

NORTH CAROLINA
DEPARTMENT OF STATE TREASURER



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STATE TREASURER OF NORTH CAROLINA
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INVESTMENT MANAGEMENT DIVISION

Performance Review

November 20, 2019



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, beginning January 2017
 - The goal is comprehensive of the Pension and Supplemental Retirement Plans
- Progress to date:

Fully Executed Activities

Realized Savings since Jan 2017 (\$000)

Investment-related services: renegotiations/restructuring	\$33,368
Investment manager terminations/renegotiations	\$192,185
Sub-Total	\$225,553

Projected Realized savings through December 2020

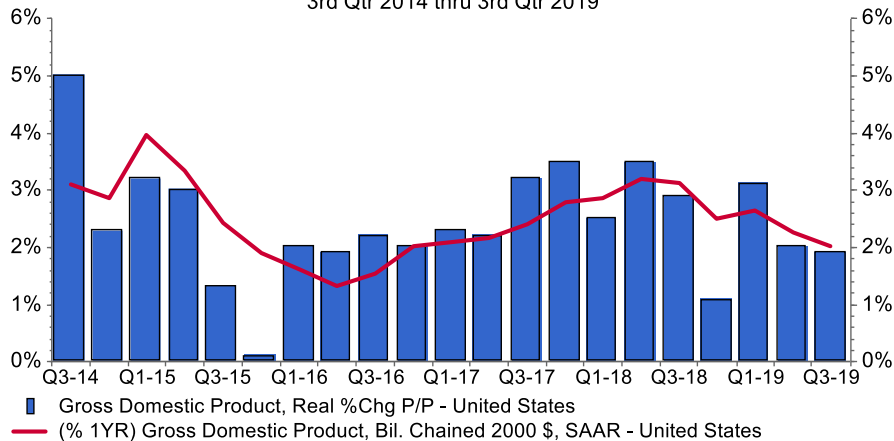
\$344,609



U.S. Economic Environment

US Real GDP Growth

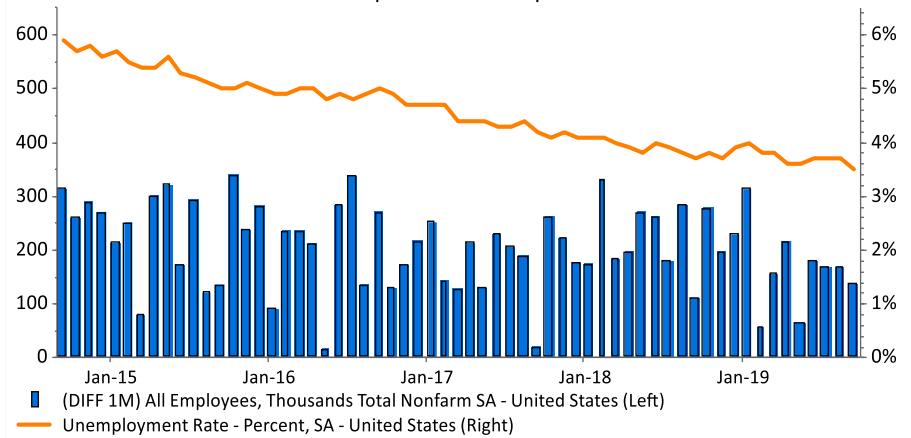
3rd Qtr 2014 thru 3rd Qtr 2019



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US Change in NonFarm Employment & Unemployment Rate

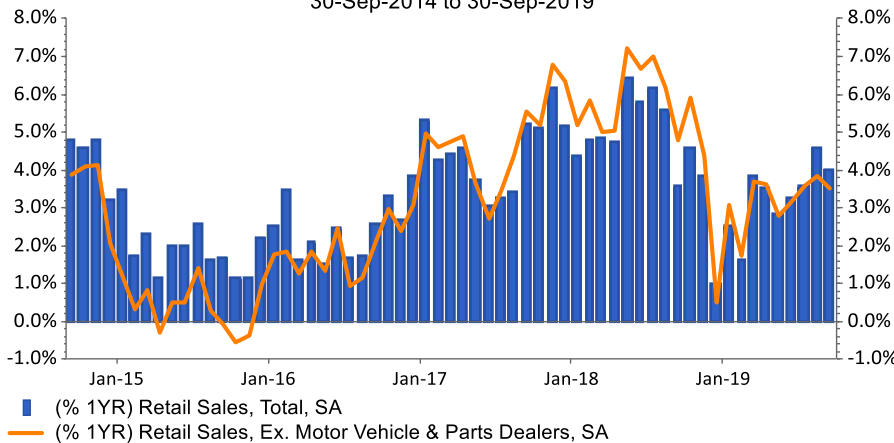
30-Sep-2014 to 30-Sep-2019



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US Retail Sales

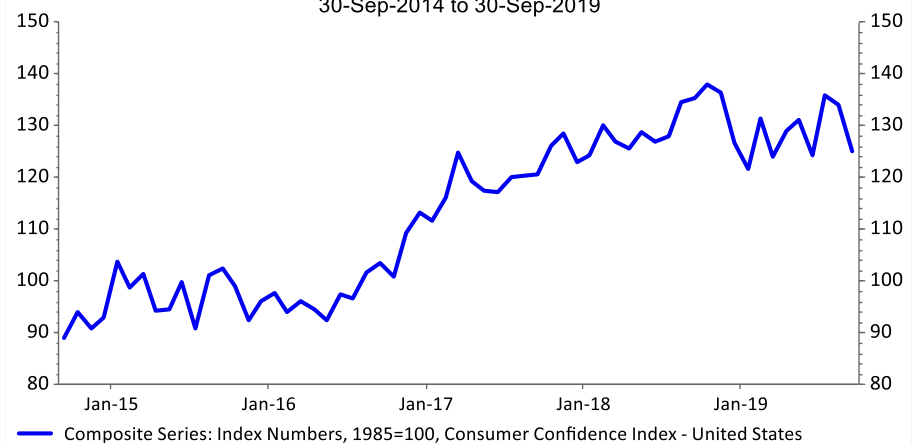
30-Sep-2014 to 30-Sep-2019



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US Consumer Confidence

30-Sep-2014 to 30-Sep-2019

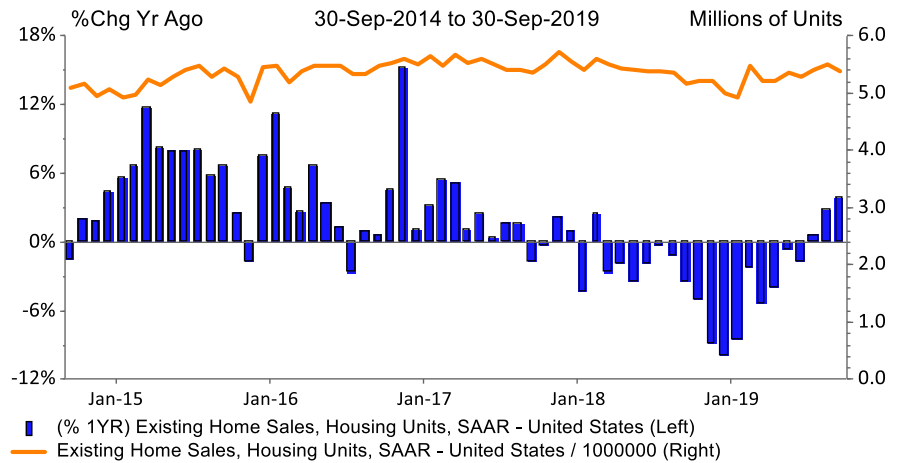


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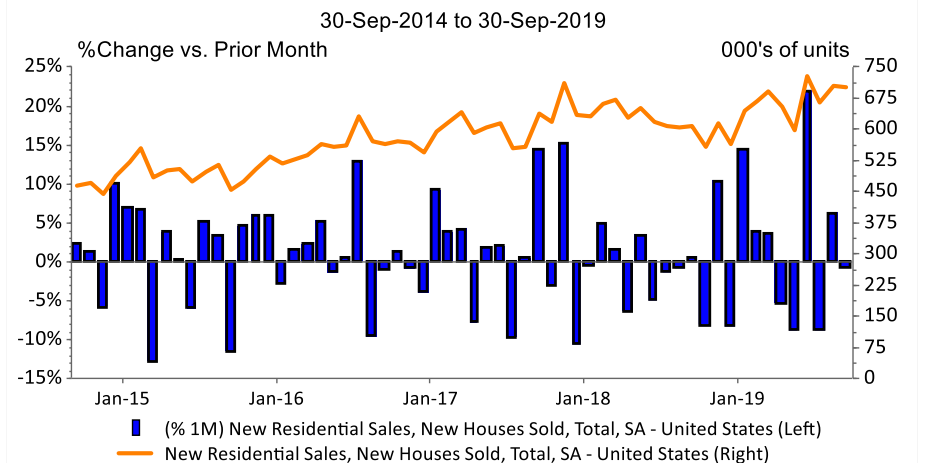
U.S. Economic Environment

US Existing Home Sales



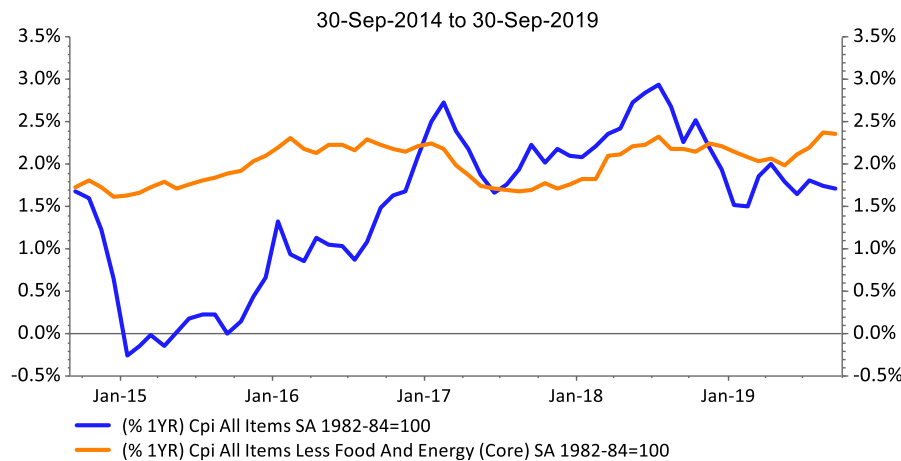
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US New Home Sales



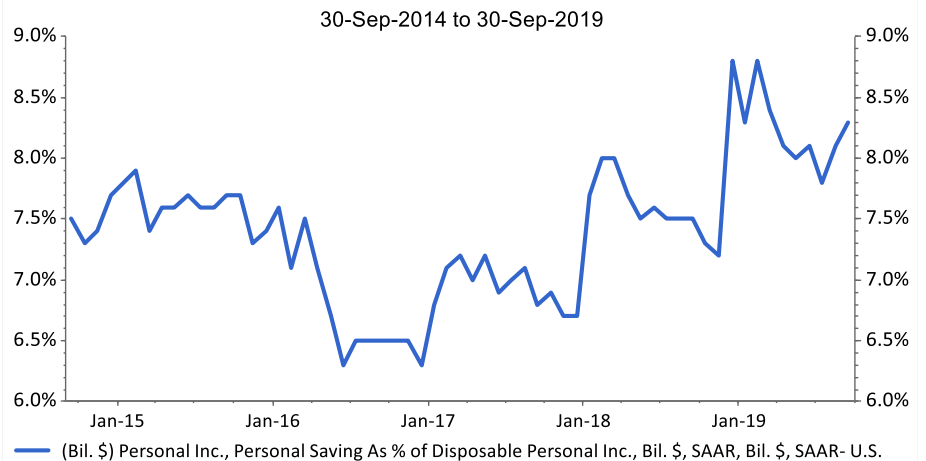
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US Consumer Price Inflation



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US Personal Savings Rate



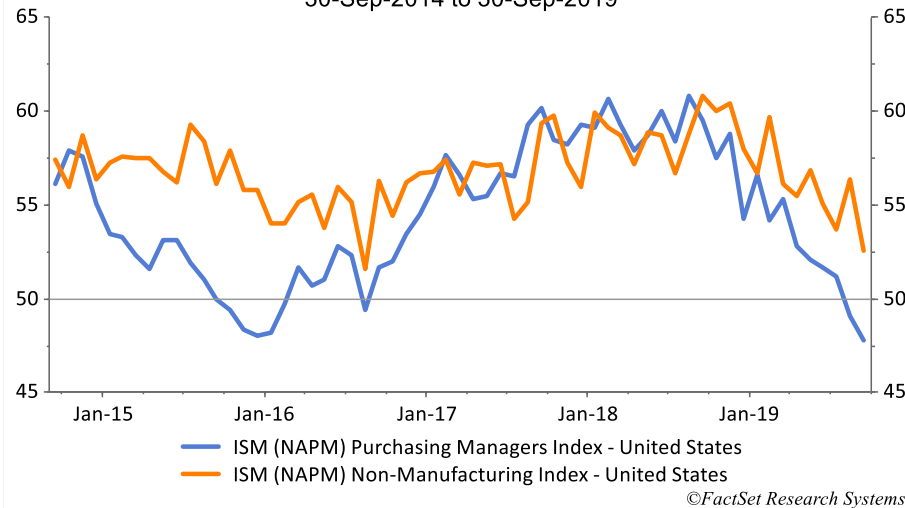
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U.S. and Global Economic Environment

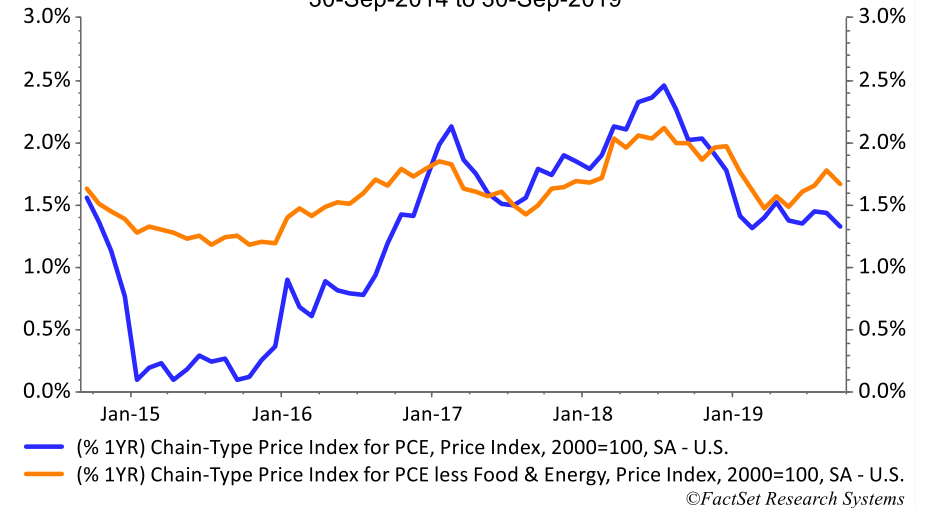
ISM Report on Business

30-Sep-2014 to 30-Sep-2019



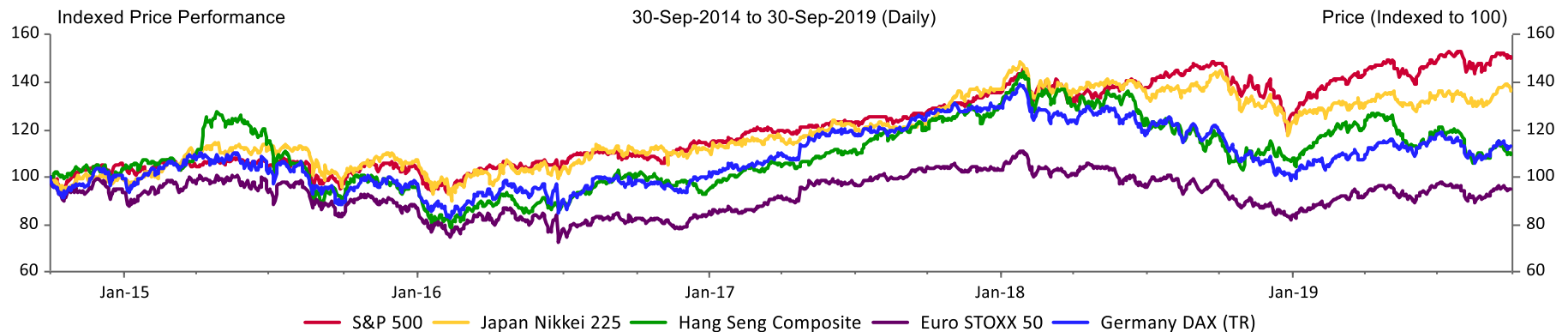
US PCE Inflation

30-Sep-2014 to 30-Sep-2019



S&P 500 vs. Peers

30-Sep-2014 to 30-Sep-2019 (Daily)

