

NORTH CAROLINA  
DEPARTMENT OF STATE TREASURER



*Dale R. Folwell, CPA*  
STATE TREASURER OF NORTH CAROLINA  
DALE R. FOLWELL, CPA

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INVESTMENT MANAGEMENT DIVISION

# Performance Review

February 15, 2018

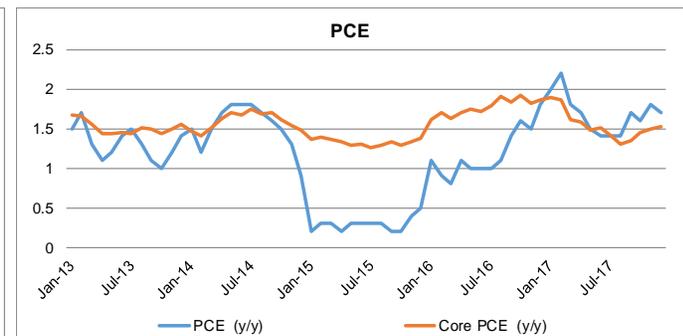
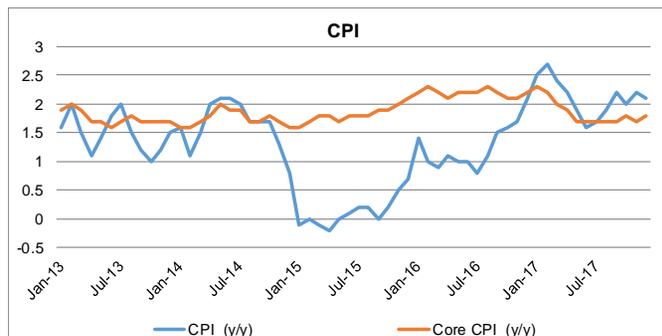
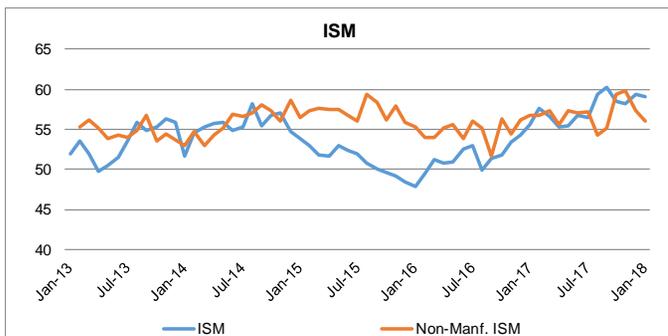
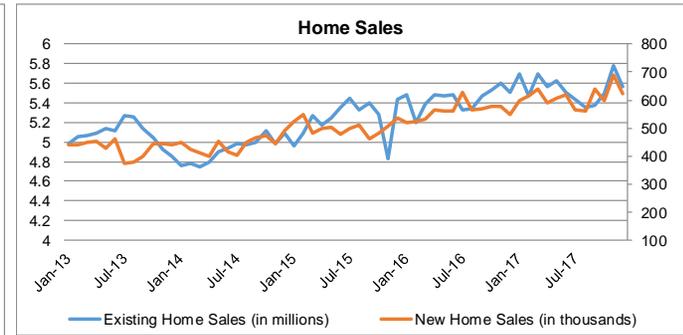
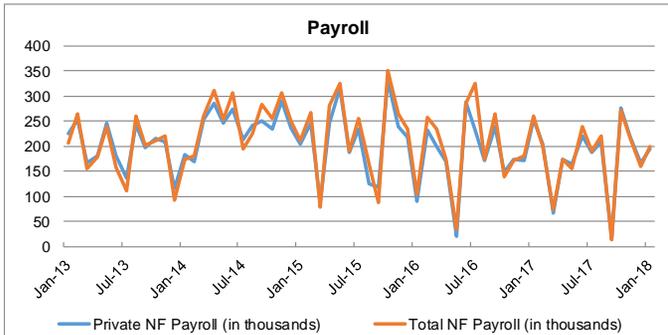
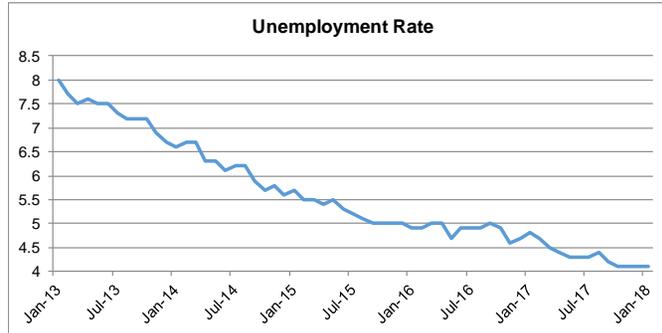
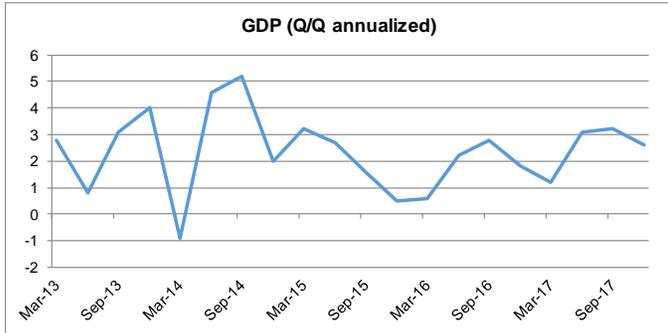


## Cost-Efficiencies Initiative Update

- 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:

<b><u>Fully Executed Activities</u></b>	<b><u>Approx. Annual Savings (\$000)</u></b>
Investment-related services: renegotiations / restructuring	\$6,459
Investment manager terminations / renegotiations	\$65,526
<b>Sub-Total</b>	<b>\$71,985</b>
<b><u>In Process</u></b>	
Investment manager & services renegotiations / restructuring	\$4,258
<b>Grand Total</b>	<b>\$76,242</b>

# US Economic Environment

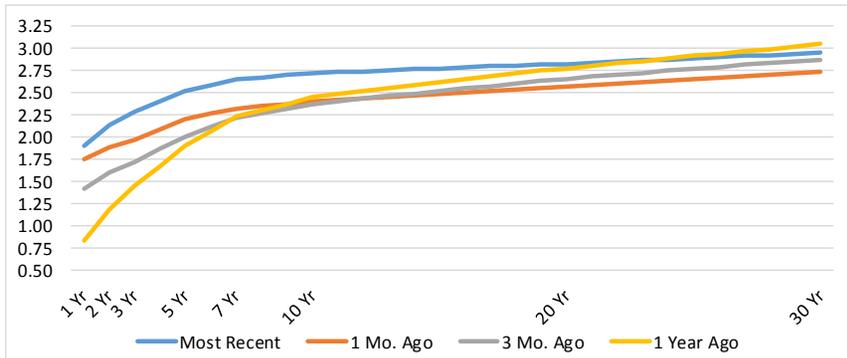


# Global Economic Environment

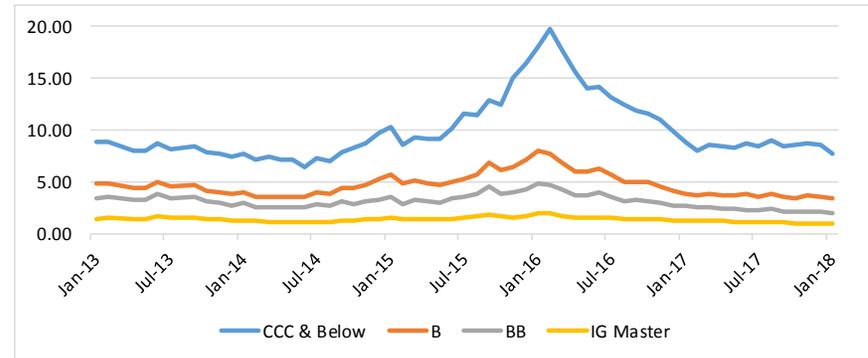
Countries	Real GDP YoY		Unemployment		CPI YoY		Countries	Real GDP YoY		Unemployment		CPI YoY	
	Date	Value	Date	Value	Date	Value		Date	Value	Date	Value	Date	Value
<b>U.S.</b>	12/17	2.5	01/18	4.1	12/17	2.1	<b>Asia/Pacific/Latam</b>						
<b>Europe</b>							China	12/17	6.8			12/17	1.8
Germany	09/17	2.8	01/18	5.4	01/18	1.6	India	09/17	6.3			12/17	4.0
France	12/17	2.4	12/17	9.2	01/18	1.4	Japan	09/17	2.1	12/17	2.8	12/17	1.0
U.K.	12/17	1.5	11/17	4.3	12/17	3.0	Indonesia	12/17	5.2			01/18	3.3
Italy	09/17	1.7	12/17	10.8	01/18	0.8	Brazil	09/17	1.4			12/17	3.0
Spain	12/17	3.1	12/17	16.4	01/18	0.5	Australia	09/17	2.8	12/17	5.5	12/17	1.9

