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MoDOT & Patrol Employees Retirement System

Investment Summary
Quarter Ending Sept. 30, 2017

Board Report

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Market Thoughts & Education





THIRD QUARTER MARKET THOUGHTS

WISH I MAY, WISH I MIGHT: WHAT'S NEXT FOR INVESTORS?

October 2017

INTRODUCTION

Investors, emboldened by an improved economic outlook and record low volatility, pushed equities even higher in the third quarter. Emerging markets, bolstered by China, continued to lead the way; they have gained 28% so far this year. They were followed by non-US developed markets, which have returned 20% in 2017, boosted by robust corporate earnings in Europe and Japan. In their ninth year of a bull run, US stocks were also in the black amid optimism around a tax overhaul working its way through Congress; domestic equities are up 14% this year.

The last three quarters have been a banner year for global stocks. The outperformance of international equities, in particular, has exceeded our expectations even as we began the year with an overweight recommendation for them. Their stellar returns are all the more significant when you reflect on the pessimism at the start of 2017: Europe was under a shroud of political uncertainty as a number of key elections loomed, investors were fretting over potential capital outflows from China as economic growth appeared to slow, and there were concerns around major shifts in US trade policy disrupting the global economic order. These risks—
notwithstanding some outbursts on Twitter, tensions with North Korea and lingering political concerns in Europe—seemingly dissipated as the year went on, as if three wishes had been granted to investors. To this end, not only did consumer sentiment and economic indicators improve across Europe, Japan and China, but also the decline in perceived risks benefited the euro and emerging market currencies, which have rallied over 10% relative to the US dollar.

"We encourage investors to prioritize actions that reduce total portfolio volatility."

However, now that the three wishes are spent and equities have scaled new heights, a colder reality sets in. Investors' desire for continued market stability—a big driver of returns for risky assets—in the year ahead may be wishful thinking as corporate earnings and fundamental valuations assume a greater role. With this in mind, we encourage investors to prioritize actions that reduce total portfolio volatility. We suggest using the outsized gains of US equities and high-yield bonds to rebalance safe-haven fixed-income exposure back to strategic targets. We also support adding assets, for instance, systematic-global macro or long-volatility strategies, which mitigate the effects of market drawdowns.

To be sure, this is less of a warning and more of a reminder that adhering to strategic asset allocation targets is the most effective long-term risk-management tool. That said, we still see opportunities driven by fundamentals in global markets and recommend investors maintain an overweight position in international equities. We believe a multi-year earnings recovery is underway in non-US developed markets, offering the possibility of elevated returns. Within emerging markets, equities offer the highest potential for total returns for public-market investors as corporate earnings and currencies benefit from the economic adjustments of recent years. While we view equities positively in a pro-risk environment, we are well aware that all wishes do not come true. To this end, we remind investors that a diversified investment program is best equipped to weather market uncertainty.

GLOBAL EQUITY MARKETS

Global equities posted another solid quarter with returns of 5.2%, according to the MSCI ACWI Index. Small-cap stocks bested large-cap equities. Returns, in US dollar terms, were boosted by a stronger euro, sterling and Canadian dollar. Energy, materials and information technology led performance; regionally, Norway, Italy and Portugal were top performers.

At home, the S&P 500 gained 4.5% and the Russell 2000 Index returned 5.7% for the three months ended September 30. Growth bested value; economic growth overshadowed the fallout from hurricanes and floods, and the threat of a nuclear outburst between the US and North Korea, confounding ever-expanding valuations of financial assets.

Emerging market stocks maintained their lead with gains of 7.9%, according to the MSCI Emerging Markets Index, aided by Brazil, Russia and China. Real estate was the top-performing sector, dominated by China. Energy took second place with higher oil prices fueling returns.

GLOBAL EQUITY MARKET RETURNS AS OF 09/30/2017				
Global Equity	Quarter	1 Year	3 Yrs	5 Yrs
MSCI ACWI	5.2%	18.6%	7.4%	10.2%
US Equity	Quarter	1 Year	3 Yrs	5 Yrs
S&P 500	4.5%	18.6%	10.8%	14.2%
Russell 1000 Growth	5.9%	21.9%	12.7%	15.3%
Russell 1000 Value	3.1%	15.1%	8.5%	13.2%
Russell 2000	5.7%	20.7%	12.2%	13.8%
Russell 2000 Growth	6.2%	21.0%	12.2%	14.3%
Russell 2000 Value	5.1%	20.5%	12.1%	13.3%
International Equity	Quarter	1 Year	3 Yrs	5 Yrs
MSCI EAFE	5.4%	19.1%	5.0%	8.4%
MSCI EAFE Hedged USD	3.4%	19.0%	7.9%	12.3%
MSCI EAFE Small Cap	7.5%	21.8%	11.1%	12.8%
MSCI Europe	6.4%	22.3%	4.4%	8.4%
MSCI Japan	4.0%	14.1%	7.7%	10.6%
MSCI Emerging Markets	7.9%	22.5%	4.9%	4.0%
MSCI Emerging Markets Small Cap	5.6%	14.9%	3.1%	4.6%
Alternative	Quarter	1 Year	3 Yrs	5 Yrs
HFRI Equity Hedge	3.6%	11.1%	4.6%	6.3%
HFRI Emerging Markets	5.1%	14.1%	4.5%	5.1%
HFRI ED: Activist	1.2%	11.1%	6.6%	10.6%
HFRI ED: Merger Arbitrage	0.9%	5.9%	3.8%	3.8%
HFRI Short Bias	-2.4%	-9.3%	-3.6%	-7.3%

In private equity, \$40.8 billion of value exited public markets across 224 companies in the third quarter, a 20% drop from the earlier quarter as high valuations slowed down activity. That said, investor demand remains strong with the median size for US private equity funds at a record \$239 million and \$265 million for buyout funds; funds larger than \$5 billion accounted for 54% of capital raised through the third quarter. While there was a 20% drop in the number of deals in the third quarter from the second, aggregate value fell only 6% in the same period as deal sizes got larger.

Within hedge funds, healthcare-focused approaches outperformed, with returns of 5.9%. They were followed by emerging-market strategies—dominated by Latin America and Asia—which were up 4.9%. Energy and basic materials gained following higher prices

on the back of Hurricane Harvey. Sector-focused managers bested diversified equity; market-neutral strategies were also in the black. Special-situations strategies have gained momentum as hedge fund investors seek more idiosyncratic sources of return.

GLOBAL FIXED-INCOME MARKETS

US credit also fared well in the third quarter. The Barclays US Aggregate Index was in the black, pushing returns so far this year to just over 3.0%. High-yield debt was up 2.0% with spreads modestly tighter than the second quarter; the S&P LSTA Leveraged Loan Index returned 1.0% in the third quarter, bringing gains so far this year to 3.0%.



The Barclays Long Treasury Index gained 0.6%, the Barclays Long Credit Index was up 2.2%, and the Barclays Long Government/Credit Index returned 1.5%. Yields compressed 10 basis points in the third quarter for the Long Credit and Long Government/Credit Indices to 4.2% and 3.6%, respectively. The long Treasury yield remained unchanged at 2.8%.

As in public equities, emerging markets led the pack. Emerging-market local-sovereign debt returned 3.6%, clocking returns so far this year of over 14%, helped, in large part, by currency appreciation.

In private debt, fundraising has totaled \$16.5 billion so far in 2017, already surpassing the \$14.4 billion raised last year. Across the pond, fundraising totaled €10.4 billion in Europe, exceeding the €6.0 billion in 2016.

Within hedge funds, credit was up 1.4% for the quarter; relative-value arbitrage strategies were in the black for the three months ended September 30.

REAL ASSETS

Commodities gained 2.5% in the third quarter, according to the Bloomberg Commodity Index, helped by a decline in the US dollar. Energy futures were up 9.8% with the exception of natural gas, which was down 4.2%. Metals were up 6.5%, led by industrial metals which gained 9.9%; precious metals returned 2.3%. Steep contango—when the futures price of a commodity is above the expected future spot price—in agriculture resulted in a negative roll yield; wheat and lean-hogs contracts were in the red.

Within energy, our highest conviction strategies remain in private equity and credit as these managers appear best equipped to invest and manage assets amid what we believe will be a choppy recovery. We still believe asset selection is critical in energy; in the public markets, we favor midstream/Master Limited Partnerships or MLPs, as these companies repair their balance sheets and reset dividends for a strong outlook.

We are constructive on the mining sector over the mid-to-longer-term and are actively seeking infrastructure opportunities; however, the impact of federal legislation remains uncertain. We are positive on energy, negative on timber and neutral on agriculture, infrastructure, and metals and mining; we prefer niche opportunities targeting assets within sectors we have rated as neutral.

In real estate, US core property markets have normalized, but fundamentals remain healthy. Future value appreciation will likely come from income growth as opposed to compressions in the cap rate.

