

September 22, 2022



**Pennsylvania State Employees'
Retirement System – Defined
Benefit Plan**

Second Quarter 2022

Executive Summary

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Callan

Market Environment

Equity and Fixed Income Markets Both Fell in 2Q22

Negative returns for stocks and bonds at the same time are unusual

Global equity markets down sharply following the invasion of Ukraine

- Similar impact across developed markets

Fixed income down with sharply higher inflation and interest rates

- Bloomberg Aggregate: -10.4% year-to-date
- CPI-U: +9.1% for the year ended 2Q22

Number of times stocks and bonds have been down together

- 37 quarters in almost 100 years, about 10% of the quarters
- But just twice on annual basis

Inflation spiked to highest rate in decades

Economic data show growth hit “pause”

- GDP fell 0.9% in 2Q22, after dropping 1.6% in 1Q22
- Forecasters have cut growth estimates for 2022 to 0%, or lower, and to 1.5% for 2023.

Returns for Periods ended 6/30/22

	1 Quarter	Year to Date	1 Year	5 Years	10 Years	25 Years
U.S. Equity						
Russell 3000	-16.70	-21.10	-13.87	10.60	12.57	8.06
S&P 500	-16.10	-19.96	-10.62	11.31	12.96	7.97
Russell 2000	-17.20	-23.43	-25.20	5.17	9.35	7.41
Global ex-U.S. Equity						
MSCI World ex USA	-14.66	-18.76	-16.76	2.66	5.37	4.07
MSCI Emerging Markets	-11.45	-17.63	-25.28	2.18	3.07	--
MSCI ACWI ex USA Small Cap	-17.55	-22.92	-22.45	2.55	6.22	5.68
Fixed Income						
Bloomberg Aggregate	-4.69	-10.35	-10.29	0.88	1.54	4.36
90-day T-Bill	0.10	0.14	0.17	1.11	0.64	1.96
Bloomberg Long Gov/Credit	-12.27	-21.88	-20.14	1.03	2.63	6.14
Bloomberg Global Agg ex-US	-11.01	-16.49	-18.78	-1.75	-1.06	2.83
Real Estate						
NCREIF Property	5.33	10.94	23.91	9.30	9.89	9.61
FTSE Nareit Equity	-17.00	-20.20	-6.27	5.30	7.39	8.67
Alternatives						
CS Hedge Fund	-2.30	-0.21	1.92	4.83	4.65	6.26
Cambridge Private Equity*	-1.51	3.61	22.01	20.68	16.50	15.43
Bloomberg Commodity	-5.66	18.44	24.27	8.39	-0.82	1.81
Gold Spot Price	-7.51	-1.16	2.02	7.79	1.20	6.97
Inflation - CPI-U	3.06	6.28	9.06	3.88	2.59	2.49

*Cambridge PE data through 03/31/22.

Sources: Bloomberg, Callan, Cambridge, Credit Suisse, FTSE Russell, MSCI, NCREIF, S&P Dow Jones Indices

Diversification Remains Key Risk Control

Periodic Table of Investment Returns

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2 Qtrs. 2022
Emerging Markets	Emerging Markets	Emerging Markets	Emerging Markets	Emerging Markets	U.S. Fixed	Emerging Markets	Small Cap	Real Estate Funds	Emerging Markets	Small Cap	Large Cap	Real Estate Funds	Small Cap	Emerging Markets	Real Estate Funds	Large Cap	Small Cap	Large Cap	Real Estate Funds
55.82%	25.55%	34.00%	32.17%	39.38%	5.24%	78.51%	26.85%	14.96%	18.23%	38.82%	13.69%	13.95%	21.31%	37.28%	7.36%	31.49%	19.96%	28.71%	12.00%
Small Cap	Non-U.S. Equity	Real Estate Funds	Non-U.S. Equity	Real Estate Funds	Non-U.S. Fixed	High Yield	Emerging Markets	U.S. Fixed	Non-U.S. Equity	Large Cap	Real Estate Funds	Large Cap	High Yield	Non-U.S. Equity	Cash Equivalent	Small Cap	Large Cap	Real Estate Funds	Cash Equivalent
47.25%	20.38%	20.15%	25.71%	14.84%	4.39%	58.21%	18.88%	7.84%	16.41%	32.39%	11.46%	1.38%	17.13%	24.21%	1.87%	25.52%	18.40%	21.02%	0.14%
Non-U.S. Equity	Small Cap	Non-U.S. Equity	Small Cap	Hedge Funds	Cash Equivalent	Non-U.S. Equity	Real Estate Funds	High Yield	Small Cap	Non-U.S. Equity	U.S. Fixed	U.S. Fixed	Large Cap	Large Cap	U.S. Fixed	Non-U.S. Equity	Emerging Markets	Small Cap	Hedge Funds
39.42%	18.33%	14.47%	18.37%	12.56%	2.06%	33.67%	15.26%	4.98%	16.35%	21.02%	5.97%	0.55%	11.96%	21.83%	0.01%	22.49%	18.31%	14.82%	-0.21%
High Yield	Non-U.S. Fixed	Hedge Funds	Large Cap	Non-U.S. Equity	Real Estate Funds	Small Cap	High Yield	Non-U.S. Fixed	Large Cap	Real Estate Funds	Small Cap	Cash Equivalent	Emerging Markets	Small Cap	High Yield	Emerging Markets	Non-U.S. Fixed	Non-U.S. Equity	U.S. Fixed
28.97%	12.54%	7.61%	15.79%	12.44%	-10.70%	27.17%	15.12%	4.36%	16.00%	12.90%	4.89%	0.05%	11.19%	14.65%	-2.08%	18.44%	10.11%	12.62%	-10.35%
Large Cap	Real Estate Funds	Large Cap	Real Estate Funds	Non-U.S. Fixed	Hedge Funds	Large Cap	Large Cap	Large Cap	High Yield	Hedge Funds	Hedge Funds	Hedge Funds	Real Estate Funds	Non-U.S. Fixed	Non-U.S. Fixed	High Yield	Non-U.S. Equity	Hedge Funds	High Yield
28.68%	12.00%	4.91%	15.27%	11.03%	-19.07%	26.47%	15.06%	2.11%	15.81%	9.73%	4.13%	-0.71%	7.79%	10.51%	-2.15%	14.32%	7.59%	8.23%	-14.19%
Non-U.S. Fixed	High Yield	Small Cap	Hedge Funds	U.S. Fixed	High Yield	Hedge Funds	Hedge Funds	Cash Equivalent	Real Estate Funds	High Yield	High Yield	Non-U.S. Equity	Non-U.S. Equity	High Yield	Hedge Funds	Hedge Funds	U.S. Fixed	High Yield	Non-U.S. Fixed
19.36%	11.13%	4.55%	13.86%	6.97%	-26.16%	18.57%	10.95%	0.10%	9.79%	7.44%	2.45%	-3.04%	2.75%	7.50%	-3.19%	9.31%	7.51%	5.28%	-16.49%
Hedge Funds	Large Cap	Cash Equivalent	High Yield	Large Cap	Small Cap	Non-U.S. Fixed	Non-U.S. Equity	Hedge Funds	Hedge Funds	Cash Equivalent	Cash Equivalent	Small Cap	U.S. Fixed	Hedge Funds	Large Cap	U.S. Fixed	High Yield	Cash Equivalent	Emerging Markets
15.44%	10.88%	3.06%	11.85%	5.49%	-33.79%	7.53%	8.95%	-2.52%	7.67%	0.07%	0.04%	-4.41%	2.65%	7.12%	-4.38%	8.72%	7.11%	0.05%	-17.63%
Real Estate Funds	Hedge Funds	High Yield	Non-U.S. Fixed	Cash Equivalent	Large Cap	U.S. Fixed	U.S. Fixed	Small Cap	U.S. Fixed	U.S. Fixed	Emerging Markets	High Yield	Non-U.S. Fixed	Real Estate Funds	Small Cap	Non-U.S. Fixed	Hedge Funds	U.S. Fixed	Non-U.S. Equity
8.28%	9.64%	2.74%	8.16%	5.00%	-37.00%	5.93%	6.54%	-4.18%	4.21%	-2.02%	-2.19%	-4.47%	1.49%	6.66%	-11.01%	5.09%	6.36%	-1.54%	-18.76%
U.S. Fixed	U.S. Fixed	U.S. Fixed	Cash Equivalent	High Yield	Non-U.S. Equity	Cash Equivalent	Non-U.S. Fixed	Non-U.S. Equity	Non-U.S. Fixed	Emerging Markets	Non-U.S. Fixed	Non-U.S. Fixed	Hedge Funds	U.S. Fixed	Non-U.S. Equity	Real Estate Funds	Cash Equivalent	Emerging Markets	Large Cap
4.10%	4.34%	2.43%	4.86%	1.87%	-43.56%	0.21%	4.95%	-12.21%	4.09%	-2.60%	-3.09%	-6.02%	1.25%	3.54%	-14.09%	4.39%	0.67%	-2.54%	-19.96%
Cash Equivalent	Cash Equivalent	Non-U.S. Fixed	U.S. Fixed	Small Cap	Emerging Markets	Real Estate Funds	Cash Equivalent	Emerging Markets	Cash Equivalent	Non-U.S. Fixed	Non-U.S. Equity	Emerging Markets	Cash Equivalent	Cash Equivalent	Emerging Markets	Cash Equivalent	Real Estate Funds	Non-U.S. Fixed	Small Cap
1.15%	1.33%	-8.65%	4.33%	-1.57%	-53.33%	-30.40%	0.13%	-18.42%	0.11%	-3.08%	-4.32%	-14.92%	0.33%	0.86%	-14.57%	2.28%	0.34%	-7.05%	-23.43%

- Bloomberg Barclays Corp High Yield ● Bloomberg Barclays Global Aggregate ex US ● Bloomberg Barclays US Aggregate
- Credit Suisse Hedge Fund ● ICE BofAML US 3-Month Treasury Bill ● MSCI Emerging Markets ● MSCI World ex USA
- NFI-ODCE (value-weighted net) ● Russell 2000 ● S&P 500

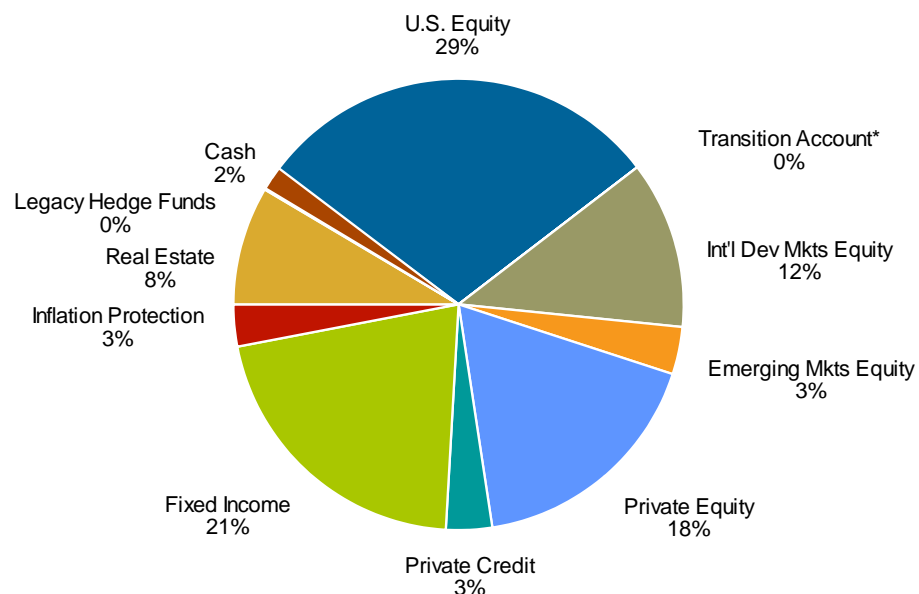
Callan

**PA SERS Defined Benefit Plan
Performance Review**

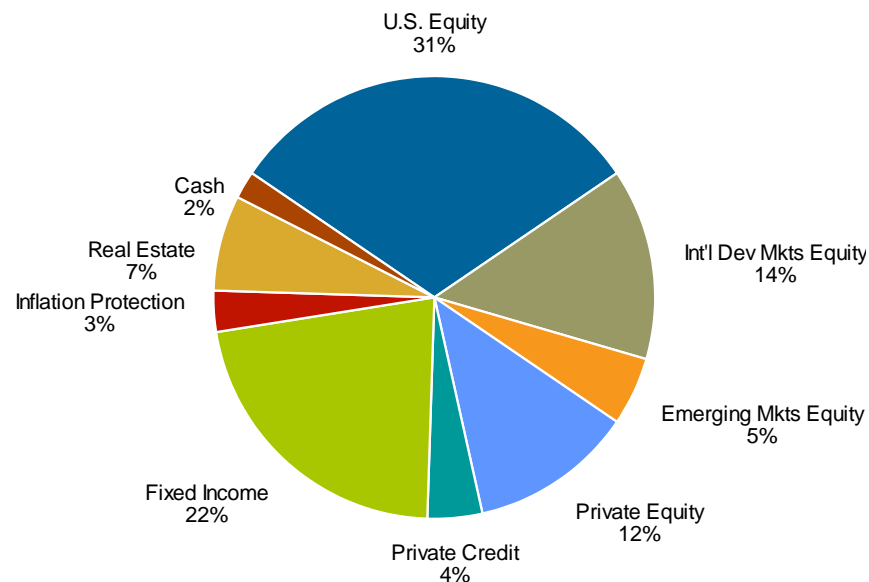
Total Fund

Actual Asset Allocation versus Target as of June 30, 2022

Actual Asset Allocation



Target Asset Allocation



Asset Class	\$000s Actual	Weight Actual	Target	Percent Difference	\$000s Difference
U.S. Equity	10,154,430	29.4%	31.0%	(1.6%)	(540,699)
Transition Account*	1,042	0.0%	0.0%	0.0%	1,042
Int'l Dev Mkts Equity	4,131,937	12.0%	14.0%	(2.0%)	(698,121)
Emerging Mkts Equity	1,165,024	3.4%	5.0%	(1.6%)	(559,997)
Private Equity	6,058,510	17.6%	12.0%	5.6%	1,918,461
Private Credit	1,136,040	3.3%	4.0%	(0.7%)	(243,977)
Fixed Income	7,267,495	21.1%	22.0%	(0.9%)	(322,597)
Inflation Protection	1,042,834	3.0%	3.0%	0.0%	7,822
Real Estate	2,920,427	8.5%	7.0%	1.5%	505,398
Legacy Hedge Funds	19,412	0.1%	0.0%	0.1%	19,412
Cash	603,265	1.7%	2.0%	(0.3%)	(86,743)
Total	34,500,415	100.0%	100.0%		

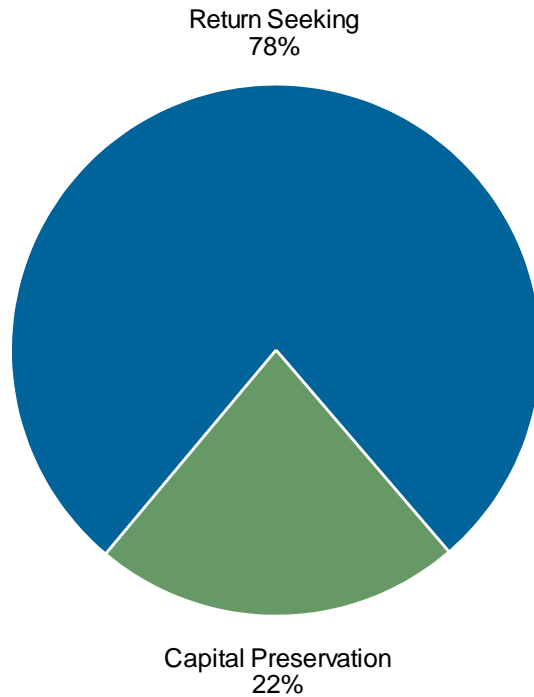
*Market values are shown net of accrued fees.

*Transition account market values are not included in any asset class and are excluded from these charts.

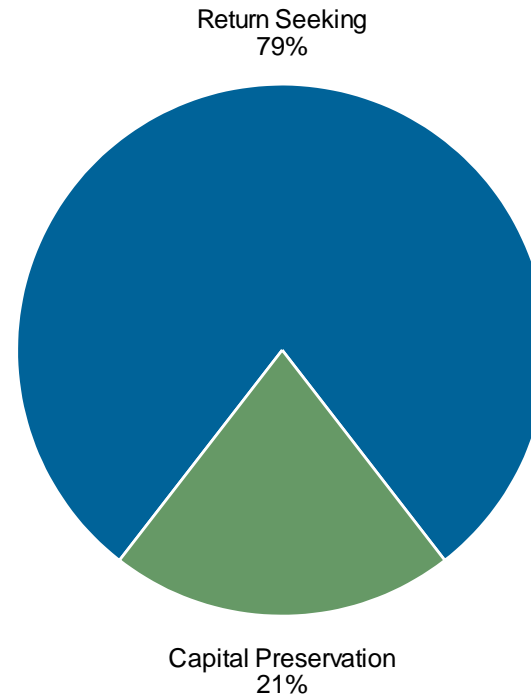
Return Seeking and Capital Preservation Assets

As of June 30, 2022

Actual Asset Allocation



Target Asset Allocation



*Return Seeking Assets: U.S. Equity, Int'l Developed Markets Equity, Emerging Markets Equity, Transition Account, Opportunistic Fixed Income, Long Duration Credit, High Yield, Private Equity, Private Credit, Real Estate and Legacy Hedge Funds.

