

NORTH CAROLINA
DEPARTMENT OF STATE TREASURER



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DALE R. FOLWELL, CPA

INVESTMENT MANAGEMENT DIVISION

Performance Review

November 15, 2018

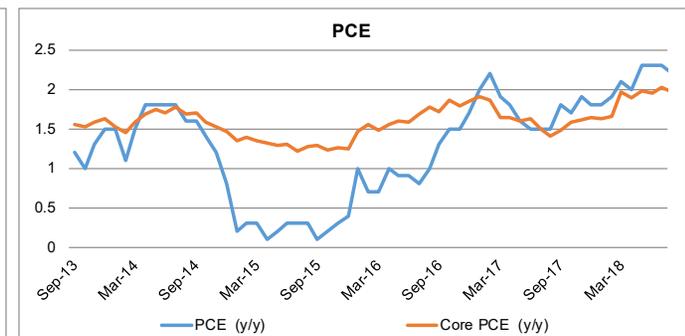
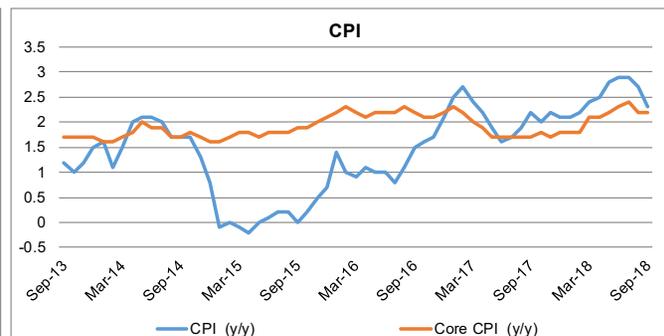
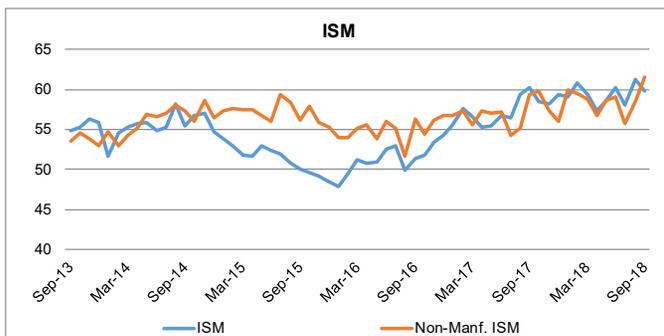
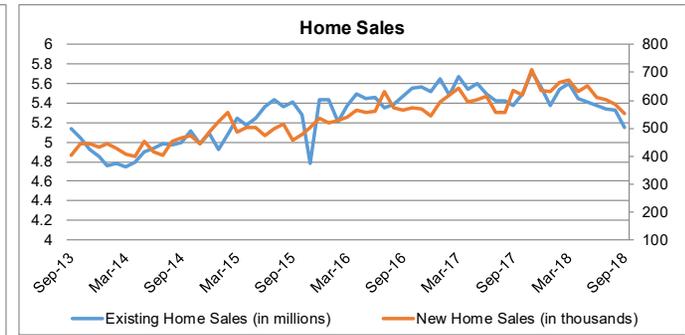
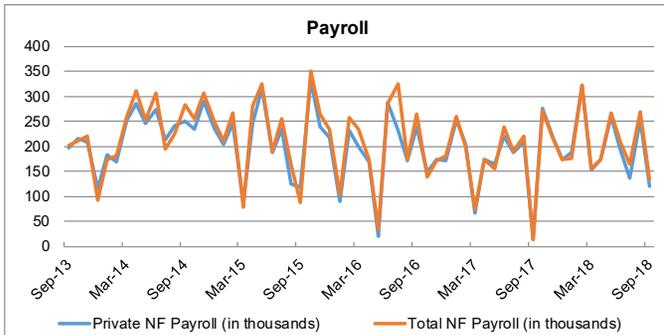
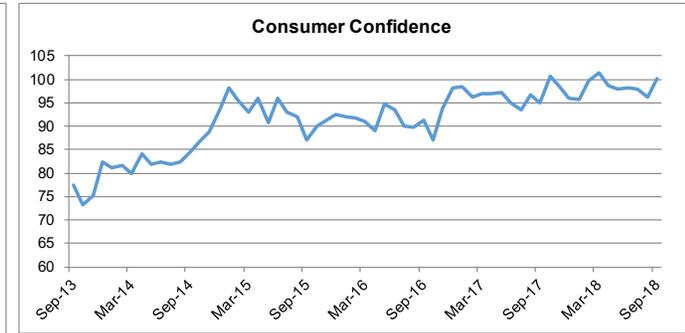
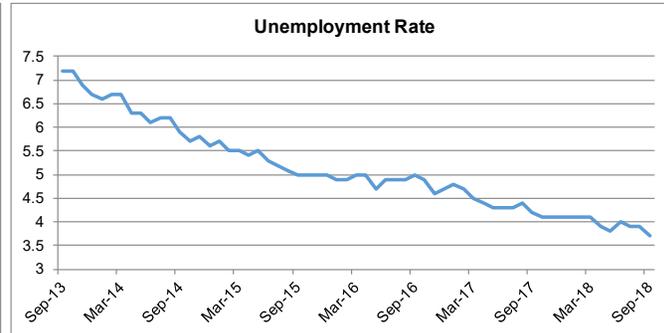
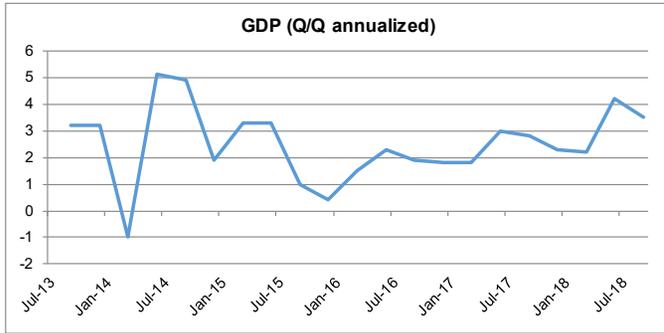


Cost-Efficiencies Initiative Update

- Goal:
 - Obtain \$100 million of incremental cost-efficiencies for the NCRS investment program, consistent with fiduciary requirements and investment objectives
 - The \$100 million goal would be measured on a cumulative basis over a four-year timeframe
 - The goal is comprehensive of the Pension and Supplemental Retirement Plans
- Progress to date:

<u>Fully Executed Activities</u>	<u>Approx. Annual Savings (\$000)</u>
Investment-related services renegotiations / restructuring	\$8,575
Investment manager terminations / renegotiations	\$81,939
Sub-Total	\$90,514
<u>In Process</u>	
Investment manager & services renegotiations / restructuring	\$4,033
Grand Total	\$94,548

US Economic Environment





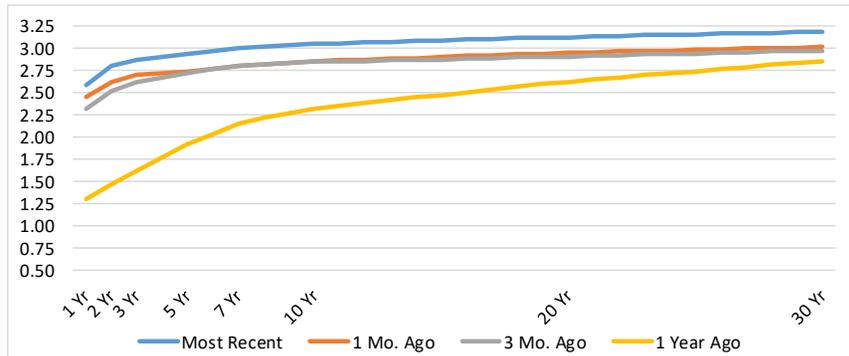
Global Economic Environment

Countries	Real GDP YoY		Unemployment		CPI YoY		Countries	Real GDP YoY		Unemployment		CPI YoY	
	Date	Value	Date	Value	Date	Value		Date	Value	Date	Value	Date	Value
U.S.	09/18	3.0	09/18	3.7	09/18	2.3	Asia/Pacific/Latam						
Europe							China	09/18	6.5			09/18	2.5
Germany	06/18	2.0	09/18	5.1	09/18	2.3	India	06/18	8.2			08/18	5.6
France	06/18	1.7	08/18	9.3	09/18	2.2	Japan	06/18	1.3	08/18	2.4	09/18	1.2
U.K.	06/18	1.2	08/18	4.0	09/18	2.4	Indonesia	06/18	5.3			09/18	2.9
Italy	06/18	1.2	08/18	9.7	09/18	1.4	Brazil	06/18	1.0			09/18	4.5
Spain	06/18	2.5	08/18	15.2	09/18	2.3	Australia	06/18	3.4	09/18	5.0	06/18	2.1

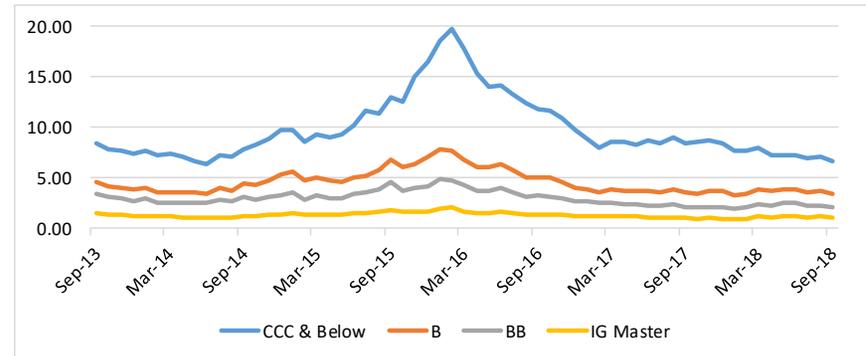


Market Environment

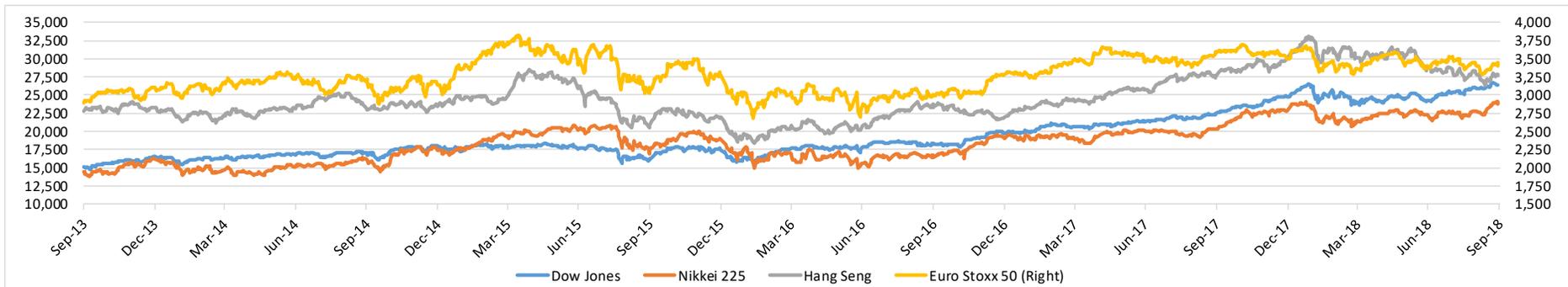
UST (Constant Maturity) Curve



Corporate Credit OAS (BofAML Indices)



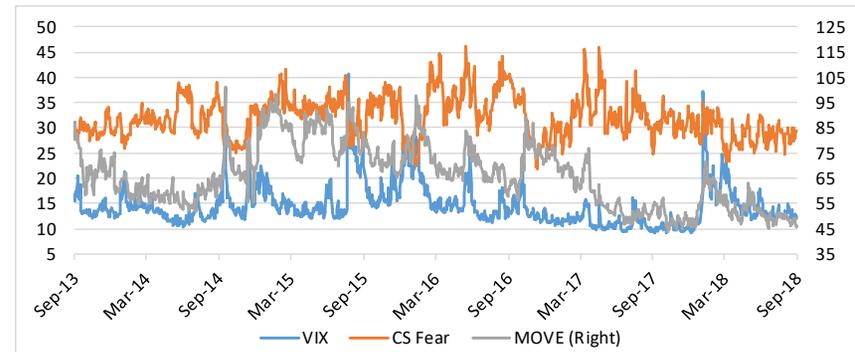
Global Equity Markets



US Dollar Trade Weighted Broad Index



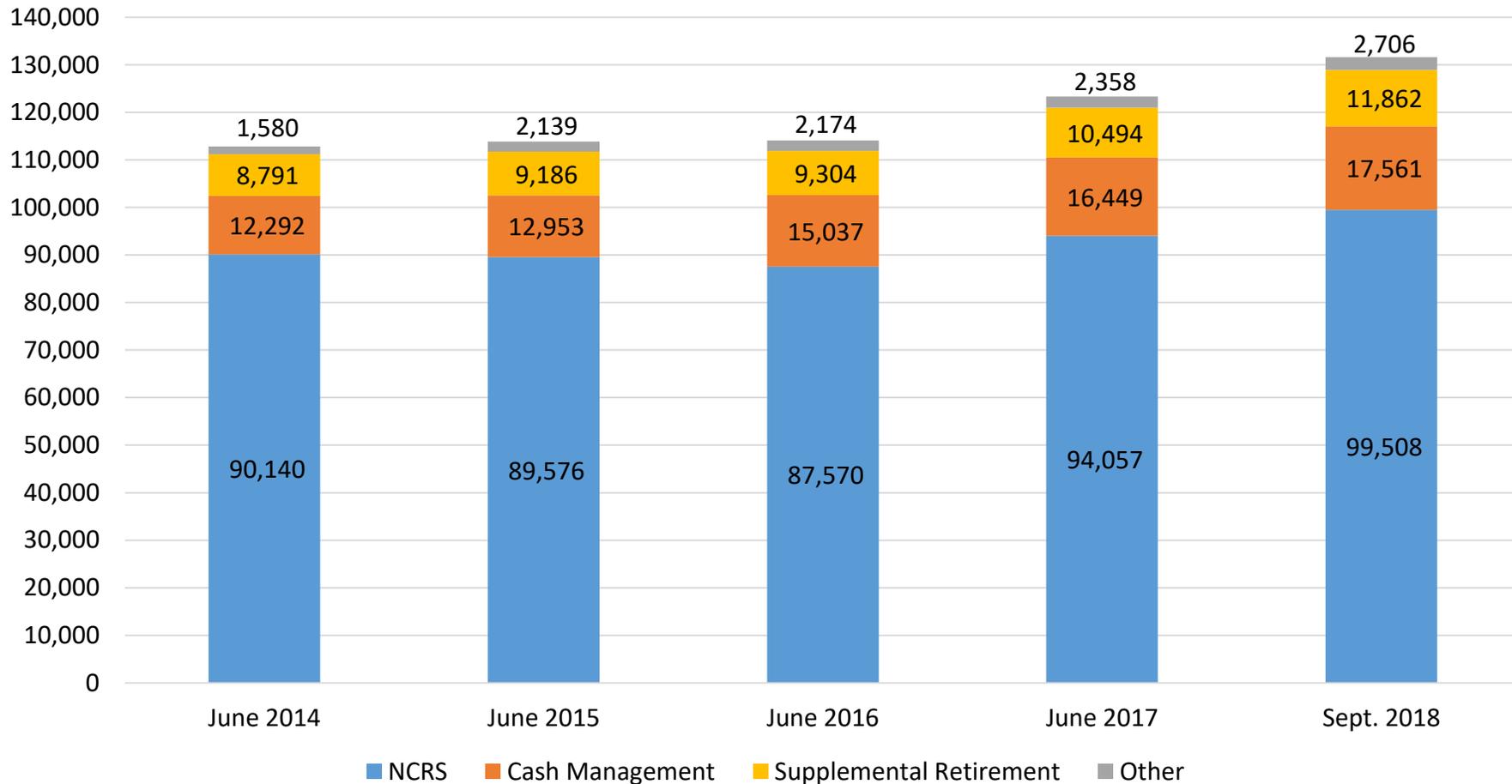
Volatility Indicators



Source: Federal Reserve Bank of St. Louis; Bloomberg (data as of 10/26/18)

Assets Under Management (\$MM)

\$131.3 billion as of September 30, 2018



Note: The Cash Management Program does not include Assets with Fiscal Agent, which are reflected in the Bond Proceeds Fund. These funds, which may have been reported in the Cash Management Program previously, have now been removed for all years shown in this report to more accurately reflect the Cash Management Program balance.