GLOBAL FIXED INCOME MARKET RETURNS AS OF 09/30/2017				
Global Fixed Income	Quarter	1 Year	3 Yrs	5 Yrs
BC Global Aggregate	1.8%	-1.3%	1.3%	0.5%
BC Global Aggregate (USD Hedged)	0.8%	-0.2%	3.1%	3.1%
JPM EMBI Plus	2.2%	2.9%	6.3%	4.0%
JPM GBI-EM Global Diversified	3.6%	7.3%	0.3%	0.9%
Domestic Fixed Income	Quarter	1 Year	3 Yrs	5 Yrs
BC Aggregate Bond	0.8%	0.1%	2.7%	2.1%
BC Municipal Bond	1.1%	0.9%	3.2%	3.0%
BC TIPS	0.9%	-0.7%	1.6%	0.0%
BC US Treasury	0.4%	1.7%	2.0%	1.2%
BC US Long Treasury	0.6%	-6.4%	4.9%	2.8%
BC MBS	1.0%	0.3%	2.4%	2.0%
BC US Credit	1.3%	2.0%	3.9%	3.2%
BC US Long Credit	2.2%	2.9%	6.0%	4.7%
BC High Yield	2.0%	8.9%	5.8%	6.4%
BC Muni High Yield	1.5%	1.4%	4.6%	4.7%
S&P LSTA Lev. Loan	1.0%	5.3%	3.9%	4.1%
BC T-Bills	0.3%	0.6%	0.3%	0.2%
Alternative	Quarter	1 Year	3 Yrs	5 Yrs
HFRI Credit Index	1.4%	7.5%	3.6%	5.4%
HFRI ED: Credit Arbitrage	1.4%	8.1%	3.5%	5.2%
HFRI ED: Distressed/Restructuring	1.7%	10.7%	2.2%	5.4%



REAL ASSET RETURNS AS OF 09/30/2017

	Quarter	1 Year	3 Yrs	5 Yrs
Bloomberg Commodity	2.5%	-0.3%	-10.4%	-10.5%
GSCI Commodity	7.2%	9.6%	-11.4%	-9.7%
Gold Spot	3.1%	-2.7%	1.9%	-6.3%
WTI Crude Oil Spot	12.2%	7.1%	-17.2%	-10.9%
BBG Commodity - Agriculture	-6.1%	-11.1%	-6.2%	-11.4%
BBG Commodity - Energy	9.8%	-2.9%	-26.6%	-17.7%
BBG Commodity - Industrial Metals	9.9%	24.0%	-1.3%	-4.5%
BBG Commodity - Precious Metals	2.3%	-6.6%	0.4%	-8.8%
S&P Global Natural Resource Equities	10.6%	19.9%	0.7%	0.5%
NAREIT Composite Index	1.3%	3.6%	10.2%	9.6%
NAREIT Global REIT Ex US	0.3%	-4.8%	3.0%	-
Alerian MLP	-3.0%	-3.7%	-12.9%	-0.6%

Rising interest rates will place upward pressure on cap rates but we expect growth, although at a slower pace, as capital flows chase income-yielding assets in the United States; the US remains the largest, healthiest and most diversified real-estate investment market. Relative value opportunities remain within non-core US real estate. We favor demographically-driven property sectors, and managers that are attentive to duration risk in the later innings of the expansion cycle. Capital

markets constraints and pockets of distress in Europe and emerging markets may be appealing. Select subordinate-debt opportunities may yield attractive income streams, while providing a hedge against declining property values.

FINAL THOUGHTS

While we welcome the robust gains of 2017, it is beneficial to remind investors of this core investment principle: reduce exposure to assets that have outperformed expectations over a prolonged period. This especially holds true for US equities and high-yield bonds, which have provided outsized returns in recent years. We encourage investors to tap these asset classes as a funding source to ensure safe-haven fixed-income exposures are near strategic targets.

Furthermore, despite a positive outlook for global equities, we advocate balance and recommend investors seek out exposures that mitigate portfolio volatility should market stability break down. These include systematic global macro strategies and long-volatility exposures. With 2018 around the corner, we view equities positively in a pro-risk market environment. Still, we doubt the harmonious financial conditions we saw in 2017 can provide a similar backdrop for the coming year. In time, new trends will evolve. We remain vigilant and look forward to helping investors meet their long-term investment objectives.

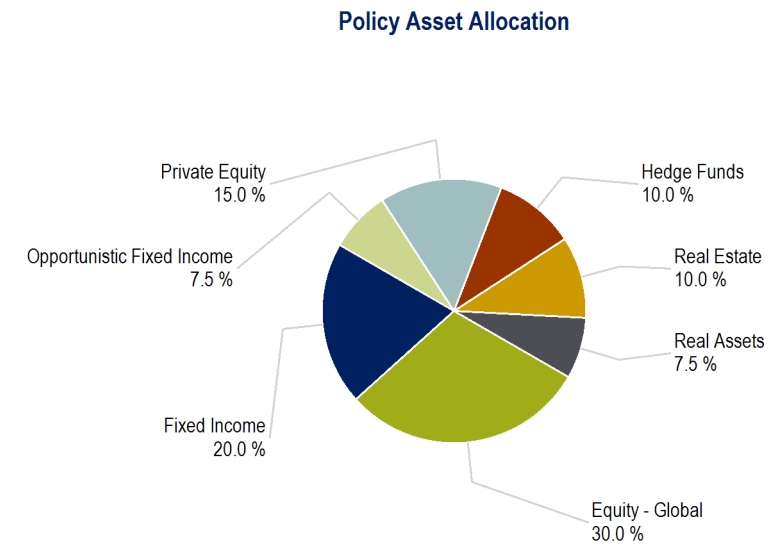
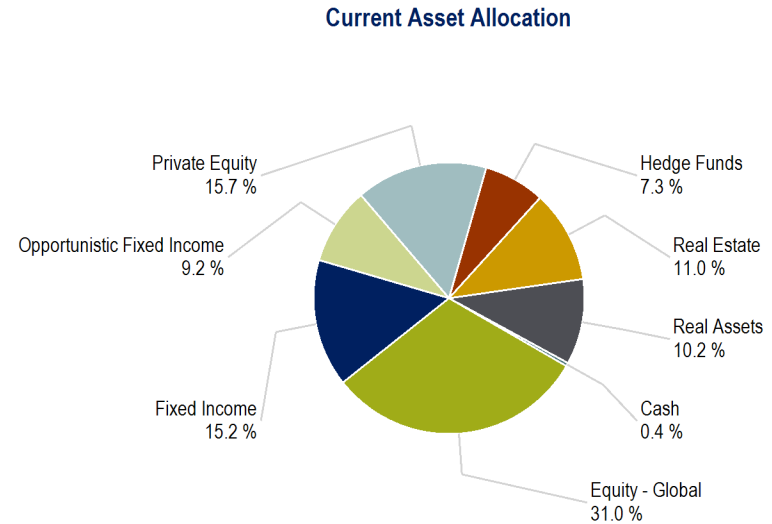
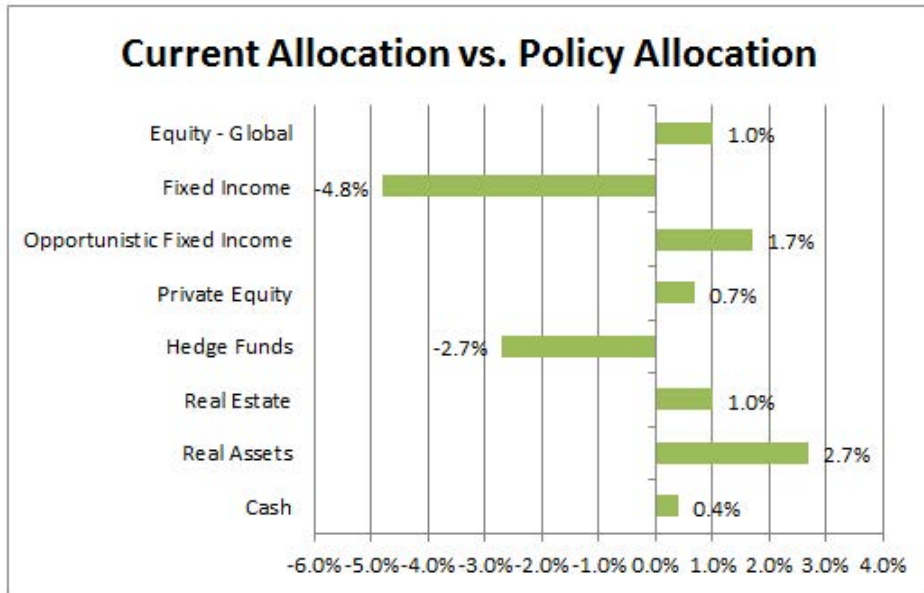
DISCLAIMERS AND DISCLOSURES

- Past performance is no guarantee of future results
- All investments carry some level of risk. Diversification and other asset allocation techniques do not ensure profit or protect against losses.
- The information in this report has been obtained from sources NEPC believes to be reliable. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.
- The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.

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Executive Summary

Total Fund Asset Allocation vs. Current Allocation



Current Asset Allocation vs. Policy Asset Allocation

	Current	Policy	Current Difference*
Equity - Global	\$687,563,778	30.0%	31.0% 1.0%
Fixed Income	\$336,119,520	20.0%	15.2% -4.8%
Opportunistic Fixed Income	\$203,645,286	7.5%	9.2% 1.7%
Private Equity	\$349,287,955	15.0%	15.7% 0.7%
Hedge Funds	\$161,911,567	10.0%	7.3% -2.7%
Real Estate	\$243,378,253	10.0%	11.0% 1.0%
Real Assets	\$226,446,195	7.5%	10.2% 2.7%
Cash	\$9,433,524	--	0.4% 0.4%
Total	\$2,217,786,078	100.0%	100.0%

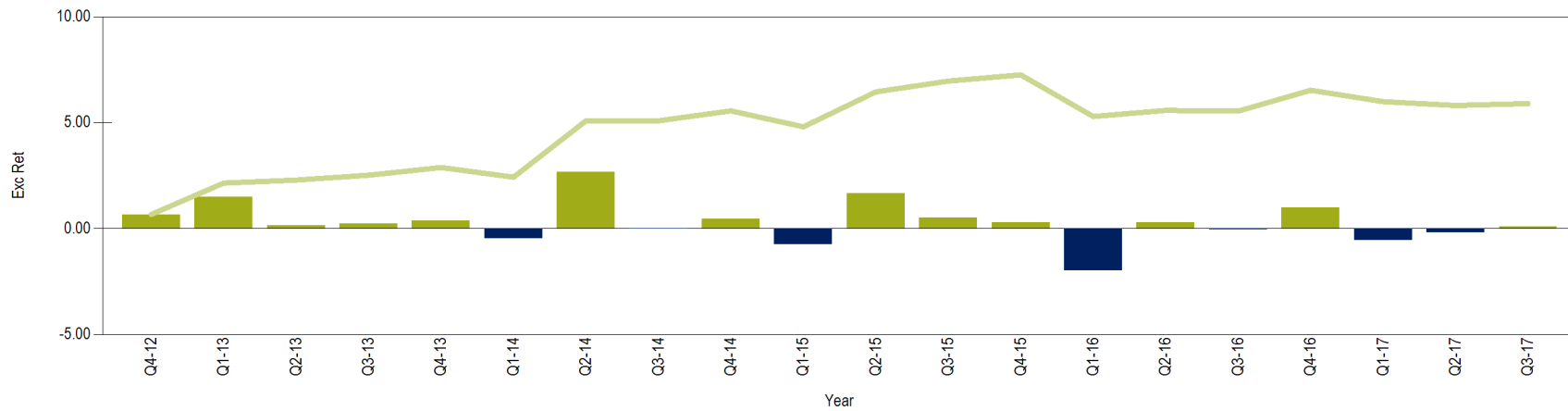
*Difference between Policy and Current Allocation

Allocations may not add to 100% due to rounding.

