Callan

December 1 , 2020

Pennsylvania State Employees' Retirement System – Defined Benefit Plan

Third Quarter 2020

Executive Summary

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Market Environment

Continued Recovery in Global Equity Markets in 3Q20

Global equity continued the rally in 3Q after March market bottom:

- S&P 500 Index -33.5% from peak (02/19/20) to low on 3/23/20
- Rebound since March puts S&P 500 even with February peak, suggesting broad-based recovery, but year to date results are concentrated in a few stocks.
- Fed cut rates to zero, commenced QE, instituted multiple facilities to backstop money markets, credit markets, and economy.
  - Fed expects to get paid back
  - Further fiscal stimulus expected
- Congress passed fiscal stimulus (CARES) to carry the economy through the crisis.
- Economic recovery will be uncertain as COVID-19 infections surge anew; re-openings may be reversed.

Returns for Periods ended 9/30/20

	1 Quarter	Year to Date	1 Year	5 Years	10 Years	25 Years
U.S. Equity						
Russell 3000	9.21	5.41	15.00	13.69	13.48	9.29
S&P 500	8.93	5.57	15.15	14.15	13.74	9.31
Russell 2000	4.93	-8.69	0.39	8.00	9.85	7.96
Global ex-U.S. Equity						
MSCI World ex USA	4.92	-7.13	0.16	5.32	4.37	4.71
MSCI Emerging Markets	9.56	-1.16	10.54	8.97	2.51	--
MSCI ACWI ex USA Small Cap	10.50	-3.64	6.97	6.80	5.31	5.82
Fixed Income						
Bloomberg Barclays Aggregate	0.62	6.79	6.98	4.18	3.64	5.30
90-day T-Bill	0.04	0.64	1.10	1.20	0.64	2.32
Bloomberg Barclays Long Gov/Credit	1.22	14.20	12.92	8.78	7.36	7.66
Bloomberg Barclays Global Agg ex-US	4.14	4.77	5.48	3.60	1.35	3.90
Real Estate						
NCREIF Property	0.74	0.45	2.00	6.28	9.37	9.09
FTSE Nareit Equity	1.44	-17.54	-18.16	3.95	7.90	9.34
Alternatives						
CS Hedge Fund	3.44	-0.02	2.41	2.76	3.64	7.25
Cambridge Private Equity*	9.89	6.74	7.67	11.36	13.38	14.86
Bloomberg Commodity	9.07	-12.08	-8.20	-3.09	-6.03	0.91
Gold Spot Price	5.28	24.45	28.69	11.19	3.77	6.57
Inflation - CPI-U	0.96	1.29	1.37	1.81	1.77	2.14

*Cambridge PE data through 06/30/20

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

Market Environment: 3Q20

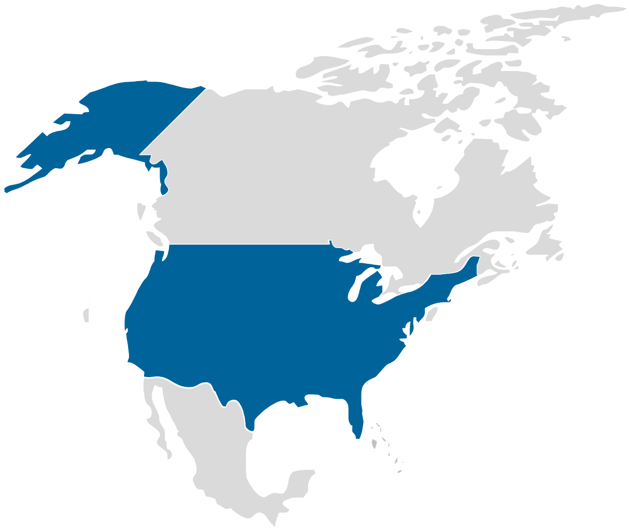
High degree of uncertainty

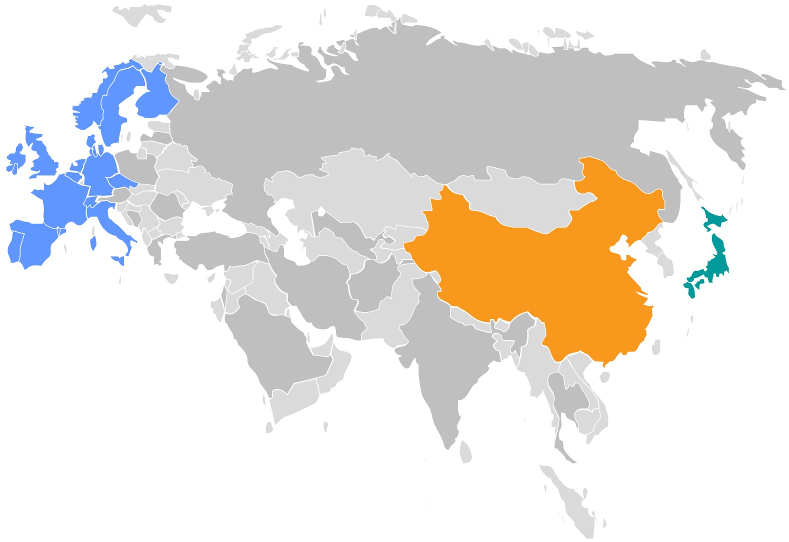
U.S.

- 2Q GDP fell -31.4%, largest decline on record; 3Q gain of 33% (both on an annualized basis)
- Retail sales, durable goods, and personal spending rebounded in 2Q and 3Q, but growth slowed in August and September.
- Unemployment dropped to 7.9% in September from 14.7% April peak.
  - Jobless claims decelerated to less than 1 million per week, but are still elevated relative to prior recession peaks.
- Housing benefiting from relatively low mortgage rates
- Fed left rates close to 0% and expects to be on hold until at least 2022.

Overseas

- Euro zone 1Q GDP contracted 3.7% (-14% annualized), followed by 11.8% drop (-39.5% annualized) in 2Q; largest quarterly drop on record.
- U.K. GDP sank 19.8% in 2Q (-59% annualized)—most ever.
- Japan's economy shrank 7.9% (-28% annualized) in 2Q; third straight quarterly drop, dating back to 2019.
- China's GDP fell 10% (-34% annualized) in 1Q, but rebounded 11.7% (+56%) in 2Q and is up 2.7% (11.3% annualized) in 3Q; only country expected to grow in 2020.
  - Chinese government unveiled fiscal stimulus of US$506 bn, bringing budget deficit to a record high of 3.6% of GDP.



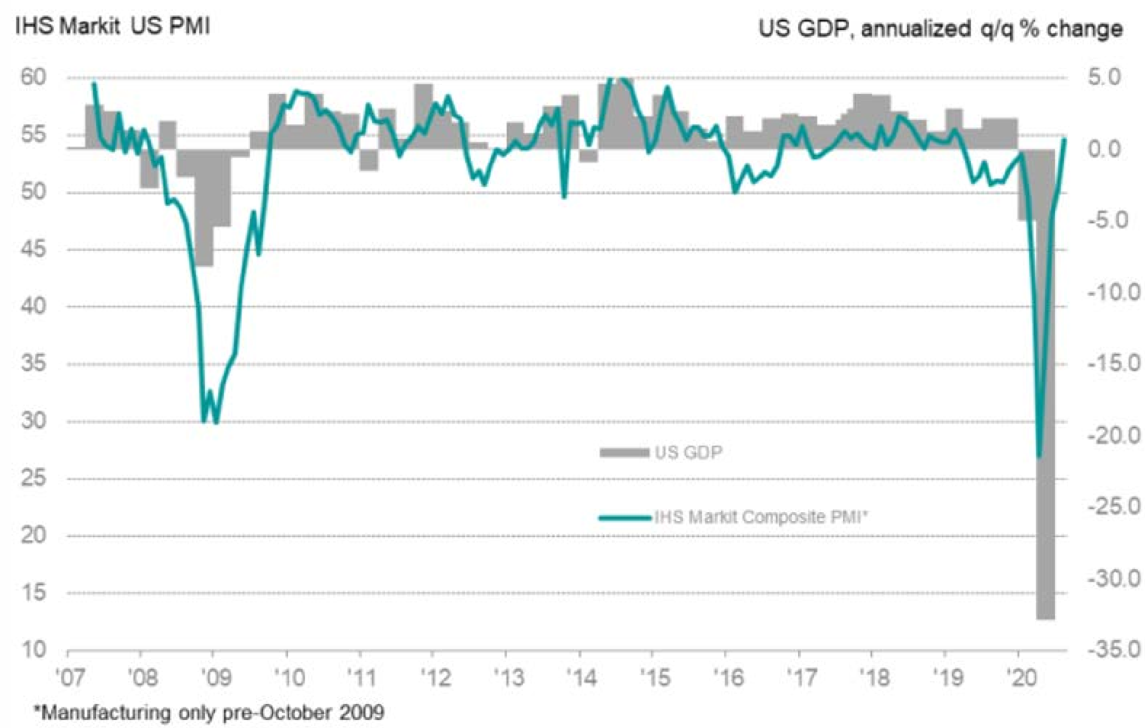


Stock Market is Not the Economy

Economic growth seriously impaired in 2020; recovery could be several quarters away

- US Purchasing Managers' Index (US PMI) provides a good proxy for future GDP.
- Initial decline in PMI mirrored by sharp decline in 1Q20 and 2Q20 GDP; for 3Q U.S. GDP projected at +33% annualized
- PMI has rebounded sharply.
  - IHS Markit US Composite PMI Output Index posted 53.2 in September
  - Up from 50.3 at the start of 3Q
  - Strong increase in output
- Broad improvement, but signs of slowing and an uneven recovery
- Manufacturing firms' new order inflows slipped in September.
- The level of the PMI in 3Q was lower than during previous periods of expansion, such as the entirety of 2018.

IHS Markit Composite PMI and U.S. GDP



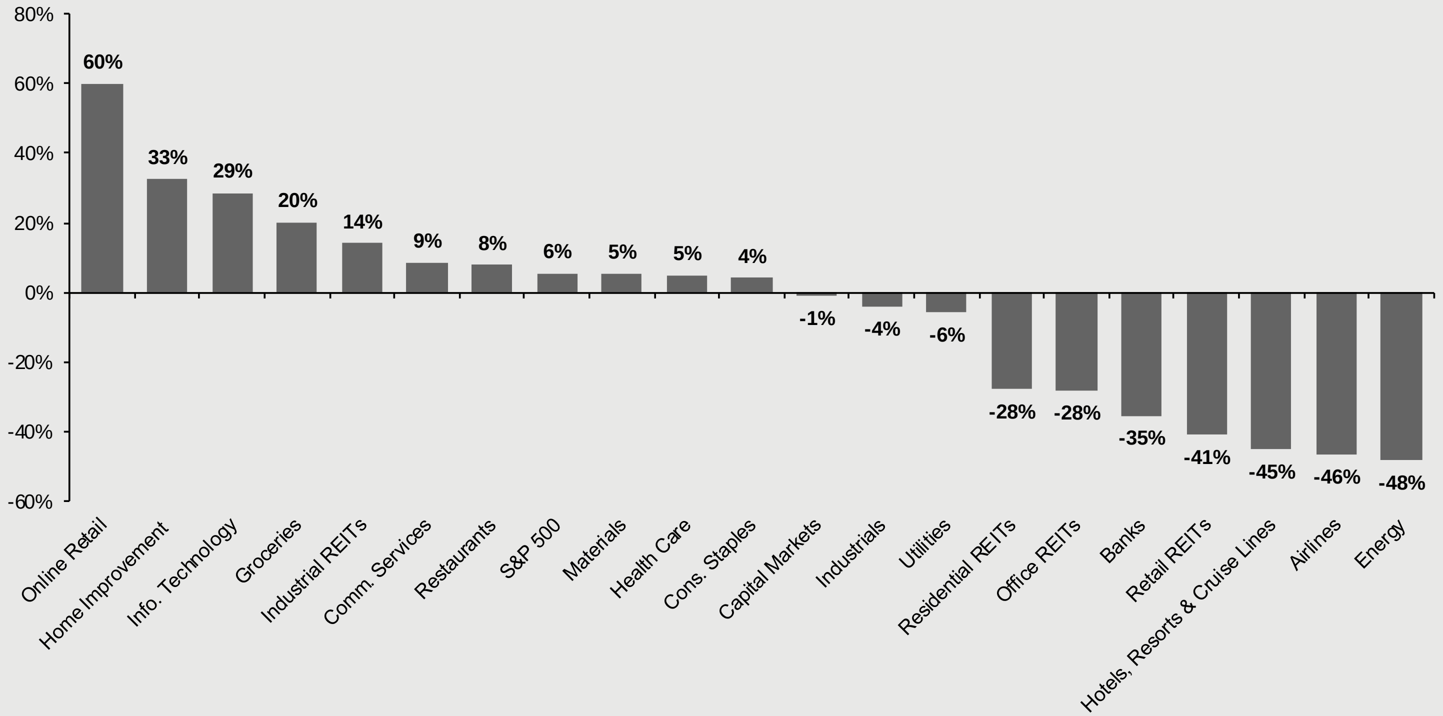
Source: IHS Markit Flash U.S. Composite PMI™

U.S. Stock Market Returns YTD Are Widely Dispersed

Concentration of outperformance in technology, online retail, and supporting industries

Year-to-date returns

Total returns by sector and industry

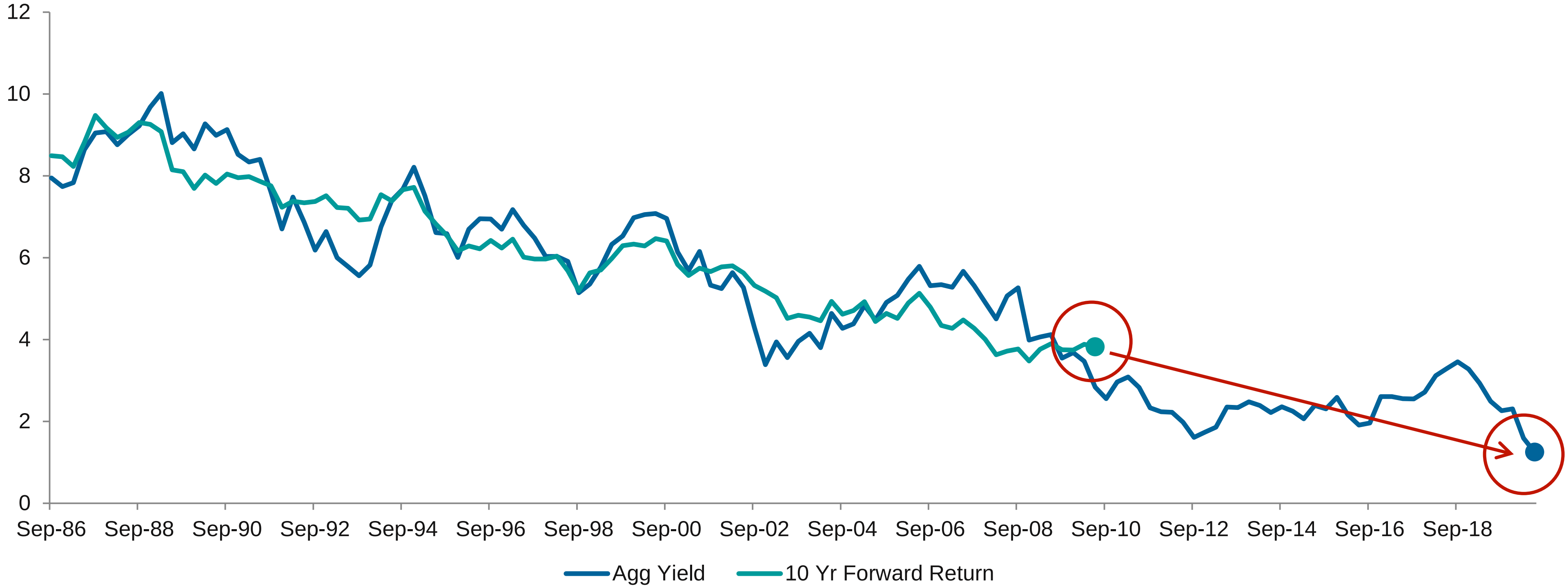


– Best-performing sectors employ far fewer workers than many of the underperforming sectors (health care, capital markets, banks, hospitality, transportation, energy).

Sources: FactSet, J.P. Morgan Asset Management Guide to the Markets – U.S., Standard & Poor's; Data are as of 9/30/20.

Starting Yield Is a Strong Determinant of Forward Return

Bloomberg Barclays Aggregate Starting Yield vs. 10-Year Forward Return



– Somewhat strong relationship between GDP growth and the 10-Year Treasury Yield; the relationship improves even more when you add smoothing and lags.