NCRS Asset Allocation

As of September 30, 2018

	Market Value (\$MM)	%	Target	Range		Relative %	Relative \$ (\$MM)
				Minimum	Maximum		
Growth	\$53,663	53.93%	58.00%	37.00%	71.00%	-4.07%	(\$4,052)
Public Equity	39,336	39.53%	42.00%	37.00%	47.00%	-2.47%	(2,457)
Private Equity	5,294	5.32%	6.00%	0.00%	8.75%	-0.68%	(677)
Non Core Real Estate	3,218	3.23%	3.00%	0.00%	8.00%	0.23%	232
Opportunistic Fixed Income	5,815	5.84%	7.00%	0.00%	7.50%	-1.16%	(1,150)
Rates & Liquidity	32,118	32.28%	29.00%	24.00%	42.00%	3.28%	3,261
IG Fixed Income & Cash	27,606	27.74%	28.00%	24.00%	32.00%	-0.26%	(256)
Pension Cash	4,512	4.53%	1.00%	0.00%	10.00%	3.53%	3,517
Inflation Sensitive & Diversifiers	11,710	11.77%	11.00%	4.00%	16.00%	0.77%	764
Inflation Sensitive	6,340	6.37%	6.00%	2.00%	7.50%	0.37%	369
Core Real Estate	5,370	5.40%	5.00%	2.00%	10.00%	0.40%	395
Multi-Strategy	2,017	2.03%	2.00%	0.00%	4.00%	0.03%	27
Grand Total	\$99,508	100.00%					



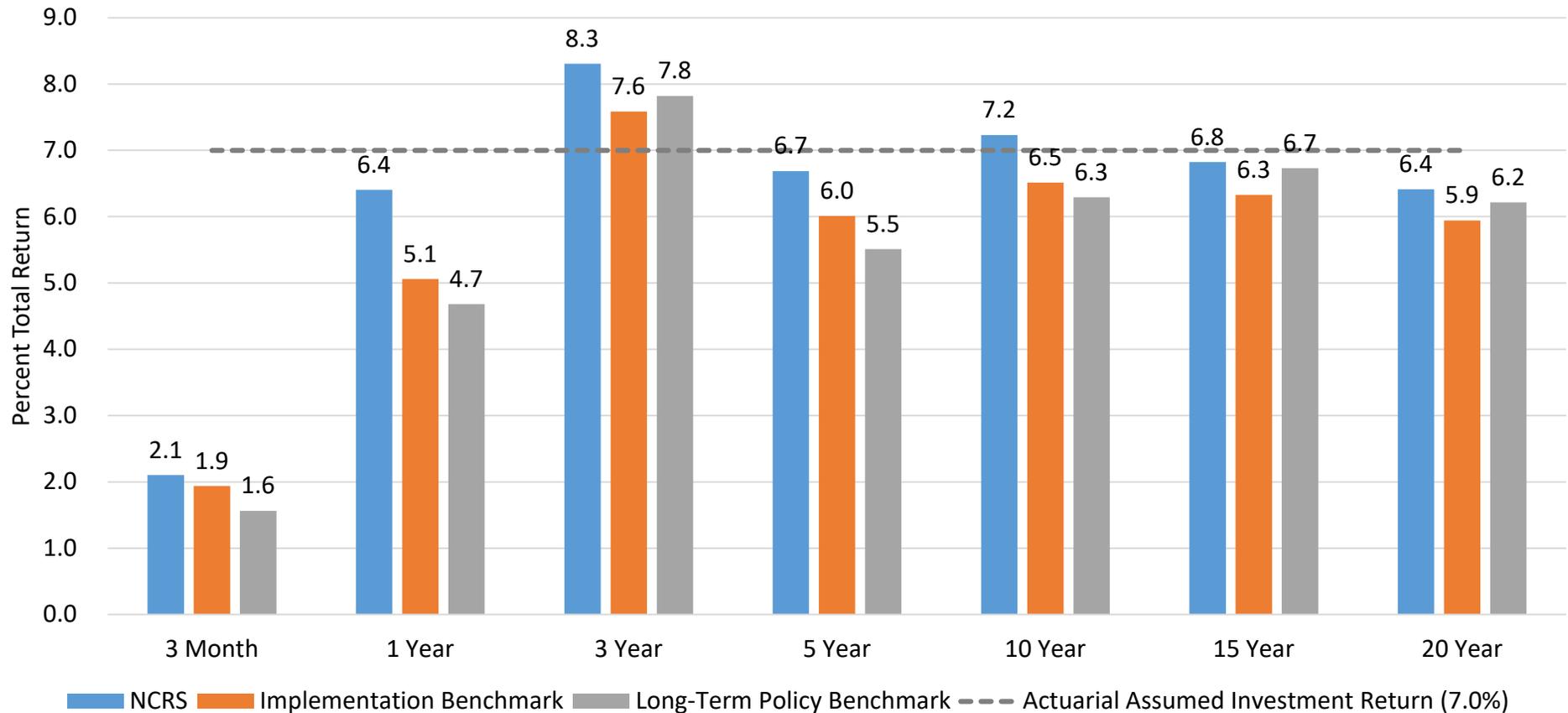
NCRS Asset Allocation (Unaudited)

As of October 23, 2018

	Market Value (\$MM)	%	Target	Range		Relative %	Relative \$ (\$000)
				Minimum	Maximum		
Growth	\$50,856	52.83%	58.00%	37.00%	71.00%	-5.17%	(\$4,977)
Public Equity	36,543	37.96%	42.00%	37.00%	47.00%	-4.04%	(3,888)
Private Equity	5,348	5.56%	6.00%	0.00%	8.75%	-0.44%	(427)
Non Core Real Estate	3,226	3.35%	3.00%	0.00%	8.00%	0.35%	338
Opportunistic Fixed Income	5,739	5.96%	7.00%	0.00%	7.50%	-1.04%	(1,000)
Rates & Liquidity	31,715	32.95%	29.00%	24.00%	42.00%	3.95%	3,799
IG Fixed Income & Cash	27,346	28.41%	28.00%	24.00%	32.00%	0.41%	393
Pension Cash	4,369	4.54%	1.00%	0.00%	10.00%	3.54%	3,406
Inflation Sensitive & Diversifiers	11,675	12.13%	11.00%	4.00%	16.00%	1.13%	1,086
Inflation Sensitive	6,371	6.62%	6.00%	2.00%	7.50%	0.62%	596
Core Real Estate	5,304	5.51%	5.00%	2.00%	10.00%	0.51%	490
Multi-Strategy	2,017	2.10%	2.00%	0.00%	4.00%	0.10%	92
Grand Total	\$96,263	100.00%					

NCRS Total Net Portfolio Return vs. Benchmarks

As of September 30, 2018



Notes:

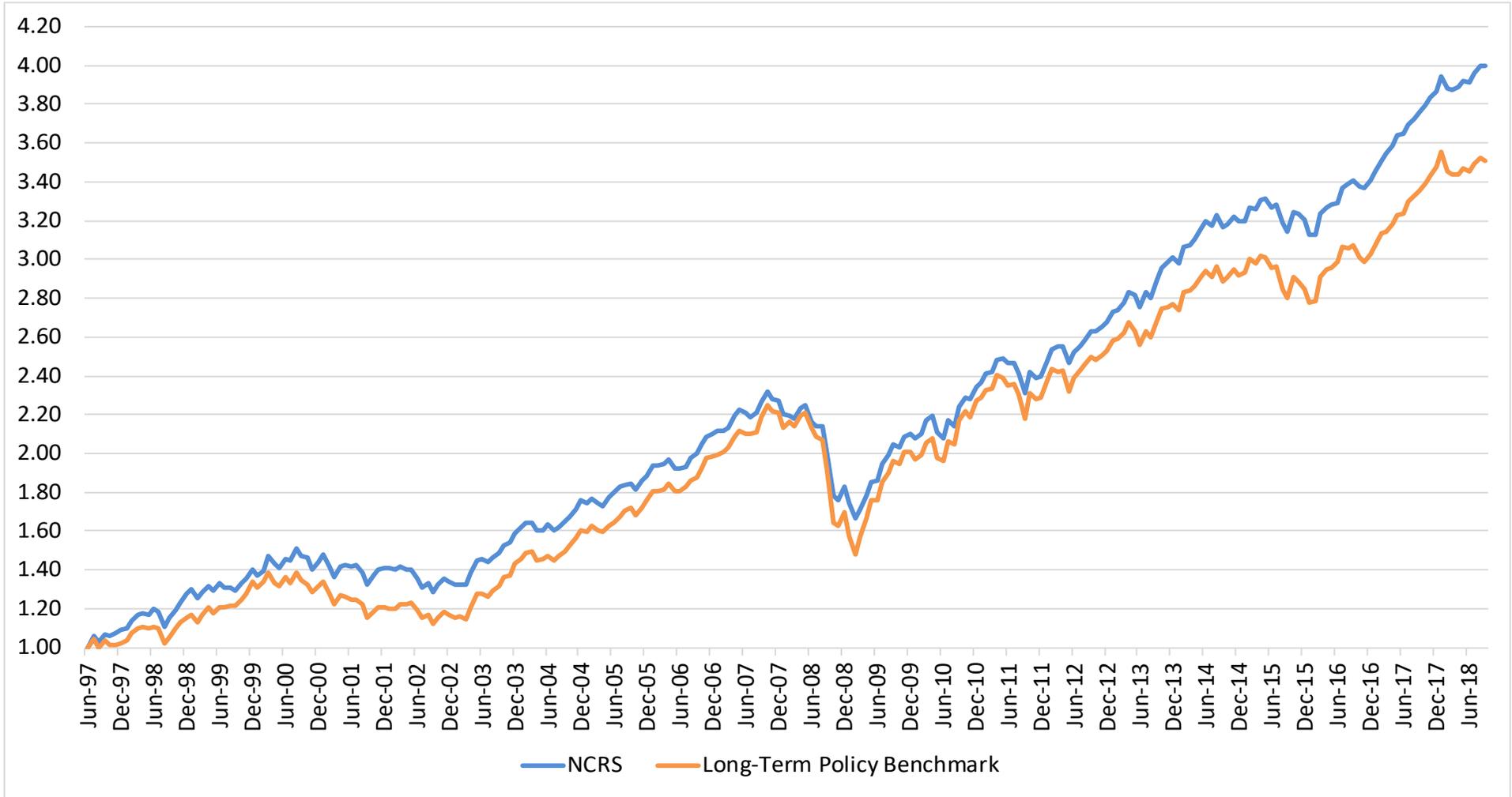
Returns for periods greater than one year are annualized.

Implementation Benchmark is a blend of the Asset Class Benchmarks at policy weights. It is currently weighted as follows: 58% Growth Benchmark; 29% Rates & Liquidity Benchmark; 11% Inflation Sensitive & Diversifiers Benchmark; and 2% Multi-Strategy Benchmark.

Long-Term Policy Benchmark is comprised of 57% MSCI ACWI IMI Net; 33% BOAML 5+ Years US Treasury Index; 6% Bloomberg Commodity Index; and 4% BOAML 1-3 Years US Inflation-Linked Treasury Index.