Total Fund Performance Summary

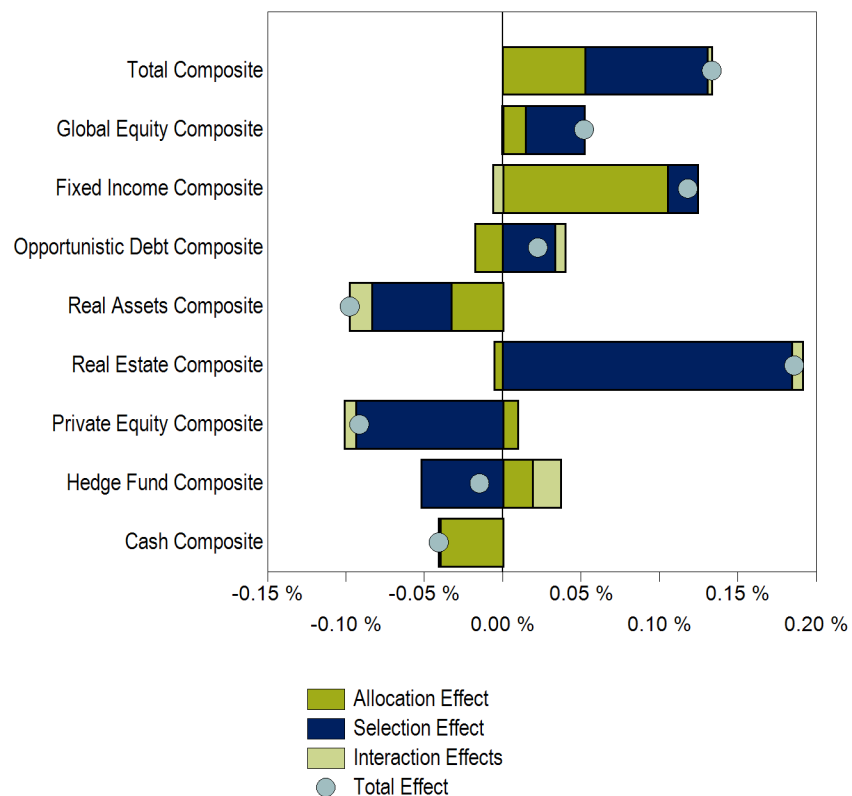
	Market Value	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs
Total Composite	\$2,217,786,078	3.10%	9.55%	11.47%	7.08%	9.67%	5.33%
<i>Policy Index</i>		3.01%	10.22%	11.07%	6.78%	8.42%	5.30%
<i>InvestorForce Public DB Net Median</i>		3.23%	10.69%	11.56%	6.43%	7.95%	5.11%

Quarterly and Cumulative Excess Performance



Total Fund Attribution Analysis

Attribution Effects
3 Months Ending September 30, 2017



Attribution Summary
3 Months Ending September 30, 2017

	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Interaction Effects	Total Effects
Global Equity Composite	5.3%	5.2%	0.1%	0.0%	0.0%	0.0%	0.1%
Fixed Income Composite	0.9%	0.8%	0.1%	0.0%	0.1%	0.0%	0.1%
Opportunistic Debt Composite	2.4%	2.0%	0.4%	0.0%	0.0%	0.0%	0.0%
Real Assets Composite	1.1%	1.8%	-0.7%	-0.1%	0.0%	0.0%	-0.1%
Real Estate Composite	3.5%	1.7%	1.8%	0.2%	0.0%	0.0%	0.2%
Private Equity Composite	3.2%	3.8%	-0.6%	-0.1%	0.0%	0.0%	-0.1%
Hedge Fund Composite	1.8%	2.3%	-0.5%	-0.1%	0.0%	0.0%	0.0%
Cash Composite	0.2%	0.3%	-0.1%	0.0%	0.0%	0.0%	0.0%
Total	3.1%	3.0%	0.1%	0.1%	0.1%	0.0%	0.1%

Note: Plan attribution calculations are returns based and the results shown reflect the composites shown. As a result, the total returns shown may vary from the calculated return shown on the performance summary.

The target return shown for each composite is a custom index, based on aggregated policy indices. This policy index asset weights the underlying policy indices of each option in the plan and the respective benchmark return.

The allocation, selection, and interaction effects are calculated using the custom index described above along with the policy or target weight of each composite.
May not add due to rounding

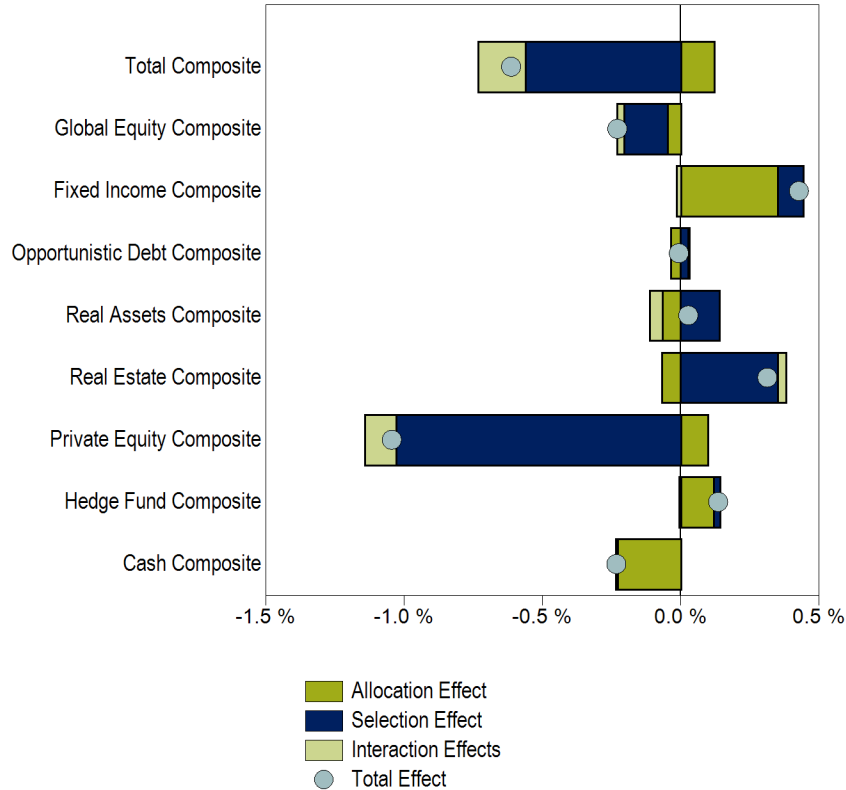
Allocation Effect - The return attributable to the asset allocation of the portfolio

Selection Effect - The return attributable to the managers' security selection

Interaction Effect - The return attributable to the interaction between the Allocation and Selection Effects

Total Fund Attribution Analysis

Attribution Effects Relative to Policy Index
YTD Ending September 30, 2017



Attribution Summary
YTD Ending September 30, 2017

	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Interaction Effects	Total Effects
Global Equity Composite	16.7%	17.3%	-0.6%	-0.2%	0.0%	0.0%	-0.2%
Fixed Income Composite	3.8%	3.5%	0.3%	0.1%	0.4%	0.0%	0.4%
Opportunistic Debt Composite	7.3%	7.0%	0.3%	0.0%	0.0%	0.0%	0.0%
Real Assets Composite	6.7%	5.3%	1.4%	0.1%	-0.1%	0.0%	0.0%
Real Estate Composite	8.3%	4.9%	3.4%	0.3%	-0.1%	0.0%	0.3%
Private Equity Composite	9.1%	16.0%	-7.0%	-1.0%	0.1%	-0.1%	-1.0%
Hedge Fund Composite	5.7%	5.6%	0.1%	0.0%	0.1%	0.0%	0.1%
Cash Composite	0.5%	0.6%	-0.2%	0.0%	-0.2%	0.0%	-0.2%
Total	9.5%	10.1%	-0.7%	-0.6%	0.1%	-0.2%	-0.6%

Note: Plan attribution calculations are returns based and the results shown reflect the composites shown. As a result, the total returns shown may vary from the calculated return shown on the performance summary.
 The target return shown for each composite is a custom index, based on aggregated policy indices. This policy index asset weights the underlying policy indices of each option in the plan and the respective benchmark return.
 The allocation, selection, and interaction effects are calculated using the custom index described above along with the policy or target weight of each composite.
 May not add due to rounding

Allocation Effect - The return attributable to the asset allocation of the portfolio
 Selection Effect - The return attributable to the managers' security selection
 Interaction Effect - The return attributable to the interaction between the Allocation and Selection Effects

