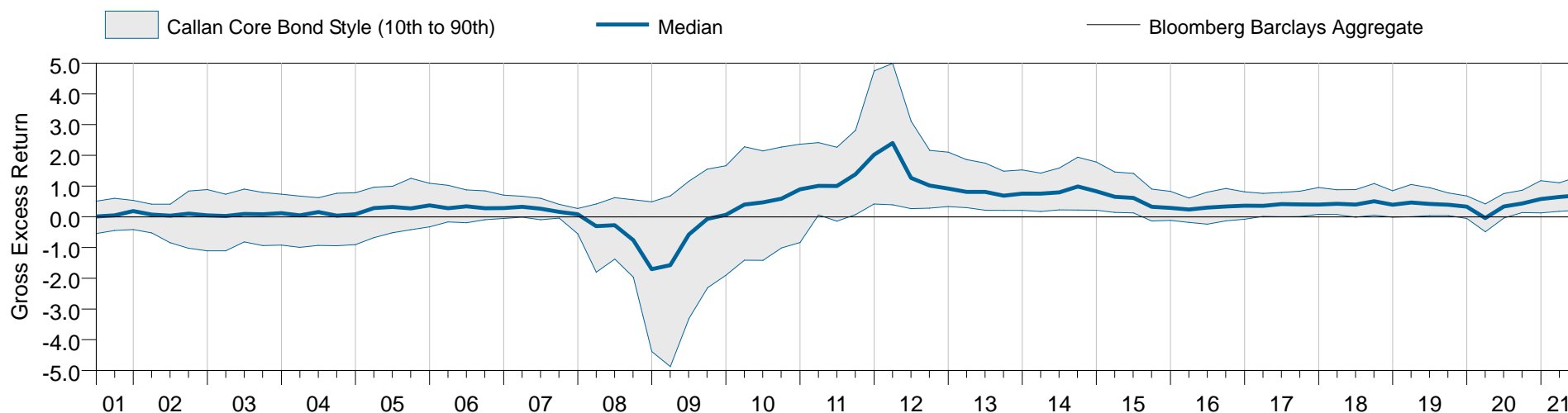
How often Manager Beat Benchmark by more than Fee Hurdle in Rolling 3-Year Periods over last 20 Years

Fee Hurdle	0.20%	0.25%	0.30%	0.35%	0.40%	0.45%	0.50%	0.55%	0.60%	0.65%
Median	69%	68%	58%	49%	39%	33%	30%	29%	26%	24%
45th Percentile	71%	70%	66%	59%	50%	36%	35%	33%	31%	28%
40th Percentile	79%	73%	70%	66%	60%	49%	41%	33%	31%	30%
35th Percentile	86%	80%	75%	68%	65%	59%	51%	44%	36%	31%
30th Percentile	91%	86%	80%	73%	69%	65%	61%	55%	45%	45%
25th Percentile	95%	93%	86%	81%	75%	73%	69%	64%	59%	50%

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

0.37%

Rolling 3-Year Gross Excess Return relative to Bloomberg Barclays Aggregate for 20 Years ended June 30, 2021



Core Plus Bond Style vs. Bloomberg Barclays Aggregate

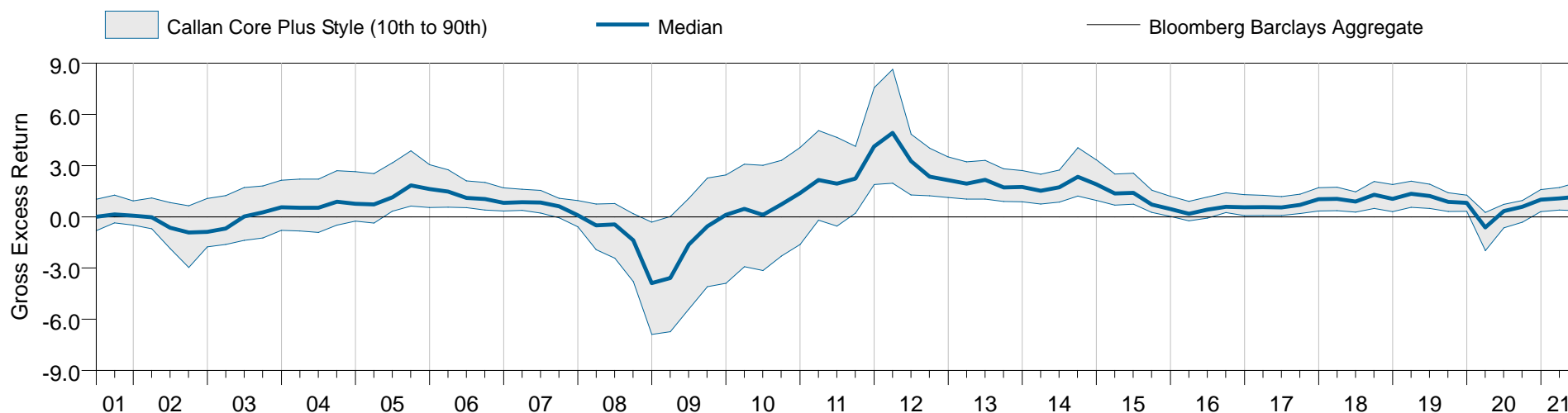
How often Manager Beat Benchmark by more than Fee Hurdle in Rolling 3-Year Periods over last 20 Years

Fee Hurdle	0.20%	0.25%	0.30%	0.35%	0.40%	0.45%	0.50%	0.55%	0.60%	0.65%
Median	75%	75%	74%	73%	73%	71%	69%	65%	59%	58%
45th Percentile	79%	76%	74%	74%	73%	71%	71%	70%	65%	60%
40th Percentile	81%	79%	79%	76%	76%	75%	74%	74%	73%	70%
35th Percentile	84%	84%	81%	79%	78%	76%	76%	76%	75%	73%
30th Percentile	86%	86%	86%	85%	84%	81%	80%	78%	78%	75%
25th Percentile	89%	89%	89%	89%	86%	85%	84%	84%	80%	79%

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

0.78%

Rolling 3-Year Gross Excess Return relative to Bloomberg Barclays Aggregate for 20 Years ended June 30, 2021



Assumptions for Historical Return Analysis

To analyze historical results, Callan modeled all mixes assuming monthly rebalancing

This is an analysis of how structures would have performed historically, **not the portfolio's actual performance**

Candidate Core candidate manager is proxied by a representative fund which is broadly reflective of Callan's Core peer group characteristics

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.

List of Callan's Investment Manager Clients

Quarterly List as of September 30, 2021

Confidential – For Callan Client Use Only

Callan takes its fiduciary and disclosure responsibilities to clients very seriously. We recognize that there are numerous potential conflicts of interest encountered in the investment consulting industry, and that it is our responsibility to manage those conflicts effectively and in the best interest of our clients. At Callan, we employ a robust process to identify, manage, monitor, and disclose potential conflicts on an ongoing basis.

The list below is an important component of our conflicts management and disclosure process. It identifies those investment managers that pay Callan fees for educational, consulting, software, database, or reporting products and services. We update the list quarterly because we believe that our fund sponsor clients should know the investment managers that do business with Callan, particularly those investment manager clients that the fund sponsor clients may be using or considering using. Please note that if an investment manager receives a product or service on a complimentary basis (e.g., attending an educational event), they are not included in the list below. Callan is committed to ensuring that we do not consider an investment manager's business relationship with Callan, or lack thereof, in performing evaluations for or making suggestions or recommendations to its other clients. Please refer to Callan's ADV Part 2A for a more detailed description of the services and products that Callan makes available to investment manager clients through our Institutional Consulting Group, Independent Adviser Group, and Fund Sponsor Consulting Group. Due to the complex corporate and organizational ownership structures of many investment management firms, parent and affiliate firm relationships are not indicated on our list.

Fund sponsor clients may request a copy of the most currently available list at any time. Fund sponsor clients may also request specific information regarding the fees paid to Callan by particular fund manager clients. Per company policy, information requests regarding fees are handled exclusively by Callan's Compliance department.

Manager Name
abrdn (Aberdeen Standard Investments)
Acadian Asset Management LLC
Adams Street Partners, LLC
AEGON USA Investment Management Inc.
AllianceBernstein
Allianz
American Century Investments
AQR Capital Management
Ares Management LLC
Ariel Investments, LLC
Aristotle Capital Management, LLC
Atlanta Capital Management Co., LLC
Aviva Investors
AXA Investment Managers
Baillie Gifford International, LLC
Baird Advisors
Barings LLC
Baron Capital Management, Inc.
Barrow, Hanley, Mewhinney & Strauss, LLC
BlackRock

Manager Name
BMO Global Asset Management
BNP Paribas Asset Management
BNY Mellon Asset Management
Boston Partners
Brandes Investment Partners, L.P.
Brandywine Global Investment Management, LLC
Brown Brothers Harriman & Company
Cambiar Investors, LLC
Capital Group
Carillon Tower Advisers
CastleArk Management, LLC
Causeway Capital Management LLC
Chartwell Investment Partners
ClearBridge Investments, LLC
Cohen & Steers Capital Management, Inc.
Columbia Threadneedle Investments North America
Credit Suisse Asset Management
Crescent Capital Group LP
Crosscreek Capital Group
D.E. Shaw Investment Management, LLC

List of Callan's Investment Manager Clients (continued)

Quarterly List as of September 30, 2021

Manager Name
DePrince, Race & Zollo, Inc.
Dimensional Fund Advisors LP
Doubleline
Duff & Phelps Investment Management Co.
DWS
EARNEST Partners, LLC
Eaton Vance Management
Epoch Investment Partners, Inc.
Fayez Sarofim & Company
Federated Hermes, Inc.
Fidelity Institutional Asset Management
Fiera Capital Corporation
First Hawaiian Bank Wealth Management Division
First Sentier Investors (formerly First State Investments)
Fisher Investments
Franklin Templeton
GAM (USA) Inc.
GCM Grosvenor
GlobeFlex Capital, L.P.
GoldenTree Asset Management, LP
Goldman Sachs
Guggenheim Investments
GW&K Investment Management
Harbor Capital Group Trust
Heitman LLC
Hotchkis & Wiley Capital Management, LLC
Income Research + Management, Inc.
Insight Investment
Intech Investment Management, LLC
Intech Investment Management, LLC
Intercontinental Real Estate Corporation
Invesco

Manager Name
J.P. Morgan
Janus
Jennison Associates LLC
Jobs Peak Advisors
J O Hambro Capital Management Limited
KeyCorp
Lazard Asset Management
LGIM America (formerly Legal & General Inv Mgmt America)
Lincoln National Corporation
Longview Partners
Loomis, Sayles & Company, L.P.
Lord Abbett & Company
LSV Asset Management
MacKay Shields LLC
Macquarie Investment Management (MIM)
Manning & Napier Advisors, LLC
Manulife Investment Management
McKinley Capital Management, LLC
Mellon
MetLife Investment Management
MFS Investment Management
MidFirst Bank
Mondrian Investment Partners Limited
Montag & Caldwell, LLC
Morgan Stanley Investment Management
MUFG Union Bank, N.A.
Natixis Investment Managers
Neuberger Berman
Newton Investment Management
Ninety One North America, Inc. (formerly Investec Asset Mgmt.)
Northern Trust Asset Management
Nuveen

Quarterly List as of September 30, 2021

[illegible]

Memorandum

To: CMERS Investment Committee
From: Erich Sauer, CFA, CAIA
Date: November 11, 2021
Re: Abbott Capital – Due Diligence Virtual Meeting: October 13, 2021
Due Diligence Team: Anthony Lubarsky and Erich Sauer

Background

Abbott Capital (Abbott) is one of the four managers hired by the Employees' Retirement System (ERS) to invest its Private Equity allocation via fund of funds. The ERS has committed a total of \$345 million to 11 of Abbott's Annual Program (AP) vehicles:

AP 2010 - \$35M	AP 2013 - \$35M	AP 2016 - \$20M	AP 2020 - \$40M
AP 2011 - \$55M	AP 2014 - \$35M	AP 2018 - \$20M	AP 2021 - \$20M
AP 2012 - \$40M	AP 2015 - \$25M	AP 2019 - \$20M	

In addition, the ERS is currently considering a \$35 million commitment to AP 2022. As of June 30, 2021, the ERS' invested capital in the AP funds listed above totaled \$264.5 million.

Key Takeaways from Recent Meeting

- Jonathan Roth, president, has announced his intention to retire from the firm, beginning with a reduced role in 2023. Managing director Len Pangburn has been promoted to co-president, and will assume the sole responsibility of president in 2023. As prior memos have mentioned, Abbott has successfully navigated the retirement of key individuals in the past, first with the firm's co-founders in the early 2000s, and more recently with CIO Thad Gray in 2017. ERS staff expects Abbott to successfully navigate this retirement as well, but will monitor the situation closely.
- For the AP 2022 fund, Abbott has increased the target to opportunistic investments (secondaries and co-investments) to 25% from 20% in AP 2021. This is in line with competitors in the marketplace, and staff and Callan are comfortable with the change.
- AUM has seen significant growth over the past few years, much of it due to increases in the NAVs of existing investments. The amount of commitments that Abbott is deploying on an annual basis has grown more modestly, from ~\$800 million to ~\$1 billion, and shows that they are still taking a measured approach to asset growth.
- Abbott has been stable overall, and key managing directors remain in place. Performance has been strong, particularly in our early funds, with AP2010 through AP 2014 all having TVPI multiples ranging from 2.1X to 2.3X. Staff remains comfortable with Abbott's abilities as a Private Equity Fund of Funds manager.

Firm Summary

Abbott is a Limited Liability Company that is 100% independently owned. Abbott was founded in 1986 and private equity investment management is its only business. The firm is registered as an investment adviser with the SEC. The company's ten managing directors own the majority of the company, with a residual ownership of 5% held by one retired co-founder. The firm's managing directors appear committed to keeping Abbott independent and owned from within.

Abbott has 57 employees, a number which has been relatively consistent over the past several years, and all but two of them work in its New York City headquarters. Those two, including one managing director, are European nationals who work at the firm's satellite office in London. The

London office appears stable, and Abbott expects staffing to remain at level of two employees for the foreseeable future. Abbott has experienced very little turnover since its founding, with only one senior member of the firm leaving for anything other than retirement purposes.

Abbott had \$12.7 billion in assets as of March 31, 2021, which is up from the \$9.4 billion the firm held in December of 2018. Abbott has always claimed that they take a measured approach to asset growth, given that capacity in top-tier private equity funds is finite. Fortunately, the recent asset growth has primarily come from strong returns in existing investments, with new flows into the firm playing a smaller role. Abbott estimated that they have gone from needing to commit approximately \$800 million per year a few years ago, to approximately \$1 billion today. This increase is manageable given that the managers Abbott invests with have increased fund sizes as the overall market has grown as well.

Abbott discontinued its ACE program in January 2015, which was a significant portion of Abbott's total AUM. Unlike the AP Funds, fundraising for the ACE Funds took place every 2-4 years. This decision allowed Abbott to focus its offerings on the AP Funds as well as the existing Select Buyout Funds, Select Venture Funds, and Secondary Funds. Beginning with AP2015, Abbott has also offered AP investors the ability to customize private equity allocations at the strategy level. Abbott was successful in marketing the advantages, such as increased commitment flexibility, of the AP Funds to existing clients and brought additional investors into AP2016 and subsequent funds. Abbott has more than 180 institutional clients in its existing fund of funds, including public pension plans, corporate pension plans, endowments, and foundations.

Investment Team

Abbott has 17 dedicated investment professionals. As mentioned above, Jonathan Roth will be stepping down from his role as president of the firm at the beginning of 2023. He plans to remain with the firm for at least one year after that as a part-time executive advisor. Len Pangburn has been named co-president, and will replace Mr. Roth when he steps down. The reason this is not a larger concern is that Abbott has a history of navigating this type of transition successfully, first with the firm's co-founders in the early 2000s, and more recently with CIO Thad Gray. In addition, Abbott is a partnership, with the managing directors collectively responsible for the direction of the firm, which should serve to provide stability. The entire investment team is involved in the research, due diligence, and discussions on investments, but Abbott's investment committee, comprised of senior members of the investment team, has final decision-making authority.

Investment Philosophy and Process

Abbott's investment philosophy is based upon the idea manager skill has more of an effect on returns than sector allocation or the macroeconomic conditions at the time the fund begins making commitments. Thus, Abbott focuses on making commitments to the best private equity managers and then allowing them to find the best opportunities. As a consequence, Abbott's industry allocations end up being a result of investments that the underlying managers make.