Source: FRED

Diversification Remains Key Risk Control

Periodic Table of Investment Returns 2003 – 3Q2020

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	3 Qtrs. 2020
U.S. Fixed 8.43%	Non-U.S. Fixed 22.37%	Emerging Markets 55.82%	Emerging Markets 25.55%	Emerging Markets 34.00%	Emerging Markets 32.17%	Emerging Markets 39.38%	U.S. Fixed 5.24%	Emerging Markets 78.51%	Small Cap 26.85%	Real Estate Funds 14.96%	Emerging Markets 18.23%	Small Cap 38.82%	Large Cap 13.69%	Real Estate Funds 13.95%	Small Cap 21.31%	Emerging Markets 37.28%	Real Estate Funds 7.36%	Large Cap 31.49%	U.S. Fixed 6.79%
High Yield 5.28%	U.S. Fixed 10.26%	Small Cap 47.25%	Non-U.S. Equity 20.38%	Real Estate Funds 20.15%	Non-U.S. Equity 25.71%	Real Estate Funds 14.84%	Non-U.S. Fixed 4.39%	High Yield 58.21%	Emerging Markets 18.88%	U.S. Fixed 7.84%	Non-U.S. Equity 16.41%	Large Cap 32.39%	Real Estate Funds 11.46%	Large Cap 1.38%	High Yield 17.13%	Non-U.S. Equity 24.21%	Cash Equivalent 1.87%	Small Cap 25.52%	Large Cap 5.57%
Real Estate Funds 4.64%	Real Estate Funds 4.57%	Non-U.S. Equity 39.42%	Small Cap 18.33%	Non-U.S. Equity 14.47%	Small Cap 18.37%	Hedge Funds 12.56%	Cash Equivalent 2.06%	Non-U.S. Equity 33.67%	Real Estate Funds 15.26%	High Yield 4.98%	Small Cap 16.35%	Non-U.S. Equity 21.02%	U.S. Fixed 5.97%	U.S. Fixed 0.55%	Large Cap 11.96%	Large Cap 21.83%	U.S. Fixed 0.01%	Non-U.S. Equity 22.49%	Non-U.S. Fixed 4.77%
Cash Equivalent 4.42%	Hedge Funds 3.04%	High Yield 28.97%	Non-U.S. Fixed 12.54%	Hedge Funds 7.61%	Large Cap 15.79%	Non-U.S. Equity 12.44%	Real Estate Funds -10.70%	Small Cap 27.17%	High Yield 15.12%	Non-U.S. Fixed 4.36%	Large Cap 16.00%	Real Estate Funds 12.90%	Small Cap 4.89%	Cash Equivalent 0.05%	Emerging Markets 11.19%	Small Cap 14.65%	High Yield -2.08%	Emerging Markets 18.44%	Cash Equivalent 0.64%
Hedge Funds 4.42%	Cash Equivalent 1.78%	Large Cap 28.68%	Real Estate Funds 12.00%	Large Cap 4.91%	Real Estate Funds 15.27%	Non-U.S. Fixed 11.03%	Hedge Funds -19.07%	Large Cap 26.47%	Large Cap 15.06%	Large Cap 2.11%	High Yield 15.81%	Hedge Funds 9.73%	Hedge Funds 4.13%	Hedge Funds -0.71%	Real Estate Funds 7.79%	Non-U.S. Fixed 10.51%	Non-U.S. Fixed -2.15%	High Yield 14.32%	High Yield 0.62%
Small Cap 2.49%	High Yield -1.37%	Non-U.S. Fixed 19.36%	High Yield 11.13%	Small Cap 4.55%	Hedge Funds 13.86%	U.S. Fixed 6.97%	High Yield -26.16%	Hedge Funds 18.57%	Hedge Funds 10.95%	Cash Equivalent 0.10%	Real Estate Funds 9.79%	High Yield 7.44%	High Yield 2.45%	Non-U.S. Equity -3.04%	Non-U.S. Equity 2.75%	High Yield 7.50%	Hedge Funds -3.19%	Hedge Funds 9.31%	Hedge Funds -0.02%
Emerging Markets -2.61%	Emerging Markets -6.16%	Hedge Funds 15.44%	Large Cap 10.88%	Cash Equivalent 3.06%	High Yield 11.85%	Large Cap 5.49%	Small Cap -33.79%	Non-U.S. Fixed 7.53%	Non-U.S. Equity 8.95%	Hedge Funds -2.52%	Hedge Funds 7.67%	Cash Equivalent 0.07%	Cash Equivalent 0.04%	Small Cap -4.41%	U.S. Fixed 2.65%	Hedge Funds 7.12%	Large Cap -4.38%	U.S. Fixed 8.72%	Real Estate Funds -0.74%
Non-U.S. Fixed -3.75%	Non-U.S. Equity -15.80%	Real Estate Funds 8.28%	Hedge Funds 9.64%	High Yield 2.74%	Non-U.S. Fixed 8.16%	Cash Equivalent 5.00%	Large Cap -37.00%	U.S. Fixed 5.93%	U.S. Fixed 6.54%	Small Cap -4.18%	U.S. Fixed 4.21%	U.S. Fixed -2.02%	Emerging Markets -2.19%	High Yield -4.47%	Non-U.S. Fixed 1.49%	Real Estate Funds 6.66%	Small Cap -11.01%	Non-U.S. Fixed 5.09%	Emerging Markets -1.16%
Large Cap -11.89%	Small Cap -20.48%	U.S. Fixed 4.10%	U.S. Fixed 4.34%	U.S. Fixed 2.43%	Cash Equivalent 4.86%	High Yield 1.87%	Non-U.S. Equity -43.56%	Cash Equivalent 0.21%	Non-U.S. Fixed 4.95%	Non-U.S. Equity -12.21%	Non-U.S. Fixed 4.09%	Emerging Markets -2.60%	Non-U.S. Fixed -3.09%	Non-U.S. Fixed -6.02%	Hedge Funds 1.25%	U.S. Fixed 3.54%	Non-U.S. Equity -14.09%	Real Estate Funds 4.39%	Non-U.S. Equity -7.13%
		Cash Equivalent 1.15%	Cash Equivalent 1.33%	Non-U.S. Fixed -8.65%	U.S. Fixed 4.33%	Small Cap -1.57%	Emerging Markets -53.33%	Real Estate Funds -30.40%	Cash Equivalent 0.13%	Emerging Markets -18.42%	Cash Equivalent 0.11%	Non-U.S. Fixed -3.08%	Non-U.S. Equity -4.32%	Emerging Markets -14.92%	Cash Equivalent 0.33%	Cash Equivalent 0.86%	Emerging Markets -14.57%	Cash Equivalent 2.28%	Small Cap -8.69%

- 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

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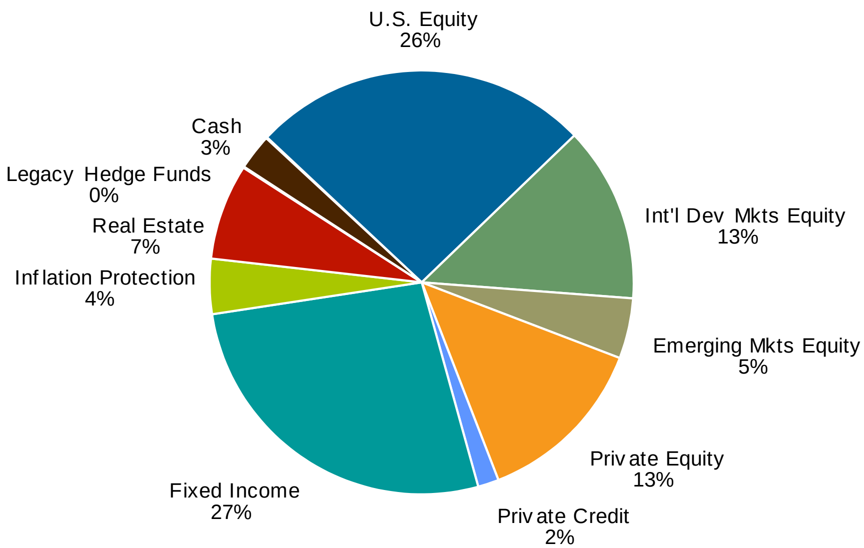
PA SERS Defined Benefit Plan Performance Review

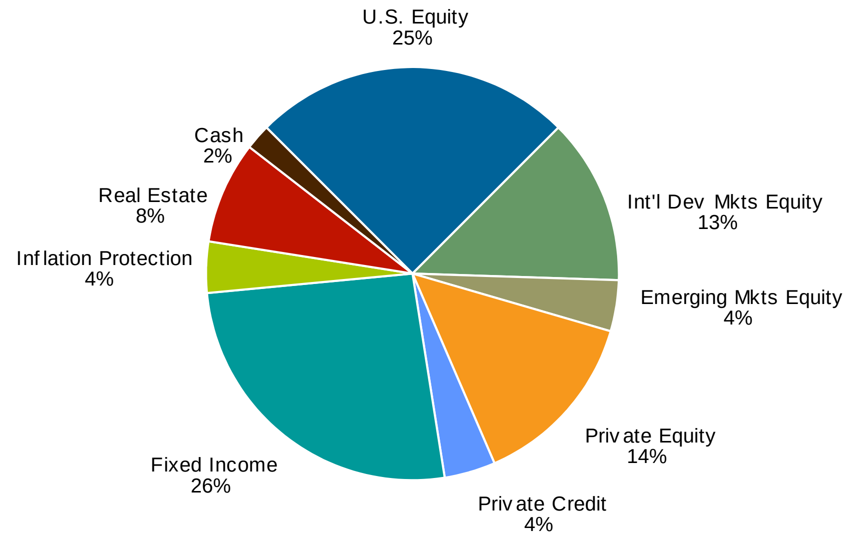
Total Fund

Actual Asset Allocation versus Target as of September 30, 2020

Actual Asset Allocation



Target Asset Allocation

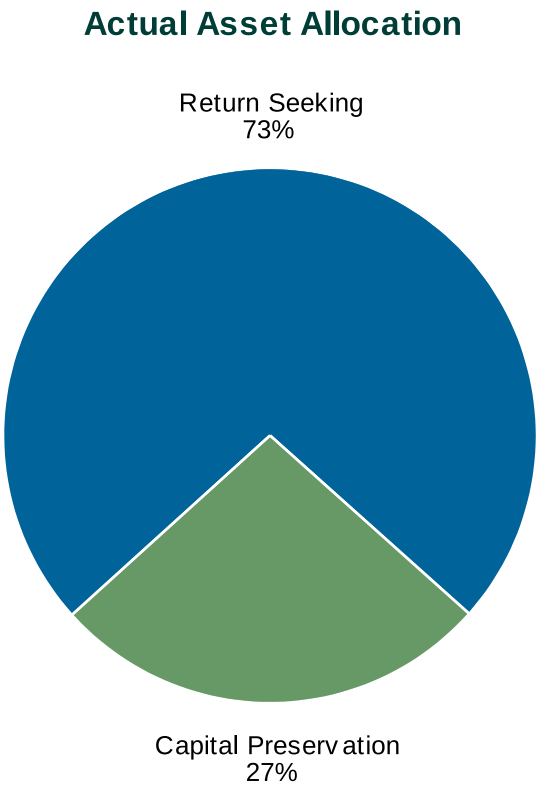


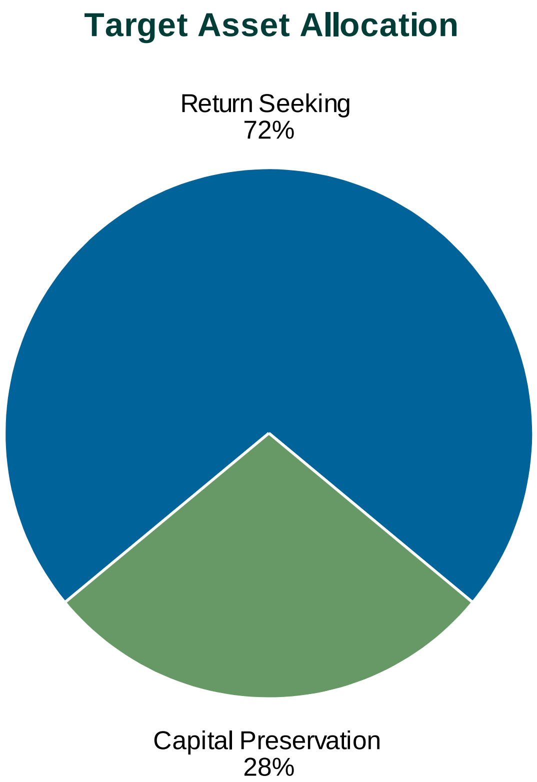
Asset Class	$000s Actual	Weight Actual	Target	Percent Difference	$000s Difference
U.S. Equity	8,133,340	25.8%	25.0%	0.8%	267,410
Int'l Dev Mkts Equity	4,220,404	13.4%	13.0%	0.4%	130,121
Emerging Mkts Equity	1,457,295	4.6%	4.0%	0.6%	198,746
Private Equity	4,170,316	13.3%	14.0%	(0.7%)	(234,605)
Private Credit	498,557	1.6%	4.0%	(2.4%)	(759,991)
Fixed Income	8,478,450	26.9%	26.0%	0.9%	297,882
Inflation Protection	1,320,319	4.2%	4.0%	0.2%	61,770
Real Estate	2,311,123	7.3%	8.0%	(0.7%)	(205,974)
Legacy Hedge Funds	24,094	0.1%	0.0%	0.1%	24,094
Cash	849,821	2.7%	2.0%	0.7%	220,547
Total	31,463,722	100.0%	100.0%		

Current Quarter Target = 26.0% Blmbg Aggregate, 25.0% Russell 3000 Index, 14.0% Private Equity, 13.0% MSCI World ex US IMI, 7.2% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% MSCI EM IMI, 4.0% Blmbg:TIPS, 4.0% S&P:LSTA Lev Loan lagged 3 months+1.0%, 2.0% 3-month Treasury Bill, 0.8% FTSE EP/NA US Index lagged 3 months, 0.0% HFRI Fund of Funds Compos and 0.0% S&P:LSTA Lev Loan.

Return Seeking and Capital Preservation Assets

As of September 30, 2020





Return Seeking Assets include: Domestic Equity, International Developed Equity, Emerging Markets Equity, Opportunistic Fixed Income, Private Equity, Private Credit, and Real Estate
Capital Preservation Assets include: Core Fixed Income, Inflation Protection (TIPS), and Cash

Projected Risk, Liquidity and Correlation

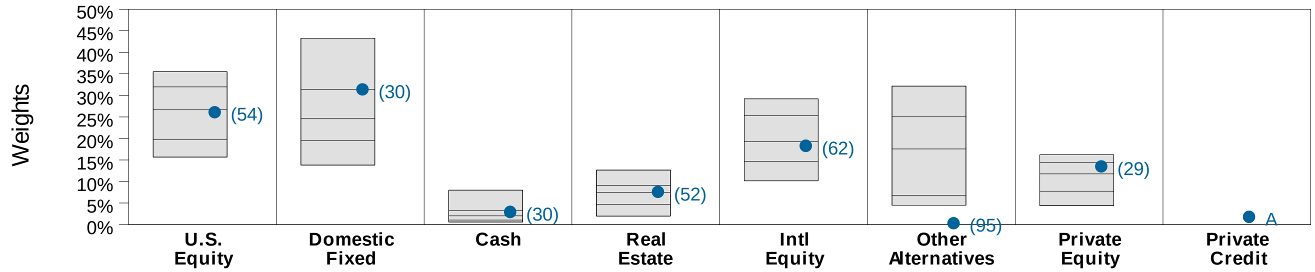
	Capital Preservation Assets			Return Seeking Assets						
	Cash	Inflation Protection (TIPS)	Core Fixed Income	U.S. Equity	Developed International Equity	Emerging Markets Equity	Opportunistic Fixed Income	Private Credit	Real Estate	Private Equity
Policy Target Asset Allocation	2%	4%	22%	25%	13%	4%	4%	4%	8%	14%
Projected Return* (Geometric)	2.25%	2.40%	2.75%	7.15%	7.00%	7.25%	4.55%	5.90%	7.70%	8.50%
Projected Risk* (Standard Deviation)	0.90%	5.05%	3.75%	18.10%	19.70%	25.70%	7.65%	12.10%	19.10%	27.80%
Liquidity	High	High	High	High	High	Medium	Low	Low	Low	Low
Correlation to U.S. Equity*	-0.03	-0.05	-0.11	1.00	0.78	0.78	0.69	0.80	0.78	0.84
Months of Benefit Payments**	2.7	4.2	18.5							
Months of Benefit Payments (Includes EE & ER Contributions)**	8.8	13.7	60.7							
Cumulative Months of Benefit Payments **(Includes EE & ER Contributions)		83.2								

Source: *Callan 2020 Capital Market Projections, **SERS IO as of 9/30/2020

Total Fund

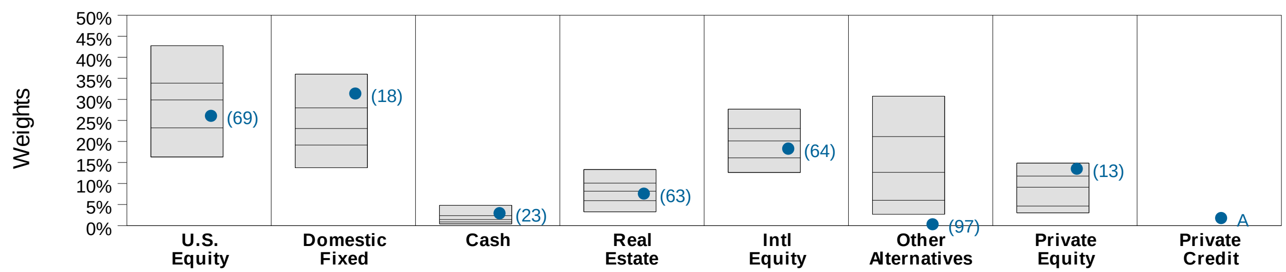
Actual Asset Allocation versus Very Large Public DB Plan (>$10B) Peers and Large Public DB Plan (>$1B) Peers as of September 30, 2020

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



	U.S. Equity	Domestic Fixed	Cash	Real Estate	Intl Equity	Other Alternatives	Private Equity	Private Credit
10th Percentile	35.50	43.27	7.99	12.67	29.19	32.14	16.21	-
25th Percentile	31.97	31.38	3.24	9.09	25.29	25.01	14.43	-
Median	26.78	24.69	2.03	7.49	19.28	17.57	11.78	-
75th Percentile	19.70	19.53	1.06	4.72	14.69	6.82	7.75	-
90th Percentile	15.67	13.82	0.60	1.96	10.16	4.49	4.41	-
Fund ●	25.85	31.14	2.70	7.35	18.05	0.08	13.25	1.58
% Group Invested	96.15%	100.00%	73.08%	92.31%	96.15%	73.08%	34.62%	0.00%

Asset Class Weights vs Callan Public Fund Spons - Large (>1B)



	U.S. Equity	Domestic Fixed	Cash	Real Estate	Intl Equity	Other Alternatives	Private Equity	Private Credit
10th Percentile	42.74	36.00	4.83	13.34	27.67	30.75	14.86	-
25th Percentile	33.85	27.99	2.36	10.11	23.06	21.17	11.78	-
Median	29.88	23.07	1.45	8.19	20.12	12.65	9.12	-
75th Percentile	23.21	19.13	0.89	5.92	16.10	6.02	4.65	-
90th Percentile	16.33	13.76	0.40	3.26	12.62	2.70	3.03	-
Fund ●	25.85	31.14	2.70	7.35	18.05	0.08	13.25	1.58
% Group Invested	98.21%	98.21%	76.79%	83.93%	96.43%	64.29%	41.07%	0.00%

Current Quarter Target = 26.0% Blmbg Aggregate, 25.0% Russell 3000 Index, 14.0% Private Equity, 13.0% MSCI World ex US IMI, 7.2% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% MSCI EM IMI, 4.0% Blmbg:TIPS, 4.0% S&P:LSTA Lev Loan lagged 3 months+1.0%, 2.0% 3-month Treasury Bill, 0.8% FTSE EP/NA US Index lagged 3 months, 0.0% HFRI Fund of Funds Compos and 0.0% S&P:LSTA Lev Loan.

Total Fund

One Quarter Attribution Analysis versus Target – Gross of Fees as of September 30, 2020

- The Plan started the transition to the new asset allocation approved by the Board at the February 25, 2020 Investment Committee meeting during the first quarter of 2020. Callan will provide longer attribution as more historical data becomes available under the new asset allocation policy.