MPERS

Total Composite

	Policy %	% of Portfolio	Market Value (\$)	3 Mo (%)	Rank	YTD (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	10 Yrs (%)	Rank
Total Composite	100.00	100.00	2,217,786,078	3.10	64	9.55	82	11.47	52	7.08	22	9.67	5	5.33	43
<i>Policy Index</i>				3.01	72	10.22	64	11.07	62	6.78	32	8.42	35	5.30	46
Global Equity Composite	30.00	31.00	687,563,778	5.30	43	16.68	55	19.89	36	8.34	37	11.85	32	4.93	44
<i>MSCI ACWI</i>				5.18	45	17.25	52	18.65	48	7.43	47	10.20	54	3.88	66
Fixed Income Composite	20.00	15.16	336,119,520	0.89	92	3.84	86	3.42	59	5.59	11	5.93	13	6.10	27
<i>Fixed Income Custom Benchmark</i>				0.81	93	3.49	88	0.79	77	3.06	48	2.50	63	4.54	54
Opportunistic Debt Composite	7.50	9.18	203,645,286	2.41	9	7.31	17	--	--	--	--	--	--	--	--
<i>BBgBarc US High Yield TR</i>				1.98	35	7.00	27	8.88	34	5.83	27	6.36	26	7.84	14
Real Assets Composite	7.50	10.21	226,446,195	1.08	--	6.66	--	11.73	--	0.25	--	6.35	--	--	--
<i>CPI + 4% (Unadjusted)</i>				1.75	--	5.28	--	6.31	--	5.26	--	5.35	--	5.76	--
Real Estate Composite	10.00	10.97	243,378,253	3.53	--	8.31	--	8.28	--	10.40	--	12.99	--	4.85	--
<i>NFI-ODCE Eq Wtd Net Non Lag</i>				1.68	--	4.89	--	6.93	--	10.11	--	10.64	--	3.95	--
Private Equity Composite	15.00	15.75	349,287,955	3.20	--	9.06	--	12.02	--	10.13	--	13.39	--	6.38	--
<i>MO Hwy Priv. Equ. Index - Lagged</i>				3.84	--	16.03	--	21.38	--	12.88	--	18.03	--	10.68	--
Hedge Fund Composite	10.00	7.30	161,911,567	1.80	--	5.70	--	9.00	--	2.49	--	4.44	--	3.83	--
<i>HFRI Fund of Funds Composite Index</i>				2.31	--	5.60	--	6.51	--	2.24	--	3.85	--	1.07	--
Cash Composite	0.00	0.43	9,433,524	0.19	--	0.46	--	0.51	--	0.25	--	0.19	--	0.48	--
<i>91 Day T-Bills</i>				0.26	--	0.62	--	0.72	--	0.32	--	0.21	--	0.36	--

Total Composite is ranked in the IFx Public DB (peer) Net + Universe

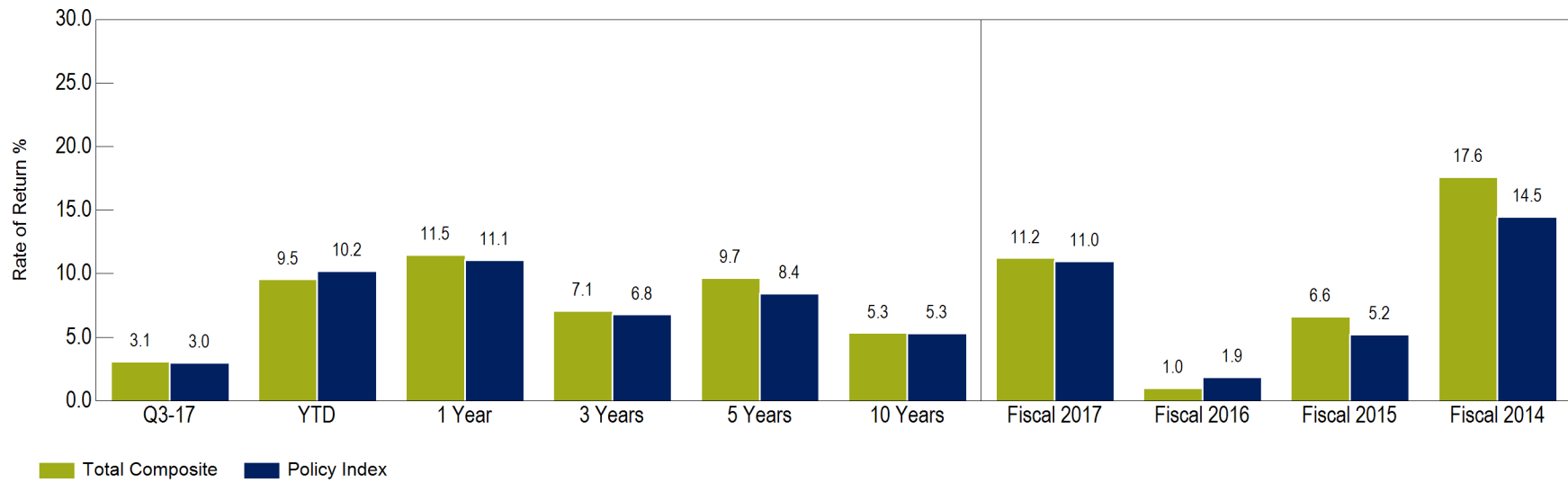
Global Equity Composite is ranked in the eA Global All Cap Equity Net Universe

Fixed Income Composite is ranked in the eA All Global Fixed Inc Net Universe



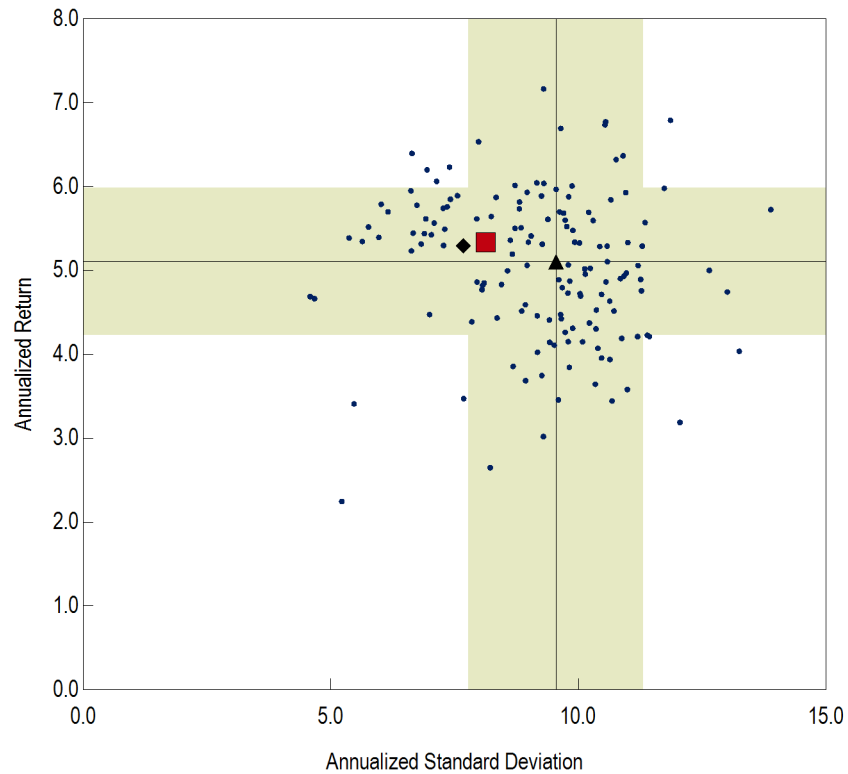
Total Fund Return Summary

Return Summary Net



Total Fund Risk/Return - 10 Years

10 Years Ending September 30, 2017



- Total Composite
- ◆ Policy Index
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB Net

Statistics Summary
10 Years Ending September 30, 2017

	Anlzd Ret	Rank	Anlzd Std Dev	Rank
Total Composite	5.33%	43	8.13%	26
Policy Index	5.30%	46	7.68%	21

Statistics Summary
10 Years Ending September 30, 2017

	Sharpe Ratio	Rank
Total Composite	0.61	26
Policy Index	0.64	23

Total Fund Performance

MPERS

Total Fund Performance Detail

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Total Composite	2,217,786,078	100.00	100.00	3.10	9.55	11.47	7.08	9.67	5.33
<i>Policy Index</i>				3.01	10.22	11.07	6.78	8.42	5.30
Global Equity Composite	687,563,778	31.00	30.00	5.30	16.68	19.89	8.34	11.85	4.93
<i>MSCI ACWI</i>				5.18	17.25	18.65	7.43	10.20	3.88
Tortoise	68,597,779	3.09		-2.01	-2.79	-0.03	-9.44	4.54	--
<i>Alerian MLP Index</i>				-3.05	-5.62	-3.70	-12.93	-0.57	6.49
Domestic Equity Composite	382,265,974	17.24	--	5.37	16.73	21.45	11.70	15.05	7.59
<i>Russell 3000</i>				4.57	13.91	18.71	10.74	14.22	7.57
Large Cap Composite	320,922,154	14.47	--	5.06	16.28	20.16	11.69	14.31	8.24
Cash/S&P Futures	320,922,154	14.47		5.06	16.28	20.16	11.20	13.24	--
S&P 500				4.48	14.24	18.61	10.81	14.22	7.44
Small/Mid Cap Composite	61,343,820	2.77	--	7.00	19.20	27.84	13.12	16.25	8.94
Kennedy Capital	30,426,136	1.37		7.12	12.77	28.05	16.32	--	--
Pinnacle	30,917,684	1.39		6.88	23.26	27.26	10.84	15.15	8.89
<i>Russell 2500</i>				4.74	11.00	17.79	10.60	13.86	8.19
International Equity Composite	236,700,025	10.67	--	7.52	24.02	24.19	8.44	9.66	2.69
<i>MSCI ACWI ex USA</i>				6.16	21.13	19.61	4.70	6.97	1.28
Silchester	138,636,338	6.25		5.69	20.56	23.43	8.19	12.19	7.39
Acadian Int'l Small Cap	42,570,764	1.92		9.83	29.92	26.21	13.03	--	--
<i>MSCI EAFE</i>				5.40	19.96	19.10	5.04	8.38	1.34
GMO EM	24,767,897	1.12		7.07	27.10	18.20	6.83	--	--
<i>MSCI Emerging Markets</i>				7.89	27.78	22.46	4.90	3.99	1.32
MPERS-Acadian Non-US Microcap	30,316,048	1.37		13.66	--	--	--	--	--
<i>MSCI EAFE Small Cap</i>				7.46	25.42	21.84	11.13	12.85	4.63
Transition Account	408,978	0.02							

MPERS - Acadian Non-US Microcap was funded on 03/20/2017.