# Market Environment

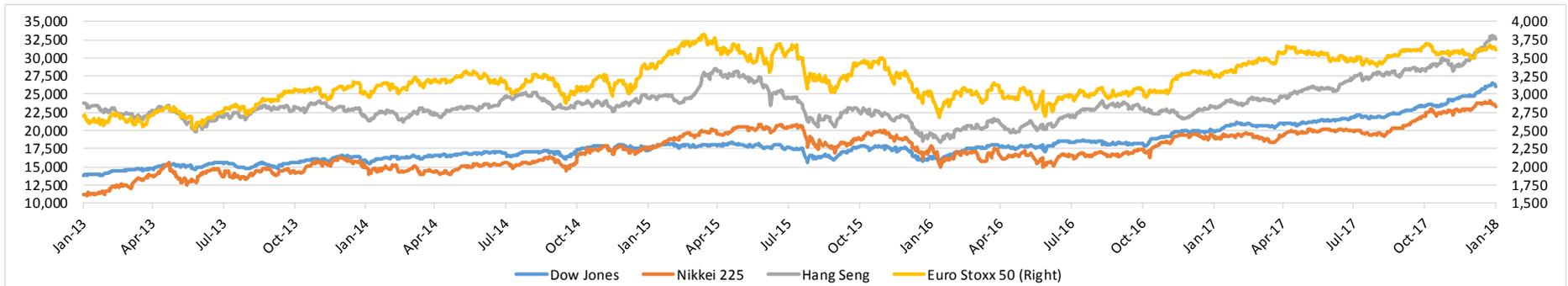
**UST (Constant Maturity) Curve**



**Corporate Credit OAS (BofAML Indices)**



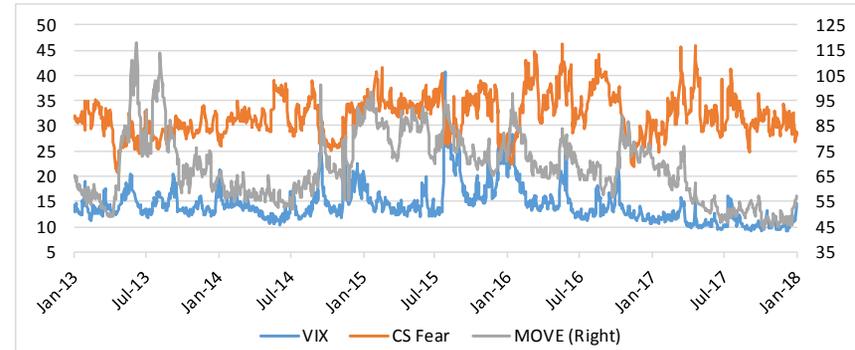
**Global Equity Markets**



**US Dollar Trade Weighted Broad Index**

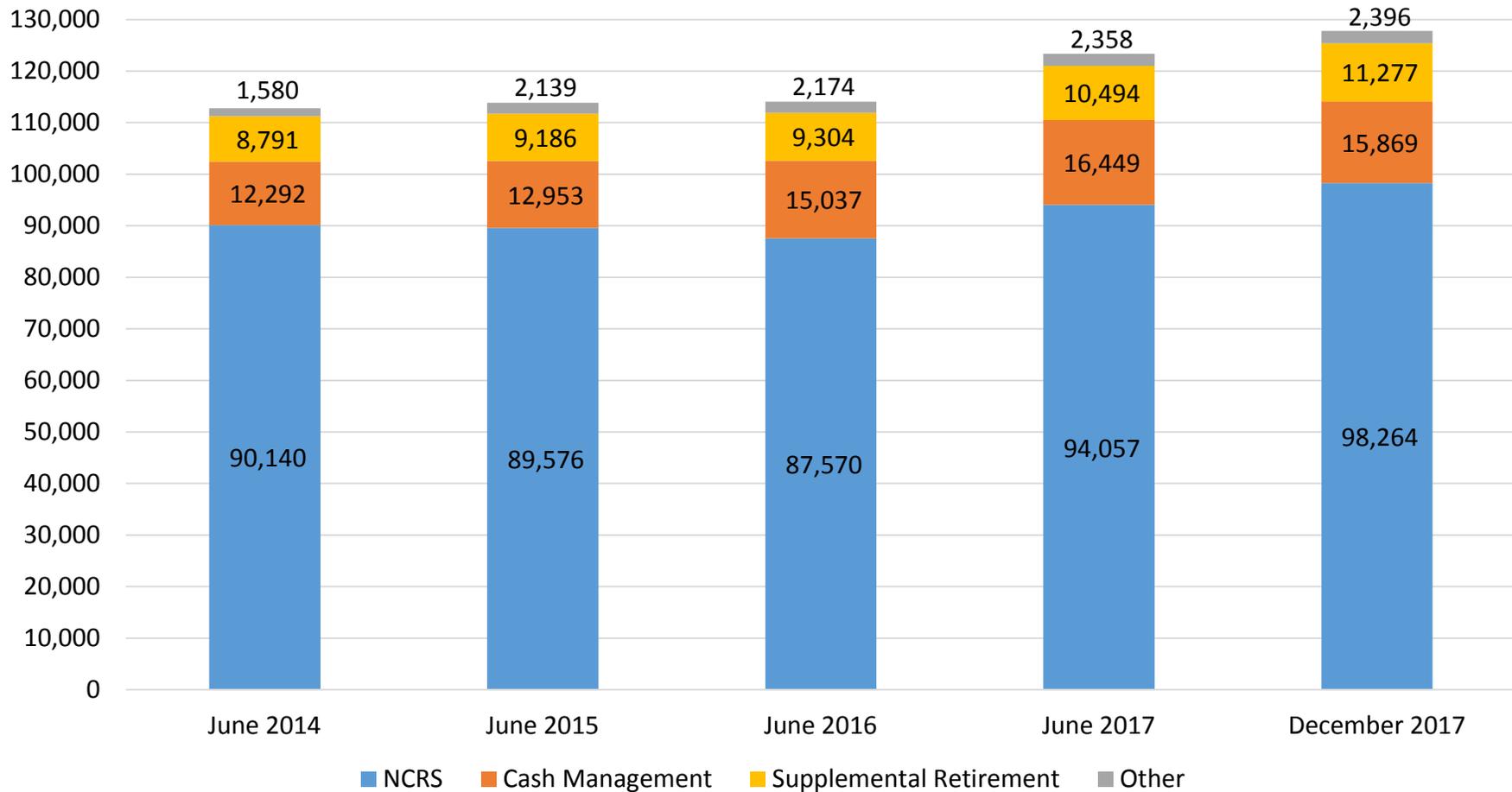


**Volatility Indicators**



# Assets Under Management (\$MM)

## \$127.8 Billion as of December 31, 2017



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 December 31, 2017

	Market Value (\$MM)	%	Target	Range		Relative %	Relative \$ (\$MM)
				Minimum	Maximum		
<b>Growth</b>	<b>\$52,935</b>	<b>53.87%</b>	<b>58.00%</b>	<b>37.00%</b>	<b>71.00%</b>	<b>-4.13%</b>	<b>(\$4,058)</b>
Public Equity	39,103	39.79%	42.00%	37.00%	47.00%	-2.21%	(2,168)
Private Equity	5,006	5.09%	6.00%	0.00%	8.75%	-0.91%	(890)
Non Core Real Estate	3,315	3.37%	3.00%	0.00%	8.00%	0.37%	367
Opportunistic Fixed Income	5,511	5.61%	7.00%	0.00%	7.50%	-1.39%	(1,368)
<b>Rates &amp; Liquidity</b>	<b>32,155</b>	<b>32.72%</b>	<b>29.00%</b>	<b>24.00%</b>	<b>42.00%</b>	<b>3.72%</b>	<b>3,659</b>
IG Fixed Income & Cash	28,862	29.37%	28.00%	24.00%	32.00%	1.37%	1,348
Pension Cash	3,294	3.35%	1.00%	0.00%	10.00%	2.35%	2,311
<b>Inflation Sensitive &amp; Diversifiers</b>	<b>11,264</b>	<b>11.46%</b>	<b>11.00%</b>	<b>4.00%</b>	<b>16.00%</b>	<b>0.46%</b>	<b>455</b>
Inflation Sensitive	6,188	6.30%	6.00%	2.00%	7.50%	0.30%	292
Core Real Estate	5,076	5.17%	5.00%	2.00%	10.00%	0.17%	163
<b>Multi-Strategy</b>	<b>1,910</b>	<b>1.94%</b>	<b>2.00%</b>	<b>0.00%</b>	<b>4.00%</b>	<b>-0.06%</b>	<b>(55)</b>
<b>Grand Total</b>	<b>\$98,264</b>	<b>100.00%</b>					



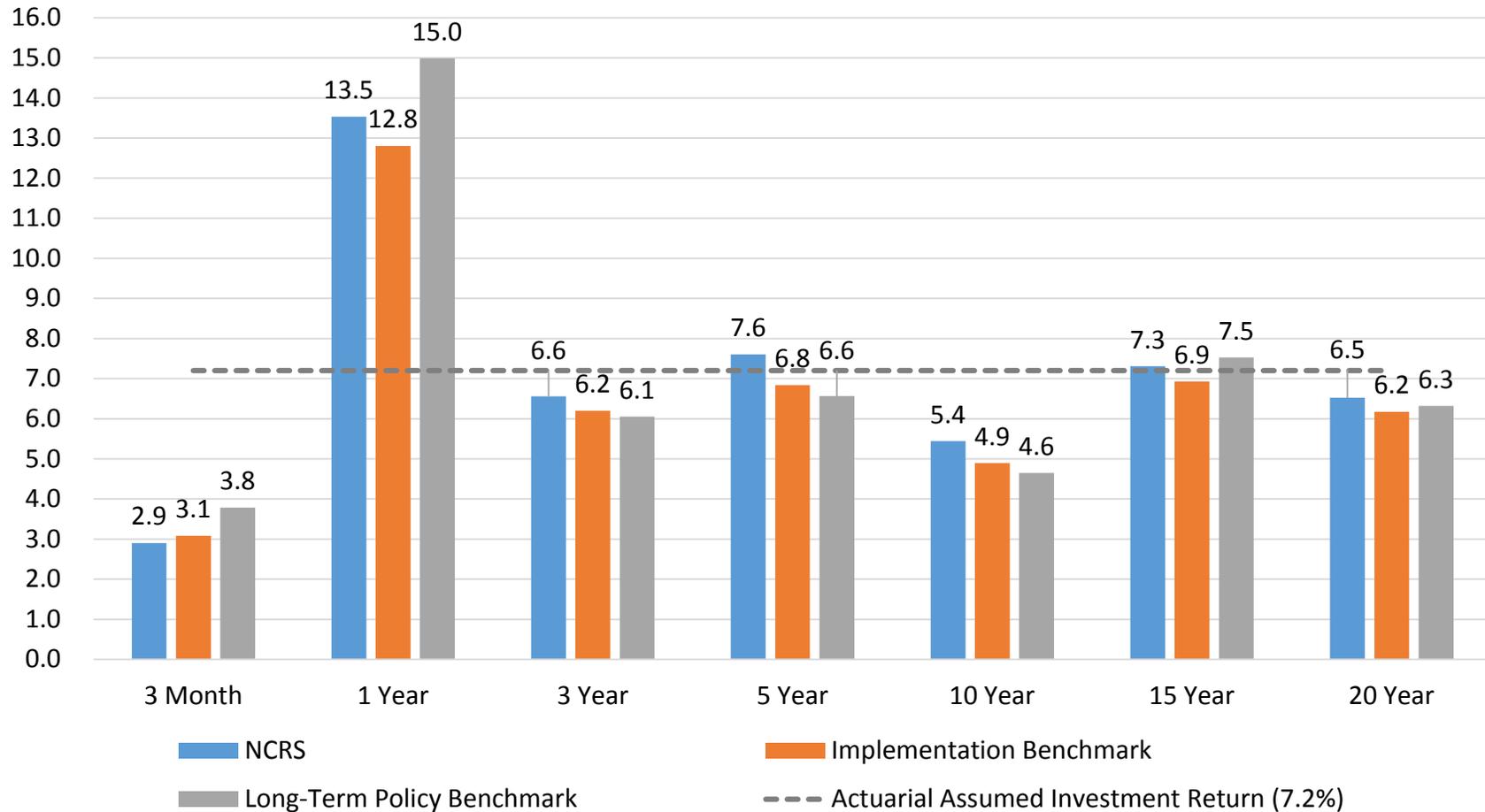
# NCRS Asset Allocation (Unaudited)

As of February 08, 2017

	Market Value (\$MM)	%	Target	Range		Relative %	Relative \$ (\$MM)
				Minimum	Maximum		
<b>Growth</b>	<b>\$52,401</b>	<b>54.14%</b>	<b>58.00%</b>	<b>37.00%</b>	<b>71.00%</b>	<b>-3.86%</b>	<b>(\$3,734)</b>
Public Equity	38,599	39.88%	42.00%	37.00%	47.00%	-2.12%	(2,050)
Private Equity	4,972	5.14%	6.00%	0.00%	8.75%	-0.86%	(835)
Non Core Real Estate	3,322	3.43%	3.00%	0.00%	8.00%	0.43%	419
Opportunistic Fixed Income	5,508	5.69%	7.00%	0.00%	7.50%	-1.31%	(1,267)
<b>Rates &amp; Liquidity</b>	<b>31,347</b>	<b>32.39%</b>	<b>29.00%</b>	<b>24.00%</b>	<b>42.00%</b>	<b>3.39%</b>	<b>3,280</b>
IG Fixed Income & Cash	28,185	29.12%	28.00%	24.00%	32.00%	1.12%	1,086
Pension Cash	3,162	3.27%	1.00%	0.00%	10.00%	2.27%	2,194
<b>Inflation Sensitive &amp; Diversifiers</b>	<b>11,061</b>	<b>11.43%</b>	<b>11.00%</b>	<b>4.00%</b>	<b>16.00%</b>	<b>0.43%</b>	<b>415</b>
Inflation Sensitive	5,953	6.15%	6.00%	2.00%	7.50%	0.15%	146
Core Real Estate	5,108	5.28%	5.00%	2.00%	10.00%	0.28%	269
<b>Multi-Strategy</b>	<b>1,975</b>	<b>2.04%</b>	<b>2.00%</b>	<b>0.00%</b>	<b>4.00%</b>	<b>0.04%</b>	<b>39</b>
<b>Grand Total</b>	<b>\$96,784</b>	<b>100.00%</b>					

# NCRS Total Net Portfolio Return vs. Benchmarks

As of December 31, 2017



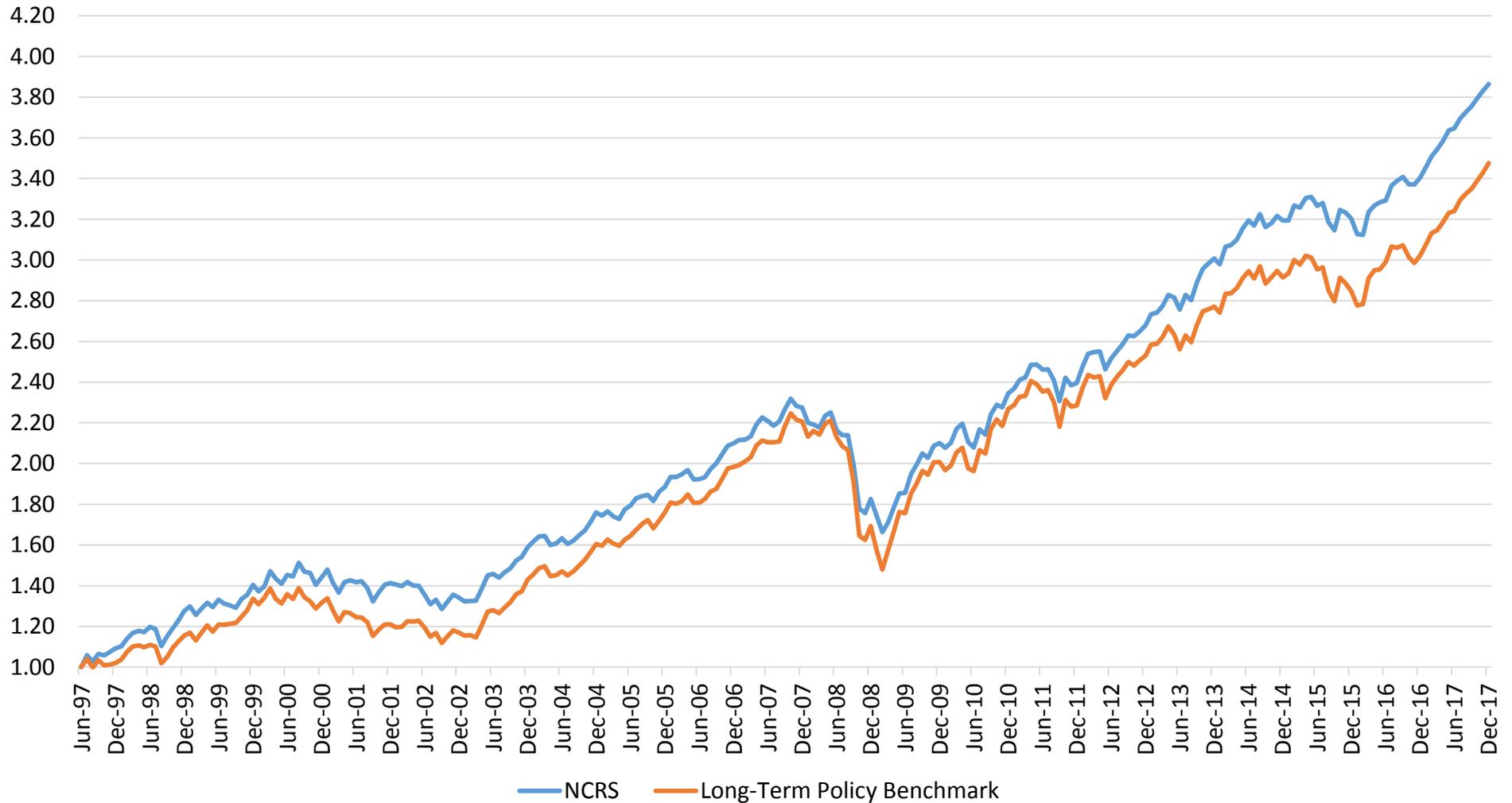
Notes:

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 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 December 31, 2017

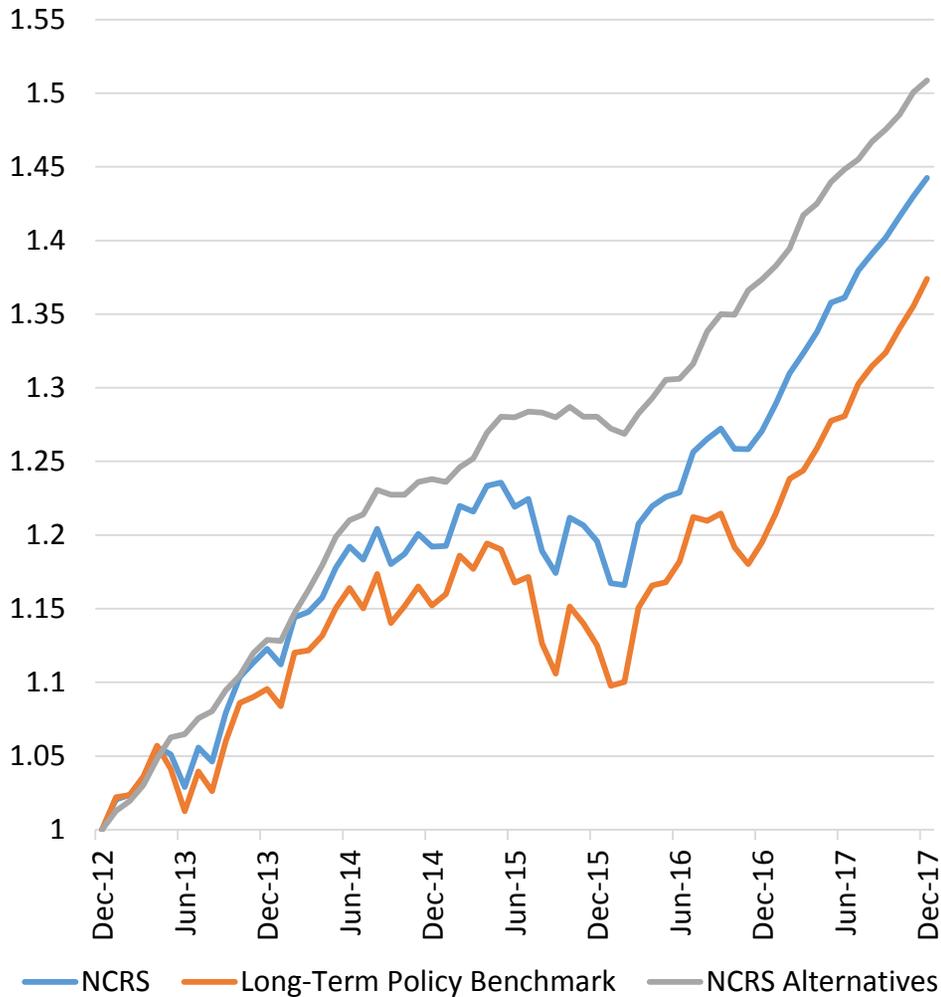


Notes:

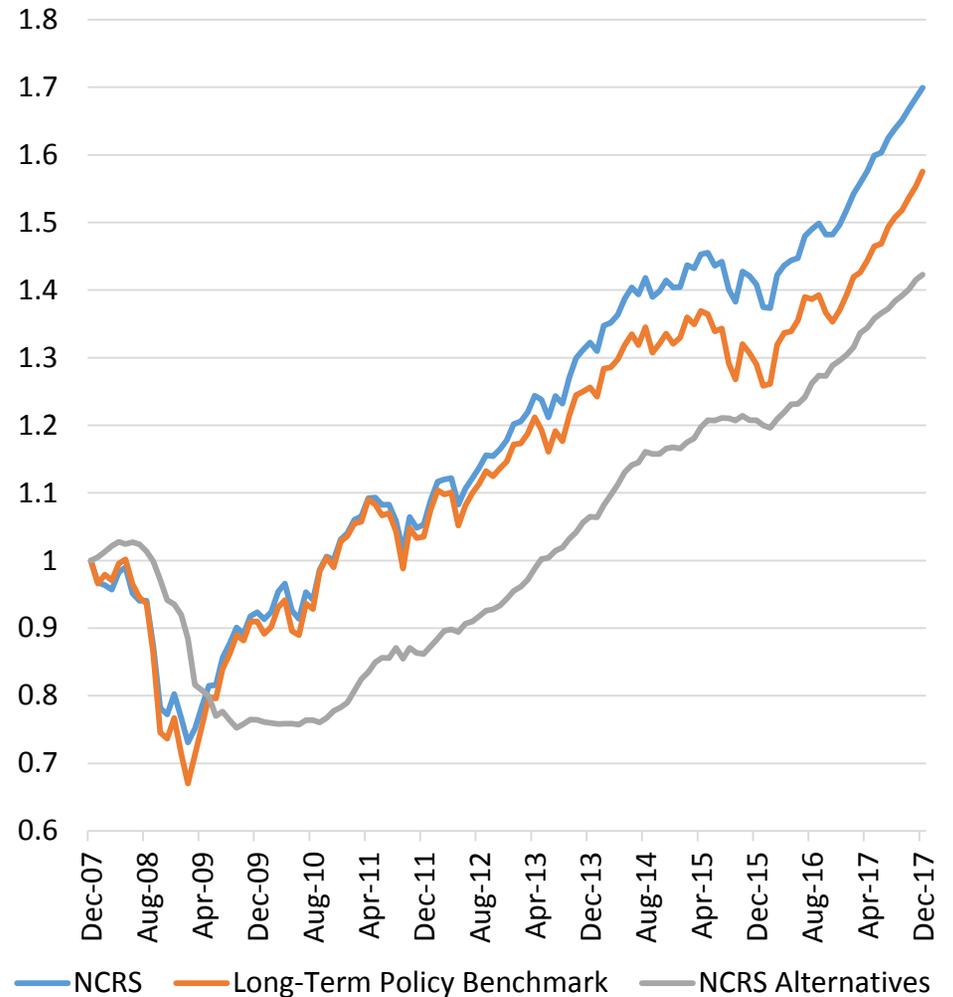
Long-Term Policy Benchmark is comprised of 57% MSCI ACWI IMI Net; 33% BOAML 5+ Years U.S. Treasury Index; 6% Bloomberg Commodity Index; and 4% BOAML 1-3 Years U.S. Inflation-Linked Treasury Index.

# Growth of a Dollar

## 5 Years Ending Dec. 31, 2017



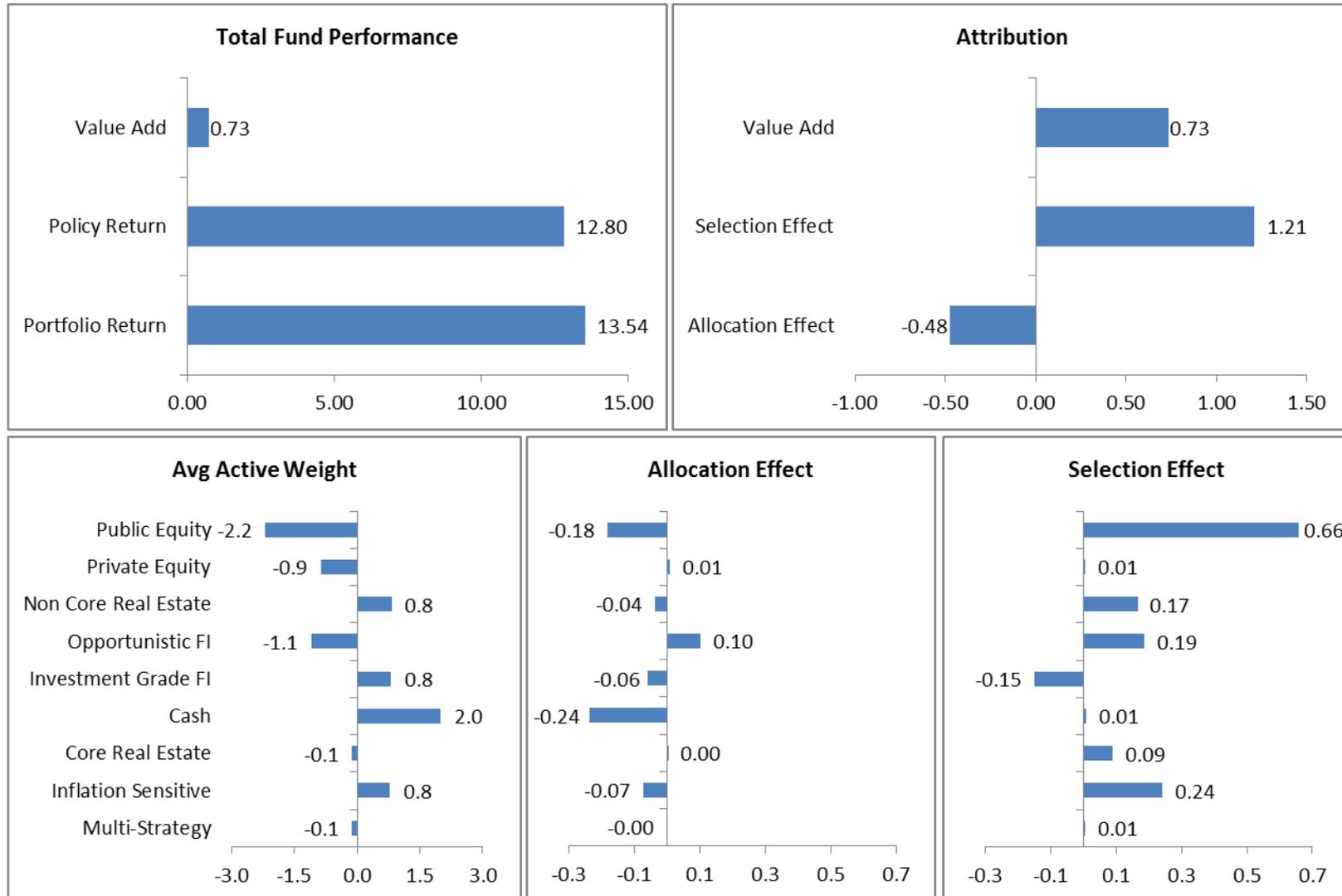
## 10 Years Ending Dec. 31, 2017



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.