Abbott's objective is to create a fund that is diversified by manager and vintage year. They target a total of 25-40 managers over a three year period. The manager count is consistent with our earlier AP funds, but Abbott let the commitment period of those earlier funds go out to as long as five years, which they have since determined was too long. The fact remains that many of the underlying funds will end up in multiple AP funds, allowing an investor to take a year off, as the ERS did in 2017, and not worry about completely missing out on a group of underlying funds. Abbott's core target allocations for AP 2022 are as follows:

North American Private Equity	30%	Small Buyouts	20%
Ex-North America Private Equity	20%	Venture and Growth Equity	30%

The team at Abbott remains confident they can hit these precise targets since they typically have enough visibility about client commitments, and the upcoming manager pipeline, to properly size positions, but they do retain the ability to come in under a target if the opportunities in that area are not attractive. ERS staff will monitor to make sure this is the case, and they are not stretching into second-tier managers in order to fill an allocation.

Up to 25% of the fund can be allocated to opportunistic investments, comprised of secondaries and co-investments. This is up from 20% in AP 2021. Abbott targets secondary transactions that are smaller than dedicated secondary funds, typically in the range of \$1-2 million, but may move up to as high as \$10 million if the deal has especially low competition. Abbott targets deals where they have an advantage in the purchase process, which is typically due to an existing relationship with the GP. Similarly, co-investments are sourced from Abbott's existing GP relationships. Abbott's goal is to have the opportunistic allocation evenly split between secondaries and co-investments, but this could vary depending on deal flow.

Abbott's investment team identifies potential investments by relying on its deep network of relationships and by screening its internal deal tracking system, which includes data on over 8,000 funds that Abbott has interacted with during the past 35 years. In addition, Abbott has an "open door" policy, which means it will meet with any private equity manager at least once. This is the case even though Abbott requires managers to have a performance track record before a commitment is considered. Abbott says it has established some great relationships with managers because of its "open door" policy, even though Abbott did not invest with them until they completed their first fund.

Abbott follows a rigorous process when evaluating potential investments. The investment team typically reviews nearly 600 investment opportunities in a given year, and commits to fewer than 5%. The investment review starts with a one-page memo that is discussed at the team's weekly meeting. A majority of the potential investments are eliminated after this initial review. For investments that look promising, Abbott assigns a deal lead, who is responsible for coordinating preliminary quantitative analysis and follow-on meetings that are attended by multiple Abbott team members. Once the deal team has enough information, the deal goes to the investment committee, and then, if approved, in-depth due diligence commences.

Due diligence on a manager can take anywhere from 2-12 months. Every investment manager that Abbott commits to goes through the same level of due diligence regardless of whether or not it was in a prior Fund. The due diligence process involves a full quantitative and qualitative analysis of the potential investment. Quantitative analysis includes things like: confirmation of cash flows, loss rate, performance benchmarking, purchase price multiples, as well as attribution by team member, in order to determine who the key members of the team really are.

Abbott's qualitative analysis is a distinguishing feature. In addition to the meetings described above, the team typically meets with at least five underlying portfolio companies that the private equity manager has previously invested in to understand if and how they added value. The team also uses its industry contacts to speak with 10-20 references, separate from those provided by the manager. The final stage involves a discussion and a vote by Abbott's whole investment team. While each person on the team gets to vote, the votes of the senior members (managing directors) are what determine if an investment is approved or not.

Abbott confirmed that they have still been able to conduct all of the elements of the due diligence process virtually during the pandemic. They are able to make all the reference calls they need, including to people not on the official reference list. Zoom meetings with CEOs have replaced in-person meetings, but this has provided a couple benefits. First, more members of the Abbott team can attend, since they are not physically traveling, and second, CEOs have much greater availability, since they are also not traveling as much as they would have pre-pandemic.

In the current fundraising environment, top-tier funds are often significantly oversubscribed. Abbott has seen constrained allocations on approximately one third of their investments over the past five years. In addition, GPs are using the favorable environment to push back on terms like due diligence requests or even hurdle rates. Abbott is approaching this very carefully, and many GPs view having Abbott in their fund as a “stamp of approval,” which can help to balance the negotiations, but ERS staff will continue to monitor this issue closely.

Legal Review

Mary Hornby is Abbott’s General Counsel and a managing director at the firm. One of her main responsibilities is to conduct a deep legal due diligence, including a review of the legal documents, and lead negotiations on the underlying private equity managers that the investment team has approved for commitments. When Abbott is negotiating with managers, they reference a proprietary database that contains major terms and conditions governing fund investments. Items that Abbott negotiates include, but are not limited to, fees, carried interest, key people and diversification. In certain circumstances, Abbott hires outside legal counsel to separately review the legal agreements. Abbott has indicated in the past that they are willing to decline an investment over poor contract terms.

Monitoring

Abbott monitors its investments at multiple levels. First, two investment team members, including at least one managing director, are responsible for monitoring every investment that Abbott makes. In addition, Abbott joins the Advisory Boards of approximately half its underlying funds. Abbott also maintains a proprietary database in eFront, an industry leading private equity software system, that allows them to compare underlying funds. eFront allows for automated data communication between underlying portfolio funds, Abbott, and Abbott clients.

Other monitoring activities take place when the Investment Team attends manager meetings, analyzes reports, and engages in dialogue with the manager. Abbott views the benefits of taking an active approach to monitoring its existing investments as twofold; first, it can give Abbott a direct line to the private equity managers who are managing the portfolio of companies; and second, it allows Abbott to see an additional perspective of the manager that may impact how they view future fundraisings.

Reporting

Lauren Massey and Paolo Parziale are both managing directors, and head the firm’s Operations and Administration Departments, respectively. Abbott divides its accounting group between those who support separate account clients and those who support fund of funds. As soon as Abbott makes a commitment to an underlying manager, Ms. Massey and Mr. Parziale work with the manager to coordinate reporting requirements. They may suggest to the manager how they can improve back office controls at this point as well. Abbott’s Operations Department reviews valuations with the investment team and makes sure that the total Net Asset Value is reasonable. In addition, Abbott’s Operations and Administration Departments do an annual check of every confirmation, capital call, and distribution. In the fourth quarter of 2020, Abbott created a formal

valuation committee, primarily due to the expansion of the co-investment practice. The valuation committee is also tasked with approval of any portfolio fund valuation adjustments.

Typically, Abbott has provided quarterly reports to the ERS within 75-90 days after the end of a quarter, which has been an acceptable timeline. Abbott's Annual Financial Statements can take up to 150 days to complete but they have been able to provide estimated values earlier to avoid causing a delay in the ERS' year-end reporting schedule.

Compliance

Monique Horton is Abbott's Chief Compliance Officer (CCO). Ms. Horton was initially hired as Deputy CCO in 2019, and has prior experience at Invesco Private Capital and ACA Compliance Group. Ms. Horton works with Ms. Massey and Ms. Hornby to develop and implement Abbott's compliance policies. Ms. Horton is responsible for the daily testing and monitoring of compliance with the policy. Abbott's policies include a Compliance Manual, which cover topics such as the Code of Ethics, Proxy Voting, Trading, and Information Security, among others. The Compliance Manual is updated at least annually and employees are required to certify that they have read and understand certain critical policies and procedures at least annually.

Abbott's Investment Team is primarily responsible for monitoring compliance with investment guidelines. Each Abbott fund of funds is governed by its respective Limited Partnership Agreement. In general, the Limited Partnership Agreements supersede the ERS' Investment Policy and Guidelines. However, the ERS has negotiated side letters with respect to each Abbott fund of funds which supersede the Limited Partnership Agreements and provide the ERS with certain investment protections.

Disaster Recovery

Abbott has a formal business continuity plan that it tests once a year. The firm maintains all electronic files and systems at a separate facility located in Marlborough, MA, and can switch to the co-location in less than one hour, allowing users to connect remotely. The most recent test of the disaster recovery system was in June of 2021, and showed no issues.

Abbott has been working remotely since the start of the pandemic. Similar to many of the ERS' other managers, the transition to remote work went smoothly for Abbott. They had already moved to firm issued laptops using Microsoft Azure prior to the pandemic, which meant they did not encounter any major problems when they made the switch to a fully remote environment.

Summary

The amount of due diligence Abbott conducts with private equity managers along with the high bar the investment team sets before making a commitment to a manager gives ERS Staff confidence that Abbott's fund of funds partnerships will be able to generate attractive returns over time. The Investment Team's experience and deep network of relationships are also very important. Abbott has a reputation of being a significant long-term investor and a value-added limited partner which gives them the ability to access many top-tier managers. ERS Staff is impressed that Abbott has continued to make innovative improvements to its business model over time.

While not considered major, ERS Staff will continue to monitor Jonathan Roth's eventual retirement, the increased allocation to opportunistic investments, firm AUM, and trends with respect to GP terms.

3rd Quarter 2021 Performance Report

November 11, 2021

Employees' Retirement System

Presentation Agenda

- Fund Overview
- Public Equity
- Fixed Income
- Absolute Return
- Private Equity
- Recent Performance Update

Market Environment

Asset Class	Benchmark	Target Weight	Benchmark Return Q3 2021
Public Equity	MSCI ACWI IMI	44%	-1.1%
Fixed Income	BBG Barclays US Agg.	23%	0.1%
Real Assets ⁽¹⁾	Blended Benchmark	13%	3.0%
Private Equity ⁽¹⁾	Russell 3000 + 2%	10%	8.4%
Absolute Return	90-Day T-Bill + 3%	10%	0.8%

	Q3 2021
CMERS Benchmark	0.9%

⁽¹⁾Real Estate and Private Equity returns are reported on a 1-quarter lag.

Relative Performance Expectations

		Q3 2021		Q3 2021	Q3 2021
Value Equity Bias	Russell 3000 Value	-0.9%	Russell 3000 Growth	0.7%	↓
Small Cap Equity Bias	Russell 2000	-4.4%	Russell 1000	0.2%	↓
Fixed Income Credit	Loomis Sayles (net)	0.1%	BBG Barclays US Agg.	0.1%	
Private Equity⁽¹⁾	CMERS PE (net)	13.5%	PE Benchmark	8.4%	↑↑

	Q3 2021
CMERS Total Fund (net)	1.9%
CMERS Benchmark	0.9%

⁽¹⁾Private Equity returns are reported on a 1-quarter lag.

Total Fund Performance

10 Year Rolling Returns – 11/1/1997 to 9/30/2021

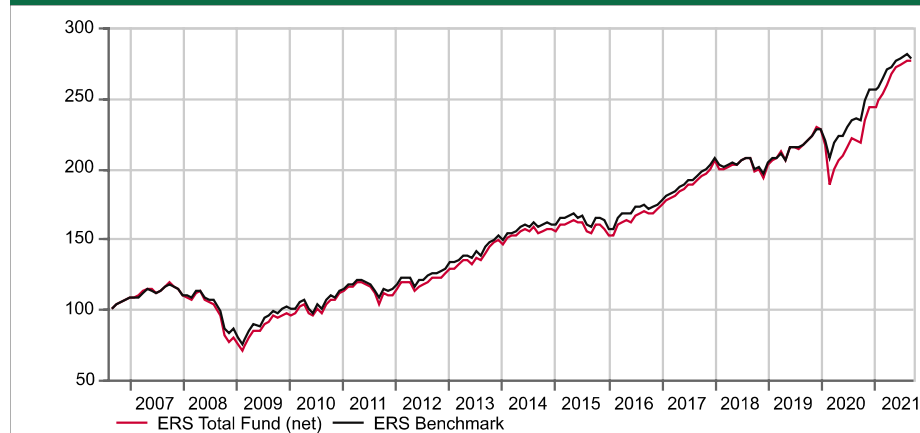


Trailing Returns

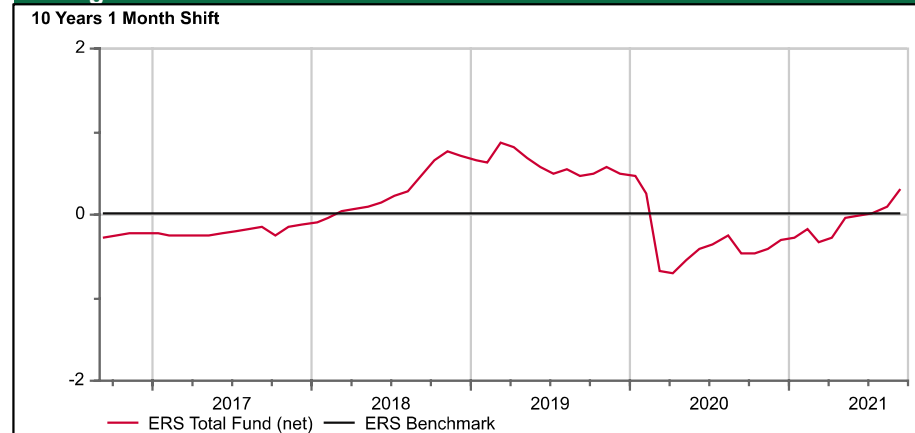
Annualized Return

	QTR	YTD	1 Year	3 Year	5 Year	7 Year	10 Year	15 Year
ERS Total Fund (net)	1.9	13.4	25.7	10.0	10.4	8.8	10.3	7.0
ERS Benchmark	0.9	8.9	18.0	10.3	9.9	8.4	10.0	7.0

Investment Growth – 10/1/2006 to 9/30/2021



Rolling Excess Returns – 10/1/2006 to 9/30/2021



ERS Fund Attribution – 3rd Quarter 2021

Asset Class	Benchmark	Average Weight %	Policy Weight %	+/-	Portfolio Return	Benchmark Return	+/-	Attribution Effect(%)			
								Broad Category Group Allocation	Manager Selection	Style Bias	Total Active Return
Public Equity	MSCI ACWI IMI NR USD	46.4	44.0	2.4	-0.9	-1.1	0.2	0.0	0.2	-0.1	0.1
Fixed Income	BbgBarc US Agg Bond TR USD	22.8	23.0	-0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Real Assets⁽¹⁾	Real Assets Benchmark	11.9	13.0	-1.1	4.8	3.0	1.9	0.0	0.2	0.0	0.2
Private Equity⁽¹⁾	Russell 3000 (Qtr Lag) + 200bps	11.1	10.0	1.1	13.5	8.4	5.1	0.1	0.6	0.0	0.6
Absolute Return	90 Day T-Bill +3%	7.9	10.0	-2.1	3.0	0.8	2.2	0.0	0.2	0.0	0.2
Total		100.0	100.0	0.0	1.9	0.9	1.1	0.0	1.1	-0.1	1.1

Main Drivers of Q3 2021 Relative Performance

Impact %

Attribution Category

- Private Equity ⁽¹⁾	0.6%	Manager Selection
- Real Estate ⁽¹⁾	0.2%	Manager Selection
- William Blair	0.2%	Manager Selection
- UBS A&Q	0.1%	Manager Selection

⁽¹⁾Real Estate and Private Equity returns are reported on a 1-quarter lag.