Growth of a Dollar Through September 30, 2018



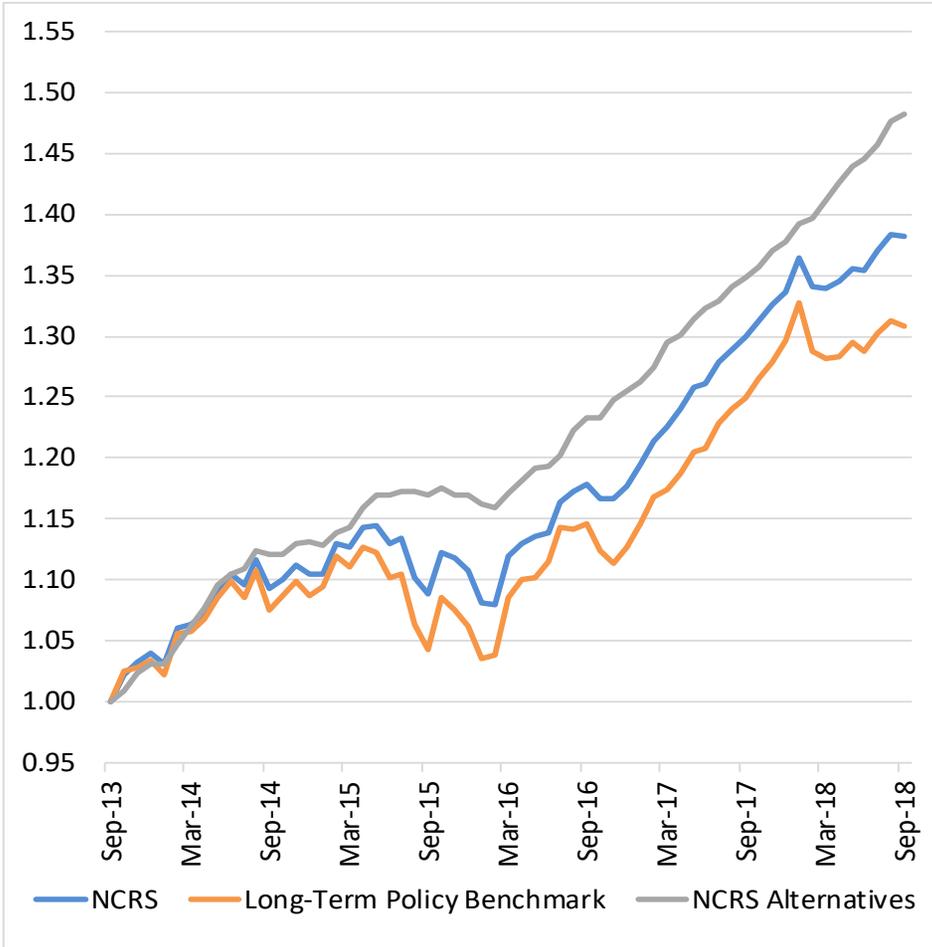
Notes:

Long-Term Policy Benchmark is comprised of 57% MSCI ACWI IMI Net; 33% BOAML 5+ Years US Treasury Index; 6% Bloomberg Commodity Index; and 4% BOAML 1-3 Years US Inflation-Linked Treasury Index.

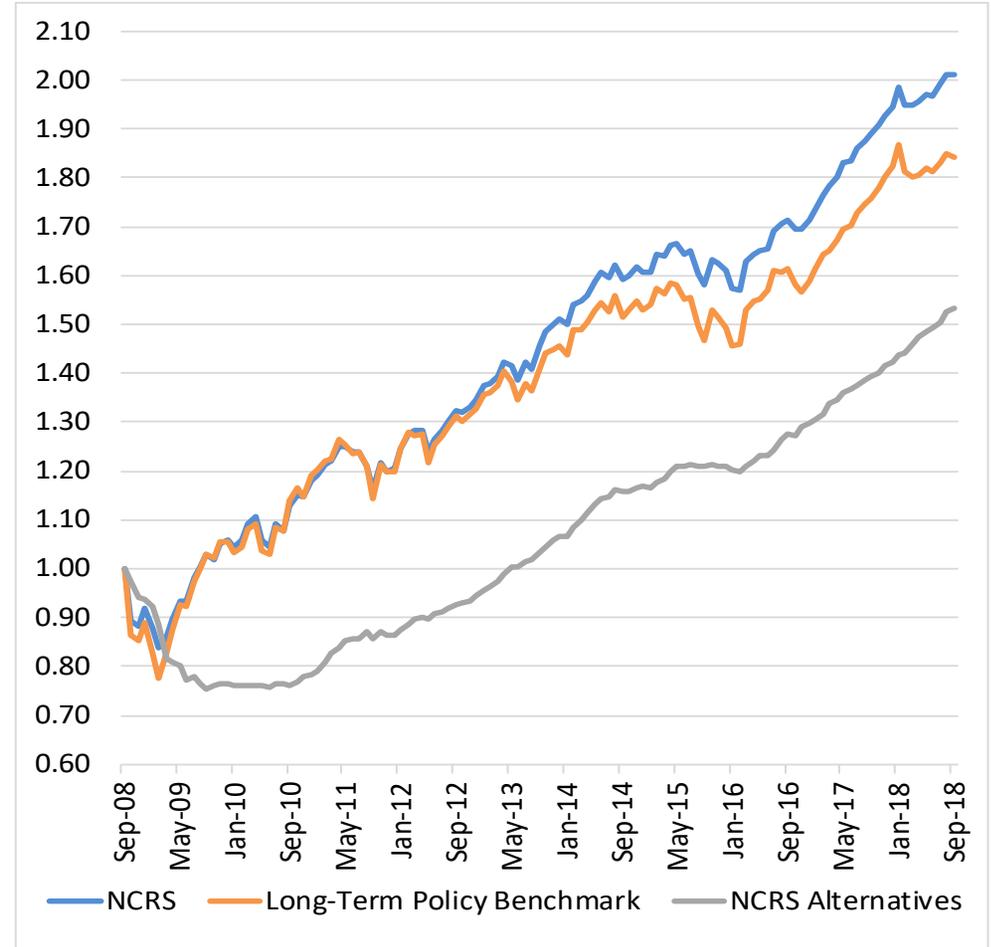


Growth of a Dollar

5 Years Ending Sept. 30, 2018



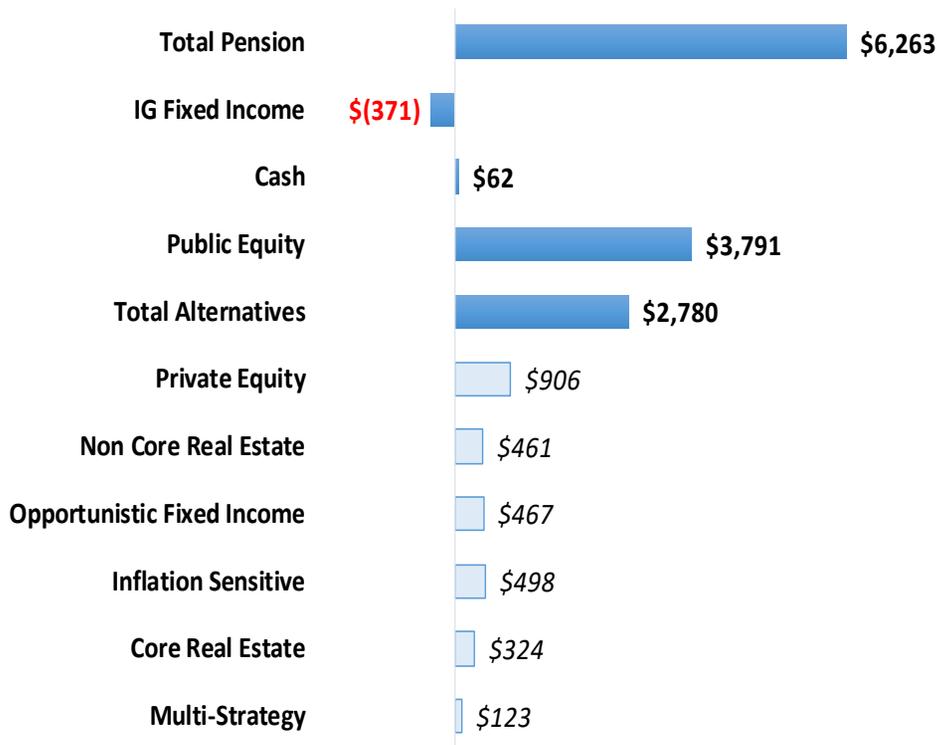
10 Years Ending Sept. 30, 2018



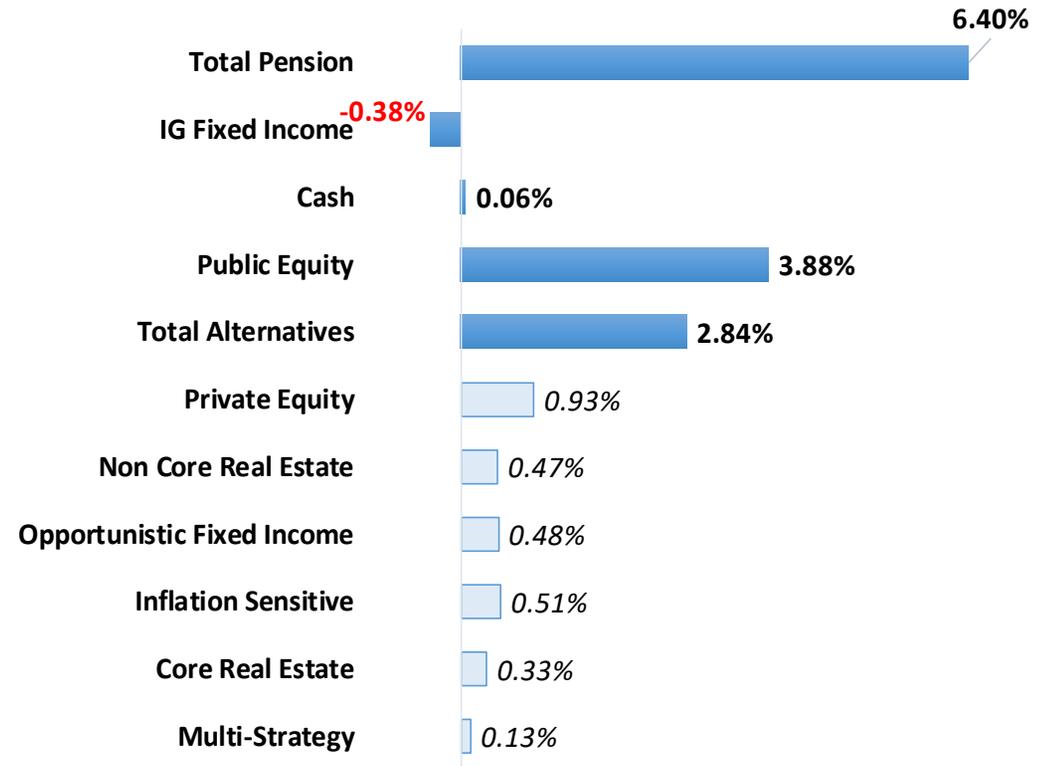
Note: NCRS Alternatives includes the following: Core Real Estate; Inflation Sensitive – Private Natural Resources; Inflation Sensitive – Real Assets and Other Diversifiers; Multi-Strategy Investments; Non Core Real Estate; Opportunistic Fixed Income; Private Equity; Equity Hedge Strategies; and closed-end Public Natural Resource funds.

Estimated Contribution to Total Plan Return – 1 Year As of September 30, 2018

Contribution to Total Plan \$ Earnings (millions)



Contribution to Total Plan % Returns



Notes:

1.) Estimated Contributions are based on average market value and the total return for the period.

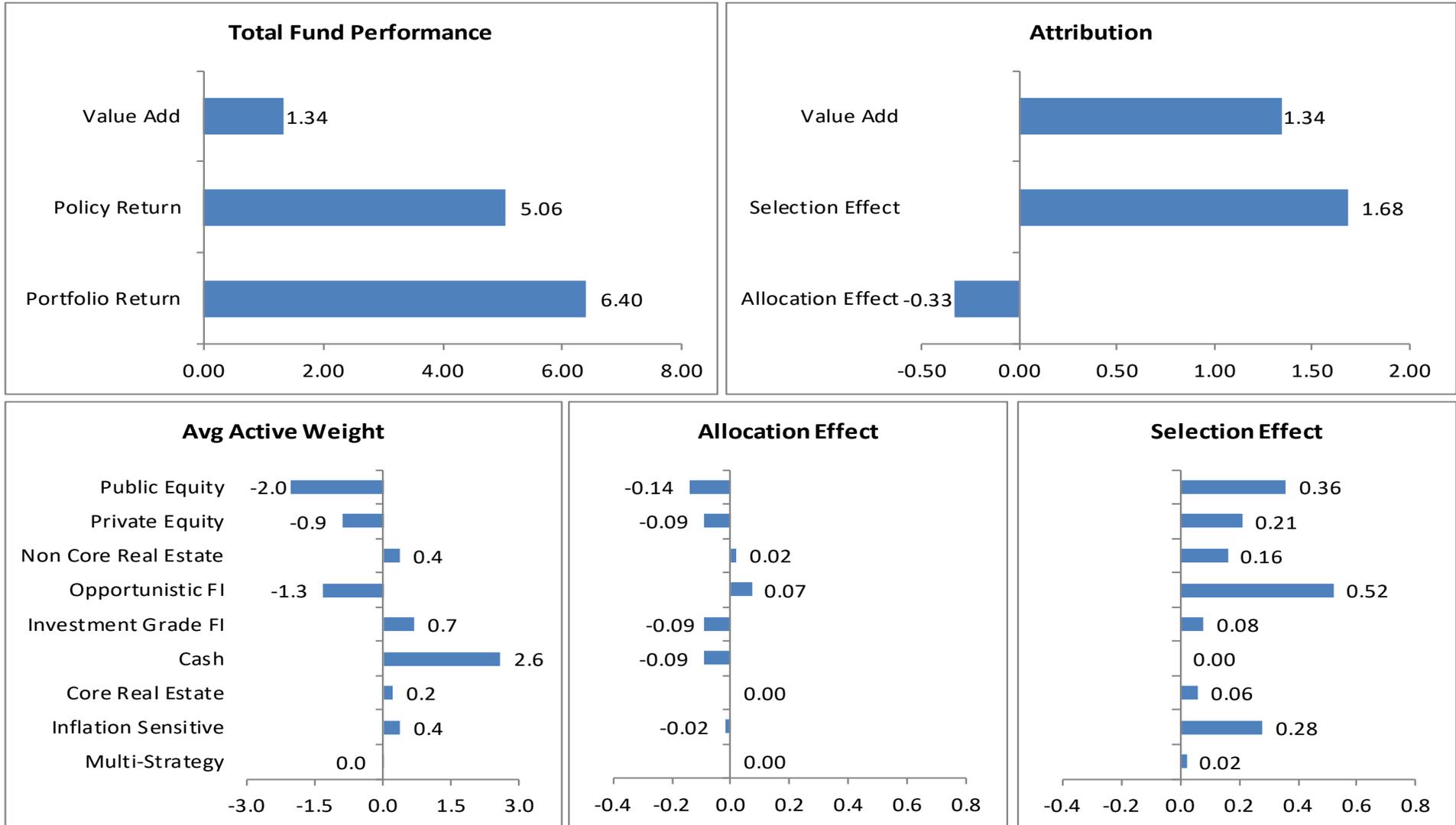
Contribution to Total Plan \$ Earnings = Average \$ Market Value * % Total Return for each asset class

Contribution to Total Plan % Returns = Average Market Value % weight * % Total Return for each asset class

2.) Alternatives for this analysis include the following: Private Equity, Non Core Real Estate, Opportunistic Fixed Income, Inflation Sensitive, Core Real Estate, and Multi-Strategy investments.