*Capital Preservation Assets: Inflation Protection (TIPS), Interm Treas, Long Duration Treas, Securitized, Intermediate Credit and Cash.

*Market values are shown net of accrued fees.

Projected Risk, Liquidity and Correlation

	Capital Preservation Assets			Return Seeking Assets					
	Cash	Inflation Protection (TIPS)	Fixed Income [^]	U.S. Equity	Developed International Equity	Emerging Markets Equity	Private Credit	Real Estate	Private Equity
Policy Target Asset Allocation	2%	3%	22%	31%	14%	5%	4%	7%	12%
Projected Return* (Geometric)	1.20%	1.25%	1.75%	6.60%	6.50%	6.90%	5.50%	5.75%	8.00%
Projected Risk* (Standard Deviation)	0.90%	5.05%	3.75%	17.95%	19.90%	25.15%	14.60%	14.20%	27.60%
Liquidity	High	High	High	High	High	Medium	Low	Low	Low
Correlation to U.S. Equity*	-0.06	-0.08	-0.10	1.00	0.77	0.79	0.68	0.64	0.77
Months of Benefit Payments**	1.6	3.3	19.0 ^{^^}						
Months of Benefit Payments (Includes EE & ER Contributions)**	6.6	11.3	65.6						
Cumulative Months of Benefit Payments (Includes EE & ER Contributions)**		83.4							

*Callan 2022 Capital Market Projections

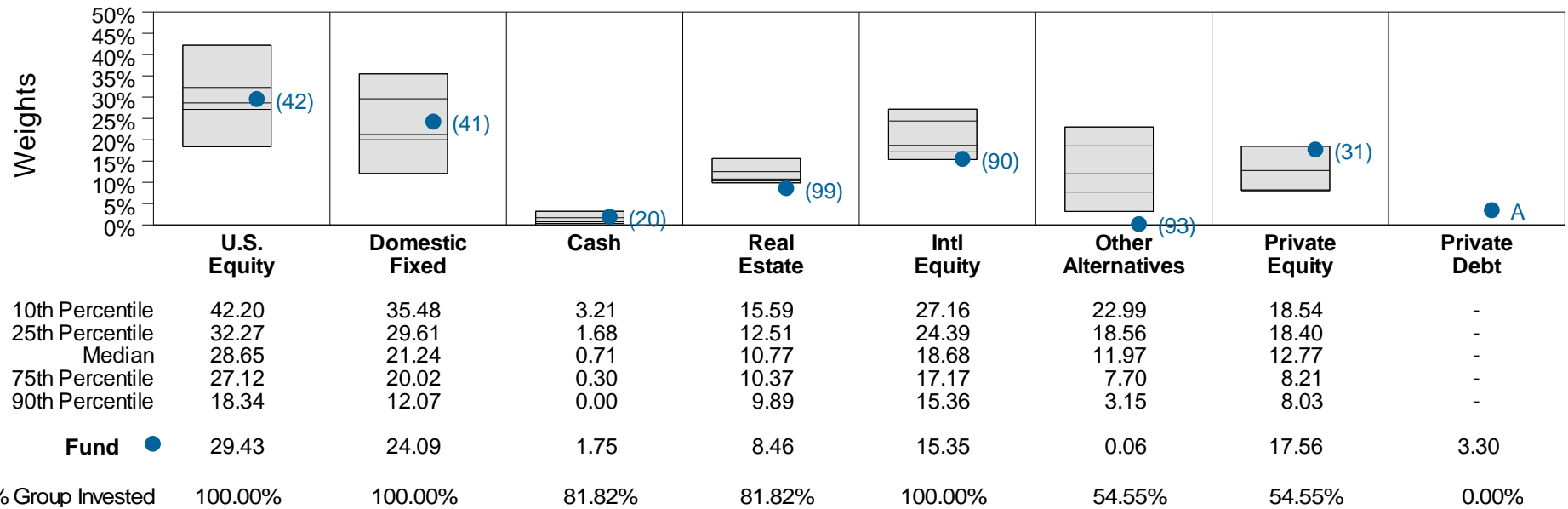
**SERS IO as of 6/30/2022. Benefit payment calculations for fixed income represent core fixed income & treasury allocations. ^^ Represents core fixed income and treasuries allocations.

[^]Core and Opportunistic fixed Income combined until new fixed income structure has been fully implemented.

Total Fund

Actual Asset Allocation versus Very Large Public DB Plan (>\$10B) Peers as of June 30, 2022

Asset Class Weights vs Callan Public Fund Spons- V Lg DB (>10B)



Current Quarter Target = 22.0% Blmbg U.S. Agg Bond Index, 31.0% Russell 3000 Index, 12.0% Private Equity, 14.0% MSCI World ex US IMI, 6.3% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% S&P Levered Loan Index +1% (Qtr lag), 5.0% MSCI EM IMI, 3.0% U.S. TIPS Index, 2.0% 3-month Treasury Bill, 0.7% FTSE EP/NA US Index

Total Fund

One Quarter Attribution Analysis versus Target – Gross of Fees as of June 30, 2022

Note: Attribution is a snapshot in time. Asset allocation effect utilizes monthly asset class weights to calculate the overall effect on attribution. Asset class weights fluctuate month to month and are combined to calculate a quarterly attribution effect.

Relative Attribution Effects for Quarter ended June 30, 2022

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
U.S. Equity	30%	31%	(16.51%)	(16.70%)	0.06%	0.03%	0.09%
Int'l Dev. Mkts Equity	13%	14%	(14.80%)	(15.15%)	0.04%	0.09%	0.13%
Emerging Markets	3%	5%	(13.10%)	(12.10%)	(0.04%)	0.05%	0.01%
Private Equity	17%	12%	(1.10%)	(1.10%)	0.00%	0.35%	0.35%
Private Credit	3%	4%	3.59%	0.15%	0.10%	(0.09%)	0.01%
Fixed Income	21%	22%	(4.84%)	(4.69%)	(0.03%)	(0.05%)	(0.08%)
Inflation Protection	3%	3%	(6.95%)	(6.08%)	(0.03%)	(0.00%)	(0.03%)
Real Estate	8%	7%	3.66%	5.09%	(0.10%)	0.09%	(0.00%)
Legacy Hedge Funds	0%	0%	0.70%	0.70%	0.00%	0.01%	0.01%
Cash	2%	2%	0.17%	0.10%	0.00%	0.02%	0.02%

Total	(8.53%) = (9.04%) + 0.02% + 0.49%	0.51%
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- What helped relative attribution?**
 - Outperformance relative to target from Private Credit, U.S. Equity and International Developed Equity managers
 - An overweight to Private Equity and Real Estate (attribution based on target return)
 - A slight underweight to International Developed Equity (attribution based on target return)
- What hurt relative attribution?**
 - Underperformance relative to target from Real Estate and Emerging Markets Equity managers
 - A slight underweight to Private Credit and Fixed Income (attribution based on target return)

Current Quarter Target = 22.0% Blmbg U.S. Agg Bond Index, 31.0% Russell 3000 Index, 12.0% Private Equity, 14.0% MSCI World ex US IMI, 6.3% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% S&P Levered Loan Index +1% (Qtr lag), 5.0% MSCI EM IMI, 3.0% U.S. TIPS Index, 2.0% 3-month Treasury Bill, 0.7% FTSE EP/NA US Index. Returns are shown gross of fees.

Total Fund

One Year Attribution Analysis versus Target – Gross of Fees as of June 30, 2022

Note: Attribution is a snapshot in time. Asset allocation effect utilizes monthly asset class weights to calculate the overall effect on attribution. Asset class weights fluctuate month to month and are combined to calculate an annual attribution effect.

One Year Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
U.S. Equity	30%	30%	(14.44%)	(13.87%)	(0.20%)	(0.14%)	(0.34%)
Int'l Dev. Mkts Equity	13%	14%	(16.85%)	(17.73%)	0.13%	0.12%	0.25%
Emerging Markets	4%	5%	(28.19%)	(24.75%)	(0.16%)	0.16%	0.00%
Private Equity	16%	12%	29.83%	29.83%	0.00%	1.07%	1.07%
Private Credit	3%	4%	17.18%	4.25%	0.35%	(0.14%)	0.21%
Fixed Income	22%	23%	(9.21%)	(10.29%)	0.25%	(0.01%)	0.24%
Inflation Protection	3%	3%	(6.39%)	(5.14%)	(0.04%)	0.00%	(0.04%)
Real Estate	7%	7%	20.54%	24.86%	(0.25%)	0.10%	(0.15%)
Legacy Hedge Funds	0%	0%	1.49%	1.49%	0.00%	0.00%	0.00%
Cash	2%	2%	0.22%	0.17%	0.00%	0.05%	0.05%

Total	(4.44%) = (5.73%) + 0.08% + 1.21%	1.29%
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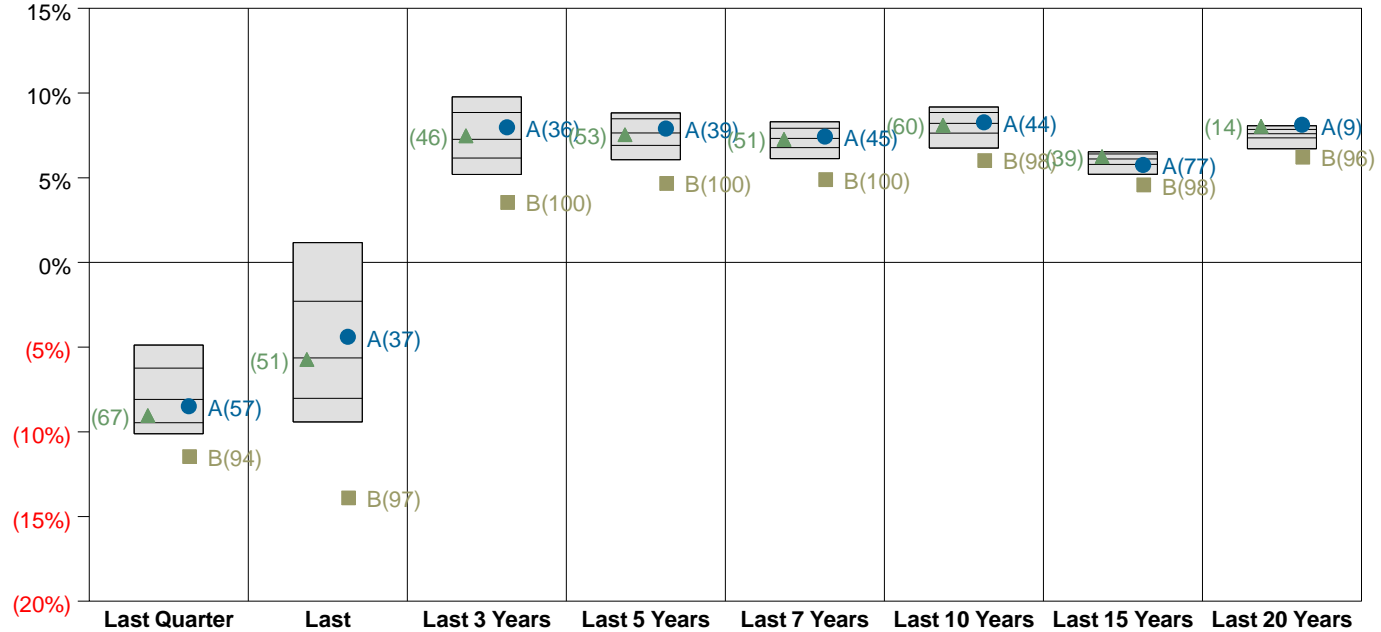
- **What helped relative attribution?**
 - Outperformance relative to target from Private Credit, Fixed Income and International Developed Markets Equity managers
 - An overweight to Private Equity (attribution based on target return)
 - A slight underweight to Emerging Markets Equity, International Developed Equity and Real Estate (attribution based on target return)
- **What hurt relative attribution?**
 - Underperformance relative to target from Real Estate, U.S. Equity and Emerging Markets Equity managers
 - A slight underweight to U.S. Equity and Private Credit (attribution based on target return)

Current Quarter Target = 22.0% Blmbg U.S. Agg Bond Index, 31.0% Russell 3000 Index, 12.0% Private Equity, 14.0% MSCI World ex US IMI, 6.3% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% S&P Levered Loan Index +1% (Qtr lag), 5.0% MSCI EM IMI, 3.0% U.S. TIPS Index, 2.0% 3-month Treasury Bill, 0.7% FTSE EP/NA US Index
Returns are shown gross of fees.

Total Fund

Gross of Fee Performance versus Very Large Public DB Plan (>\$10B) Peers and Benchmark as of June 30, 2022

Performance vs Callan Public Fund Spons- V Lg DB (>10B) (Gross)



	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years	Last 10 Years	Last 15 Years	Last 20 Years
10th Percentile	(4.88)	1.18	9.77	8.83	8.31	9.18	6.53	8.07
25th Percentile	(6.24)	(2.30)	8.85	8.48	7.91	8.85	6.40	7.85
Median	(8.09)	(5.64)	7.27	7.64	7.32	8.21	6.11	7.60
75th Percentile	(9.47)	(8.02)	6.17	6.91	6.78	7.63	5.79	7.35
90th Percentile	(10.11)	(9.42)	5.19	6.06	6.13	6.75	5.21	6.71
Total Fund	● A (8.53)	(4.44)	7.93	7.86	7.39	8.23	5.71	8.08
60% MSCI ACW IMI/40% Blmbg U.S. Agg	■ B (11.46)	(13.90)	3.54	4.66	4.89	6.02	4.58	6.22
Total Fund Custom Benchmark	▲ (9.04)	(5.73)	7.48	7.54	7.26	8.10	6.25	8.04

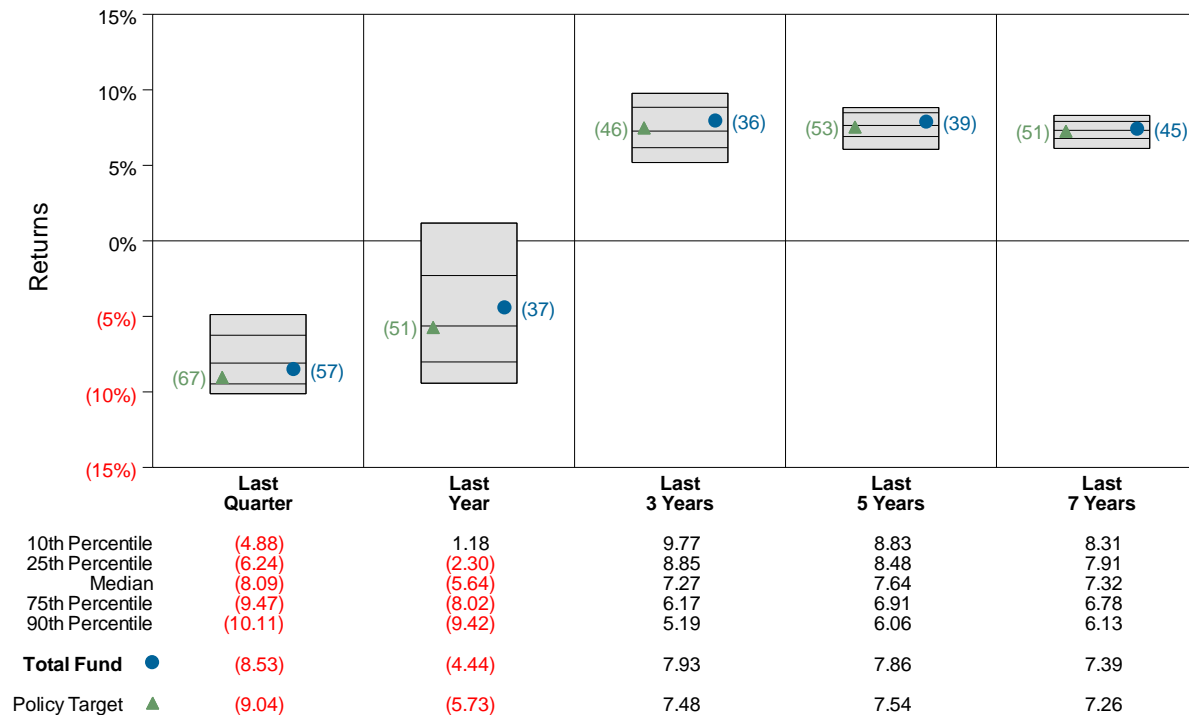
Current Quarter Target = 22.0% Blmbg U.S. Agg Bond Index, 31.0% Russell 3000 Index, 12.0% Private Equity, 14.0% MSCI World ex US IMI, 6.3% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% S&P Levered Loan Index +1% (Qtr lag), 5.0% MSCI EM IMI, 3.0% U.S. TIPS Index, 2.0% 3-month Treasury Bill, 0.7% FTSE EP/NA US Index

Total Fund

Asset Allocation-Adjusted Gross of Fee Performance versus Very Large Public DB Plan (>\$10B) Peers as of June 30, 2022

- For this comparison, each fund in the Database is adjusted to have the same asset allocation as Pennsylvania SERS. This removes large asset allocation variances among plans and allows for a greater focus on manager performance.