ERS Fund Attribution – YTD 2021

Asset Class	Benchmark	Average Weight %	Policy Weight % ⁽²⁾	+/-	Portfolio Return	Benchmark Return	+/-	Attribution Effect(%)			
								Broad Category Group Allocation	Manager Selection	Style Bias	Total Active Return
Public Equity	MSCI ACWI IMI NR USD	46.9	43.7	2.9	14.3	11.4	2.9	0.1	1.1	0.2	1.4
Fixed Income	BbgBarc US Agg Bond TR USD	23.2	24.0	0.2	-0.3	-1.6	1.3	0.1	0.3	0.1	0.5
Real Assets ⁽¹⁾	Real Assets Benchmark	11.5	12.3	-1.5	12.9	8.2	4.7	0.0	0.5	0.0	0.5
Private Equity ⁽¹⁾	Russell 3000 (Qtr Lag) + 200bps	10.0	10.0	0.0	51.5	33.4	18.1	0.0	1.6	0.0	1.6
Absolute Return	90 Day T-Bill +3%	8.5	10.0	-1.5	5.5	2.3	3.2	0.1	0.2	0.1	0.4
Total		100.0	100.0	0.0	13.3	8.9	4.4	0.4	3.7	0.3	4.4

Main Drivers of YTD 2021 Relative Performance

Impact %

Manager Selection

- Private Equity ⁽¹⁾	1.6%
Mesirow, Abbott	1.5%
- Public Equity (8 out of 11 Active Public Equity Mandates Outperformed)	1.1%
DFA Mandates, Brandes, William Blair	1.1%
- Real Estate Core Managers ⁽¹⁾	0.4%
ProLogis, Morgan Stanley, JP Morgan	0.4%
- Loomis Sayles	0.3%
- UBS A&Q	0.2%

Asset Allocation

-Underweight Fixed Income & Absolute Return; Overweight Public Equity	0.4%
---	------

Style Bias

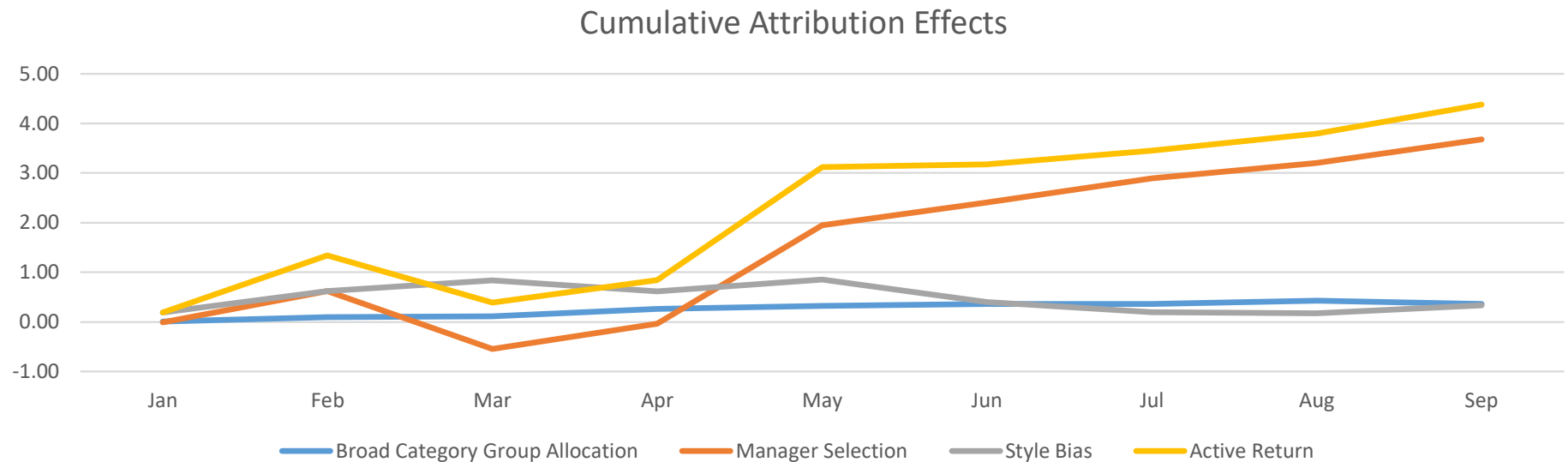
-Public Equity Style Bias (primarily U.S. Small Cap Value)	0.2%
--	------

⁽¹⁾Real Estate and Private Equity returns are reported on a 1-quarter lag.

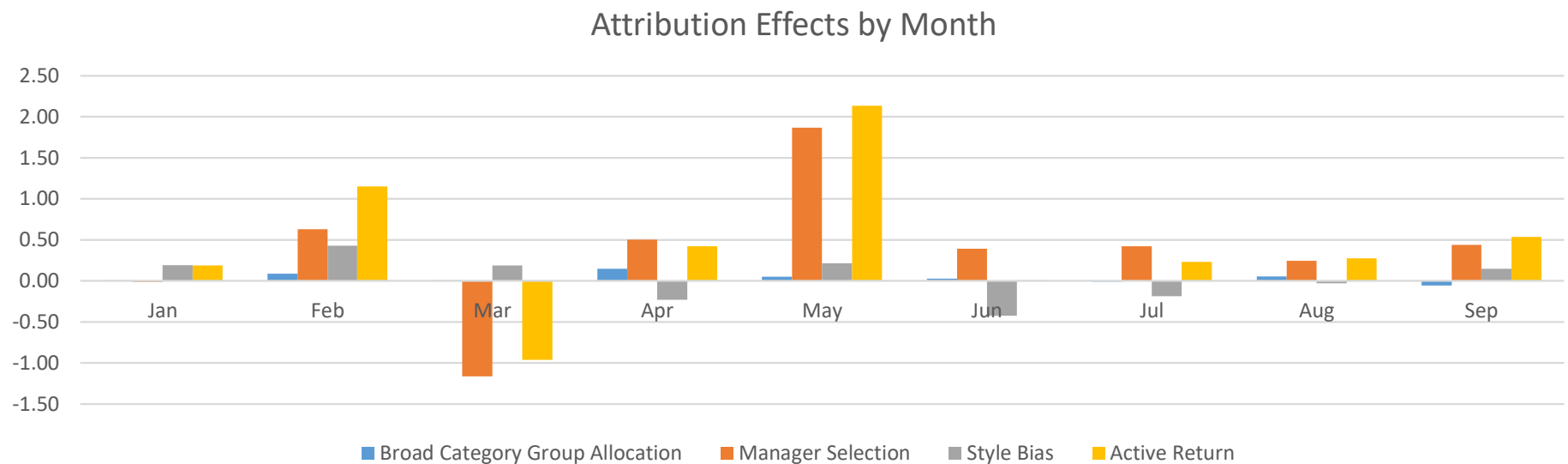
⁽²⁾ Policy Weights changed effective April 1, 2021 to reflect the Strategic Policy targets approved in the December 2020 ALM Study.

Year-to-Date 2021 Attribution

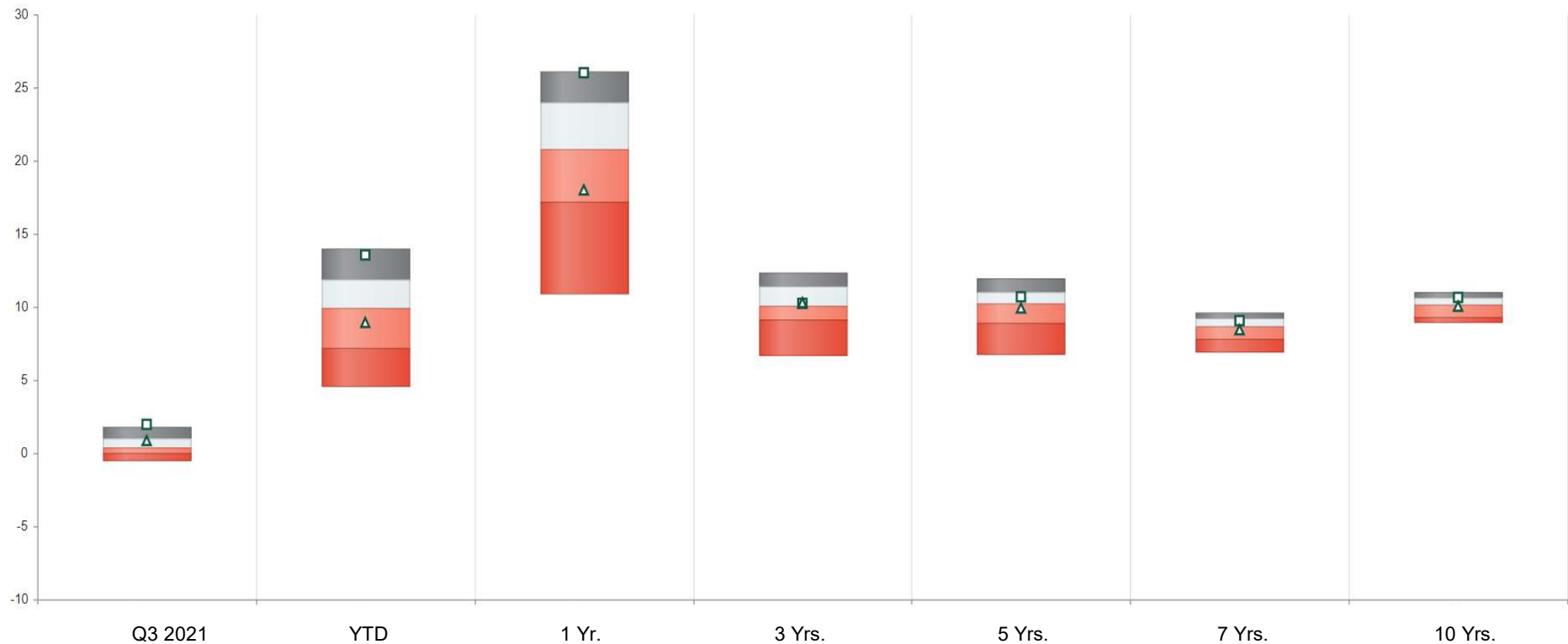
Cumulative Attribution Effects



Monthly Attribution Effects

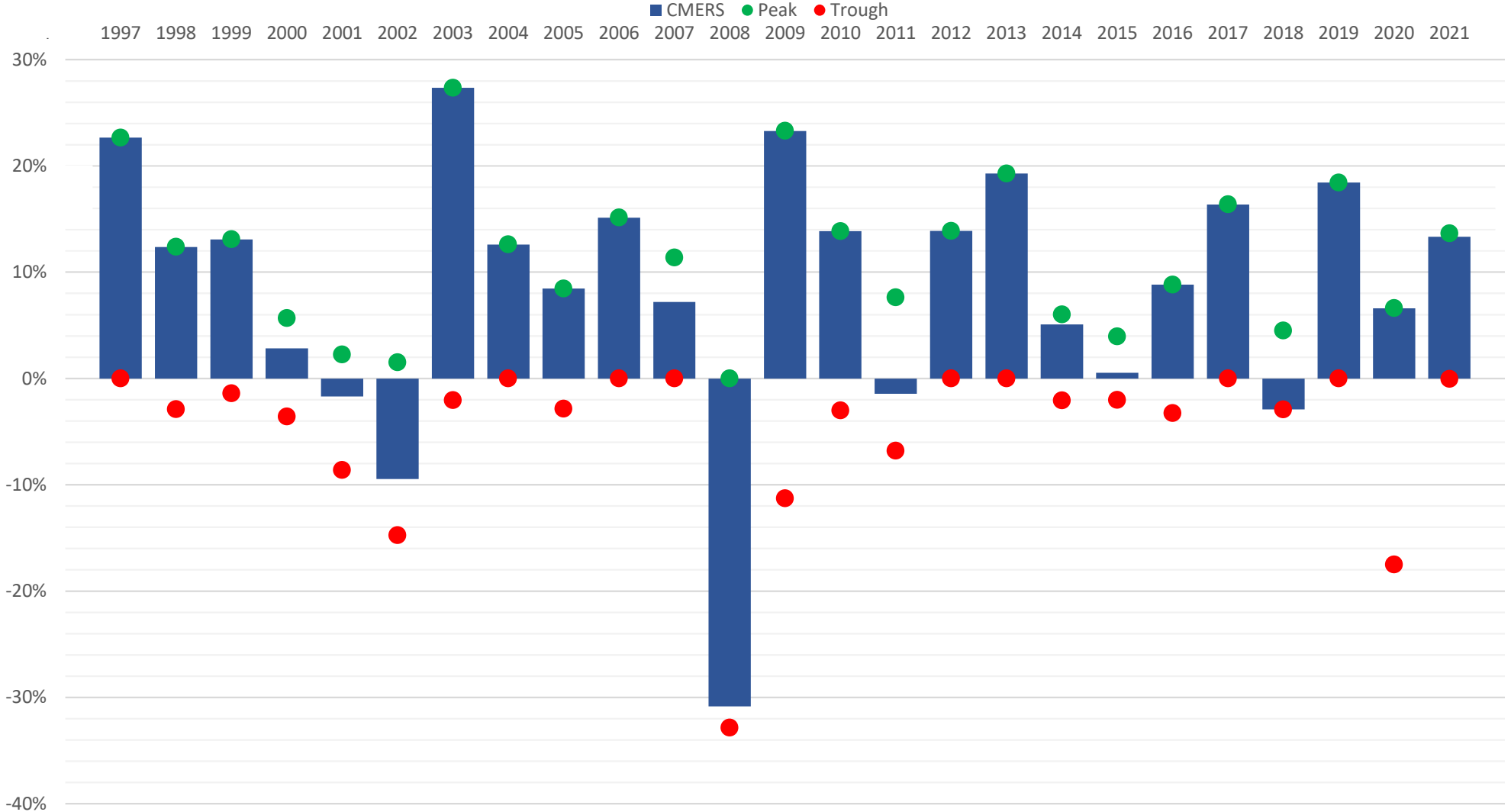


Total Fund vs Universe



	Q3 2021	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.
Account Return	2.0	13.6	26.0	10.2	10.7	9.1	10.6
Percentile Rank	6	13	11	48	38	34	29
Index Return	0.9	8.9	18.0	10.3	9.9	8.4	10.0
Percentile Rank	27	65	74	47	54	53	53
1st Quartile	1.0	11.8	24.0	11.4	11.0	9.2	10.7
Median	0.4	9.9	20.8	10.1	10.2	8.7	10.2
3rd Quartile	0.0	7.2	17.2	9.2	8.9	7.8	9.3
Observations	45	46	46	44	41	32	24