Relative Attribution Effects for Quarter ended September 30, 2020

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
U.S. Equity	27%	25%	8.79%	9.21%	(0.11%)	0.03%	(0.08%)
International. Developed	14%	13%	6.14%	5.64%	0.07%	(0.00%)	0.06%
Emerging Mkts Equity	5%	4%	11.52%	9.79%	0.08%	0.01%	0.09%
Private Equity	13%	14%	12.66%	12.66%	0.00%	(0.11%)	(0.11%)
Private Credit	2%	4%	6.30%	9.89%	(0.05%)	(0.10%)	(0.15%)
Fixed Income	27%	26%	1.81%	0.62%	0.33%	(0.10%)	0.24%
Inflation Protection	4%	4%	3.12%	3.03%	0.00%	(0.01%)	(0.00%)
Real Estate	7%	8%	0.52%	(1.23%)	0.13%	0.06%	0.19%
Legacy Hedge Funds	0%	0%	0.09%	4.24%	(0.00%)	(0.00%)	(0.00%)
Cash	2%	2%	0.05%	0.04%	0.00%	0.01%	0.01%
Total			**6.03% =**	**5.79% +**	**0.44% +**	**(0.20%)**	**0.24%**

- **What helped relative attribution?**
  - Outperformance relative to target from Fixed Income, Real Estate, Emerging Markets Equity and International Developed Equity managers
  - An underweight to Real Estate (attribution based on target return)
  - An overweight to U.S. Equity (attribution based on target return)

- **What hurt relative attribution?**
  - Underperformance relative to target from Private Credit managers
  - Underperformance from passive U.S. Equity index managers and a structural overweight to smaller cap stocks
  - An underweight during the quarter to Private Equity and Private Credit (attribution based on target return)
  - An overweight during the quarter to Fixed Income (attribution based on target return)

Current Quarter Target = 26.0% Blmbg Aggregate, 25.0% Russell 3000 Index, 14.0% Private Equity, 13.0% MSCI World ex US IMI, 7.2% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% MSCI EM IMI, 4.0% Blmbg:TIPS, 4.0% S&P:LSTA Lev Loan lagged 3 months+1.0%, 2.0% 3-month Treasury Bill,0.8% FTSE EP/NA US Index lagged 3 months, 0.0% HFRI Fund of Funds Compos and 0.0% S&P:LSTA Lev Loan.

Total Fund

Year to Date Attribution Analysis versus Target – Gross of Fees as of September 30, 2020

- The Plan started the transition to the new asset allocation approved by the Board at the February 25, 2020 Investment Committee meeting during the first quarter of 2020. Callan will provide longer attribution as more historical data becomes available under the new asset allocation policy.

Three Quarters 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	26%	25%	3.84%	5.41%	(0.36%)	(0.17%)	(0.53%)
International. Developed	15%	13%	(5.56%)	(6.70%)	0.20%	(0.84%)	(0.65%)
Emerging Mkts Equity	5%	4%	3.94%	(1.29%)	0.24%	(0.20%)	0.05%
Private Equity	13%	14%	6.03%	6.03%	0.00%	(0.24%)	(0.24%)
Private Credit	1%	4%	5.66%	(2.14%)	0.10%	0.20%	0.30%
Fixed Income	25%	26%	3.67%	6.79%	(0.70%)	(0.82%)	(1.52%)
Inflation Protection	4%	4%	9.24%	9.22%	0.00%	(0.07%)	(0.07%)
Real Estate	7%	8%	(2.01%)	(1.37%)	(0.05%)	0.04%	(0.01%)
Multi-Strategy	1%	0%	0.00%	(0.66%)	(0.03%)	0.02%	(0.01%)
Legacy Hedge Funds	0%	0%	(1.38%)	2.57%	(0.00%)	(0.00%)	(0.00%)
Cash	3%	2%	0.60%	0.64%	(0.00%)	0.20%	0.20%
Total			**1.42% =**	**3.91% +**	**(0.62%) +**	**(1.87%)**	**(2.49%)**

- **What helped relative attribution?**
  - Outperformance relative to target from Emerging Markets Equity, International Developed Equity and Private Credit managers
  - An underweight to Private Credit and Real Estate (attribution based on target return)
  - An overweight to Cash (attribution based on target return)

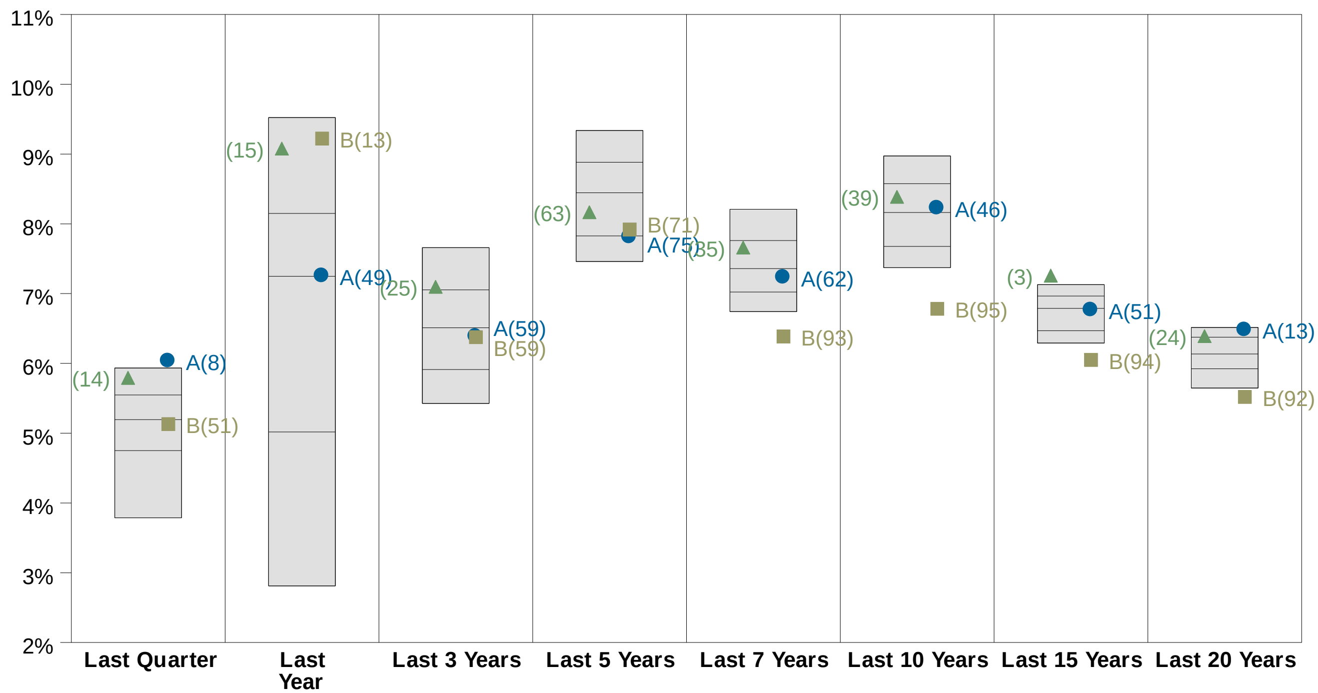
- **What hurt relative attribution?**
  - Underperformance relative to target from Fixed Income, U.S. Equity and Real Estate managers
  - An underweight to Fixed Income, Private Equity and TIPS (attribution based on target return)
  - An overweight to International Developed Equity, Emerging Markets Equity, U.S. Equity (attribution based on target return)

Current Quarter Target = 26.0% Blmbg Aggregate, 25.0% Russell 3000 Index, 14.0% Private Equity, 13.0% MSCI World ex US IMI, 7.2% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% MSCI EM IMI, 4.0% Blmbg:TIPS, 4.0% S&P:LSTA Lev Loan lagged 3 months+1.0%, 2.0% 3-month Treasury Bill,0.8% FTSE EP/NA US Index lagged 3 months, 0.0% HFRI Fund of Funds Compos and 0.0% S&P:LSTA Lev Loan.

Total Fund

Gross of Fee Performance versus Very Large Public DB Plan (>$10B) Peers and Benchmark (As of September 30, 2020)

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	5.94	9.52	7.66	9.34	8.21	8.97	7.13	6.52
25th Percentile	5.55	8.15	7.05	8.88	7.76	8.58	6.97	6.38
Median	5.19	7.25	6.51	8.45	7.36	8.16	6.79	6.13
75th Percentile	4.75	5.02	5.91	7.83	7.02	7.68	6.47	5.92
90th Percentile	3.79	2.81	5.43	7.46	6.74	7.37	6.29	5.65
Total Fund ● A	6.03	7.25	6.38	7.81	7.23	8.22	6.77	6.48
60% MSCI ACW IMI/40% U.S. Agg Bond ■ B	5.13	9.22	6.38	7.92	6.39	6.78	6.05	5.52
Total Fund Custom Benchmark ▲	5.79	9.08	7.10	8.17	7.66	8.39	7.26	6.39

Current Quarter Target = 26.0% Blmbg Aggregate, 25.0% Russell 3000 Index, 14.0% Private Equity, 13.0% MSCI World ex US IMI, 7.2% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% MSCI EM IMI, 4.0% Blmbg:TIPS, 4.0% S&P:LSTA Lev Loan lagged 3 months+1.0%, 2.0% 3-month Treasury Bill, 0.8% FTSE EP/NA US Index lagged 3 months, 0.0% HFRI Fund of Funds Compos and 0.0% S&P:LSTA Lev Loan.

Total Fund

Gross of Fee Performance versus Large Public DB Plan (>$1B) Peers and Benchmark (As of September 30, 2020)

Performance vs Callan Public Fund Spons - Large (>1B) (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		5.98	9.75	7.48	9.34	8.21	9.01	7.16	6.58
25th Percentile		5.54	8.26	6.96	8.74	7.57	8.52	6.94	6.33
Median		4.99	6.90	6.07	8.06	7.04	7.97	6.55	6.04
75th Percentile		4.44	5.37	5.29	7.53	6.48	7.32	6.12	5.67
90th Percentile		3.94	3.23	4.48	6.86	5.83	6.90	5.53	5.33
Total Fund	● A	6.03	7.25	6.38	7.81	7.23	8.22	6.77	6.48
60% MSCI ACW IMI/40% U.S. Agg Bond	■ B	5.13	9.22	6.38	7.92	6.39	6.78	6.05	5.52
Total Fund Custom Benchmark	▲	5.79	9.08	7.10	8.17	7.66	8.39	7.26	6.39

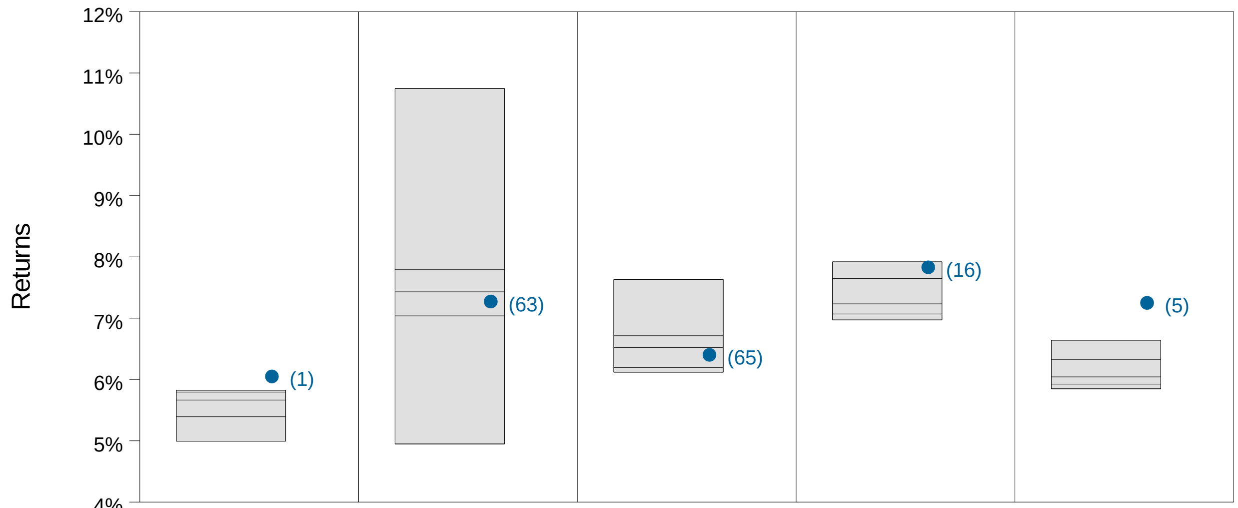
Current Quarter Target = 26.0% Blmbg Aggregate, 25.0% Russell 3000 Index, 14.0% Private Equity, 13.0% MSCI World ex US IMI, 7.2% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% MSCI EM IMI, 4.0% Blmbg:TIPS, 4.0% S&P:LSTA Lev Loan lagged 3 months+1.0%, 2.0% 3-month Treasury Bill, 0.8% FTSE EP/NA US Index lagged 3 months, 0.0% HFRI Fund of Funds Compos and 0.0% S&P:LSTA Lev Loan.

Total Fund

Asset Allocation-Adjusted Gross of Fee Performance versus Very Large Public DB Plan (>$10B) Peers as of September 30, 2020

- 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.

Asset Allocation Adjusted Ranking



	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
10th Percentile	5.83	10.75	7.63	7.92	6.64
25th Percentile	5.80	7.80	6.72	7.65	6.33
Median	5.67	7.43	6.52	7.24	6.04
75th Percentile	5.39	7.04	6.19	7.07	5.93
90th Percentile	4.99	4.95	6.12	6.97	5.85
Total Fund ●	6.03	7.25	6.38	7.81	7.23

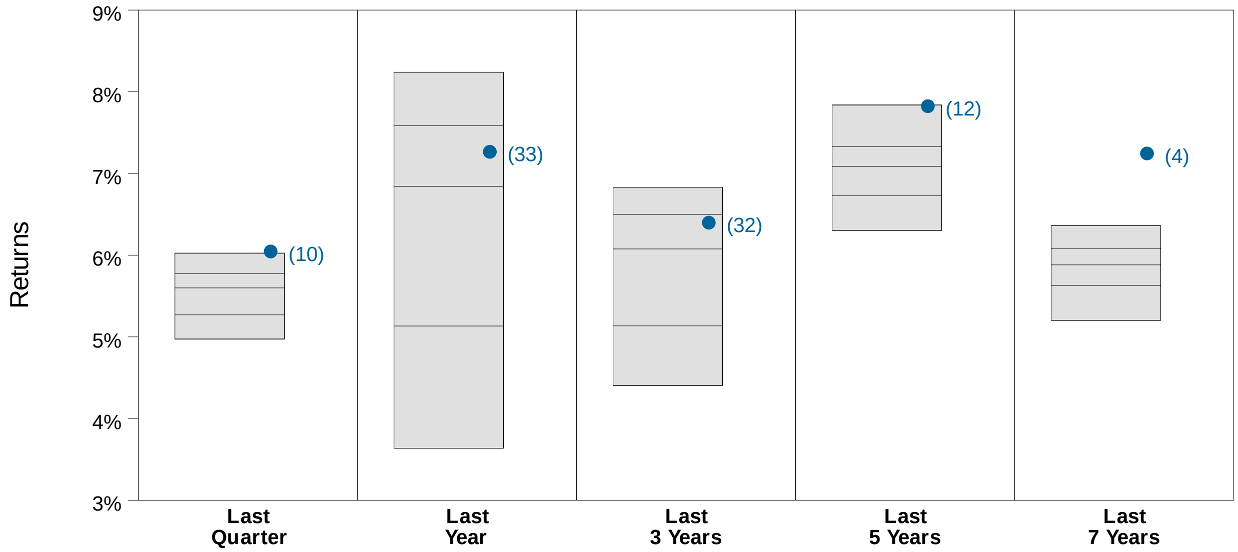
Current Quarter Target = 26.0% Blmbg Aggregate, 25.0% Russell 3000 Index, 14.0% Private Equity, 13.0% MSCI World ex US IMI, 7.2% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% MSCI EM IMI, 4.0% Blmbg:TIPS, 4.0% S&P:LSTA Lev Loan lagged 3 months+1.0%, 2.0% 3-month Treasury Bill, 0.8% FTSE EP/NA US Index lagged 3 months, 0.0% HFRI Fund of Funds Compos and 0.0% S&P:LSTA Lev Loan.

Total Fund

Asset Allocation-Adjusted Gross of Fee Performance versus Large Public DB Plan (>$1B) Peers as of September 30, 2020

- 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.

Asset Allocation Adjusted Ranking



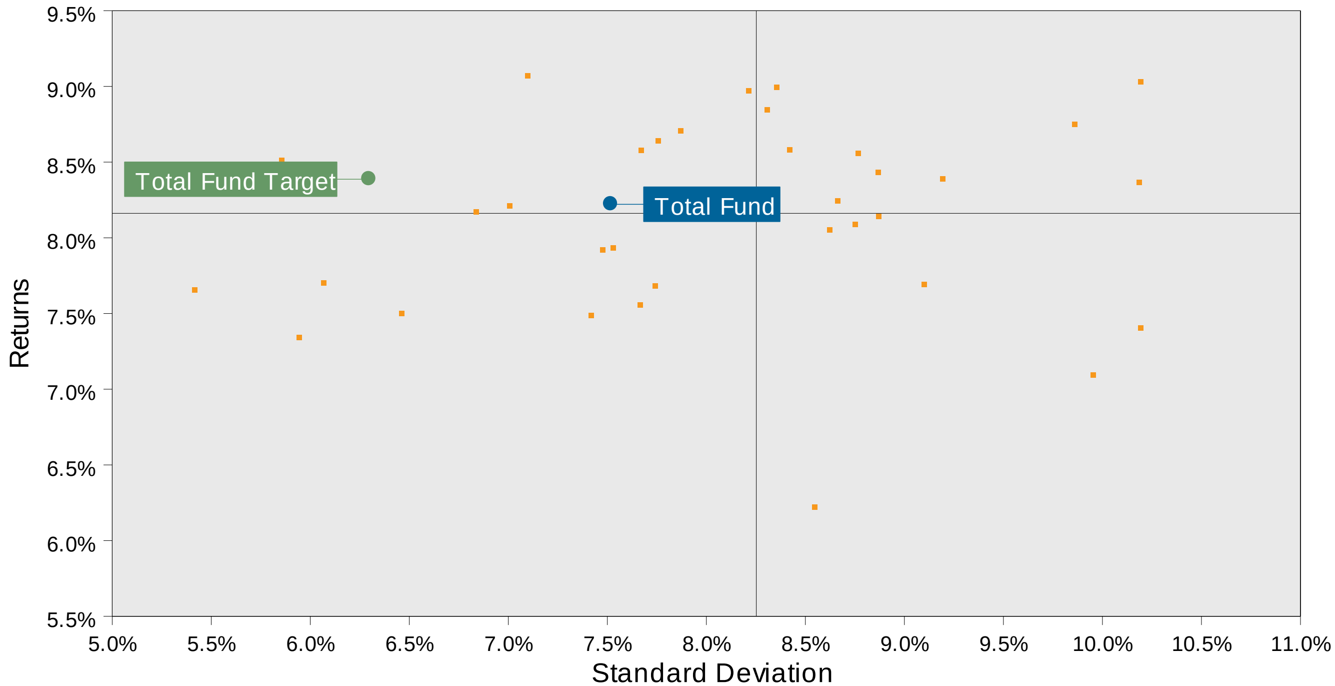
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
10th Percentile	6.03	8.24	6.83	7.84	6.36
25th Percentile	5.78	7.59	6.50	7.33	6.08
Median	5.60	6.84	6.08	7.09	5.88
75th Percentile	5.27	5.13	5.14	6.73	5.63
90th Percentile	4.97	3.64	4.41	6.30	5.20
Total Fund ●	6.03	7.25	6.38	7.81	7.23

Current Quarter Target = 26.0% Blmbg Aggregate, 25.0% Russell 3000 Index, 14.0% Private Equity, 13.0% MSCI World ex US IMI, 7.2% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% MSCI EM IMI, 4.0% Blmbg:TIPS, 4.0% S&P:LSTA Lev Loan lagged 3 months+1.0%, 2.0% 3-month Treasury Bill, 0.8% FTSE EP/NA US Index lagged 3 months, 0.0% HFRI Fund of Funds Compos and 0.0% S&P:LSTA Lev Loan.