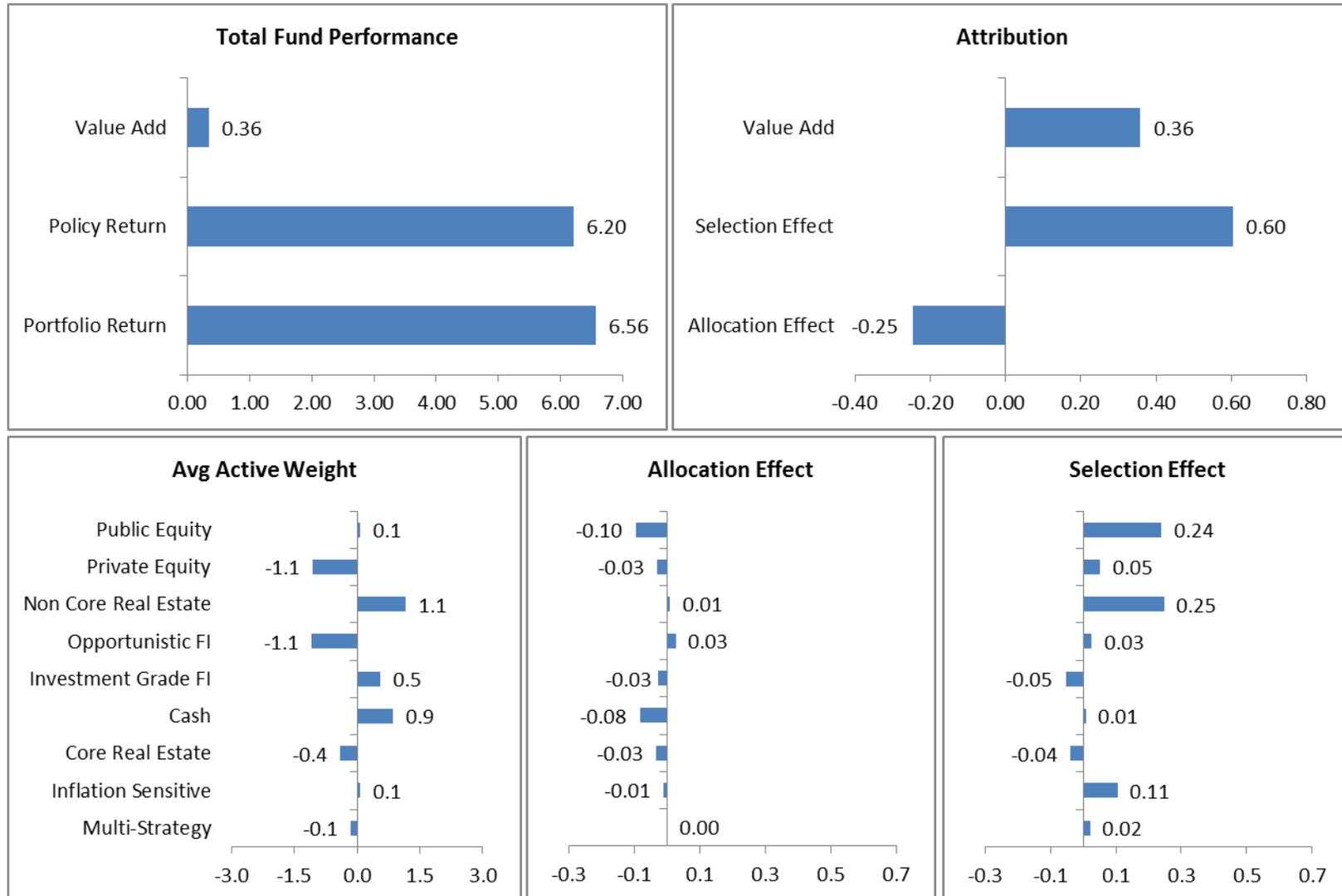
# NCRS Net of Fees Return Attribution

Total Fund vs. Implementation Benchmark: 1 Year Ending Dec. 31, 2017



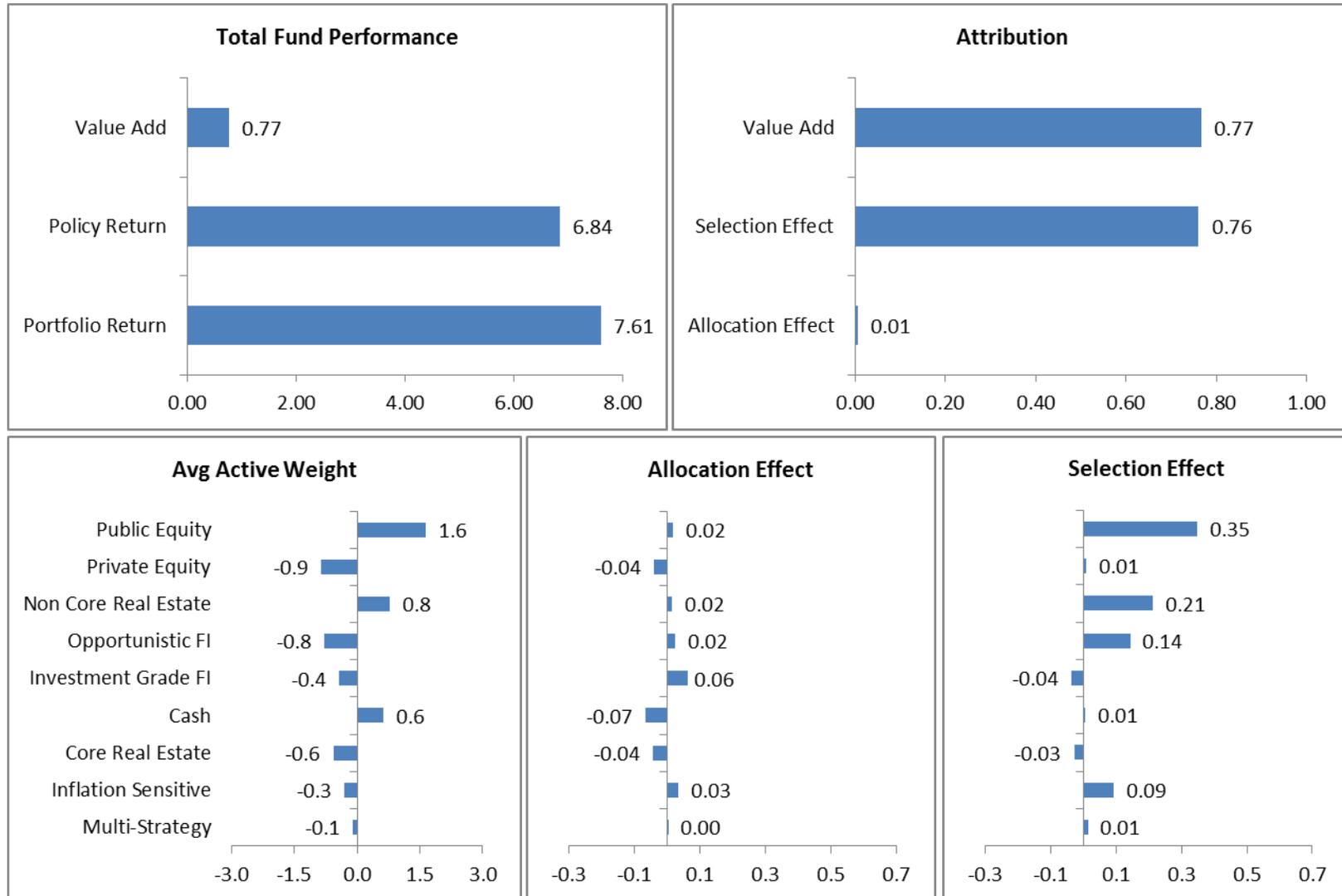
# NCRS Net of Fees Return Attribution

Total Fund vs. Implementation Benchmark: 3 Years Ending Dec. 31, 2017



# NCRS Net of Fees Return Attribution

Total Fund vs. Implementation Benchmark: 5 Years Ending Dec. 31, 2017





# NCRS Gross of Fees Return and Risk

BNY Mellon Universe: US Public Funds > \$20B; Data as of December 31, 2017

<u>Returns</u>	<u>3 Years</u>	<u>5 Years</u>	<u>10 Years</u>	<u>15 Year</u>	<u>20 Year</u>
25th percentile	8.44	9.75	6.28	8.69	7.18
<b>Median</b>	<b>7.96</b>	<b>8.88</b>	<b>5.89</b>	<b>8.35</b>	<b>6.92</b>
75th percentile	7.33	8.63	5.60	7.89	6.77
<b>NCRS</b>	<b>7.24</b>	<b>8.24</b>	<b>5.96</b>	<b>7.71</b>	<b>6.83</b>
Percentile Rank (1 = highest performance)	77	83	36	88	54

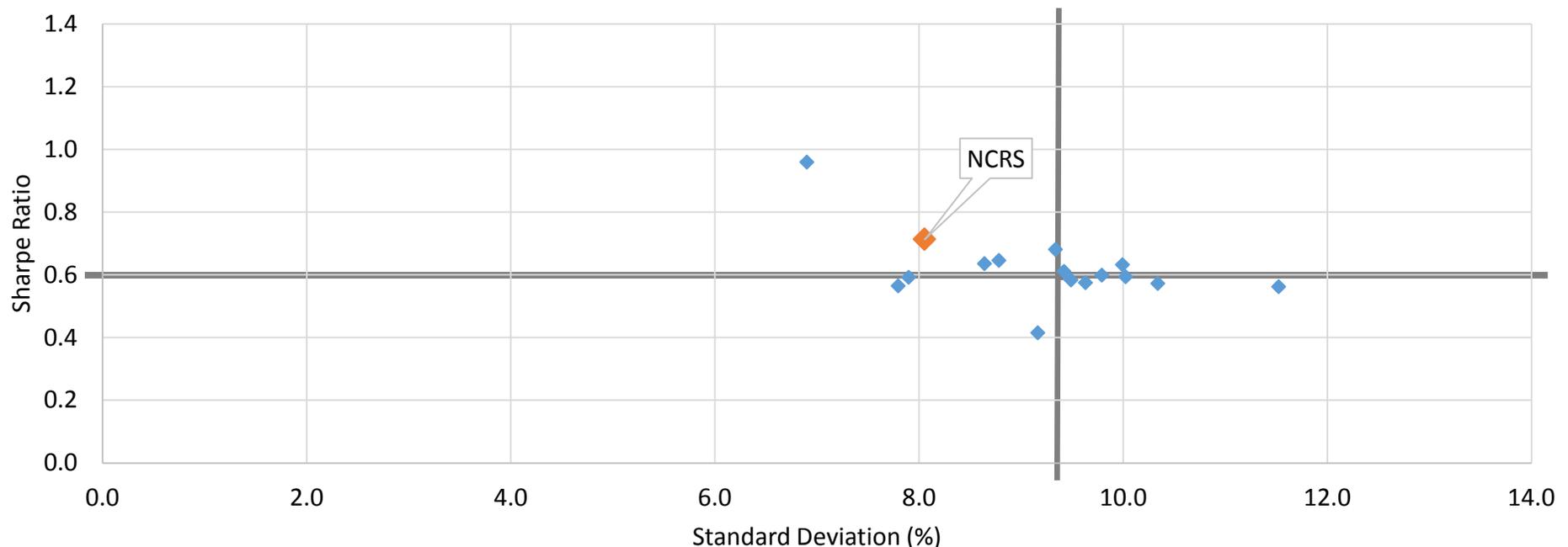
<u>Risk</u>	<u>3 Years</u>	<u>5 Years</u>	<u>10 Years</u>	<u>15 Year</u>	<u>20 Year</u>
25th percentile	5.66	5.64	9.94	8.96	9.71
<b>Median</b>	<b>5.16</b>	<b>5.15</b>	<b>9.38</b>	<b>8.45</b>	<b>8.71</b>
75th percentile	4.57	4.59	8.20	7.92	8.17
<b>NCRS</b>	<b>4.52</b>	<b>4.71</b>	<b>8.05</b>	<b>7.31</b>	<b>7.92</b>
Percentile Rank (100 = lowest risk)	77	71	77	94	87

# NCRS Gross of Fees Sharpe Ratio

BNY Mellon Universe: US Public Funds > \$20B; Data as of December 31, 2017

<b>Sharpe Ratio</b>	<b>3 Years</b>	<b>5 Years</b>	<b>10 Years</b>	<b>15 Year</b>	<b>20 Year</b>
25th percentile	1.50	1.77	0.64	0.90	0.62
<b>Median</b>	<b>1.44</b>	<b>1.63</b>	<b>0.60</b>	<b>0.83</b>	<b>0.59</b>
75th percentile	1.29	1.51	0.57	0.79	0.52
<b>NCRS</b>	<b>1.48</b>	<b>1.65</b>	<b>0.71</b>	<b>0.88</b>	<b>0.62</b>
Percentile Rank (1 = highest performance)	36	48	12	32	27

10 Year Plot: Sharpe Ratio vs. Volatility

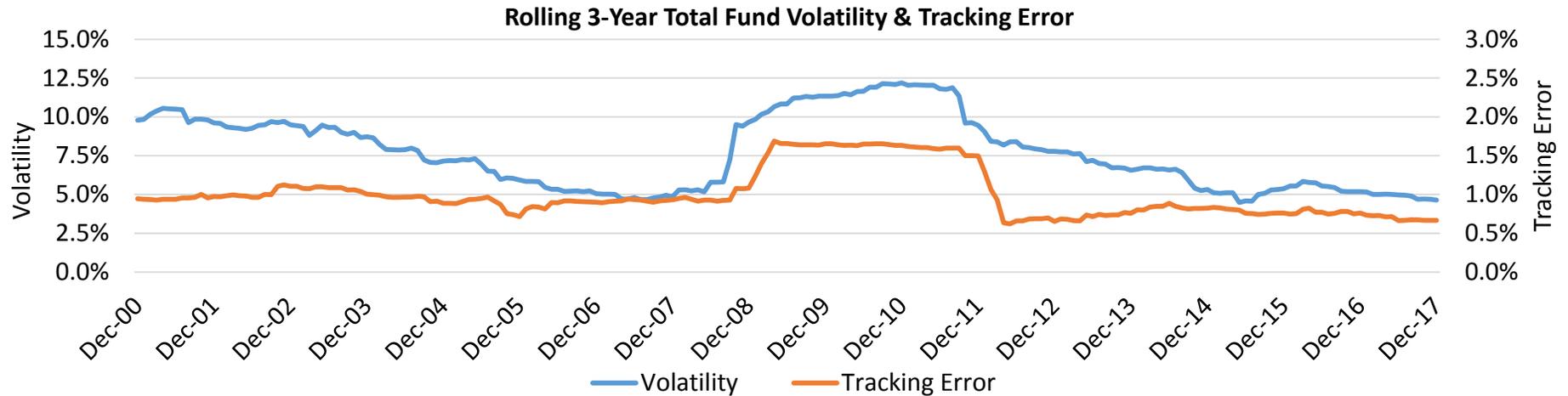


Note: Data shown is gross of fees with the exception of incentive payments, which have been deducted from NAV when applicable.