Annual Returns, Peaks and Troughs

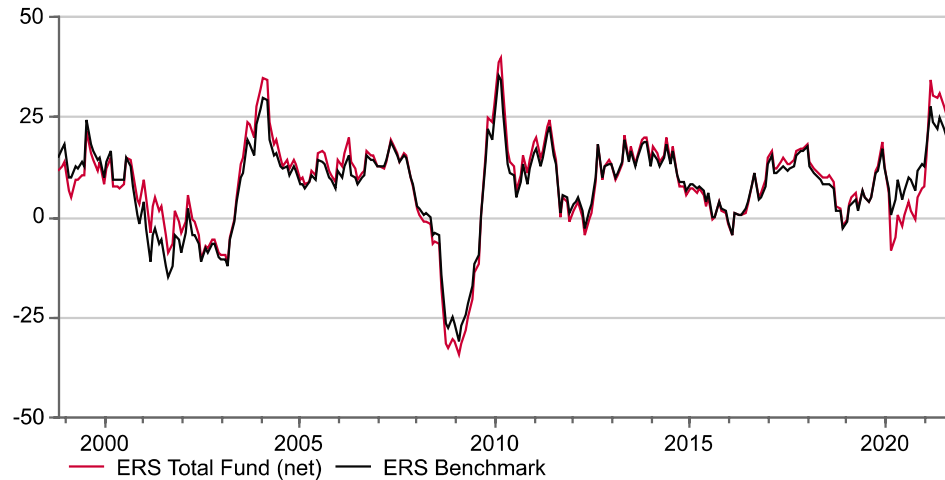


*Net of Fees

Total Fund Rolling Returns as of September 30, 2021

1 Year Rolling Returns – 12/1/1997 to 9/30/2021

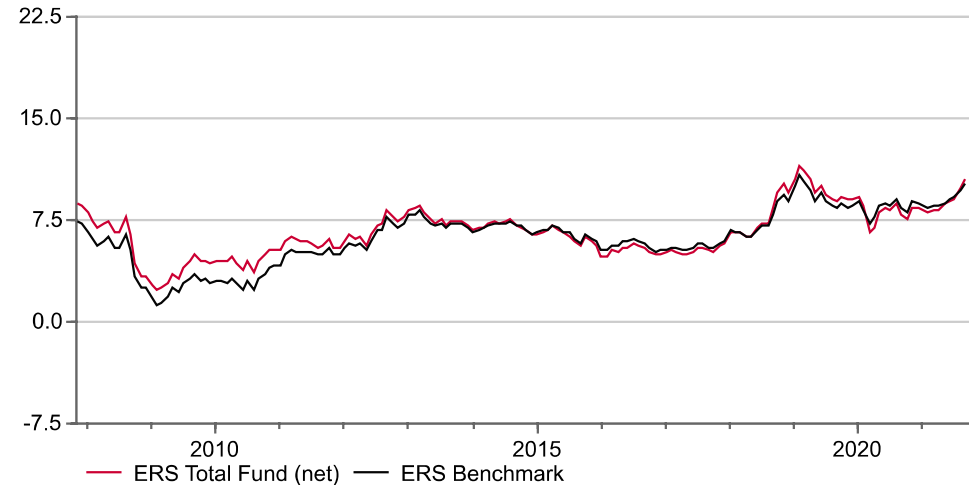
1 Year 1 Month Shift



©FactSet Research Systems

10 Year Rolling Returns – 12/1/1997 to 9/30/2021

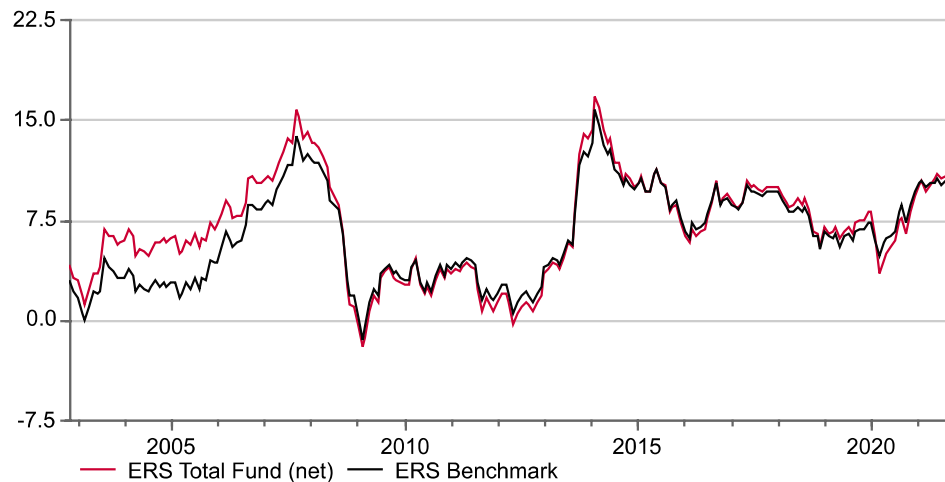
10 Years 1 Month Shift



©FactSet Research Systems

5 Year Rolling Returns – 12/1/1997 to 9/30/2021

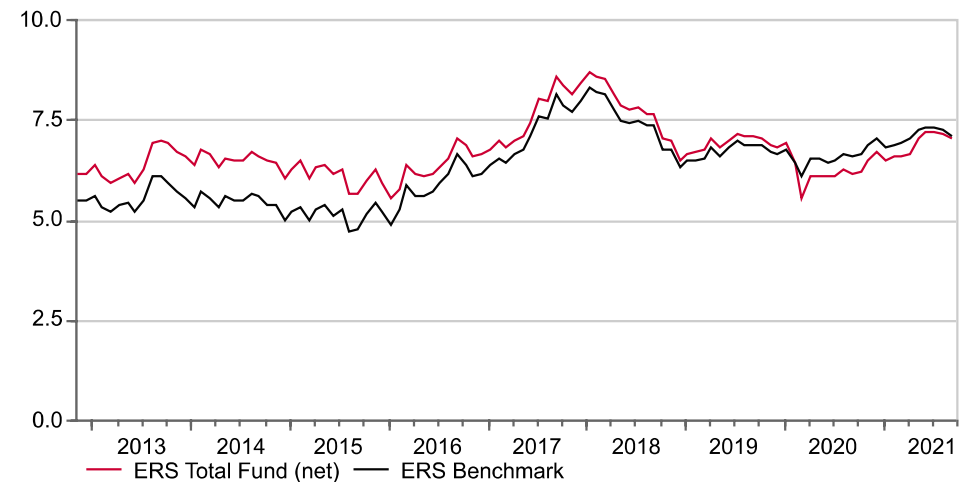
5 Years 1 Month Shift



©FactSet Research Systems

15 Year Rolling Returns – 12/1/1997 to 9/30/2021

15 Years 1 Month Shift

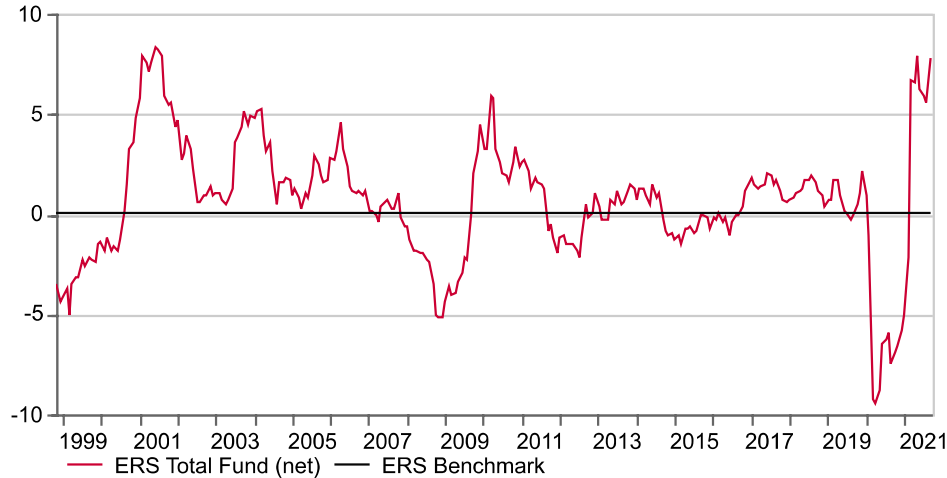


©FactSet Research Systems

Total Fund Rolling Excess Returns as of September 30, 2021

1 Year Rolling Excess Returns – 12/1/1997 to 9/30/2021

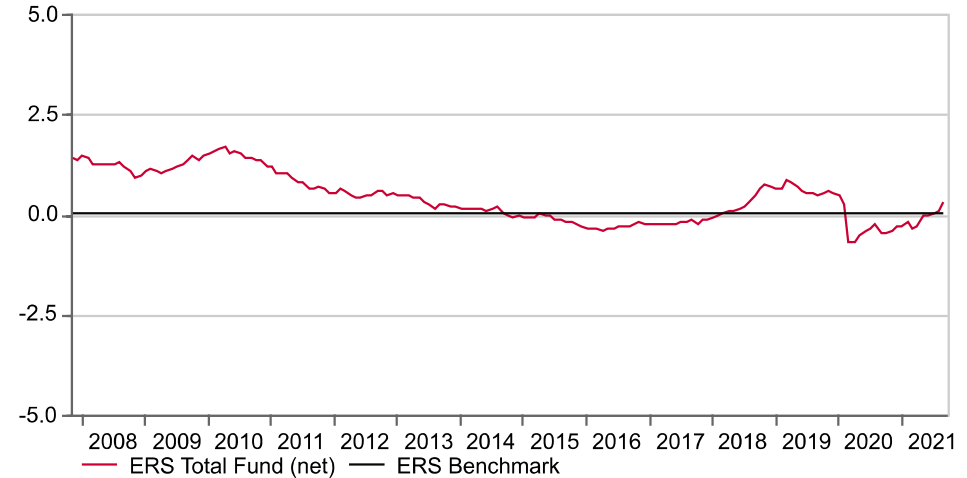
1 Year 1 Month Shift



©FactSet Research Systems

10 Year Rolling Excess Returns – 12/1/1997 to 9/30/2021

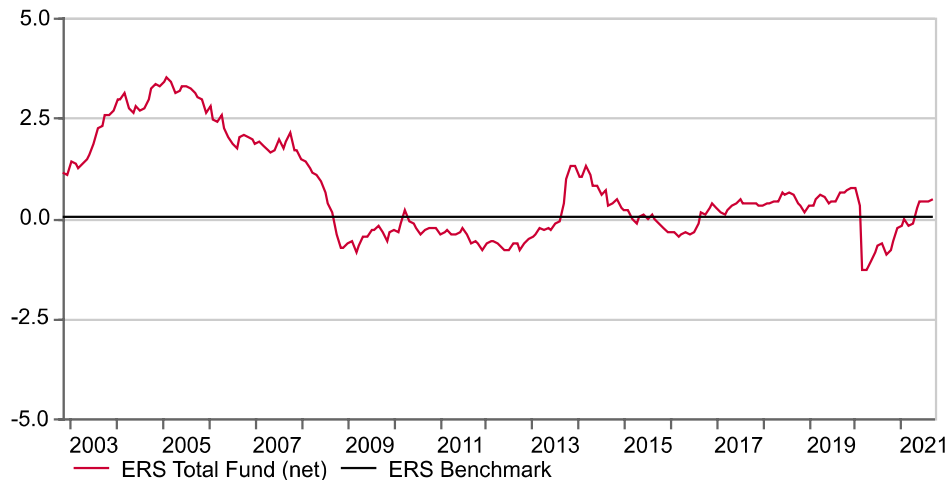
10 Years 1 Month Shift



©FactSet Research Systems

5 Year Rolling Excess Returns – 12/1/1997 to 9/30/2021

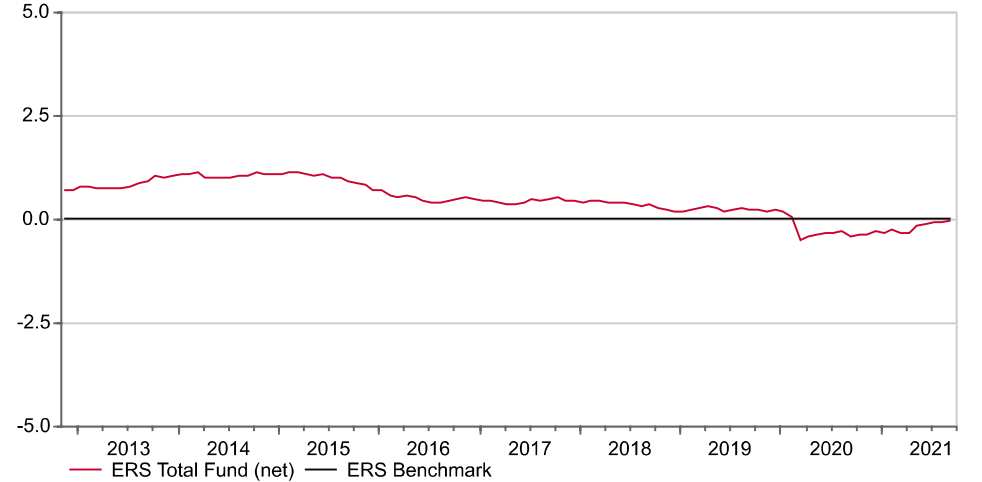
5 Years 1 Month Shift



©FactSet Research Systems

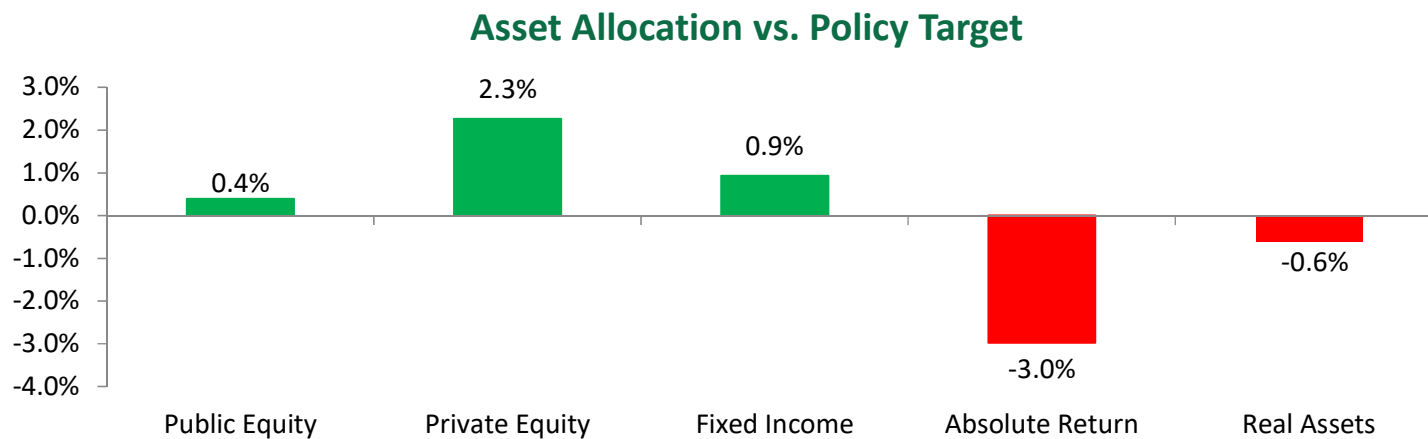
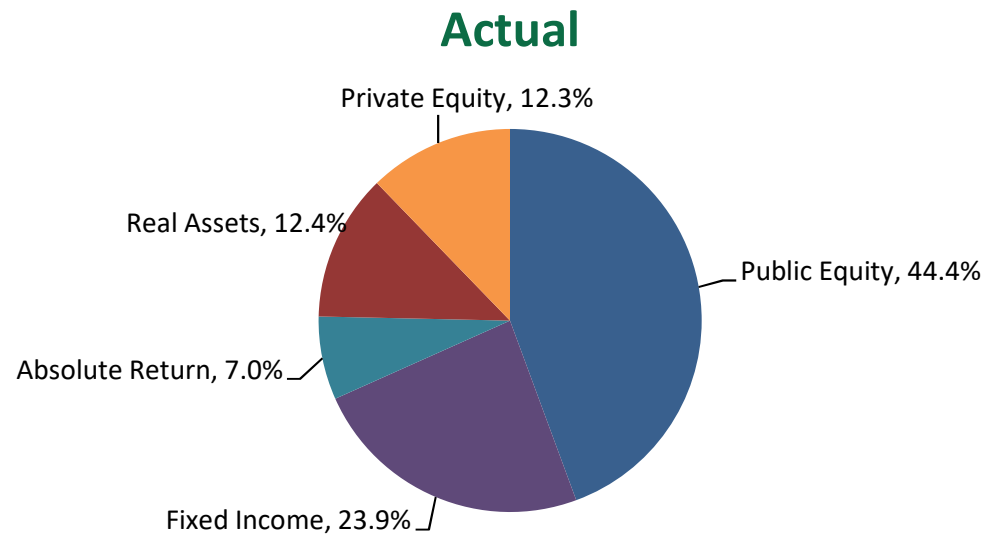
15 Year Rolling Excess Returns – 12/1/1997 to 9/30/2021

15 Years 1 Month Shift



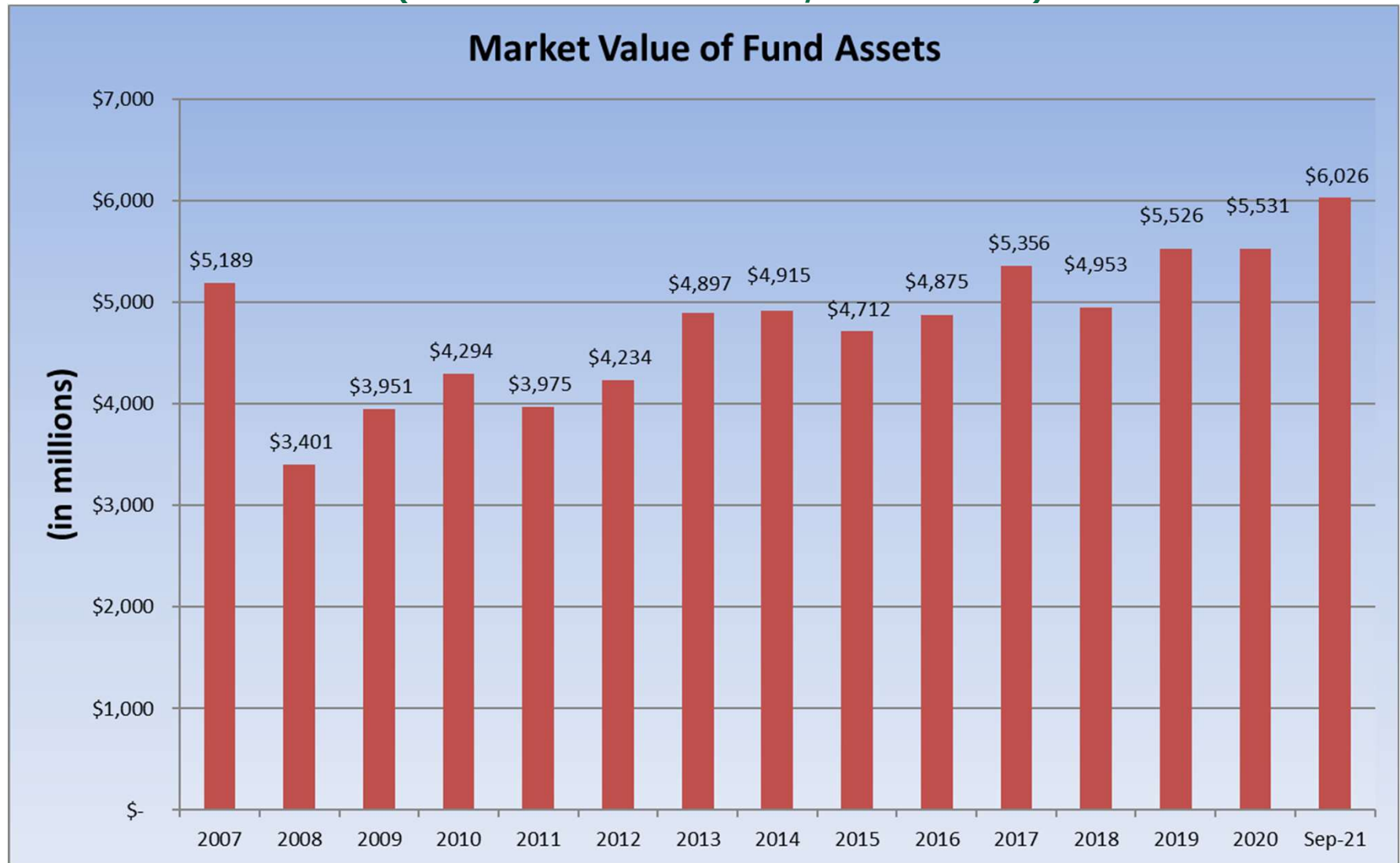
©FactSet Research Systems

Asset Allocation as of September 30, 2021



Fund Value of Assets: 2007 – September 30, 2021

(Year Ended Dates Reflect 12/31 Fund Values)



Most recent Actuarial valuation projects benefit payments to total \$5.1 billion in next 10 years.