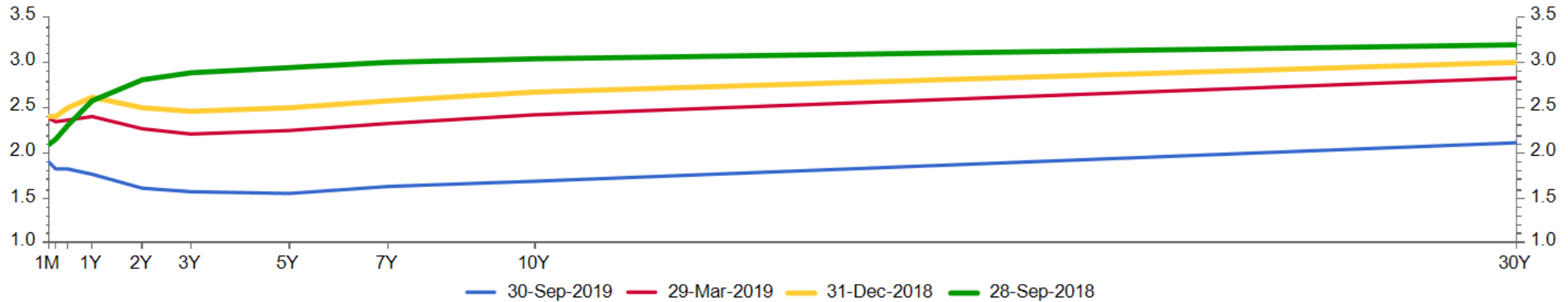


Source: FactSet Prices



Market Environment

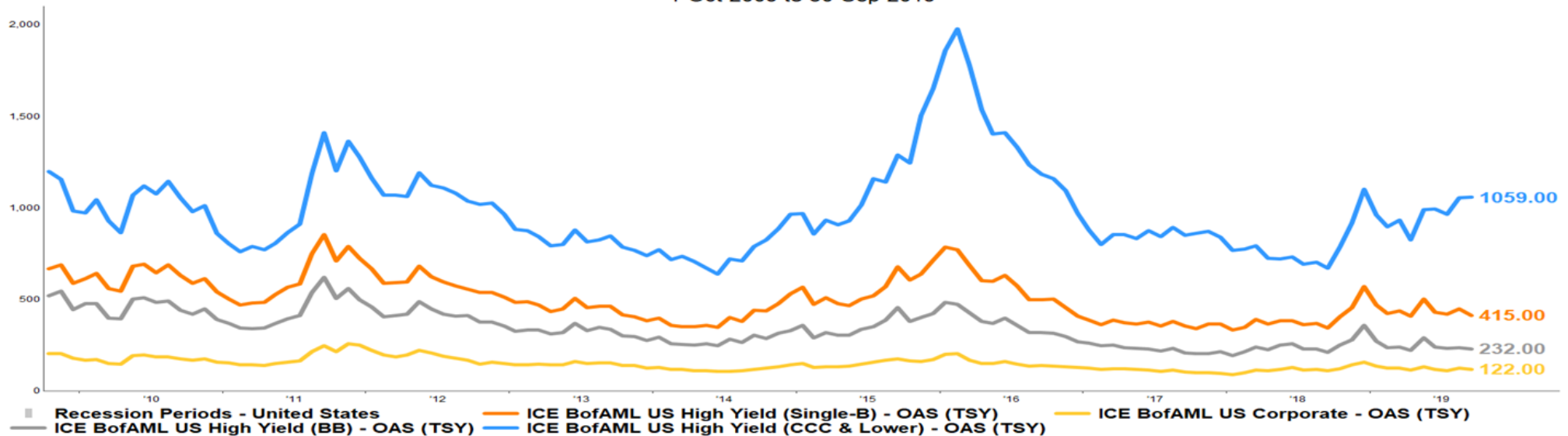
United States Treasury Yield Curve



Source: FactSet Interest Rate Database

Corporate Credit OAS (BofAML Indices)

1-Oct-2009 to 30-Sep-2019

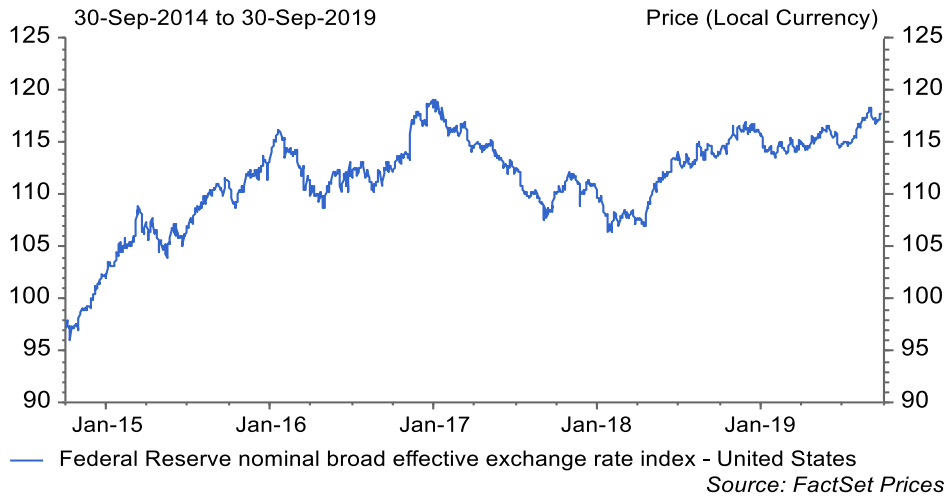


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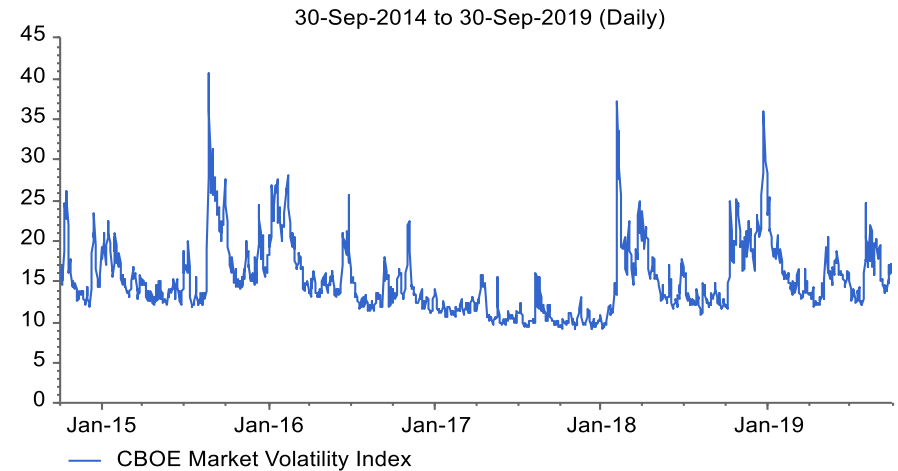


Market Environment

Closing Price Fed Nominal Broad Dollar Index



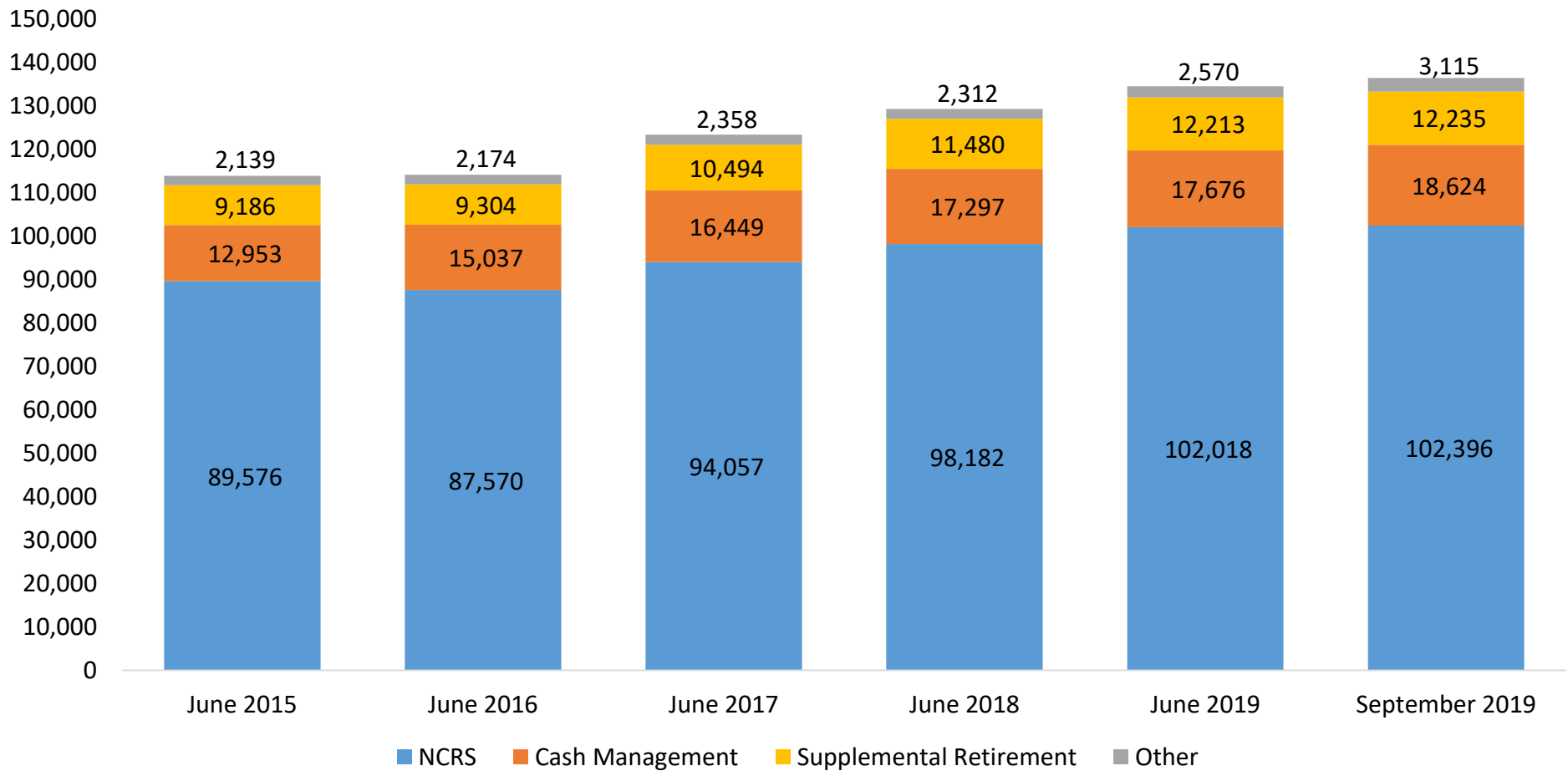
Closing Price CBOE VIX Index



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.	06/19	2.3	09/19	3.5	09/19	1.7	Asia/Pacific/Latam						
Europe							China	09/19	6.0			09/19	3.0
Germany	06/19	0.4	09/19	5.0	09/19	1.2	India	06/19	5.0			08/19	6.3
France	06/19	1.4	08/19	8.5	09/19	0.9	Japan	06/19	1.0	08/19	2.2	09/19	0.2
U.K.	06/19	1.3	08/19	3.9	09/19	1.7	Indonesia	06/19	5.1			09/19	3.4
Italy	06/19	0.1	08/19	9.5	09/19	0.3	Brazil	06/19	1.0			09/19	2.9
Spain	06/19	2.0	08/19	13.8	09/19	0.1	Australia	06/19	1.4	09/19	5.2	06/19	1.6

Assets Under Management (\$MM)

\$136.4 billion as of September 30, 2019



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, 2019

	Market Value (\$MM)	%	Target	Range		Relative %	Relative \$ (\$MM)
				Minimum	Maximum		
Growth	\$47,107	46.00%	58.00%	37.00%	71.00%	-12.00%	(\$12,283)
Public Equity	32,695	31.93%	42.00%	37.00%	47.00%	-10.07%	(10,311)
Private Equity	5,465	5.34%	6.00%	0.00%	8.75%	-0.66%	(679)
Non Core Real Estate	3,224	3.15%	3.00%	0.00%	8.00%	0.15%	152
Opportunistic Fixed Income	5,722	5.59%	7.00%	0.00%	7.50%	-1.41%	(1,445)
Rates & Liquidity	41,279	40.31%	29.00%	24.00%	42.00%	11.31%	11,584
IG Fixed Income & Cash	30,915	30.19%	28.00%	24.00%	32.00%	2.19%	2,244
Pension Cash	10,365	10.12%	1.00%	0.00%	10.00%	9.12%	9,341
Inflation Sensitive & Diversifiers	11,907	11.63%	11.00%	4.00%	16.00%	0.63%	643
Inflation Sensitive	6,115	5.97%	6.00%	2.00%	7.50%	-0.03%	(29)
Core Real Estate	5,791	5.66%	5.00%	2.00%	10.00%	0.66%	672
Multi-Strategy	2,103	2.05%	2.00%	0.00%	4.00%	0.05%	55
Grand Total	\$102,396	100.00%					



NCRS Asset Allocation (Unaudited)

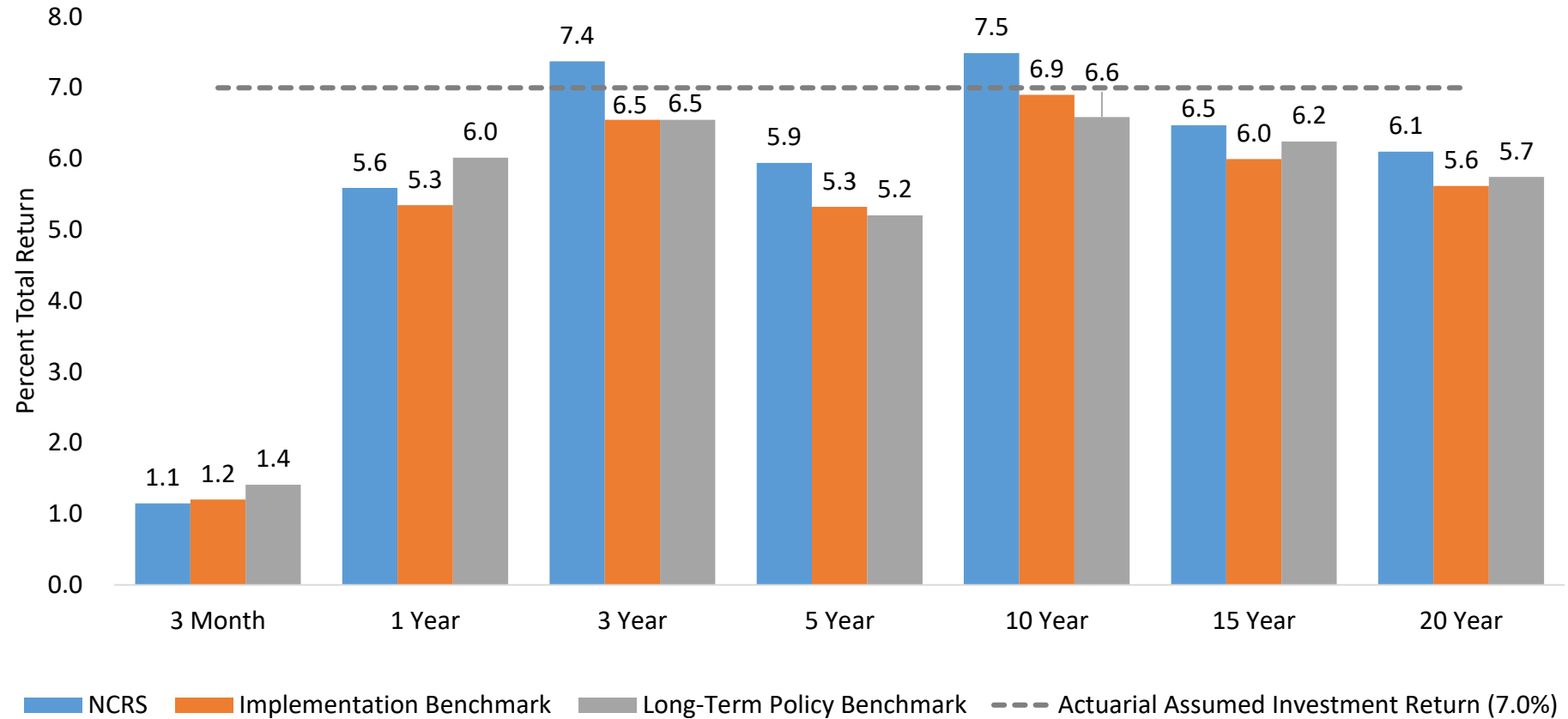
As of November 13, 2019

	Market Value (\$MM)	%	Target	Range		Relative %	Relative \$ (\$000)
				Minimum	Maximum		
Growth	\$47,465	45.91%	58.00%	37.00%	71.00%	-12.09%	(\$12,502)
Public Equity	33,084	32.00%	42.00%	37.00%	47.00%	-10.00%	(10,340)
Private Equity	5,435	5.26%	6.00%	0.00%	8.75%	-0.74%	(768)
Non Core Real Estate	3,275	3.17%	3.00%	0.00%	8.00%	0.17%	173
Opportunistic Fixed Income	5,671	5.49%	7.00%	0.00%	7.50%	-1.51%	(1,566)
Rates & Liquidity	41,941	40.57%	29.00%	24.00%	42.00%	11.57%	11,958
IG Fixed Income & Cash	30,902	29.89%	28.00%	24.00%	32.00%	1.89%	1,953
Pension Cash	11,039	10.68%	1.00%	0.00%	10.00%	9.68%	10,005
Inflation Sensitive & Diversifiers	11,832	11.44%	11.00%	4.00%	16.00%	0.44%	459
Inflation Sensitive	6,100	5.90%	6.00%	2.00%	7.50%	-0.10%	(103)
Core Real Estate	5,732	5.54%	5.00%	2.00%	10.00%	0.54%	563
Multi-Strategy	2,152	2.08%	2.00%	0.00%	4.00%	0.08%	84
Grand Total	\$103,391	100.00%					