# NCRS Net of Fees Risk and Return Metrics

As of December 31, 2017

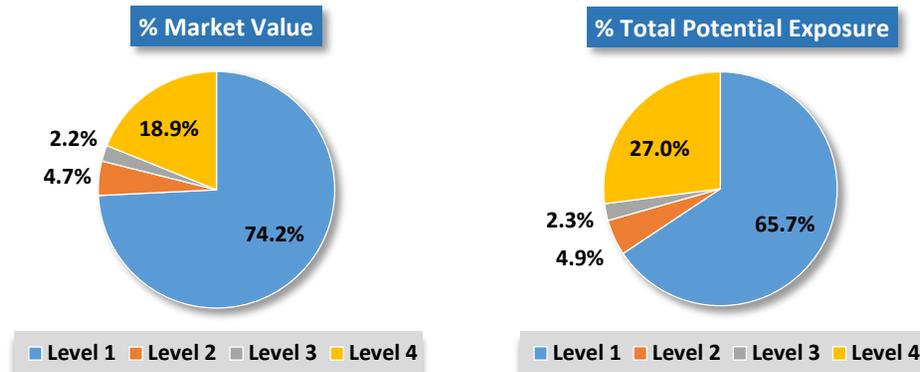


Program	POSITION		36-MONTH					60-MONTH				
	\$ Bil	% Wgt	Return	St. Dev	Active Return	TE	IR	Return	St. Dev	Active Return	TE	IR
<b>Total NCRS</b>	<b>98.3</b>	<b>100.0</b>	<b>6.6</b>	<b>4.6</b>	<b>0.4</b>	<b>0.7</b>	<b>0.5</b>	<b>7.6</b>	<b>4.8</b>	<b>0.8</b>	<b>0.8</b>	<b>1.0</b>
<b>Growth</b>	52.9	53.9	9.2	7.7	1.0	0.8	1.2	11.1	7.5	1.3	0.8	1.5
Public Equity	39.1	39.8	9.7	10.2	0.6	0.6	1.0	11.5	9.8	0.8	0.7	1.2
Private Equity	5.0	5.1	9.0	3.2	1.1	2.0	0.6	10.6	3.1	0.2	3.3	0.1
Non-Core Real Estate	3.3	3.4	13.0	2.8	6.2	3.8	1.6	14.2	3.1	5.2	3.7	1.4
Opportunistic Fixed Income	5.5	5.6	3.7	3.0	0.4	3.9	0.1	6.1	3.2	3.0	3.4	0.9
<b>Rates &amp; Liquidity</b>	32.2	32.7	2.5	3.2	-0.2	0.6	-0.3	2.4	3.6	-0.2	0.6	-0.3
IG Fixed Income & Cash	28.9	29.4	2.6	3.3	-0.1	0.6	-0.3	2.5	3.7	-0.1	0.6	-0.2
Pension Cash	3.3	3.4	0.9	0.1	0.5	0.1	5.2	--	--	--	--	--
<b>Inflation Sensitive &amp; Diversifiers</b>	11.3	11.5	4.4	2.6	0.1	2.5	0.0	4.1	2.8	0.2	2.4	0.1
Inflation Sensitive	6.2	6.3	1.6	4.5	1.3	3.1	0.4	0.5	4.4	1.4	2.8	0.5
Core Real Estate	5.1	5.2	8.4	2.4	-1.0	2.0	-0.5	9.3	3.6	-0.7	2.7	-0.3
<b>Multi-Strategy</b>	1.9	1.9	6.7	7.3	1.2	1.0	1.2	8.9	7.0	0.8	1.0	0.8

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

# NCRS Liquidity Profile

## As of December 31, 2017



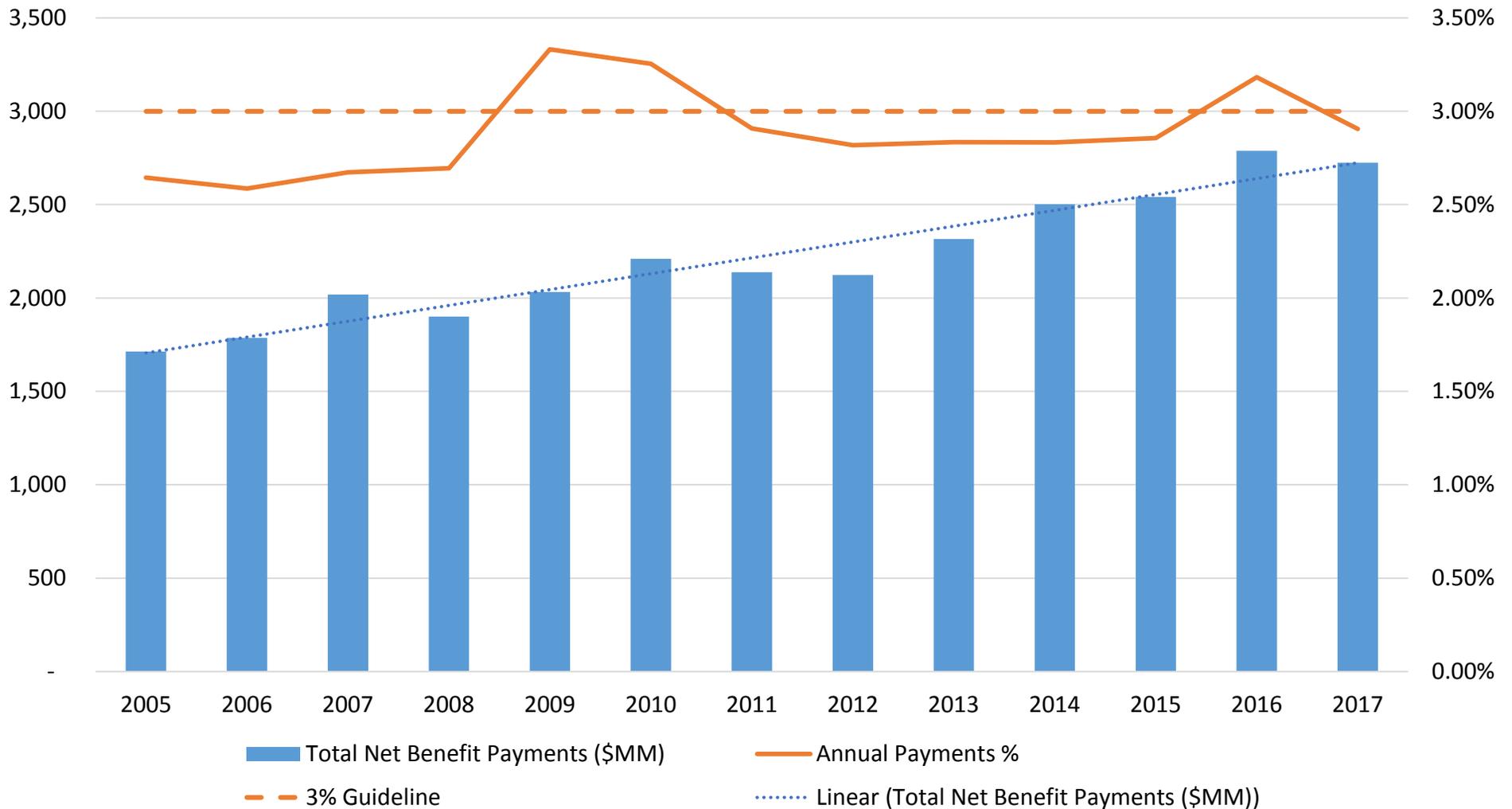
Current Exposure (\$MM Market Value)											
	Global Public Equity	Private Equity	Non Core Real Estate	Opportunistic Fixed Income	Investment Grade Fixed Income	Pension Cash	Inflation Sensitive	Core Real Estate	Multi-Strategy	Total \$	Total %
Level 1	\$37,678	\$26	\$0	\$532	\$28,862	\$3,294	\$282	\$716	\$1,552	<b>\$72,941</b>	<b>74.2%</b>
Level 2	\$785	\$0	\$0	\$1,796	\$0	\$0	\$846	\$1,028	\$146	<b>\$4,601</b>	<b>4.7%</b>
Level 3	\$229	\$0	\$0	\$1,178	\$0	\$0	\$223	\$519	\$0	<b>\$2,150</b>	<b>2.2%</b>
Level 4	\$411	\$4,980	\$3,315	\$2,005	\$0	\$0	\$4,837	\$2,812	\$212	<b>\$18,573</b>	<b>18.9%</b>
<b>Total \$</b>	<b>\$39,103</b>	<b>\$5,006</b>	<b>\$3,315</b>	<b>\$5,511</b>	<b>\$28,862</b>	<b>\$3,294</b>	<b>\$6,188</b>	<b>\$5,076</b>	<b>\$1,910</b>	<b>\$98,264</b>	<b>100.0%</b>
<b>Total %</b>	<b>39.79%</b>	<b>5.09%</b>	<b>3.37%</b>	<b>5.61%</b>	<b>29.37%</b>	<b>3.35%</b>	<b>6.30%</b>	<b>5.17%</b>	<b>1.94%</b>		

Total Potential Exposure (Market Value + Unfunded Commitments)											
	Global Public Equity	Private Equity	Non Core Real Estate	Opportunistic Fixed Income	Investment Grade Fixed Income	Pension Cash	Inflation Sensitive	Core Real Estate	Multi-Strategy	Total	Total %
Level 1	\$31,602	\$26	\$0	\$532	\$26,528	\$3,294	\$282	\$716	\$1,552	<b>\$64,532</b>	<b>65.7%</b>
Level 2	\$785	\$0	\$0	\$1,936	\$0	\$0	\$846	\$1,150	\$146	<b>\$4,863</b>	<b>4.9%</b>
Level 3	\$229	\$0	\$0	\$1,275	\$0	\$0	\$223	\$575	\$0	<b>\$2,302</b>	<b>2.3%</b>
Level 4	\$821	\$7,606	\$5,150	\$2,972	\$0	\$0	\$6,189	\$3,456	\$372	<b>\$26,568</b>	<b>27.0%</b>
<b>Total \$</b>	<b>\$33,438</b>	<b>\$7,632</b>	<b>\$5,150</b>	<b>\$6,715</b>	<b>\$26,528</b>	<b>\$3,294</b>	<b>\$7,540</b>	<b>\$5,897</b>	<b>\$2,071</b>	<b>\$98,264</b>	<b>100.0%</b>
<b>Total %</b>	<b>34.03%</b>	<b>7.77%</b>	<b>5.24%</b>	<b>6.83%</b>	<b>27.00%</b>	<b>3.35%</b>	<b>7.67%</b>	<b>6.00%</b>	<b>2.11%</b>		