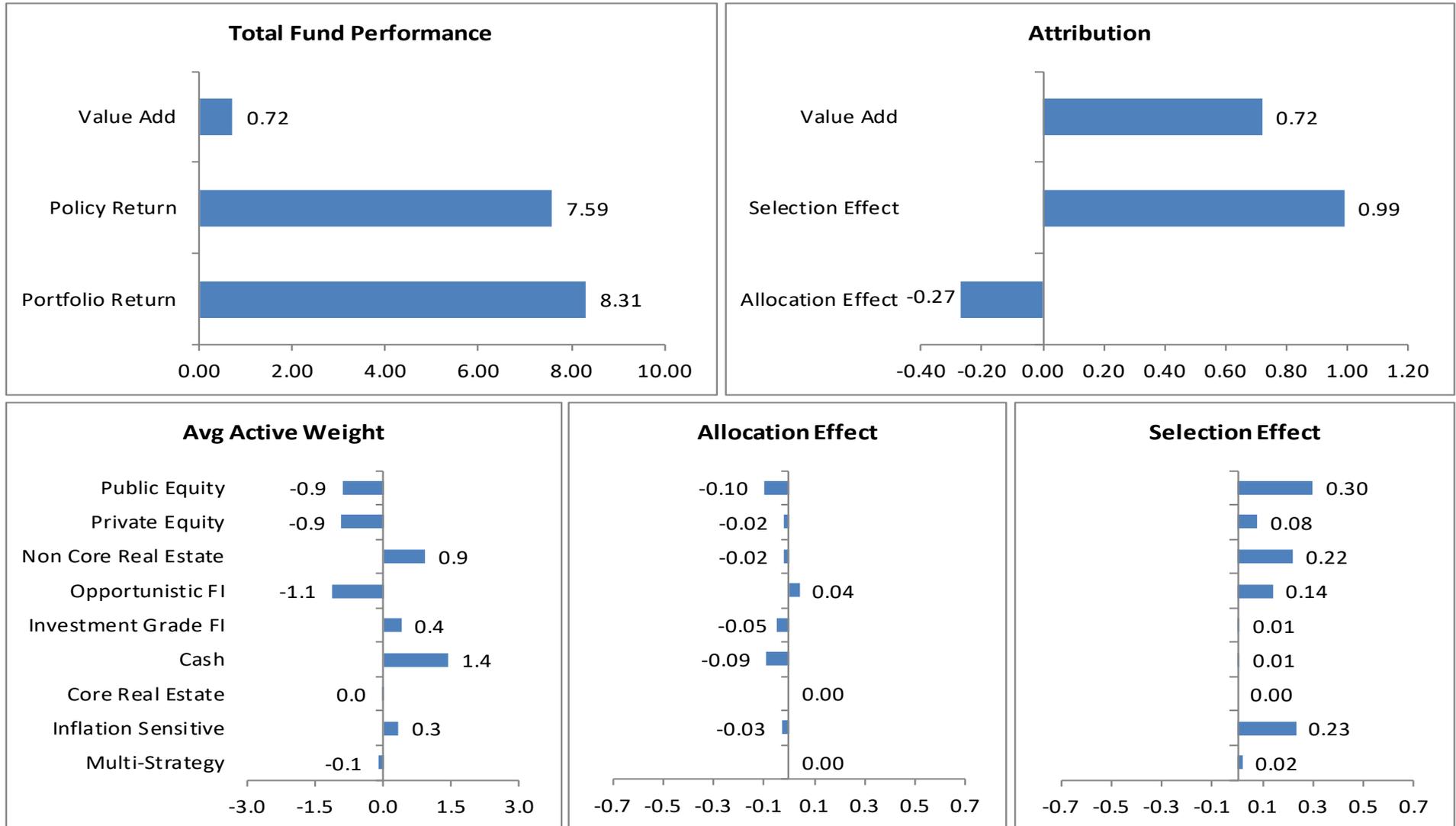
NCRS Net of Fees Return Attribution

Total Fund vs. Implementation Benchmark: 1 Year Ending Sept. 30, 2018



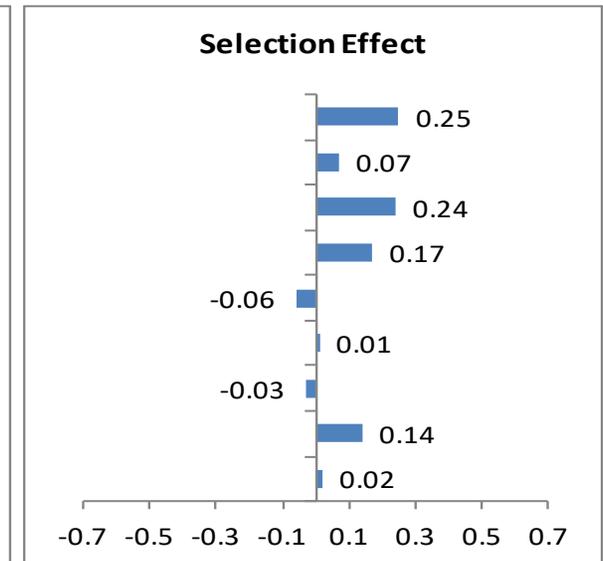
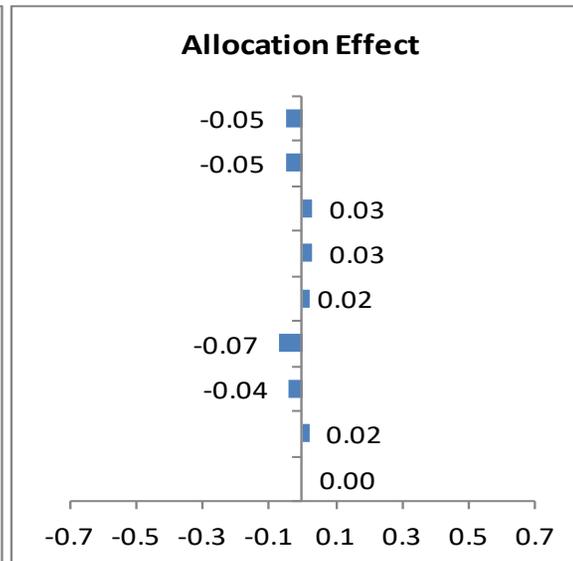
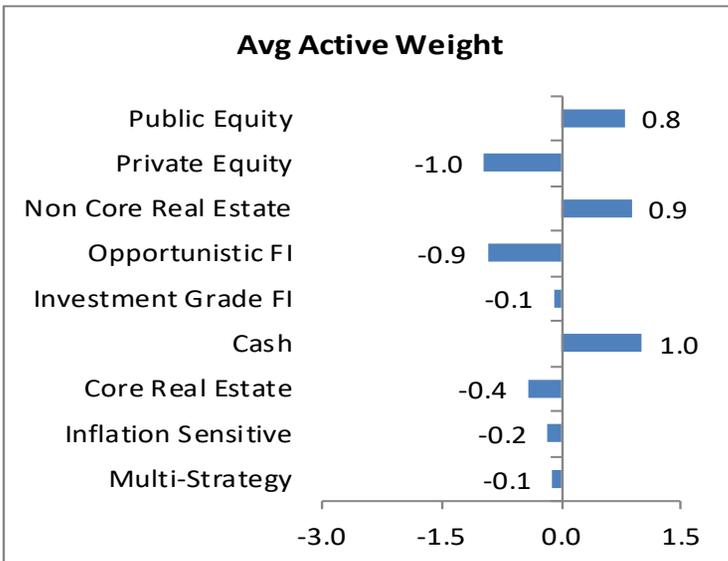
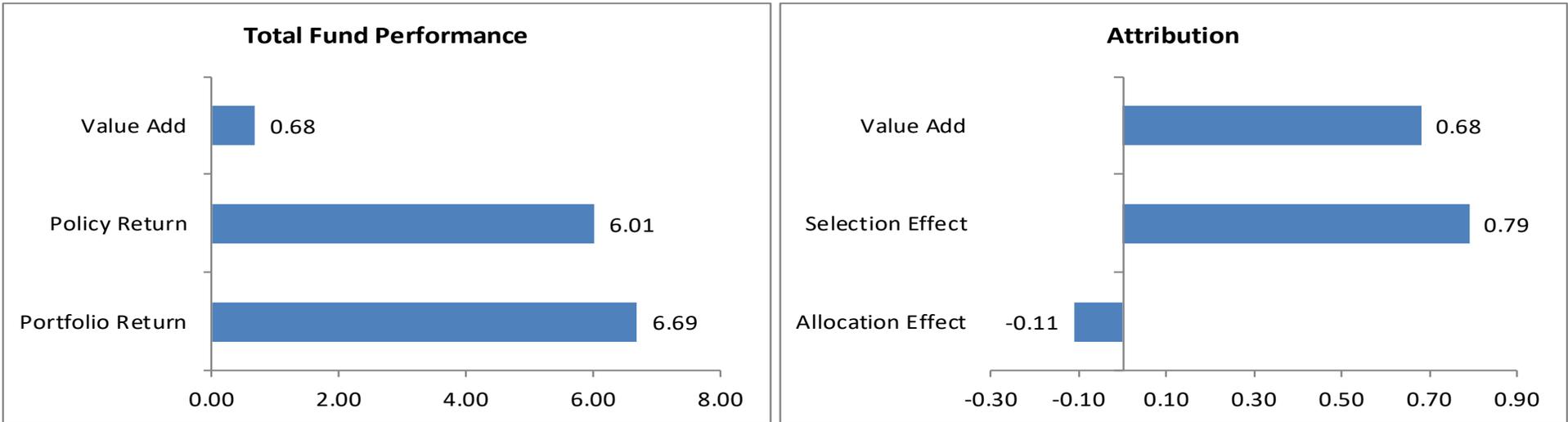
NCRS Net of Fees Return Attribution

Total Fund vs. Implementation Benchmark: 3 Years Ending Sept. 30, 2018



NCRS Net of Fees Return Attribution

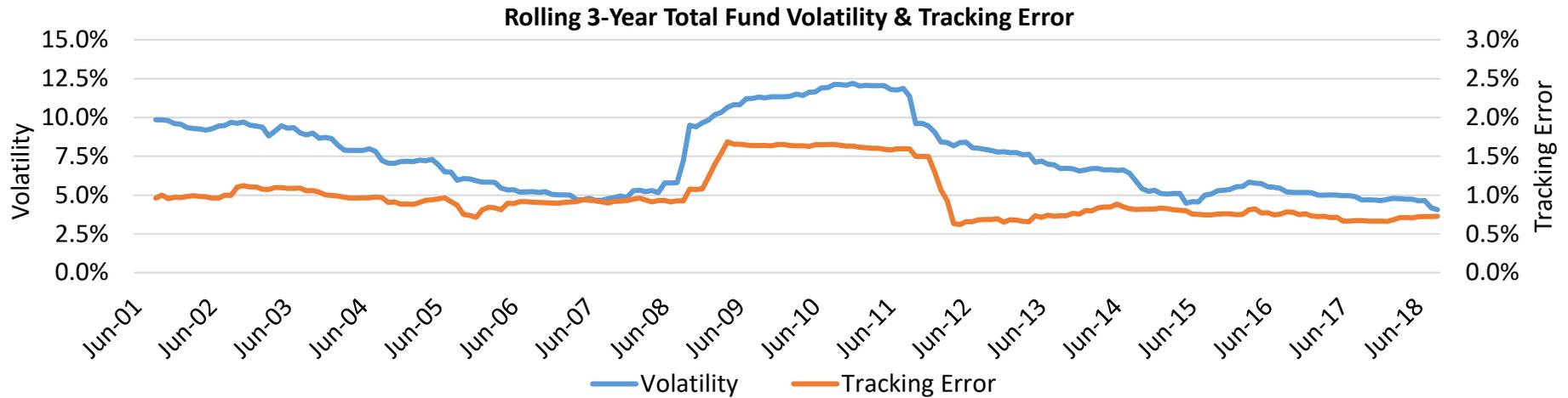
Total Fund vs. Implementation Benchmark: 5 Years Ending Sept. 30, 2018





NCRS Net of Fees Risk and Return Metrics

As of September 30, 2018



Program	POSITION		36-MONTH					60-MONTH				
	\$ Bil	% Wgt	Return	St. Dev	Active Return	TE	IR	Return	St. Dev	Active Return	TE	IR
Total NCRS	99.5	100.0	8.3	4.1	0.7	0.7	1.0	6.7	4.4	0.7	0.7	0.9
Growth	53.7	53.9	12.4	6.7	1.4	0.9	1.5	9.2	7.2	1.3	0.9	1.5
Public Equity	39.3	39.5	13.6	9.0	0.8	0.7	1.1	9.0	9.5	0.6	0.6	1.0
Private Equity	5.3	5.3	10.3	3.2	1.5	1.9	0.8	12.0	3.2	1.5	3.3	0.5
Non-Core Real Estate	3.2	3.2	12.4	3.2	5.6	2.7	2.0	14.5	3.4	6.0	3.7	1.6
Opportunistic Fixed Income	5.8	5.8	6.2	2.6	2.4	4.5	0.5	5.1	2.9	3.0	3.7	0.8
Rates & Liquidity	32.1	32.3	1.7	2.9	0.1	0.5	0.1	2.7	3.1	-0.2	0.6	-0.3
IG Fixed Income & Cash	27.6	27.7	1.7	3.1	0.1	0.5	0.1	2.8	3.3	-0.2	0.6	-0.3
Pension Cash	4.5	4.5	1.2	0.1	0.4	0.1	3.2	0.9	0.1	0.4	0.1	4.5
Inflation Sensitive & Diversifiers	11.7	11.8	6.8	1.9	1.7	2.3	0.8	4.5	2.6	0.4	2.2	0.2
Inflation Sensitive	6.3	6.4	6.0	2.9	3.3	2.9	1.1	2.0	4.2	2.0	2.8	0.7
Core Real Estate	5.4	5.4	8.0	2.3	0.0	1.9	0.0	8.1	2.3	-1.1	2.0	-0.6
Multi-Strategy	2.0	2.0	9.1	6.3	0.9	0.9	0.9	6.6	6.7	1.0	0.9	1.1

Note: Active Return = Net Managed less benchmark returns; TE = Tracking Error; IR = Information Ratio



NCRS Gross of Fees Return and Risk

BNY Mellon Universe: US Public Funds > \$20B; Data as of Sept. 30, 2018

Returns	3 Years	5 Years	10 Years	15 Years	20 Years
25th Percentile	10.37	8.46	8.09	8.04	7.30
Median Percentile	9.83	7.82	7.86	7.81	6.93
75th Percentile	9.20	7.55	7.68	7.45	6.73
NCRS	8.90	7.29	7.76	7.24	6.73
Percentile Rank (1 = highest performance)	83	83	71	88	75