Callan Public Fund Spons- V Lg DB (>10B)

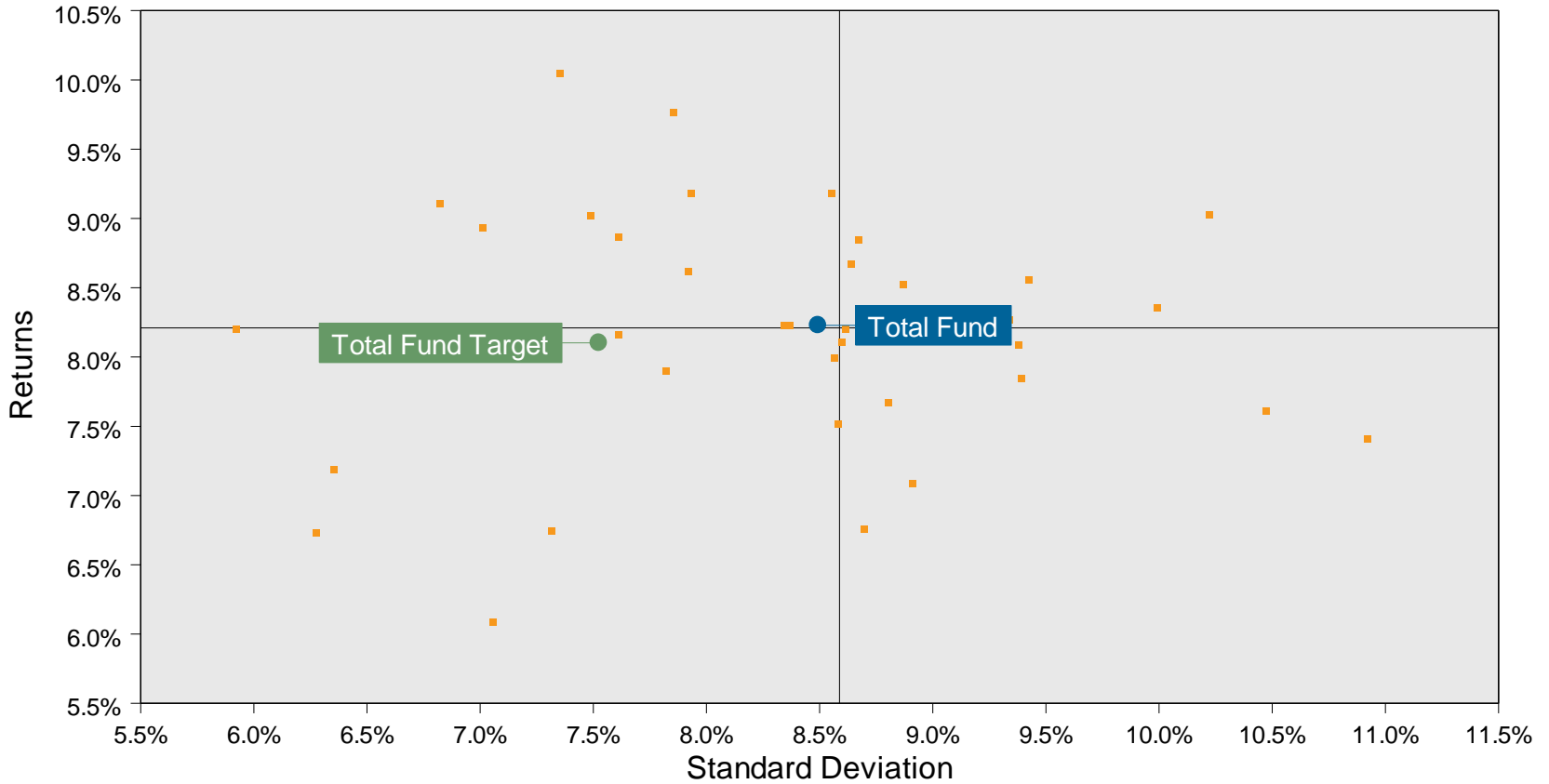


Current Quarter Target = 22.0% Blmbg U.S. Agg Bond Index, 31.0% Russell 3000 Index, 12.0% Private Equity, 14.0% MSCI World ex US IMI, 6.3% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% S&P Levered Loan Index +1% (Qtr lag), 5.0% MSCI EM IMI, 3.0% U.S. TIPS Index, 2.0% 3-month Treasury Bill, 0.7% FTSE EP/NA US Index

Total Fund

Risk vs. Return versus Very Large Public DB Plan (>\$10B) Peers as of June 30, 2022

Ten Year Annualized Risk vs Return



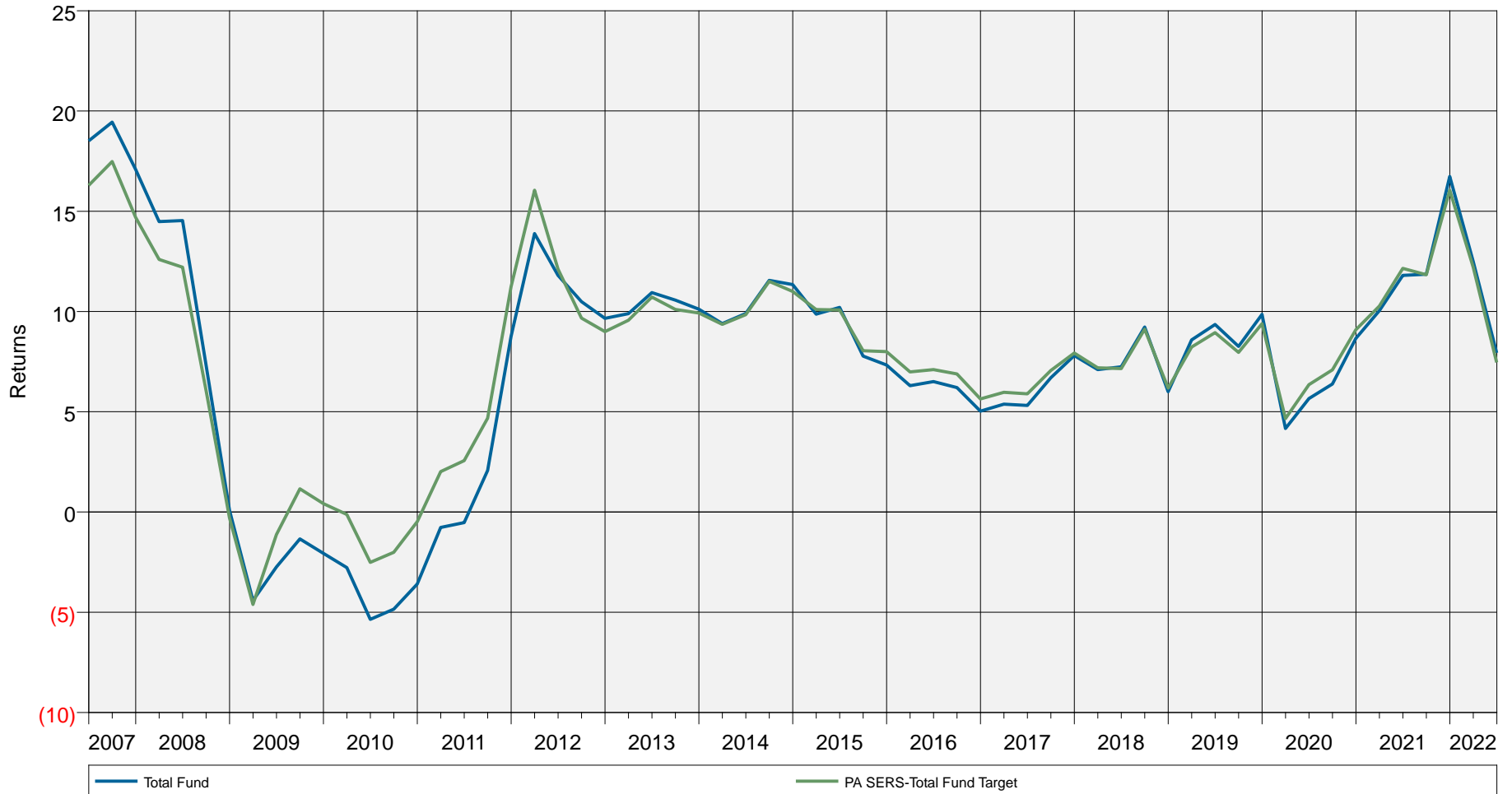
Squares represent membership of the Callan Public Fund Spons- V Lg DB (>10B)

Current Quarter Target = 22.0% Blmbg U.S. Agg Bond Index, 31.0% Russell 3000 Index, 12.0% Private Equity, 14.0% MSCI World ex US IMI, 6.3% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% S&P Levered Loan Index +1% (Qtr lag), 5.0% MSCI EM IMI, 3.0% U.S. TIPS Index, 2.0% 3-month Treasury Bill, 0.7% FTSE EP/NA US Index

Total Fund

Rolling 3-year Gross of Fee Performance versus Benchmark as of June 30, 2022

Rolling 12 Quarter Gross of Fee Returns
for 15 Years Ended June 30, 2022

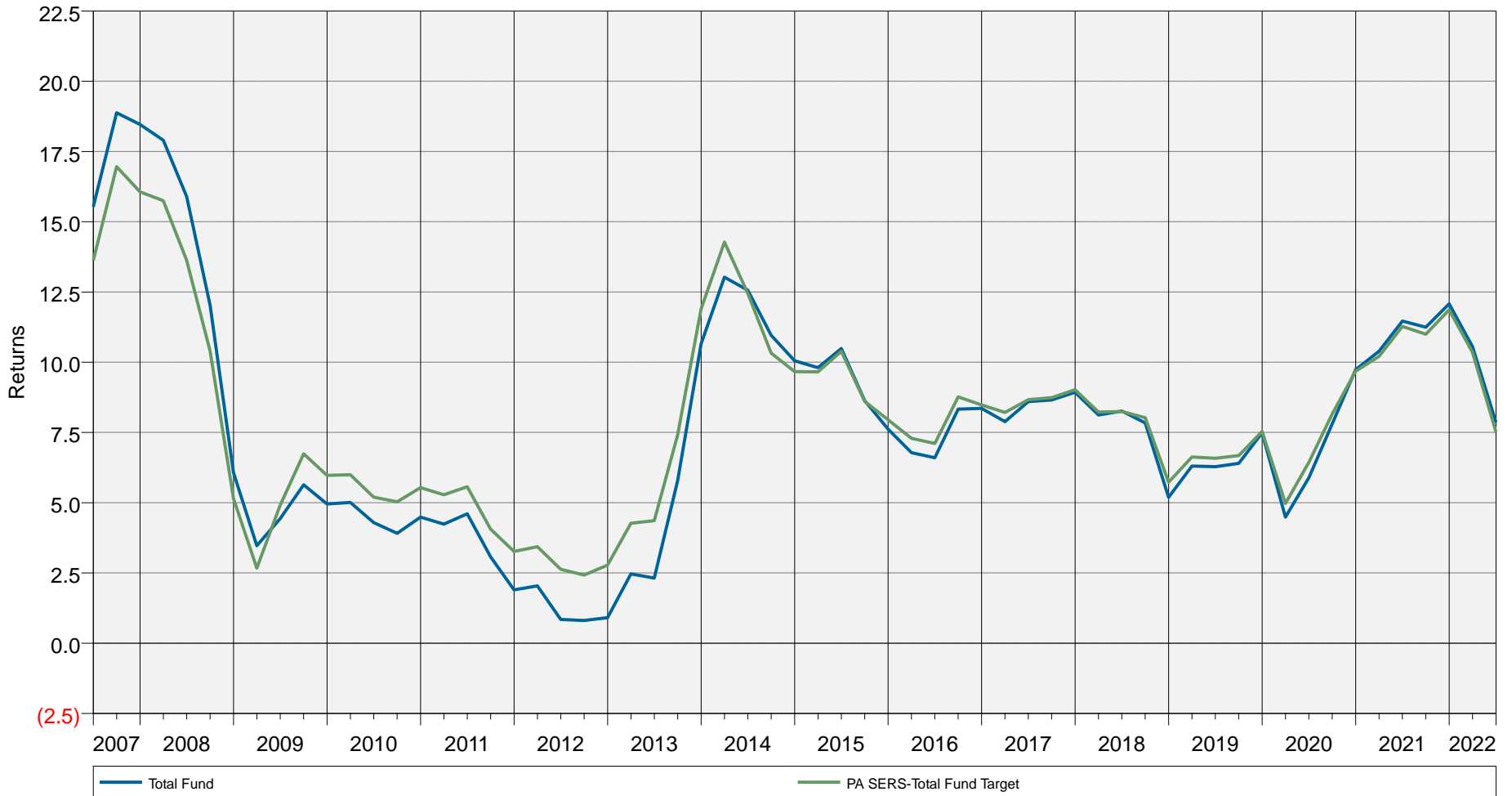


Current Quarter Target = 22.0% Blmbg U.S. Agg Bond Index, 31.0% Russell 3000 Index, 12.0% Private Equity, 14.0% MSCI World ex US IMI, 6.3% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% S&P Levered Loan Index +1% (Qtr lag), 5.0% MSCI EM IMI, 3.0% U.S. TIPS Index, 2.0% 3-month Treasury Bill, 0.7% FTSE EP/NA US Index

Total Fund

Rolling 5-year Gross of Fee Performance versus Benchmark as of June 30, 2022

Rolling 20 Quarter Gross of Fee Returns
for 15 Years Ended June 30, 2022



Current Quarter Target = 22.0% Blmbg U.S. Agg Bond Index, 31.0% Russell 3000 Index, 12.0% Private Equity, 14.0% MSCI World ex US IMI, 6.3% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% S&P Levered Loan Index +1% (Qtr lag), 5.0% MSCI EM IMI, 3.0% U.S. TIPS Index, 2.0% 3-month Treasury Bill, 0.7% FTSE EP/NA US Index

Asset Class Returns

As of June 30, 2022

	Market Value \$(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance							
Total Fund	\$34,500	100.00%	(8.72%)	(11.68%)	(5.65%)	6.84%	6.96%
Total Fund Custom Benchmark(1)	-	-	(9.04%)	(11.91%)	(5.73%)	7.48%	7.54%
Public Market Equiv Benchmark(2)	-	-	(9.45%)	(12.06%)	(8.02%)	6.35%	6.94%
60/40 Index(3)	-	-	(11.46%)	(16.44%)	(13.90%)	3.54%	4.66%
U.S. Equity	\$10,154	29.43%	(16.51%)	(21.07%)	(14.47%)	9.33%	9.82%
Russell 3000 Index (4)	-	-	(16.70%)	(21.10%)	(13.87%)	9.77%	10.60%
S&P 1500 Index	-	-	(16.02%)	(19.91%)	(11.02%)	10.29%	10.92%
Int'l Developed Mkts Equity	\$4,132	11.98%	(14.83%)	(19.73%)	(16.96%)	2.69%	3.13%
MSCI World ex US IMI	-	-	(15.15%)	(19.54%)	(17.73%)	1.72%	2.58%
Emerging Mkts Equity	\$1,165	3.38%	(13.21%)	(21.74%)	(28.57%)	1.92%	2.87%
MSCI EM IMI	-	-	(12.10%)	(17.94%)	(24.75%)	1.15%	2.33%
Private Equity	\$6,059	17.56%	(1.55%)	1.19%	22.79%	23.63%	19.22%
Burgiss Private Equity Index (Qtr lag)	-	-	(0.66%)	3.58%	17.15%	19.14%	17.11%
Global Equity + 3% (Qtr lag)(5)	-	-	(4.22%)	3.82%	12.99%	19.75%	17.67%
Private Credit	\$1,136	3.29%	2.42%	5.49%	12.68%	12.54%	-
S&P Levered Loan Index + 1% (Qtr lag)	-	-	0.15%	1.14%	4.25%	5.30%	-
Fixed Income	\$7,267	21.06%	(4.88%)	(9.75%)	(9.39%)	(1.01%)	0.87%
Blmbg U.S. Agg Bond Index	-	-	(4.69%)	(10.35%)	(10.29%)	(0.93%)	0.88%
Inflation Protection (TIPS)	\$1,043	3.02%	(6.98%)	(9.79%)	(6.49%)	2.44%	2.84%
Blmbg U.S. TIPS Index	-	-	(6.08%)	(8.92%)	(5.14%)	3.04%	3.21%
Real Estate	\$2,920	8.46%	2.59%	6.25%	17.25%	10.04%	7.03%
Real Estate Custom Bench (Qtr lag)(6)	-	-	5.09%	11.63%	24.86%	10.54%	8.78%
CPI + 3% (Qtr lag)	-	-	3.80%	6.23%	11.54%	7.19%	6.35%
Cash	\$603	1.75%	0.17%	0.19%	0.21%	0.65%	1.19%
3-month Treasury Bill	-	-	0.10%	0.14%	0.17%	0.63%	1.11%

(1) The current total fund benchmark consists of: 22% Bloomberg U.S. Agg Bond Index, 12% SERS Private Equity Composite, 31% Russell 3000 Index, 14% MSCI World ex US IMI Index, 7% Real Estate Custom Benchmark, 4% S&P/LSTA Leveraged Loan Index + 1% (Qtr lag), 5% MSCI Emerging Markets IMI Index, 3% Bloomberg US TIPS Index, 2% ICE BofAML 3 Mo US T-Bill Index. See page 78 for full benchmark history.