Total Fund

Risk vs. Return versus Very Large Public DB Plan (>$10B) Peers (As of September 30, 2020)

Ten Year Annualized Risk vs Return

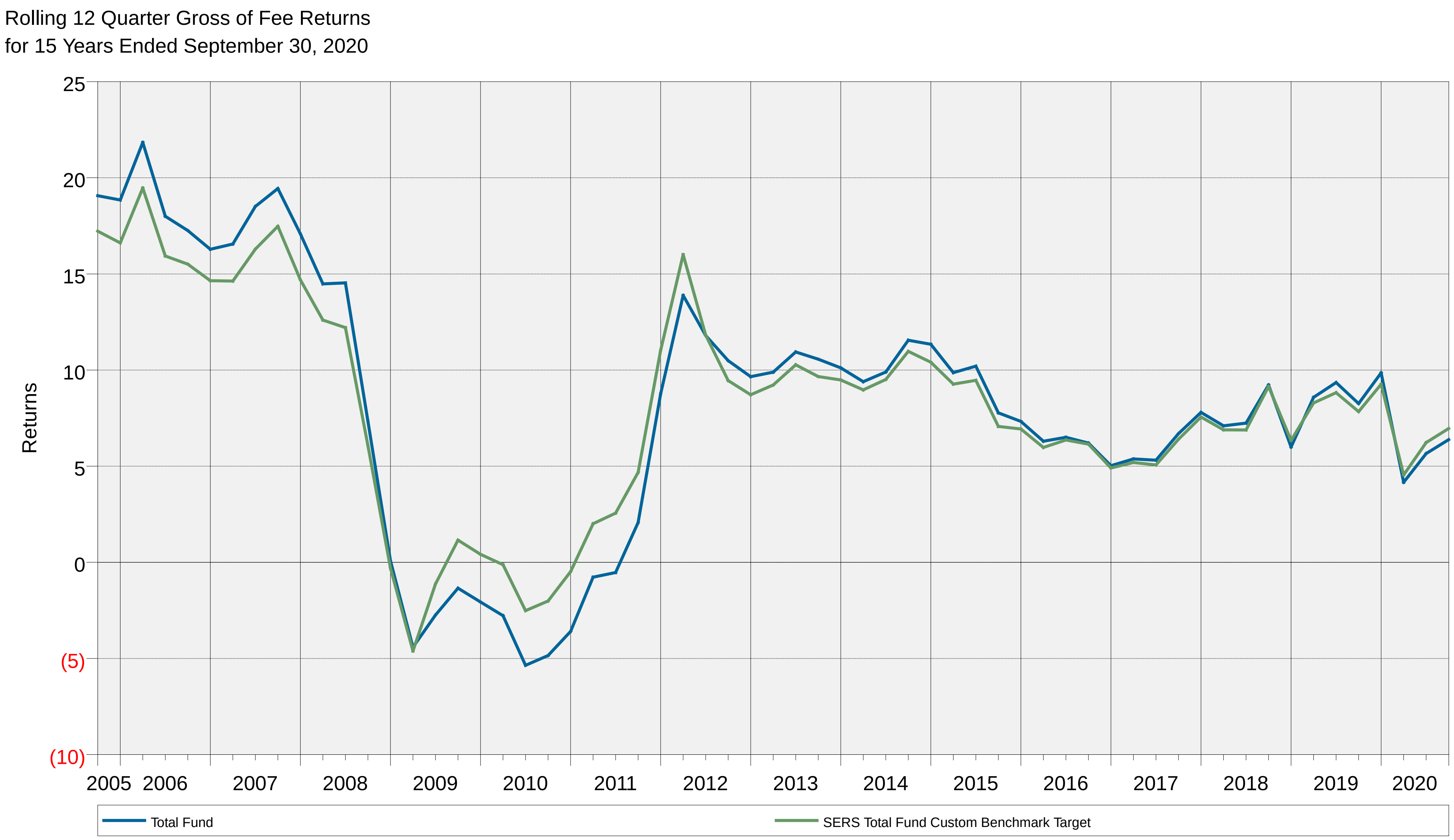


Squares represent membership of the Callan Public Fund Spons- V Lg DB (>10B)

Current Quarter Target = 26.0% Blmbg Aggregate, 25.0% Russell 3000 Index, 14.0% Private Equity, 13.0% MSCI World ex US IMI, 7.2% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% MSCI EM IMI, 4.0% Blmbg:TIPS, 4.0% S&P:LSTA Lev Loan lagged 3 months+1.0%, 2.0% 3-month Treasury Bill, 0.8% FTSE EP/NA US Index lagged 3 months, 0.0% HFRI Fund of Funds Compos and 0.0% S&P:LSTA Lev Loan.

Total Fund

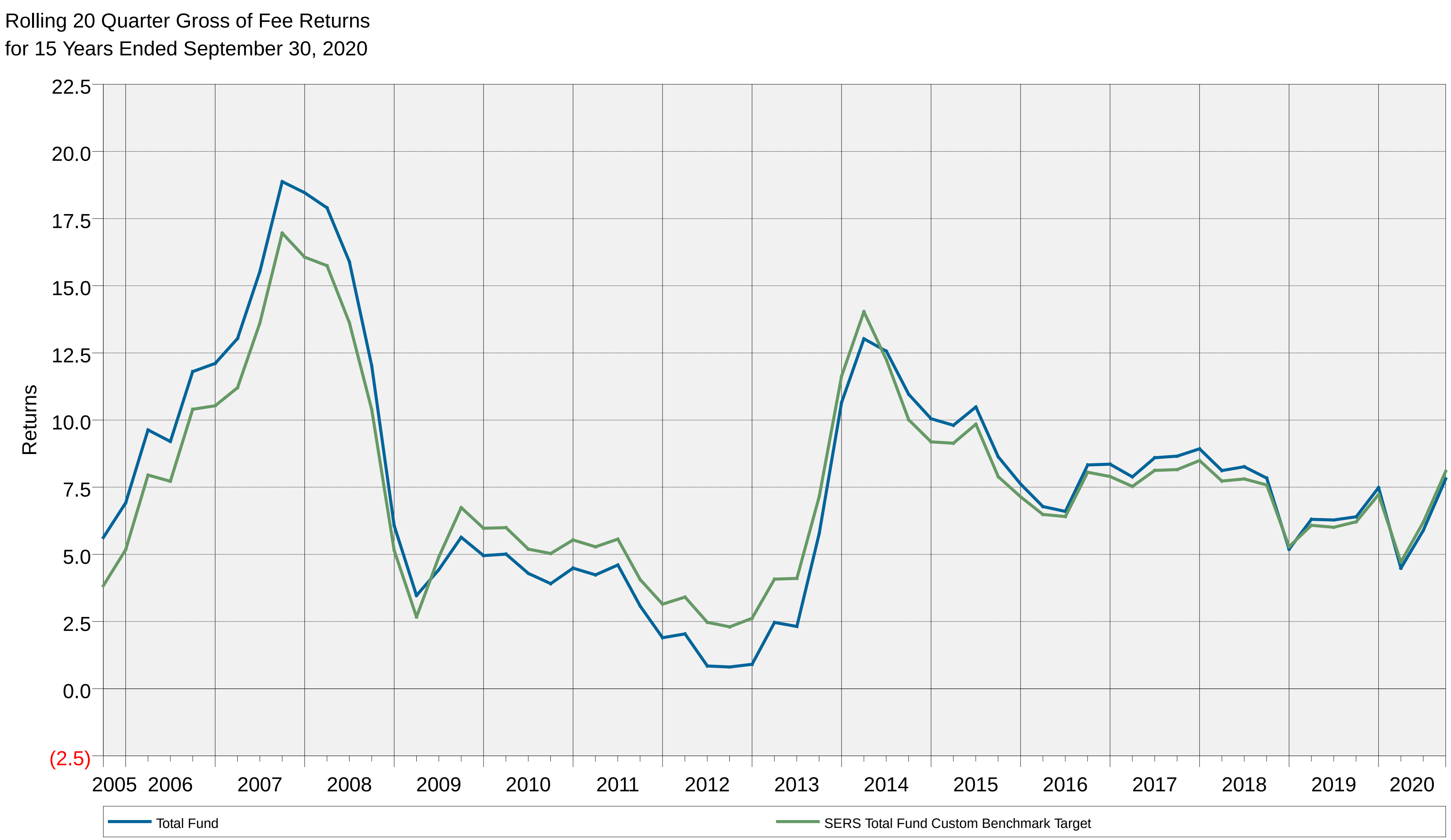
Rolling 3-year Gross of Fee Performance versus Peers and Benchmark (As of September 30, 2020)



Current Quarter Target = 26.0% Blmbg Aggregate, 25.0% Russell 3000 Index, 14.0% Private Equity, 13.0% MSCI World ex US IMI, 7.2% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% MSCI EM IMI, 4.0% Blmbg:TIPS, 4.0% S&P:LSTA Lev Loan lagged 3 months+1.0%, 2.0% 3-month Treasury Bill, 0.8% FTSE EP/NA US Index lagged 3 months, 0.0% HFRI Fund of Funds Compos and 0.0% S&P:LSTA Lev Loan.

Total Fund

Rolling 5-year Gross of Fee Performance versus Peers and Benchmark (As of September 30, 2020)



Current Quarter Target = 26.0% Blmbg Aggregate, 25.0% Russell 3000 Index, 14.0% Private Equity, 13.0% MSCI World ex US IMI, 7.2% NCREIF NFI-ODCE Eq Wt Net lagged 3 months, 4.0% MSCI EM IMI, 4.0% Blmbg:TIPS, 4.0% S&P:LSTA Lev Loan lagged 3 months+1.0%, 2.0% 3-month Treasury Bill, 0.8% FTSE EP/NA US Index lagged 3 months, 0.0% HFRI Fund of Funds Compos and 0.0% S&P:LSTA Lev Loan.

Asset Class Returns

As of September 30, 2020

	Market Value $(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance							
Total Fund	**$31,465**	**100.00%**	**5.78%**	**0.93%**	**6.62%**	**5.80%**	**7.20%**
Total Fund Custom Benchmark(1)	-	-	5.79%	3.91%	9.08%	7.10%	8.17%
Public Market Equiv Benchmark(2)	-	-	7.02%	4.50%	9.64%	7.66%	8.77%
60/40 Index(3)	-	-	5.13%	3.59%	9.22%	6.38%	7.92%
U.S. Equity	**$8,133**	**25.85%**	**8.77%**	**3.79%**	**13.34%**	**9.85%**	**12.05%**
Russell 3000 Index	-	-	9.21%	5.41%	15.00%	11.65%	13.69%
International Developed Markets Eq	**$4,220**	**13.41%**	**6.11%**	**(5.73%)**	**2.28%**	**1.14%**	**6.35%**
MSCI World Ex US IMI	-	-	5.64%	(6.70%)	1.10%	0.73%	5.60%
Emerging Mkts Equity	**$1,457**	**4.63%**	**11.38%**	**3.54%**	**16.58%**	**3.93%**	**11.30%**
MSCI EM IMI	-	-	9.79%	(1.29%)	10.14%	2.04%	8.43%
Private Equity	**$4,170**	**13.25%**	**10.50%**	**4.33%**	**6.66%**	**9.73%**	**8.55%**
Burgiss Private Equity Idx (Qtr lag)	-	-	7.57%	4.67%	5.56%	10.84%	10.24%
Global Equity +3% (Qtr lag)(4)	-	-	20.83%	6.19%	8.20%	12.88%	13.03%
Private Credit	**$499**	**1.58%**	**5.82%**	**3.32%**	**7.28%**	**-**	**-**
S&P Lvrd Loan Index +1% (Qtr lag)	-	-	9.89%	(2.00%)	(0.79%)	3.15%	3.94%
Fixed Income	**$8,478**	**26.95%**	**1.76%**	**3.46%**	**4.04%**	**4.09%**	**4.16%**
U.S. Agg Bond Index	-	-	0.62%	6.79%	6.98%	5.24%	4.18%
Inflation Protection (TIPS)	**$1,320**	**4.20%**	**3.10%**	**9.12%**	**9.79%**	**5.64%**	**4.61%**
U.S. TIPS Index	-	-	3.03%	9.22%	10.08%	5.79%	4.61%
Real Estate	**$2,311**	**7.34%**	**1.01%**	**(1.33%)**	**0.22%**	**2.25%**	**2.88%**
Real Estate Cstm Bench (Qtr lag)(5)	-	-	(1.23%)	(1.37%)	(0.42%)	4.02%	5.73%
CPI + 3% (Qtr lag)	-	-	0.62%	2.64%	3.65%	4.72%	4.56%
Cash	**$850**	**2.70%**	**0.05%**	**0.60%**	**1.08%**	**1.77%**	**1.44%**
3-month Treasury Bill	-	-	0.04%	0.64%	1.10%	1.69%	1.20%

(1) Total Fund Custom Benchmark returns provided by RVK prior to 12/31/2018. As of 01/01/2020, benchmark consists of: 26% Bloomberg US Agg Bond Index, 14% SERS Private Equity Composite, 25% Russell 3000 Index, 13% MSCI World ex US IMI Index, 8% Real Estate Custom Benchmark, 4% S&P/LSTA Leveraged Loan Index + 1% (Qtr lag), 4% MSCI Emerging Markets IMI Index, 4% Bloomberg US TIPS Index, 2% ICE BofAML 3 Mo US T-Bill Index,

(2) Public Market Equivalent Benchmark returns provided by RVK prior to 12/31/2018. As of 01/01/2020, benchmark consists of: 26% Bloomberg U.S. Agg Bond Index, 25% Russell 3000,13% MSCI World ex US Index, 10.5% Russell 3000+ 3% (Qtr lag), 8% CPI+3% (Qtr Lag), 4% S&P/LSTA Levered Loan Index +1% (Qtr lag), 4% Bloomberg US TIPS Index, 4% MSCI Emerging Markets Index, 3.5% MSCI World ex US +3% (Qtr lag), 2% ICE BofAML 3 Mo US T-Bill Index

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

(4) As of 01/01/2020 benchmark consists of 25% MSCI World ex US and 75% Russell 3000 + 3% with a 1 quarter lag. Benchmark performance represents the historical benchmark (Russell 3000 +3% Qtr lag) linked to the current benchmark.

(5) 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.

Asset Class Returns

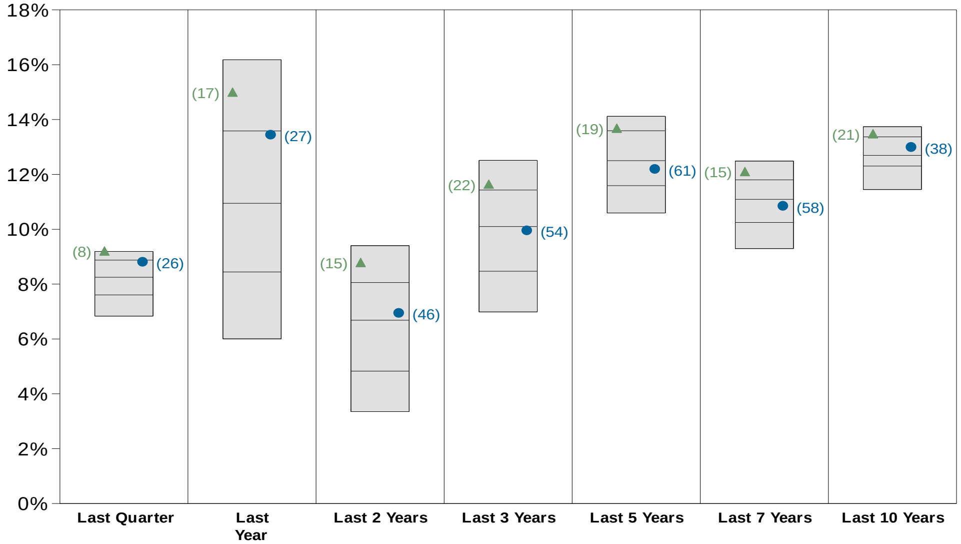
As of September 30, 2020

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception	
Net Performance						
Total Fund	**7.54%**	**5.99%**	**5.71%**	**7.67%**	**9.39%**	(1/81)
Total Fund Custom Benchmark(1)	8.39%	7.26%	6.39%	8.14%	-	
Public Market Equiv Benchmark(2)	8.79%	7.52%	6.59%	8.30%	-	
60/40 Index(3)	6.78%	6.05%	5.52%	6.50%	-	
U.S. Equity	**12.83%**	**7.88%**	**6.26%**	**8.78%**	**10.62%**	(1/81)
Russell 3000 Index	13.48%	9.13%	6.58%	9.29%	11.07%	(1/81)
International Developed Markets Equity	**5.64%**	**3.91%**	**-**	**-**	**5.80%**	(1/02)
MSCI World ex US IMI	4.65%	3.97%	3.92%	4.88%	5.91%	(1/02)
Emerging Mkts Equity	**2.86%**	**4.09%**	**-**	**-**	**7.42%**	(1/02)
MSCI EM IMI	2.34%	5.87%	7.74%	4.68%	9.31%	(1/02)
Private Equity	**10.75%**	**10.53%**	**7.23%**	**13.05%**	**10.79%**	(1/86)
Burgiss Private Equity Index (Qtr lag)	12.56%	11.84%	8.91%	14.67%	16.60%	(1/86)
Global Equity +3% (Qtr lag)(4)	16.86%	12.15%	9.56%	12.72%	14.37%	(1/86)
Private Credit	**-**	**-**	**-**	**-**	**7.63%**	(12/17)
S&P Levered Loan Index +1% (Qtr lag)	5.19%	5.33%	5.51%	-	3.04%	(12/17)
Fixed Income	**4.12%**	**4.96%**	**5.70%**	**5.95%**	**8.33%**	(1/81)
U.S. Agg Bond Index	3.64%	4.48%	5.01%	5.30%	7.66%	(1/81)
Inflation Protection (TIPS)	**2.98%**	**3.82%**	**-**	**-**	**3.63%**	(2/03)
U.S. TIPS Index	3.57%	4.21%	5.52%	-	4.63%	(2/03)
Real Estate	**7.08%**	**4.40%**	**6.25%**	**7.57%**	**8.17%**	(3/84)
Real Estate Custom Bench (Qtr lag)(5)	9.55%	6.02%	7.13%	-	-	
CPI +3% (Qtr lag)	4.69%	4.90%	5.03%	5.12%	5.59%	(3/84)
Cash	**0.91%**	**1.60%**	**2.09%**	**2.67%**	**3.57%**	(1/87)
3-month Treasury Bill	0.64%	1.29%	1.59%	2.32%	3.21%	(1/87)

(1) Total Fund Custom Benchmark returns provided by RVK prior to 12/31/2018. As of 01/01/2020, benchmark consists of: 26% Bloomberg US Agg Bond Index, 14% SERS Private Equity Composite, 25% Russell 3000 Index, 13% MSCI World ex US IMI Index, 8% Real Estate Custom Benchmark, 4% S&P/LSTA Leveraged Loan Index + 1% (Qtr lag), 4% MSCI Emerging Markets IMI Index, 4% Bloomberg US TIPS Index, 2% ICE BofAML 3 Mo US T-Bill Index,
(2) Public Market Equivalent Benchmark returns provided by RVK prior to 12/31/2018. As of 01/01/2020, benchmark consists of: 26% Russell 3000, 25% Bloomberg U.S. Agg Bond Index, 13% MSCI World ex US Index, 10.5% Russell 3000+ 3% (Qtr lag), 8% CPI+3% (Qtr Lag), 4% S&P/LSTA Levered Loan Index +1% (Qtr lag), 4% Bloomberg US TIPS Index, 4% MSCI Emerging Markets Index, 3.5% MSCI World ex US +3% (Qtr lag), 2% ICE BofAML 3 Mo US T-Bill Index
(3) Benchmark consists of 60% MSCI ACW IM Index, 40% Bloomberg U.S. Agg Bond Index
(4) As of 01/01/2020 benchmark consists of 25% MSCI World ex US and 75% Russell 3000 + 3% with a 1 quarter lag. Benchmark performance represents the historical benchmark linked to the current benchmark.
(5) 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.