Risk	3 Years	5 Years	10 Years	15 Years	20 Years
25th Percentile	5.14	5.45	9.32	8.85	9.24
Median Percentile	4.72	4.95	8.79	8.36	8.59
75th Percentile	4.15	4.42	7.54	7.84	8.06
NCRS	3.96	4.35	7.45	7.16	7.66
Percentile Rank (100 = lowest risk)	83	77	77	94	94

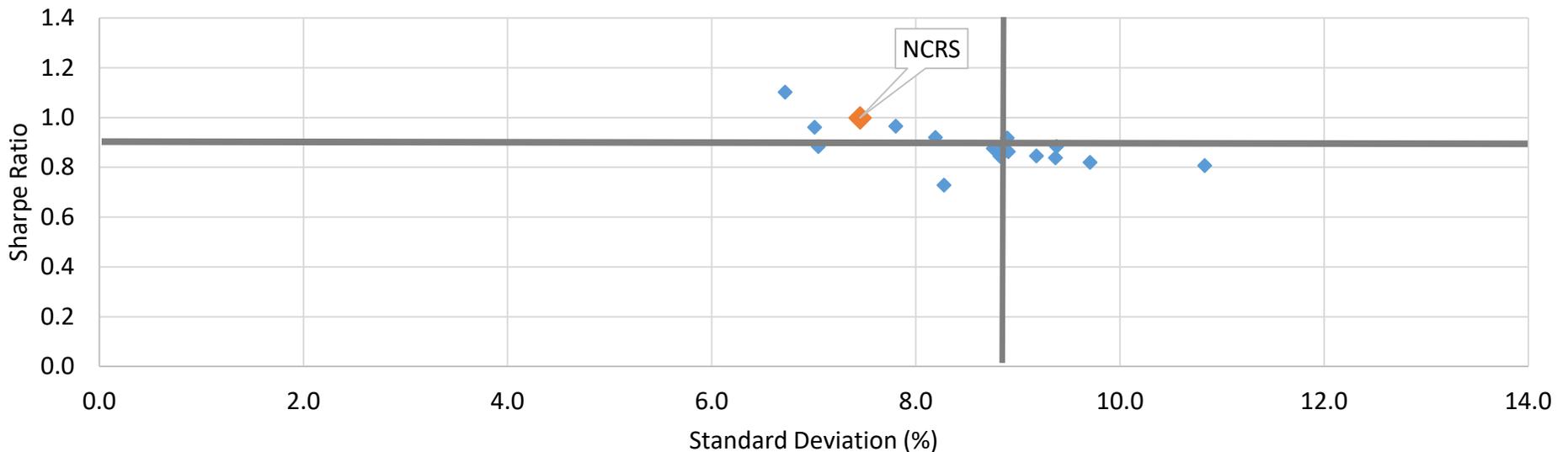
Note: Data shown is gross of fees with the exception of incentive payments, which have been deducted from NAV when applicable.

NCRS Gross of Fees Sharpe Ratio

BNY Mellon Universe: US Public Funds > \$20B; Data as of Sept. 30, 2018

Sharpe	3 Years	5 Years	10 Years	15 Years	20 Years
25th Percentile	1.98	1.53	0.95	0.83	0.66
Median Percentile	1.82	1.42	0.88	0.78	0.62
75th Percentile	1.76	1.35	0.84	0.74	0.55
NCRS	1.97	1.52	1.00	0.83	0.64
Percentile Rank	30	30	12	25	32

10 Year Plot: Sharpe Ratio vs. Volatility

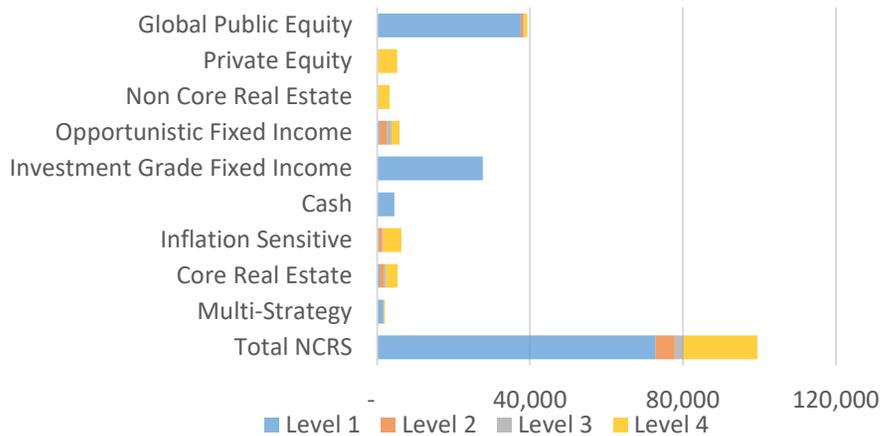


Note: Data shown is gross of fees with the exception of incentive payments, which have been deducted from NAV when applicable.

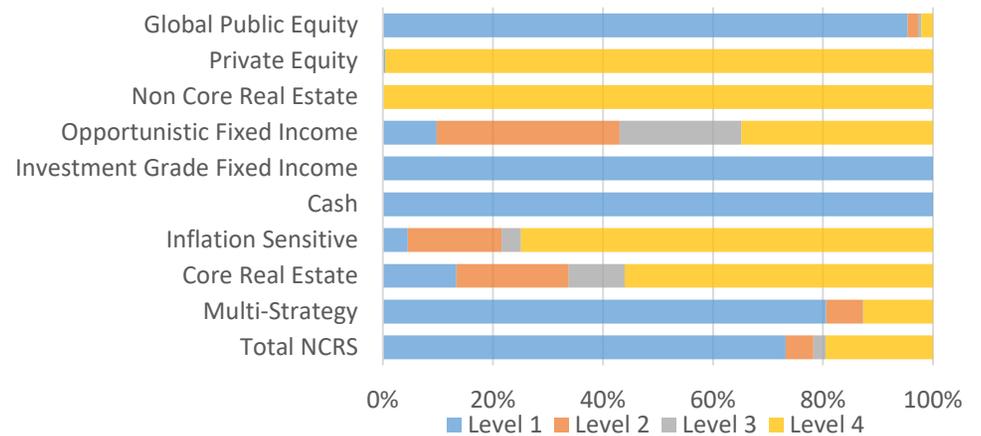
NCRS Liquidity Profile - Structural

As of September 30, 2018

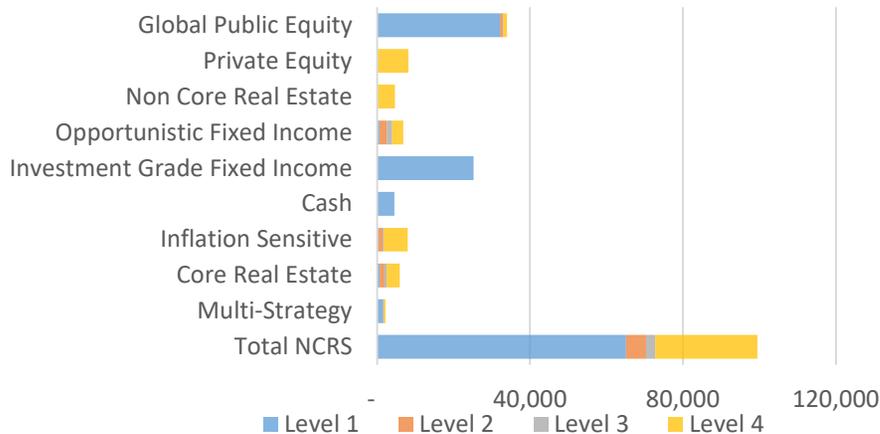
Liquidity Allocation (\$ Market Value)



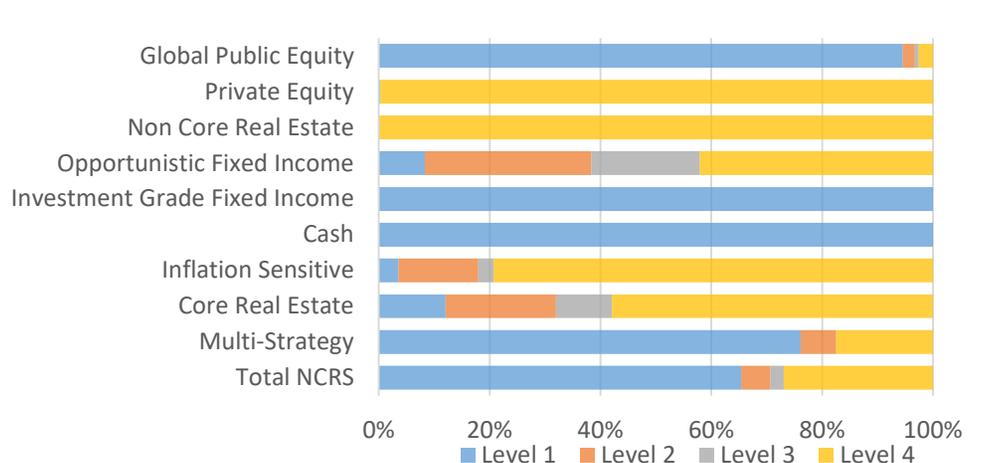
Liquidity Allocation (% Market Value)



Liquidity Allocation (\$ Market Value + Unfunded)



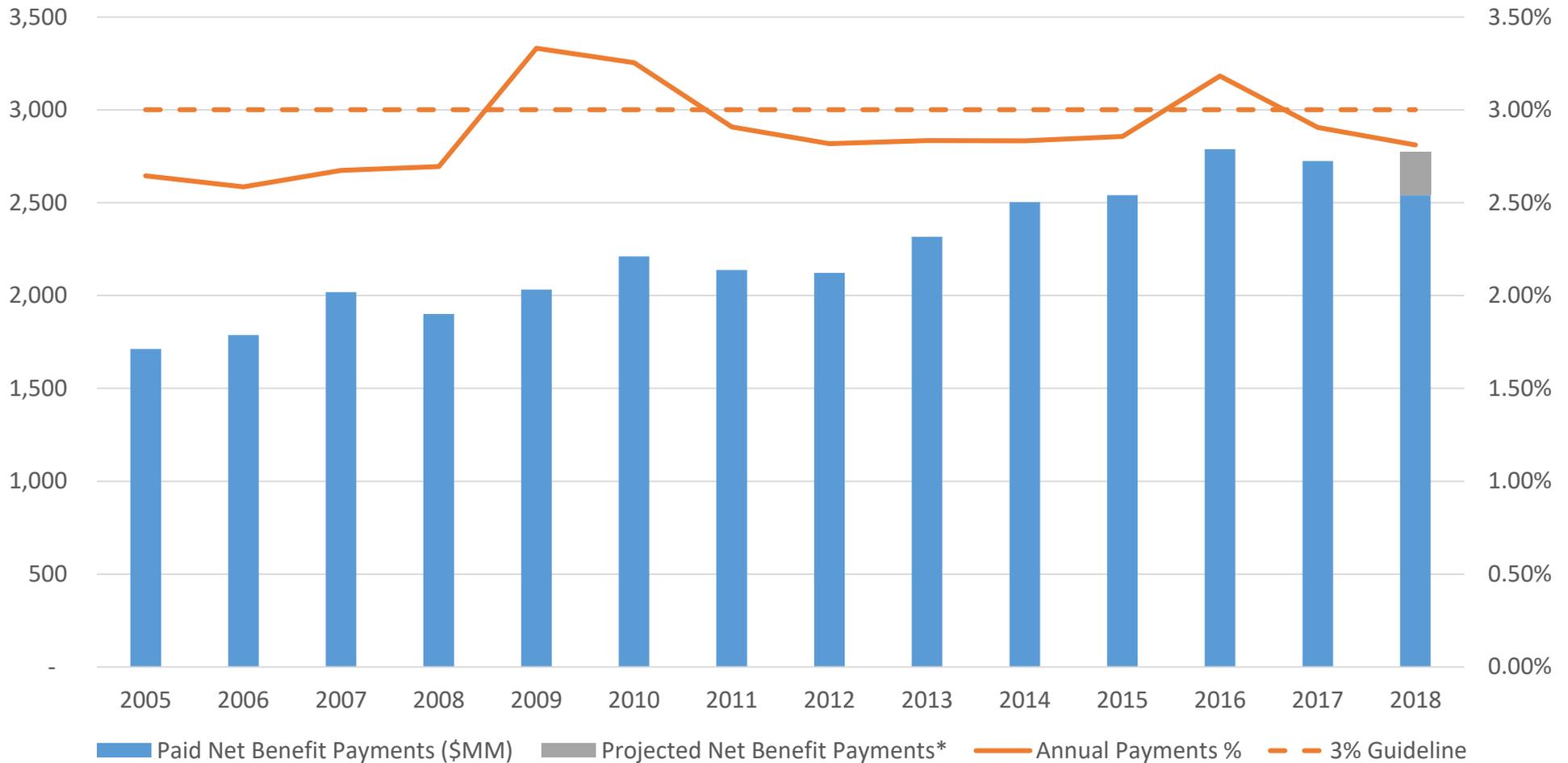
Liquidity Allocation (% Market Value + Unfunded)



Note: Level 1 Liquidity = T+3; Level 2 = T+3 to 12 Months; Level 3 = 12 to 24 Months; Level 4 = Greater than 24 Months

NCRS Liquidity Profile - Funding

Net Benefit Payments by calendar year

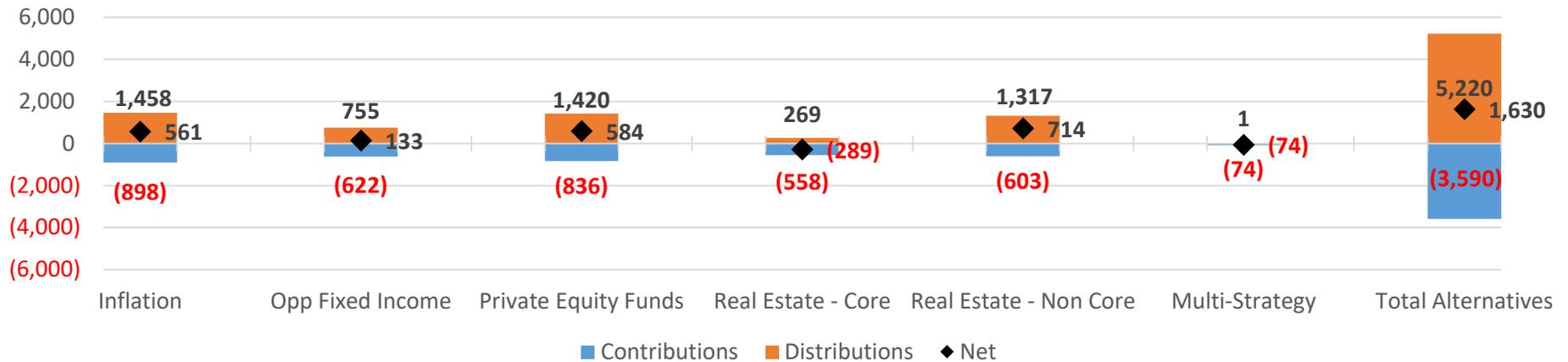


*For Calendar Year 2018, Paid Net Benefits are updated through November. Projected Net Benefits are for the month of December only and represent the average of the last 12 monthly payments