(2) The current public equivalent benchmark consists of: 22% Bloomberg U.S. Agg Bond Index, 31% Russell 3000, 14% MSCI World ex US IMI Index, 9% Russell 3000+ 3% (Qtr lag), 7% CPI+3% (Qtr Lag), 4% S&P/LSTA Levered Loan Index +1% (Qtr lag), 3% Bloomberg US TIPS Index, 5% MSCI EM IMI Index, 3% MSCI World ex US +3% (Qtr lag) 2% ICE BofAML 3 Mo US T-Bill Index. See page 78 for full benchmark history.

(3) Benchmark consists of 60% MSCI ACW IMI Index and 40% Bloomberg U.S. Agg Bond Index.

(4) Benchmark history is a blend of current and past benchmark indices. History prior to 12/31/2018 is provided by RVK.

(5) As of 01/01/2020 benchmark consists of 25% MSCI World ex US +3% (Qtr lag) and 75% Russell 3000 + 3% (Qtr lag). Benchmark performance represents the historical benchmark (Russell 3000 +3% Qtr lag) linked to the current benchmark.

(6) As of 03/31/2019 benchmark consists of 90% NCREIF ODCE Index (Qtr lag) and 10% FTSE NAREIT Index (unlagged).

Prior to 03/31/2019, benchmark history was provided by RVK.

Asset Class Returns

As of June 30, 2022

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception
Net Performance					
Total Fund	7.44%	4.88%	7.23%	6.99%	9.32% (1/81)
Total Fund Custom Benchmark(1)	8.10%	6.25%	8.04%	7.44%	-
Public Market Equity Benchmark(2)	8.00%	6.20%	8.01%	7.42%	-
60/40 Index(3)	6.02%	4.58%	6.22%	5.65%	-
U.S. Equity	11.86%	6.70%	8.55%	7.66%	10.52% (1/81)
Russell 3000 Index (4)	12.57%	8.36%	9.14%	8.02%	10.83% (1/81)
S&P 1500 Index	12.77%	8.51%	9.16%	8.18%	-
Int'l Developed Mkts Equity	6.30%	1.54%	5.74%	-	5.64% (1/02)
MSCI World ex US IMI	5.53%	1.72%	5.77%	4.31%	5.64% (1/02)
Emerging Mkts Equity	3.65%	0.47%	6.36%	-	6.42% (1/02)
MSCI EM IMI	3.20%	2.12%	8.52%	4.00%	8.39% (1/02)
Private Equity	14.10%	11.88%	12.31%	13.66%	11.96% (1/86)
Burgiss Private Equity Index (Qtr lag)	14.47%	11.75%	13.12%	14.29%	17.14% (1/86)
Global Equity + 3% (Qtr lag)(5)	17.02%	13.26%	12.58%	12.84%	14.93% (1/86)
Private Credit	-	-	-	-	11.31% (12/17)
S&P Levered Loan Index + 1% (Qtr lag)	-	-	-	-	5.12% (12/17)
Fixed Income	1.96%	3.63%	4.80%	4.95%	7.73% (1/81)
Blmbg U.S. Agg Bond Index	1.54%	3.26%	3.57%	4.36%	7.02% (1/81)
Inflation Protection (TIPS)	1.61%	3.18%	-	-	3.11% (2/03)
Blmbg U.S. TIPS Index	1.73%	3.92%	4.44%	5.04%	4.10% (2/03)
Real Estate	7.72%	3.70%	6.98%	7.86%	8.52% (3/84)
Real Estate Custom Bench (Qtr lag)(6)	9.81%	5.91%	7.95%	8.45%	-
CPI + 3% (Qtr lag)	5.29%	5.27%	5.41%	5.37%	5.76% (3/84)
Cash	0.90%	1.07%	1.51%	2.29%	3.40% (1/87)
3-month Treasury Bill	0.64%	0.75%	1.25%	1.96%	3.13% (1/87)

(1) The current total fund benchmark consists of: 22% Bloomberg U.S. Agg Bond Index, 12% SERS Private Equity Composite, 31% Russell 3000 Index, 14% MSCI World ex US IMI Index, 7% Real Estate Custom Benchmark, 4% S&P/LSTA Leveraged Loan Index + 1% (Qtr lag), 5% MSCI Emerging Markets IMI Index, 3% Bloomberg US TIPS Index, 2% ICE BofAML 3 Mo US T-Bill Index. See page 78 for full benchmark history.

(2) The current public equivalent benchmark consists of: 22% Bloomberg U.S. Agg Bond Index, 31% Russell 3000, 14% MSCI World ex US IMI Index, 9% Russell 3000+ 3% (Qtr lag), 7% CPI+3% (Qtr Lag), 4% S&P/LSTA Levered Loan Index +1% (Qtr lag), 3% Bloomberg US TIPS Index, 5% MSCI EM IMI Index, 3% MSCI World ex US +3% (Qtr lag) 2% ICE BofAML 3 Mo US T-Bill Index. See page 78 for full benchmark history.

(3) Benchmark consists of 60% MSCI ACW IMI Index and 40% Bloomberg U.S. Agg Bond Index

(4) Benchmark history is a blend of current and past benchmark indices. History prior to 12/31/2018 is provided by RVK.

(5) As of 01/01/2020 benchmark consists of 25% MSCI World ex US +3% (Qtr lag) and 75% Russell 3000 + 3% (Qtr lag). Benchmark performance represents the historical benchmark (Russell 3000 +3% Qtr lag) linked to the current benchmark.

(6) As of 03/31/2019 benchmark consists of 90% NCREIF ODCE Index (Qtr lag) and 10% FTSE NAREIT Index (unlagged)

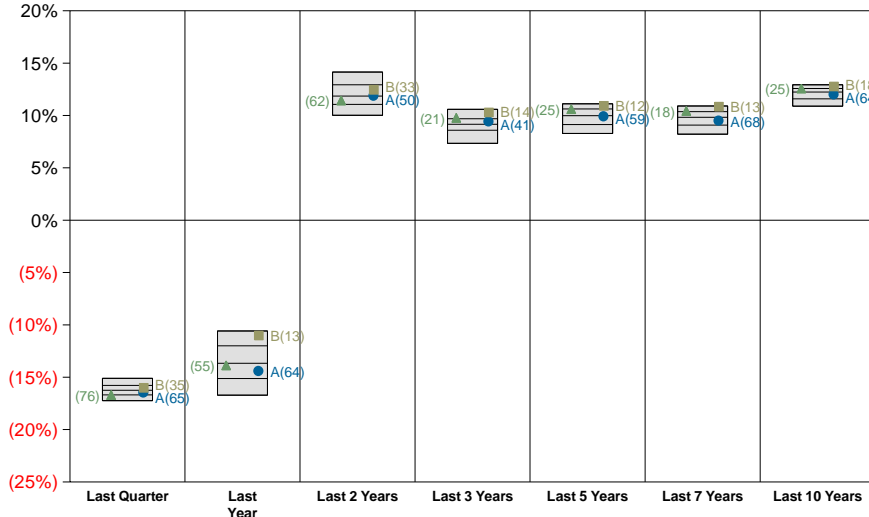
Prior to 03/31/2019, benchmark history was provided by RVK.

Callan

**Appendix I – Asset Class and Manager
Performance**

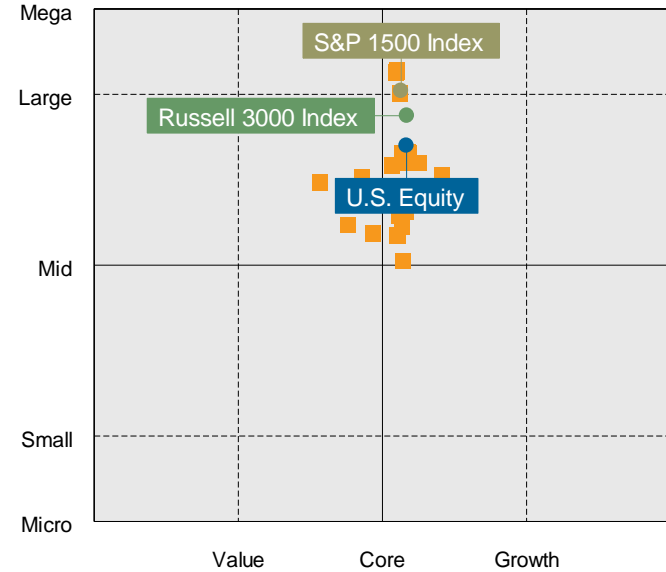
U.S. Equity as of June 30, 2022

Performance vs Public Fund - Domestic Equity (Gross)

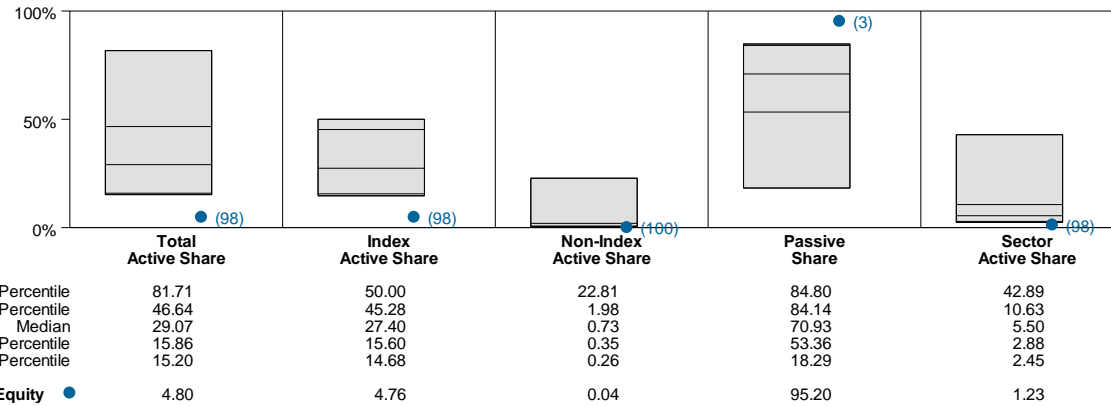


	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 7 Years	Last 10 Years
10th Percentile	(15.10)	(10.58)	14.15	10.59	11.12	10.91	12.93
25th Percentile	(15.78)	(12.00)	12.94	9.69	10.63	10.37	12.58
Median	(16.24)	(13.67)	11.85	9.16	9.98	9.83	12.24
75th Percentile	(16.69)	(15.13)	11.06	8.59	9.13	9.09	11.59
90th Percentile	(17.24)	(16.71)	10.02	7.34	8.28	8.21	10.88
U.S. Equity ● A	(16.51)	(14.44)	11.85	9.39	9.88	9.47	11.98
S&P 1500 Index ■ B	(16.02)	(11.02)	12.46	10.29	10.92	10.84	12.77
Russell 3000 Index ▲ A	(16.70)	(13.87)	11.43	9.77	10.60	10.43	12.57

Style Map vs Pub Pln- Dom Equity Holdings as of June 30, 2022



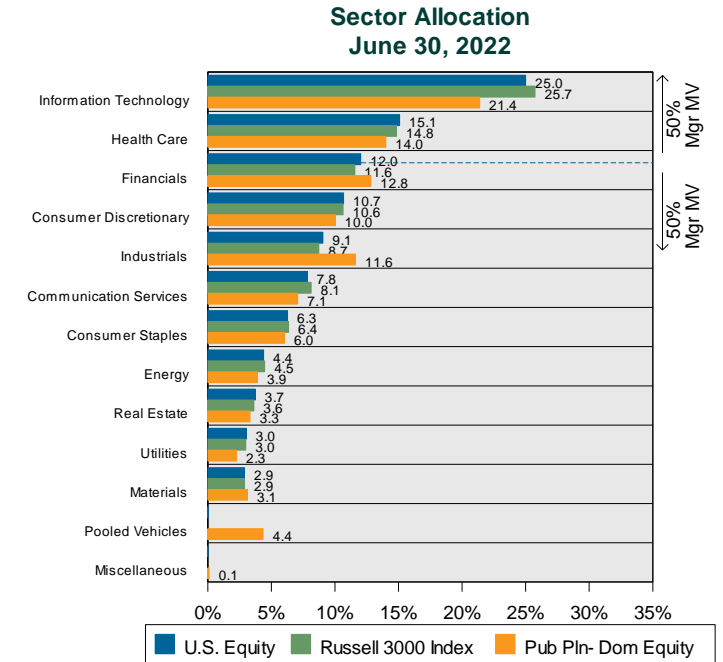
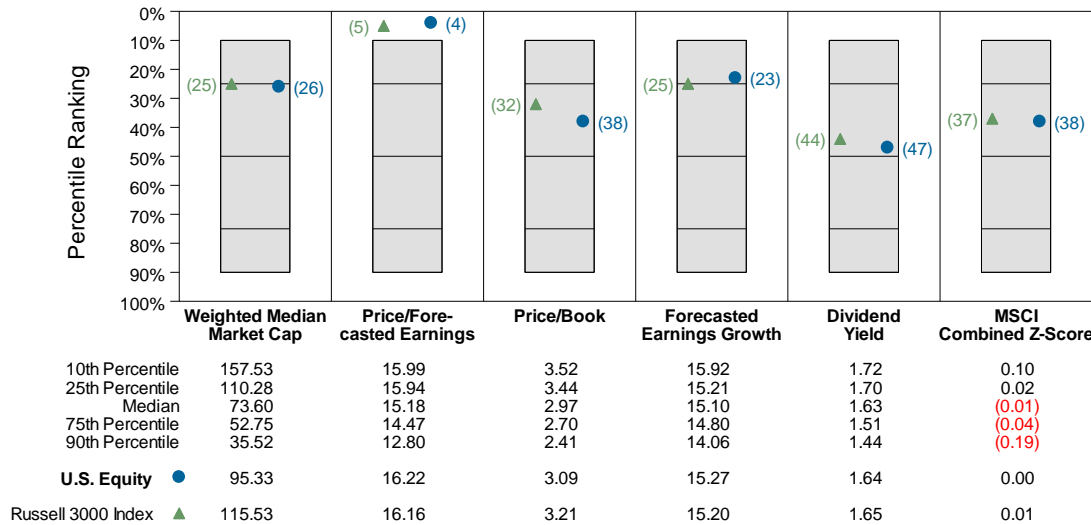
Active Share vs. Pub Pln- Dom Equity



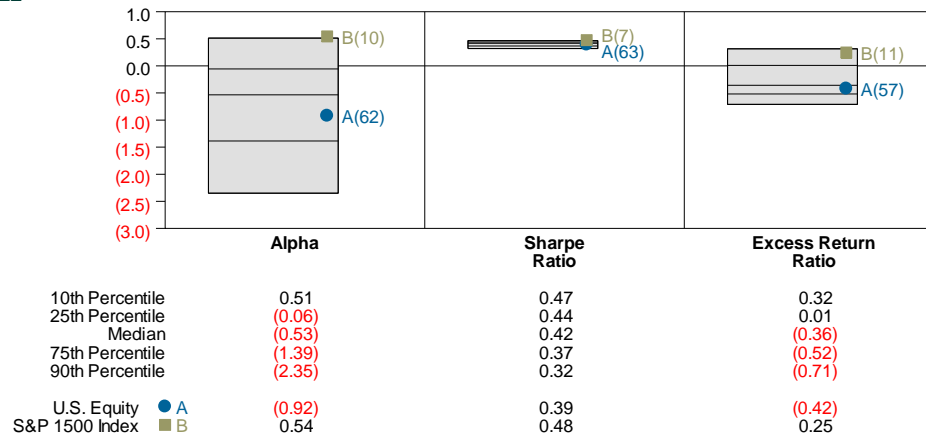
U.S. Equity

As of June 30, 2022

Portfolio Characteristics Percentile Rankings
Rankings Against Public Fund - Domestic Equity
as of June 30, 2022

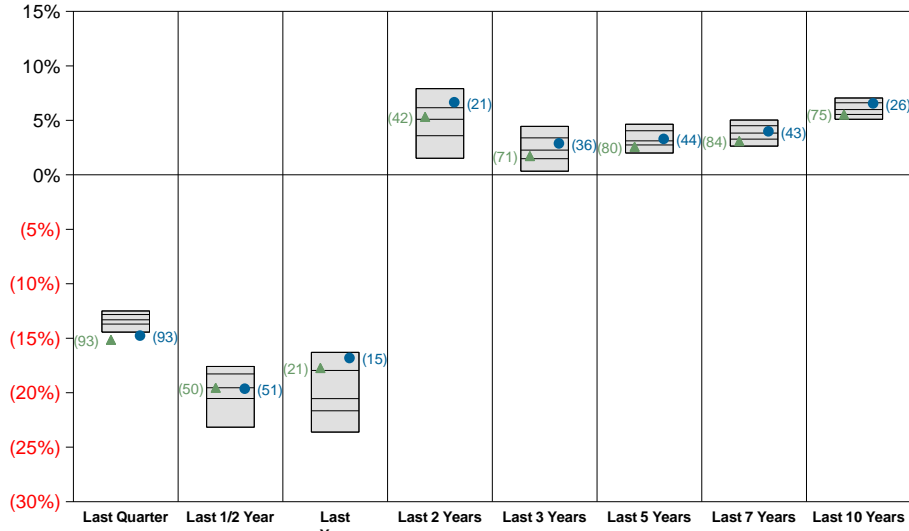


Risk Adjusted Return Measures vs Russell 3000 Index
Rankings Against Public Fund - Domestic Equity (Gross)
Five Years Ended June 30, 2022