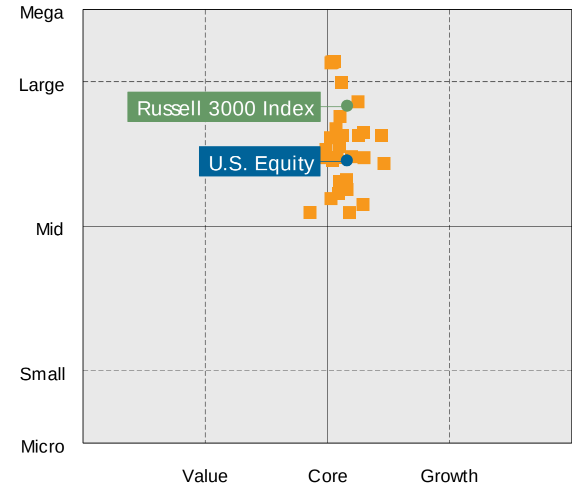
U.S. Equity as of September 30, 2020

Performance vs Public Fund - Domestic Equity (Gross)

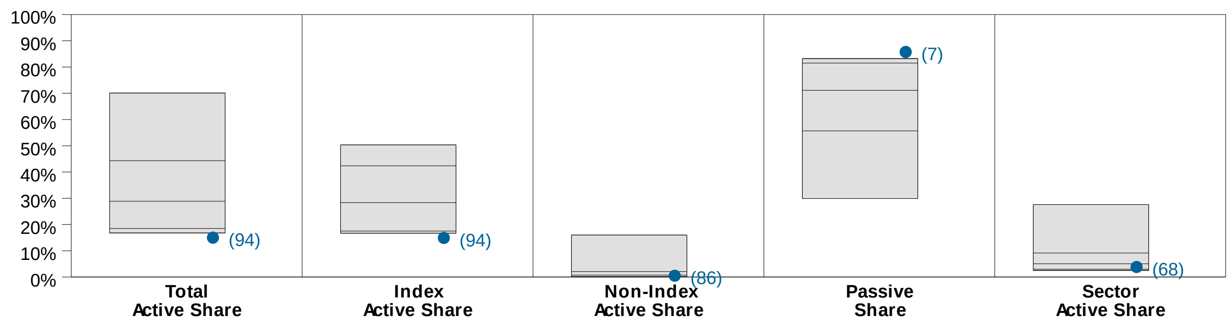


	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 7 Years	Last 10 Years
10th Percentile	9.19	16.18	9.40	12.51	14.12	12.49	13.74
25th Percentile	8.87	13.59	8.06	11.43	13.59	11.80	13.37
Median	8.25	10.95	6.68	10.10	12.50	11.09	12.69
75th Percentile	7.60	8.44	4.83	8.47	11.59	10.25	12.31
90th Percentile	6.83	6.00	3.35	6.98	10.59	9.30	11.45
U.S. Equity ●	8.79	13.42	6.92	9.93	12.17	10.82	12.97
Russell 3000 Index ▲	9.21	15.00	8.79	11.65	13.69	12.11	13.48

Style Map vs Pub Pln- Dom Equity Holdings as of September 30, 2020



Active Share vs. Pub Pln- Dom Equity

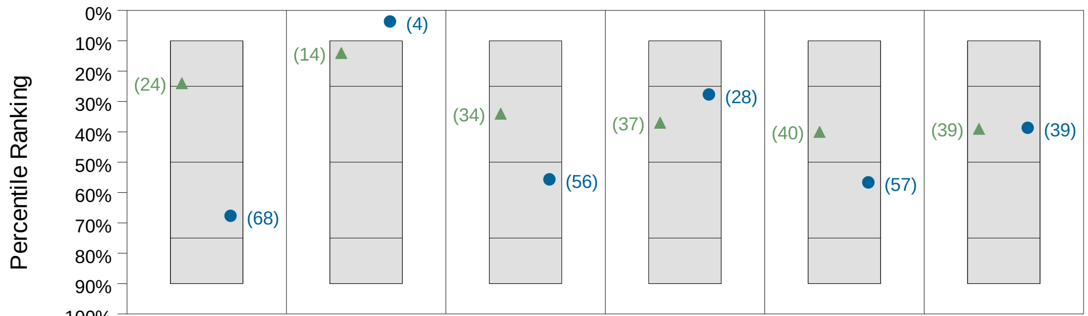


	Total Active Share	Index Active Share	Non-Index Active Share	Passive Share	Sector Active Share
10th Percentile	70.12	50.35	16.03	83.20	27.61
25th Percentile	44.33	42.35	2.08	81.51	9.17
Median	28.88	28.32	0.74	71.12	5.05
75th Percentile	18.49	17.53	0.19	55.67	2.98
90th Percentile	16.80	16.68	0.11	29.88	2.51
U.S. Equity ●	14.66	14.53	0.13	85.34	3.46

U.S. Equity

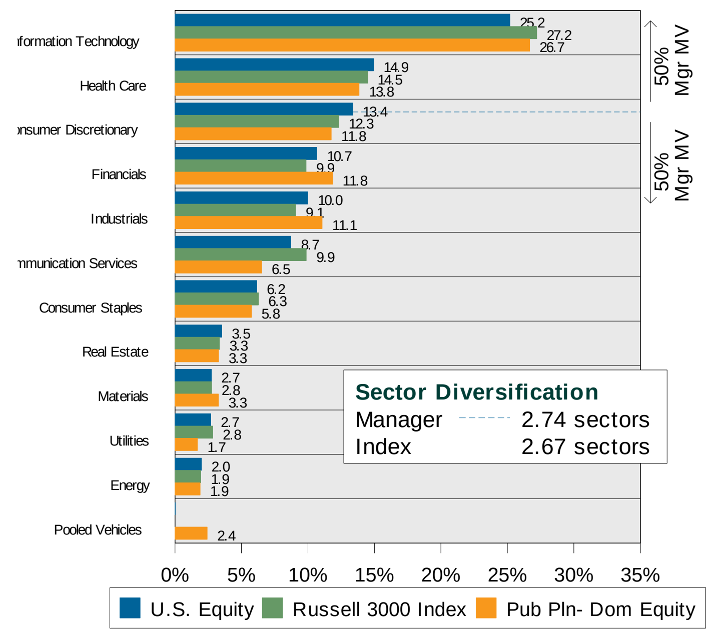
As of September 30, 2020

Portfolio Characteristics Percentile Rankings
Rankings Against Public Fund - Domestic Equity
as of September 30, 2020

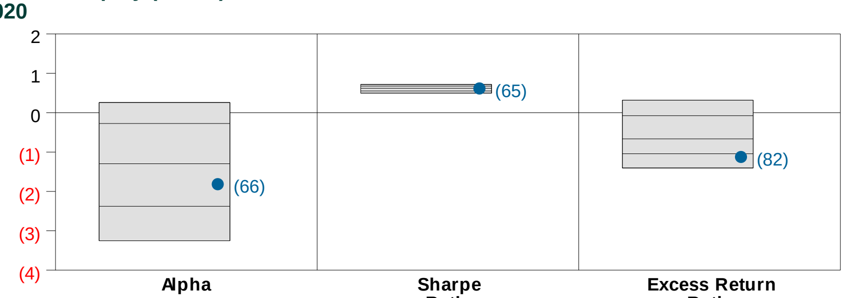


	Weighted Median Market Cap	Price/Fore-casted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	153.20	23.47	3.53	13.13	1.69	0.16
25th Percentile	109.45	22.35	3.45	12.45	1.65	0.07
Median	76.09	21.67	3.09	11.32	1.53	(0.00)
75th Percentile	57.55	21.05	2.85	10.86	1.39	(0.04)
90th Percentile	31.98	20.08	2.44	10.47	1.27	(0.15)
U.S. Equity ●	66.66	23.98	2.97	12.13	1.50	0.02
Russell 3000 Index ▲	112.32	22.95	3.30	11.54	1.58	0.02

Sector Allocation
September 30, 2020



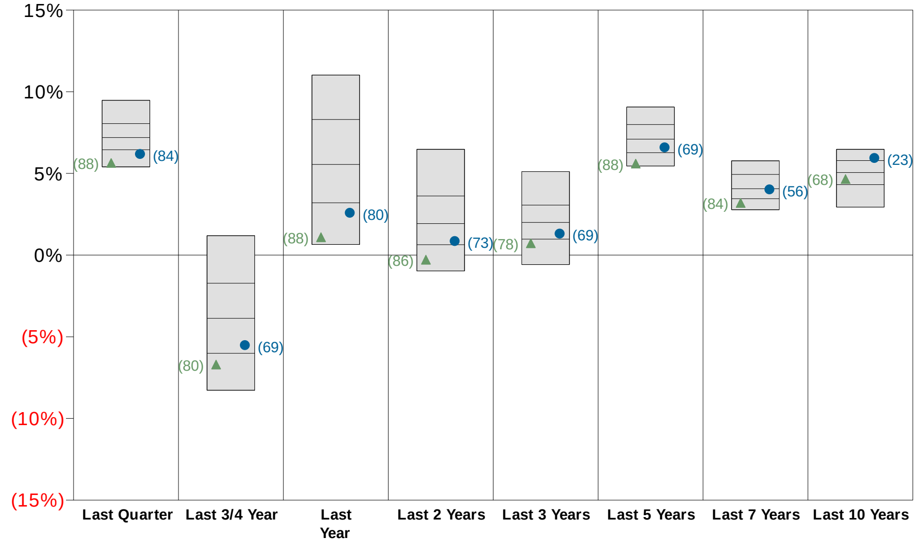
Risk Adjusted Return Measures vs Russell 3000 Index
Rankings Against Public Fund - Domestic Equity (Gross)
Five Years Ended September 30 2020



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.26	0.72	0.32
25th Percentile	(0.27)	0.68	(0.08)
Median	(1.30)	0.62	(0.66)
75th Percentile	(2.38)	0.55	(1.04)
90th Percentile	(3.25)	0.50	(1.40)
U.S. Equity ●	(1.84)	0.59	(1.15)

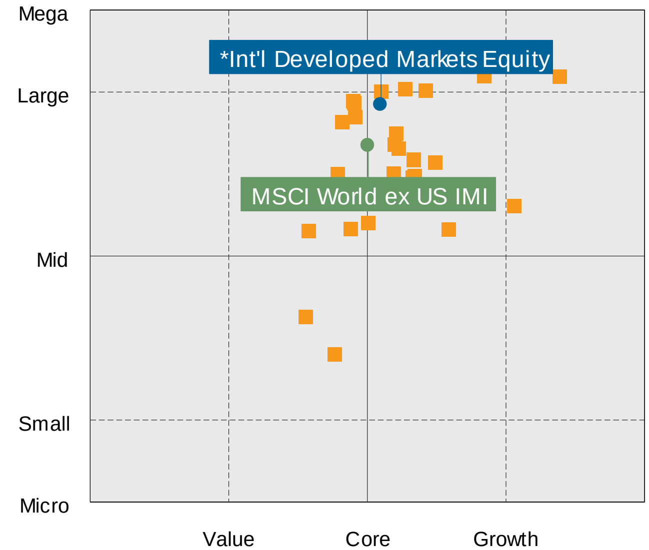
International Equity as of September 30, 2020

Performance vs Public Fund - International Equity (Gross)

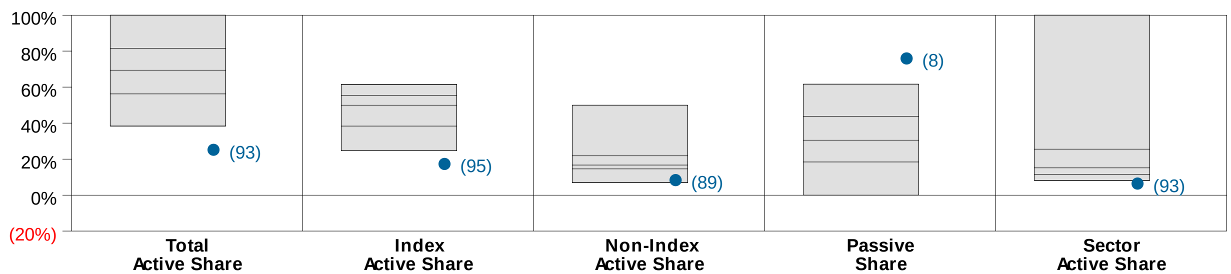


	Last Quarter	Last 3/4 Year	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 7 Years	Last 10 Years
10th Percentile	9.48	1.19	11.02	6.48	5.11	9.06	5.77	6.47
25th Percentile	8.05	(1.72)	8.30	3.62	3.06	7.99	4.94	5.79
Median	7.19	(3.87)	5.55	1.93	2.00	7.10	4.06	5.06
75th Percentile	6.45	(6.01)	3.20	0.64	0.98	6.27	3.46	4.32
90th Percentile	5.40	(8.27)	0.65	(0.97)	(0.58)	5.45	2.78	2.94
Int'l Developed Markets Equity ●	6.14	(5.56)	2.54	0.81	1.27	6.55	3.97	5.89
MSCI World ex US IMI ▲	5.64	(6.70)	1.10	(0.28)	0.73	5.60	3.20	4.65

Style Map vs Pub Pln- Intl Equity
Holdings as of September 30, 2020



Active Share vs. Pub Pln- Intl Equity

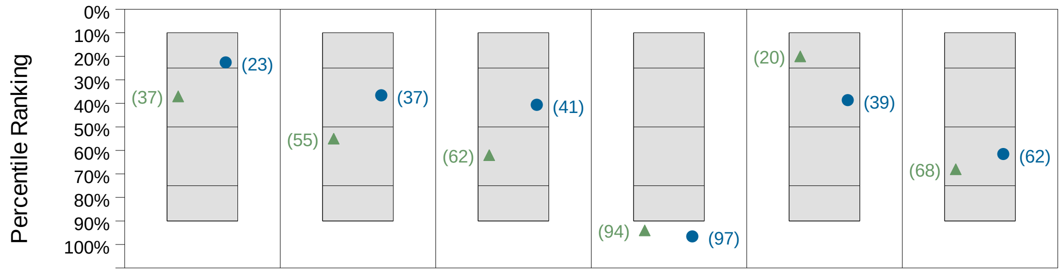


	Total Active Share	Index Active Share	Non-Index Active Share	Passive Share	Sector Active Share
10th Percentile	100.00	61.50	50.00	61.63	100.00
25th Percentile	81.62	55.41	21.83	43.77	25.58
Median	69.44	50.00	16.71	30.56	15.13
75th Percentile	56.23	38.33	14.59	18.38	11.49
90th Percentile	38.37	24.66	6.97	0.00	8.18
Int'l Developed Markets Equity ●	24.59	16.77	7.82	75.41	5.89

International Equity

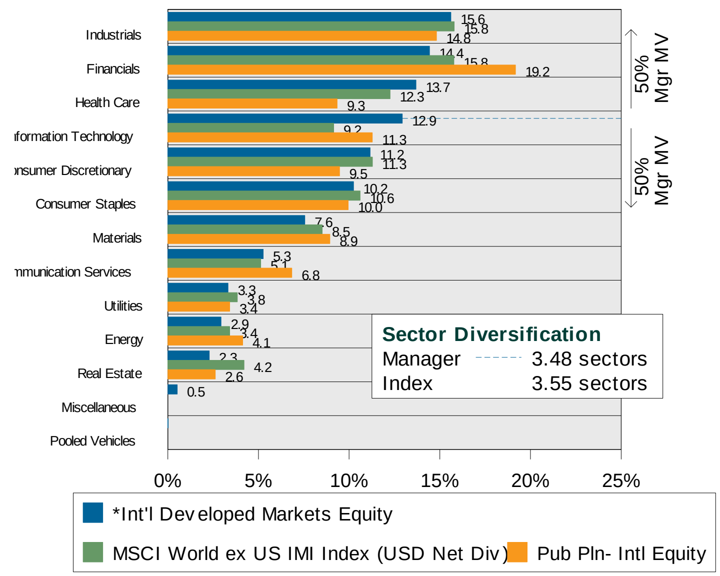
As of September 30, 2020

Portfolio Characteristics Percentile Rankings
Rankings Against Public Fund - International Equity
as of September 30, 2020

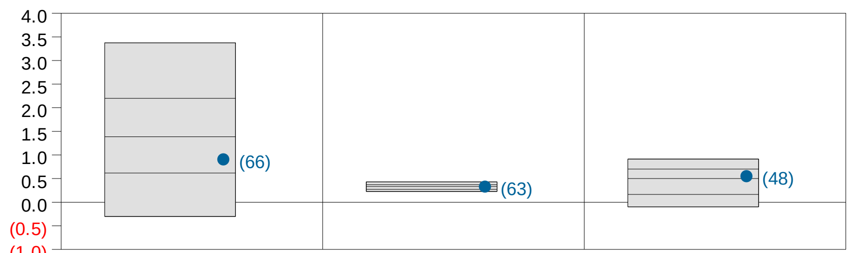


	Weighted Median Market Cap	Price/Fore-casted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	37.24	23.75	2.51	15.98	2.81	0.73
25th Percentile	32.18	18.65	2.03	13.28	2.53	0.33
Median	23.88	17.23	1.67	11.57	2.22	0.21
75th Percentile	20.10	15.68	1.50	10.13	1.85	(0.02)
90th Percentile	16.39	13.92	1.21	8.48	1.35	(0.14)
***Int'l Developed Markets Equity** ●	32.98	17.71	1.75	8.16	2.44	0.09
MSCI World ex US IMI Index (USD Net Div) ▲	27.65	17.14	1.55	8.37	2.72	0.02