NCRS Alternatives Liquidity Profile - Funding Through September 30, 2018

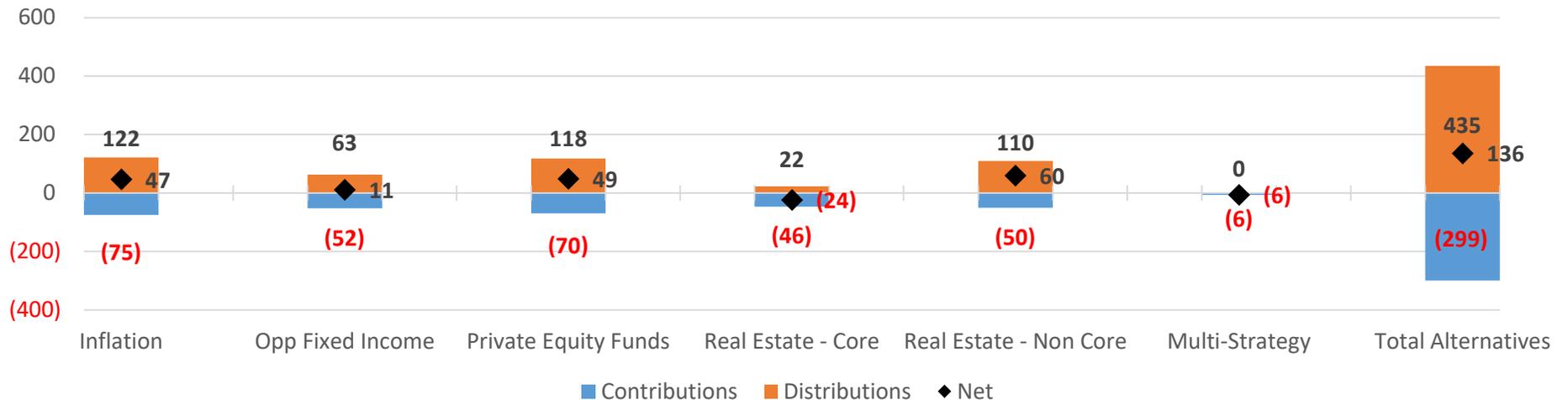
Prior 12-Months

Total Cash Flows by Alternative Asset Class (\$MM)



Prior 12-Months

Average Monthly Cash Flows by Alternative Asset Class (\$MM)





NCRS Asset Class Net of Fees Performance

As of September 30, 2018

	Market Value (\$MM)	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
Growth	\$53,663	10.91	12.41	9.23	8.31	7.88	6.89
Benchmark ¹		8.50	11.04	7.93	7.36	7.28	5.97
Public Equity	\$39,336	10.12	13.60	8.99	8.92	7.99	6.96
Benchmark ²		9.20	12.82	8.39	8.06	7.35	5.94
Private Equity	\$5,294	18.17	10.26	11.97	7.63	8.59	7.18
Benchmark ³		13.67	8.79	10.43	8.13	12.01	11.42
Non-Core Real Estate	\$3,218	14.12	12.43	14.55	3.48	7.47	7.44
Benchmark ⁴		9.27	6.84	8.58	1.06	7.39	7.40
Opportunistic Fixed Income	\$5,815	8.44	6.25	5.08	6.81	-	-
Benchmark ⁵		-0.54	3.82	2.06	1.41	-	-
Rates & Liquidity	\$32,118	-1.04	1.68	2.74	5.30	4.83	5.40
Benchmark ⁶		-1.50	1.61	2.92	5.04	4.61	5.17
IG Fixed Income	\$27,606	-1.35	1.70	2.79	5.32	4.85	5.41
Benchmark ⁷		-1.61	1.64	2.96	5.06	4.62	5.18
Cash	\$4,512	1.58	1.18	0.90	-	-	-
Benchmark ⁸		1.52	0.82	0.50	-	-	-
Inflation Sensitive & Diversifiers	\$11,710	7.32	6.79	4.52	1.39	4.10	4.89
Benchmark ⁹		4.43	5.05	4.10	0.11	3.70	4.97
Inflation Sensitive	\$6,340	7.97	5.95	1.98	-1.41	3.18	3.37
Benchmark ¹⁰		3.53	2.64	-0.01	-0.84	4.29	4.03
Core Real Estate	\$5,370	6.57	7.96	8.10	5.57	6.58	6.80
Benchmark ¹¹		5.51	7.97	9.20	5.14	7.14	7.58
Multi-Strategy	\$2,017	6.54	9.09	6.60	6.81	6.13	-
Benchmark ¹²		5.72	8.19	5.59	6.70	7.54	-

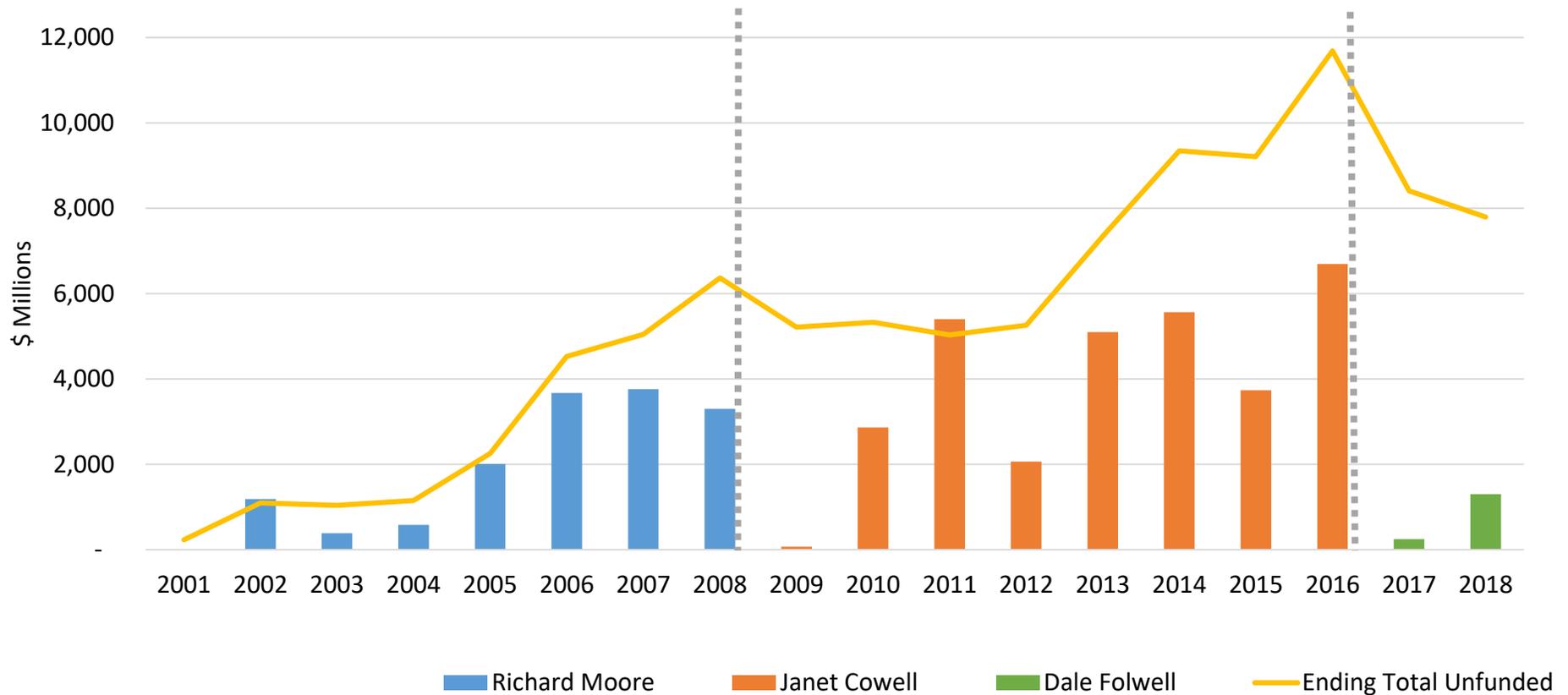


NCRS Calendar Year Asset Class Return Diversification

As of September 30, 2018

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	YTD 2018
Non Core Real Estate 20.66	Inflation Sensitive 9.50	Global Public Equity 32.68	Opportunistic Fixed Income 15.89	Non Core Real Estate 17.28	Global Public Equity 17.59	Global Public Equity 26.27	Non Core Real Estate 19.45	Non Core Real Estate 14.84	Non Core Real Estate 11.73	Global Public Equity 24.44	Private Equity 14.25
Private Equity 18.00	Investment Grade Fixed Income 7.05	Multi-Strategy 16.75	Global Public Equity 15.24	Private Equity 13.87	Multi-Strategy 14.70	Multi-Strategy 22.61	Private Equity 14.02	Private Equity 9.20	Global Public Equity 7.33	Multi-Strategy 13.58	Non Core Real Estate 11.32
Multi-Strategy 8.73	Opportunistic Fixed Income -2.15	Total Pension Plan 15.08	Total Pension Plan 11.61	Investment Grade Fixed Income 10.82	Opportunistic Fixed Income 13.95	Opportunistic Fixed Income 16.56	Core Real Estate 10.41	Core Real Estate 8.28	Inflation Sensitive 7.19	Total Pension Plan 13.53	Opportunistic Fixed Income 6.80
Core Real Estate 8.48	Non Core Real Estate -3.08	Investment Grade Fixed Income 7.63	Investment Grade Fixed Income 9.45	Core Real Estate 7.89	Core Real Estate 13.67	Non Core Real Estate 12.88	Investment Grade Fixed Income 8.51	Multi-Strategy 0.85	Opportunistic Fixed Income 7.09	Non Core Real Estate 12.40	Inflation Sensitive 6.16
Total Pension Plan 8.34	Private Equity -4.46	Opportunistic Fixed Income 6.72	Core Real Estate 8.48	Multi-Strategy 6.15	Total Pension Plan 11.84	Total Pension Plan 12.28	Total Pension Plan 6.19	Total Pension Plan 0.29	Core Real Estate 6.68	Private Equity 11.95	Global Public Equity 4.56
Global Public Equity 7.88	Core Real Estate -13.37	Inflation Sensitive -5.77	Multi-Strategy 6.90	Opportunistic Fixed Income 2.22	Non Core Real Estate 7.78	Private Equity 11.72	Global Public Equity 3.68	Investment Grade Fixed Income 0.28	Total Pension Plan 6.26	Core Real Estate 10.12	Core Real Estate 4.50
Inflation Sensitive 7.82	Total Pension Plan -19.72	Private Equity -9.39	Private Equity 5.70	Total Pension Plan 2.12	Investment Grade Fixed Income 7.29	Core Real Estate 11.28	Opportunistic Fixed Income 3.40	Global Public Equity -1.26	Private Equity 6.05	Inflation Sensitive 7.53	Total Pension Plan 3.40
Investment Grade Fixed Income 7.09	Multi-Strategy -25.19	Core Real Estate -13.63	Non Core Real Estate -4.23	Inflation Sensitive -5.47	Private Equity 5.74	Inflation Sensitive -1.32	Multi-Strategy 2.69	Opportunistic Fixed Income -2.61	Multi-Strategy 6.00	Opportunistic Fixed Income 7.05	Multi-Strategy 3.35
Opportunistic Fixed Income 7.06	Global Public Equity -39.90	Non Core Real Estate -43.11	Inflation Sensitive -13.21	Global Public Equity -7.20	Inflation Sensitive 1.06	Investment Grade Fixed Income -3.49	Inflation Sensitive -0.65	Inflation Sensitive -9.05	Investment Grade Fixed Income 3.24	Investment Grade Fixed Income 4.42	Investment Grade Fixed Income -2.01

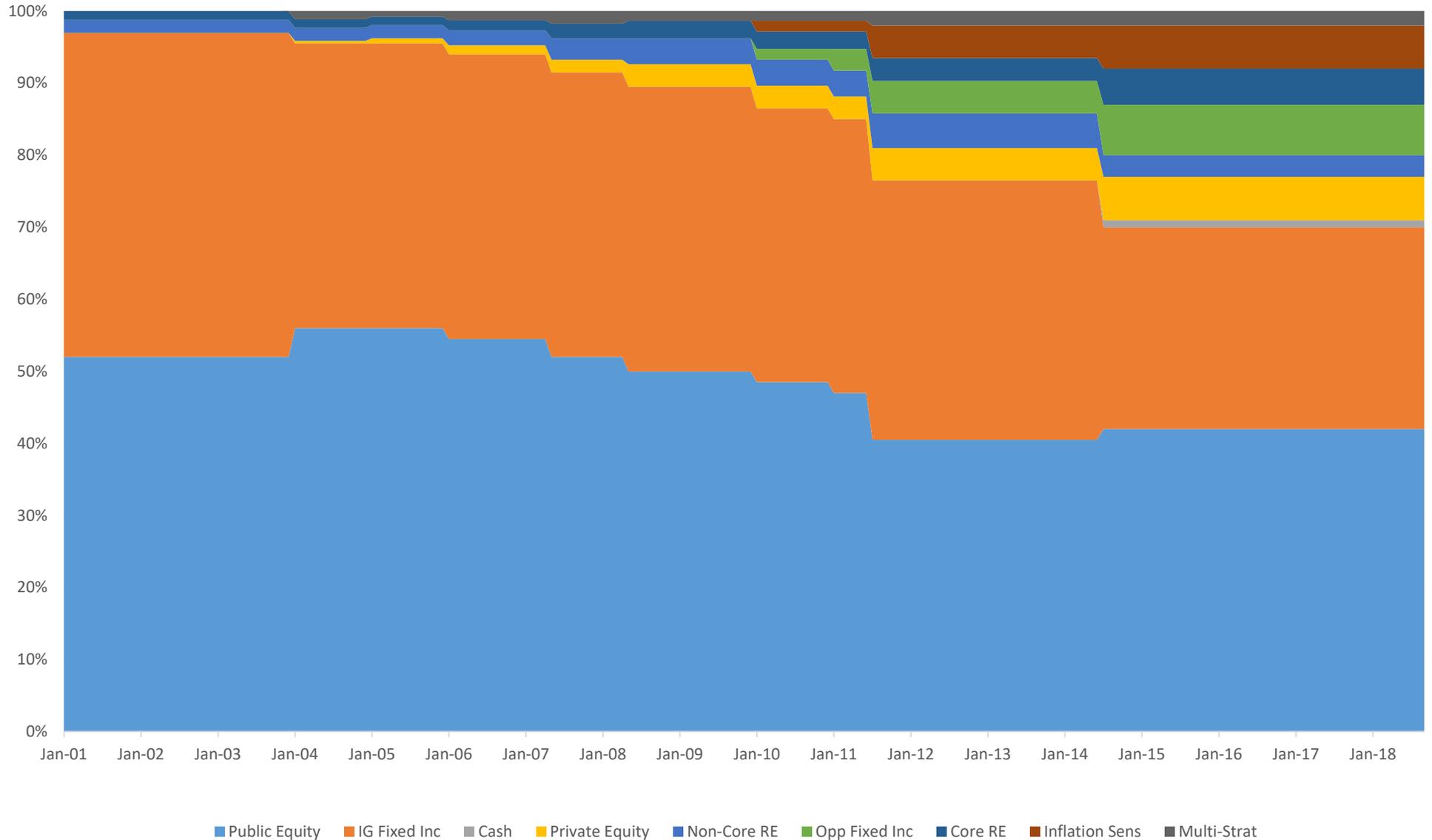
New and Total Unfunded Private Asset Class Commitments By Calendar Year of Closing