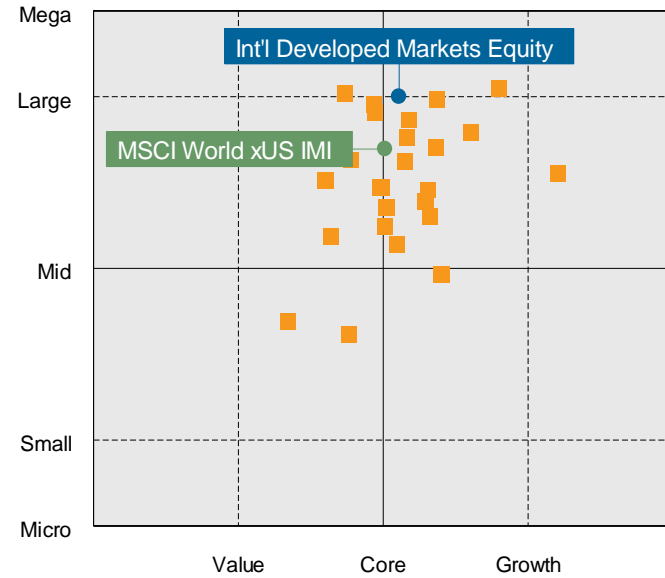
International Equity as of June 30, 2022

Performance vs Public Fund - International Equity (Gross)

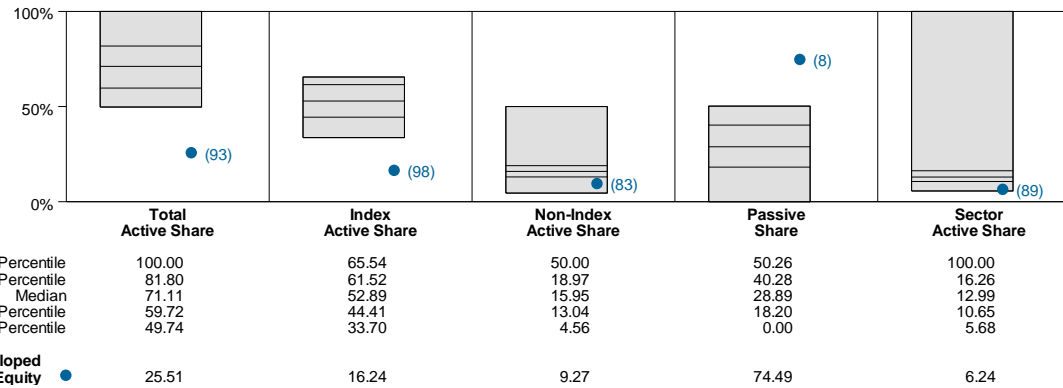


10th Percentile	(12.50)	(17.59)	(16.29)	7.92	4.45	4.65	5.03	7.05
25th Percentile	(12.82)	(18.27)	(17.96)	6.16	3.39	4.05	4.51	6.61
Median	(13.30)	(19.54)	(20.54)	5.10	2.27	3.12	3.84	5.99
75th Percentile	(13.70)	(20.53)	(21.66)	3.59	1.48	2.74	3.27	5.54
90th Percentile	(14.44)	(23.16)	(23.62)	1.51	0.34	2.00	2.64	5.09
Int'l Developed Markets Equity	(14.80)	(19.67)	(16.85)	6.62	2.85	3.26	3.95	6.52
MSCI World xUS IMI	(15.15)	(19.54)	(17.73)	5.32	1.72	2.58	3.09	5.53

Style Map vs Pub Pln- Intl Equity Holdings as of June 30, 2022



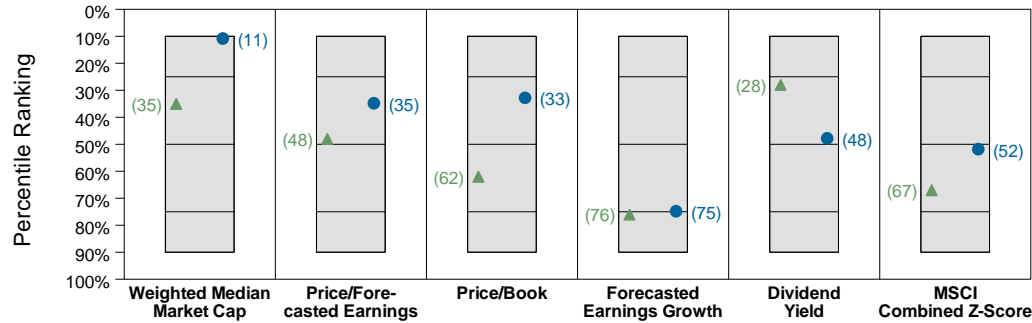
Active Share vs. Pub Pln- Intl Equity



International Equity

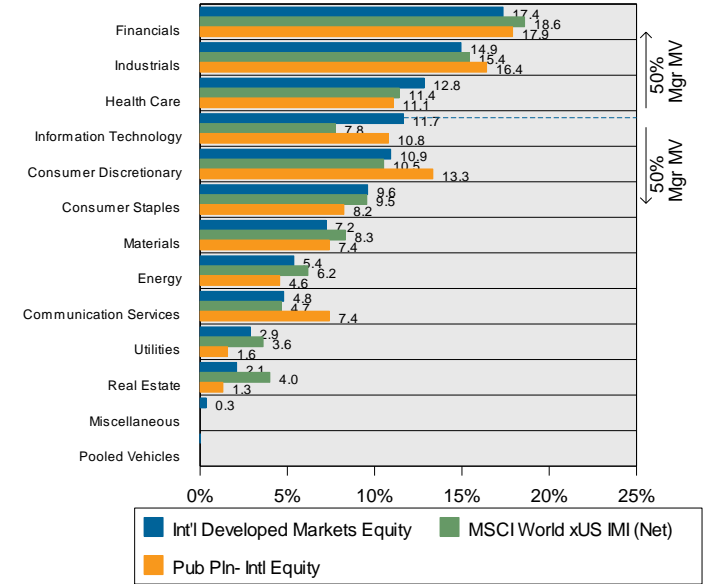
As of June 30, 2022

Portfolio Characteristics Percentile Rankings Rankings Against Public Fund - International Equity as of June 30, 2022

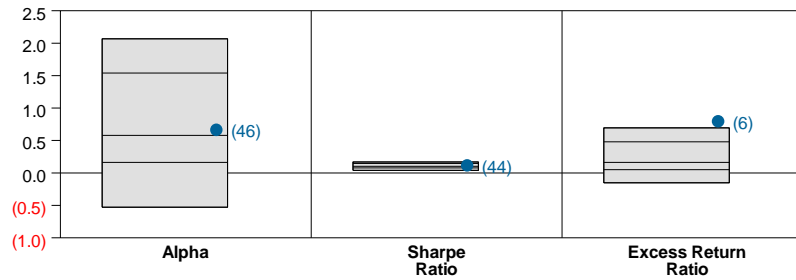


Metric	Weighted Median Market Cap	Price/Forecasted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	37.55	14.52	2.28	16.75	3.90	0.61
25th Percentile	32.49	13.41	1.82	14.54	3.45	0.32
Median	25.05	12.09	1.62	13.18	2.70	0.11
75th Percentile	19.27	10.63	1.43	11.09	2.55	(0.10)
90th Percentile	11.29	9.72	1.18	9.88	2.31	(0.30)
Int'l Developed Markets Equity	36.78	12.69	1.77	11.16	2.84	0.08
MSCI World xUS IMI (Net)	29.43	12.13	1.54	10.82	3.22	(0.01)

Sector Allocation June 30, 2022



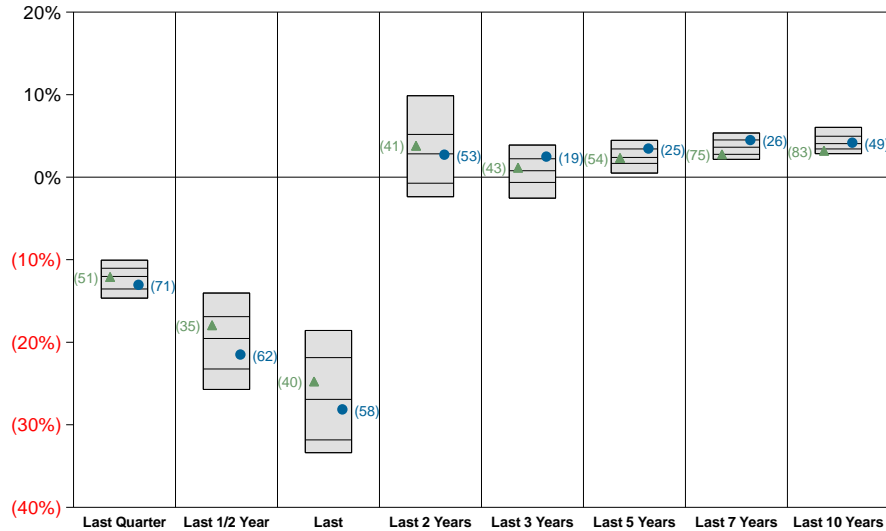
Risk Adjusted Return Measures vs MSCI World ex US IMI Rankings Against Public Fund - International Equity (Gross) Five Years Ended June 30, 2022



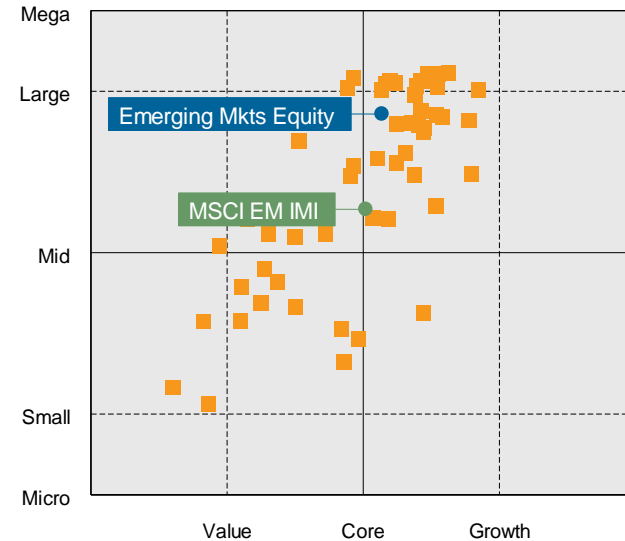
Metric	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.07	0.17	0.69
25th Percentile	1.54	0.15	0.48
Median	0.58	0.10	0.16
75th Percentile	0.16	0.08	0.05
90th Percentile	(0.53)	0.04	(0.15)
Int'l Developed Markets Equity	0.66	0.11	0.79
MSCI World ex US IMI			

Emerging Markets Equity as of June 30, 2022

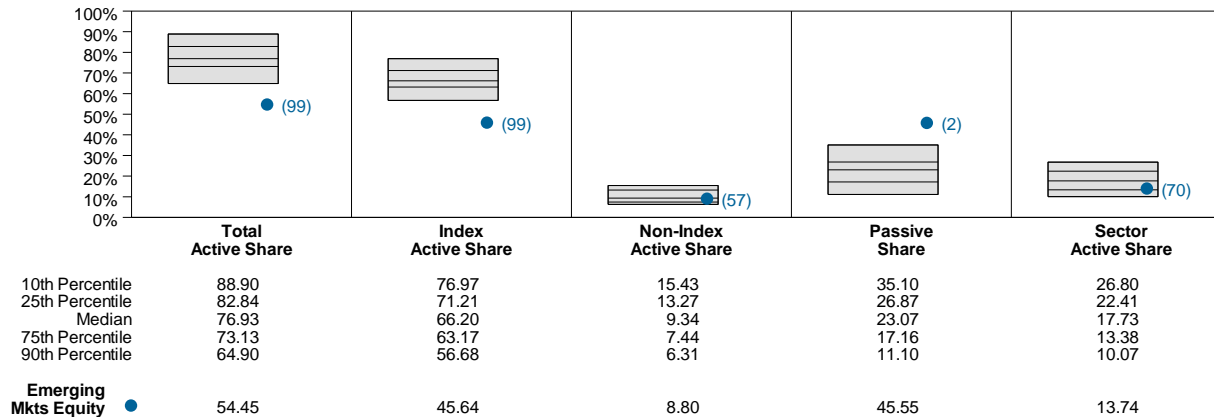
Performance vs Callan Emerging Broad (Gross)



Style Map vs Callan Emerging Broad Holdings as of June 30, 2022



Active Share vs. Callan Emerging Broad



Emerging Markets Equity

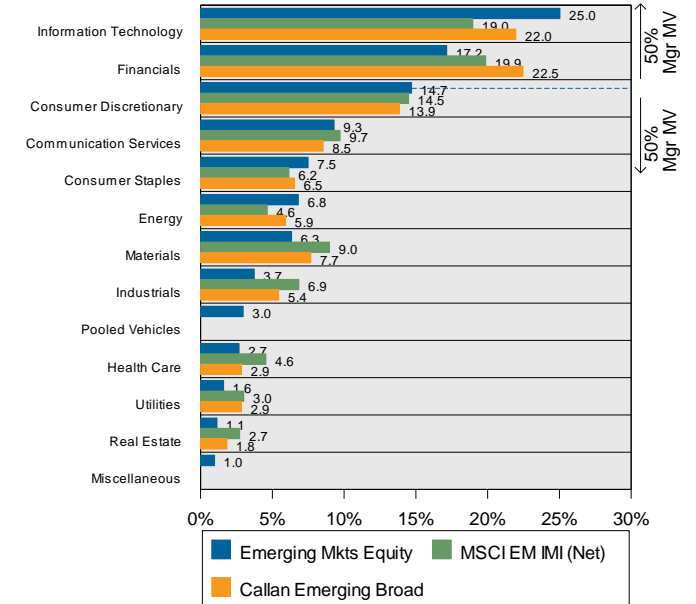
As of June 30, 2022

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Emerging Broad
as of June 30, 2022

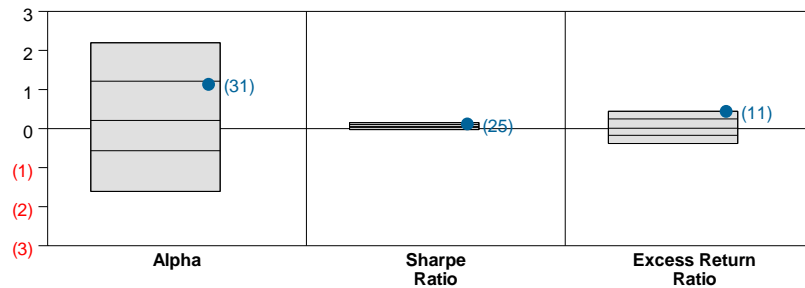


	Weighted Median Market Cap	Price/Forecasted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	50.79	16.40	2.65	19.42	5.51	0.50
25th Percentile	36.65	13.69	2.06	17.16	3.90	0.40
Median	25.64	10.47	1.52	15.48	2.74	0.14
75th Percentile	14.44	7.72	1.10	13.32	2.03	(0.39)
90th Percentile	8.16	6.72	0.92	11.12	1.68	(0.75)
Emerging Mkts Equity ●	33.34	11.48	1.64	14.56	2.80	0.10
MSCI EM IMI (Net) ▲	19.28	10.64	1.52	15.52	3.06	(0.00)

Sector Allocation June 30, 2022



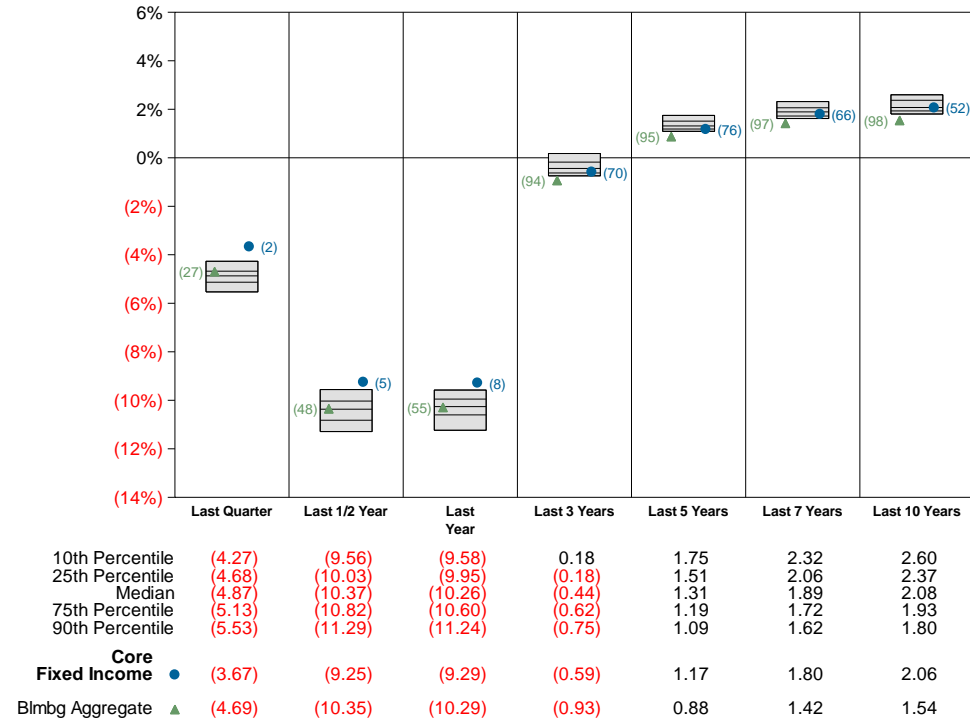
Risk Adjusted Return Measures vs MSCI EM IMI
Rankings Against Callan Emerging Broad (Gross)
Five Years Ended June 30, 2022