Benefit Payments	\$4.6 billion
Expenses	\$242 million
Contributions	\$1.3 billion
Investment Gain	\$4.4 billion

13 3/4 Year Estimates (1/1/2008 - 9/30/2021)

Benefit Payments, Expenses, Contributions, and Investment Gain amounts are calculated using estimates of cash flows into and out of the Fund. These amounts are not audited and may not tie to CMERS Financial Statements.

Year-to-Date 2021 Market Value Change

December 31, 2020 Market Value including City Reserve & PABF Accounts			\$ 5,565,502,643
Monthly Cash Outflows thru	<u>September 30, 2021</u>		
Retiree Payroll Expense		\$ (321,801,267)	
PABF Payroll Expense		\$ (52,489)	
Expenses Paid		\$ (10,843,152)	
GPS Benefit Payments		\$ (10,870,507)	
Sub-Total Monthly Cash Outflows			\$ (343,567,416)
Monthly Cash Inflows thru	<u>September 30, 2021</u>		
Contributions		\$ 100,109,750	
PABF Contribution		\$ 46,350	
Sub-Total Monthly Contributions			\$ 100,156,100
City Reserve Fund Contribution			\$ 8,000,000
Capital Market Gain/(Loss)			<u>\$ 738,435,044</u>
Value including City Reserve & PABF Accounts as of	<u>September 30, 2021</u>		<u>\$ 6,068,526,372</u>
Less City Reserve Account ¹			\$ 42,230,594
Less PABF Fund ²			\$ 2,500
Net Projected ERS Fund Value as of	<u>September 30, 2021</u>		<u>\$ 6,026,293,278</u>

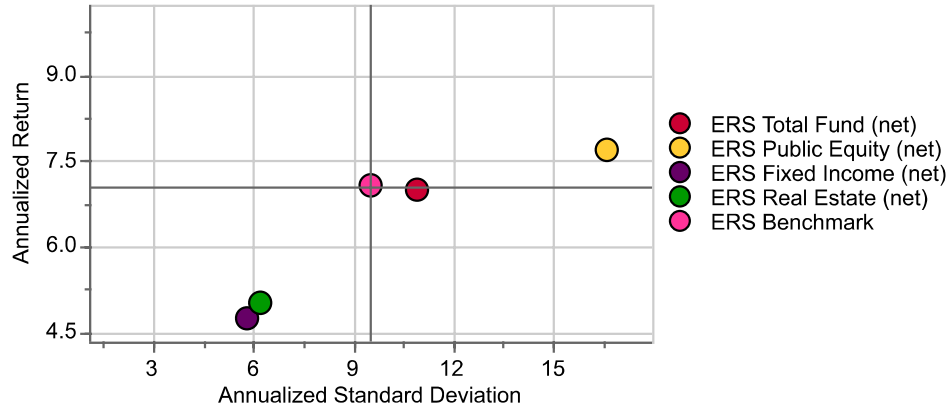
1 The City Reserve Account balance equals the market value currently held in the Baird account.

2 PABF Fund balance equals the market value currently held in the PABF account.

Monthly Cash Outflows, Monthly Cash Inflows, and Capital Market Gain/(Loss) amounts are calculated using estimates of cash flows into and out of the Fund. These amounts are not audited and may not tie to CMERS Financial Statements.

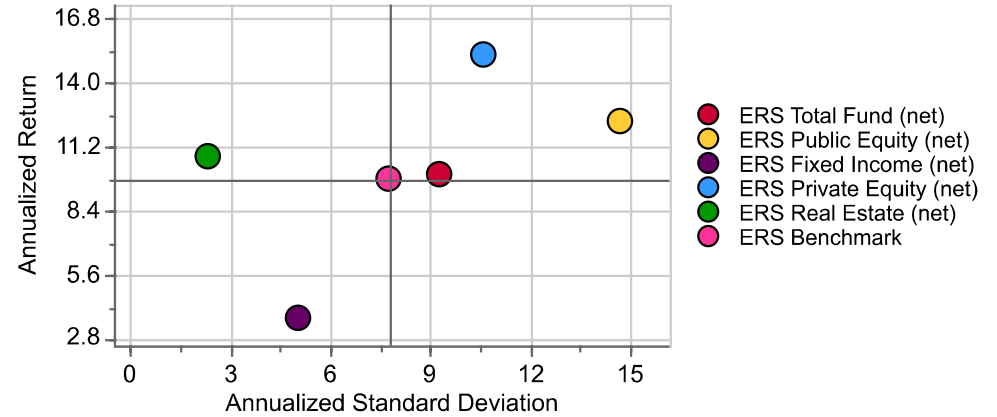
Total Fund Statistics

15 Year Risk-Reward –10/1/2006 to 9/30/2021



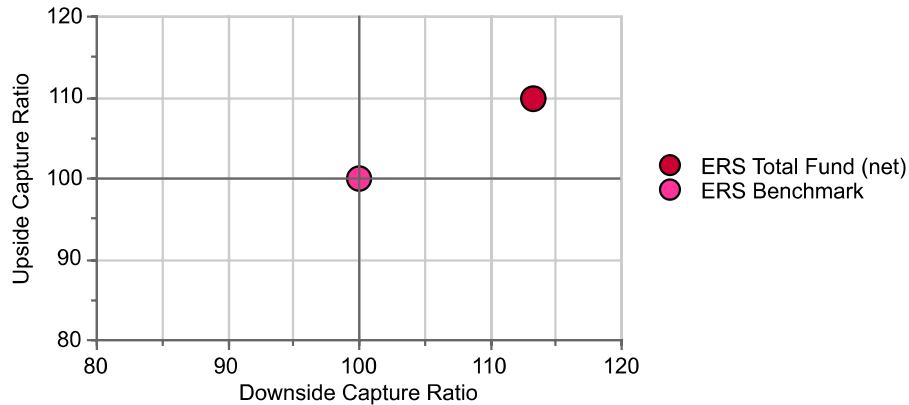
©FactSet Research Systems

Risk-Reward Since Private Equity Inception – 7/1/2010 to 9/30/2021



©FactSet Research Systems

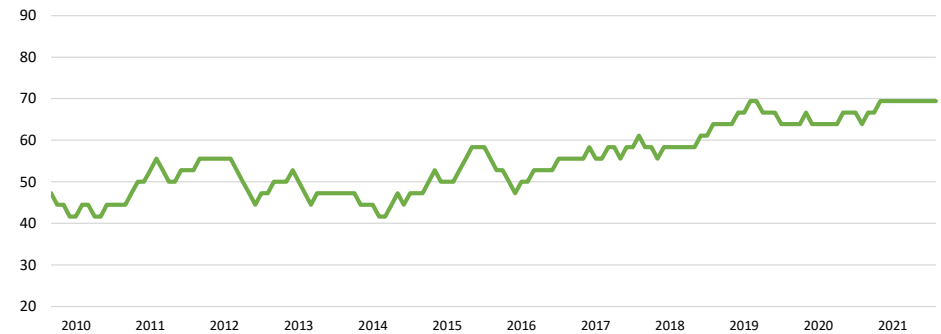
15 Year Upside-Downside –10/1/2006 to 9/30/2021



©FactSet Research Systems

Batting Average

Rolling Window: 3 years
Time Period: 10/1/2006 to 9/30/2021



15 Year Risk –10/1/2006 to 9/30/2021

	Annualized Return	Standard Deviation	Sharpe Ratio	Information Ratio	Tracking Error	Beta
ERS Total Fund (net)	7.0	10.9	-0.1	0.0	2.6	1.1
ERS Benchmark	7.0	9.5	0.0	0.6	NA	1.0

Risk – 7/1/2013 to 9/30/2021

	Annualized Return	Standard Deviation	Sharpe Ratio	Information Ratio	Tracking Error	Beta
ERS Total Fund (net)	9.4	8.7	-0.1	1.0	0.0	3.1
ERS Benchmark	9.1	7.0	0.0	1.2	NA	1.0

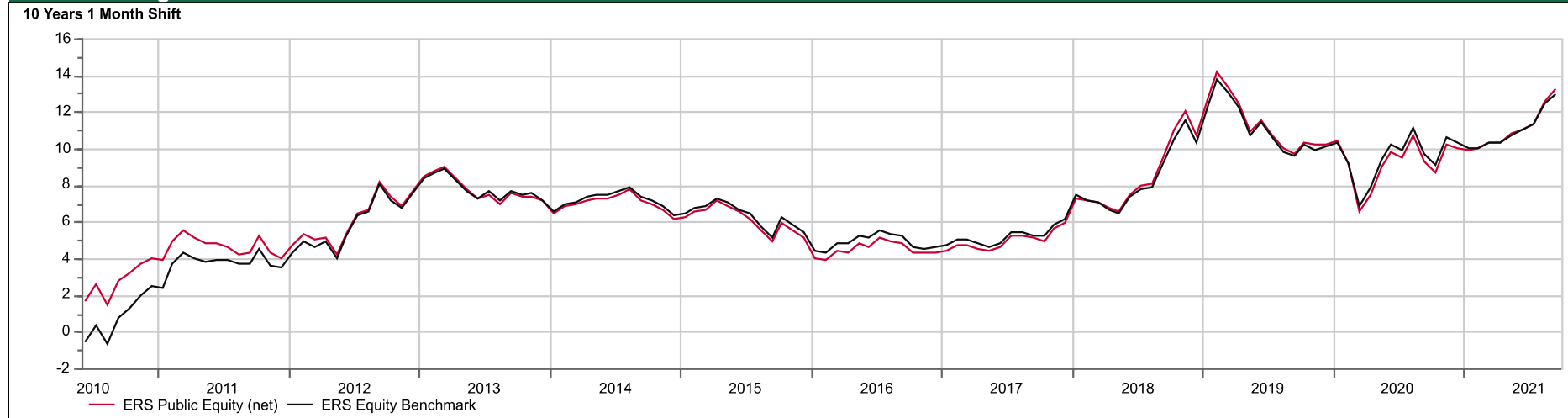
Notable CMERS Manager Events

Manager	Event	Date
LaSalle	ERS Staff worked with the City Attorney's office and Reinhart to complete an MFN election related to our investment in the LaSalle Property Fund.	November 2021

Public Equity

Public Equity Performance

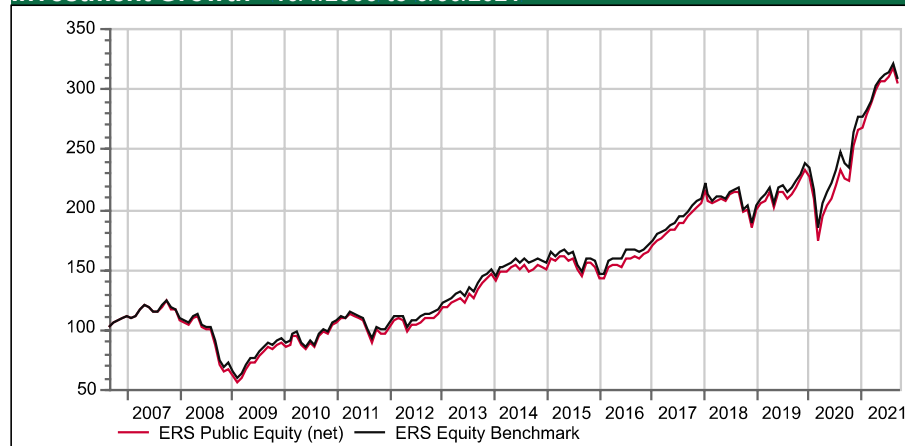
10 Year Rolling Returns – 7/1/2000 to 9/30/2021



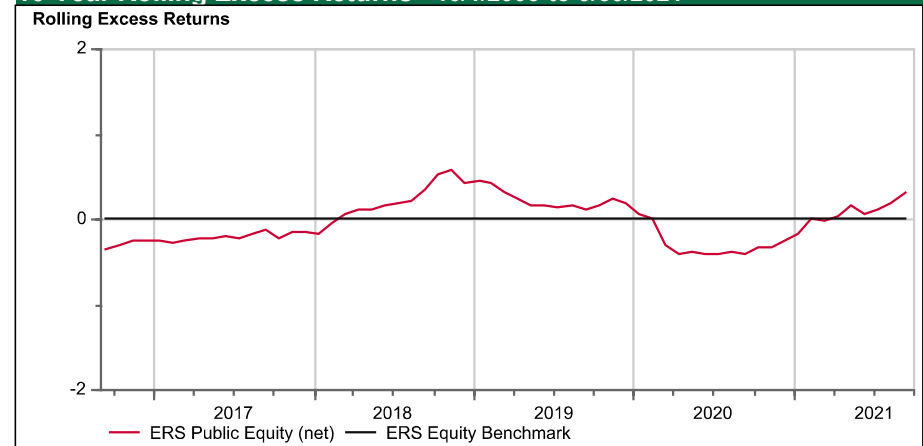
Trailing Returns

	Annualized Return							
	QTR	YTD	1 Year	3 Year	5 Year	7 Year	10 Year	15 Year
ERS Public Equity (Gross)	-0.8	14.6	35.3	12.7	14.0	11.2	13.6	8.0
ERS Public Equity (Net)	-0.9	14.3	34.9	12.4	13.6	10.8	13.2	7.7
ERS Public Equity Benchmark	-1.1	11.4	28.9	12.4	13.1	10.4	12.9	7.8
MSCI AC World IMI	-1.1	11.4	28.9	12.4	13.1	10.0	12.0	7.4