*2018 data as of 9/30/2018



Strategic Asset Allocation Policy History





Exited Investments

Since August 23rd IAC Meeting

<u>Fund Name</u>	<u>Redemption Amount (\$MM)</u>	<u>Redemption Effective</u>
Public Equity		
Piedmont Russell 200 Passive	\$636	9/28
Blackrock Russell 1000 Passive	\$3,950	9/28
Private Equity		
None	--	--
Non-Core Real Estate		
None	--	--
Opportunistic Fixed Income		
None	--	--
Inflation Sensitive		
None	--	--
Core Real Estate		
None	--	--
Multi Strategy		
None	--	--



Top 20 Investment Managers

As of September 30, 2018

	Manager	Market Value (\$)	Unfunded (\$)	% MV	% MV Cum.
1	Internal Fixed Income	32,118,376,844	-	32.3%	32.3%
2	Internal Equity	15,913,189,536	-	16.0%	48.3%
3	BlackRock, Inc.	10,867,881,560	-	10.9%	59.2%
4	Wellington Management	3,039,273,692	-	3.1%	62.2%
5	Blackstone Group, The	2,798,455,873	1,344,692,483	2.8%	65.1%
6	Mondrian Investment Partners Limited	2,434,178,905	-	2.4%	67.5%
7	Baillie Gifford	2,399,815,852	-	2.4%	69.9%
8	Rockwood Capital	2,319,866,395	472,043,276	2.3%	72.2%
9	Walter Scott & Partners	1,850,011,892	-	1.9%	74.1%
10	Gladius Capital Management LP	1,796,501,450	103,001,751	1.8%	75.9%
11	Angelo, Gordon & Co.	1,660,505,669	87,716,462	1.7%	77.6%
12	ValueAct Capital	847,313,980	35,000,000	0.9%	78.4%
13	TimesSquare Capital Management, LLC	712,494,287	-	0.7%	79.1%
14	Campbell Group LLC, The	710,614,353	-	0.7%	79.9%
15	DoubleLine Capital LP	684,558,812	75,000,000	0.7%	80.5%
16	Rockpoint Group, LLC	665,134,291	266,265,370	0.7%	81.2%
17	Franklin Templeton Investments	622,104,667	-	0.6%	81.8%
18	Providence Equity Partners	608,550,046	154,203,468	0.6%	82.5%
19	Earnest Partners	605,753,796	-	0.6%	83.1%
20	Marathon Asset Management	560,907,514	73,952,000	0.6%	83.6%
Top 20 Total		83,215,489,414	2,611,874,810	83.6%	83.6%



Appendix



NCRS Public Equity Net of Fees Performance

As of September 30, 2018

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Public Equity	\$39,336	3.46	10.12	13.60	8.99	8.92
Benchmark ²		3.75	9.20	12.82	8.39	8.06
Domestic Portfolio	\$20,584	7.01	18.27	16.82	13.26	12.24
Russell 3000		7.12	17.58	17.07	13.46	12.01
Non-US Portfolio	\$18,099	(0.04)	3.36	11.97	5.47	5.93
Custom Benchmark		0.39	1.79	10.14	4.39	5.00
Equity Hedge	\$645	4.66	7.09	6.72	5.47	-
MSCI ACWI (Beta Adjusted)		1.54	3.83	5.31	2.86	-

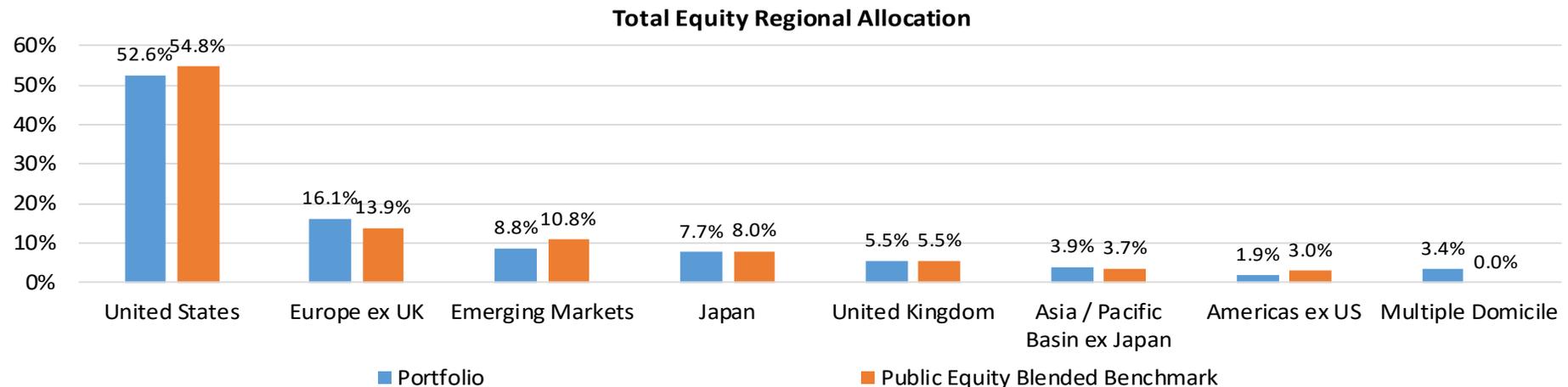
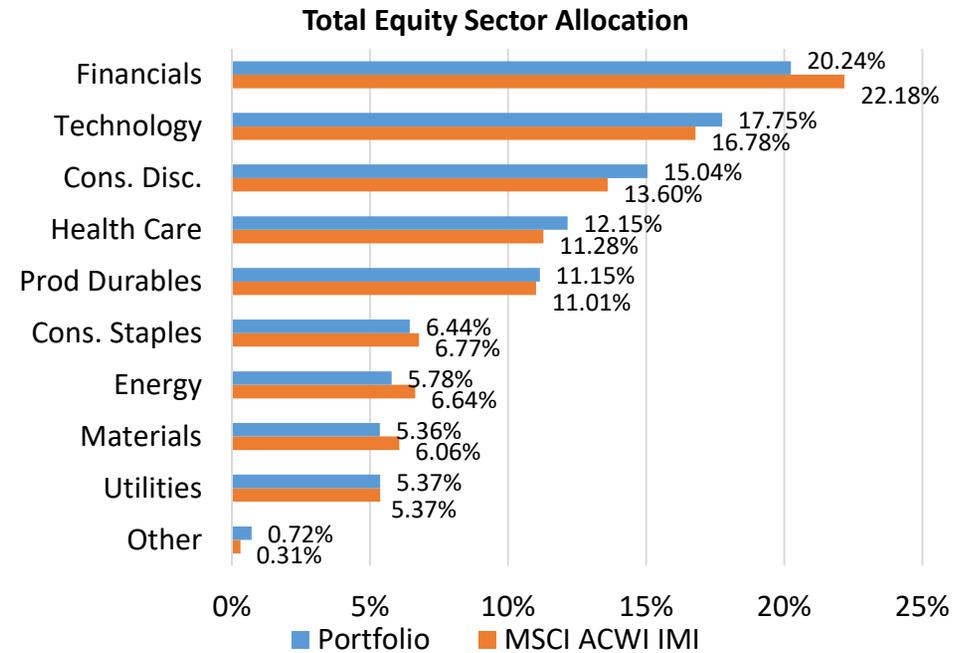
*Public Equity returns also include the global portfolio, which has been liquidated but currently contains a residual amount of roughly \$860k.



NCRS Public Equity Portfolio Characteristics

As of September 30, 2018

Portfolio Characteristics		
	Portfolio	MSCI ACWI IMI
Price / Earnings	20.4	19.3
Dividend Yield	2.08	2.3
Price / Book	2.53	2.35
Debt / Equity	0.93	0.96
Market Cap (\$B Weighted Median)	43.38	42.37
Return on Equity - 1 Year	17.4	17.0



NCRS Private Equity Portfolio

As of September 30, 2018

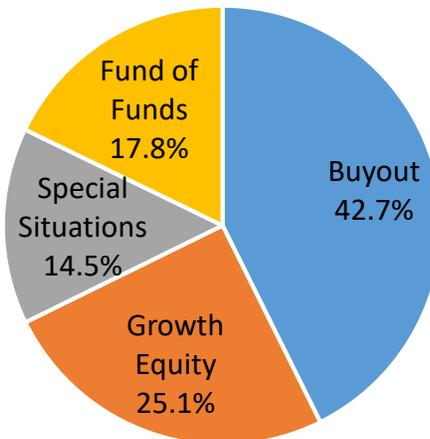
Net of Fees Performance

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Private Equity	\$5,294	4.54	18.17	10.26	11.97	7.63
Benchmark ³		3.34	13.67	8.79	10.43	8.13
Buyout	\$2,249	3.45	16.25	11.22	10.89	6.16
Growth	\$1,323	6.69	25.52	10.83	16.44	10.84
Special Situations	\$762	2.91	13.77	7.42	6.09	5.86
Fund of Funds	\$939	5.57	17.47	10.19	13.91	8.55

IRR by Vintage Year

	<u>Pre-2004</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>Total</u>
NCRS	11.99	6.94	5.37	3.43	10.01	9.58	11.22	21.12	11.26	15.23	11.56	18.68	13.84	11.26	6.60	4.55	8.54
# of Funds	28	3	11	21	15	17	3	1	6	6	9	4	9	6	7	3	149

Strategy Allocation (Based on Valuation)





NCRS Non-Core Real Estate Portfolio

As of September 30, 2018

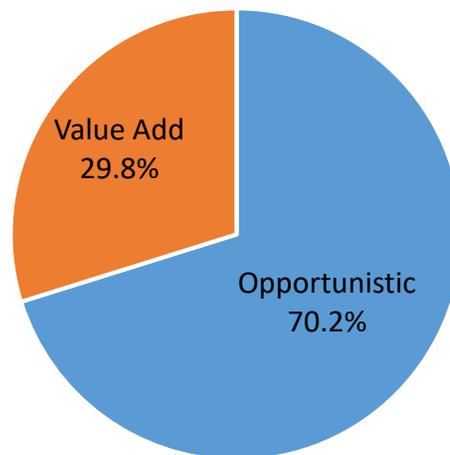
Net of Fees Performance

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Non-Core Real Estate	\$3,218	1.17	14.12	12.43	14.55	3.48
Benchmark ⁴		1.04	9.27	6.84	8.58	1.06
Opportunistic	\$2,258	0.39	14.96	11.83	14.03	2.27
Value Add	\$960	3.08	11.76	13.25	15.28	5.44

IRR by Vintage Year

	<u>Pre-2004</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>Total</u>
NCRS	9.12	15.69	-1.45	2.82	2.41	16.39	N/A	15.94	18.40	18.81	16.24	7.96	9.18	7.30	N/A	-0.06	6.65
# of Funds	16	3	15	13	8	6	N/A	6	7	5	7	7	6	7	N/A	1	107

Strategy Allocation (Based on Valuation)



NCRS Opportunistic Fixed Income Portfolio

As of September 30, 2018

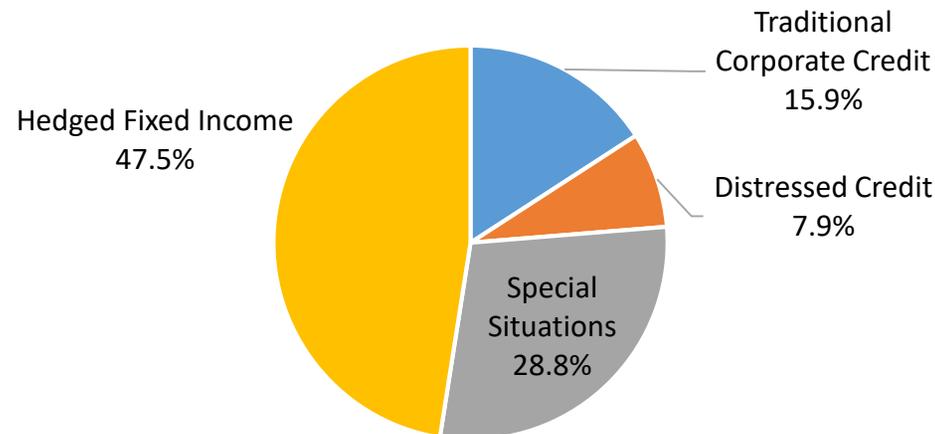
Net of Fees Performance

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Opportunistic Fixed Income	\$5,815	2.57	8.44	6.25	5.08	6.81
Benchmark ⁵		1.05	(0.54)	3.82	2.06	1.41
Traditional Corporate Credit	\$922	2.30	8.70	7.36	5.85	-
Distressed Credit	\$457	3.38	10.49	10.35	8.29	9.04
Special Situations	\$1,674	2.95	9.54	8.49	9.09	10.33
Hedged Fixed Income	\$2,763	2.31	7.38	4.38	3.23	-