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

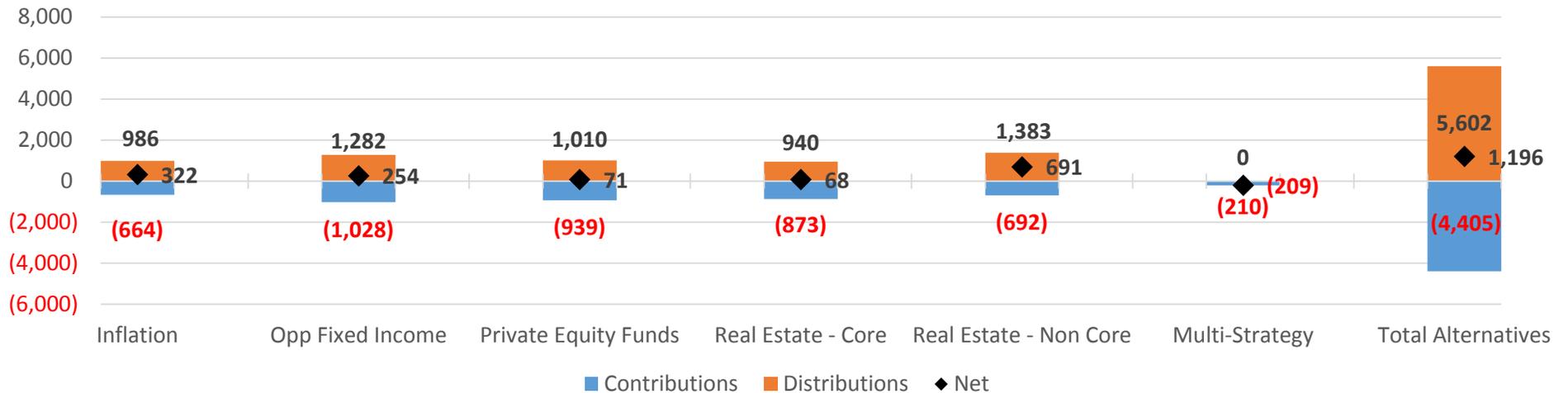


# NCRS Alternatives Liquidity Profile

## Through December 2017

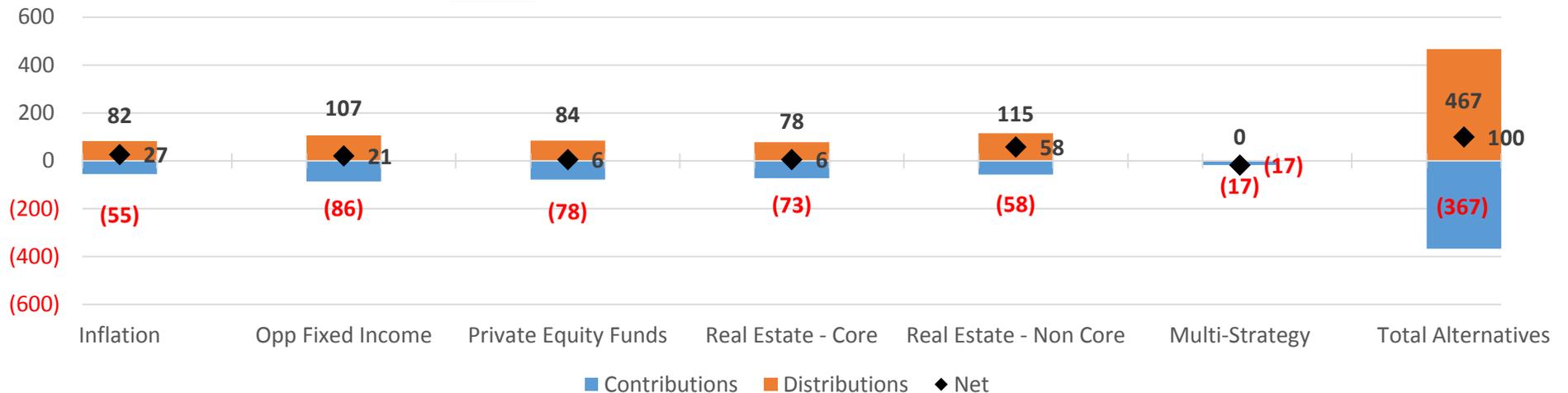
### Prior 12-Months

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 December 31, 2017

	Market Value (\$MM)	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
<b>Growth</b>	<b>\$52,935</b>	<b>20.41</b>	<b>9.18</b>	<b>11.10</b>	<b>5.25</b>	<b>8.59</b>	<b>6.61</b>
Benchmark <sup>1</sup>		18.36	8.21	9.83	4.56	8.10	5.89
<b>Public Equity</b>	<b>\$39,103</b>	<b>24.44</b>	<b>9.66</b>	<b>11.54</b>	<b>5.64</b>	<b>8.83</b>	<b>6.75</b>
Benchmark <sup>2</sup>		22.66	9.06	10.71	4.98	8.21	5.86
<b>Private Equity</b>	<b>\$5,006</b>	<b>11.95</b>	<b>9.04</b>	<b>10.55</b>	<b>6.17</b>	<b>7.52</b>	<b>6.99</b>
Benchmark <sup>3</sup>		11.80	7.91	10.38	7.20	11.66	11.92
<b>Non-Core Real Estate</b>	<b>\$3,315</b>	<b>12.40</b>	<b>12.98</b>	<b>14.23</b>	<b>2.64</b>	<b>6.65</b>	<b>7.33</b>
Benchmark <sup>4</sup>		8.15	6.81	9.04	0.07	7.11	7.89
<b>Opportunistic Fixed Income</b>	<b>\$5,511</b>	<b>7.05</b>	<b>3.74</b>	<b>6.12</b>	<b>6.61</b>	-	-
Benchmark <sup>5</sup>		4.09	3.33	3.11	0.42	-	-
<b>Rates &amp; Liquidity</b>	<b>\$32,155</b>	<b>4.10</b>	<b>2.50</b>	<b>2.40</b>	<b>5.37</b>	<b>5.24</b>	<b>6.01</b>
Benchmark <sup>6</sup>		4.75	2.70	2.55	5.14	5.08	5.82
<b>IG Fixed Income</b>	<b>\$28,862</b>	<b>4.42</b>	<b>2.63</b>	<b>2.51</b>	<b>5.43</b>	<b>5.28</b>	<b>6.04</b>
Benchmark <sup>7</sup>		4.90	2.78	2.62	5.18	5.10	5.84
<b>Cash</b>	<b>\$3,294</b>	<b>1.12</b>	<b>0.89</b>	-	-	-	-
Benchmark <sup>8</sup>		0.87	0.41	0.26	-	-	-
<b>Inflation Sensitive &amp; Diversifiers</b>	<b>\$11,264</b>	<b>8.58</b>	<b>4.43</b>	<b>4.12</b>	<b>0.84</b>	<b>4.06</b>	<b>5.11</b>
Benchmark <sup>9</sup>		6.08	4.36	3.95	-0.43	3.91	5.48
<b>Inflation Sensitive</b>	<b>\$6,188</b>	<b>7.53</b>	<b>1.59</b>	<b>0.55</b>	<b>-1.28</b>	<b>3.13</b>	<b>3.30</b>
Benchmark <sup>10</sup>		4.21	0.30	-0.82	0.56	4.37	4.57
<b>Core Real Estate</b>	<b>\$5,076</b>	<b>10.12</b>	<b>8.35</b>	<b>9.34</b>	<b>4.52</b>	<b>6.59</b>	<b>7.09</b>
Benchmark <sup>11</sup>		8.34	9.33	10.04	4.49	7.30	8.05
<b>Multi-Strategy</b>	<b>\$1,910</b>	<b>13.58</b>	<b>6.68</b>	<b>8.86</b>	<b>5.68</b>	<b>6.41</b>	-
Benchmark <sup>12</sup>		13.28	5.50	8.10	4.57	7.79	-



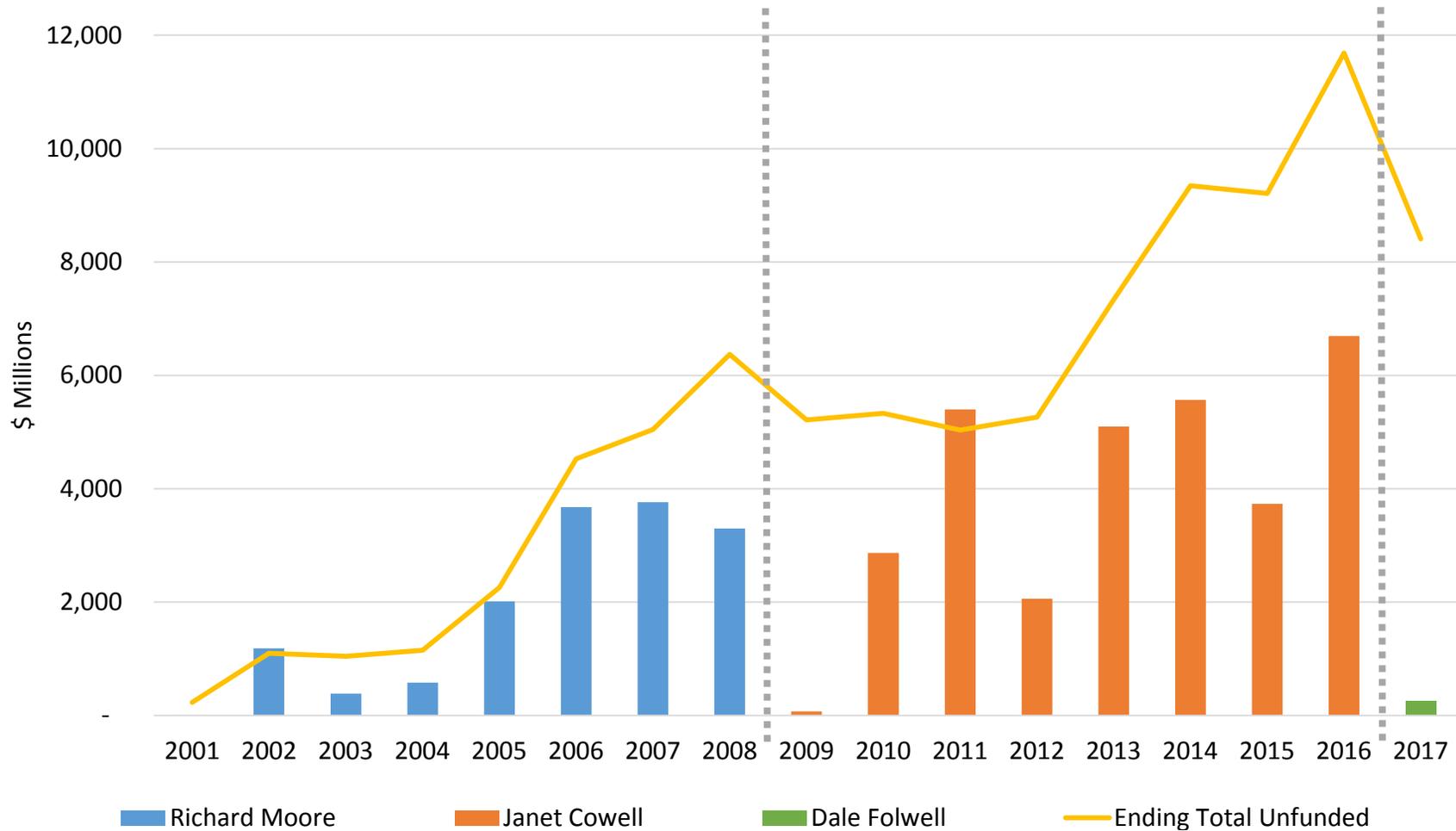
# New, Incremental, & Unfunded Investment Commitments

Since November 16 IAC Meeting As of December 31, 2017

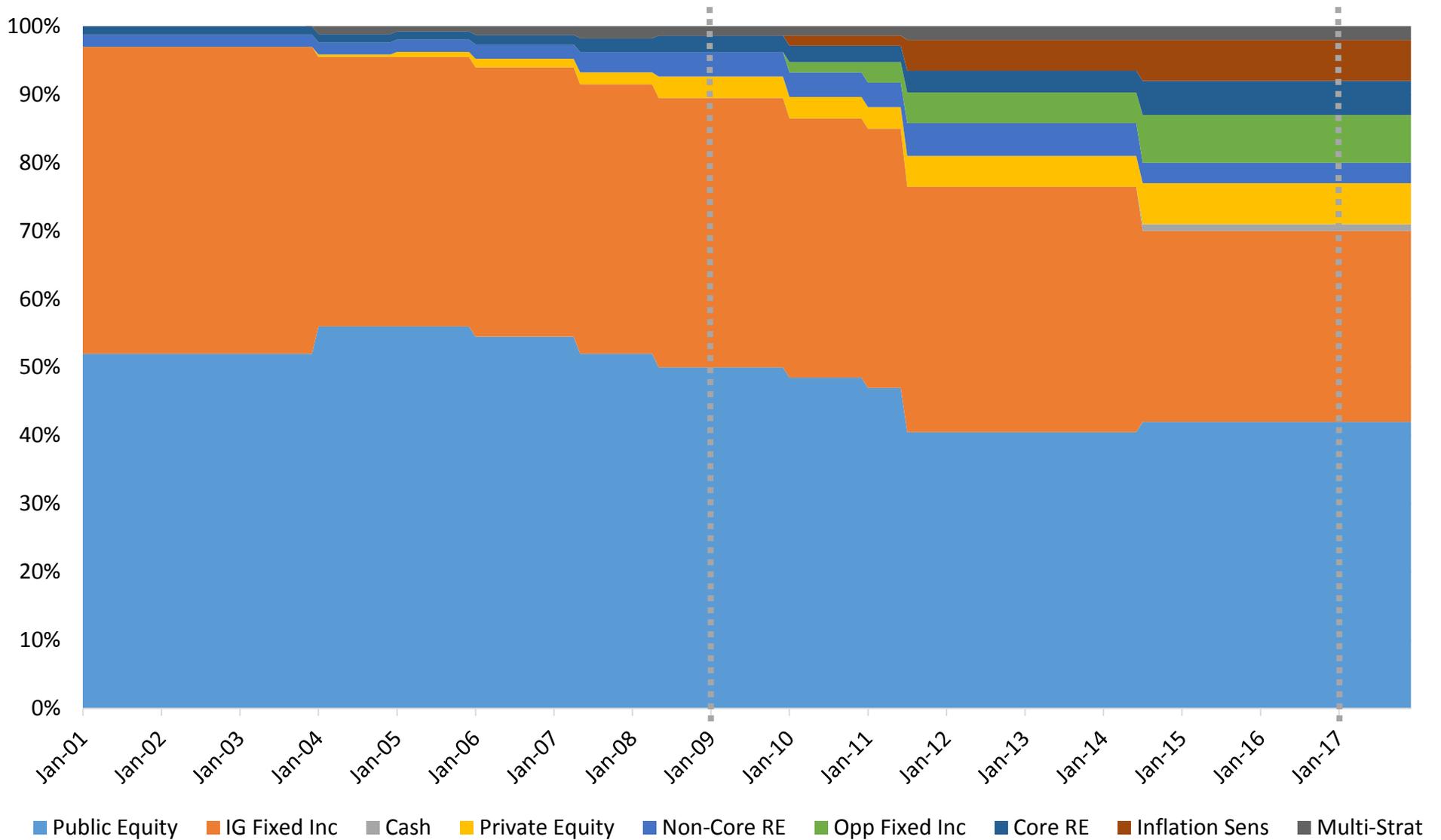
<u>Fund Name</u>	<u>Firm Name</u>	<u>New or Incremental Commitment (\$MM)</u>	<u>Closing Date</u>
<b>Public Equity</b>			
None	--	--	--
<b>Private Equity</b>			
None	--	--	--
<b>Non-Core Real Estate</b>			
None	--	--	--
<b>Opportunistic Fixed Income</b>			
None	--	--	--
<b>Inflation Sensitive</b>			
None	--	--	--
<b>Core Real Estate</b>			
LBA NC Core Industrial II	LBA Realty	250	12/05/17
<b>Multi Strategy</b>			
None	--	--	--

<u>Asset Class</u>	<u>Unfunded Commitments (\$MM)</u>
Public Equity	410
Private Equity	2,627
Non-Core Real Estate	1,835
Opportunistic Fixed Income	1,204
Inflation Sensitive	1,352
Core Real Estate	821
Multi Strategy	160
<b>Total</b>	<b>8,409</b>

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



# Strategic Asset Allocation Policy History





# Exited Investments

## Since November 16 IAC Meeting

<u>Fund Name</u>	<u>Redemption Amount</u>	<u>Redemption Effective</u>
<b>Public Equity</b>		
None	--	--
<b>Private Equity</b>		
None	--	--
<b>Non-Core Real Estate</b>		
None	--	--
<b>Opportunistic Fixed Income</b>		
None	--	--
<b>Inflation Sensitive</b>		
None	--	--
<b>Core Real Estate</b>		
None	--	--
<b>Multi Strategy</b>		
None	--	--