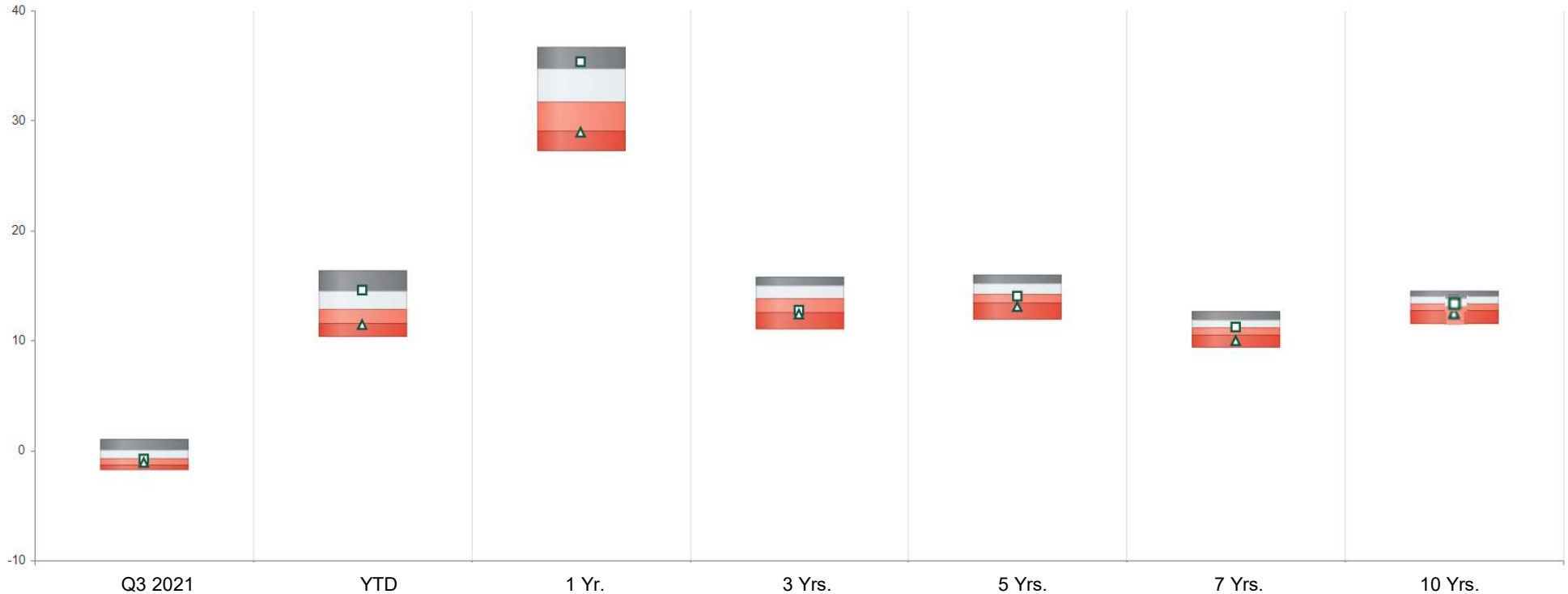
Investment Growth – 10/1/2006 to 9/30/2021



10 Year Rolling Excess Returns – 10/1/2006 to 9/30/2021



Public Equity vs Universe

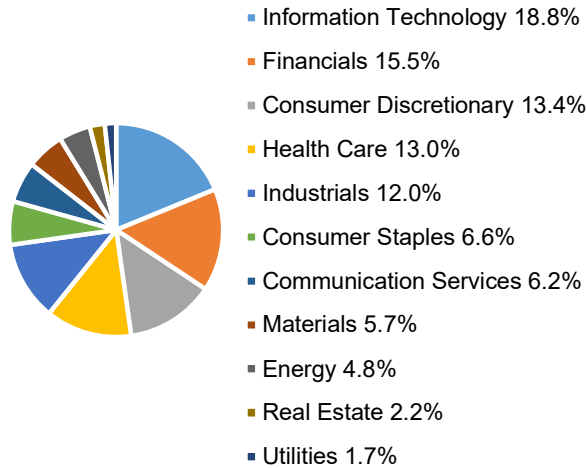


■ Account
 ▲ Index

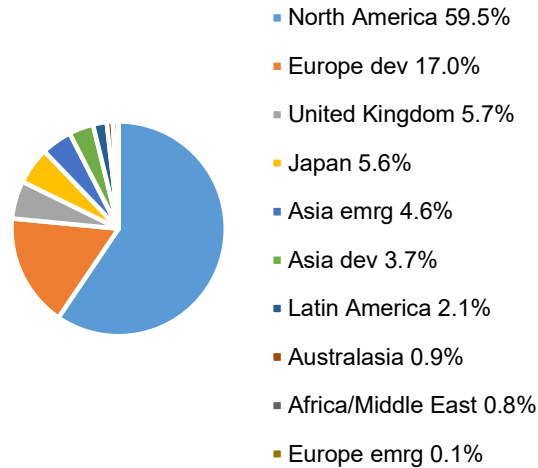
	Q3 2021	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.
Account Return	-0.8	14.6	35.3	12.7	14.0	11.2	13.6
Percentile Rank	53	24	21	73	55	50	42
Index Return	-1.1	11.4	28.9	12.4	13.1	10.4	12.9
Percentile Rank	70	78	80	79	81	4th Quartile	3rd Quartile
1st Quartile	0.0	14.5	34.7	15.0	15.2	11.9	14.1
Median	-0.7	12.9	31.7	13.8	14.2	11.2	13.3
3rd Quartile	-1.3	11.6	29.1	12.5	13.5	10.5	12.7
Observations	138	140	140	138	134	128	111

Public Equity Portfolio Snapshot

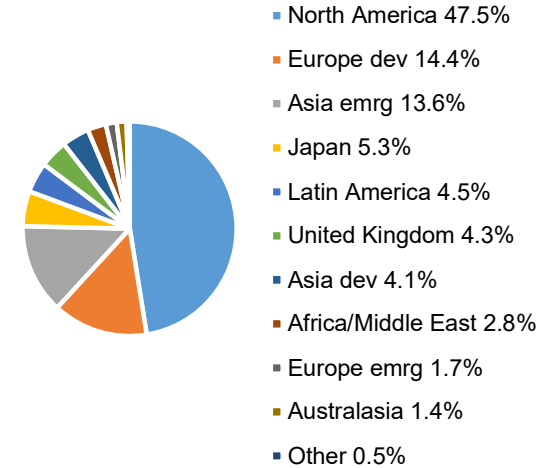
Equity Sector Exposure (GICS)



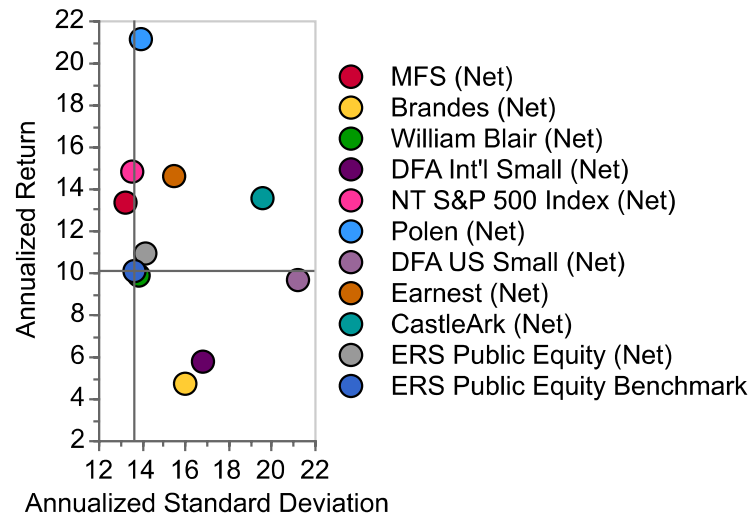
Regional Exposure by Domicile



Regional Exposure by Source of Revenue



Risk – Reward – 10/1/2013 to 9/30/2021



Top 10 Holdings

Portfolio Date 9/30/21	Weight %	Return %
Alphabet Inc.	1.9	8.0
Microsoft Corporation	1.6	4.3
Apple Inc.	1.3	3.5
Amazon.com, Inc.	1.1	-4.5
Facebook, Inc.	0.9	-2.4
Visa Inc.	0.6	-4.6
Takeda Pharmaceutical	0.6	1.3
Alibaba Group Holding	0.6	-35.8
JPMorgan Chase & Co.	0.6	5.9
Taiwan Semi Mfg. Co.	0.6	-5.4

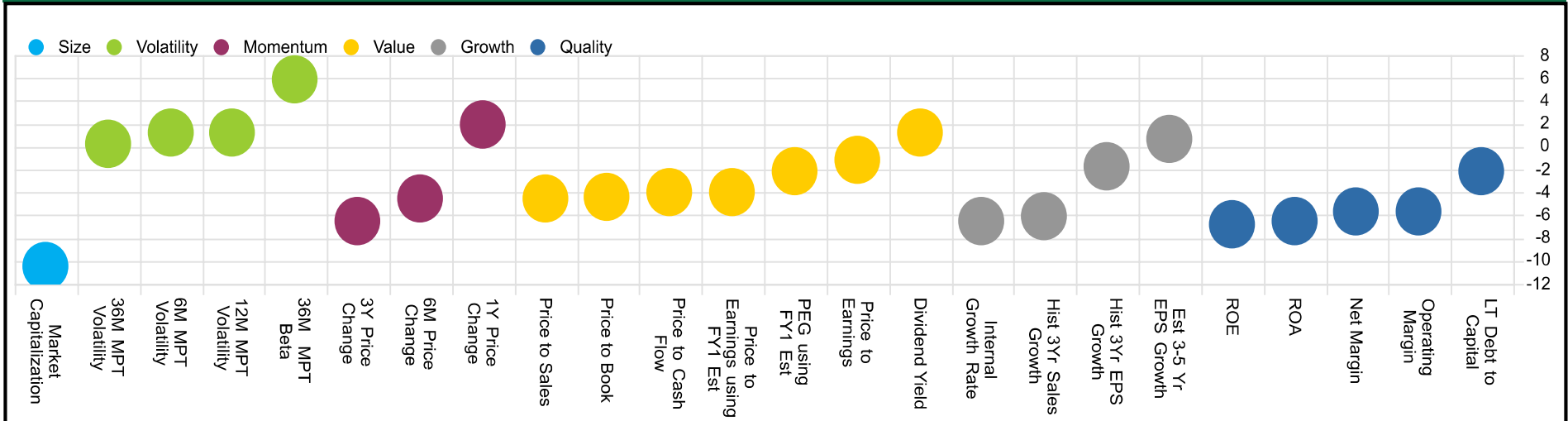
Top 10 Managers

Portfolio Date 9/30/21	Weight %
Brandes Int'l Value	14.4
NTQA S&P 500 Index Core	12.3
BlackRock Global Core	11.0
William Blair Int'l Growth	10.7
DFA US Small Cap Value	7.6
DFA Int'l Small Cap Value	7.3
MFS Global Growth	7.1
Polen US Large Cap Growth	6.0
BlackRock R1000 Value Index	5.9
DFA US Large Cap Value	5.8

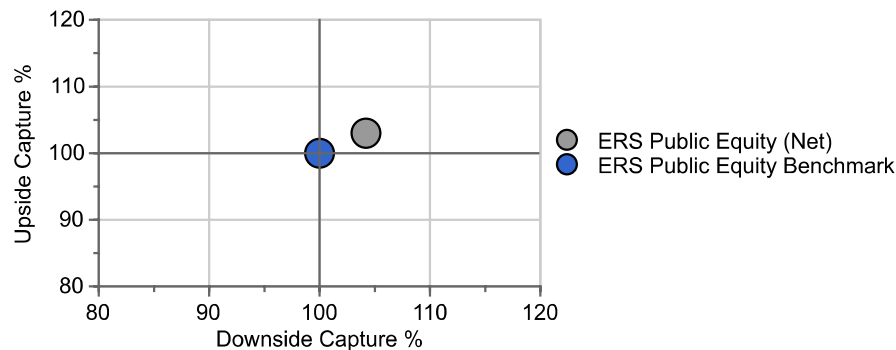
©FactSet Research Systems

Public Equity Statistics

Characteristics Tilt vs MSCI ACWI IMI 9/30/2021

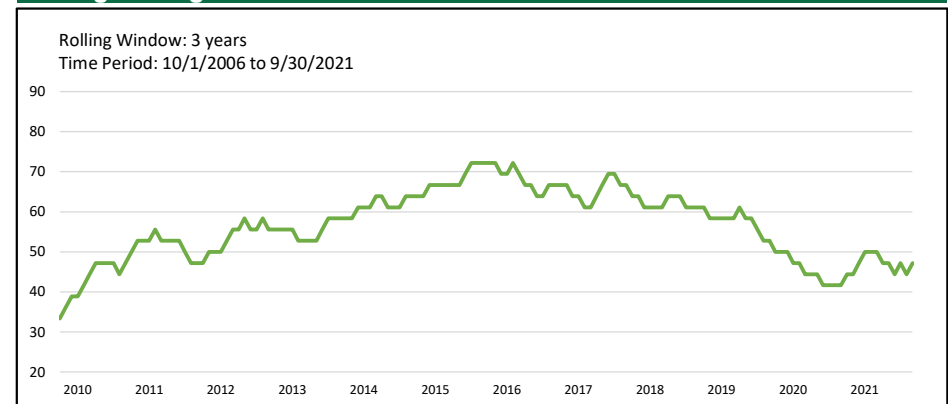


15 Year Upside-Downside –10/1/2006 to 9/30/2021



©FactSet Research Systems

Batting Average



15 Year Risk –10/1/2006 to 9/30/2021

	Annualized Return	Standard Deviation	Sharpe Alpha	Information Ratio	Tracking Ratio	Error	Beta
ERS Public Equity (Net)	7.7	16.6	0.0	0.4	0.0	1.7	1.0
ERS Public Equity Benchmark	7.8	15.9	0.0	0.4	--	--	1.0

Risk – 7/1/2013 to 9/30/2021

	Annualized Return	Standard Deviation	Sharpe Alpha	Information Ratio	Tracking Ratio	Error	Beta
ERS Public Equity (Net)	11.7	14.2	0.0	0.8	0.1	1.6	1.0
ERS Public Equity Benchmark	11.3	13.6	0.0	0.8	--	--	1.0

Public Equity Valuation Characteristics

As of September 30, 2021

	Price/ Earnings	P/E using FY2 Est	Price/ Book	Price/ CF	Dividend Yield
ERS Public Equity	15.9	14.4	1.8	10.8	1.74
MSCI AC World IMI	19.2	16.7	2.7	13.5	1.72

Domestic Managers	Price/ Earnings	P/E using FY2 Est	Price/ Book	Price/ CF	Dividend Yield
BlackRock R1000 Value Index	17.6	15.7	2.5	13.0	1.93
CastleArk Small Growth	32.6	24.2	4.9	22.7	0.12
DFA Large Value	14.1	12.7	2.0	10.1	1.92
DFA Small Value	11.0	10.4	1.3	7.6	1.36
Earnest Mid Core	20.3	16.1	3.1	15.6	1.06
NT S&P 500 Index	23.8	19.7	4.3	18.3	1.37
Polen Large Growth	42.4	34.2	11.2	35.3	0.33

Global & International Managers	Price/ Earnings	P/E using FY2 Est	Price/ Book	Price/ CF	Dividend Yield
AQR Emerging Markets Core	8.4	7.9	1.3	5.4	3.78
BlackRock Global Core	19.7	16.6	2.9	14.2	1.73
Brandes Int'l Value	9.9	9.8	1.0	6.1	3.67
DFA Int'l Small Value	10.5	10.2	0.8	6.1	2.46
MFS Global Growth	30.5	23.0	5.5	23.3	0.94
William Blair Int'l Growth	35.9	29.1	6.1	30.5	0.74

*"Price/Earnings" and "P/E using FY2 Est" values exclude companies with negative earnings from calculations.

P/E Ratio Comparisons in the U.S. Since 1980 - As of September 30, 2021

Value vs. Growth

Relative Price to Earnings

31-Dec-1980 to 30-Sep-2021 (Monthly)



© FactSet Research Systems

Large vs. Small

Relative Price to Earnings

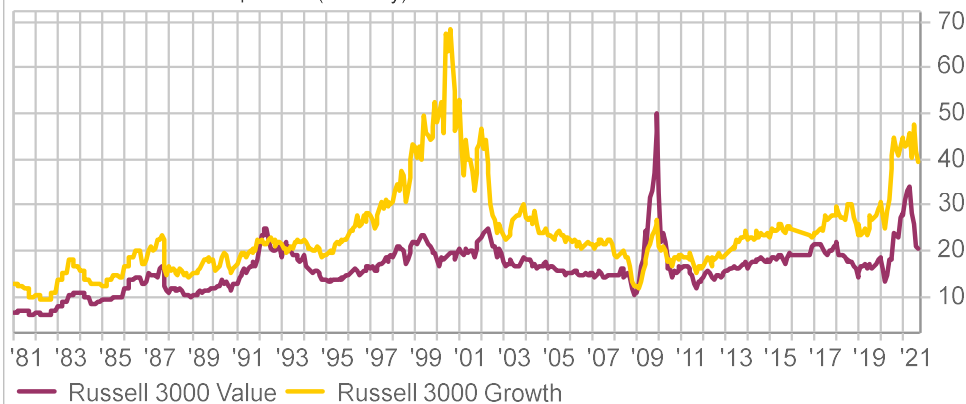
31-Dec-1980 to 30-Sep-2021 (Monthly)



© FactSet Research Systems

Price to Earnings - Russell 3000 Value vs Russell 3000 Growth

31-Dec-1980 to 30-Sep-2021 (Monthly)



© FactSet Research Systems

Relative Price to Earnings

31-Dec-1980 to 30-Sep-2021 (Monthly)



© FactSet Research Systems

Price to Earnings ratios for Value vs. Growth charts include companies with negative earnings in calculations.