IRR by Vintage Year

	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>Total</u>
NCRS	2.87	N/A	17.03	8.70	22.42	6.59	4.97	2.61	5.34	4.56	11.80	10.07	11.60	N/A	6.44
# of Funds	1	N/A	1	3	1	4	9	2	7	3	1	8	2	N/A	42

Strategy Allocation (Based on Valuation)





NCRS Rates & Liquidity Portfolio

As of September 30, 2018

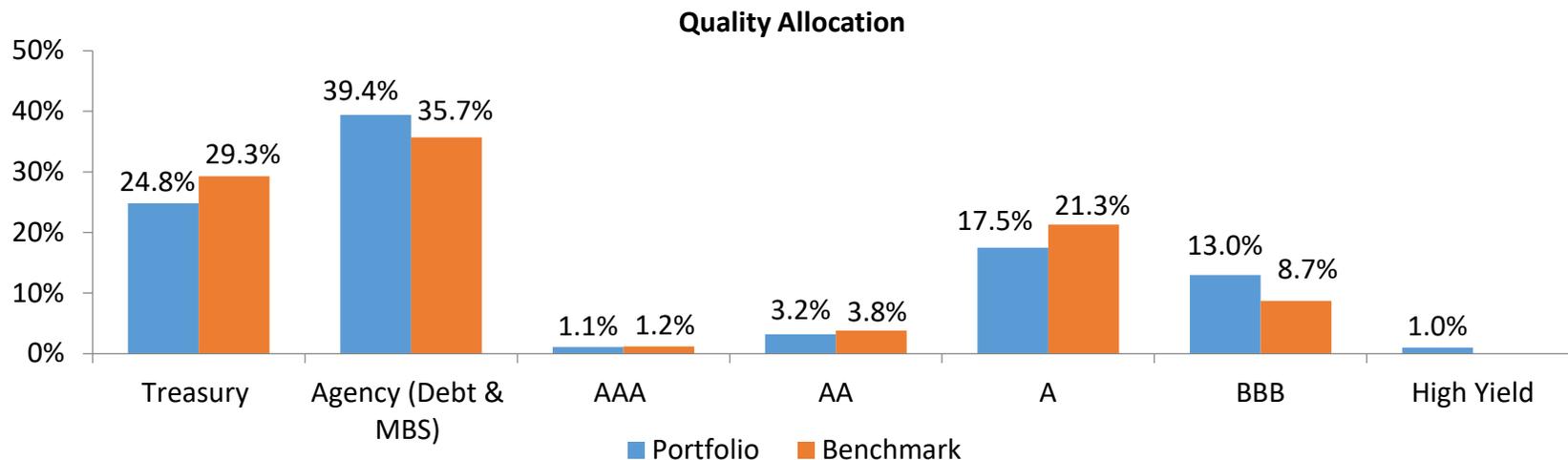
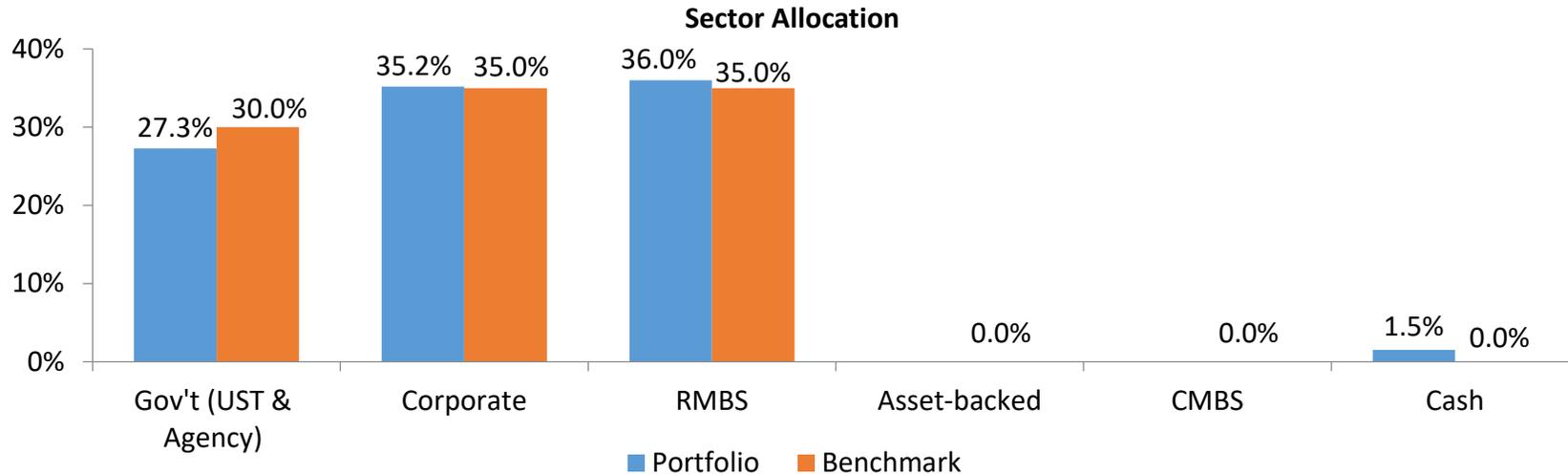
	Net of Fees Performance					
	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Rates & Liquidity	\$32,118	0.09	(1.04)	1.68	2.74	5.30
Benchmark ⁶		(0.12)	(1.50)	1.61	2.92	5.04
IG Fixed Income	\$27,606	0.03	(1.35)	1.70	2.79	5.32
Core Fixed Income	\$24,572	(0.01)	(1.67)	1.78	2.89	5.35
IG Fixed Income Cash	\$3,035	0.42	1.47	1.10	-	-
Pension Cash	\$4,512	0.49	1.58	1.18	0.90	-

Core Fixed Income Portfolio Characteristics

	<u>Avg. Coupon</u>	<u>Yield to Worst</u>	<u>Effective Duration</u>
Government (Treasury & Agency)	4.1%	3.1%	9.4
Corporate	4.5%	4.3%	9.0
Mortgage	3.7%	3.5%	4.9
Total	4.1%	3.7%	7.6

NCRS Core Fixed Income Portfolio Characteristics

As of September 30, 2018



NCRS Inflation Sensitive Portfolio

As of September 30, 2018

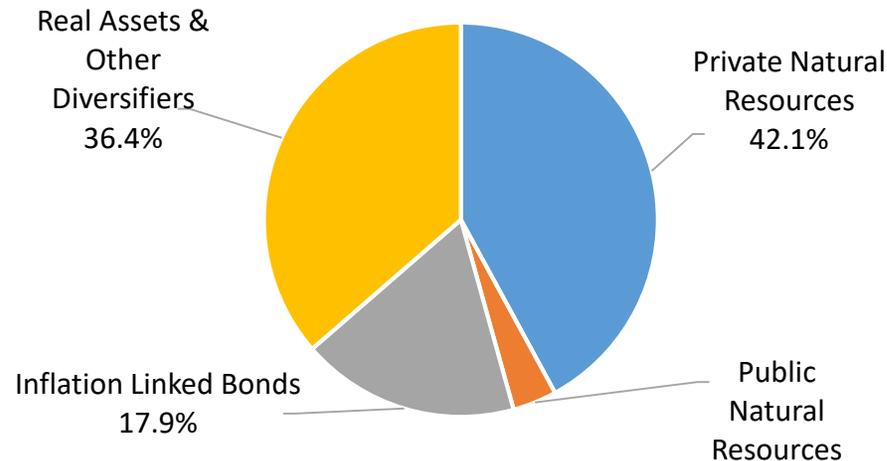
Net of Fees Performance

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Inflation Sensitive	\$6,340	2.26	7.97	5.95	1.98	(1.41)
Benchmark ¹⁰		0.48	3.53	2.64	(0.01)	(0.84)
Private Natural Resources	\$2,667	2.03	7.33	4.69	2.90	0.94
Public Natural Resources	\$229	(0.34)	2.81	(0.96)	(6.69)	-
Inflation Linked Bonds	\$1,137	1.33	2.42	3.16	-	-
Real Assets & Other Diversifiers	\$2,306	3.20	10.72	9.92	8.66	-

IRR by Vintage Year

	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>Total</u>
NCRS	0.38	6.76	-2.85	N/A	-7.69	-6.37	7.83	6.75	10.94	5.07	3.85	N/A	31.78	1.14
# of Funds	3	2	2	N/A	3	9	7	11	12	4	4	N/A	4	61

Strategy Allocation (Based on Valuation)





NCRS Core Real Estate Portfolio

As of September 30, 2018

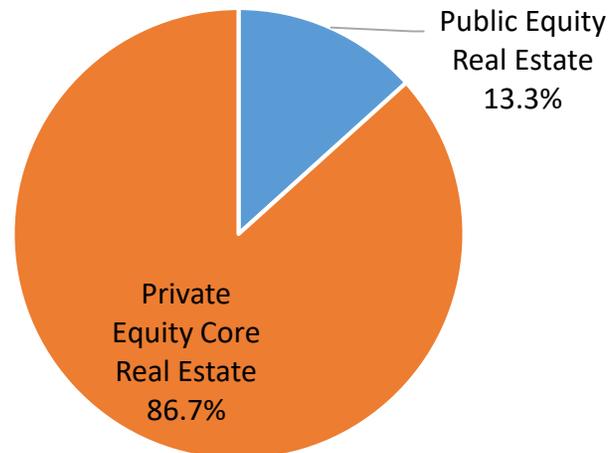
Net of Fees Performance

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Core Real Estate	\$5,370	1.24	6.57	7.96	8.10	5.57
Benchmark ¹¹		0.23	5.51	7.97	9.20	5.14
Public Equity Real Estate	\$716	(0.19)	4.18	7.13	7.35	7.82
Private Equity Core Real Estate	\$4,655	1.47	6.94	8.12	8.18	4.88

IRR by Vintage Year

	<u>Pre-2004</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>Total</u>
NCRS	7.63	9.76	-8.33	5.46	1.39	9.99	N/A	23.62	N/A	N/A	7.47	7.66	3.99	8.30	N/A	-2.04	7.20
# of Funds	5	1	1	2	3	1	N/A	1	N/A	N/A	2	6	2	9	N/A	1	34

Strategy Allocation (Based on Valuation)



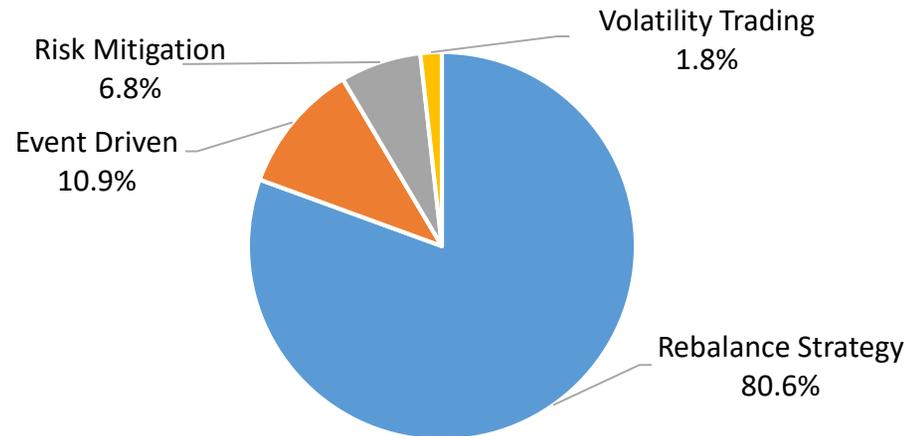
NCRS Multi-Strategy Portfolio

As of September 30, 2018

Net of Fees Performance

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Multi-Strategy	\$2,017	2.94	6.54	9.09	6.60	6.81
Benchmark ¹²		2.92	5.72	8.19	5.59	6.70
Rebalance Strategy	\$1,625	3.89	8.74	10.95	7.84	-
Event Driven	\$220	2.18	6.51	-	-	-
Risk Mitigation	\$136	(3.65)	(7.51)	-	-	-
Volatility Trading	\$36	(10.56)	(30.09)	-	-	-

Strategy Allocation (Based on Valuation)



Notes:

All data presented are based on currently available information at time of publication and may be revised subsequently.

1. The Growth Benchmark is a blend of the Public Equity Benchmark, Private Equity Benchmark, Non-Core Real Estate Benchmark, and Opportunistic FI Benchmark at policy weights.
2. The Public Equity Benchmark is the dynamically-weighted combination of the MSCI ACWI IMI Net (Long-Only) and a beta-adjusted MSCI ACWI IMI Net (Hedged Equity).
3. The Private Equity Benchmark is comprised of the following Burgiss Group Private iQ indices: 50% Buyout, 20% Venture Capital, and 30% Distressed.
4. The Non-Core Real Estate Benchmark is comprised of the following Burgiss Group Private iQ indices: 80% U.S. Non-Core Real Estate (Opportunistic and Value-Added) and 20% Non-U.S. Non-Core Real Estate (Opportunistic and Value-Added).
5. The Opportunistic Fixed Income Benchmark is a comprised of 50% HFRX Distressed Securities Index, 20% HFRX Relative Value Index, 15% Credit Suisse Leveraged Loan Index, and 15% BOAML High Yield Index*.
6. The Rates & Liquidity Benchmark is a blend of the IG Fixed Income Benchmark and the Cash Benchmark at policy weights.
7. The IG Fixed Income Benchmark is comprised 10% iMoneyNet First Tier Institutional Money Market Funds Net Index and 90% custom BOAML Core Investment Grade Index*. The custom BOAML core index comprised of the following weightings: 30% BOAML 5+ Years Governments, 35% BOAML 5+ Years Investment Grade Corporates, and 35% BOAML Mortgage Master.
8. The Cash Benchmark is the iMoneyNet First Tier Institutional Money Market Funds Net Index.
9. The Inflation Sensitive & Diversifiers Benchmark is a blend of the Inflation Sensitive Benchmark and the Core Real Estate Benchmark at policy weights.
10. The Inflation Sensitive Benchmark is the dynamically weighted combination of the Bank of America Merrill Lynch 1-3 Years U.S. Inflation-Linked Treasury Index (TIPS)*, the Bloomberg Commodities Index (Commodities), and a combination of the benchmarks of investments classified within Private Natural Resources or Other Real Assets and Diversifiers.
11. The Core Real Estate Benchmark is comprised of 80% NCREIF ODCE Net and 20% FTSE EPRA NAREIT Global Index.
12. The Multi-Strategy Benchmark is comprised of a dynamically-weighted combination of the HFRX ED: Multi-Strategy Index, net of fees, and the market value weighted benchmarks for any other total fund strategies within the Portfolio.

*Source: BofA Merrill Lynch, used with permission. See disclaimer on next page.



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