Sector Allocation
September 30, 2020



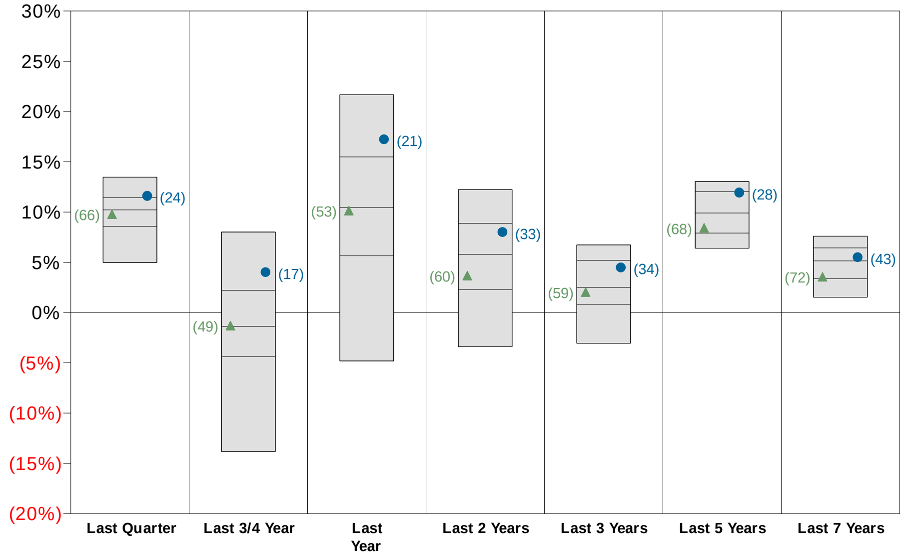
Risk Adjusted Return Measures vs MSCI World ex US IMI
Rankings Against Public Fund - International Equity (Gross)
Five Years Ended September 30, 2020



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	3.37	0.43	0.91
25th Percentile	2.20	0.37	0.70
Median	1.39	0.33	0.50
75th Percentile	0.62	0.27	0.16
90th Percentile	(0.30)	0.23	(0.10)
Int'l Developed Markets Equity ●	0.88	0.31	0.53

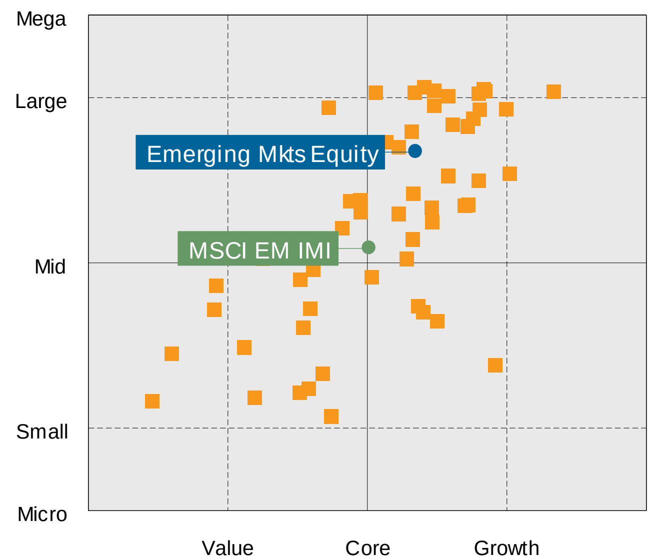
Emerging Markets Equity as of September 30, 2020

Performance vs Callan Emerging Broad (Gross)

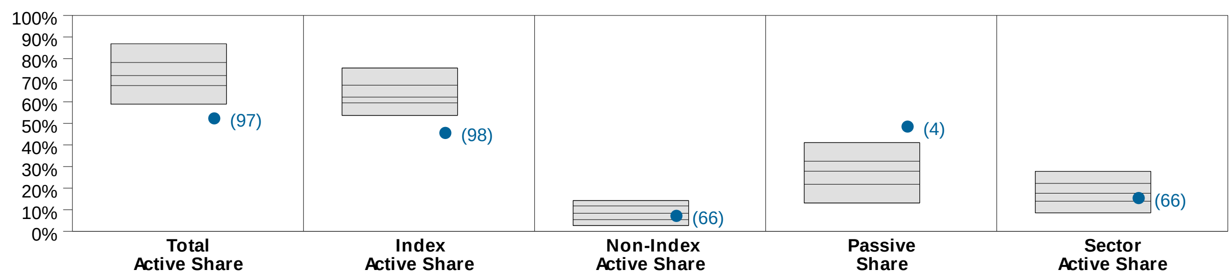


	Last Quarter	Last 3/4 Year	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 7 Years
10th Percentile	13.46	8.01	21.68	12.23	6.73	13.03	7.60
25th Percentile	11.43	2.21	15.49	8.88	5.19	12.03	6.43
Median	10.21	(1.37)	10.45	5.79	2.50	9.90	5.14
75th Percentile	8.57	(4.38)	5.65	2.29	0.83	7.91	3.37
90th Percentile	4.98	(13.83)	(4.82)	(3.40)	(3.06)	6.40	1.52
Emerging Mkts Equity ●	11.52	3.94	17.15	7.93	4.41	11.85	5.43
MSCI EM IMI ▲	9.79	(1.29)	10.14	3.68	2.04	8.43	3.56

Style Map vs Callan Emerging Broad Holdings as of September 30, 2020



Active Share vs. Callan Emerging Broad

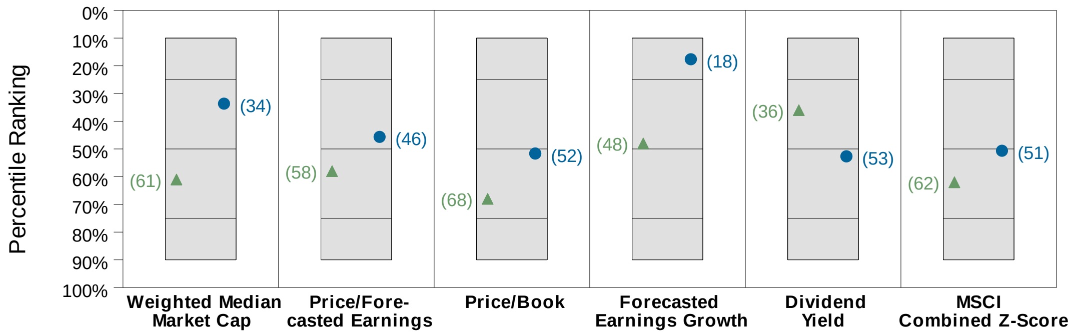


	Total Active Share	Index Active Share	Non-Index Active Share	Passive Share	Sector Active Share
10th Percentile	86.87	75.63	14.26	41.12	27.83
25th Percentile	78.21	67.69	11.78	32.48	22.19
Median	72.11	62.15	8.37	27.89	17.66
75th Percentile	67.52	59.47	5.43	21.79	13.98
90th Percentile	58.88	53.70	2.70	13.13	8.59
Emerging Mkts Equity ●	51.88	45.14	6.74	48.12	15.01

Emerging Markets Equity

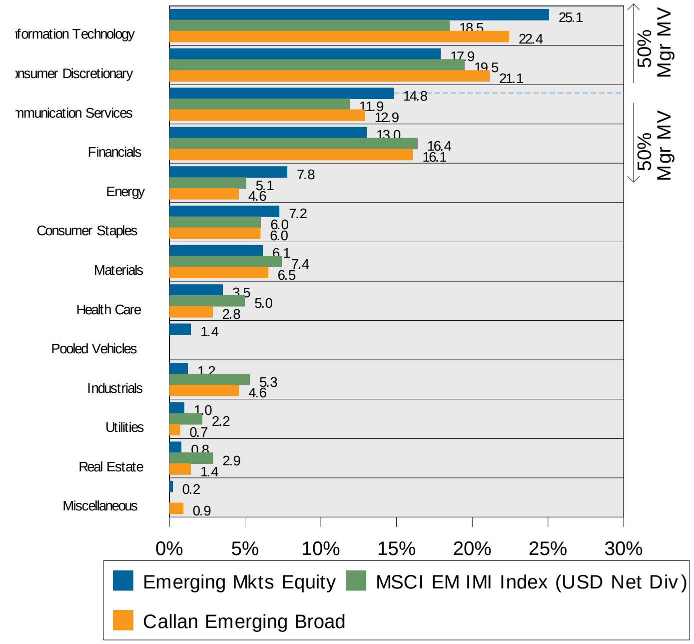
As of September 30, 2020

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Emerging Broad
as of September 30, 2020

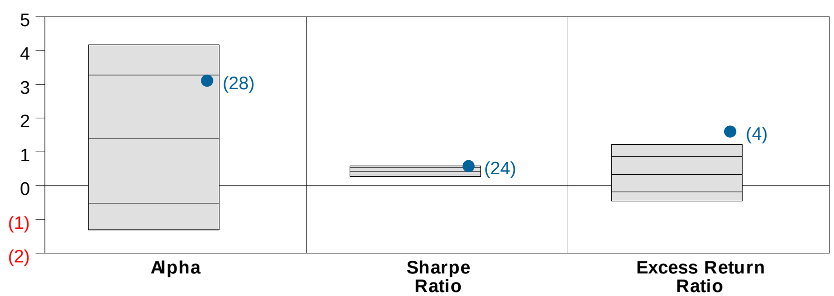


	Weighted Median Market Cap	Price/Fore-casted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	40.93	24.94	3.74	23.09	3.99	0.73
25th Percentile	31.79	21.10	2.79	18.78	2.77	0.55
Median	20.29	16.77	2.02	16.86	1.98	0.31
75th Percentile	10.13	11.66	1.28	13.54	1.52	(0.27)
90th Percentile	5.37	9.38	0.93	10.98	1.18	(0.74)
Emerging Mkts Equity ●	27.63	17.05	1.92	19.88	1.93	0.29
MSCI EM IMI Index (USD Net Div) ▲	15.15	14.53	1.47	17.02	2.39	0.03

Sector Allocation
September 30, 2020



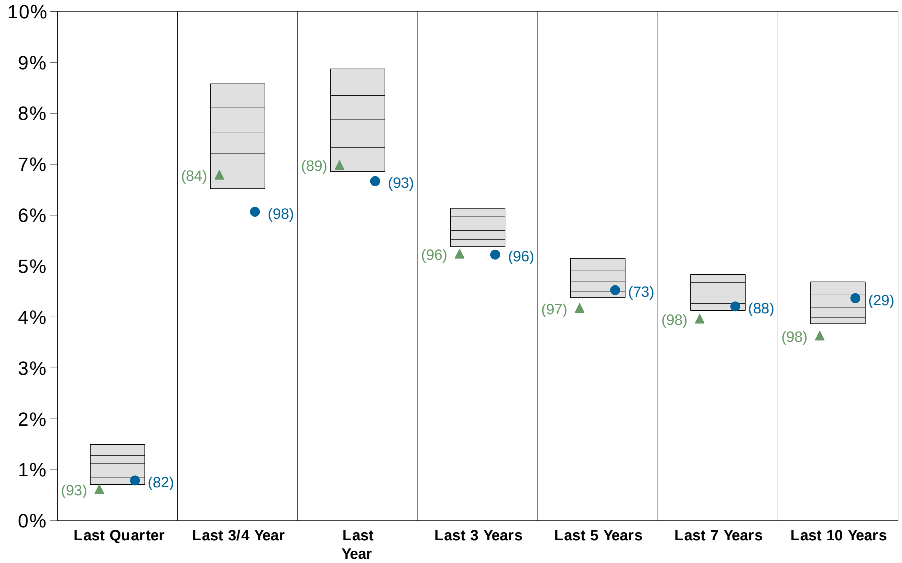
Risk Adjusted Return Measures vs MSCI EM IMI
Rankings Against Callan Emerging Broad (Gross)
Five Years Ended September 30, 2020



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	4.17	0.58	1.22
25th Percentile	3.27	0.54	0.86
Median	1.39	0.42	0.33
75th Percentile	(0.52)	0.34	(0.18)
90th Percentile	(1.31)	0.27	(0.46)
Emerging Mkts Equity ●	3.08	0.55	1.57

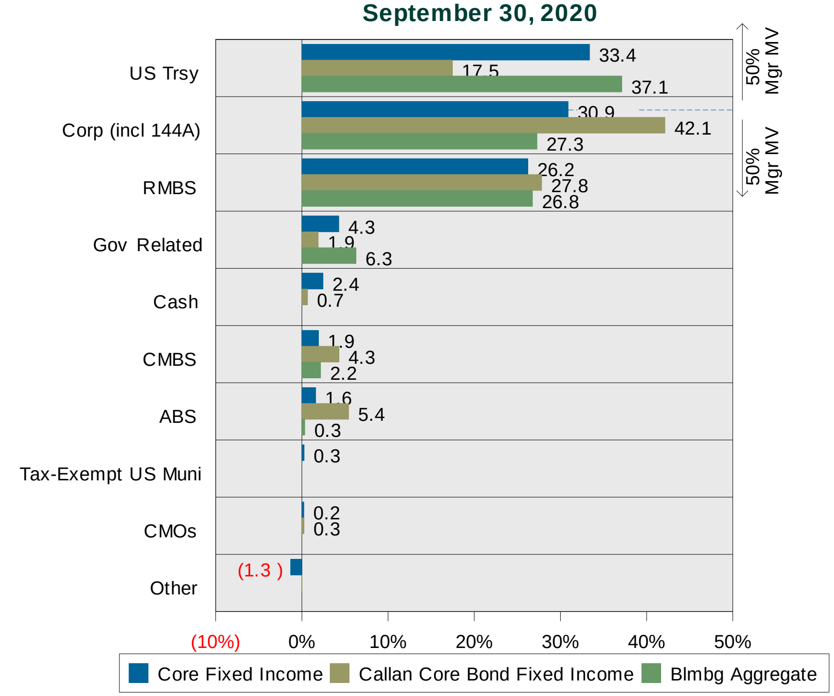
Core Fixed Income As of September 30, 2020

Performance vs Callan Core Bond Fixed Income (Gross)

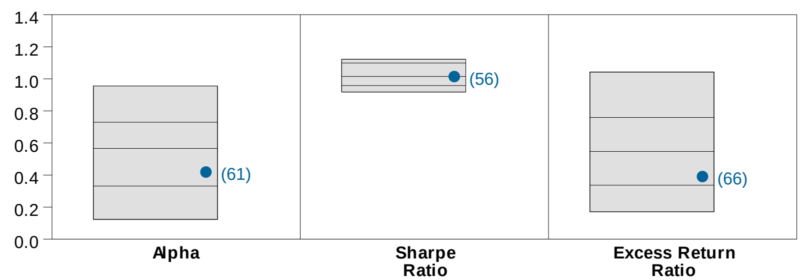


	Last Quarter	Last 3/4 Year	Last Year	Last 3 Years	Last 5 Years	Last 7 Years	Last 10 Years
10th Percentile	1.50	8.58	8.87	6.14	5.15	4.83	4.69
25th Percentile	1.28	8.12	8.35	5.98	4.92	4.67	4.43
Median	1.12	7.61	7.88	5.70	4.70	4.41	4.18
75th Percentile	0.84	7.22	7.33	5.52	4.50	4.26	3.99
90th Percentile	0.71	6.52	6.86	5.38	4.38	4.13	3.87
Core Fixed Income ●	0.77	6.05	6.65	5.21	4.51	4.19	4.35
Blmbg Aggregate ▲	0.62	6.79	6.98	5.24	4.18	3.97	3.64

Sector Allocation
September 30, 2020



Risk Adjusted Return Measures vs Blmbg Aggregate
Rankings Against Public Fund - Domestic Fixed (Gross)
Five Years Ended September30, 2020

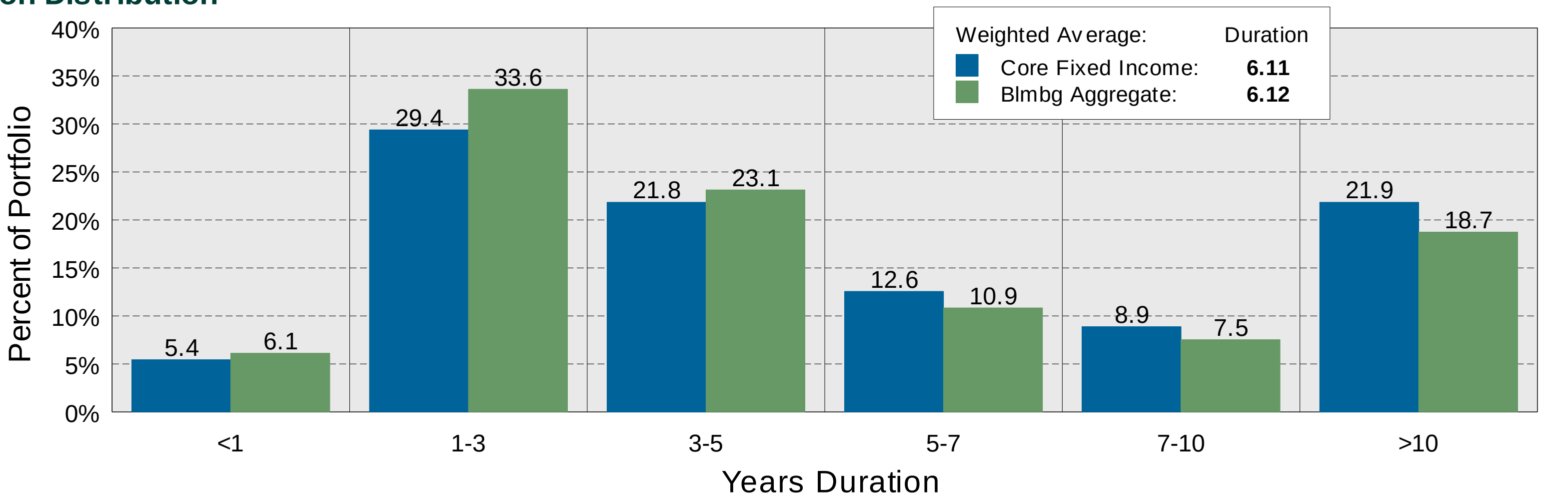


	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.96	1.12	1.04
25th Percentile	0.73	1.10	0.76
Median	0.57	1.02	0.55
75th Percentile	0.33	0.96	0.34
90th Percentile	0.12	0.92	0.17
Core Fixed Income ●	0.41	1.01	0.38