NCRS Total Net Portfolio Return vs. Benchmarks

As of September 30, 2019



Notes:

Actuarial Assumed Investment Return was lowered from 7.2% to 7.0% in April 2018

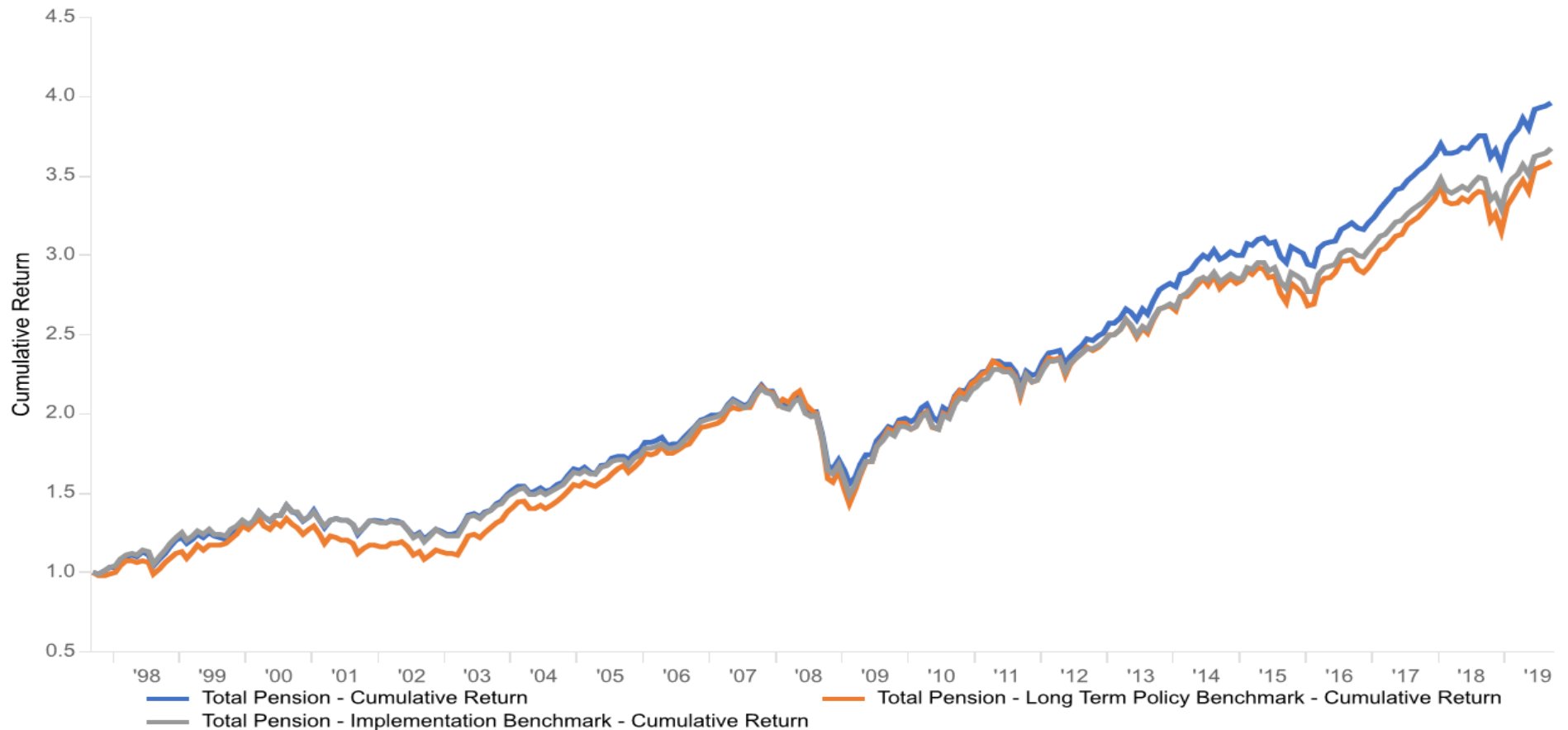
Returns for periods greater than one year are annualized.

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 U.S. Treasury Index; 6% Bloomberg Commodity Index; and 4% BOAML 1-3 Years U.S. Inflation-Linked Treasury Index.



Growth of a Dollar Through September 30, 2019



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Notes:

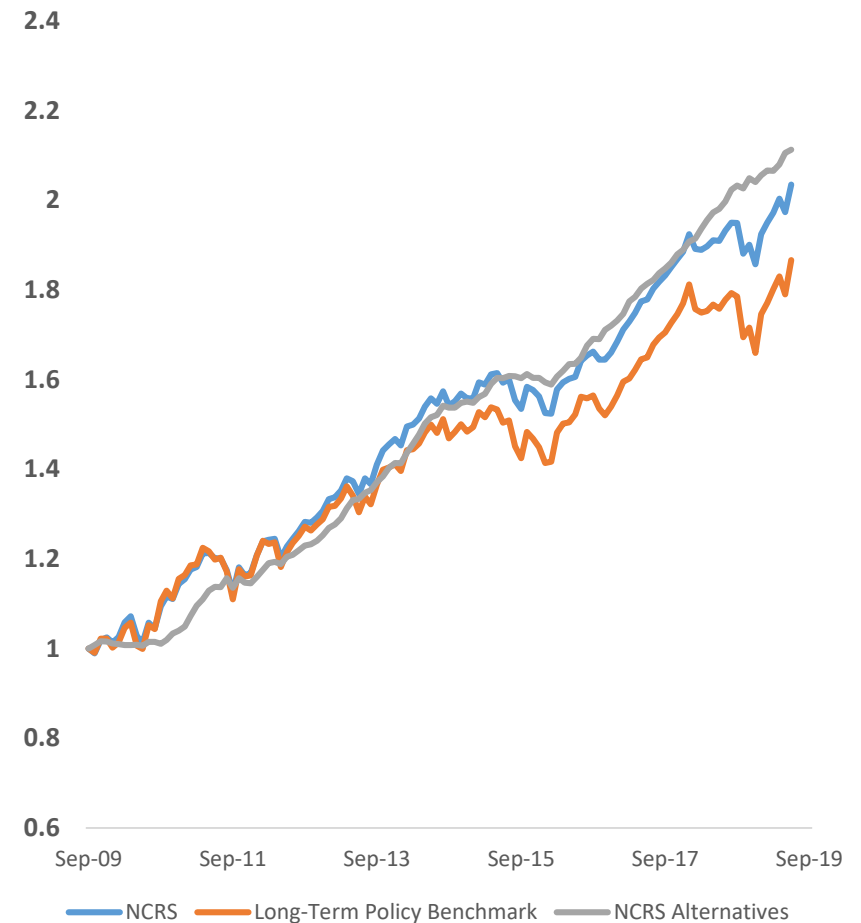
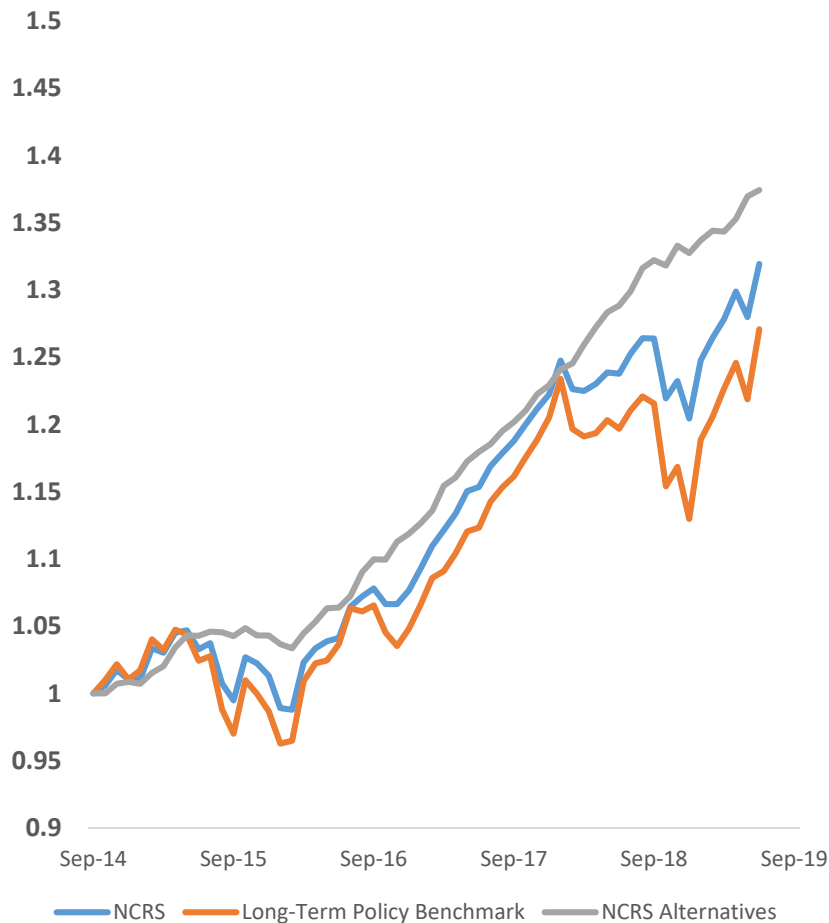
Long-Term Policy Benchmark is comprised of 57% MSCI ACWI IMI Net; 33% BOAML 5+ Years U.S. Treasury Index; 6% Bloomberg Commodity Index; and 4% BOAML 1-3 Years U.S. Inflation-Linked Treasury Index.



Growth of a Dollar

5 Years Ending September 30, 2019

10 Years Ending September 30, 2019

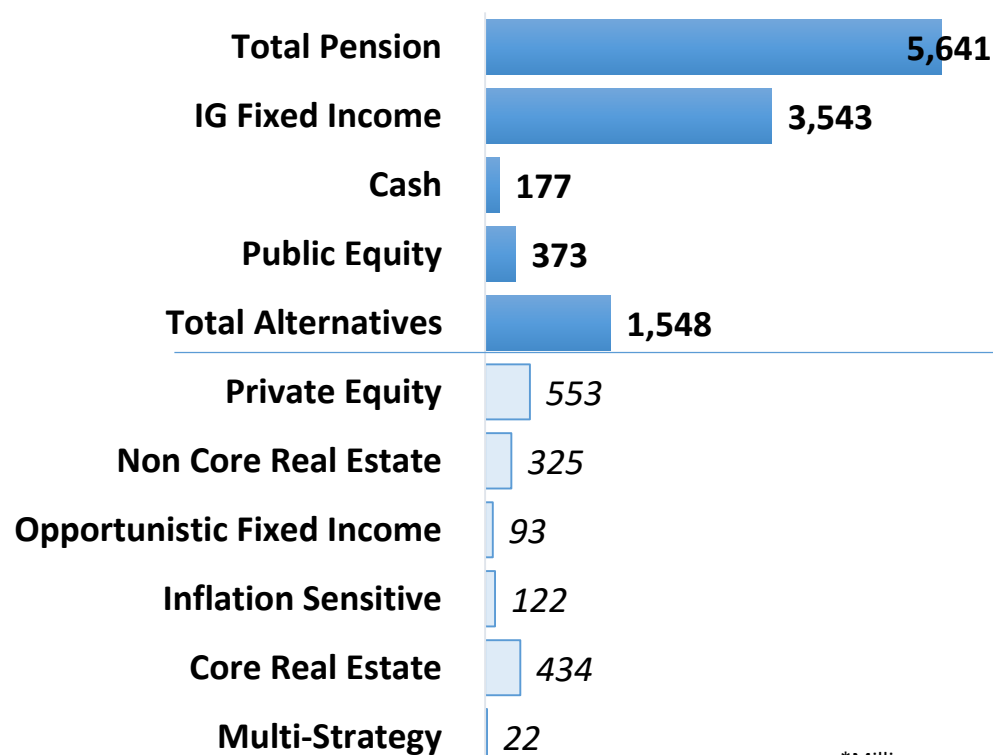


Note: NCRS Alternatives includes the following: Core Real Estate; Inflation Sensitive – Private Natural Resources; Inflation Sensitive – Real Assets and Other Diversifiers; Multi-Strategy Investments; Non Core Real Estate; Opportunistic Fixed Income; Private Equity; Equity Hedge Strategies; and closed-end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

Estimated Contribution to Total Plan Return – 1 Year

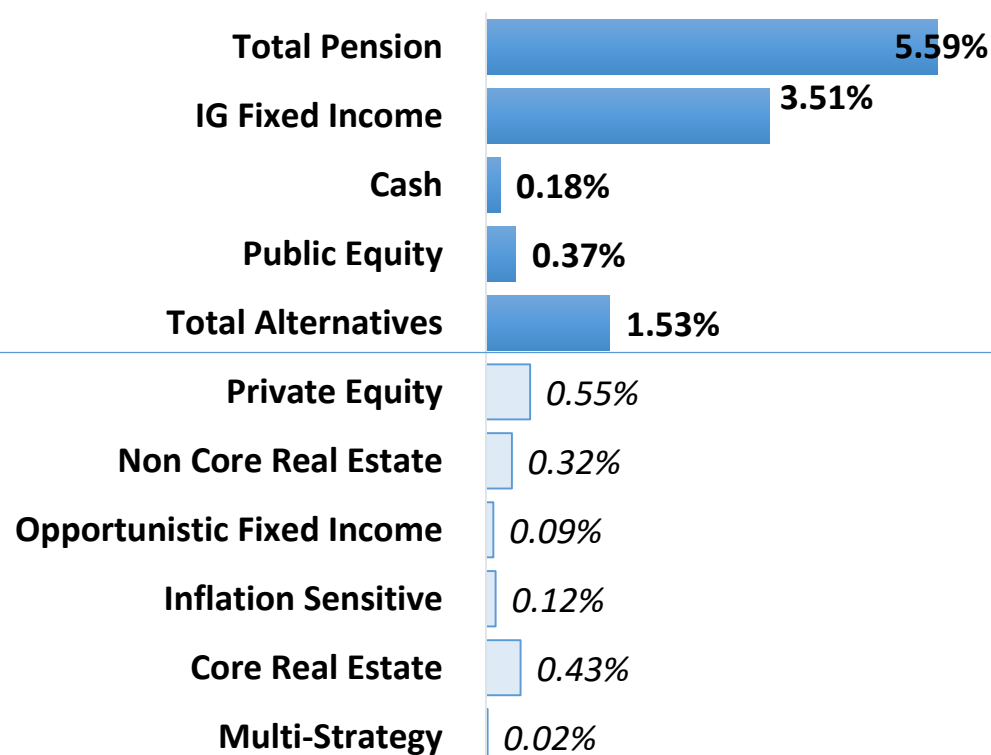
As of September 30, 2019

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

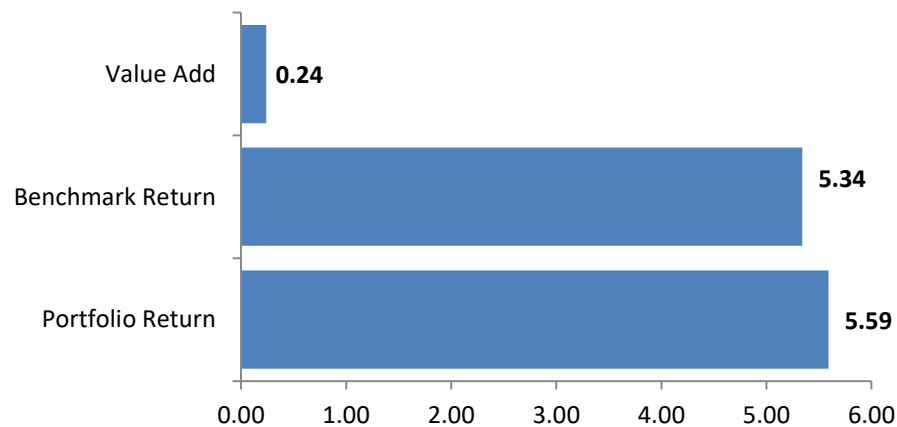
2.) Alternatives for this analysis include the following: Private Equity, Non Core Real Estate, Opportunistic Fixed Income, Inflation Sensitive, Core Real Estate, and Multi-Strategy investments.