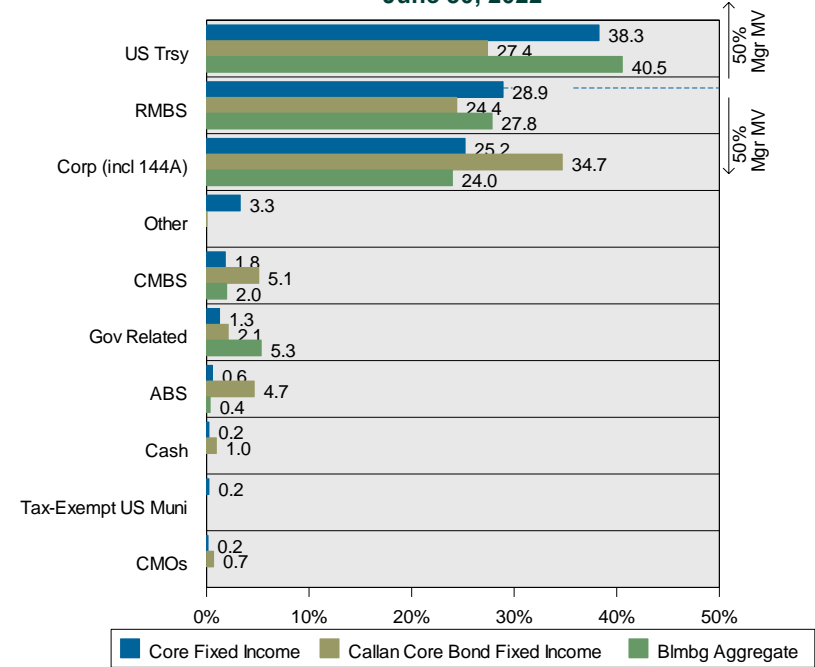
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.20	0.15	0.44
25th Percentile	1.21	0.10	0.25
Median	0.21	0.06	0.01
75th Percentile	(0.57)	0.03	(0.17)
90th Percentile	(1.61)	(0.03)	(0.38)
Emerging Mkts Equity ●	1.12	0.10	0.43

Core Fixed Income As of June 30, 2022

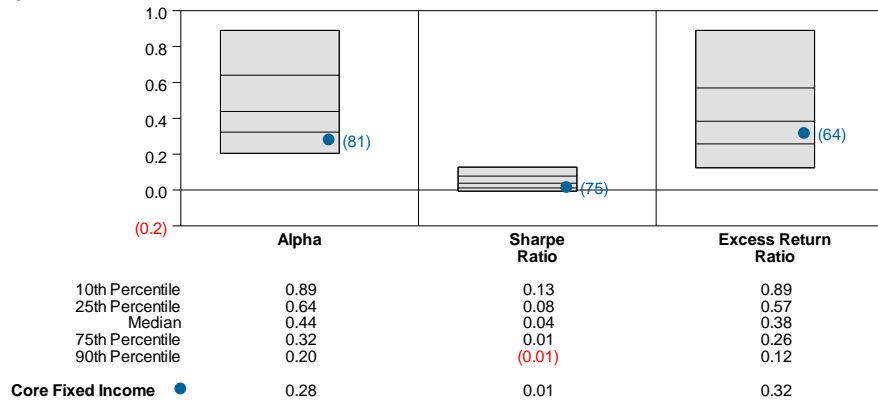
Performance vs Callan Core Bond Fixed Income (Gross)



Sector Allocation June 30, 2022



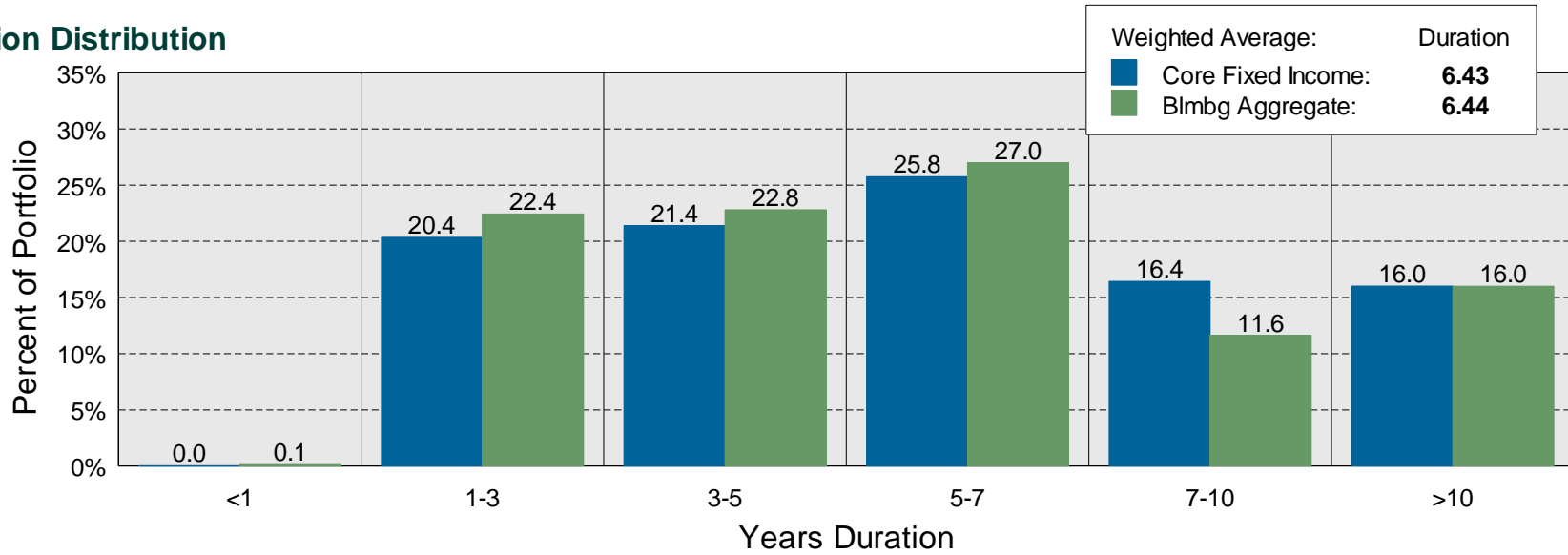
Risk Adjusted Return Measures vs Blmbg Aggregate Rankings Against Public Fund - Domestic Fixed (Gross) Five Years Ended June 30, 2022



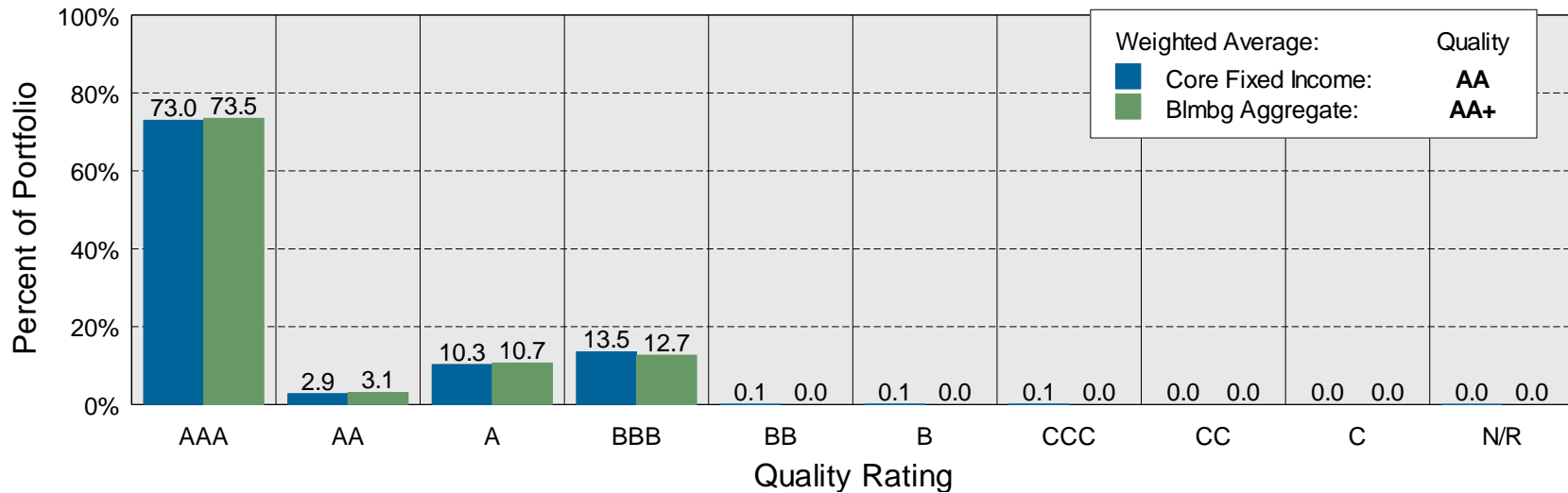
Core Fixed Income

As of June 30, 2022

Duration Distribution

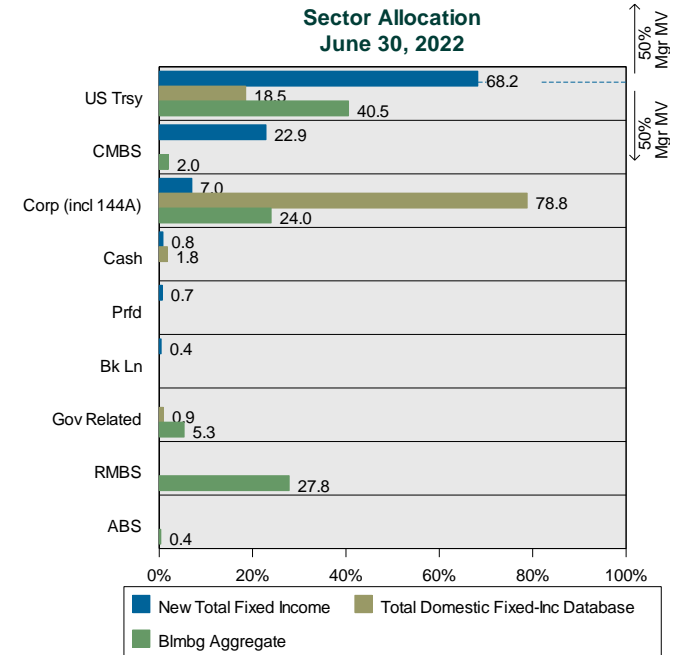
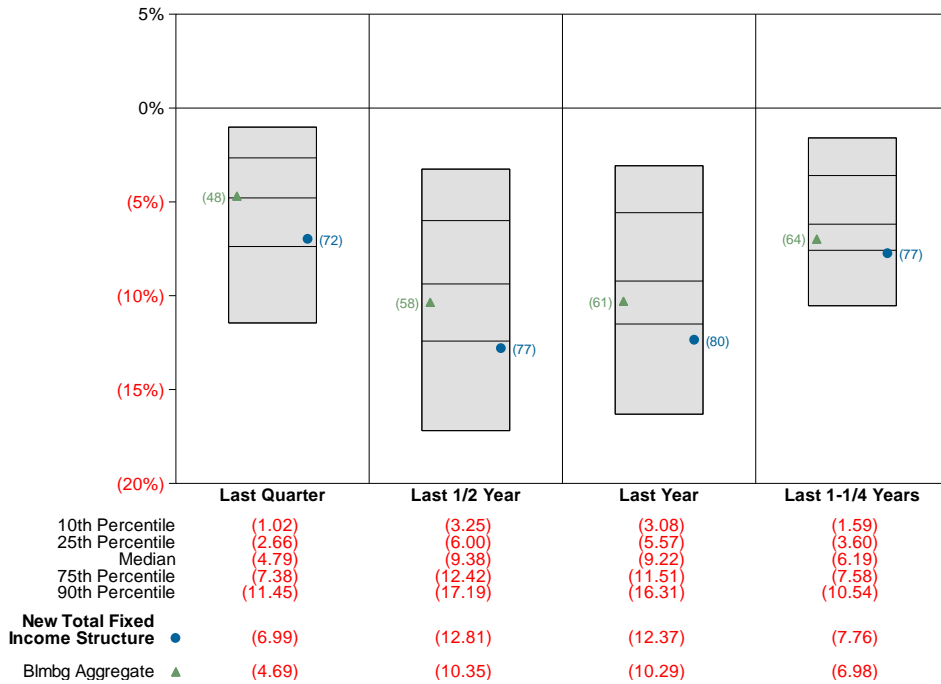


Quality Distribution

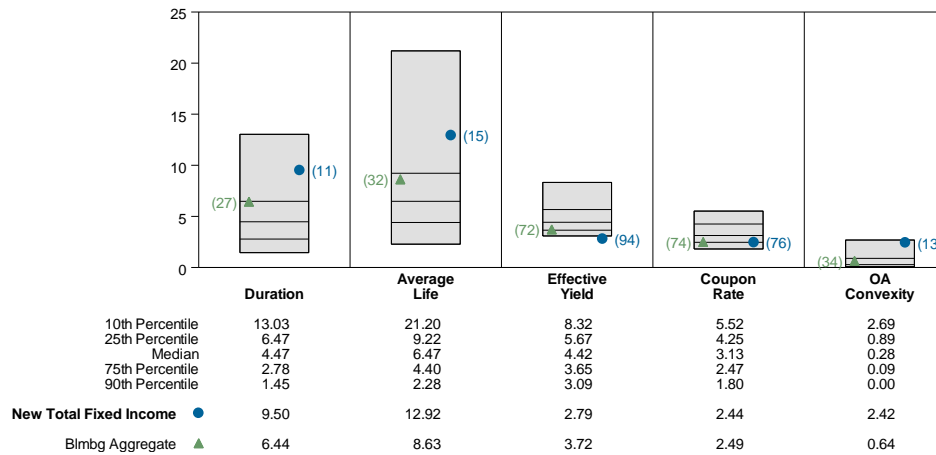


New Fixed Income Structure As of June 30, 2022

Performance vs Total Domestic Fixed-Inc Database (Gross)



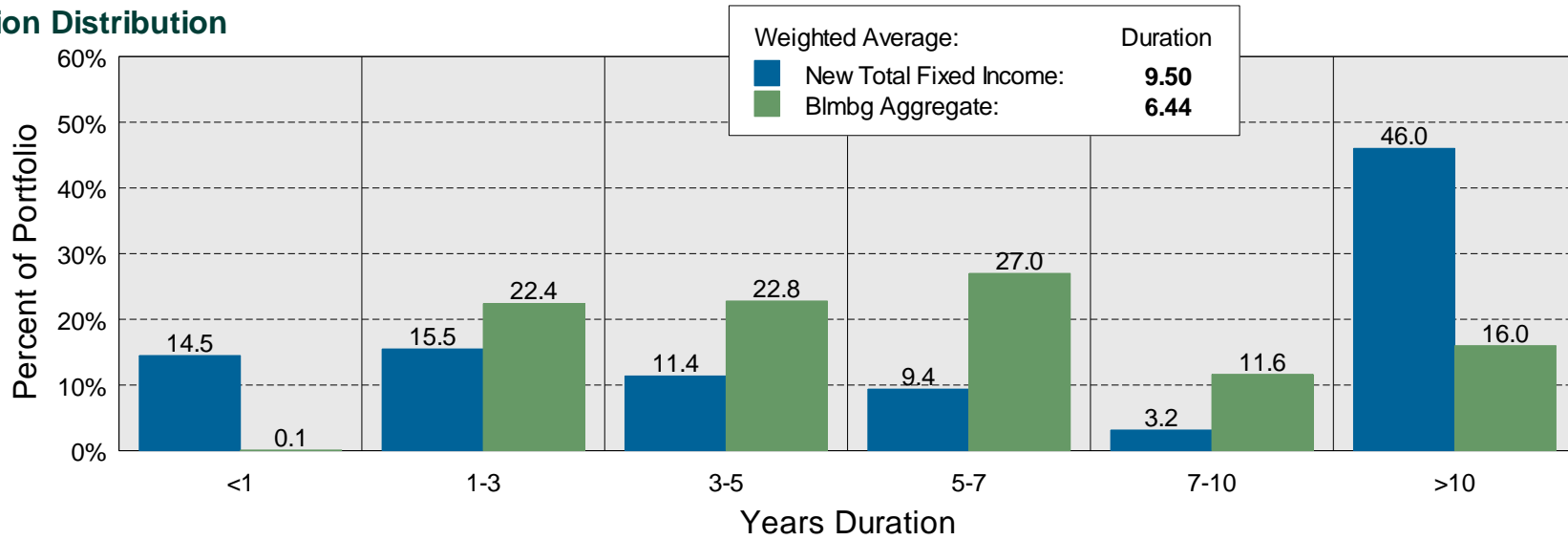
Fixed Income Portfolio Characteristics Rankings Against Total Domestic Fixed-Inc Database as of June 30, 2022