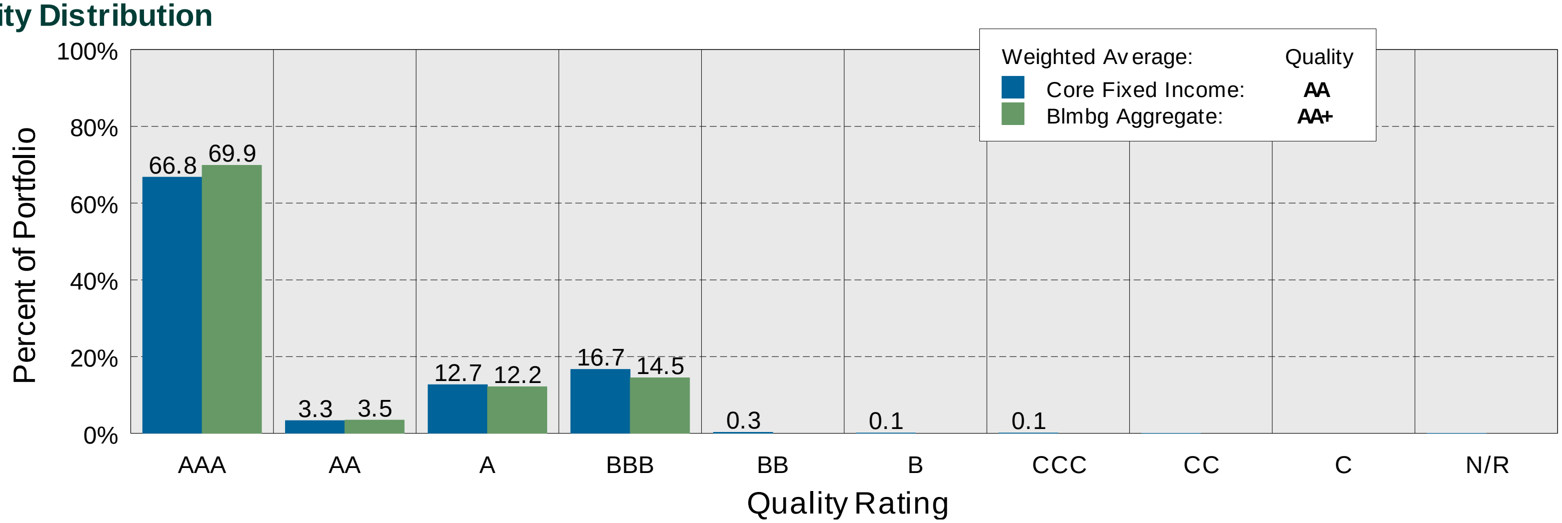
Core Fixed Income

As of September 30, 2020

Duration Distribution

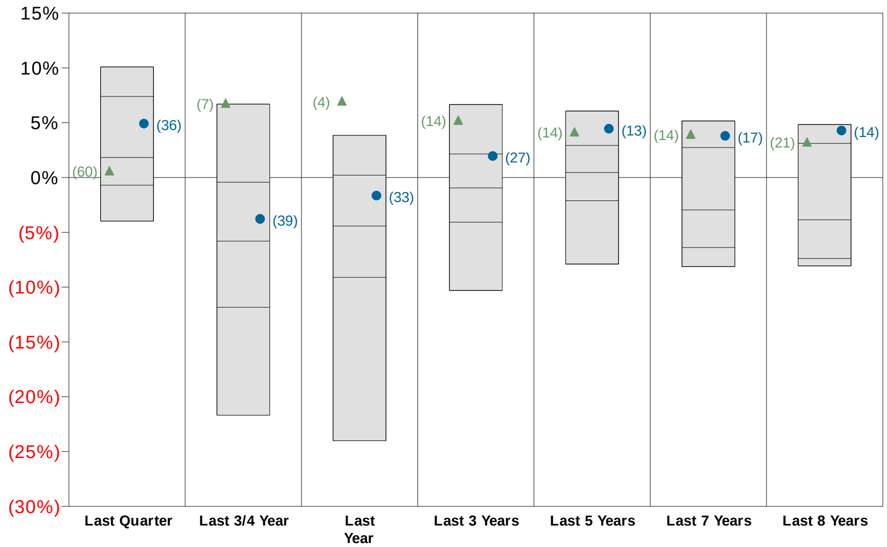


Quality Distribution



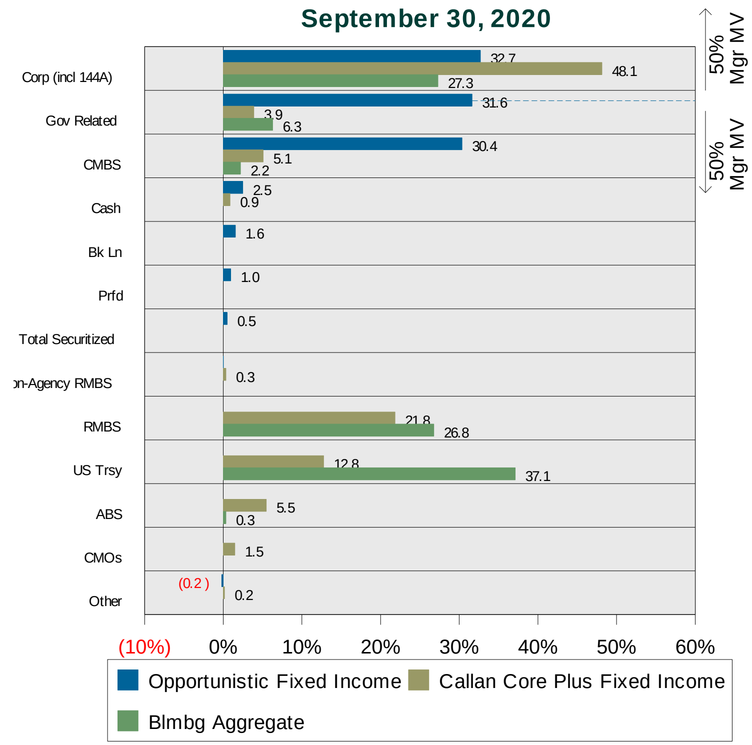
Opportunistic Fixed Income As of September 30, 2020

Performance vs Callan Alternative Investments DB (Gross)

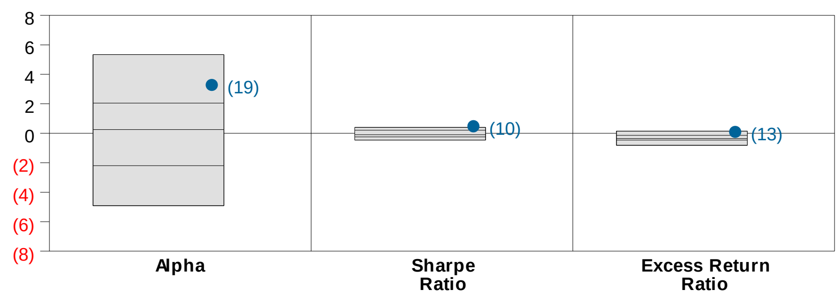


	Last Quarter	Last 3/4 Year	Last Year	Last 3 Years	Last 5 Years	Last 7 Years	Last 8 Years
10th Percentile	10.10	6.69	3.85	6.65	6.06	5.16	4.83
25th Percentile	7.39	(0.43)	0.21	2.15	2.93	2.74	3.12
Median	1.83	(5.81)	(4.43)	(0.95)	0.46	(2.96)	(3.86)
75th Percentile	(0.70)	(11.84)	(9.11)	(4.07)	(2.12)	(6.39)	(7.38)
90th Percentile	(3.98)	(21.69)	(24.01)	(10.30)	(7.90)	(8.13)	(8.07)
Opportunistic Fixed Income ●	4.85	(3.85)	(1.72)	1.88	4.38	3.73	4.21
Blmbg Aggregate ▲	0.62	6.79	6.98	5.24	4.18	3.97	3.24

Sector Allocation
September 30, 2020



Risk Adjusted Return Measures vs Blmbg Aggregate
Rankings Against Callan Alternative Investments DB (Gross)
Five Years Ended September 30, 2020

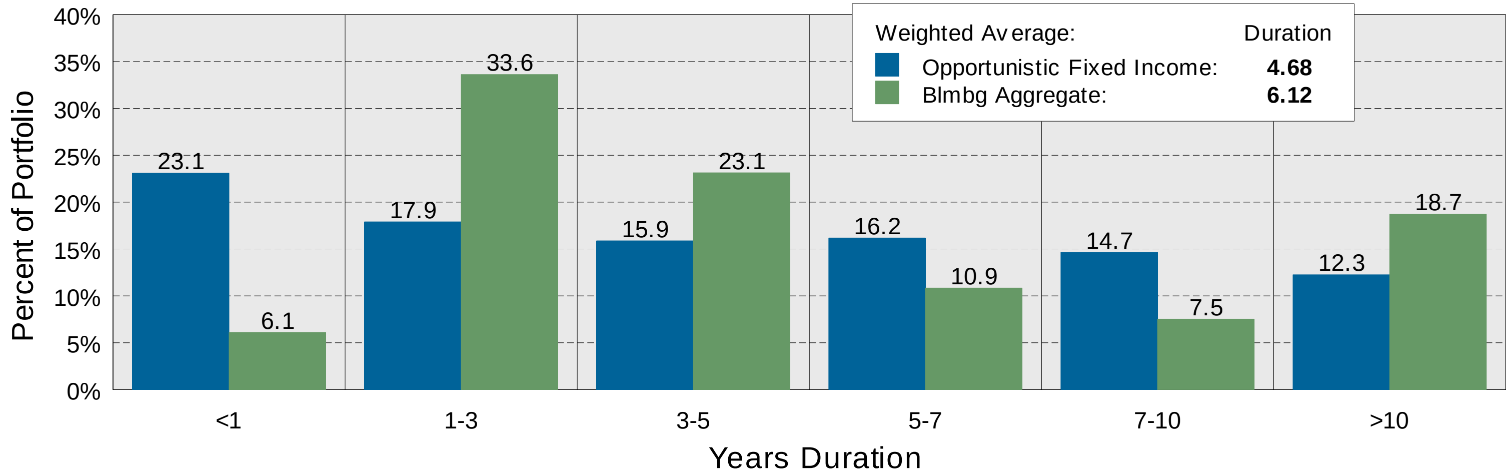


	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	5.33	0.40	0.15
25th Percentile	2.05	0.20	(0.14)
Median	0.25	(0.10)	(0.36)
75th Percentile	(2.20)	(0.25)	(0.46)
90th Percentile	(4.92)	(0.47)	(0.82)
Opportunistic Fixed Income ●	3.21	0.41	0.02

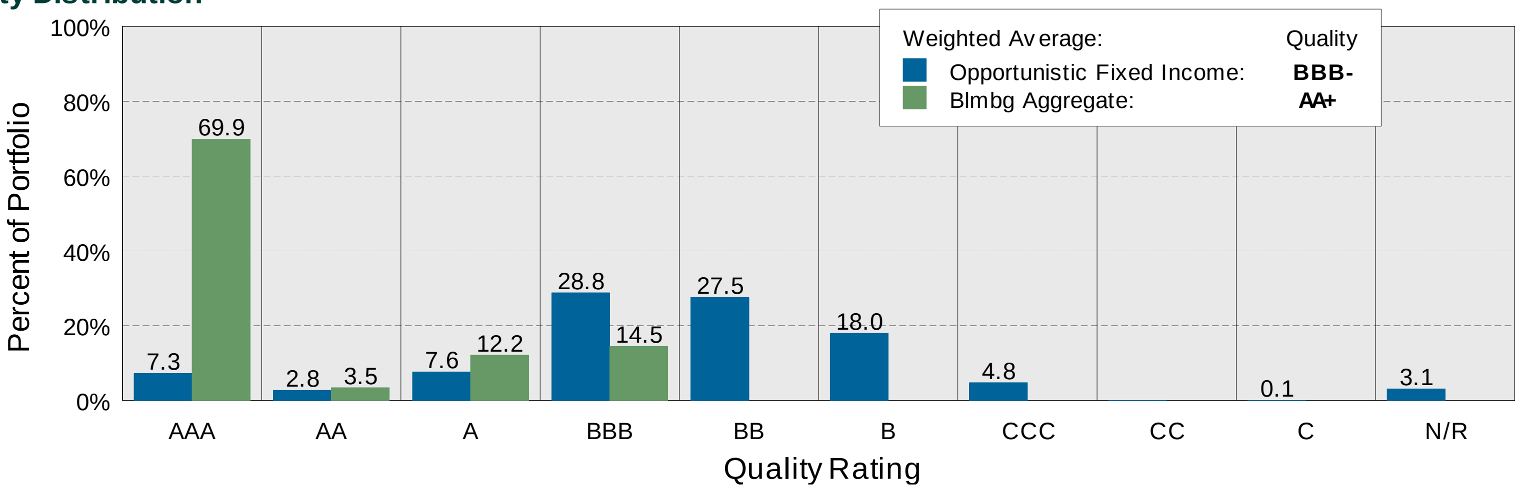
Opportunistic Fixed Income

As of September 30, 2020

Duration Distribution



Quality Distribution



Callan

Appendix I – Investment Manager Returns

Investment Manager Returns

As of September 30, 2020

	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	**$8,133**	**100.00%**	**8.77%**	**3.79%**	**13.34%**	**9.85%**	**12.05%**
Russell 3000 Index (1)	-	-	9.21%	5.41%	15.00%	11.65%	13.69%
MCM Russell 1000 Index	6,511	80.05%	9.42%	6.27%	15.86%	12.37%	14.10%
Russell 1000 Index	-	-	9.47%	6.40%	16.01%	12.38%	14.09%
MCM Russell 2000 Core Index	336	4.13%	5.03%	(8.81%)	0.28%	1.70%	-
Russell 2000 Index	-	-	4.93%	(8.69%)	0.39%	1.77%	8.00%
MCM Russell 2000 Val Index	488	6.00%	2.54%	(21.51%)	(14.85%)	(5.16%)	-
Russell 2000 Value Index	-	-	2.56%	(21.54%)	(14.88%)	(5.13%)	4.11%
Emerald Asset Management	799	9.82%	9.07%	8.50%	20.85%	10.42%	-
Russell 2000 Growth Index	-	-	7.16%	3.88%	15.71%	8.18%	11.42%

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception	
Net Performance- Domestic Equity						
U.S. Equity	**12.83%**	**7.88%**	**6.26%**	**8.78%**	**10.62%**	(1/81)
Russell 3000 Index (1)	13.48%	9.13%	6.58%	9.22%	10.97%	(1/81)
MCM Russell 1000 Index	-	-	-	-	14.24%	(1/12)
Russell 1000 Index	13.76%	9.28%	6.54%	9.43%	14.28%	(1/12)
MCM Russell 2000 Core Index	-	-	-	-	4.87%	(12/16)
Russell 2000 Index	9.85%	7.03%	6.88%	7.96%	4.92%	(12/16)
MCM Russell 2000 Val Index	-	-	-	-	(1.64%)	(12/16)
Russell 2000 Value Index	7.09%	4.93%	7.40%	8.21%	(1.61%)	(12/16)
Emerald Asset Management	-	-	-	-	13.12%	(12/16)
Russell 2000 Growth Index	12.34%	8.90%	5.92%	7.19%	11.14%	(12/16)

*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) 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 September 30, 2020

	Market Value $(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance- International Equity							
International Dev Mkts Equity	**$4,220**	**74.33%**	**6.11%**	**(5.73%)**	**2.28%**	**1.14%**	**6.35%**
MSCI World ex US IMI	-	-	5.64%	(6.70%)	1.10%	0.73%	5.60%
Walter Scott & Partners(1)	602	10.60%	8.66%	5.60%	14.54%	13.46%	14.45%
MSCI World	-	-	7.93%	1.70%	10.41%	7.74%	10.48%
BlackRock MSCI World Ex US Index	3,181	56.03%	4.97%	(6.87%)	0.51%	0.99%	-
MSCI World ex US	-	-	4.92%	(7.13%)	0.16%	0.62%	5.32%
Xponance Non-U.S. Small Cap	201	3.55%	12.11%	(5.99%)	5.73%	-	-
MSCI ACWI ex US Small Cap	-	-	10.50%	(3.64%)	6.97%	0.93%	6.80%
Harris Assoc Int'l SCV	228	4.02%	10.00%	(13.82%)	(3.42%)	(3.72%)	4.06%
MSCI World ex US Sm Cap	-	-	10.12%	(4.05%)	6.88%	1.42%	7.35%
MSCI World ex US Sm Value	-	-	7.24%	(14.73%)	(5.19%)	(3.48%)	4.13%
Emerging Mkts Equity	**$1,457**	**25.67%**	**11.38%**	**3.54%**	**16.58%**	**3.93%**	**11.30%**
MSCI EM IMI	-	-	9.79%	(1.29%)	10.14%	2.04%	8.43%
Macquarie Emg Mkts Equity	482	8.49%	11.38%	3.14%	17.83%	4.01%	12.12%
MSCI EM	-	-	9.56%	(1.16%)	10.54%	2.42%	8.97%
Martin Currie Emg Mkts Equity	508	8.95%	13.35%	3.98%	17.96%	5.33%	13.87%
MSCI EM	-	-	9.56%	(1.16%)	10.54%	2.42%	8.97%
BlackRock Emg Mkts Index	141	2.49%	9.43%	(1.41%)	10.14%	2.16%	-
MSCI EM	-	-	9.56%	(1.16%)	10.54%	2.42%	8.97%
Leading Edge Emg Mkts Fund	233	4.10%	9.84%	(1.65%)	9.50%	-	-
MSCI EM	-	-	9.56%	(1.16%)	10.54%	2.42%	8.97%
GlobeFlex Emerging Small Cap	93	1.64%	7.89%	(4.00%)	5.86%	(1.98%)	5.34%
MSCI EM Small Cap	-	-	11.85%	(2.40%)	6.89%	(1.09%)	4.61%

(1) Walter Scott since inception returns were contained in the Global Mandates composite prior to 12/31/2019.
*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 September 30, 2020

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception	
Net Performance- International Equity						
International Dev Mkts Equity	**5.64%**	**3.91%**	**-**	**-**	**5.80%**	(1/02)
MSCI World ex US IMI	4.65%	3.97%	3.92%	4.88%	5.91%	(1/02)
Walter Scott & Partners(1)	11.50%	-	-	-	9.42%	(10/06)
MSCI World	9.37%	6.61%	4.99%	6.85%	6.09%	(10/06)
BlackRock MSCI World Ex US Index	-	-	-	-	2.68%	(6/17)
MSCI World ex US	4.37%	3.71%	3.64%	4.71%	2.25%	(6/17)
Xponance Non-U.S. Small Cap	-	-	-	-	0.23%	(10/18)
MSCI ACWI ex US Small Cap	5.31%	5.67%	7.04%	5.82%	0.47%	(10/18)
Harris Assoc Int'l SCV	5.21%	6.09%	-	-	9.55%	(7/03)
MSCI World ex US Sm Cap	6.55%	5.26%	-	-	8.87%	(7/03)
MSCI World ex US Sm Value	4.70%	4.55%	7.63%	6.41%	8.20%	(7/03)
Emerging Mkts Equity	**2.86%**	**4.09%**	**-**	**-**	**7.42%**	(1/02)
MSCI EM IMI	2.34%	5.87%	7.74%	4.68%	9.31%	(1/02)
Macquarie Emg Mkts Equity	-	-	-	-	5.08%	(5/13)
MSCI EM	2.51%	5.81%	-	-	3.04%	(5/13)
Martin Currie Emg Mkts Equity	-	-	-	-	6.03%	(1/14)
MSCI EM	2.51%	5.81%	-	-	3.61%	(1/14)
BlackRock Emg Mkts Index	-	-	-	-	4.40%	(7/17)
MSCI EM	2.51%	5.81%	-	-	4.65%	(7/17)
Leading Edge Emg Mkts Fund	-	-	-	-	9.13%	(11/18)
MSCI EM	2.51%	5.81%	-	-	9.33%	(11/18)
GlobeFlex Emerging Small Cap	-	-	-	-	3.28%	(8/13)
MSCI EM Small Cap	1.03%	6.05%	8.18%	4.11%	2.45%	(8/13)