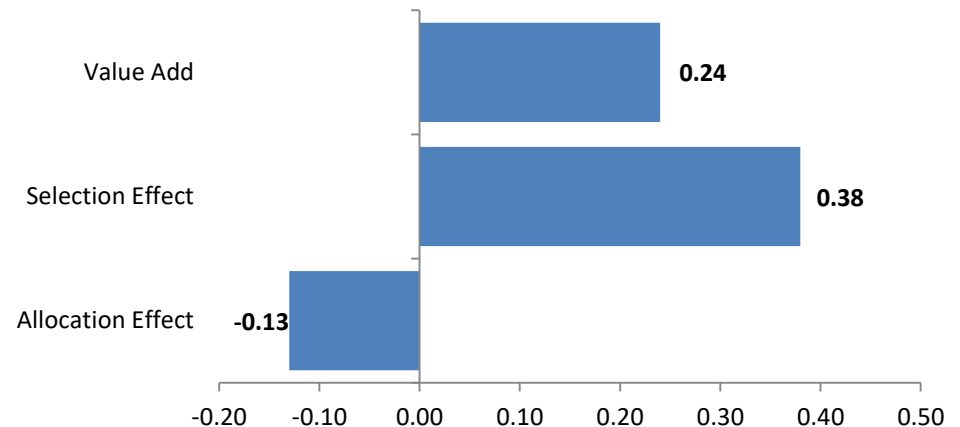
NCRS Net of Fees Return Attribution

Total Fund vs. Implementation Benchmark: 1 Year Ending September 30, 2019

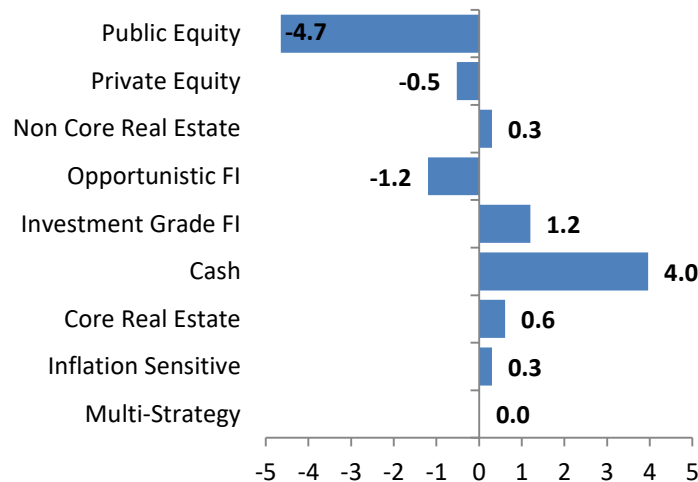
Total Fund Performance



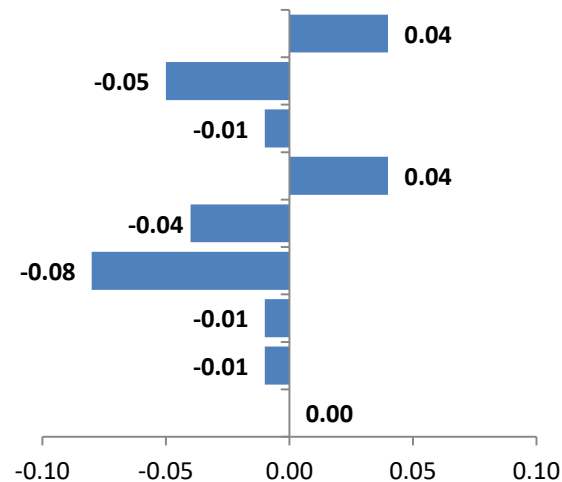
Attribution



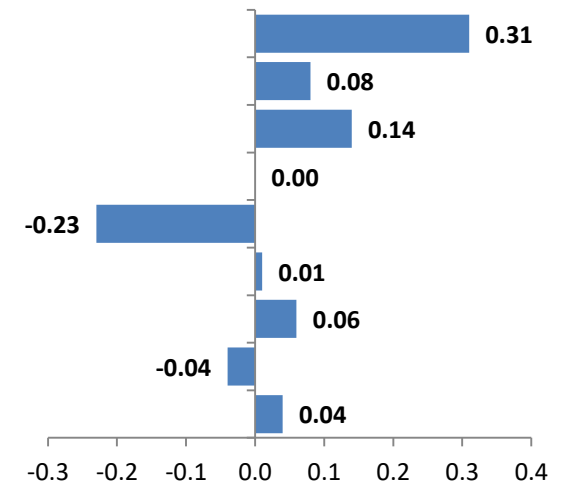
Avg Active Weight



Allocation Effect



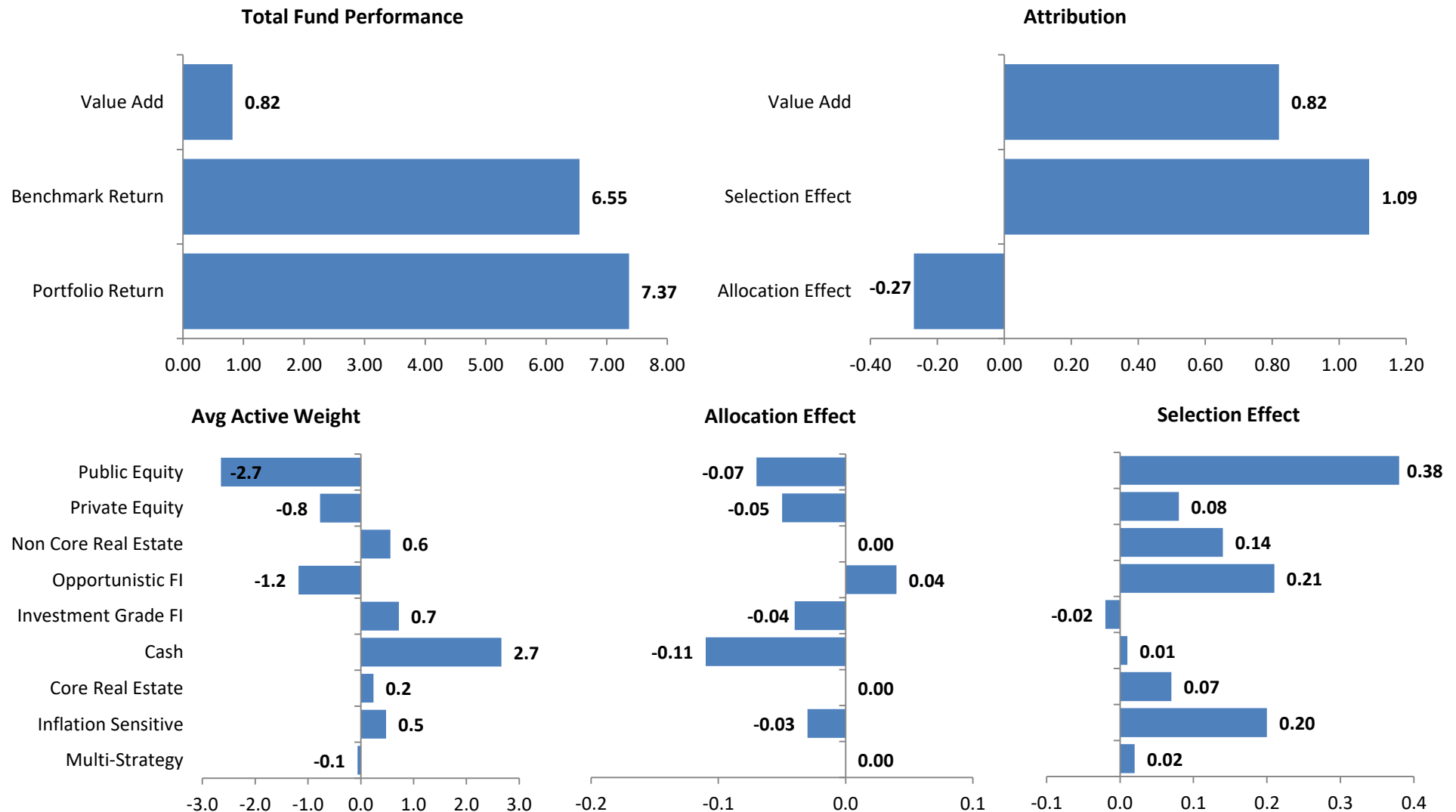
Selection Effect





NCRS Net of Fees Return Attribution

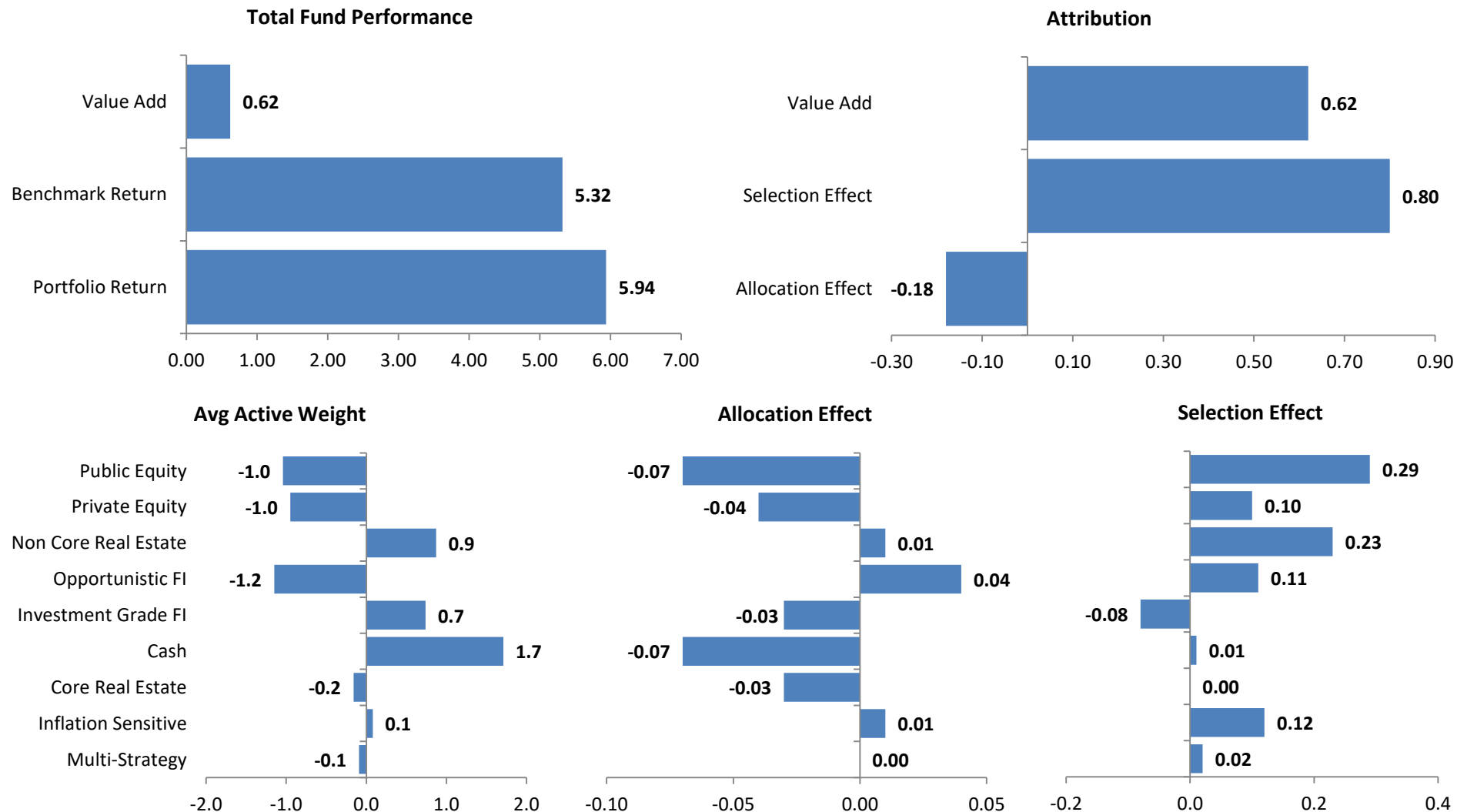
Total Fund vs. Implementation Benchmark: 3 Years Ending September 30, 2019