MPERS

Total Fund Performance Detail

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Fixed Income Composite	336,119,520	15.16	20.00	0.89	3.84	3.42	5.59	5.93	6.10
<i>Fixed Income Custom Benchmark</i>				0.81	3.49	0.79	3.06	2.50	4.54
Core Fixed Income Composite	156,916,964	7.08	10.00	0.99	2.74	2.42	3.30	3.14	3.81
Aberdeen	16,442,537	0.74		2.59	9.20	10.68	6.41	5.94	5.88
<i>BBgBarc US Aggregate TR</i>				0.85	3.14	0.07	2.71	2.06	4.27
Internal Fixed - Core	98,112,713	4.42		0.73	1.25	0.21	2.15	2.16	--
<i>BBgBarc US Govt/Credit TR</i>				0.81	3.49	-0.01	2.83	2.10	4.34
Octagon Senior Debt	27,171,260	1.23		0.82	2.88	3.94	--	--	--
<i>BBgBarc US Aggregate TR</i>				0.85	3.14	0.07	2.71	2.06	4.27
Principal CMBS Fixed	15,190,454	0.68		1.25	4.16	3.68	3.84	--	--
<i>BBgBarc US CMBS ERISA Eligible TR</i>				0.79	2.99	-0.13	2.91	2.51	5.03
Long Duration Composite	143,025,837	6.45	5.00	0.77	5.90	-2.25	5.38	4.29	--
Internal Fixed - Long Duration	143,025,837	6.45		0.77	5.90	-2.25	5.38	4.29	6.97
<i>BBgBarc US Govt/Credit Long TR</i>				1.53	7.65	-0.79	5.45	3.94	7.37
Inflation Protection Securities Composite	36,176,719	1.63	5.00	0.98	2.43	0.73	2.23	0.41	--
Internal US TIPS	36,176,719	1.63		0.98	2.43	0.73	2.23	0.41	--
<i>BBgBarc US TIPS TR</i>				0.86	1.72	-0.73	1.62	0.02	3.90
Opportunistic Debt Composite	203,645,286	9.18	7.50	2.41	7.31	--	--	--	--
<i>BBgBarc US High Yield TR</i>				1.98	7.00	8.88	5.83	6.36	7.84
ABRY ASF	147,509	0.01		-4.10	4.09	7.84	11.31	21.65	--
Anchorage Capital II	1	0.00		-48.50	-50.25	-54.16	-16.53	-4.67	--
Anchorage Capital III	4,087,886	0.18		4.40	8.69	4.98	8.98	11.09	--
Anchorage Illiquid Opps V	11,090,977	0.50		1.95	4.43	8.02	--	--	--
Audax Mezzanine II	114,805	0.01		-4.28	-15.25	-9.94	-2.28	3.70	5.96
CVI Credit Value	4,777,804	0.22		2.49	8.57	12.28	12.71	21.52	--
CVI Credit Value Fund III	13,368,692	0.60		2.72	9.12	13.93	--	--	--
CVI Global Value	3,677,911	0.17		-0.42	1.73	2.48	2.66	9.36	8.02
GOLUB Capital	27,059,966	1.22		2.75	5.78	9.10	7.95	7.06	--
GSO Credit Alpha Fund	17,979,324	0.81		3.34	5.19	13.08	--	--	--
GSO Energy Select Opps	3,733,649	0.17		1.13	5.06	13.06	--	--	--
GSO I	417,720	0.02		1.15	-13.61	-14.58	-2.00	8.29	--
GSO II	5,243,340	0.24		0.29	6.04	11.72	8.25	12.73	--
GSO III	4,875,458	0.22		1.34	4.40	3.22	--	--	--
Internal Fixed - Nonrated	2,071,537	0.09		1.51	5.35	4.44	--	--	--

Fixed Income Custom Benchmark was BBgBarc US Universal TR preceding 01/01/2017. As of 01/01/2017 the benchmark is BBgBarc US Agg Govt/Credit.



MPERS

Total Fund Performance Detail

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
M&G III	3,832,716	0.17		5.42	14.39	10.68	-0.12	--	--
Northern Shipping II	9,554,648	0.43		1.83	4.87	2.72	7.64	--	--
Northern Shipping III	6,999,732	0.32		0.78	-0.67	4.04	--	--	--
Och-Ziff Struct Products II	3,183,110	0.14		5.15	9.71	35.75	14.75	16.24	--
OCP Asia	17,777,823	0.80		2.09	10.65	15.80	15.01	--	--
Octagon Opportunistic	37,928,561	1.71		1.55	8.23	14.64	--	--	--
Owl Rock	6,517,941	0.29		2.40	9.21	--	--	--	--
Riverstone Credit Partners	15,164,818	0.68		3.70	12.01	15.34	--	--	--
Siguler Guff Sec Opps	4,039,358	0.18		8.16	11.02	19.48	--	--	--
<i>BBgBarc US High Yield TR</i>				1.98	7.00	8.88	5.83	6.36	7.84
Real Assets Composite	226,446,195	10.21	7.50	1.08	6.66	11.73	0.25	6.35	--
<i>CPI + 4% (Unadjusted)</i>				1.75	5.28	6.31	5.26	5.35	5.76
American Infrastructure I MLP	18,011,566	0.81		0.79	8.85	10.64	7.48	2.02	--
American Infrastructure II MLP	9,202,949	0.41		6.91	0.07	-2.52	3.63	--	--
Apollo Aviation III	7,881,181	0.36		11.41	37.63	34.48	--	--	--
Blue Road	5,371,273	0.24		4.59	4.87	-4.65	--	--	--
EIF - US Power III	6,752,927	0.30		-4.37	-3.62	6.28	13.86	10.64	-3.49
EMG I	6,875,092	0.31		-5.04	-4.75	1.25	-14.97	3.77	11.54
EMG II	12,639,337	0.57		1.83	9.89	11.82	2.85	--	--
EMG III	19,296,096	0.87		0.31	15.51	3.06	-2.51	--	--
EMG IV	12,129,654	0.55		-2.06	13.69	28.95	--	--	--
Grey Rock Energy Fund II	6,516,010	0.29		3.62	1.25	-6.24	--	--	--
NGP IX	624,069	0.03		1.79	-1.96	-6.87	-20.86	-0.78	--
NGP X	5,790,685	0.26		1.29	2.01	16.44	-0.70	7.75	--
NGP XI	9,196,405	0.41		6.78	18.50	40.90	--	--	--
Orion II	5,179,414	0.23		1.87	--	--	--	--	--
Orion Mine Finance Fund I	12,704,704	0.57		6.32	29.97	44.35	14.57	--	--
Ridgewood Energy	8,599,453	0.39		-0.01	-0.52	10.93	4.23	--	--
Ridgewood III	1,106,743	0.05		4.07	-3.23	19.10	--	--	--
Sciens Marine Investments	3,391,120	0.15		12.96	49.89	49.98	-26.23	--	--
<i>CPI + 4% (Unadjusted)</i>				1.75	5.28	6.31	5.26	5.35	5.76

MPERS

Total Fund Performance Detail

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Timber Composite	75,177,517	3.39	--	-1.88	-5.64	3.31	-2.99	4.35	--
RMK - Timberland	394,735	0.02		-65.45	-76.81	-71.29	-37.37	-19.77	-10.78
MP Timber	36,281,656	1.64		-0.96	-1.74	6.04	--	--	--
MPATC	19,450,679	0.88		-0.50	--	--	--	--	--
MPCTT	10,412,001	0.47		-1.21	--	--	--	--	--
MPMCB	8,638,446	0.39		-0.12	--	--	--	--	--
MPERS - MP Battlefield	0	0.00		0.00	--	--	--	--	--
<i>NCREIF Timberland 1 Qtr Lag</i>				0.70	2.66	3.35	5.58	7.19	5.56
Real Estate Composite	243,378,253	10.97	10.00	3.53	8.31	8.28	10.40	12.99	4.85
<i>NFI-ODCE Eq Wtd Net Non Lag</i>				1.68	4.89	6.93	10.11	10.64	3.95
Core Real Estate Composite	133,585,609	6.02	--	1.83	6.92	8.05	11.47	14.32	4.60
<i>NCREIF Property Index</i>				1.70	5.08	6.90	9.83	10.35	6.23
Clarion Partners Lion Prop Fd	43,597,663	1.97		1.87	7.34	8.66	10.99	11.07	2.91
Principal CMBS	12,044,964	0.54		-8.00	-4.69	-3.33	5.93	17.62	--
Principal Enhanced Property	52,200,219	2.35		4.22	11.04	11.04	15.19	15.42	3.50
<i>NCREIF Property Index</i>				1.70	5.08	6.90	9.83	10.35	6.23
Principal U.S. Property Fund	25,657,509	1.16		2.07	6.09	8.74	11.02	11.35	4.26
<i>NCREIF ODCE</i>				1.87	5.44	7.66	10.84	11.59	5.03
Non-Core Real Estate Composite	93,990,707	4.24	--	6.99	11.32	10.35	9.40	11.33	3.09
AEW Partners V	58,285	0.00		-0.02	5.84	10.89	52.99	40.54	13.17
Apollo European III	1,551,451	0.07		-1.11	2.93	-3.16	-5.52	1.26	--
Apollo Real Estate	6,274,966	0.28		-0.46	3.20	1.18	12.07	11.88	0.13
Centersquare III	29,139,562	1.31		2.32	5.24	4.83	--	--	--
Clarion Part Lion Mexico Fund	1,489,853	0.07		-1.52	-25.83	-28.23	-21.26	-14.90	-8.67
Colony Capital VIII	830,000	0.04		-1.36	-11.37	-6.54	-10.85	1.34	-16.17
M&G II	5,860,628	0.26		6.24	16.92	13.71	2.85	--	--
Och Ziff RE Credit FD LP	1,361,803	0.06		-5.68	4.79	3.38	--	--	--
Och-Ziff	2,497,706	0.11		13.33	22.50	25.72	33.87	34.69	21.89
Och-Ziff RE III	3,619,690	0.16		5.68	17.31	19.36	-11.77	--	--
Torchlight Debt Opp II	8,618,247	0.39		-0.14	-3.35	-1.83	6.55	--	--
Torchlight Debt Opp III	2,932,827	0.13		3.55	6.76	12.52	21.87	--	--
Torchlight Debt Opps V	9,506,267	0.43		3.32	10.56	18.01	--	--	--