(1) Walter Scott since inception returns were contained in the Global Mandates composite prior to 12/31/2019.
*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 September 30, 2020

	Market Value $(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance - Fixed Income							
Fixed Income	**$8,478**	**57.62%**	**1.76%**	**3.46%**	**4.04%**	**4.09%**	**4.16%**
Blmbg Aggregate	-	-	0.62%	6.79%	6.98%	5.24%	4.18%
Core Fixed Income	**$5,863**	**39.84%**	**0.76%**	**5.99%**	**6.57%**	**5.11%**	**4.40%**
Blmbg Aggregate	-	-	0.62%	6.79%	6.98%	5.24%	4.18%
PIMCO Core Bond Fund	715	4.86%	1.51%	6.50%	7.44%	5.33%	4.67%
Blmbg Agg ex Treasury	-	-	0.89%	5.21%	6.08%	5.00%	4.37%
Mellon Bond-Index	4,929	33.49%	0.59%	6.71%	6.87%	5.18%	4.12%
Blmbg Aggregate (1)	-	-	0.62%	6.79%	6.98%	5.24%	4.18%
BMO (TCH) Corp FI	219	1.49%	2.18%	6.73%	8.45%	6.17%	6.29%
Blmbg Credit	-	-	1.50%	6.39%	7.50%	6.19%	5.75%
Nominal U.S. Treasuries	**$374**	**2.54%**	**0.22%**	**13.05%**	**11.25%**	**7.31%**	**4.66%**
Blmbg US Treas Bell 10Y	-	-	0.06%	12.77%	10.78%	7.00%	4.30%
PIMCO US Treasuries	374	2.54%	0.22%	13.05%	11.25%	7.31%	4.91%
Blmbg US Treas Bell 10Y	-	-	0.06%	12.77%	10.78%	7.00%	4.30%

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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 September 30, 2020

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception	
Net Performance - Fixed Income						
Fixed Income	**4.12%**	**4.96%**	**5.70%**	**5.95%**	**8.33%**	(1/81)
Blmbg Aggregate	3.64%	4.48%	5.01%	5.30%	7.66%	(1/81)
Core Fixed Income	**4.20%**	**4.82%**	**-**	**-**	**4.99%**	(1/02)
Blmbg Aggregate	3.64%	4.48%	5.01%	5.30%	4.67%	(1/02)
PIMCO Core Bond Fund	-	-	-	-	3.44%	(1/13)
Blmbg Agg ex Treasury	3.88%	4.68%	-	-	3.51%	(1/13)
Mellon Bond-Index	3.53%	4.37%	4.96%	5.32%	7.16%	(4/84)
Blmbg Aggregate (1)	3.64%	4.48%	5.08%	5.43%	-	
BMO (TCH) Corp FI	5.15%	5.58%	-	-	6.06%	(12/00)
Blmbg Credit	4.92%	5.44%	6.00%	6.03%	5.98%	(12/00)
Nominal U.S. Treasuries	**-**	**-**	**-**	**-**	**3.77%**	(9/11)
Blmbg US Treas Bell 10Y	4.05%	4.92%	5.32%	5.35%	3.76%	(9/11)
PIMCO US Treasuries	-	-	-	-	3.96%	(9/11)
Blmbg US Treas Bell 10Y	4.05%	4.92%	5.32%	5.35%	3.76%	(9/11)

*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) 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 September 30, 2020

	Market Value $(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance - Fixed Income							
Opportunistic Fixed Income	**$2,242**	**100.00%**	**4.71%**	**(4.32%)**	**(2.40%)**	**1.29%**	**3.75%**
BAAM Keystone(1)	924	41.21%	4.27%	(4.73%)	(1.08%)	2.30%	3.25%
HFRI FOF Comp Index	-	-	4.24%	2.55%	5.71%	2.88%	3.09%
Brandywine Global Opp FI	205	9.17%	3.44%	0.33%	4.51%	1.20%	4.18%
FTSE Wrld Gov't Bond Index	-	-	2.94%	7.14%	6.77%	4.37%	3.95%
Eaton Vance GMARA(2)	218	9.73%	1.97%	2.33%	6.80%	-	-
3 Mo LIBOR Index +6%	-	-	1.53%	5.04%	7.07%	7.88%	7.47%
Fidelity HY CMBS	311	13.88%	6.35%	(8.96%)	(8.70%)	0.69%	2.05%
Bloomberg US CMBS Ex AAA Index	-	-	5.53%	(0.28%)	(0.94%)	4.33%	4.20%
SEI Str. Credit: HY Bank Loans(3)(4)	211	9.39%	9.50%	(10.94%)	(13.09%)	(0.46%)	3.47%
FTSE:HY Corp (1 month lag)	-	-	6.94%	3.03%	4.04%	4.56%	6.13%
Stone Harbor Glbl HY	214	9.53%	5.10%	1.36%	3.45%	3.99%	6.06%
FTSE High Yield Market Index	-	-	4.86%	(0.15%)	2.68%	3.88%	6.52%
Stone Harbor EMD	159	7.09%	2.89%	(0.69%)	2.23%	1.70%	6.19%
JPM Emg Mkts Bond Global Index	-	-	2.28%	0.37%	2.47%	3.27%	6.03%

(1) Blackstone Keystone since inception returns were included in the Legacy Hedge Fund composite through 9/30/2017 and in the Multi-Strategy composite through 12/31/2019.
(2) Eaton Vance since inception returns were included in the Multi-Strategy composite through 12/31/2019.
(3) 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.
(4) SEI HY Bank Loans has a 1 month lag in valuation.

Investment Manager Returns

As of September 30, 2020

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception	
Net Performance - Fixed Income						
Opportunistic Fixed Income	**-**	**-**	**-**	**-**	**3.56%**	(10/12)
BAAM Keystone(1)	-	-	-	-	6.26%	(7/12)
HFRI FOF Comp Index	2.88%	2.64%	3.27%	4.88%	3.68%	(7/12)
Brandywine Global Opp FI	-	-	-	-	3.74%	(2/11)
FTSE Wrld Gov't Bond Index	1.86%	3.56%	4.71%	4.33%	2.11%	(2/11)
Eaton Vance GMARA(2)	-	-	-	-	3.80%	(6/18)
3 Mo LIBOR Index +6%	6.89%	7.66%	7.89%	-	7.90%	(6/18)
Fidelity HY CMBS	7.31%	5.57%	7.27%	-	7.85%	(4/97)
Bloomberg US CMBS Ex AAA Index	5.36%	0.75%	-	-	-	
SEI Str. Credit: HY Bank Loans(3)(4)	7.78%	-	-	-	9.97%	(5/08)
FTSE:HY Corp (1 month lag)	6.59%	6.71%	6.96%	6.94%	7.35%	(5/08)
Stone Harbor Glbl HY	5.63%	6.28%	7.32%	-	7.34%	(7/00)
FTSE High Yield Market Index	6.17%	6.71%	6.96%	6.85%	6.91%	(7/00)
Stone Harbor EMD	4.57%	6.55%	-	-	7.06%	(4/05)
JPM Emg Mkts Bond Global Index	5.21%	6.51%	7.92%	9.37%	6.96%	(4/05)

(1) Blackstone Keystone since inception returns were included in the Legacy Hedge Fund composite through 9/30/2017 and in the Multi-Strategy composite through 12/31/2019.
(2) Eaton Vance since inception returns were included in the Multi-Strategy composite through 12/31/2019.
(3) 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.
(4) SEI HY Bank Loans has a 1 month lag in valuation.

Investment Manager Returns

As of September 30, 2020

	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)	**$1,320**	**100.00%**	**3.10%**	**9.12%**	**9.79%**	**5.64%**	**4.61%**
Blmbg US TIPS	-	-	3.03%	9.22%	10.08%	5.79%	4.61%
NISA Inv Adv TIPS	570	43.14%	3.08%	9.21%	10.10%	5.75%	4.61%
Blmbg US TIPS (1)	-	-	3.03%	9.22%	10.08%	5.79%	4.61%
Brown Brothers TIPS	619	46.91%	2.92%	9.21%	9.91%	5.73%	4.63%
Blmbg US TIPS	-	-	3.03%	9.22%	10.08%	5.79%	4.61%
New Century Global TIPS	131	9.96%	4.06%	9.24%	8.96%	5.21%	4.69%
Blmbg:Wld Infl-Lnk Unhdg	-	-	3.58%	7.66%	7.68%	4.75%	4.27%

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception	
Net Performance - Inflation Protection						
Inflation Protection (TIPS)	**2.98%**	**3.82%**	**-**	**-**	**3.63%**	(2/03)
Blmbg US TIPS	3.57%	4.21%	5.52%	-	4.63%	(2/03)
NISA Inv Adv TIPS	2.78%	-	-	-	3.65%	(4/07)
Blmbg US TIPS (1)	2.78%	3.49%	4.97%	-	3.65%	(4/07)
Brown Brothers TIPS	-	-	-	-	2.58%	(2/12)
Blmbg US TIPS	3.57%	4.21%	5.52%	-	2.43%	(2/12)
New Century Global TIPS	-	-	-	-	3.03%	(2/12)
Blmbg:Wld Infl-Lnk Unhdg	3.38%	4.11%	5.80%	-	2.53%	(2/12)

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The market values and performance of such accounts are included within their relevant composites.
(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 September 30, 2020

	Market Value $(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance - Private Equity							
Private Equity	**$4,170**	**89.32%**	**10.50%**	**4.33%**	**6.66%**	**9.73%**	**8.55%**
Burgiss Private Equity Index (Qtr lag)	-	-	7.57%	4.67%	5.56%	10.84%	10.24%
Global Equity +3% (Qtr lag)(1)	-	-	20.83%	6.19%	8.20%	12.88%	13.03%
Buyouts	2,201	47.13%	12.97%	7.39%	10.15%	11.14%	10.72%
Burgiss Buyout Index (Qtr lag)	-	-	7.00%	1.81%	2.67%	9.04%	10.23%
Special Situations	431	9.24%	3.47%	0.83%	5.87%	9.26%	7.81%
Burgiss Special Situations Idx (Qtr lag)	-	-	4.08%	(1.19%)	(0.87%)	4.17%	5.04%
Growth Equity	959	20.54%	13.33%	12.99%	18.70%	20.37%	11.78%
Burgiss Venture Capital Index (Qtr lag)	-	-	10.17%	13.70%	15.14%	19.05%	12.79%
Keystone Legacy(2)	579	12.41%	2.83%	(13.09%)	(15.68%)	-	-
Private Credit	**$499**	**10.68%**	**5.82%**	**3.32%**	**7.28%**	**-**	**-**
S&P Levered Loan Index +1% (Qtr lag)	-	-	9.89%	(2.00%)	(0.79%)	3.15%	3.94%

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception	
Net Performance - Private Equity						
Private Equity	**10.75%**	**10.53%**	**7.23%**	**13.05%**	**10.79%**	(1/86)
Burgiss Private Equity Index (Qtr lag)	12.56%	11.84%	8.91%	14.67%	16.60%	(1/86)
Global Equity + 3% (Qtr lag)(1)	16.86%	12.15%	9.56%	12.72%	14.37%	(1/86)
Buyouts	13.10%	12.76%	9.94%	16.02%	13.05%	(4/86)
Burgiss Buyout Index (Qtr lag)	12.31%	12.15%	10.84%	13.22%	19.13%	(9/86)
Special Situations	9.66%	11.11%	11.42%	11.96%	12.05%	(1/95)
Burgiss Special Situations Idx (Qtr lag)	8.07%	7.61%	8.92%	10.03%	10.14%	(6/95)
Growth Equity	11.31%	7.94%	0.59%	7.83%	7.32%	(1/86)
Burgiss Venture Capital Index (Qtr lag)	15.93%	12.02%	3.84%	15.61%	13.74%	(1/86)
Keystone Legacy(2)	-	-	-	-	(8.33%)	(7/18)
Private Credit	**-**	**-**	**-**	**-**	**7.63%**	(12/17)
S&P Levered Loan Index +1% (Qtr lag)	5.19%	5.33%	5.51%	-	3.04%	(12/17)

(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 7/31/2018, Keystone Legacy SPV consists of 163 non-core funds, prior performance in previous sub-asset classes

Investment Manager Returns

As of September 30, 2020

	Market Value $(mm)	Ending Weight	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years
Net Performance - Real Estate							
Real Estate	**$2,311**	**100.00%**	**1.01%**	**(1.33%)**	**0.22%**	**2.25%**	**2.88%**
Real Estate Custom Bench (Qtr lag)(1)	-	-	(1.23%)	(1.37%)	(0.42%)	4.02%	5.73%
CPI +3% (Qtr lag)	-	-	0.62%	2.64%	3.65%	4.72%	4.56%
Core/Core Plus Real Estate Funds	885	38.30%	0.79%	(0.24%)	1.76%	4.65%	6.28%
NCREIF ODCE Index (Qtr lag)	-	-	(1.47%)	0.52%	1.70%	5.09%	6.72%
Value Add/Opportunistic SMA	689	29.80%	1.82%	4.22%	7.10%	1.49%	1.80%
NCREIF ODCE Index (Qtr lag)	-	-	(1.47%)	0.52%	1.70%	5.09%	6.72%
Value Add/Opportunistic Funds	489	21.15%	0.03%	(2.39%)	(1.66%)	4.81%	5.11%
NCREIF ODCE Index (Qtr lag)	-	-	(1.47%)	0.52%	1.70%	5.09%	6.72%
Legacy Real Assets	5	0.23%	(4.93%)	(6.48%)	2.73%	(2.65%)	(1.88%)
CPI +3% (Qtr lag)	-	-	0.62%	2.64%	3.65%	4.72%	4.56%
REITS	243	10.52%	1.28%	(14.43%)	(15.22%)	1.74%	2.44%
FTSE NAREIT US Index	-	-	0.87%	(20.01%)	(20.77%)	(0.92%)	3.12%

	Last 10 Years	Last 15 Years	Last 20 Years	Last 25 Years	Since Inception	
Net Performance - Real Estate						
Real Estate	**7.08%**	**4.40%**	**6.25%**	**7.57%**	**8.17%**	(3/84)
Real Estate Custom Benchmark (Qtr lag)(1)	9.55%	6.02%	7.13%	-	-	
CPI +3% (Qtr lag)	4.69%	4.90%	5.03%	5.12%	5.59%	(3/84)
Core/Core Plus Real Estate Funds	9.82%	6.64%	7.30%	8.49%	6.93%	(9/86)
NCREIF ODCE Index (Qtr lag)	9.95%	5.99%	6.68%	7.58%	5.89%	(9/86)
Value Add/Opportunistic SMA	5.77%	3.08%	4.69%	6.28%	5.19%	(6/88)
NCREIF ODCE Index (Qtr lag)	9.95%	5.99%	6.68%	7.58%	5.92%	(6/88)
Value Add/Opportunistic Funds	10.06%	4.94%	7.12%	8.58%	7.61%	(3/84)
NCREIF ODCE Index (Qtr lag)	9.95%	5.99%	6.68%	7.58%	6.15%	(3/84)
Legacy Real Assets	(0.87%)	1.47%	2.07%	3.45%	4.06%	(3/93)
CPI +3% (Qtr lag)	4.69%	4.90%	5.03%	5.12%	5.19%	(3/93)
REITS	7.64%	5.87%	8.91%	-	8.98%	(4/96)
FTSE NAREIT US Index	8.54%	5.52%	9.04%	9.65%	9.33%	(4/96)

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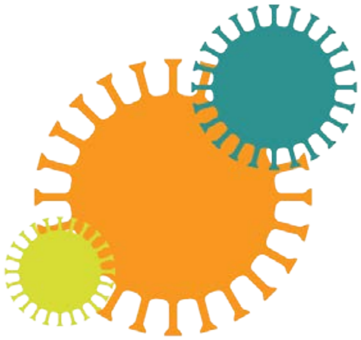
(1) As of 03/31/2019 benchmark consists of 90% NCREIF ODCE Index (1 Qtr lag) and 10% FTSE NAREIT Index (unlagged)
Prior to 03/31/2019, benchmark history was provided by RVK.

Appendix II – Callan Update

Published Research Highlights from 3Q20

Private Equity Fees and Terms Study

Coping with COVID-19: Investment Manager Survey, 2nd Edition



2020 ESG Survey

How New Risk-Retention Rules Affect the CMBS Market

Recent Blog Posts

How Investors Can Address Climate Risk in Real Estate

Munir Iman and Aaron Quach

Fine-Tuning Implementation of the CARES Act

Jana Steele

Plus our blog contains a wide array of posts related to the pandemic

Additional Reading

Private Equity Trends quarterly newsletter

Active vs. Passive quarterly charts

Capital Market Review quarterly newsletter

Monthly Updates to the Periodic Table

Market Pulse Flipbook quarterly markets update

Callan Institute Events

Upcoming conferences, workshops, and webinars

"Callan College"

Introduction to Investments—Virtual

This program familiarizes institutional investor trustees and staff and asset management advisers with basic investment theory, terminology, and practices. It is held over three days with virtual modules of 2.5-3 hours. This course is designed for individuals with less than two years of experience with asset-management oversight and/or support responsibilities. Tuition is $950 per person and includes instruction and digital materials.

Next Session: April 13-15, 2021

Additional information can be found at:
www.callan.com/cc-introduction-virtual/

"Research, education, and dialogue are more important than ever in these extraordinary times, which is why I'm pleased to announce that we are adding more webinars, and we plan to expand our events to include roundtables and other interactive digital offerings."

Barb Gerraty
Director, Callan Institute

Upcoming Webinars

Callan's Capital Markets Assumptions
January 14, 2021

Learn about our 2021-2030 Capital Markets Assumptions and the potential implications for strategic recommendations.

Details at www.callan.com/callan-institute-events

Market Intelligence Special Edition
January 22, 2021

Get insights on the current environment, including trends for equities, fixed income, alternative investments, and defined contribution plans; an overview of the capital markets; and case studies analyzing how institutional investors are addressing the financial stresses from the pandemic.

Save the Date!

2021 National Conference
June 21-23, 2021

We can't wait to see you!

Callan Updates

Firm updates by the numbers, as of Sept. 30, 2020

Total Associates: 199

Ownership
- 100% employees
- Broadly distributed across more than 95 shareholders

Leadership Changes
- Denise Steele promoted to chief technology officer
- Shalaka Kachare promoted to chief financial officer
- Jen Gallo promoted to general counsel

Total General and Fund Sponsor Consultants: more than 45

Total Specialty and Research Consultants: more than 60

Total CFA/CAIA/FRMs: more than 55

Total Fund Sponsor Clients: more than 400

AUA: more than $2.5 trillion

Denise Steele
CTO

Shalaka Kachare
CFO

Jen Gallo
General Counsel

Disclaimers

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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.