NCRS Net of Fees Return Attribution

Total Fund vs. Implementation Benchmark: 5 Years Ending September 30, 2019

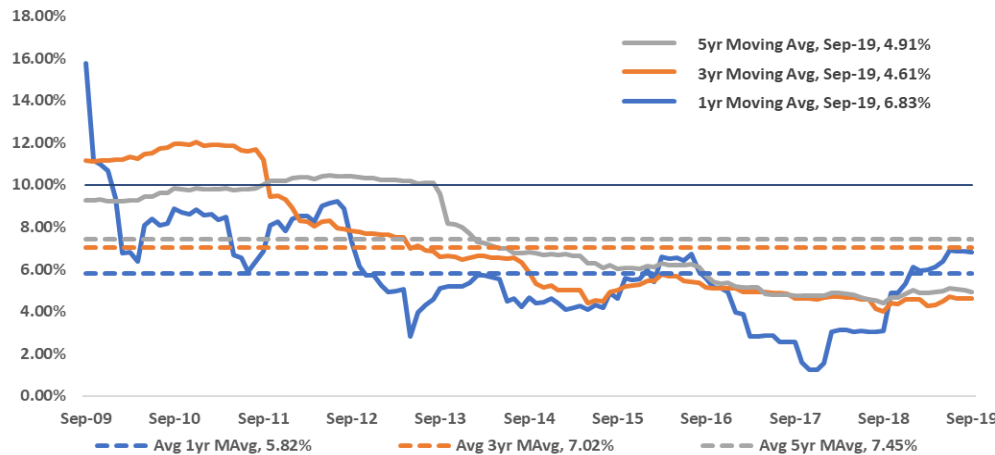




NCRS Net of Fees Risk Metrics

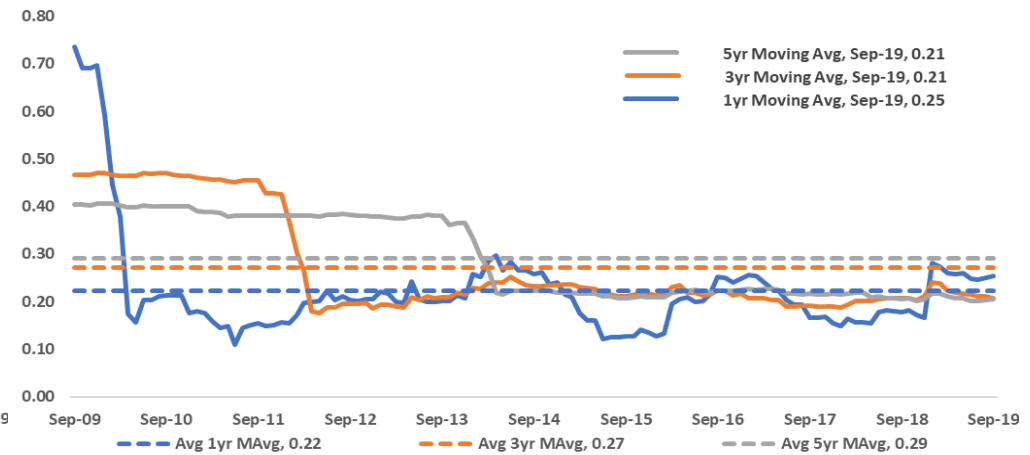
As of September 30, 2019

Rolling Volatility



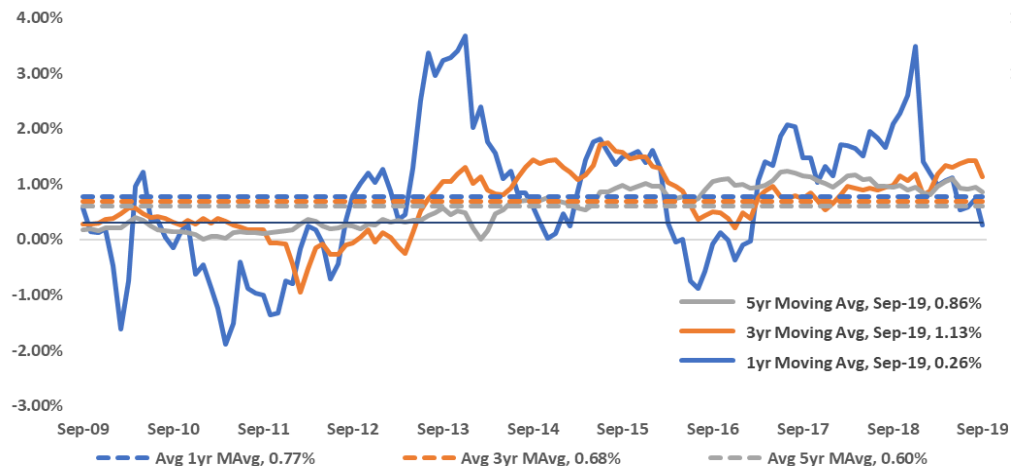
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Rolling Tracking Error



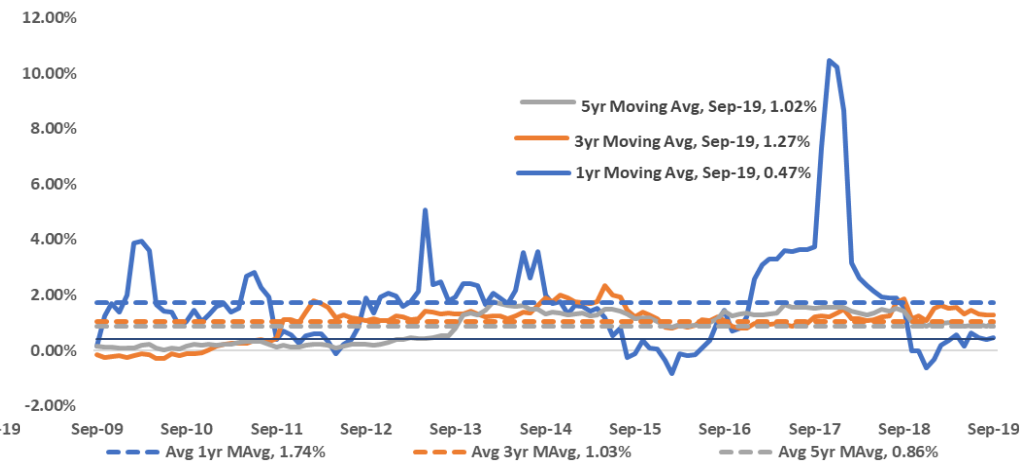
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Rolling Information Ratio



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Rolling Sharpe Ratio

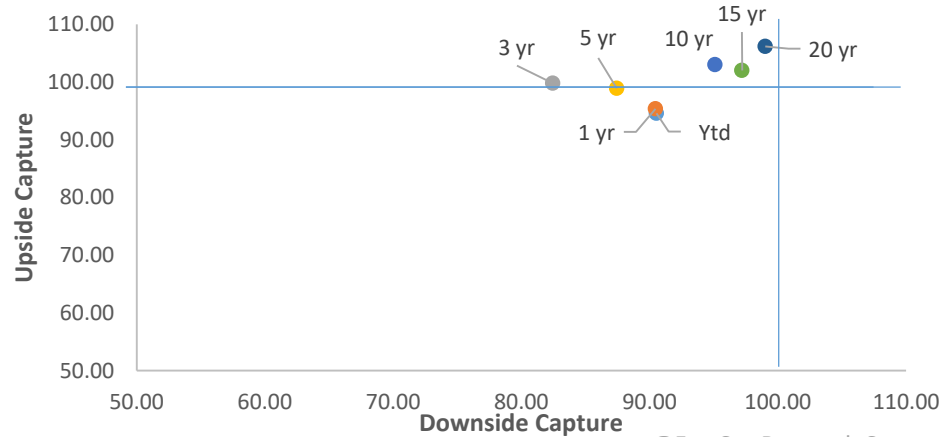


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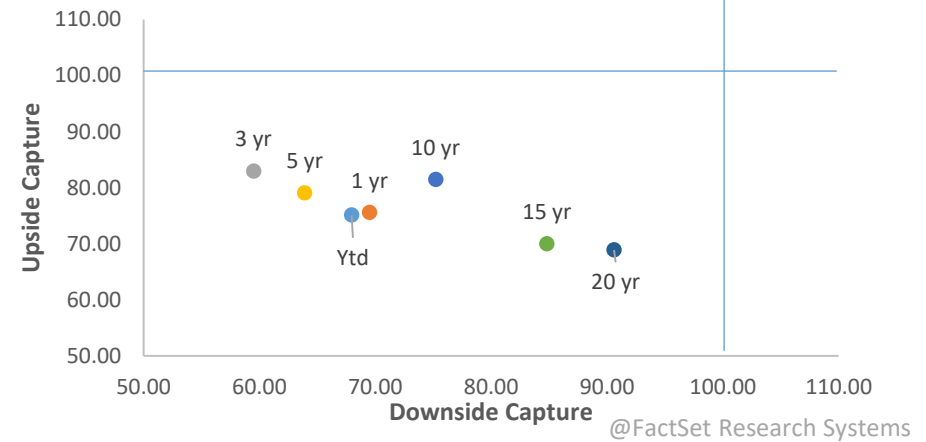
NCRS Net of Fees Risk Metrics As of September 30, 2019

Up/Down Capture
Implementation Benchmark



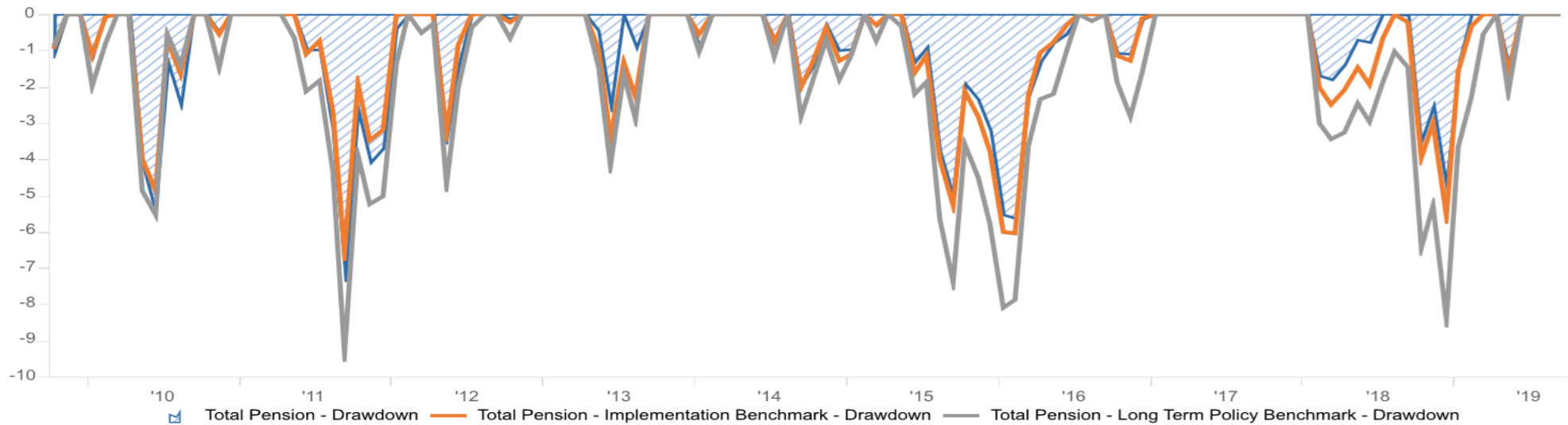
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Up/Down Capture
Long Term Policy Benchmark



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Drawdown



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NCRS Gross of Fees Return and Risk

BNY Mellon Universe: U.S. Public Funds > \$20B; Data as of September 30, 2019

Returns	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
25th Percentile	6.16	8.74	7.40	8.85	7.45	6.78
Median Percentile	4.92	8.50	6.80	8.47	7.35	6.47
75th Percentile	4.45	8.15	6.52	8.01	6.91	6.36
NCRS	6.05	7.89	6.51	8.02	6.91	6.44
Percentile Rank (1 = highest performance)	36	89	77	71	75	63

Risk	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
25th Percentile	9.42	6.35	6.38	7.45	9.00	9.23
Median Percentile	8.18	5.64	5.72	6.82	8.49	8.60
75th Percentile	6.89	4.83	4.94	5.94	7.89	8.14
NCRS	6.79	4.58	4.87	5.93	7.22	7.60
Percentile Rank (1 = highest risk)	77	83	83	77	94	94

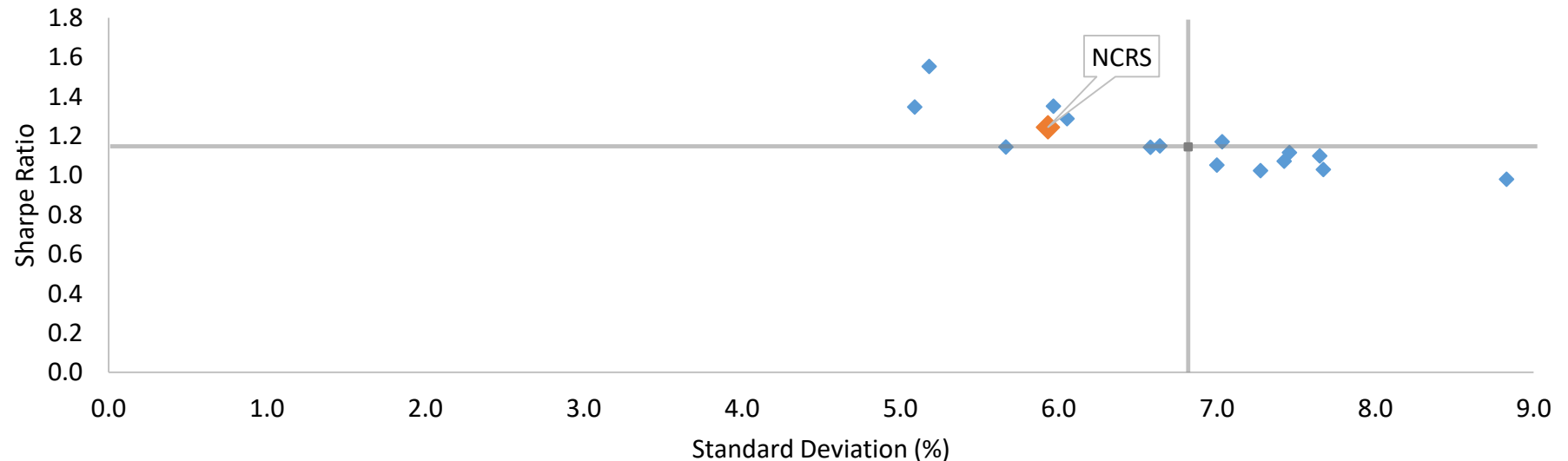


NCRS Gross of Fees Sharpe Ratio

BNY Mellon Universe: U.S. Public Funds > \$20B; Data as of September 30, 2019

Sharpe	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
25th Percentile	0.54	1.34	1.12	1.28	0.77	0.61
Median Percentile	0.34	1.20	1.00	1.14	0.70	0.58
75th Percentile	0.27	1.10	0.91	1.06	0.66	0.51
NCRS	0.55	1.35	1.12	1.24	0.77	0.62
Percentile Rank (1 = highest performance)	24	24	24	30	25	13

10 Year Plot: Sharpe Ratio vs. Volatility

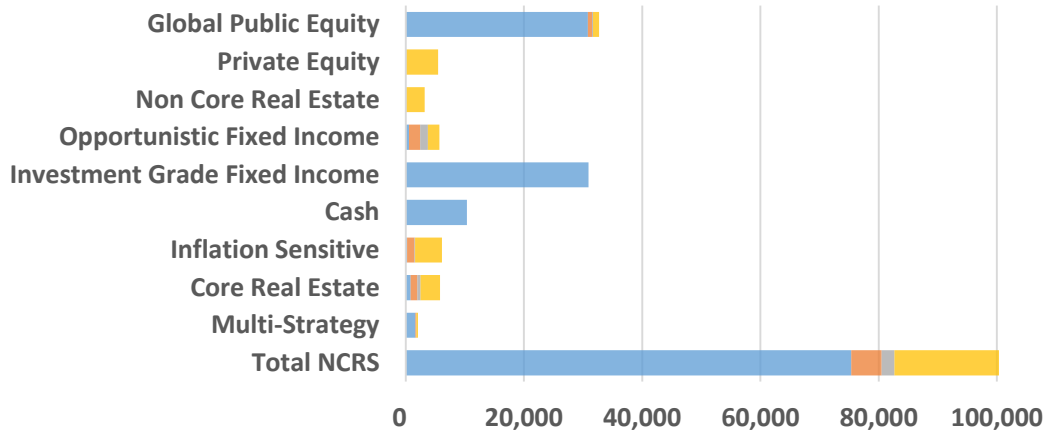


Note: Data shown is gross of fees with the exception of incentive payments, which have been deducted from NAV when applicable.