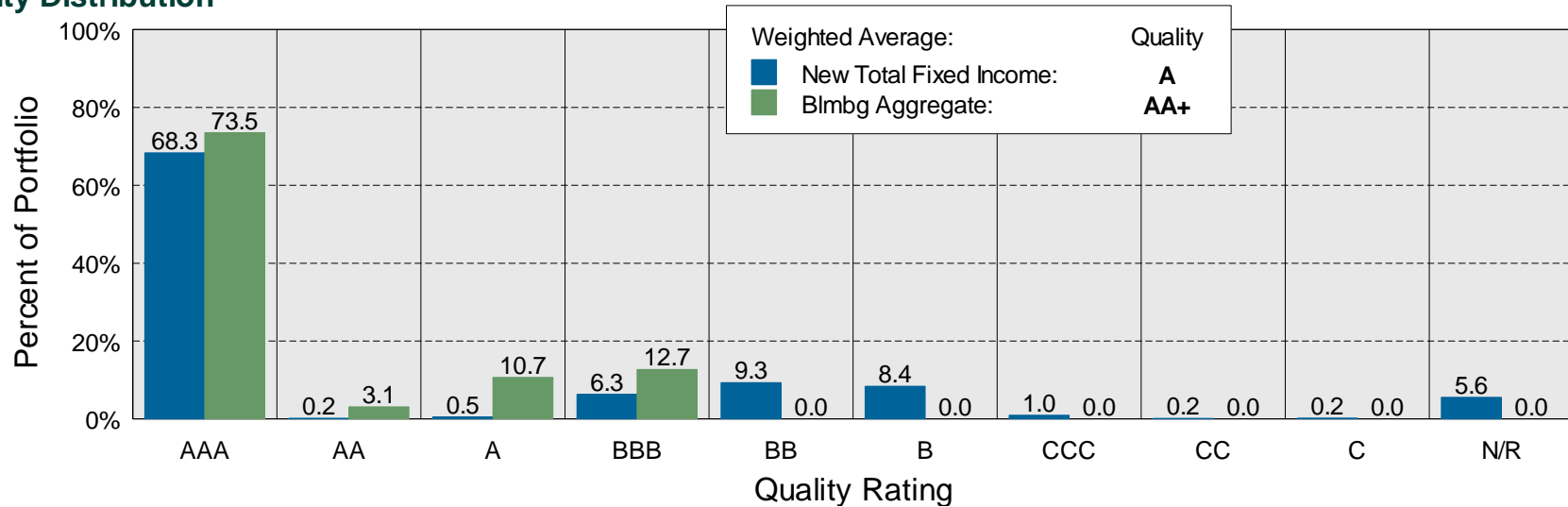
New Fixed Income Structure

As of June 30, 2022

Duration Distribution

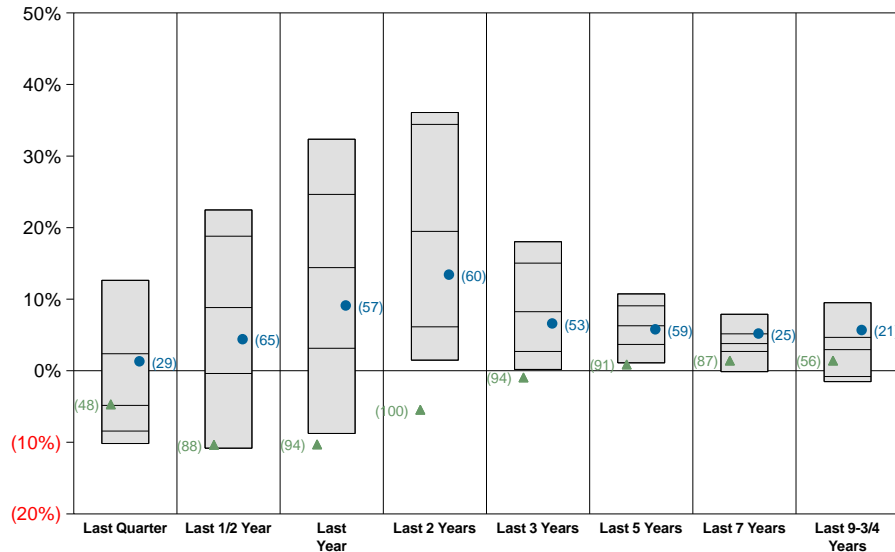


Quality Distribution



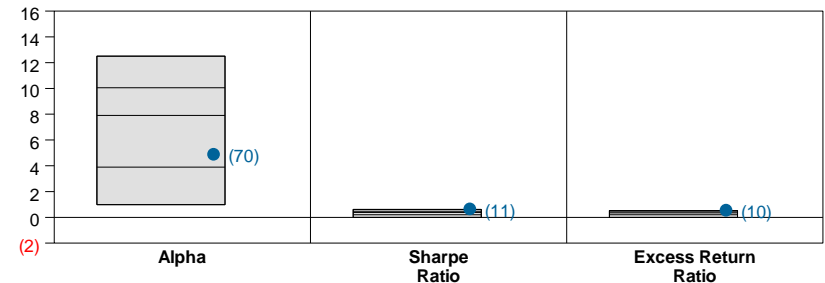
Opportunistic Fixed Income As of June 30, 2022

Performance vs Callan Alternative Investments DB (Gross)



10th Percentile	12.64	22.47	32.35	36.09	18.04	10.74	7.89	9.51
25th Percentile	2.38	18.80	24.64	34.42	15.04	9.07	5.15	4.67
Median	(4.84)	8.82	14.42	19.47	8.25	6.28	3.79	2.96
75th Percentile	(8.43)	(0.39)	3.15	6.13	2.69	3.68	2.69	(0.80)
90th Percentile	(10.17)	(10.82)	(8.77)	1.47	0.18	1.10	(0.12)	(1.52)

Risk Adjusted Return Measures vs Blmbg Aggregate Rankings Against Callan Alternative Investments DB (Gross) Five Years Ended June 30, 2022



10th Percentile	12.50	0.61	0.53
25th Percentile	10.05	0.48	0.42
Median	7.91	0.38	0.35
75th Percentile	3.89	0.20	0.20
90th Percentile	0.98	(0.01)	0.00

Opportunistic Fixed Income ●

Investment Manager Returns

As of June 30, 2022

	Market Value \$(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance- Domestic Equity							
U.S. Equity	\$10,154	100.00%	(16.51%)	(21.07%)	(14.47%)	9.33%	9.82%
Russell 3000 Index (1)	-	-	(16.70%)	(21.10%)	(13.87%)	9.77%	10.60%
S&P 1500 Index	-	-	(16.02%)	(19.91%)	(11.02%)	10.29%	10.92%
MCM Russell 1000 Index	9,139	90.00%	(16.43%)	(20.70%)	(12.63%)	10.31%	11.11%
Russell 1000 Index	-	-	(16.67%)	(20.94%)	(13.04%)	10.17%	11.00%
S&P 500 Index	-	-	(16.10%)	(19.96%)	(10.62%)	10.60%	11.31%
MCM Russell 2000 Core Index	392	3.86%	(17.10%)	(23.34%)	(23.28%)	4.70%	5.44%
Russell 2000 Index	-	-	(17.20%)	(23.43%)	(25.20%)	4.21%	5.17%
S&P 600 Index	-	-	(14.11%)	(18.94%)	(16.81%)	7.30%	7.20%
MCM Russell 2000 Val Index	311	3.06%	(15.13%)	(17.17%)	(16.14%)	6.27%	4.91%
Russell 2000 Value Index	-	-	(15.28%)	(17.31%)	(16.28%)	6.18%	4.89%
S&P 600 Value Index	-	-	(12.74%)	(14.16%)	(13.93%)	8.02%	6.75%
Emerald Asset Management	313	3.08%	(20.89%)	(29.12%)	(29.98%)	1.17%	5.69%
Russell 2000 Growth Index	-	-	(19.25%)	(29.45%)	(33.43%)	1.40%	4.80%
S&P 600 Growth Index	-	-	(15.62%)	(23.65%)	(19.63%)	6.09%	7.39%
		Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception	

Net Performance- Domestic Equity

U.S. Equity	11.86%	6.70%	8.55%	7.66%	10.52% ^(1/81)
Russell 3000 Index (1)	12.57%	8.36%	9.14%	8.02%	10.83% ^(1/81)
S&P 1500 Index	12.77%	8.51%	9.16%	8.18%	-
MCM Russell 1000 Index	12.87%	-	-	-	13.16% ^(1/12)
Russell 1000 Index	12.82%	8.51%	9.21%	8.13%	13.14% ^(1/12)
S&P 500 Index	12.96%	8.54%	9.08%	7.97%	13.28% ^(1/12)
MCM Russell 2000 Core Index	-	-	-	-	6.30% ^(12/16)
Russell 2000 Index	9.35%	6.33%	8.17%	7.41%	6.05% ^(12/16)
S&P 600 Index	11.26%	8.03%	9.58%	9.31%	7.59% ^(12/16)
MCM Russell 2000 Val Index	-	-	-	-	5.25% ^(12/16)
Russell 2000 Value Index	9.05%	5.58%	7.77%	8.15%	5.23% ^(12/16)
S&P 600 Value Index	11.01%	7.31%	8.85%	9.16%	6.79% ^(12/16)
Emerald Asset Management	-	-	-	-	7.24% ^(12/16)
Russell 2000 Growth Index	9.30%	6.80%	8.34%	6.19%	6.34% ^(12/16)
S&P 600 Growth Index	11.35%	8.64%	10.19%	9.04%	8.12% ^(12/16)

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(1) Benchmark history is a blend of current and past benchmark indices. History prior to 12/31/2018 is provided by RVK.

Investment Manager Returns

As of June 30, 2022

	Market Value \$(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance- International Equity							
Int'l Developed Mkts Equity	\$4,132	100.00%	(14.83%)	(19.73%)	(16.96%)	2.69%	3.13%
MSCI World ex US IMI	-	-	(15.15%)	(19.54%)	(17.73%)	1.72%	2.58%
Walter Scott & Partners(1) MSCI World	630	15.24%	(15.81%) (16.19%)	(23.33%) (20.51%)	(15.92%) (14.34%)	6.75% 7.00%	9.97% 7.67%
BlackRock MSCI World Ex US Index MSCI World ex US	3,191	77.22%	(14.46%) (14.66%)	(18.47%) (18.76%)	(16.34%) (16.76%)	2.13% 1.70%	3.09% 2.66%
Xponance Non-U.S. Small Cap MSCI ACWI ex US Small Cap	197	4.77%	(17.29%) (17.55%)	(24.79%) (22.92%)	(25.01%) (22.45%)	0.37% 2.94%	- 2.55%
Harris Assoc Int'l SCV MSCI World ex US Sm Cap MSCI World ex US Sm Value	111	2.69%	(15.64%) (17.94%) (15.64%)	(24.48%) (23.87%) (18.10%)	(25.14%) (23.02%) (17.41%)	2.37% 1.97% 1.99%	0.83% 2.16% 1.43%

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception
Net Performance- International Equity					
Int'l Developed Mkts Equity	6.30%	1.54%	5.74%	-	5.64% ^(1/02)
MSCI World ex US IMI	5.53%	1.72%	5.77%	4.31%	5.64% ^(1/02)
Walter Scott & Partners(1) MSCI World	10.93% 9.51%	8.20% 5.19%	- 7.32%	- 5.93%	8.71% ^(10/06) 6.06% ^(10/06)
BlackRock MSCI World Ex US Index MSCI World ex US	- 5.37%	- 1.55%	- 5.47%	- 4.07%	3.10% ^(6/17) 2.64% ^(6/17)
Xponance Non-U.S. Small Cap MSCI ACWI ex US Small Cap	- 6.22%	- 2.79%	- 8.16%	- 5.68%	(0.46%) ^(10/18) 1.10% ^(10/18)
Harris Assoc Int'l SCV MSCI World ex US Sm Cap MSCI World ex US Sm Value	6.42% 6.70% 6.34%	3.71% 2.67% 2.48%	- 7.69% 8.06%	- - 6.55%	9.28% ^(7/03) 7.99% ^(7/03) 8.04% ^(7/03)

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(1) Walter Scott since inception returns were contained in the Global Mandates composite prior to 12/31/2019.

Investment Manager Returns

As of June 30, 2022

	Market Value \$(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance- Emerging Mkts Equity							
Emerging Mkts Equity	\$1,165	100.00%	(13.21%)	(21.74%)	(28.57%)	1.92%	2.87%
MSCI EM IMI	-	-	(12.10%)	(17.94%)	(24.75%)	1.15%	2.33%
Macquarie Emg Mkts Equity	322	27.62%	(12.05%)	(22.66%)	(28.23%)	1.49%	2.35%
MSCI EM	-	-	(11.45%)	(17.63%)	(25.28%)	0.57%	2.18%
Martin Currie Emg Mkts Equity	340	29.14%	(14.73%)	(25.64%)	(33.24%)	0.92%	3.03%
MSCI EM	-	-	(11.45%)	(17.63%)	(25.28%)	0.57%	2.18%
BlackRock Emg Mkts Index	173	14.88%	(11.33%)	(17.62%)	(25.37%)	0.33%	1.95%
MSCI EM	-	-	(11.45%)	(17.63%)	(25.28%)	0.57%	2.18%
Leading Edge Emg Mkts Fund	215	18.42%	(12.02%)	(20.08%)	(28.19%)	(0.80%)	-
MSCI EM	-	-	(11.45%)	(17.63%)	(25.28%)	0.57%	2.18%
GlobeFlex Emerging Small Cap	116	9.94%	(16.65%)	(15.57%)	(19.03%)	7.57%	5.11%
MSCI EM Small Cap	-	-	(16.41%)	(20.03%)	(20.72%)	5.78%	3.48%

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception
Net Performance- Emerging Mkts Equity					
Emerging Mkts Equity	3.65%	0.47%	6.36%	-	6.42% ^(1/02)
MSCI EM IMI	3.20%	2.12%	8.52%	4.00%	8.39% ^(1/02)
Macquarie Emg Mkts Equity	-	-	-	-	2.93% ^(5/13)
MSCI EM	3.07%	2.00%	8.43%	-	2.00% ^(5/13)
Martin Currie Emg Mkts Equity	-	-	-	-	3.22% ^(1/14)
MSCI EM	3.07%	2.00%	8.43%	-	2.37% ^(1/14)
BlackRock Emg Mkts Index	-	-	-	-	1.95% ^(7/17)
MSCI EM	3.07%	2.00%	8.43%	-	2.18% ^(7/17)
Leading Edge Emg Mkts Fund	-	-	-	-	2.40% ^(11/18)
MSCI EM	3.07%	2.00%	8.43%	-	3.64% ^(11/18)
GlobeFlex Emerging Small Cap	-	-	-	-	5.41% ^(8/13)
MSCI EM Small Cap	4.31%	2.61%	9.63%	4.59%	3.68% ^(8/13)

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Investment Manager Returns

As of June 30, 2022

	Market Value \$(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance - Fixed Income							
Fixed Income (1)	\$7,267	48.88%	(4.88%)	(9.75%)	(9.39%)	(1.01%)	0.87%
Blmbg U.S. Agg Bond Index	-	-	(4.69%)	(10.35%)	(10.29%)	(0.93%)	0.88%
Core Fixed Income	\$5,125	34.48%	(3.68%)	(9.28%)	(9.35%)	(0.66%)	1.09%
Blmbg U.S. Agg Bond Index	-	-	(4.69%)	(10.35%)	(10.29%)	(0.93%)	0.88%
PIMCO Core Bond Fund	526	3.54%	(5.05%)	(10.62%)	(10.61%)	(0.65%)	1.11%
Blmbg Agg ex Treasury	-	-	(5.30%)	(11.14%)	(11.19%)	(1.09%)	0.88%
Mellon Bond Index	4,599	30.93%	(4.83%)	(10.36%)	(10.43%)	(1.06%)	0.79%
Blmbg U.S. Agg Bond Index (2)	-	-	(4.69%)	(10.35%)	(10.29%)	(0.93%)	0.88%
Nominal U.S. Treasuries	\$91	0.61%	(4.82%)	(10.79%)	(10.53%)	(1.68%)	0.50%
Blmbg US Treas Bell 10Y	-	-	(5.20%)	(11.71%)	(11.18%)	(1.54%)	0.51%
PIMCO US Treasuries	91	0.61%	(4.82%)	(10.79%)	(10.53%)	(1.09%)	0.87%
Blmbg US Treas Bell 10Y	-	-	(5.20%)	(11.71%)	(11.18%)	(1.54%)	0.51%
New Total Fixed Income Structure (1)	\$1,192	8.02%	(7.01%)	(12.84%)	(12.42%)	-	-
Intermediate Treasury	\$269	1.81%	(1.66%)	(5.75%)	(6.34%)	-	-
Mellon Intermediate Treasury Index	269	1.81%	(1.66%)	(5.75%)	(6.34%)	-	-
Blmbg Intmtd Treasury	-	-	(1.67%)	(5.80%)	(6.35%)	(0.31%)	0.87%
Long Duration	\$544	3.66%	(12.79%)	(21.99%)	(20.43%)	-	-
Mellon Long Duration Index	544	3.66%	(11.97%)	(20.93%)	(18.49%)	-	-
Blmbg Long Treasury	-	-	(11.93%)	(21.25%)	(18.45%)	(2.94%)	0.51%
High Yield	\$378	2.54%	(6.18%)	(9.81%)	(8.32%)	-	-
Fidelity HY CMBS (3)	319	2.15%	(3.08%)	(5.95%)	(4.23%)	(0.62%)	1.84%
Blmbg US CMBS Ex AAA Index (4)	-	-	(4.46%)	(9.98%)	(10.53%)	(0.58%)	2.10%
Mellon High Yield Beta Fund	59	0.40%	(10.94%)	(15.17%)	(14.01%)	-	-
Blmbg HY Corp	-	-	(9.83%)	(14.19%)	(12.81%)	0.21%	2.10%

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The market values and performance of such accounts are included within their relevant composites.