Price to Earnings ratios for Large vs Small: Top chart includes companies with negative earnings in calculations; bottom chart excludes companies with negative earnings from calculation.

Relative Investment Performance – Active Equity Managers

As of September 30, 2021

Outperforming Equity Managers

	3rd Qtr	YTD	1 Year	3 Year	5 Year	7 Year	10 Year
William Blair <i>MSCI ACWI ex US</i>	0.9% 3.7%	10.0% 3.7%	27.6% 3.1%	16.5% 8.0%	14.4% 5.0%	10.2% 4.1%	11.9% 4.0%
DFA U.S. Small Value <i>Russell 2000 Value</i>	-0.7% 2.3%	31.7% 8.8%	76.1% 12.2%	9.0% 0.4%	11.3% 0.3%	9.9% 0.3%	14.1% 0.9%
Polen <i>S&P 500</i>	2.8% 2.2%	18.2% 2.3%	30.5% 0.5%	24.4% 8.4%	24.7% 7.9%	21.5% 7.4%	N/A
CastleArk <i>Russell 2000 Growth</i>	-4.7% 1.0%	6.5% 3.7%	41.0% 7.7%	15.0% 3.3%	19.1% 3.8%	14.8% 1.6%	N/A
ERS Public Equity <i>ERS Equity Benchmark</i>	-0.9% 0.3%	14.3% 2.9%	34.9% 6.0%	12.4% 0.0%	13.6% 0.6%	10.8% 0.4%	13.2% 0.3%

Relative outperformance in blue

Relative underperformance in red

*Returns net of fees

Relative Investment Performance – Active Equity Managers

As of September 30, 2021

Underperforming Equity Managers

	3rd Qtr	YTD	1 Year	3 Year	5 Year	7 Year	10 Year
AQR <i>MSCI EM</i>	-9.3% 1.2%	1.5% 2.7%	20.7% 2.5%	8.1% 0.5%	9.1% 0.1%	N/A	N/A
Brandes <i>MSCI EAFE</i>	-1.5% 1.1%	13.8% 5.4%	38.6% 12.8%	4.5% 3.1%	6.7% 2.1%	4.4% 1.4%	7.3% 0.8%
DFA U.S. Large Value <i>Russell 1000 Value</i>	-1.5% 0.8%	19.1% 3.0%	41.9% 6.9%	7.9% 2.2%	N/A	N/A	N/A
BlackRock Global Alpha Tilts <i>MSCI ACWI</i>	-1.5% 0.5%	10.8% 0.3%	26.0% 1.4%	11.7% 0.9%	13.6% 0.4%	N/A	N/A
MFS <i>MSCI ACWI</i>	-1.4% 0.4%	9.9% 1.3%	24.3% 3.2%	17.3% 4.7%	17.4% 4.2%	14.2% 4.2%	N/A
DFA International <i>MSCI EAFE Small Cap</i>	0.6% 0.3%	13.7% 3.6%	36.2% 7.2%	4.4% 4.6%	6.7% 3.7%	5.6% 3.5%	9.1% 1.7%
Earnest <i>Russell MidCap</i>	-1.1% 0.2%	12.6% 2.6%	33.2% 5.0%	15.9% 1.7%	17.3% 2.9%	14.5% 2.4%	16.7% 1.2%
ERS Public Equity <i>ERS Equity Benchmark</i>	-0.9% 0.3%	14.3% 2.9%	34.9% 6.0%	12.4% 0.0%	13.6% 0.6%	10.8% 0.4%	13.2% 0.3%

Relative outperformance in blue

Relative underperformance in red

*Returns net of fees

Relative Investment Performance – Passive Equity Managers & Other

As of September 30, 2021

Passive Equity Managers

	3rd Qtr	YTD	1 Year	3 Year	5 Year	7 Year	10 Year
Northern Trust S&P 500 Index <i>S&P 500</i>	0.6% 0.0%	15.9% 0.0%	30.0% 0.0%	16.0% 0.0%	16.9% 0.0%	14.1% 0.0%	16.7% 0.0%
BlackRock Russell 1000 Value Index <i>Russell 1000 Value</i>	-0.8% 0.0%	16.1% 0.0%	35.0% 0.0%	10.2% 0.1%	N/A	N/A	N/A

Real Assets Manager

	3rd Qtr	YTD	1 Year	3 Year	5 Year	7 Year	10 Year
Principal Diversified Real Assets <i>Blended Benchmark</i>	1.5% 0.3%	12.3% 0.9%	24.2% 0.9%	7.1% 0.3%	6.3% 0.4%	N/A	N/A

Relative outperformance in blue

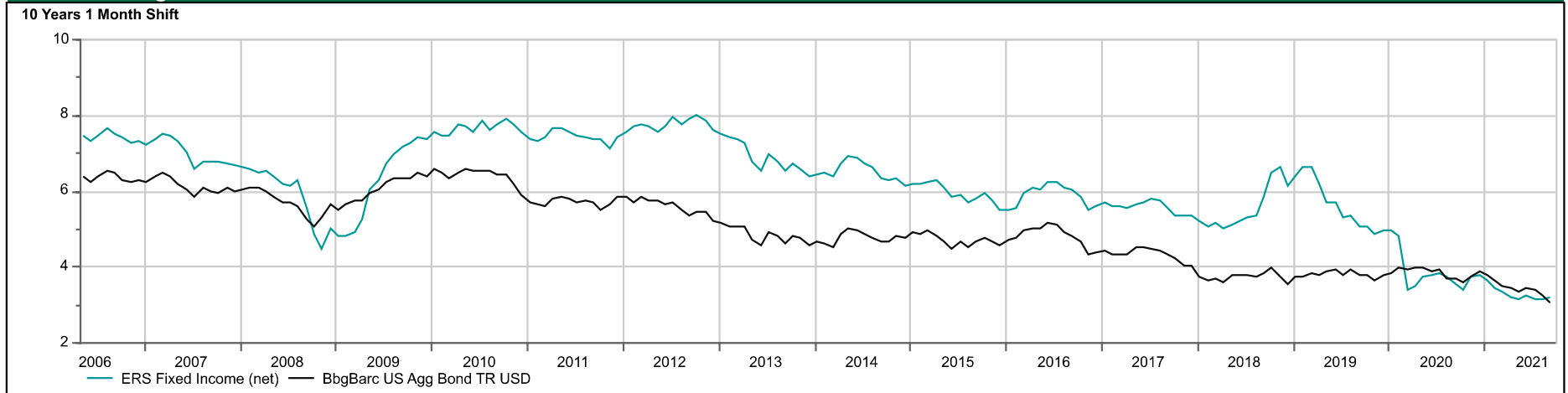
Relative underperformance in red

*Returns net of fees

Fixed Income

Fixed Income Performance

10 Year Rolling Returns – 6/1/1996 to 9/30/2021

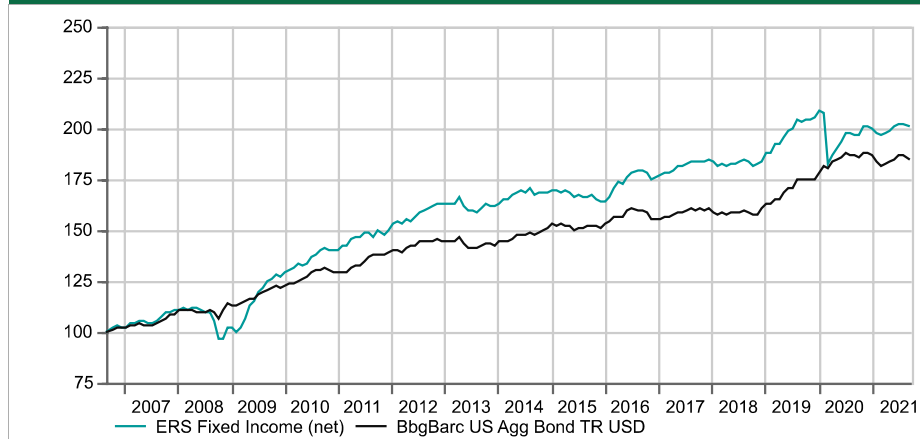


Trailing Returns

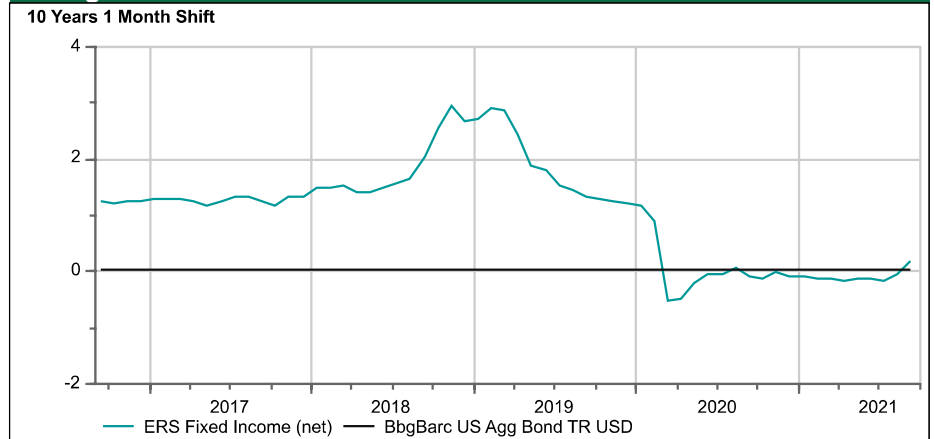
Annualized Return

	QTR	YTD	1 Year	3 Year	5 Year	7 Year	10 Year	15 Year
ERS Fixed Income (Gross)	0.1	-0.4	2.0	3.0	2.4	2.8	3.3	4.9
ERS Fixed Income (Net)	0.1	-0.4	1.9	2.9	2.3	2.6	3.2	4.7
Bloomberg Barclays US Aggregate	0.1	-1.6	-0.9	5.4	2.9	3.3	3.0	4.2

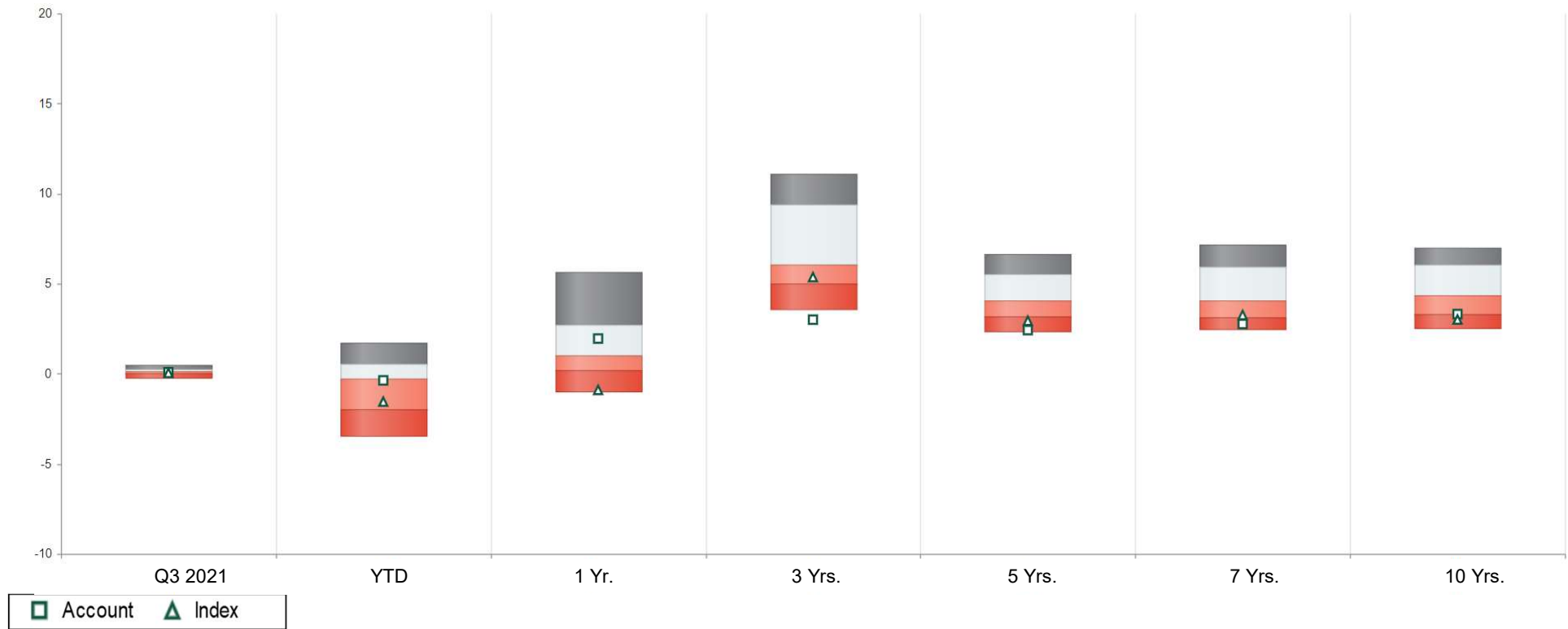
Investment Growth –10/1/2006 to 9/30/2021



Rolling Excess Return –10/1/2006 to 9/30/2021



Fixed Income vs Universe



	Q3 2021	YTD	1 Yr.	3 Yrs.	5 Yrs.	7 Yrs.	10 Yrs.
Account Return	0.1	-0.4	2.0	3.0	2.4	2.8	3.3
Percentile Rank	62	52	37	94	90	83	73
Index Return	0.1	-1.6	-0.9	5.4	2.9	3.3	3.0
Percentile Rank	70	72	89	66	81	74	82
1st Quartile	0.3	0.6	2.7	9.4	5.5	5.9	6.1
Median	0.1	-0.3	1.0	6.1	4.1	4.1	4.3
3rd Quartile	0.0	-2.0	0.2	5.0	3.2	3.1	3.3
Observations	101	101	100	104	101	99	91

Relative Investment Performance – Fixed Income Managers

As of September 30, 2021

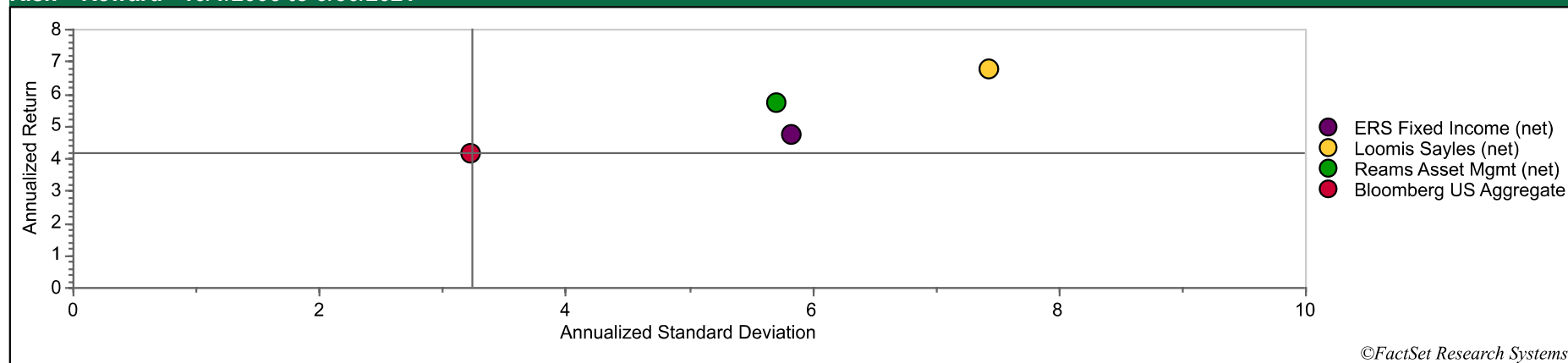
	3rd Qtr	YTD	1 Year	3 Year	5 Year	7 Year	10 Year
BlackRock Index	0.1%	-1.5%	-0.8%	5.4%	3.0%	N/A	N/A
<i>Bloomberg Barclays US Agg.</i>	0.0%	0.0%	0.1%	0.1%	0.1%		
Loomis Sayles	0.1%	2.1%	7.1%	6.9%	5.7%	5.1%	6.2%
<i>Bloomberg Barclays US Agg.</i>	0.0%	3.7%	8.0%	1.6%	2.7%	1.8%	3.2%
Reams	0.0%	-1.7%	-0.2%	8.6%	5.0%	4.8%	4.5%
<i>Bloomberg Barclays US Agg.</i>	0.0%	0.1%	0.7%	3.3%	2.1%	1.5%	1.5%
ERS Fixed Income	0.1%	-0.4%	1.9%	2.9%	2.3%	2.6%	3.2%
<i>Bloomberg Barclays US Agg.</i>	0.0%	1.1%	2.7%	2.5%	0.7%	0.6%	0.2%