MPERS

Total Fund Performance Detail

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Tristan EPISO	5,012,893	0.23		21.14	11.57	9.36	16.09	9.95	--
Tristan EPISO 3	9,225,916	0.42		46.41	73.30	61.79	13.94	--	--
Tristan EPISO 4	5,964,706	0.27		1.83	9.95	3.13	--	--	--
Urdang Value Added Fund II	45,907	0.00		-16.16	-13.21	-13.70	-4.61	2.37	1.01
<i>NCREIF Property Index</i>				1.70	5.08	6.90	9.83	10.35	6.23
REITS Composite	15,801,937	0.71	--	2.12	5.55	-1.79	2.76	4.93	--
CBRE Investors	15,801,937	0.71		2.12	5.55	-1.79	2.76	4.93	--
<i>FTSE EPRA/NAREIT Developed</i>				1.61	6.53	0.57	5.87	6.73	1.79
Private Equity Composite	349,287,955	15.75	15.00	3.20	9.06	12.02	10.13	13.39	6.38
<i>MO Hwy Priv. Equ. Index - Lagged</i>				3.84	16.03	21.38	12.88	18.03	10.68
Abry Partners VI	258,095	0.01		30.02	26.11	47.23	41.29	35.26	--
Abry Partners VII	3,199,166	0.14		1.72	29.37	31.77	21.50	17.07	--
Capital Partners II	9,019,116	0.41		4.74	18.73	19.92	12.40	--	--
DC Capital Partners	665,617	0.03		-2.96	-18.03	-25.99	--	--	--
Grove Street - MP Ventures	98,268,102	4.43		2.03	-1.01	0.40	4.89	10.15	6.31
Grove Street - MP Ventures II	186,528,139	8.41		3.52	14.63	18.92	13.21	15.23	--
KPS IV	2,882,957	0.13		5.03	--	--	--	--	--
Longford II	1,212,326	0.05		-7.13	-19.42	--	--	--	--
Newquest Fund	988,692	0.04		-6.56	-42.44	-44.48	--	--	--
Opengate Capital Partners	2,625,998	0.12		1.46	-2.24	2.24	--	--	--
Ospraie	1	0.00		1.30	16.00	9.99	7.87	11.55	--
Pfingsten Fund V	2,173,759	0.10		3.96	-4.24	-3.94	--	--	--
Shore Capital Partners GP I LP	6,438,752	0.29		33.56	42.56	40.79	-17.48	--	--
Shoreline China Valu III	6,949,496	0.31		2.88	9.33	14.10	--	--	--
Turnbridge Capital Partners I	5,384,512	0.24		-5.44	-10.30	-13.64	--	--	--
Vectis H & L II	10,023,305	0.45		8.04	26.11	27.13	21.02	19.76	--
Aisling	3,145,834	0.14		-0.44	-3.91	10.87	--	--	--
Arrowroot Capital III	6,931,280	0.31		-1.20	--	--	--	--	--
Long Ridge II	2,592,808	0.12		-2.45	-11.46	-11.46	--	--	--

MPERS

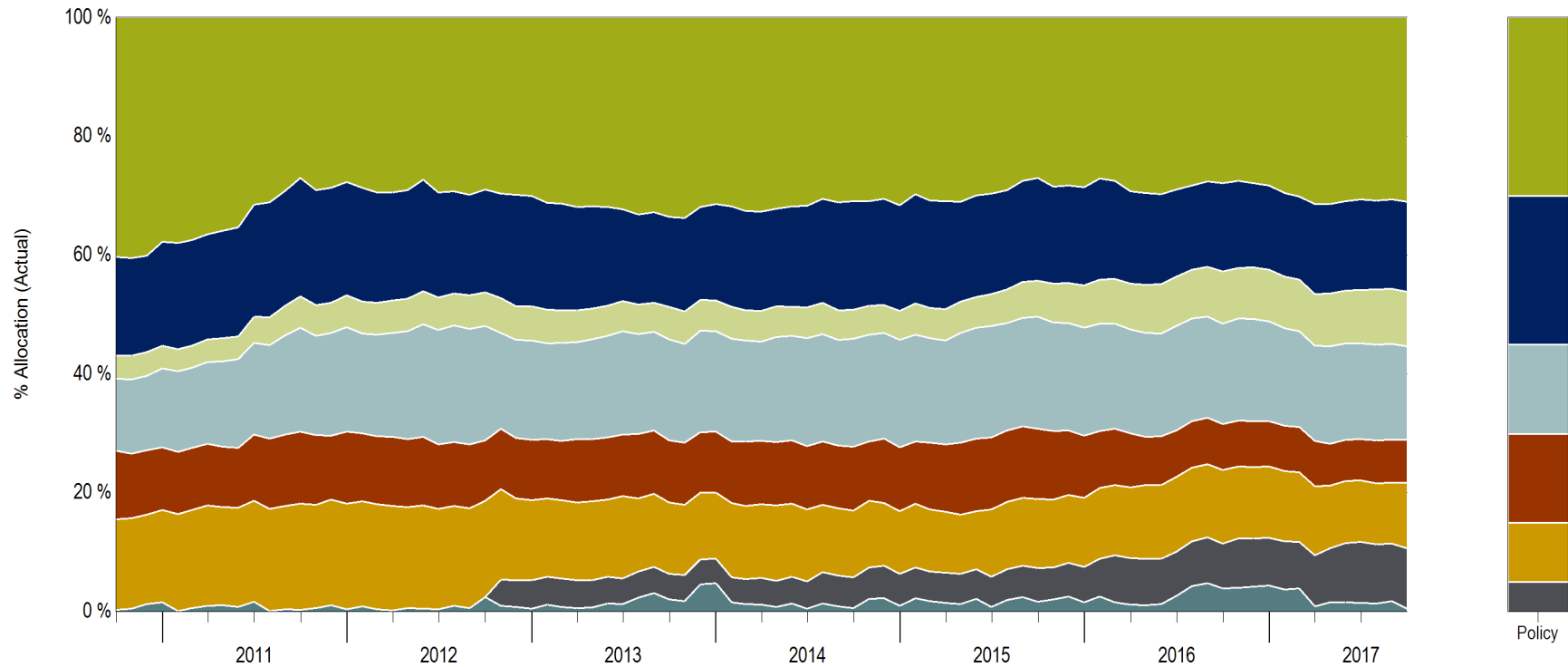
Total Fund Performance Detail

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Hedge Fund Composite	161,911,567	7.30	10.00	1.80	5.70	9.00	2.49	4.44	3.83
<i>HFRI Fund of Funds Composite Index</i>				2.31	5.60	6.51	2.24	3.85	1.07
Alpstone Capital	10,086,284	0.45		0.86	--	--	--	--	--
Alyeska Fund	15,511,417	0.70		1.92	3.01	6.04	--	--	--
BlueTrend	8,758,175	0.39		-0.35	-6.86	-10.74	-3.04	-3.57	--
Bridgewater Pure Alpha	17,836,794	0.80		0.37	-2.00	11.93	2.01	2.80	9.26
Cevian	14,864,154	0.67		0.06	10.97	17.21	7.80	9.29	--
Indus Pacific Opp. Fund	14,145,654	0.64		6.32	21.40	19.58	12.42	--	--
Koppenburg Commodity Fund	10,460,541	0.47		-0.38	-1.36	5.48	--	--	--
Luxor Capital	2,260,737	0.10		14.08	31.37	21.23	-8.52	-1.66	--
Metacapital	11,431,671	0.52		0.28	1.00	1.10	1.79	--	--
Millenium USA LP	19,462,099	0.88		2.75	6.74	7.55	--	--	--
Pentwater	12,001,766	0.54		4.19	17.21	19.69	--	--	--
PFM	601,696	0.03		0.00	1.64	-0.75	1.60	6.35	--
RK Tessera	11,747,917	0.53		3.39	5.84	10.75	4.69	--	--
Shepherd International Fund	359,547	0.02		0.78	0.56	-0.03	-3.39	-4.96	-3.67
Taconic Capital	2,868	0.00		0.00	-8.81	-7.19	-1.17	3.40	--
ValueAct	12,380,247	0.56		-0.56	7.84	14.51	4.50	11.74	--
<i>HFRI Fund of Funds Composite Index</i>				2.31	5.60	6.51	2.24	3.85	1.07
Cash Composite	9,433,524	0.43	0.00	0.19	0.46	0.51	0.25	0.19	0.48
<i>91 Day T-Bills</i>				0.26	0.62	0.72	0.32	0.21	0.36

Appendix

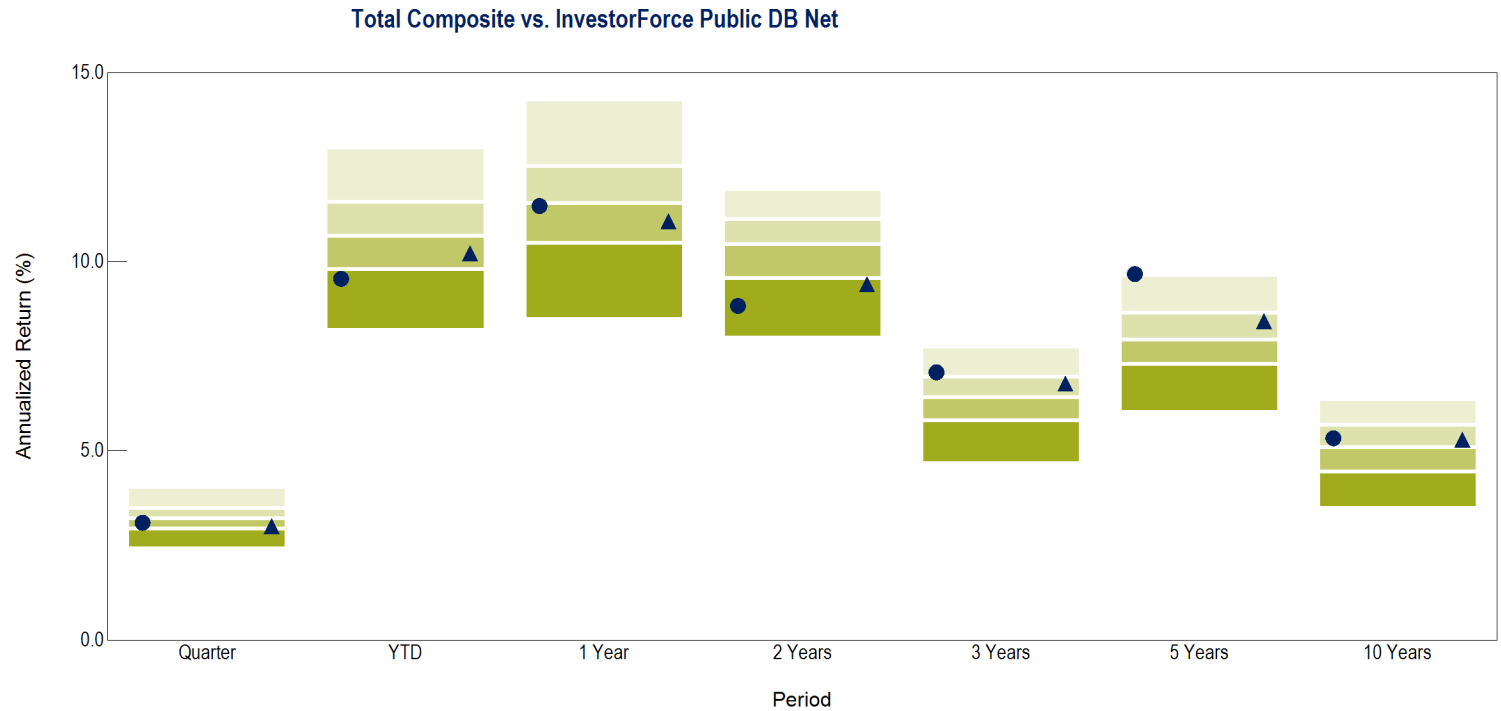
Total Fund Asset Allocation History

Asset Allocation History



- Equity - Global
- Opportunistic Fixed Income
- Hedge Funds
- Real Assets
- Cash
- Fixed Income
- Private Equity
- Real Estate