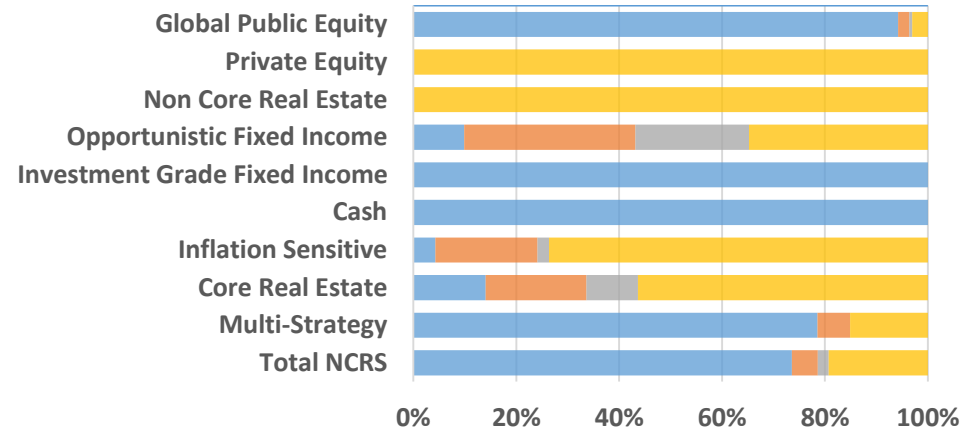


NCRS Liquidity Profile As of September 30, 2019

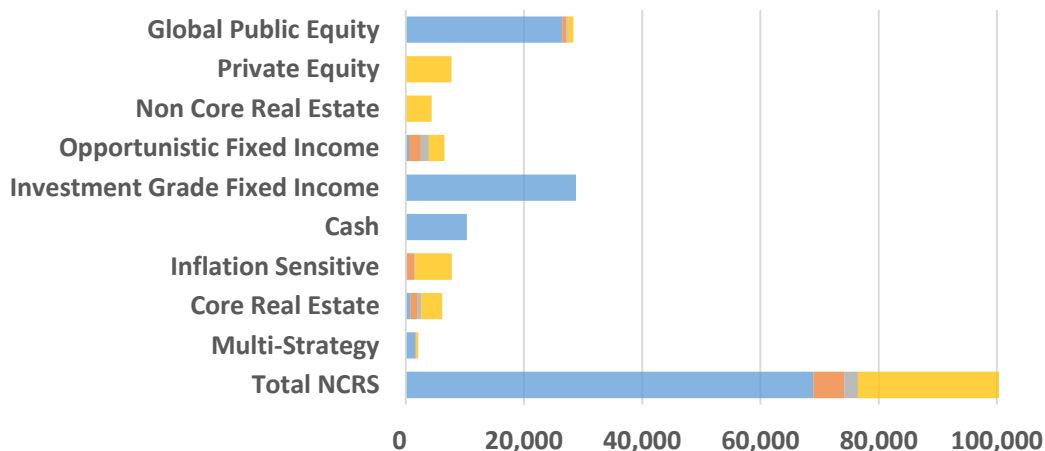
Liquidity Allocation (\$ Market Value)



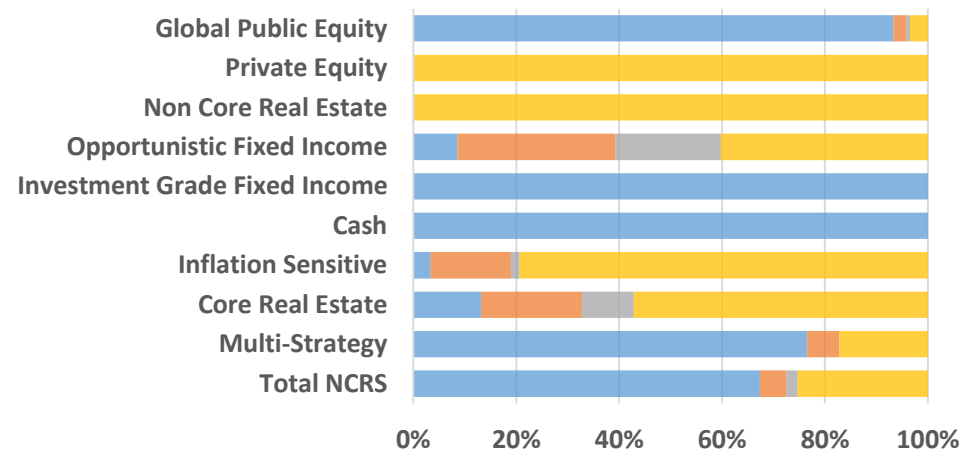
Liquidity Allocation (% Market Value)



Liquidity Allocation (\$ Market Value + Unfunded)



Liquidity Allocation (% Market Value + Unfunded)

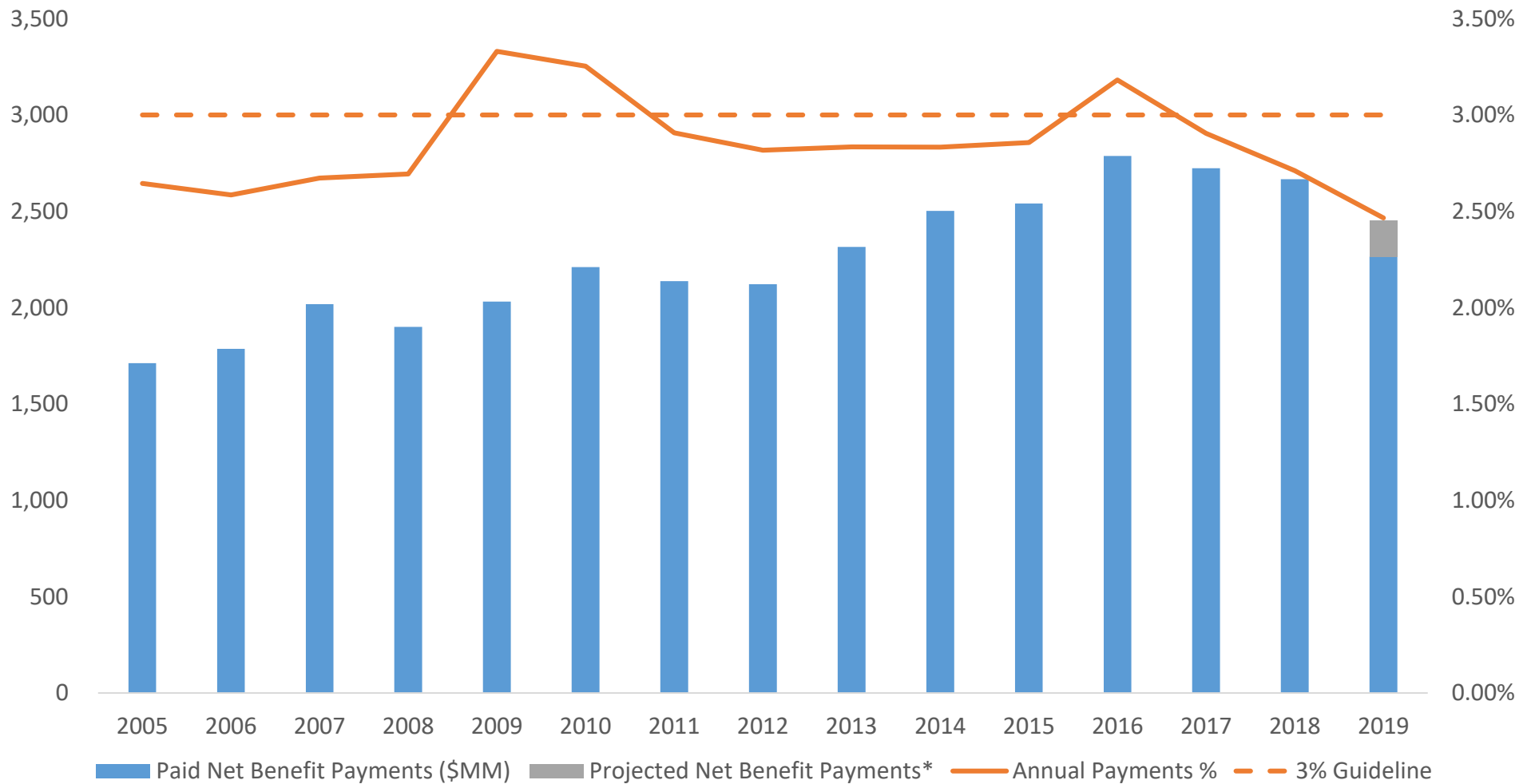


Note: ■ Level 1 Liquidity = T+3; ■ Level 2 = T+3 to 12 Months; ■ Level 3 = 12 to 24 Months; ■ Level 4 = Greater than 24 Months



NCRS Liquidity Profile

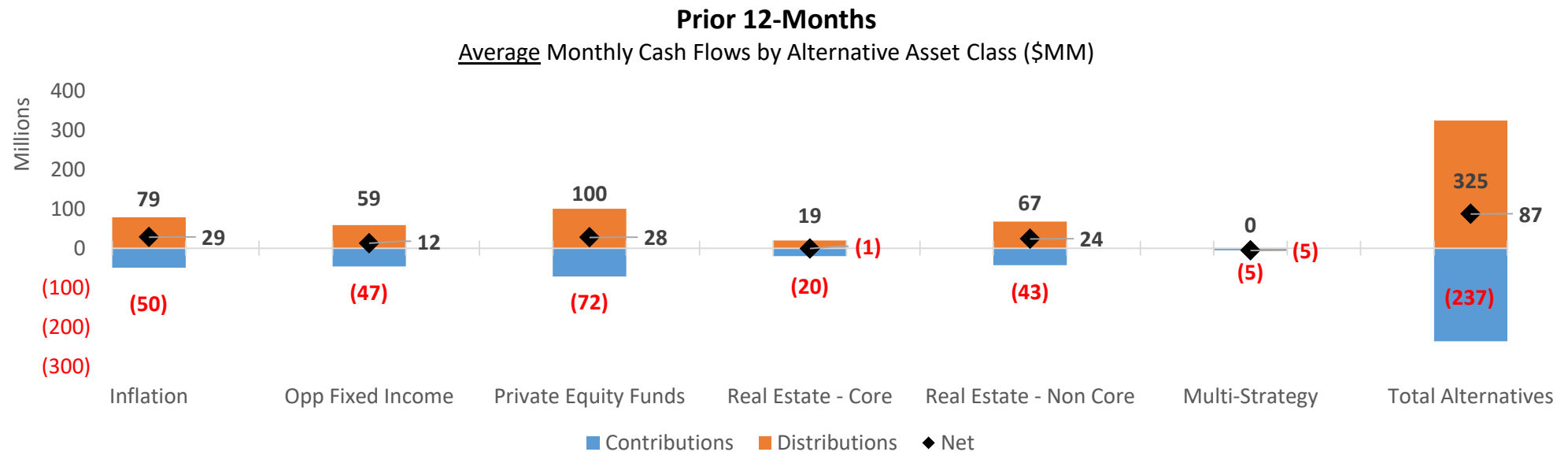
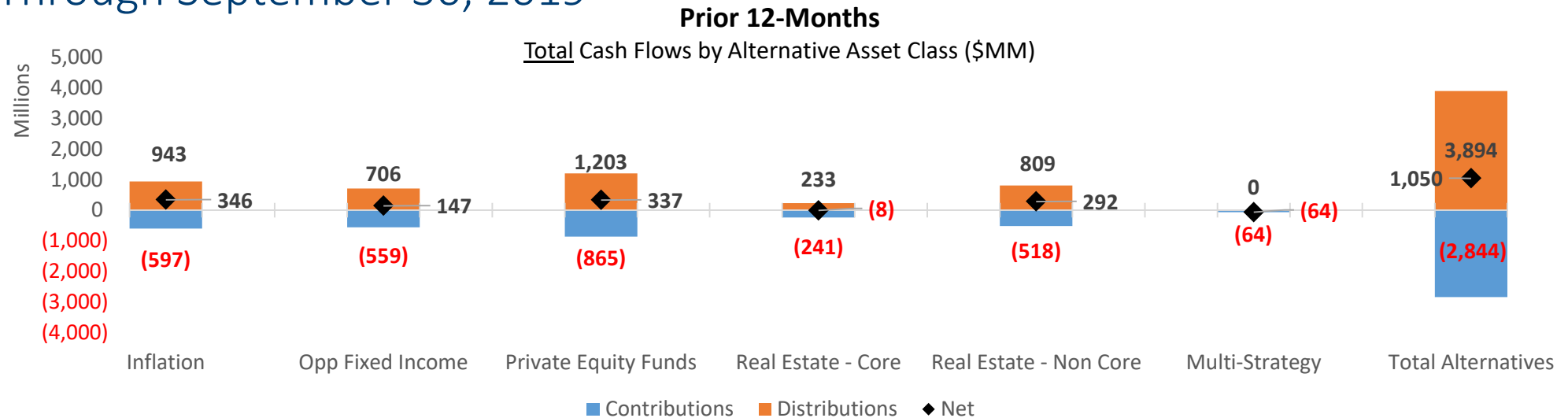
Net benefit payments by calendar year



*2019 Paid Net Benefit Payments as of 11/01/2019



NCRS Alternatives Liquidity Profile Through September 30, 2019





NCRS Asset Class Net of Fees Performance

As of September 30, 2019

	Market Value (\$MM)	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
Growth	\$47,107	2.72	9.87	7.38	9.30	6.99	5.67
Benchmark ¹		2.00	8.44	6.11	8.30	6.40	4.84
Public Equity	\$32,695	1.03	9.81	6.98	9.16	6.97	5.65
Benchmark ²		0.48	8.91	6.31	8.43	6.36	4.72
Private Equity	\$5,465	10.17	12.78	10.54	10.74	9.24	6.35
Benchmark ³		8.70	11.27	8.42	11.81	11.35	10.56
Non-Core Real Estate	\$3,224	9.99	11.60	12.96	10.80	7.40	7.09
Benchmark ⁴		5.53	7.42	6.97	7.58	6.75	7.32
Opportunistic Fixed Income	\$5,722	1.59	6.16	3.48	8.10	-	-
Benchmark ⁵		1.70	2.67	1.62	3.02	-	-
Rates & Liquidity	\$41,279	10.57	3.03	3.65	4.76	5.22	6.12
Benchmark ⁶		12.40	3.37	4.06	4.87	5.11	5.99
IG Fixed Income	\$30,915	11.98	3.41	3.94	4.91	5.33	6.20
Benchmark ⁷		12.77	3.44	4.17	4.93	5.14	6.02
Cash	\$10,365	2.35	1.66	1.28	-	-	-
Benchmark ⁸		2.24	1.50	0.95	-	-	-
Inflation Sensitive & Diversifiers	\$11,907	4.63	6.73	4.46	3.22	3.94	4.63
Benchmark ⁹		4.37	4.44	3.79	3.49	3.36	4.58
Inflation Sensitive	\$6,115	1.94	6.00	1.75	-0.72	3.05	3.54
Benchmark ¹⁰		2.54	3.00	0.04	-0.57	3.91	3.95
Core Real Estate	\$5,791	7.70	7.61	8.14	8.64	6.61	6.66
Benchmark ¹¹		6.55	6.17	8.37	8.91	6.94	7.29
Multi-Strategy	\$2,103	1.04	6.42	4.98	7.89	5.78	-
Benchmark ¹²		-0.89	5.20	3.73	6.21	7.13	-
Total Pension Plan	\$102,396	5.59	7.37	5.94	7.49	6.47	6.10
Implementation Benchmark ¹³		5.35	6.55	5.32	6.90	6.00	5.62
Long-Term Policy Benchmark ¹⁴		6.02	6.55	5.20	6.59	6.24	5.74



NCRS Calendar Year Asset Class Return Diversification

As of September 30, 2019

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	YTD
Non-Core Real Estate 20.66%	Inflation Sensitive 9.50%	Public Equity 32.68%	Public Equity 17.59%	Public Equity 26.27%	Non-Core Real Estate 19.45%	Non-Core Real Estate 14.84%	Non-Core Real Estate 11.73%	Public Equity 24.44%	Private Equity 18.32%	Public Equity 16.49%
Private Equity 18.00%	IG Fixed Income & Cash 7.05%	Multi-Strategy 16.75%	Multi-Strategy 14.70%	Multi-Strategy 22.61%	Private Equity 14.02%	Private Equity 9.20%	Public Equity 7.33%	Multi-Strategy 13.58%	Non-Core Real Estate 13.32%	Total Pension 10.81%
Multi-Strategy 8.73%	Opportunistic Fixed Income -2.15%	Total Pension 15.08%	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 13.53%	Inflation Sensitive 6.88%	IG Fixed Income & Cash 10.35%
Core Real Estate 8.48%	Non-Core Real Estate -3.08%	IG Fixed Income & Cash 7.63%	Core Real Estate 13.67%	Non-Core Real Estate 12.88%	IG Fixed Income & Cash 8.51%	Multi-Strategy 0.85%	Opportunistic Fixed Income 7.09%	Non-Core Real Estate 12.40%	Opportunistic Fixed Income 5.69%	Multi-Strategy 9.68%
Total Pension 8.34%	Private Equity -4.46%	Opportunistic Fixed Income 6.72%	Total Pension 11.84%	Total Pension 12.28%	Total Pension 6.19%	Pension Cash 0.58%	Core Real Estate 6.68%	Private Equity 11.95%	Core Real Estate 5.67%	Non-Core Real Estate 8.05%
Public Equity 7.88%	Core Real Estate -13.37%	Inflation Sensitive -5.77%	Non-Core Real Estate 7.78%	Private Equity 11.72%	Public Equity 3.68%	Total Pension 0.29%	Total Pension 6.26%	Core Real Estate 10.12%	Pension Cash 1.88%	Core Real Estate 6.50%
Inflation Sensitive 7.82%	Total Pension -19.72%	Private Equity -9.39%	IG Fixed Income & Cash 7.29%	Core Real Estate 11.28%	Opportunistic Fixed Income 3.40%	IG Fixed Income & Cash 0.28%	Private Equity 6.05%	Inflation Sensitive 7.53%	IG Fixed Income & Cash -0.57%	Private Equity 6.38%
IG Fixed Income & Cash 7.09%	Multi-Strategy -25.19%	Core Real Estate -13.63%	Private Equity 5.74%	Inflation Sensitive -1.32%	Multi-Strategy 2.69%	Public Equity -1.26%	Multi-Strategy 6.00%	Opportunistic Fixed Income 7.05%	Total Pension -1.47%	Opportunistic Fixed Income 2.66%
Opportunistic Fixed Income 7.06%	Public Equity -39.90%	Non-Core Real Estate -43.11%	Inflation Sensitive 1.06%	IG Fixed Income & Cash -3.49%	Pension Cash 0.45%	Opportunistic Fixed Income -2.61%	IG Fixed Income & Cash 3.24%	IG Fixed Income & Cash 4.42%	Multi-Strategy -4.79%	Pension Cash 1.70%
					Inflation Sensitive -0.65%	Inflation Sensitive -9.05%	Pension Cash 0.98%	Pension Cash 1.12%	Public Equity -9.32%	Inflation Sensitive 1.26%