Relative outperformance in blue
Relative underperformance in red

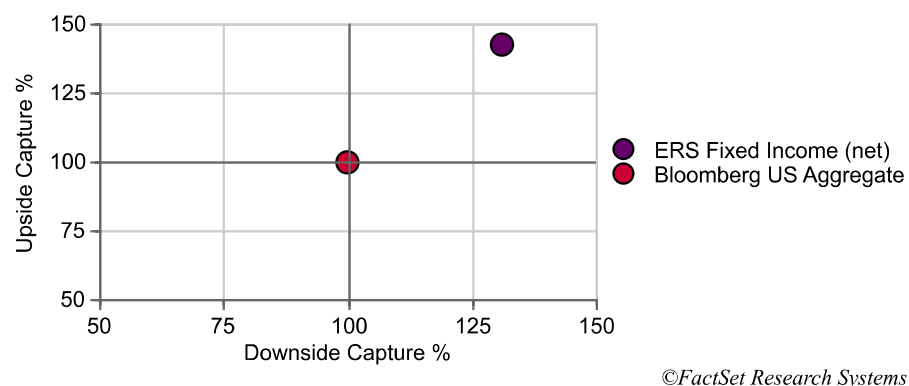
*Returns net of fees

Fixed Income Statistics

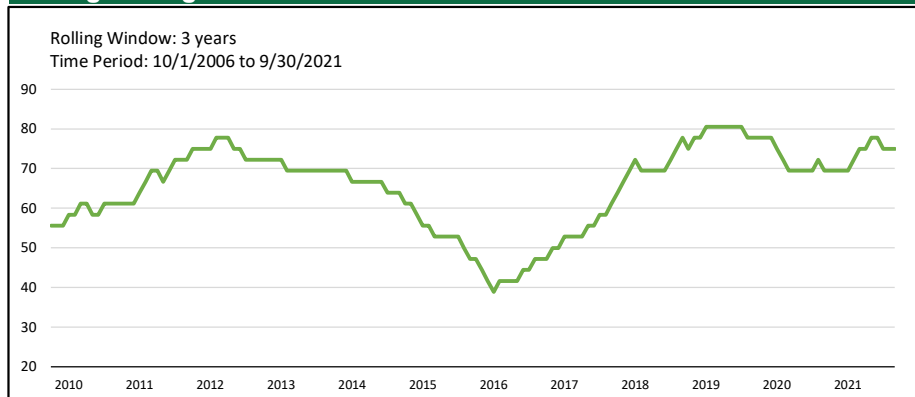
Risk – Reward –10/1/2006 to 9/30/2021



15 Year Upside-Downside –10/1/2006 to 9/30/2021



Batting Average



15 Year Risk –10/1/2006 to 9/30/2021

	Annualized Return	Standard Deviation	Sharpe Alpha	Information Ratio	Tracking Error	Beta
ERS Fixed Income (Net)	4.7	5.8	0.0	0.7	4.6	1.1
Bloomberg Barclays US Aggregate	4.2	3.2	0.0	1.0	--	1.0

Risk – 7/1/2013 to 9/30/2021

	Annualized Return	Standard Deviation	Sharpe Alpha	Information Ratio	Tracking Error	Beta
ERS Fixed Income (Net)	2.8	5.4	0.0	0.4	4.5	1.0
Bloomberg Barclays US Aggregate	3.3	3.0	0.0	0.9	--	1.0

Absolute Return

Relative Investment Performance – Absolute Return Managers

As of September 30, 2021

	3rd Qtr	YTD	1 Year	3 Year	5 Year	7 Year
Newton <i>1 Month Libor + 4%</i>	2.3% 1.3%	6.2% 3.2%	13.9% 9.8%	9.5% 4.3%	6.1% 0.9%	5.5% 0.5%
UBS A&Q <i>1 Year Libor + 4%</i>	3.0% 1.9%	5.4% 2.0%	10.1% 5.5%	8.5% 2.1%	7.1% 0.8%	N/A
ERS Absolute Return <i>3 Month T-Bill + 3%</i>	3.0% 2.2%	5.5% 3.2%	11.0% 8.0%	-0.4% 4.5%	1.9% 2.2%	2.9% 0.9%

Relative outperformance in blue

Relative underperformance in red

Risk Adjusted Returns (6/30/14 - 9/30/21)

	Return	Std Dev	Sharpe Ratio	Max Drawdown
ERS Public Equity (net)	9.9%	14.8%	0.6	-25.3%
ERS Fixed Income (net)	2.3%	5.7%	0.3	-12.6%
ERS Absolute Return (net)	3.1%	9.5%	0.2	-27.1%

*Returns net of fees

Private Equity

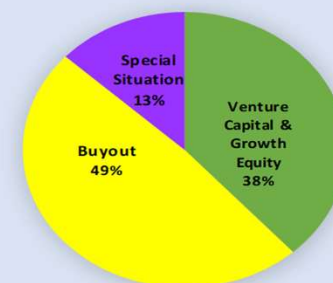
Private Equity

Milwaukee ERS Private Equity Portfolio as of June 30, 2021

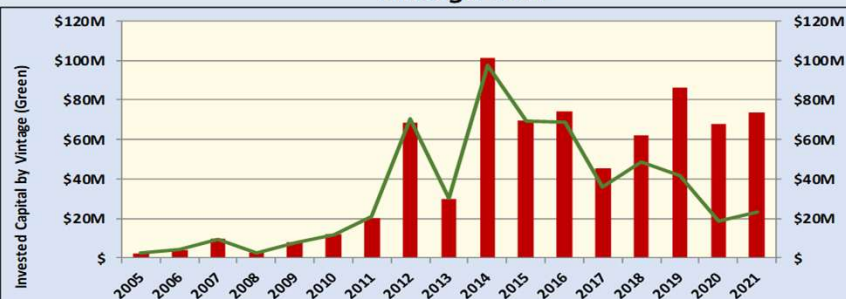
PE Summary - Portfolio Capital Calls, Distributions & NAV

Partnership	Vintage Year	Committed	Invested Capital *	Uncalled Commitments*	Distributions *	NAV	TVPI*
Abbott 2010	2010	35,000,000	34,650,405	349,595	40,517,859	32,306,489	2.10
Abbott 2011	2011	55,000,000	54,730,191	269,809	59,174,737	65,453,196	2.28
Abbott 2012	2012	40,000,000	39,400,000	600,000	34,400,000	54,094,116	2.25
Abbott 2013	2013	35,000,000	34,650,000	350,000	27,475,000	52,384,970	2.30
Abbott 2014	2014	35,000,000	34,300,000	700,000	21,175,000	57,208,521	2.29
Abbott 2015	2015	25,000,000	25,050,000	-	8,587,500	39,285,606	1.91
Abbott 2016	2016	20,000,000	18,207,500	1,792,500	5,040,000	26,872,586	1.75
Abbott 2018	2018	20,000,000	10,485,000	9,515,000	2,430,000	12,883,040	1.46
Abbott 2019	2019	20,000,000	6,333,750	13,666,250	-	9,973,914	1.57
Abbott 2020	2020	40,000,000	4,025,000	35,975,000	-	6,599,065	1.64
Abbott 2021	2021	20,000,000	2,666,787	17,333,213	-	2,768,429	1.04
Mesirow V	2008	75,000,000	70,346,194	4,653,806	99,598,045	77,957,892	2.52
Mesirow VI	2013	60,000,000	51,900,000	8,100,000	35,076,748	103,883,484	2.68
Mesirow VII	2017	100,000,000	57,514,499	42,485,501	-	95,727,969	1.66
Mesirow VIII	2020	120,000,000	18,000,000	102,000,000	-	19,480,301	1.08
Neuberger Berman III	2013	30,000,000	30,786,964	-	35,151,416	10,924,649	1.50
Neuberger Berman IV	2017	25,000,000	21,125,000	3,875,000	9,625,814	21,575,344	1.48
Private Advisors VI	2014	30,000,000	30,437,192	-	20,103,994	31,821,375	1.71
Private Advisors VII	2016	15,000,000	15,025,191	-	4,759,463	16,609,504	1.42
Private Advisors VIII	2018	15,000,000	9,588,495	5,411,505	1,231,936	12,870,527	1.47
Private Advisors IX	2019	35,000,000	12,736,649	22,263,351	3,113,971	13,228,421	1.28
Total ERS		850,000,000	581,958,817	269,340,530	407,461,483	763,909,398	2.01
% of ERS Fund				4.41%		12.52%	

Sub-Asset Class Breakdown



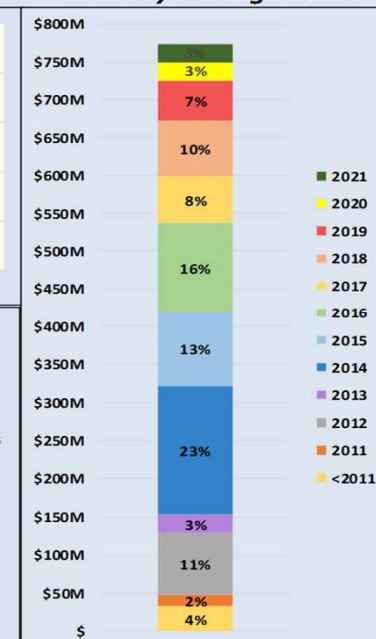
Vintage Year**



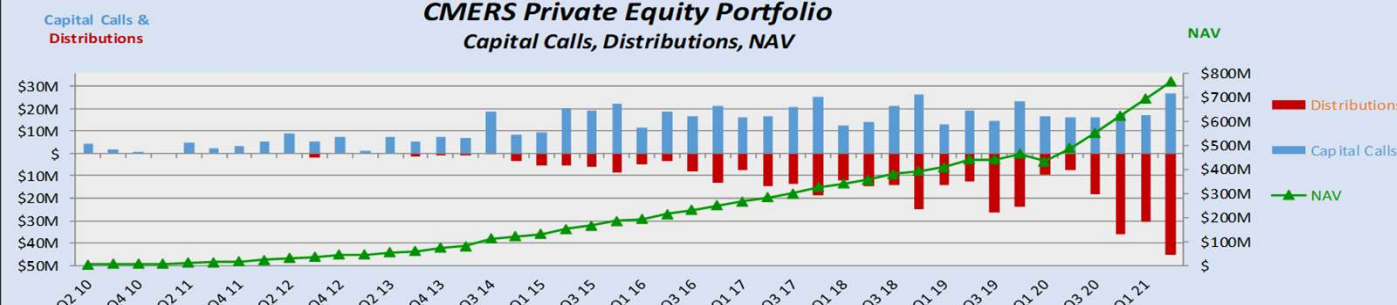
Age of Investment***



NAV by Vintage Year



CMERS Private Equity Portfolio Capital Calls, Distributions, NAV



* Invested capital, uncalled commitments, and distributions will not necessarily match partnership statement. Estimates reflect best efforts to incorporate actual ERS experience. TVPI stands for "Total Value to Paid in Capital."

** Vintage Year Investments Prior to 2005 are deemed to not be material figures and are not illustrated in above graph. Excludes Neuberger Berman.

*** Portfolio Companies by Age of Investment figures have not been fully adjusted for overlapping investments. Excludes Neuberger Berman.

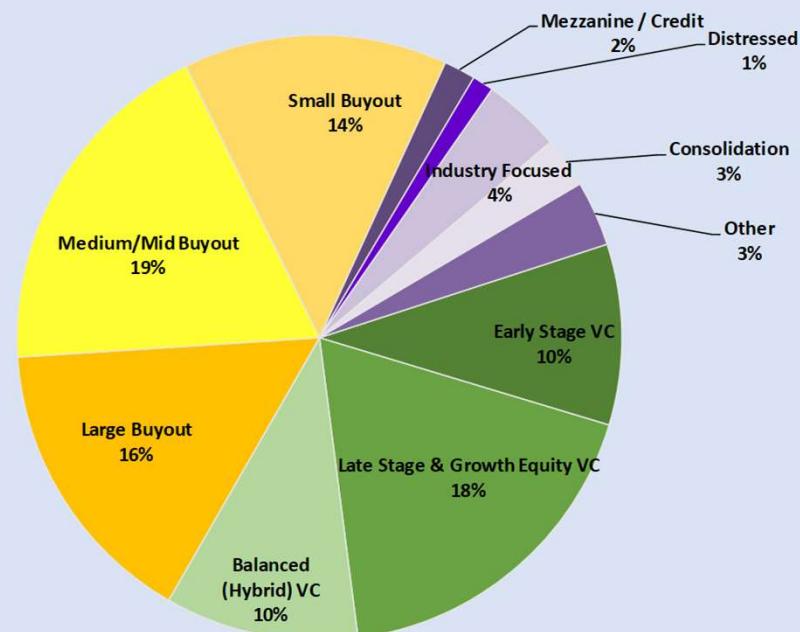
Private Equity Continued

Total Managers	202
Number of Partnerships	444
Number of Portfolio Companies	4,744

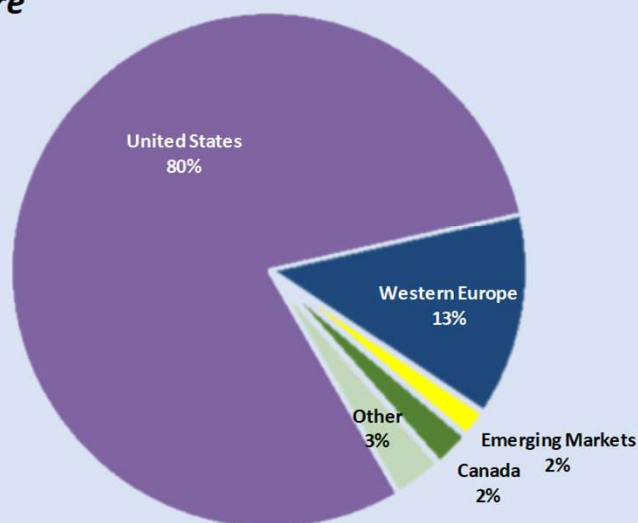
Note: Above table excludes Neuberger Berman (NB). The NB Secondary Funds has approximately 253 unique partnerships and 2,294 portfolio companies.

*Total Secondaries comprise 9.9% of the PE portfolio at a value of \$77.0m. Total Co-Investments comprise 3.1% of the PE Portfolio at a value of \$23.8m.

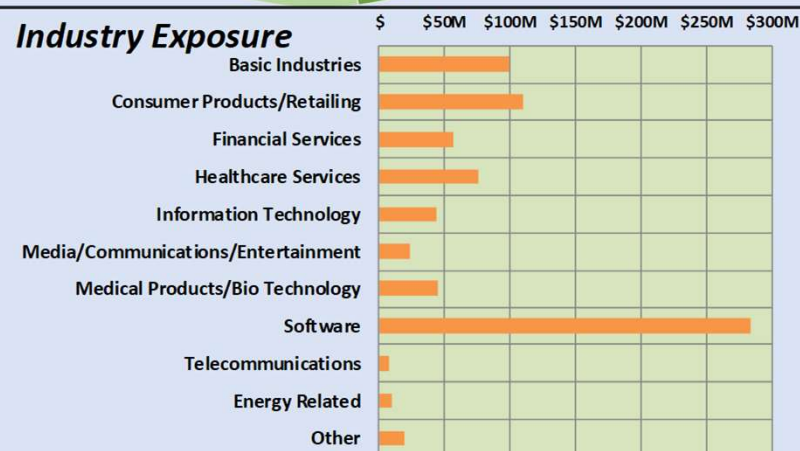
Strategy Exposure



Geographic Exposure



Industry Exposure



Performance Update

Performance Update

Estimated ERS Total Fund Market Value is \$6.16 billion as of November 3, 2021

Period	ERS Fund*	Benchmark
YTD through September 2021	13.4%	8.9%
October (Estimate)	2.2%	2.3%
November MTD (Estimate)	0.7%	0.5%
YTD Through November 3, 2021	16.7%	12.0%

*Returns Net of Fees