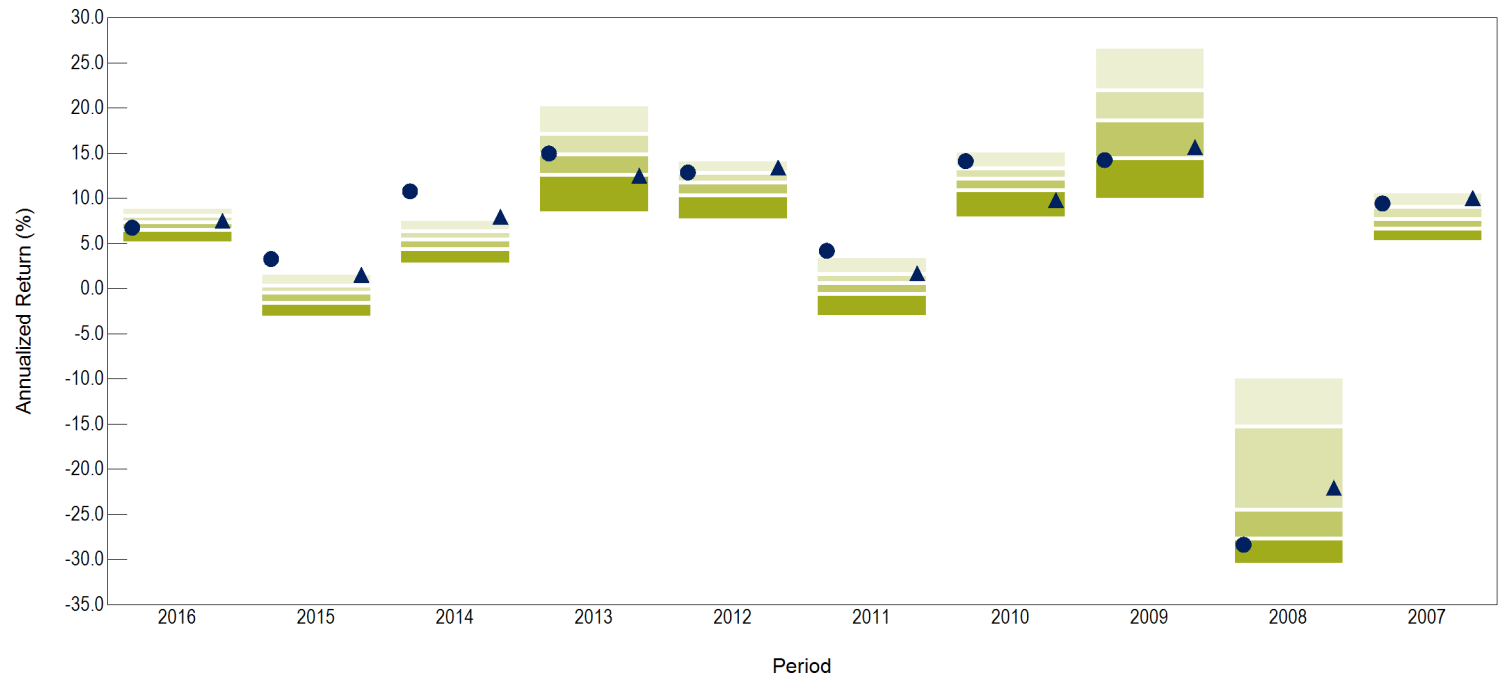
Total Fund Return Summary vs. Peer Universe



	Return (Rank)													
5th Percentile	4.0	13.0	14.3	11.9	7.7	9.6	6.4							
25th Percentile	3.5	11.6	12.5	11.1	7.0	8.7	5.7							
Median	3.2	10.7	11.6	10.5	6.4	8.0	5.1							
75th Percentile	3.0	9.8	10.5	9.6	5.8	7.3	4.5							
95th Percentile	2.4	8.2	8.5	8.0	4.7	6.0	3.5							
# of Portfolios	214	214	214	210	206	187	145							
● Total Composite	3.1	(64)	9.5	(82)	11.5	(52)	8.8	(92)	7.1	(22)	9.7	(5)	5.3	(43)
▲ Policy Index	3.0	(72)	10.2	(64)	11.1	(62)	9.4	(84)	6.8	(32)	8.4	(35)	5.3	(46)

Total Fund Return Summary vs. Peer Universe

Total Composite vs. InvestorForce Public DB Net



	Return (Rank)									
5th Percentile	9.0	1.7	7.7	20.4	14.3	3.6	15.3	26.8	-9.8	10.7
25th Percentile	8.1	0.4	6.4	17.2	12.9	1.6	13.4	22.0	-15.2	9.1
Median	7.4	-0.4	5.5	14.9	11.8	0.6	12.2	18.6	-24.4	7.8
75th Percentile	6.6	-1.5	4.4	12.7	10.4	-0.5	10.9	14.5	-27.6	6.7
95th Percentile	5.0	-3.2	2.7	8.4	7.6	-3.1	7.9	9.9	-30.5	5.2
# of Portfolios	269	262	210	191	159	137	131	128	125	122
● Total Composite	6.8 (70)	3.3 (1)	10.8 (1)	15.0 (49)	12.9 (26)	4.2 (3)	14.1 (14)	14.2 (77)	-28.4 (83)	9.4 (20)
▲ Policy Index	7.5 (47)	1.5 (7)	8.0 (4)	12.5 (76)	13.4 (15)	1.7 (24)	9.8 (88)	15.7 (68)	-22.1 (38)	10.0 (12)

Glossary of Investment Terminology—Risk Statistics

Alpha - Measures the relationship between the fund performance and the performance of another fund or benchmark index and equals the excess return while the other fund or benchmark index is zero.

Alpha Jensen - The average return on a portfolio over and above that predicted by the capital asset pricing model (CAPM), given the portfolio's beta and the average market return. Also known as the abnormal return or the risk adjusted excess return.

Annualized Excess Return over Benchmark - Annualized fund return minus the annualized benchmark return for the calculated return.

Annualized Return - A statistical technique whereby returns covering periods greater than one year are converted to cover a 12 month time span.

Beta - Measures the volatility or systematic risk and is equal to the change in the fund's performance in relation to the change in the assigned index's performance.

Information Ratio - A measure of the risk adjusted return of a financial security, asset, or portfolio.

Formula:
 $(\text{Annualized Return of Portfolio} - \text{Annualized Return of Benchmark}) / \text{Annualized Standard Deviation}(\text{Period Portfolio Return} - \text{Period Benchmark Return})$. To annualize standard deviation, multiply the deviation by the square root of the number of periods per year where monthly returns per year equals 12 and quarterly returns is four periods per year.

R-Squared – Represents the percentage of a fund's movements that can be explained by movements in an index. R-Squared values range from 0 to 100. An R-Squared of 100 denotes that all movements of a fund are completely explained by movements in the index.

Sharpe Ratio - A measure of the excess return or risk premium per unit of risk in an investment asset or trading strategy.

Sortino Ratio - A method to differentiate between good and bad volatility in the Sharpe Ratio. The differentiation of up and down volatility allows the calculation to provide a risk adjusted measure of a security or fund's performance without upward price change penalties.

Formula:
 $\text{Calculation Average } (X-Y) / \text{Downside Deviation } (X-Y) * 2$
Where X=Return Series X Y = Return Series Y which is the risk free return (91 day T-bills)

Standard Deviation - The standard deviation is a statistical term that describes the distribution of results. It is a commonly used measure of volatility of returns of a portfolio, asset class, or security. The higher the standard deviation the more volatile the returns are.

Formula:
 $(\text{Annualized Return of Portfolio} - \text{Annualized Return of Risk Free}) / \text{Annualized Standard Deviation (Portfolio Returns)}$

Tracking Error - Tracking error, also known as residual risk, is a measure of the degree to which a portfolio tracks its benchmark. It is also a measure of consistency of excess returns. Tracking error is computed as the annualized standard deviation of the difference between a portfolio's return and that of its benchmark.

Formula:
 $\text{Tracking Error} = \text{Standard Deviation } (X-Y) * \sqrt{(\# \text{ of periods per year})}$
Where X = periods portfolio return and Y = the period's benchmark return
For monthly returns, the periods per year = 12
For quarterly returns, the periods per year = 4

Treynor Ratio - A risk-adjusted measure of return based on systematic risk. Similar to the Sharpe ratio with the difference being the Treynor ratio uses beta as the measurement of volatility.

Formula:
 $(\text{Portfolio Average Return} - \text{Average Return of Risk-Free Rate}) / \text{Portfolio Beta}$

Up/Down Capture Ratio - A measure of what percentage of a market's returns is "captured" by a portfolio. For example, if the market declines 10% over some period, and the manager declines only 9%, then his or her capture ratio is 90%. In down markets, it is advantageous for a manager to have as low a capture ratio as possible. For up markets, the higher the capture ratio the better. Looking at capture ratios can provide insight into how a manager achieves excess returns. A value manager might typically have a lower capture ratio in both up and down markets, achieving excess returns by protecting on the downside, whereas a growth manager might fall more than the overall market in down markets, but achieve above-market returns in a rising market.