New, Incremental, & Unfunded Investment Commitments

Since August 21st IAC Meeting

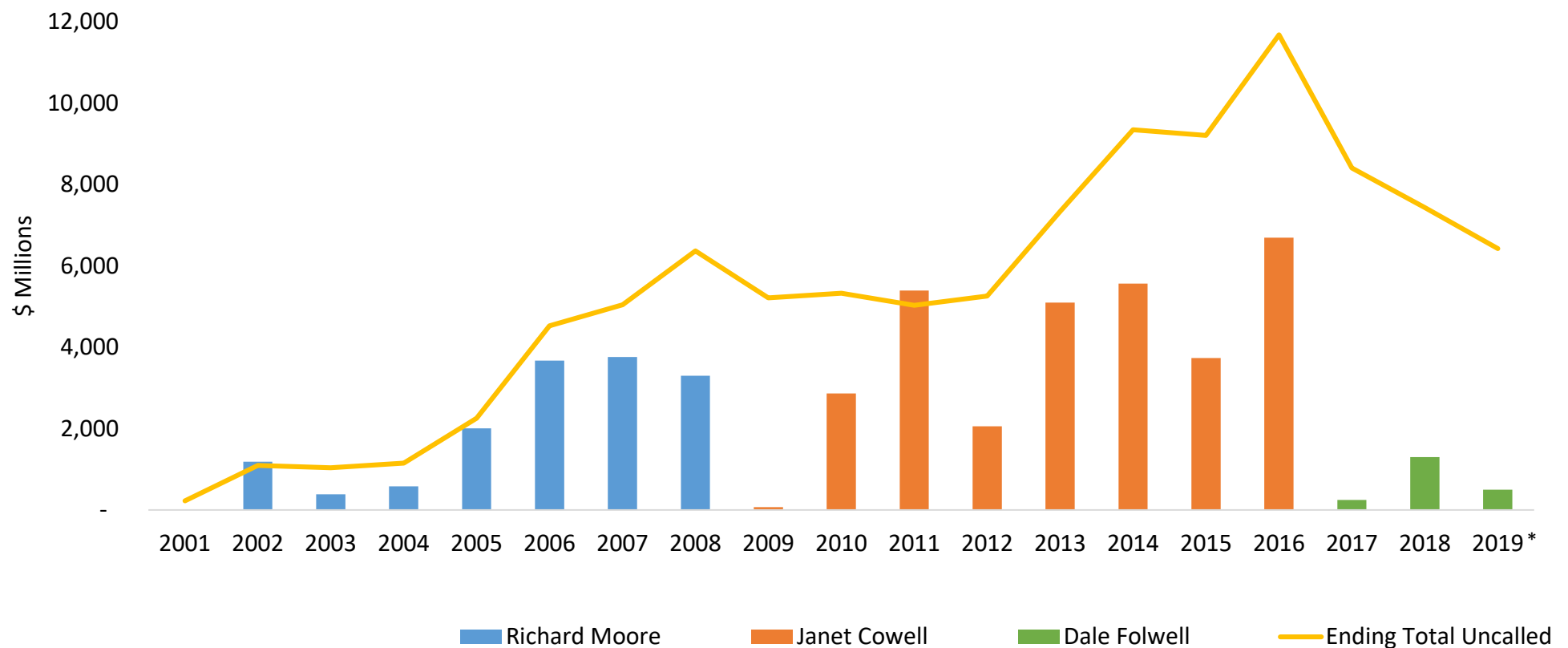
As of September 30, 2019

<u>Fund Name</u>	<u>Firm Name</u>	<u>New or Incremental Commitment (\$MM)</u>	<u>Closing Date</u>
Public Equity			
None			
Private Equity			
NCRS Series II – PE Opportunistic	Landmark Partners	200	9/12
Non-Core Real Estate			
None			
Inflation Sensitive			
None			
Opportunistic Fixed Income			
None			
Multi-Strategy			
AG Cataloochee Fund LP	Angelo Gordon	50	10/25

<u>Asset Class</u>	<u>Unfunded Commitments (\$MM)</u>
Public Equity	0
Private Equity	2,292
Non-Core Real Estate	1,191
Opportunistic Fixed Income	834
Inflation Sensitive	1,682
Core Real Estate	374
Multi Strategy	54
Total	6,428



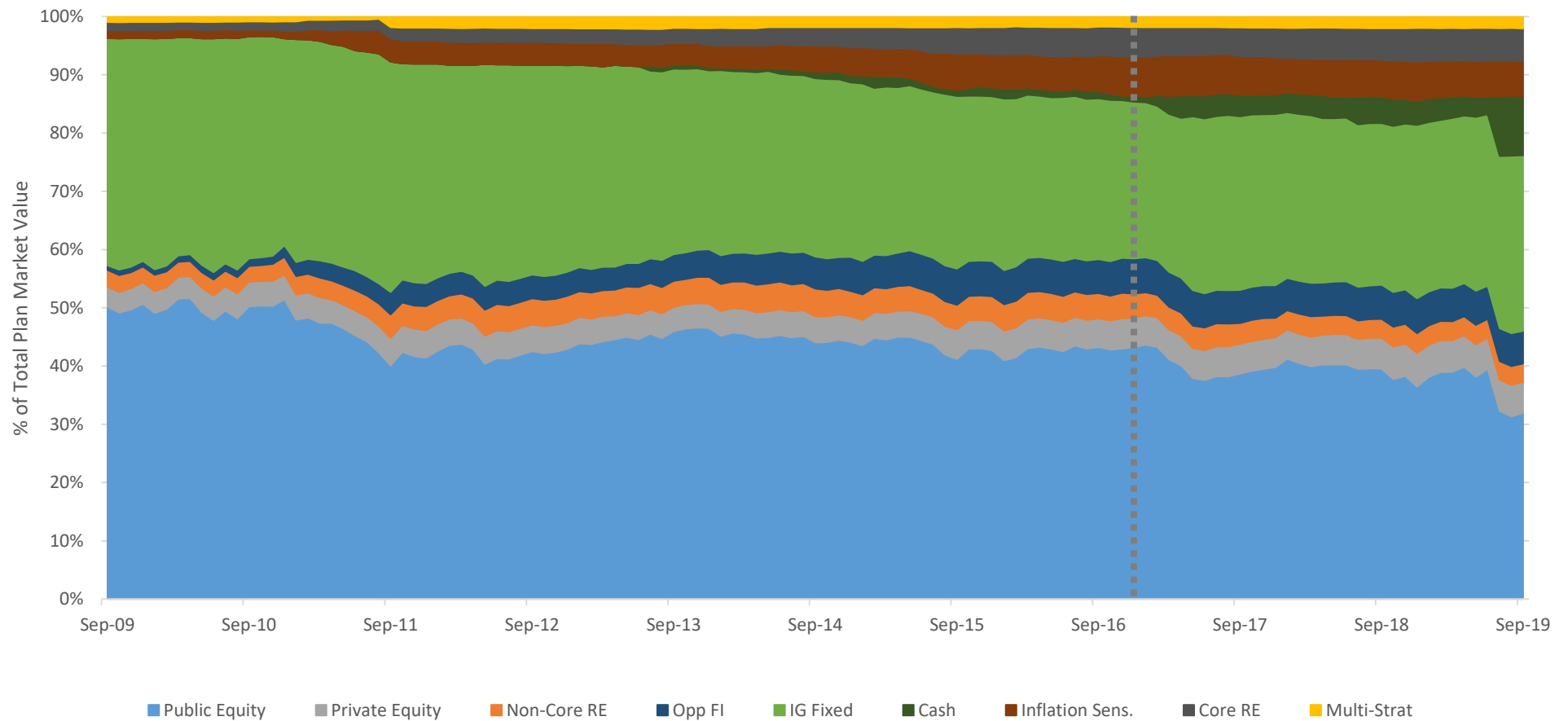
New and Total Unfunded Private Asset Class Commitments By Calendar Year of Closing



*2019 data as of 9/30/2019



Asset Allocation History as of September 30, 2019





Exited Investments

Since August 21st IAC Meeting

<u>Fund Name</u>	<u>Redemption Amount (\$MM)</u>	<u>Redemption Effective</u>
Public Equity		
BlackRock EAFE Int'l Passive	873	10/14
Menta Capital LLC	197	9/30
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, 2019

	Manager	Market Value (\$)	Uncalled (\$)	% MV	% MV Cum.
1	Internal Fixed Income	41,279,338,847	-	40.3%	40.3%
2	Internal Equity	11,056,055,036	-	10.8%	51.1%
3	BlackRock, Inc.	10,867,343,077	-	10.6%	61.7%
4	Blackstone Group, The	2,741,145,769	1,405,231,658	2.7%	64.4%
5	Rockwood Capital	2,614,516,676	231,861,245	2.6%	67.0%
6	Mondrian Investment Partners Limited	2,424,437,861	-	2.4%	69.3%
7	Wellington Management	2,324,205,417	-	2.3%	71.6%
8	Baillie Gifford	2,301,651,385	-	2.2%	73.8%
9	Walter Scott & Partners	1,932,713,612	-	1.9%	75.7%
10	Gladius Capital Management LP	1,887,784,159	39,388,239	1.8%	77.6%
11	Angelo, Gordon & Co.	1,585,337,125	66,468,831	1.5%	79.1%
12	ValueAct Capital	989,912,783	-	1.0%	80.1%
13	Landmark Partners, Inc.	830,270,003	1,352,683,592	0.8%	80.9%
14	DoubleLine Capital LP	797,678,544	-	0.8%	81.7%
15	Rockpoint Group, LLC	769,662,828	107,133,815	0.8%	82.4%
16	Campbell Group LLC, The	705,734,850	-	0.7%	83.1%
17	LBA Realty	599,988,330	27,524,752	0.6%	83.7%
18	Franklin Templeton Investments	598,998,414	-	0.6%	84.3%
19	Earnest Partners	591,277,439	-	0.6%	84.9%
20	Marathon Asset Management	558,231,491	85,355,914	0.5%	85.4%
	105 Remaining Managers*	14,939,895,792	3,112,295,954	14.6%	100.0%
Total		102,396,179,437	6,427,944,002	100.0%	100.0%

*Manager count consists of all manager accounts with a market value greater than \$5.1 million and new, not yet funded, accounts.



Appendix

NCRS Public Equity Net of Fees Performance

As of September 30, 2019

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Public Equity	\$32,695	(0.57)	1.03	9.81	6.98	9.16
Benchmark ²		(0.17)	0.48	8.91	6.31	8.43
Domestic Portfolio	\$14,027	1.22	3.80	13.39	10.47	13.16
Russell 3000		1.16	2.92	12.83	10.44	13.08
Non-US Portfolio	\$18,065	(2.04)	(1.37)	7.35	4.16	5.18
Custom Benchmark		(1.72)	(1.84)	6.10	3.05	4.31
Equity Hedge	\$602	(2.49)	(6.62)	2.59	3.72	-
MSCI ACWI (Beta Adjusted)		(0.06)	0.54	3.81	2.44	-

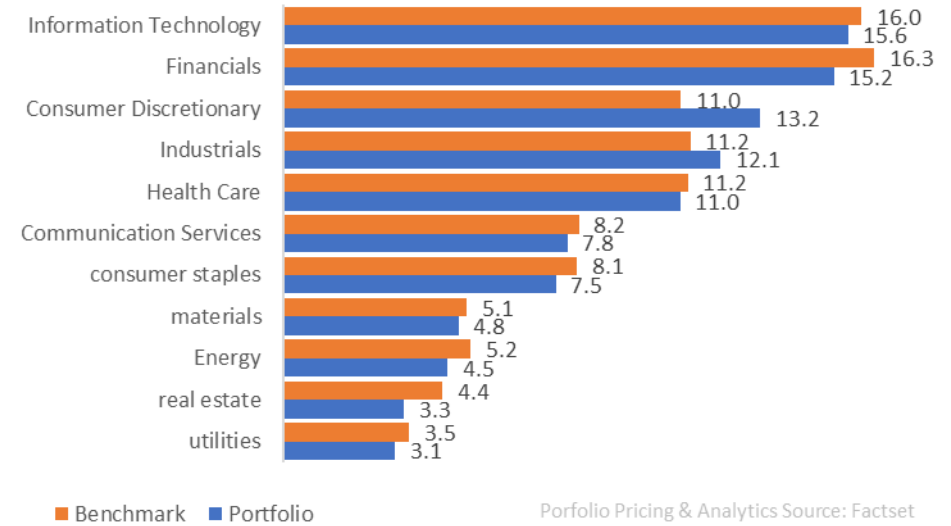


NCRS Public Equity Portfolio Characteristics

As of September 30, 2019

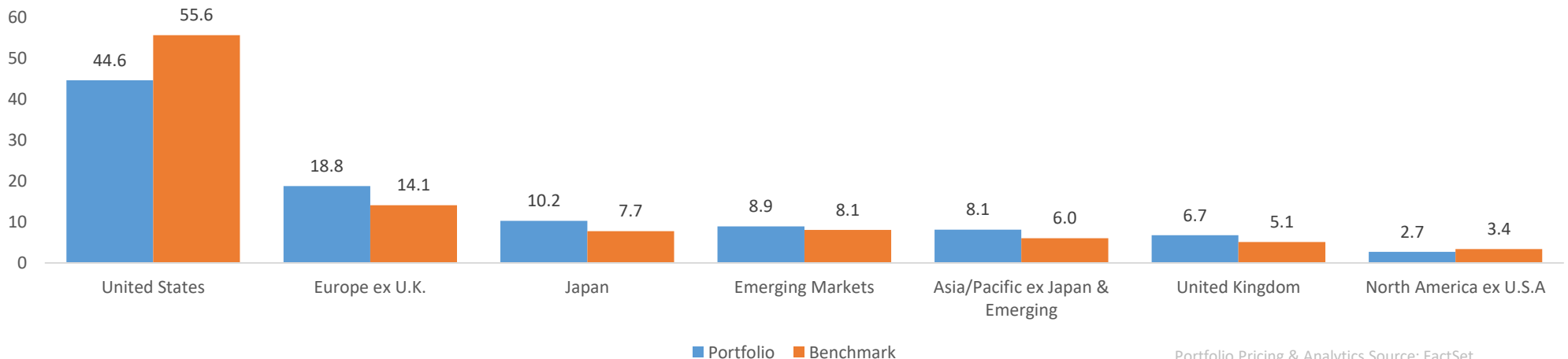
Portfolio Characteristics		
	Portfolio	MSCI ACWI IMI
Price/Earnings	17.6	17.4
Dividend Yield	2.4	2.4
Price/Book	2.1	2.1
Market Capitalization	132,135.2	143,247.5
Return On Equity	17.2	18.0

@FactSet Research Systems



Portfolio Pricing & Analytics Source: Factset
Benchmark Pricing & Analytics Source: Factset

Total Equity Regional Allocation



Portfolio Pricing & Analytics Source: FactSet
Benchmark Pricing & Analytics Source: FactSet