## Appendix



# NCRS Public Equity Net of Fees Performance

## As of December 31, 2017

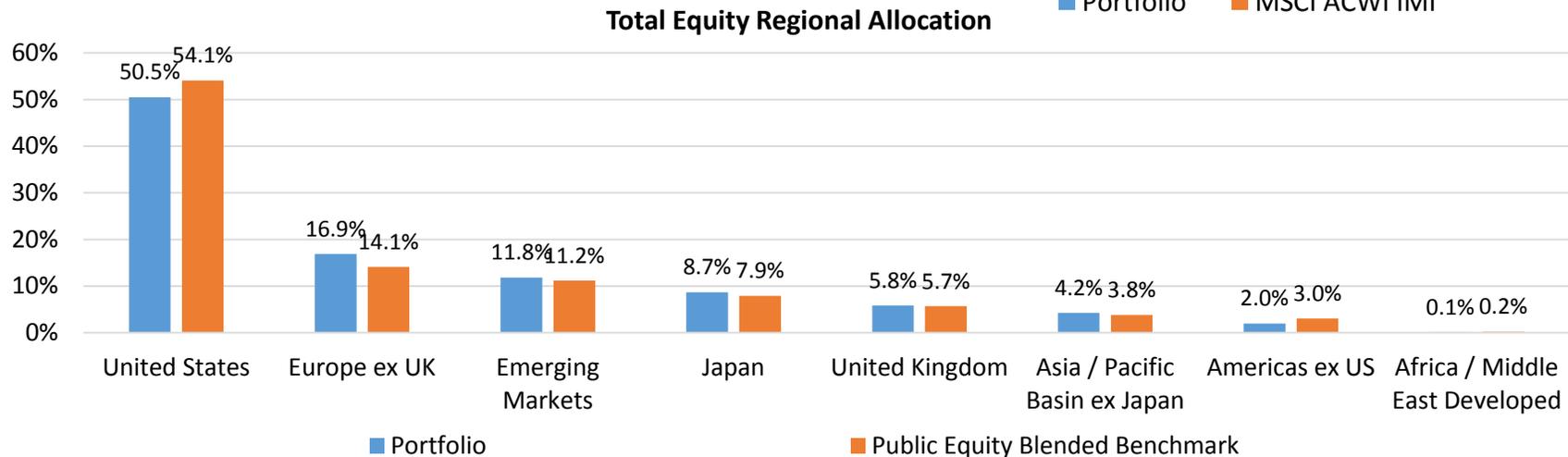
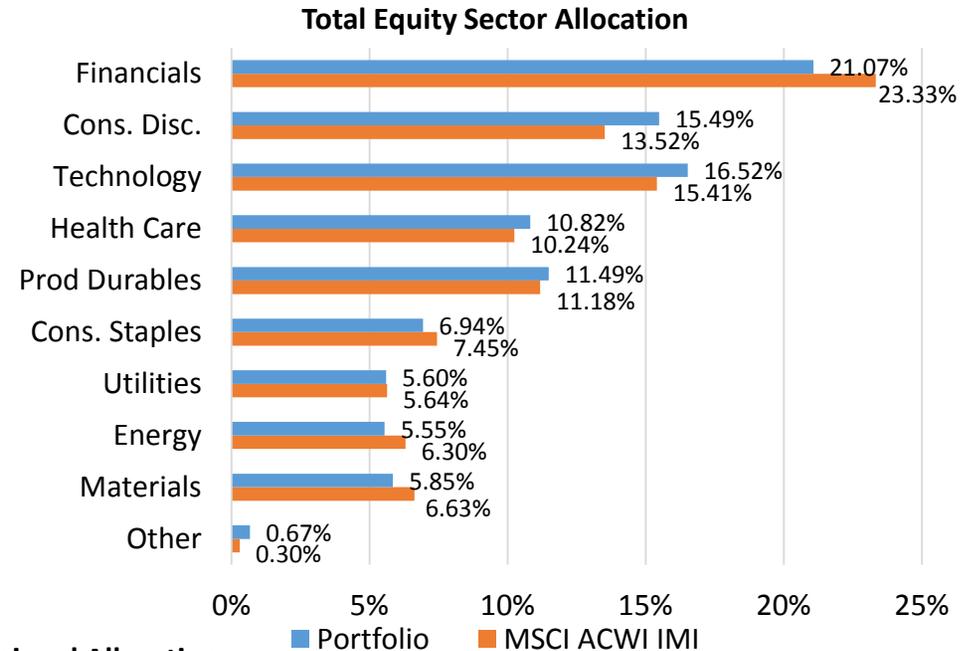
	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
<b>Public Equity*</b>	<b>\$39,103</b>	<b>5.32</b>	<b>24.44</b>	<b>9.66</b>	<b>11.54</b>	<b>5.64</b>
Benchmark <sup>2</sup>		5.43	22.66	9.06	10.71	4.98
<b>Domestic Portfolio</b>	<b>\$17,329</b>	<b>6.38</b>	<b>21.78</b>	<b>10.81</b>	<b>15.51</b>	<b>8.62</b>
Russell 3000		6.34	21.13	11.12	15.58	8.60
<b>Non-US Portfolio</b>	<b>\$18,552</b>	<b>4.85</b>	<b>31.01</b>	<b>9.46</b>	<b>8.17</b>	<b>2.36</b>
Custom Benchmark		5.23	27.81	8.38	7.22	1.68
<b>Equity Hedge</b>	<b>\$3,213</b>	<b>2.45</b>	<b>9.77</b>	<b>5.97</b>	<b>5.84</b>	<b>-</b>
MSCI ACWI (beta adjusted)		2.26	9.03	3.33	3.30	-

\*Public Equity returns also include the global portfolio, which has been liquidated but currently contains a residual amount of roughly \$1 million.

# NCRS Public Equity Portfolio Characteristics

## As of December 31, 2017

Portfolio Characteristics		
	Portfolio	MSCI ACWI IMI
Price / Earnings	22.30	21.20
Dividend Yield	1.99	2.20
Price / Book	3.40	3.05
Debt / Equity	0.91	0.95
Market Cap (\$B Weighted Median)	41.99	41.99
Return on Equity - 1 Year	15.90	15.40



# NCRS Private Equity Portfolio

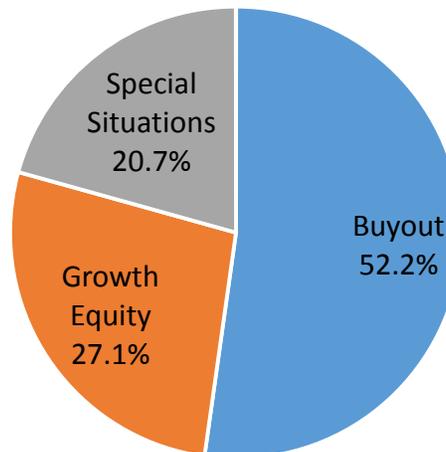
As of December 31, 2017

Net of Fees Performance						
	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
<b>Private Equity*</b>	<b>\$5,006</b>	<b>3.43</b>	<b>11.95</b>	<b>9.04</b>	<b>10.55</b>	<b>6.17</b>
Benchmark <sup>3</sup>		3.28	11.80	7.91	10.38	7.20
<b>Buyout</b>	<b>\$2,139</b>	<b>3.74</b>	<b>13.97</b>	<b>9.41</b>	<b>9.38</b>	<b>4.85</b>
<b>Growth</b>	<b>\$1,182</b>	<b>4.38</b>	<b>10.95</b>	<b>11.27</b>	<b>13.73</b>	<b>8.70</b>
<b>Special Situations</b>	<b>\$712</b>	<b>2.98</b>	<b>6.63</b>	<b>5.18</b>	<b>6.07</b>	<b>5.13</b>
<b>Fund of Funds</b>	<b>\$946</b>	<b>2.09</b>	<b>12.99</b>	<b>9.34</b>	<b>12.78</b>	<b>7.22</b>

### 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>Total</u>
NCRS	12.02	6.84	5.52	3.22	9.14	9.24	11.89	21.16	11.10	13.34	10.64	16.54	8.04	-0.63	-2.23	7.89
# of Funds	28	3	11	21	15	17	3	1	6	6	9	4	9	6	7	146

### Strategy Allocation (Based on Commitments)



\*Private Equity returns include a stock distribution account, in the amount of roughly \$26 million, which does not fall under any specific sub-section. 29

# NCRS Non-Core Real Estate Portfolio

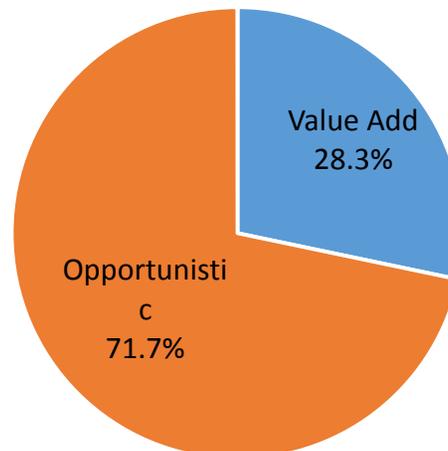
As of December 31, 2017

Net of Fees Performance						
	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
<b>Non-Core Real Estate</b>	<b>\$3,315</b>	<b>2.52</b>	<b>12.40</b>	<b>12.98</b>	<b>14.23</b>	<b>2.64</b>
Benchmark <sup>4</sup>		1.63	8.15	6.81	9.04	0.07
<b>Opportunistic</b>	<b>\$2,377</b>	<b>3.03</b>	<b>13.39</b>	<b>12.38</b>	<b>13.77</b>	<b>0.91</b>
<b>Value Add</b>	<b>\$938</b>	<b>1.20</b>	<b>10.17</b>	<b>13.98</b>	<b>14.91</b>	<b>5.52</b>

### 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>Total</u>
NCRS	9.15	15.70	-1.39	2.65	2.34	16.85	N/A	16.47	16.78	19.01	16.31	6.93	7.85	0.95	N/A	6.33
# of Funds	17	3	15	13	8	6	0	6	7	5	7	7	6	7	0	107

### Strategy Allocation (Based on Valuation)



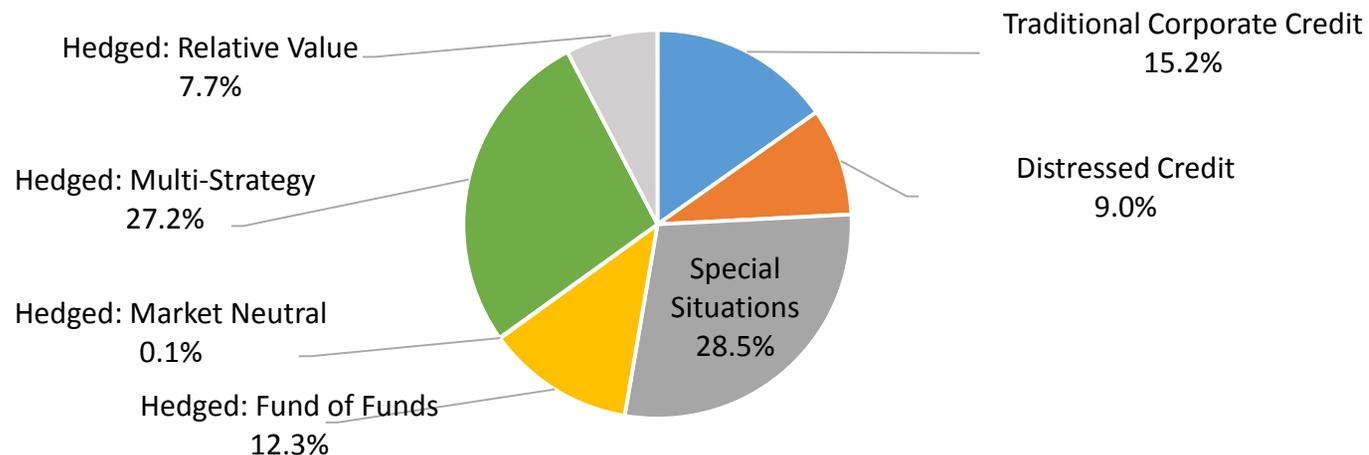
# NCRS Opportunistic Fixed Income Portfolio

As of December 31, 2017

Net of Fees Performance						
	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
<b>Opportunistic Fixed Income</b>	<b>\$5,511</b>	<b>1.53</b>	<b>7.05</b>	<b>3.74</b>	<b>6.12</b>	<b>6.61</b>
Benchmark <sup>5</sup>		0.77	4.09	3.33	3.11	0.42
<b>Traditional Corporate Credit</b>	<b>\$839</b>	<b>2.30</b>	<b>8.47</b>	<b>4.04</b>	<b>6.61</b>	<b>-</b>
<b>Distressed Credit</b>	<b>\$493</b>	<b>3.33</b>	<b>11.84</b>	<b>7.81</b>	<b>10.02</b>	<b>7.46</b>
<b>Special Situations</b>	<b>\$1,572</b>	<b>0.76</b>	<b>8.77</b>	<b>8.34</b>	<b>13.73</b>	<b>10.47</b>
<b>Hedged Fixed Income</b>	<b>\$2,606</b>	<b>1.40</b>	<b>4.97</b>	<b>1.80</b>	<b>4.03</b>	<b>-</b>