$\text{UpsideCapture} = \text{TotalReturn}(\text{FundReturns}) / \text{TotalReturns}(\text{BMReturn})$ when Period Benchmark Return is $> = 0$

$\text{DownsideCapture} = \text{TotalReturn}(\text{FundReturns}) / \text{TotalReturns}(\text{BMReturn})$ when Benchmark < 0

Data Source: InvestorForce

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Of Portfolios/Observations¹ – The total number of data points that make up a specified universe

Allocation Index³ - The allocation index measures the value added (or subtracted) to each portfolio by active management. It is calculated monthly: The portfolio asset allocation to each category from the prior month-end is multiplied by a specified market index.

Asset Allocation Effect² - Measures an investment manager's ability to effectively allocate their portfolio's assets to various sectors. The allocation effect determines whether the overweighting or underweighting of sectors relative to a benchmark contributes positively or negatively to the overall portfolio return. Positive allocation occurs when the portfolio is over weighted in a sector that outperforms the benchmark and underweighted in a sector that underperforms the benchmark. Negative allocation occurs when the portfolio is over weighted in a sector that underperforms the benchmark and under weighted in a sector that outperforms the benchmark.

Agency Bonds (Agencies)³ - The full faith and credit of the United States government is normally not pledged to payment of principal and interest on the majority of government agencies issuing these bonds, with maturities of up to ten years. Their yields, therefore, are normally higher than government and their marketability is good, thereby qualifying them as a low risk-high liquidity type of investment. They are eligible as security for advances to the member banks by the Federal Reserve, which attests to their standing.

Asset Backed Securities (ABS)³ - Bonds which are similar to mortgage-backed securities but are collateralized by assets other than mortgages; commonly backed by credit card receivables, auto loans, or other types of consumer financing.

Attribution³ - Attribution is an analytical technique that allows us to evaluate the performance of the portfolio relative to the benchmark. A proper attribution tells us where value was added or subtracted as a result of the manager's decisions.

Average Effective Maturity⁴ - For a single bond, it is a measure of maturity that takes into account the possibility that a bond might be called back to the issuer.

For a portfolio of bonds, average effective maturity is the weighted average of the maturities of the underlying bonds. The measure is computed by weighing each bond's maturity by its market value with respect to the portfolio and the likelihood of any of the bonds being called. In a pool of mortgages, this would also account for the likelihood of prepayments on the mortgages.

Batting Average¹ - A measurement representing an investment manager's ability to meet or beat an index.

Formula: Divide the number of days (or months, quarters, etc.) in which the manager beats or matches the index by the total number of days (or months, quarters, etc.) in the period of question and multiply that factor by 100.

Brinson Fachler (BF) Attribution¹ - The BF methodology is a highly accepted industry standard for calculating the allocation, selection, and interaction effects within a portfolio that collectively explains a portfolio's underlying performance. The main advantage of the BF methodology is that rather than using the overall return of the benchmark, it goes a level deeper than BHB and measures whether the benchmark sector, country, etc. outperformed/or underperformed the overall benchmark.

Brinson Hood Beebower (BHB) Attribution¹ - The BHB methodology shows that excess return must be equal to the sum of all other factors (i.e., allocation effect, selection effect, interaction effect, etc.). The advantage to using the BHB methodology is that it is a highly accepted industry standard for calculating the allocation, selection, and interaction effects within a portfolio that collectively explains a portfolio's underlying performance.

Corporate Bond (Corp)⁴ - A debt security issued by a corporation and sold to investors. The backing for the bond is usually the payment ability of the company, which is typically money to be earned from future operations. In some cases, the company's physical assets may be used as collateral for bonds.

Correlation¹ - A range of statistical relationships between two or more random variables or observed data values. A correlation is a single number that describes the degree of relationship between variables.

Data Source: ¹InvestorForce, ²Interaction Effect Performance Attribution, ³NEPC, LLC, ⁴Investopedia, ⁵Hedgeco.net

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Coupon⁴ – The interest rate stated on a bond when it is issued. The coupon is typically paid semiannually. This is also referred to as the "coupon rate" or "coupon percent rate."

Currency Effect¹ - Is the effect that changes in currency exchange rates over time affect excess performance.

Derivative Instrument³ - A financial obligation that derives its precise value from the value of one or more other instruments (or assets) at the same point of time. For example, the relationship between the value of an S&P 500 futures contract (the derivative instrument in this case) is determined by the value of the S&P 500 Index and the value of a U.S. Treasury bill that matures at the expiration of the futures contract.

Downside Deviation¹ - Equals the standard deviation of negative return or the measure of downside risk focusing on the standard deviation of negative returns.

Formula:

Annualized Standard Deviation (Fund Return - Average Fund Return) where average fund return is greater than individual fund returns, monthly or quarterly.

Duration³ - Duration is a measure of interest rate risk. The greater the duration of a bond, or a portfolio of bonds, the greater its price volatility will be in response to a change in interest rates. A bond's duration is inversely related to interest rates and directly related to time to maturity.

Equity/Debt/Cash Ratio¹ – The percentage of an investment or portfolio that is in Equity, Debt, and/or Cash (i.e. A 7/89/4 ratio represents an investment that is made up of 7% Equity, 89% Debt, and 4% Cash).

Foreign Bond³ - A bond that is issued in a domestic market by a foreign entity, in the domestic market's currency. A foreign bond is most often issued by a foreign firm to raise capital in a domestic market that would be most interested in purchasing the firm's debt. For foreign firms doing a large amount of business in the domestic market, issuing foreign bonds is a common practice.

Hard Hurdle⁵ – is a hurdle rate that once beaten allows a fund manager to charge a performance fee on only the funds above the specified hurdle rate.

High-Water Mark⁴ - The highest peak in value that an investment fund/account has reached. This term is often used in the context of fund manager compensation, which is performance based. Some performance-based fees only get paid when fund performance exceeds the high-water mark. The high-water mark ensures that the manager does not get paid large sums for poor performance.

Hurdle Rate⁴ - The minimum rate of return on an investment required, in order for a manager to collect incentive fees from the investor, which is usually tied to a benchmark.

Interaction Effects² - The interaction effect measures the combined impact of an investment manager's selection and allocation decisions within a sector. For example, if an investment manager had superior selection and over weighted that particular sector, the interaction effect is positive. If an investment manager had superior selection, but underweighted that sector, the interaction effect is negative. In this case, the investment manager did not take advantage of the superior selection by allocating more assets to that sector. Since many investment managers consider the interaction effect to be part of the selection or the allocation, it is often combined with the either effect.

Median³ - The value (rate of return, market sensitivity, etc.) that exceeds one-half of the values in the population and that is exceeded by one-half of the values. The median has a percentile rank of 50.

Modified Duration³ - The percentage change in the price of a fixed income security that results from a change in yield.

Mortgage Backed Securities (MBS)³ - Bonds which are a general obligation of the issuing institution but are also collateralized by a pool of mortgages.

Municipal Bond (Muni)⁴ - A debt security issued by a state, municipality or county to finance its capital expenditures.

Net Investment Change¹ – Is the change in an investment after accounting for all Net Cash Flows.

Performance Fee⁴ - A payment made to a fund manager for generating positive returns. The performance fee is generally calculated as a percentage of investment profits, often both realized and unrealized.

Data Source: ¹InvestorForce, ²Interaction Effect Performance Attribution, ³NEPC, LLC, ⁴Investopedia, ⁵Hedgeco.net

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Policy Index³ - A custom benchmark designed to indicate the returns that a passive investor would earn by consistently following the asset allocation targets set forth in this investment policy statement.

Price to Book (P/B)⁴ - A ratio used to compare a stock's market value to its book value. It is calculated by dividing the current closing price of the stock by the latest quarter's book value per share, also known as the "price-equity ratio".

Price to Earnings (P/E)³ - The weighted equity P/E is based on current price and trailing 12 months earnings per share (EPS).

Price to Sales (P/S)⁴ - A ratio for valuing a stock relative to its own past performance, other companies, or the market itself. Price to sales is calculated by dividing a stock's current price by its revenue per share for the trailing 12 months.

Return on Equity (ROE)⁴ - The amount of net income returned as a percentage of shareholders equity. Return on equity measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested.

Selection (or Manager) Effect² - Measures the investment manager's ability to select securities within a given sector relative to a benchmark. The over or underperformance of the portfolio is weighted by the benchmark weight, therefore, selection is not affected by the manager's allocation to the sector. The weight of the sector in the portfolio determines the size of the effect—the larger the sector, the larger the effect is, positive or negative.

Soft Hurdle rate⁵ – is a hurdle rate that once beaten allows a fund manager to charge a performance fee based on the entire annualized return.

Tiered Fee¹ – A fee structure that is paid to fund managers based on the size of the investment (i.e. 1.00% fee on the first \$10M invested, 0.90% on the next \$10M, and 0.80% on the remaining balance).

Total Effects² - The active management (total) effect is the sum of the selection, allocation, and interaction effects. It is also the difference between the total portfolio return and the total benchmark return. You can use the active management effect to determine the amount the investment manager has added to a portfolio's return.

Total Return¹ - The actual rate of return of an investment over a specified time period. Total return includes interest, capital gains, dividends, and distributions realized over a defined time period.

Universe³ - The list of all assets eligible for inclusion in a portfolio.

Upside Deviation¹ – Standard Deviation of Positive Returns

Weighted Avg. Market Cap.⁴ - A stock market index weighted by the market capitalization of each stock in the index. In such a weighting scheme, larger companies account for a greater portion of the index. Most indexes are constructed in this manner, with the best example being the S&P 500.

Yield (%)³ - The current yield of a security is the current indicated annual dividend rate divided by current price.

Yield to Maturity³ -The discount rate that equates the present value of cash flows, both principal and interest, to market price.

Data Source: ¹InvestorForce, ²Interaction Effect Performance Attribution, ³NEPC, LLC, ⁴Investopedia, ⁵Hedgeco.net

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