(1) Fixed Income also includes the new fixed income sub-composite which was funded in 03/01/2021.

(2) Benchmark history is a blend of current and past benchmark indices. History prior to 12/31/2018 is provided by RVK.

(3) On 03/01/2021, the Fidelity HY CMBS account switched from the Opportunistic Fixed composite to the High Yield composite under the new fixed income structure.

(4) Fidelity's blended benchmark consists of FTSE High Yield Market Index prior to 12/31/2009 and Blmbg US CMBS Ex AAA Index, thereafter.

Investment Manager Returns

As of June 30, 2022

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception
Net Performance - Fixed Income					
Fixed Income (1)	1.96%	3.63%	4.80%	4.95%	7.73% ^(1/81)
Blmbg U.S. Agg Bond Index	1.54%	3.26%	3.57%	4.36%	7.02% ^(1/81)
Core Fixed Income	1.96%	3.67%	3.97%	-	4.02% ^(1/02)
Blmbg U.S. Agg Bond Index	1.54%	3.26%	3.57%	4.36%	3.67% ^(1/02)
PIMCO Core Bond Fund	-	-	-	-	1.61% ^(1/13)
Blmbg Agg ex Treasury	1.81%	3.46%	-	-	1.64% ^(1/13)
Mellon Bond-Index	1.44%	3.14%	3.52%	4.37%	6.49% ^(4/84)
Blmbg U.S. Agg Bond Index (2)	1.54%	3.26%	3.65%	4.48%	-
Nominal U.S. Treasuries	0.90%	-	-	-	1.35% ^(9/11)
Blmbg US Treas Bell 10Y	0.82%	3.58%	3.65%	4.26%	1.44% ^(9/11)
PIMCO US Treasuries	1.22%	-	-	-	1.68% ^(9/11)
Blmbg US Treas Bell 10Y	0.82%	3.58%	3.65%	4.26%	1.44% ^(9/11)
New Total Fixed Income Structure (1)	-	-	-	-	(8.48%) ^(3/21)
Intermediate Treasury	-	-	-	-	(4.84%) ^(3/21)
Mellon Intermediate Treasury Index	-	-	-	-	(4.84%) ^(3/21)
Blmbg Intmdt Treasury	0.96%	2.60%	2.77%	3.62%	(4.85%) ^(3/21)
Long Duration	-	-	-	-	(13.63%) ^(3/21)
Mellon Long Duration Index	-	-	-	-	(17.45%) ^(1/21)
Blmbg Long Treasury	1.63%	5.01%	5.22%	5.93%	(17.39%) ^(1/21)
High Yield	-	-	-	-	(3.79%) ^(3/21)
Fidelity HY CMBS (3)	5.27%	5.07%	6.38%	7.29%	7.51% ^(4/97)
Blmbg US CMBS Ex AAA Index (4)	3.25%	0.14%	1.81%	3.38%	3.53% ^(4/97)
Mellon High Yield Beta Fund	-	-	-	-	(11.07%) ^(5/21)
Blmbg HY Corp	4.47%	5.78%	7.28%	5.98%	(9.84%) ^(5/21)

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The market values and performance of such accounts are included within their relevant composites.

(1) Fixed Income also includes the new fixed income sub-composite which was funded in 03/01/2021.

(2) Benchmark history is a blend of current and past benchmark indices. History prior to 12/31/2018 is provided by RVK.

(3) On 03/01/2021, the Fidelity HY CMBS account switched from the Opportunistic Fixed composite to the High Yield composite under the new fixed income structure.

(4) Fidelity's blended benchmark consists of FTSE High Yield Market Index prior to 12/31/2009 and Blmbg US CMBS Ex AAA Index, thereafter.

Investment Manager Returns

As of June 30, 2022

	Market Value \$(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance - Fixed Income							
Fixed Income (1)	\$7,267	100.00%	(4.88%)	(9.75%)	(9.39%)	(1.01%)	0.87%
Bimbg U.S. Agg Bond Index	-	-	(4.69%)	(10.35%)	(10.29%)	(0.93%)	0.88%
Opportunistic Fixed Income	\$860	11.83%	1.00%	3.81%	7.67%	5.68%	4.99%
SEI Str. Credit: HY Bank Loans (2)(3)	13	0.17%	(3.00%)	(3.44%)	3.71%	7.49%	7.74%
FTSE HY Corp (1 month lag)	-	-	(4.13%)	(5.78%)	(4.81%)	3.23%	3.45%
BAAM Keystone (4)	847	11.65%	1.08%	4.02%	6.23%	7.42%	6.34%
HFRI FOF Comp Index	-	-	(3.88%)	(6.53%)	(5.45%)	3.96%	3.63%

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception
Net Performance - Fixed Income					
Fixed Income (1)	1.96%	3.63%	4.80%	4.95%	7.73% ^(1/81)
Bimbg Aggregate	1.54%	3.26%	3.57%	4.36%	7.02% ^(1/81)
Opportunistic Fixed Income	-	-	-	-	4.90% ^(10/12)
SEI Str. Credit: HY Bank Loans (2)(3)	8.39%	-	-	-	11.56% ^(5/08)
FTSE HY Corp (1 month lag)	5.14%	5.82%	7.02%	6.23%	6.60% ^(5/08)
BAAM Keystone (4)	7.44%	-	-	-	7.44% ^(7/12)
HFRI FOF Comp Index	3.75%	1.78%	3.49%	4.12%	3.75% ^(7/12)

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The market values and performance of such accounts are included within their relevant composites.

(1) Fixed Income also includes the new fixed income sub-composite which was funded in 03/01/2021.

(2) SEI HY Bank Loans since inception returns were included in the Fixed Income composite through 9/30/2017 and in the Multi-Strategy composite through 12/31/2019.

(3) SEI HY Bank Loans has a 1 month lag in valuation.

(4) Blackstone Keystone since inception returns were included in the Legacy Hedge Fund composite through 9/30/2017, included in the Multi-Strategy composite from 10/01/2017 through 12/31/2019, included in the Opportunistic Fixed composite from 01/01/2020 through 12/31/2020, included in the Private Credit from 01/01/2021 through 09/30/2021 and Opportunistic Fixed composite, thereafter.

Investment Manager Returns

As of June 30, 2022

	Market Value \$(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance - Inflation Protection							
Inflation Protection (TIPS)	\$1,043	100.00%					
Blmbg U.S. TIPS Index	-	-	(6.98%) (6.08%)	(9.79%) (8.92%)	(6.49%) (5.14%)	2.44% 3.04%	2.84% 3.21%
NISA Inv Adv TIPS	453	43.43%	(6.26%)	(8.88%)	(5.13%)	3.01%	3.19%
Blmbg U.S. TIPS Index (1)	-	-	(6.08%)	(8.92%)	(5.14%)	3.04%	3.21%
Brown Brothers TIPS	475	45.53%	(6.10%)	(8.81%)	(5.32%)	2.92%	3.08%
Blmbg U.S. TIPS Index	-	-	(6.08%)	(8.92%)	(5.14%)	3.04%	3.21%
New Century Global TIPS	115	11.04%	(12.96%)	(16.78%)	(14.68%)	(0.66%)	1.05%
Blmbg Wrld Inflation Linked Unhdg	-	-	(13.17%)	(16.98%)	(14.02%)	(0.65%)	1.00%

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception
Net Performance - Inflation Protection					
Inflation Protection (TIPS)	1.61%	3.18%	-	-	3.11% (2/03)
Blmbg U.S. TIPS Index	1.73%	3.92%	4.44%	5.04%	4.10% (2/03)
NISA Inv Adv TIPS	1.63%	3.16%	-	-	3.09% (4/07)
Blmbg U.S. TIPS Index (1)	1.65%	3.17%	3.90%	4.60%	3.09% (4/07)
Brown Brothers TIPS	1.80%	-	-	-	1.92% (2/12)
Blmbg U.S. TIPS Index	1.73%	3.92%	4.44%	5.04%	1.82% (2/12)
New Century Global TIPS	1.35%	-	-	-	1.29% (2/12)
Blmbg Wrld Inflation Linked Unhdg	1.06%	2.86%	4.42%	4.99%	1.02% (2/12)

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(1) Benchmark history is a blend of current and past benchmark indices. History prior to 12/31/2018 is provided by RVK.

Investment Manager Returns

As of June 30, 2022

	Market Value \$(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance - Private Equity							
Private Equity	\$6,059	100.00%	(1.55%)	1.19%	22.79%	23.63%	19.22%
Burgiss Private Equity Index (Qtr lag)	-	-	(0.66%)	3.58%	17.15%	19.14%	17.11%
Global Equity + 3% (Qtr lag)(1)	-	-	(4.22%)	3.82%	12.99%	19.75%	17.67%
Buyouts	3,650	60.25%	0.62%	4.01%	22.56%	23.11%	18.92%
Burgiss Buyout Index (Qtr lag)	-	-	0.31%	4.89%	19.28%	17.40%	15.98%
Special Situations	714	11.79%	0.02%	12.26%	34.40%	25.73%	19.81%
Burgiss Special Situations Idx (Qtr lag)	-	-	0.84%	3.33%	8.81%	7.06%	7.21%
Growth Equity	1,419	23.42%	(7.25%)	(1.23%)	25.91%	35.66%	31.09%
Burgiss Venture Capital Index (Qtr lag)	-	-	(3.05%)	1.36%	16.73%	30.09%	25.70%
Keystone Legacy (2)	276	4.55%	(2.12%)	(30.84%)	(11.02%)	(0.05%)	-

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception
Net Performance - Private Equity					
Private Equity	14.10%	11.88%	12.31%	13.66%	11.96% (1/86)
Burgiss Private Equity Index (Qtr lag)	14.47%	11.75%	13.12%	14.29%	17.14% (1/86)
Global Equity + 3% (Qtr lag)(1)	17.02%	13.26%	12.58%	12.84%	14.93% (1/86)
Buyouts	15.67%	12.98%	14.61%	15.80%	13.96% (4/86)
Burgiss Buyout Index (Qtr lag)	13.92%	11.38%	14.36%	13.81%	19.50% (4/86)
Special Situations	13.89%	13.01%	14.21%	13.73%	13.66% (1/95)
Burgiss Special Situations Idx (Qtr lag)	8.26%	7.12%	9.30%	9.80%	10.18% (1/95)
Growth Equity	17.18%	12.64%	7.94%	9.72%	9.26% (1/86)
Burgiss Venture Capital Index (Qtr lag)	19.56%	14.92%	10.75%	15.31%	14.91% (1/86)
Keystone Legacy (2)	-	-	-	-	(0.84%) (7/18)

*Market values may not sum as a result of accounts funded within the quarter or accounts in the process of liquidation. The market values and performance of such accounts are included within their relevant composites.
 (1) As of 01/01/2020 benchmark consists of 25% MSCI World ex US and 75% Russell 3000 + 3% with a 1 quarter lag.
 (2) As of 12/31/2020, Keystone Legacy SPV consists of 119 non-core funds.

Investment Manager Returns

As of June 30, 2022

	Market Value \$(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance - Private Credit							
Private Credit	\$1,136	100.00%	2.42%	5.49%	12.68%	12.54%	-
S&P Levered Loan Index +1% (Qtr lag)	-	-	0.15%	1.14%	4.25%	5.30%	-
Direct Lending	371	32.67%	2.01%	5.16%	12.02%	-	-
Distressed Debt	327	28.82%	3.26%	5.93%	21.46%	-	-
Diversified Credit	438	38.51%	2.18%	5.45%	11.89%	-	-

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception
Net Performance - Private Credit					
Private Credit	-	-	-	-	11.31% <small>(12/17)</small>
S&P Levered Loan Index +1% (Qtr lag)	-	-	-	-	5.12% <small>(12/17)</small>
Direct Lending	-	-	-	-	9.87% <small>(1/20)</small>
Distressed Debt	-	-	-	-	23.27% <small>(1/20)</small>
Diversified Credit	-	-	-	-	15.13% <small>(1/20)</small>

*Market values may not sum as a result of accounts funded within the quarter or accounts in the process of liquidation. The market values and performance of such accounts are included within their relevant composites.

Investment Manager Returns

As of June 30, 2022

	Market Value \$(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance - Real Estate							
Real Estate	\$2,920	100.00%	2.59%	6.25%	17.25%	10.04%	7.03%
Real Estate Custom Bench (Qtr lag) (1)	-	-	5.09%	11.63%	24.86%	10.54%	8.78%
CPI +3% (Qtr lag)	-	-	3.80%	6.23%	11.54%	7.19%	6.35%
Core/Core Plus Real Estate Funds	1,295	44.33%	5.52%	11.65%	20.11%	9.36%	8.38%
NCREIF ODCE Index (Qtr lag)	-	-	7.77%	15.72%	28.69%	11.11%	9.46%
Value Add/Oppportunistic SMA	569	19.48%	3.31%	3.68%	16.87%	10.29%	5.01%
NCREIF ODCE Index (Qtr lag)	-	-	7.77%	15.72%	28.69%	11.11%	9.46%
Value Add/Oppportunistic Funds	747	25.56%	6.71%	12.99%	23.06%	12.12%	10.58%
NCREIF ODCE Index (Qtr lag)	-	-	7.77%	15.72%	28.69%	11.11%	9.46%
REITS	310	10.60%	(16.18%)	(18.72%)	(5.03%)	5.90%	6.76%
FTSE NAREIT US Index	-	-	(17.11%)	(20.55%)	(6.97%)	3.01%	4.80%

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception
Net Performance - Real Estate					
Real Estate	7.72%	3.70%	6.98%	7.86%	8.52% (3/84)
Real Estate Custom Bench (Qtr lag) (1)	9.81%	5.91%	7.95%	8.45%	-
CPI +3% (Qtr lag)	5.29%	5.27%	5.41%	5.37%	5.76% (3/84)
Core/Core Plus Real Estate Funds	9.77%	6.73%	8.01%	8.68%	7.34% (9/86)
NCREIF ODCE Index (Qtr lag)	10.24%	6.11%	7.62%	8.21%	6.44% (9/86)
Value Add/Oppportunistic SMA	6.09%	2.58%	5.21%	6.29%	5.51% (6/88)
NCREIF ODCE Index (Qtr lag)	10.24%	6.11%	7.62%	8.21%	6.51% (6/88)
Value Add/Oppportunistic Funds	10.86%	4.05%	8.03%	9.37%	8.20% (3/84)
NCREIF ODCE Index (Qtr lag)	10.24%	6.11%	7.62%	8.21%	6.66% (3/84)
REITS	7.07%	4.42%	8.84%	8.55%	9.43% (4/96)
FTSE NAREIT US Index	7.16%	4.42%	8.63%	8.57%	9.72% (4/96)

*Market values may not sum as a result of accounts funded within the quarter or accounts in the process of liquidation. The market values and performance of such accounts are included within their relevant composites.

(1) As of 03/31/2019 benchmark consists of 90% NCREIF ODCE Index (1 Qtr lag) and 10% FTSE NAREIT Index (unlagged) Prior to 03/31/2019, benchmark history was provided by RVK.

Callan

Appendix II – Callan Update

Published Research Highlights from 2Q22

Research Café: ESG Interview Series



Investing in Data Centers: The Real Assets of the Digital Age



Webinar: Pension Risk Transfer



Do Active Fixed Income Managers Add Value With Sector Rotation?



Recent Blog Posts

Best Practices to Make Sure Investors and Their Managers Are in Sync

Jan Mende

Rising Interest Rates Spur Look at Structured Credit

Nathan Wong

SEC Proposes Rule to Enhance ESG Disclosures for Investments

Kristin Bradbury

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. In our “Callan College” on Alternatives, you will learn about the importance of allocations to alternatives, and how to consider integrating, evaluating, and monitoring them.

Join our next VIRTUAL session via Zoom (2 sessions, 3 hours each):
August 24-25, 2022

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.

Join our next VIRTUAL session via Zoom (3 sessions, 2–3 hours each):
September 20–22, 2022

Mark Your Calendar

2022 October Regional Workshops

October 18, 2022
Denver

October 20, 2022
San Francisco

Callan Institute’s 2023 National Conference

April 2-4, 2023
Scottsdale, Arizona

Watch your email for further details and an invitation.

Webinars & Research Café Sessions

Market Intelligence

October 14, 2022 – 9:30am (PT)

Callan Updates

Firm updates by the numbers, as of June 30, 2022

Total Associates: ~200

Ownership

- 100% employees
- 67% of employees are equity owners
- 55% of shareholders identify as women or minority

Key Hires

- Craig Chaikin, CFA, SVP, Denver Consulting
- Emily Hylton, SVP, Atlanta Consulting
- Christina Mays, VP, Real Assets Consulting
- Nicole Wubbena, SVP, Global Manager Research

Total General and Investment Consultants: more than 55

Total Specialty and Research Consultants: more than 80

Total CFA/CAIA/FRMs: more than 55

Total Institutional Investor Clients: more than 475

Assets Under Advisement: more than \$4 trillion

“Callan has been offering alternatives investment consulting services for more than 30 years. The demand for our services is greater than ever as institutional investors increase their allocations to alternative investments. As a result, we’ve been expanding our already robust research resources and capabilities to support them.” — Pete Keliuotis, EVP, Callan’s Alternatives Consulting Group



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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.