NCRS Private Equity Portfolio

As of September 30, 2019

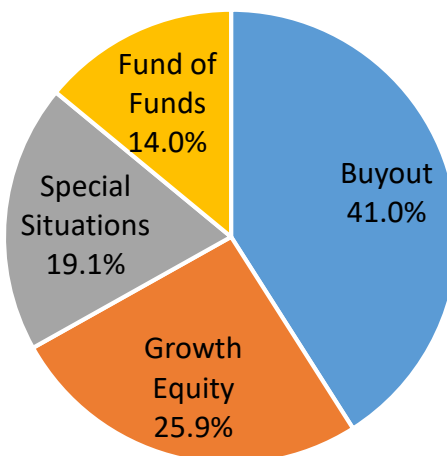
Net of Fees Performance (%)

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Private Equity	\$5,465	2.72	10.17	12.78	10.54	10.74
Benchmark ³		3.33	8.70	11.27	8.42	11.81
Buyout	\$2,238	3.51	10.09	12.39	10.22	9.87
Growth	\$1,414	2.17	14.52	16.68	13.96	13.43
Special Situations	\$1,043	0.85	5.00	8.55	5.36	7.39
Fund of Funds	\$766	3.98	10.63	13.16	11.64	12.16

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>2019</u>	<u>Total</u>
NCRS	12.02	6.92	5.46	3.37	9.64	9.48	9.30	20.69	9.91	14.42	11.96	15.32	16.60	18.21	8.77	4.24	0.00	8.66
# of Funds	28	3	11	21	15	17	3	1	6	6	9	4	9	6	7	3	0	149

Strategy Allocation (Based on Valuation)





NCRS Non-Core Real Estate Portfolio

As of September 30, 2019

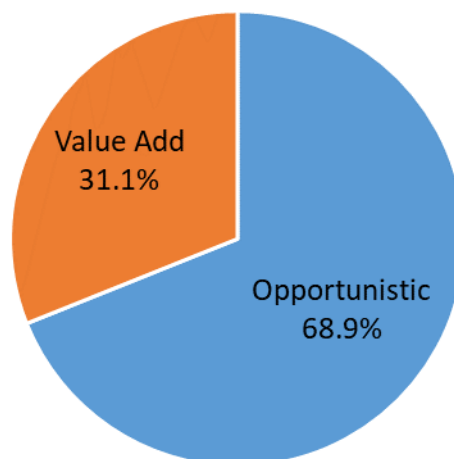
Net of Fees Performance (%)

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Non-Core Real Estate	\$3,224	3.03	9.99	11.60	12.96	10.80
Benchmark ⁴		2.13	5.53	7.42	6.97	7.58
Opportunistic	\$2,223	2.88	10.81	12.07	12.49	10.80
Value Add	\$1,002	3.39	8.19	10.35	13.55	10.84

IRR by Vintage Year

	Pre-2004	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
NCRS	9.14	15.69	-1.41		2.47	16.05	N/A	16.30	18.08	18.04	15.47	7.86	8.53	13.06	N/A	2.94	0.00	6.82
# of Funds	17	3	15	13	8	6	N/A	6	7	5	7	7	6	7	N/A	1	1	108

Strategy Allocation (Based on Valuation)





NCRS Opportunistic Fixed Income Portfolio

As of September 30, 2019

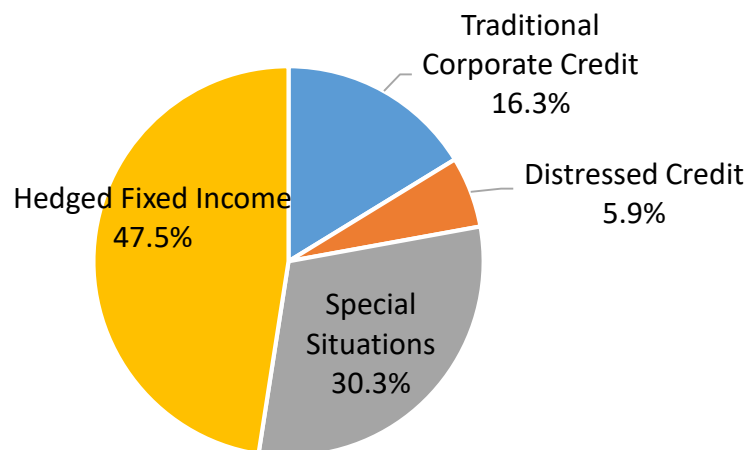
Net of Fees Performance (%)

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Opportunistic Fixed Income	\$5,722	0.11	1.59	6.16	3.48	8.10
Benchmark ⁵		0.48	1.70	2.67	1.62	3.02
Traditional Corporate Credit	\$930	0.23	0.85	6.39	3.63	8.51
Distressed Credit	\$337	0.36	2.62	8.56	6.36	10.31
Special Situations	\$1,735	1.67	7.38	9.65	8.84	15.71
Hedged Fixed Income	\$2,720	(0.94)	(1.69)	3.81	1.21	-

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>2019</u>	<u>Total</u>
NCRS	2.87	N/A	16.95	7.95	22.42	5.83	4.33	2.36	5.03	4.54	9.44	8.99	8.09	N/A	-2.45	5.90
# of Funds	1	N/A	1	3	1	4	9	2	7	3	1	8	2	N/A	1	42

Strategy Allocation (Based on Valuation)





NCRS Rates & Liquidity Portfolio

As of September 30, 2019

Net of Fees Performance (%)

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Rates & Liquidity	\$41,279	2.31	10.57	3.03	3.65	4.76
Benchmark ⁶		3.03	12.40	3.37	4.06	4.87
IG Fixed Income	\$30,915	2.89	11.98	3.41	3.94	4.91
Core Fixed Income	\$27,818	3.16	13.21	3.64	4.28	5.07
IG Fixed Income Cash	\$3,097	0.53	2.03	1.51	1.17	-
Pension Cash	\$10,365	0.55	2.35	1.66	1.28	-

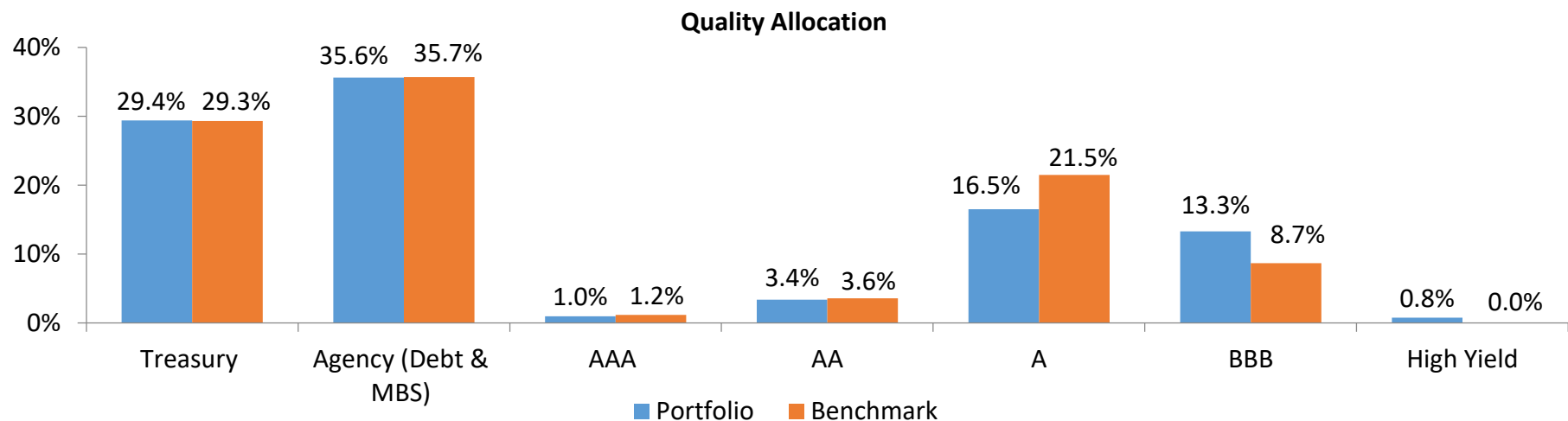
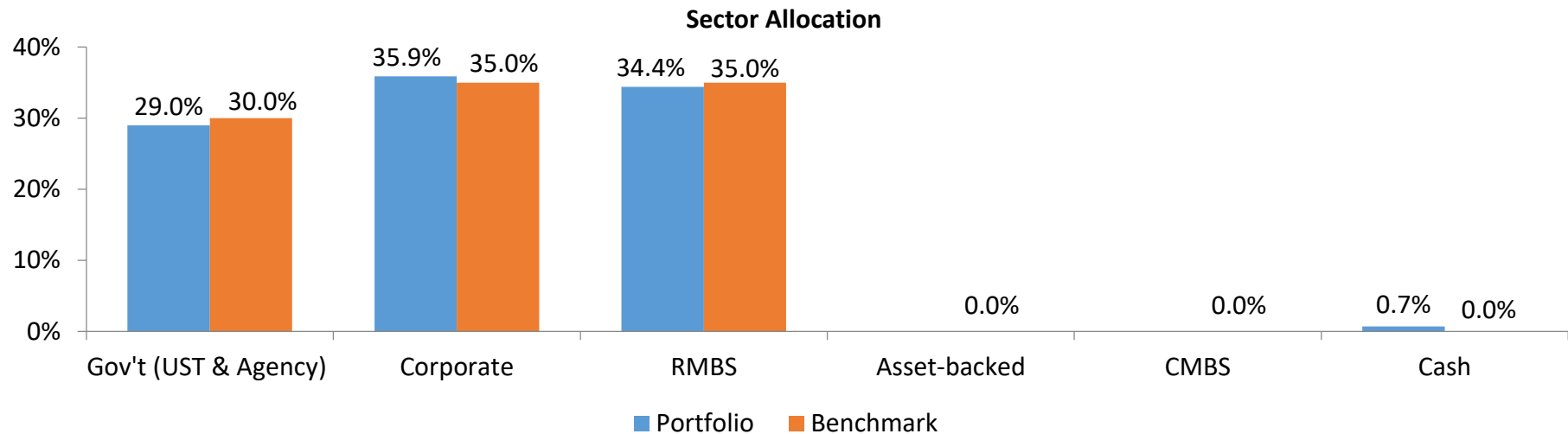
Core Fixed Income Portfolio Characteristics

	<u>Avg. Coupon</u>	<u>Yield to Worst</u>	<u>Effective Duration</u>
Government (Treasury & Agency)	3.94%	1.84%	11.3
Corporate	4.46%	3.07%	10.0
Mortgage	3.77%	2.61%	2.9
Total	4.07%	2.55%	7.9



NCRS Core Fixed Income Portfolio Characteristics

As of September 30, 2019





NCRS Inflation Sensitive Portfolio

As of September 30, 2019

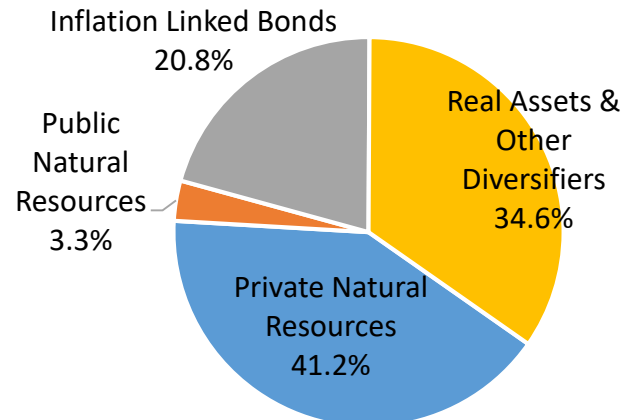
Net of Fees Performance (%)

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Inflation Sensitive	\$6,115	(0.10)	1.94	6.00	1.75	(0.72)
Benchmark ¹⁰		0.08	2.54	3.00	0.04	(0.57)
Private Natural Resources	\$2,520	(1.62)	(5.24)	4.09	0.12	0.91
Public Natural Resources	\$204	(1.94)	(10.32)	(3.03)	(7.84)	-
Inflation Linked Bonds	\$58	0.20	2.69	1.46	-	-
Real Assets & Other Diversifiers	\$2,118	1.25	10.80	10.38	8.79	-

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>2019</u>	<u>Total</u>
NCRS	0.50	-8.19	-4.91	N/A	-10.07	-6.36	7.92	6.92	9.73	5.63	4.40	N/A	48.18	-1.06	1.26
# of Funds	3	2	2	N/A	3	9	7	11	12	4	4	N/A	4	2	61

Strategy Allocation (Based on Valuation)





NCRS Core Real Estate Portfolio

As of September 30, 2019

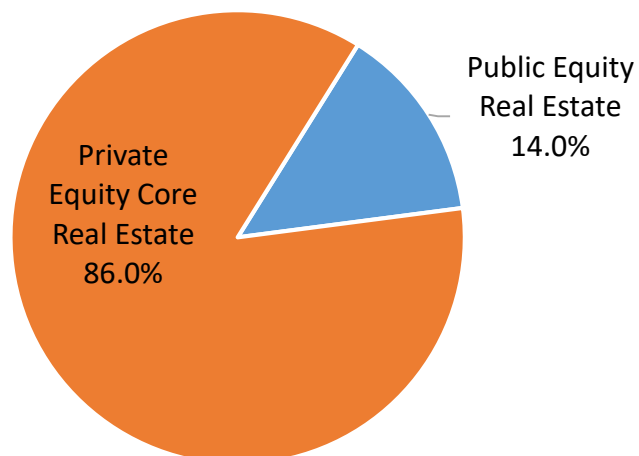
Net of Fees Performance (%)

	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Core Real Estate	\$5,791	1.98	7.70	7.61	8.14	8.64
Benchmark ¹¹		1.56	6.55	6.17	8.37	8.91
Public Equity Real Estate	\$813	3.42	13.67	7.41	8.15	9.94
Private Equity Core Real Estate	\$4,978	1.75	6.81	7.66	8.12	8.32

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>2019</u>	<u>Total</u>
NCRS	7.60	9.76	-8.33	4.74	1.39	9.70	N/A	23.62	N/A	N/A	6.87	7.29	5.41	9.52	N/A	7.24	N/A	7.26
# of Funds	5	1	1	2	3	1	N/A	1	N/A	N/A	2	6	2	9	N/A	1	N/A	34

Strategy Allocation (Based on Valuation)



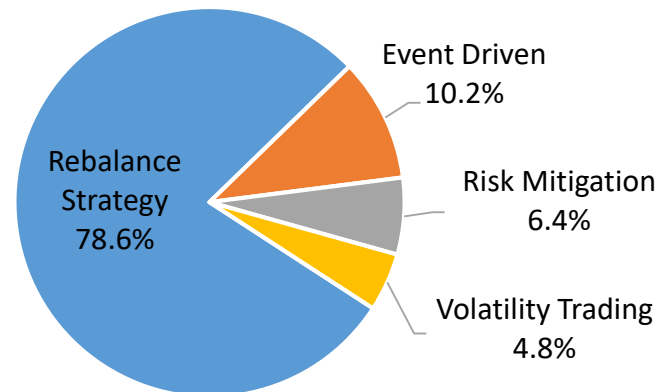


NCRS Multi-Strategy Portfolio

As of September 30, 2019

	Market Value (\$MM)	Net of Fees Performance (%)				
		3 Month	1 Year	3 Years	5 Years	10 Years
Multi-Strategy	\$2,103	0.66	1.04	6.42	4.98	7.89
Benchmark ¹²		(0.68)	(0.89)	5.20	3.73	6.21
Rebalance Strategy	\$1,652	0.63	1.72	7.86	6.22	-
Event Driven	\$215	2.05	(2.08)	4.81	-	-
Risk Mitigation	\$134	(1.38)	(1.75)	-	-	-
Volatility Trading	\$102	2.51	4.87	-	-	-

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, & Opportunistic FI Benchmark at policy weights.
2. The Public Equity Benchmark is a 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 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 & Cash Benchmark and the Pension Cash Benchmark at policy weights.
7. The IG Fixed Income & Cash 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 Pension 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.
13. The 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.
14. The Long-Term Policy Benchmark is comprised of 57% MSCI ACWI IMI Net, 33% BOAML 5+ Years U.S. Treasury Index, 6% Bloomberg Commodity Index, and 4% BOAML 1-3 Years U.S. Inflation-Linked Treasury Index.

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



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NORTH CAROLINA
DEPARTMENT OF STATE TREASURER



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STATE TREASURER OF NORTH CAROLINA
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INVESTMENT MANAGEMENT DIVISION