	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>Total</u>
NCRS	2.87	N/A	17.08	8.60	22.42	6.74	4.60	2.14	5.15	3.92	14.89	8.09	-0.44	6.14
# of Funds	1	0	1	3	1	4	9	2	7	3	1	8	2	42

### Strategy Allocation (Based on Valuation)





# NCRS Rates & Liquidity Portfolio

As of December 31, 2017

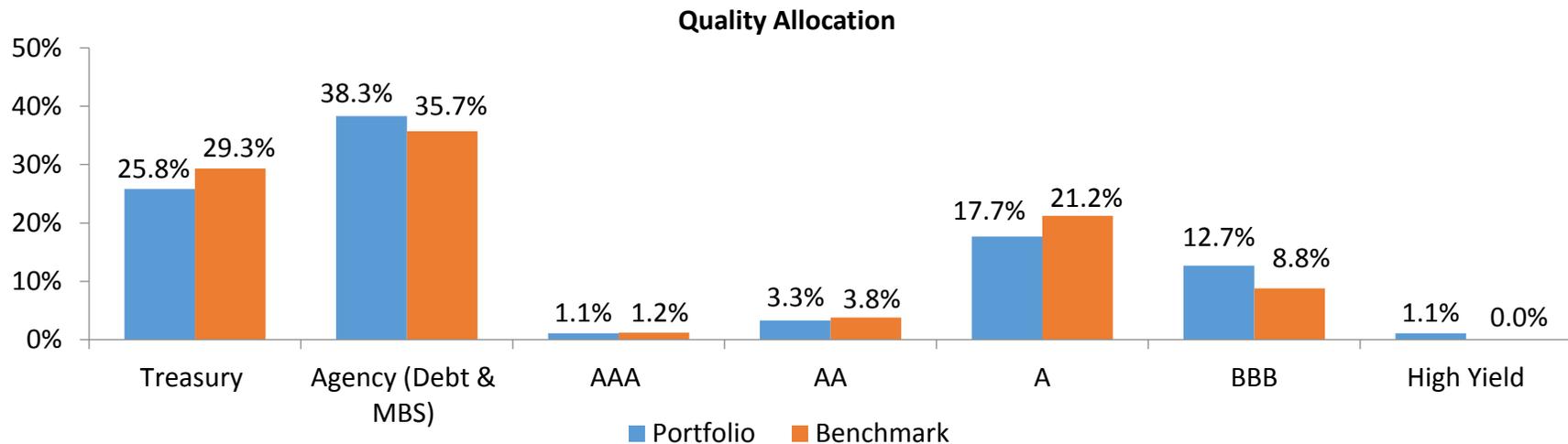
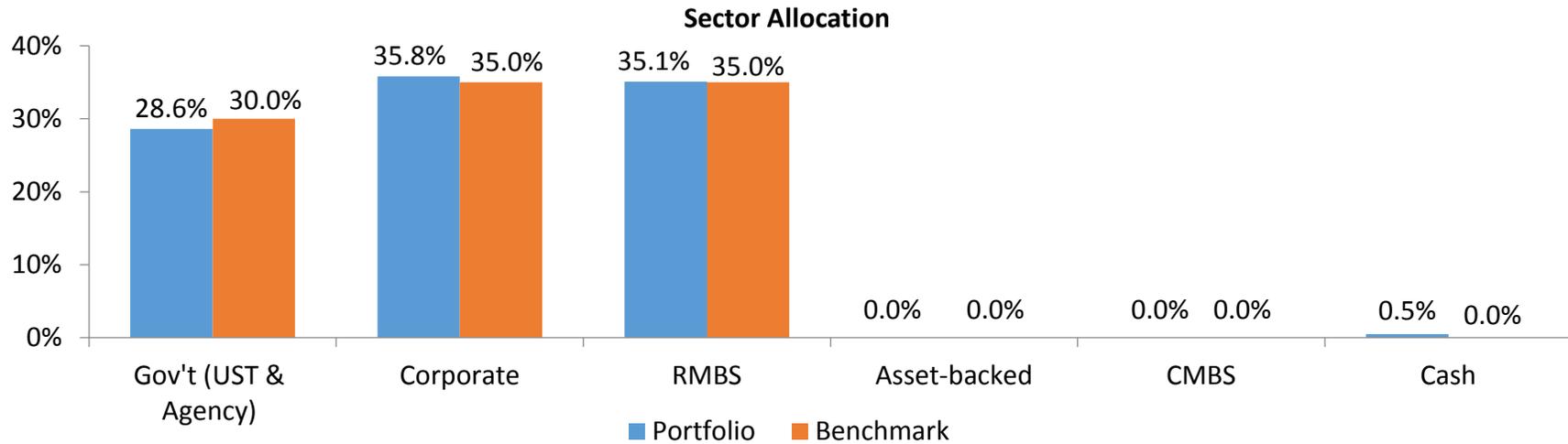
Net of Fees Performance						
	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
<b>Rates &amp; Liquidity</b>	<b>\$32,155</b>	<b>0.64</b>	<b>4.10</b>	<b>2.50</b>	<b>2.40</b>	<b>5.37</b>
Benchmark <sup>6</sup>		0.86	4.75	2.70	2.55	5.14
<b>IG Fixed Income &amp; Cash</b>	<b>\$28,862</b>	<b>0.68</b>	<b>4.42</b>	<b>2.63</b>	<b>2.51</b>	<b>5.43</b>
Core Fixed Income	\$25,861	0.72	4.82	2.85	2.65	5.50
IG Fixed Income Cash	\$3,001	0.32	1.14	0.86	-	-
<b>Pension Cash</b>	<b>\$3,294</b>	<b>0.30</b>	<b>1.12</b>	<b>0.89</b>	<b>-</b>	<b>-</b>

## Core Fixed Income Portfolio Characteristics

	<u>Avg. Coupon</u>	<u>Yield to Maturity</u>	<u>Duration (Years)</u>
Government (Treasury & Agency)	4.24%	2.48%	9.8
Corporate	4.57%	3.48%	9.2
Mortgage	3.72%	2.87%	4.1
<b>Total</b>	<b>4.17%</b>	<b>2.98%</b>	<b>7.6</b>

# NCRS Core Fixed Income Portfolio Characteristics

## As of December 31, 2017





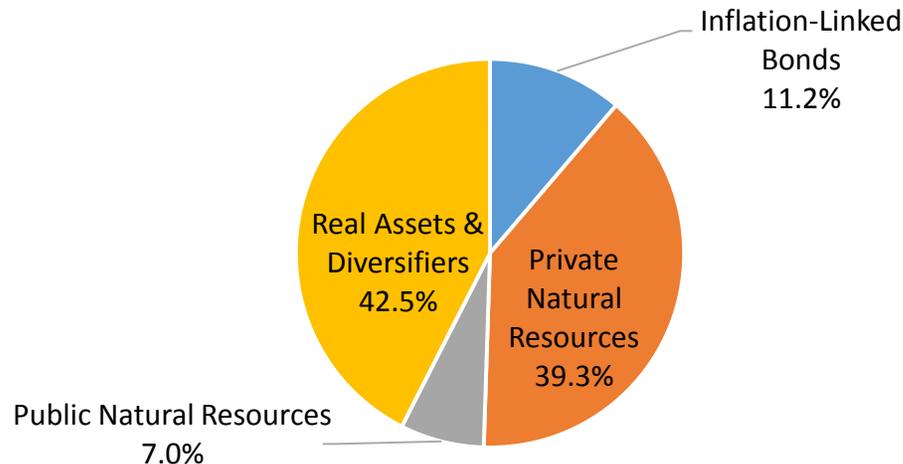
# NCRS Inflation Sensitive Portfolio

As of December 31, 2017

Net of Fees Performance						
	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
<b>Inflation Sensitive</b>	<b>\$6,188</b>	<b>1.70</b>	<b>7.53</b>	<b>1.59</b>	<b>0.55</b>	<b>(1.28)</b>
Benchmark <sup>10</sup>		1.65	4.21	0.30	(0.82)	0.56
<b>Private Natural Resources</b>	<b>\$2,564</b>	<b>1.43</b>	<b>9.16</b>	<b>0.02</b>	<b>3.27</b>	<b>1.12</b>
<b>Public Natural Resources</b>	<b>\$432</b>	<b>3.23</b>	<b>(1.02)</b>	<b>(6.12)</b>	<b>(8.06)</b>	<b>-</b>
<b>Inflation-Linked Bonds</b>	<b>\$56</b>	<b>0.15</b>	<b>0.37</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Real Assets &amp; Other Diversifiers</b>	<b>\$2,496</b>	<b>1.81</b>	<b>9.19</b>	<b>8.22</b>	<b>7.98</b>	<b>-</b>

	IRR by Vintage Year												
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
NCRS	0.10	7.08	0.88	N/A	-7.86	-6.92	6.10	6.06	10.25	4.72	4.57	N/A	0.14
# of Funds	3	2	2	0	3	9	7	11	12	4	4	0	57

Strategy Allocation (Based on Valuation)



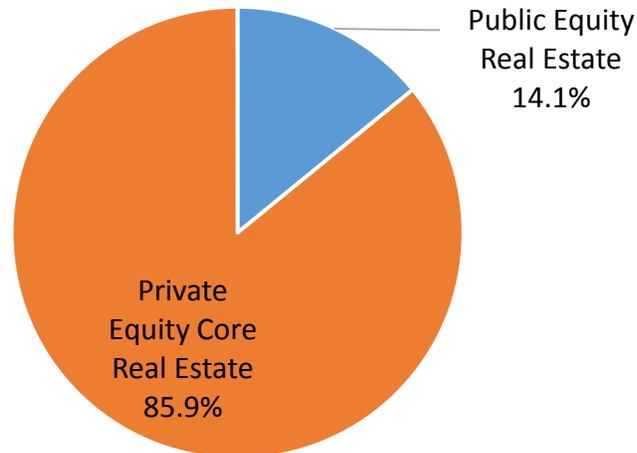
# NCRS Core Real Estate Portfolio

As of December 31, 2017

Net of Fees Performance						
	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
<b>Core Real Estate</b>	<b>\$5,076</b>	<b>1.98</b>	<b>10.12</b>	<b>8.35</b>	<b>9.34</b>	<b>4.52</b>
Benchmark <sup>11</sup>		2.07	8.34	9.33	10.04	4.49
<b>Public Equity Real Estate</b>	<b>\$716</b>	<b>4.27</b>	<b>15.04</b>	<b>5.89</b>	<b>8.65</b>	<b>5.29</b>
<b>Private Equity Core Real Estate</b>	<b>\$4,359</b>	<b>1.60</b>	<b>9.35</b>	<b>8.92</b>	<b>9.68</b>	<b>4.46</b>

	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>Total</u>
NCRS	7.63	9.76	-8.36	5.29	1.39	9.58	N/A	23.62	N/A	N/A	7.58	7.93	3.25	11.99	N/A	7.25
# of Funds	5	1	1	2	3	1	0	1	0	0	2	6	2	9	1	34

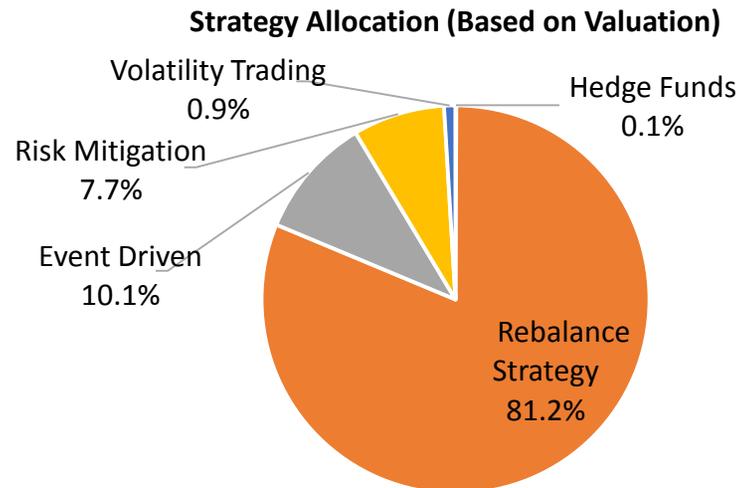
Strategy Allocation (Based on Valuation)



# NCRS Multi-Strategy Portfolio

As of December 31, 2017

Net of Fees Performance						
	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
<b>Multi-Strategy</b>	<b>\$1,910</b>	<b>3.09</b>	<b>13.58</b>	<b>6.68</b>	<b>8.86</b>	<b>5.68</b>
Benchmark <sup>12</sup>		3.04	13.28	5.50	8.10	4.57
<b>Hedge Funds</b>	<b>\$1</b>	<b>(10.18)</b>	<b>(25.32)</b>	<b>(13.33)</b>	<b>(6.37)</b>	<b>(4.07)</b>
<b>Rebalance Strategy</b>	<b>\$1,552</b>	<b>3.85</b>	<b>15.99</b>	<b>7.94</b>	<b>10.19</b>	<b>-</b>
<b>Distressed Credit</b>	<b>\$193</b>	<b>0.47</b>	<b>8.24</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Risk Mitigation</b>	<b>\$146</b>	<b>(0.62)</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Volatility Trading</b>	<b>\$18</b>	<b>(3.40)</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>



## 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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# INVESTMENT MANAGEMENT DIVISION