

NORTH CAROLINA
DEPARTMENT OF STATE TREASURER



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STATE TREASURER OF NORTH CAROLINA
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INVESTMENT MANAGEMENT DIVISION

Performance Review

May 20, 2020



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	\$40,771
Investment manager terminations/renegotiations	\$241,299
Sub-Total	\$282,070

Projected Realized savings through December 2020

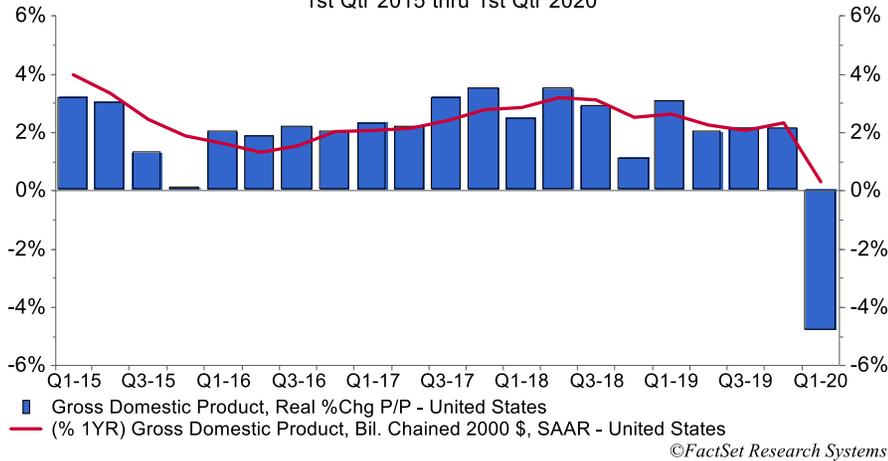
\$347,137



US Economic Environment

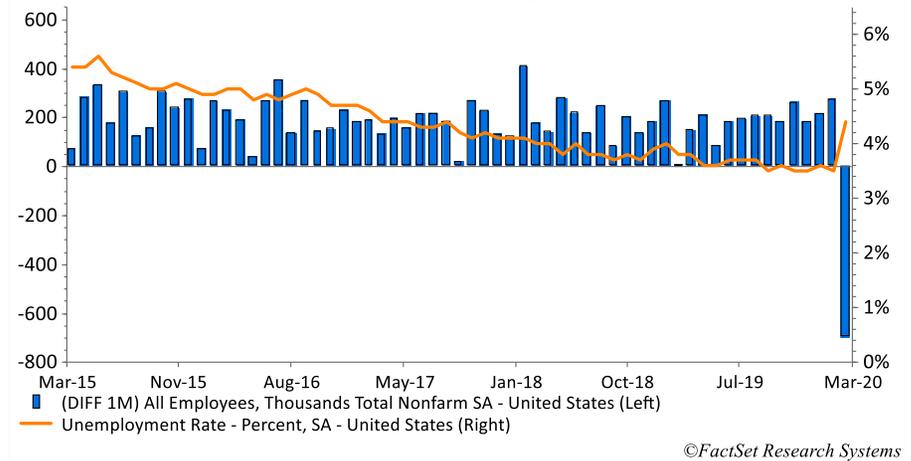
US Real GDP Growth

1st Qtr 2015 thru 1st Qtr 2020



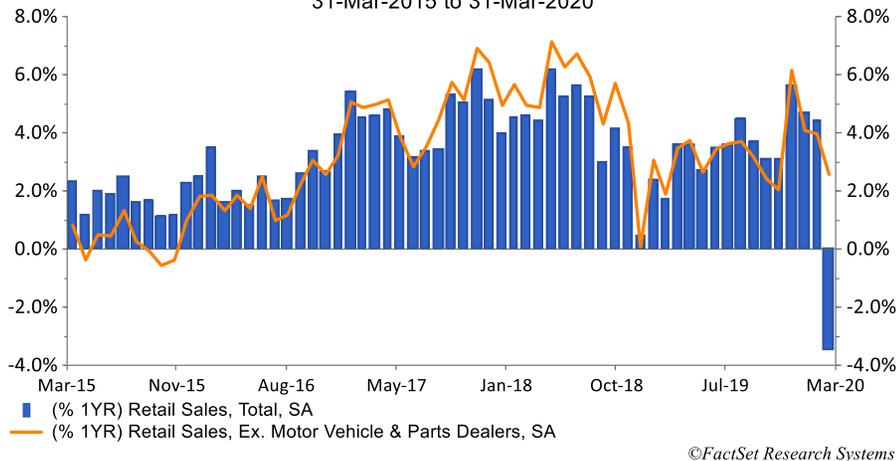
US Change in NonFarm Employment & Unemployment Rate

31-Mar-2015 to 31-Mar-2020



US Retail Sales

31-Mar-2015 to 31-Mar-2020



US Consumer Confidence

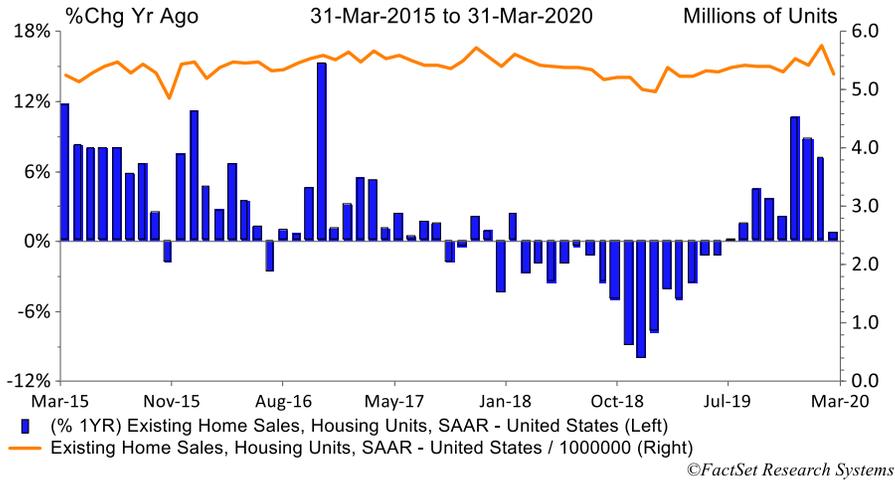
31-Mar-2015 to 31-Mar-2020



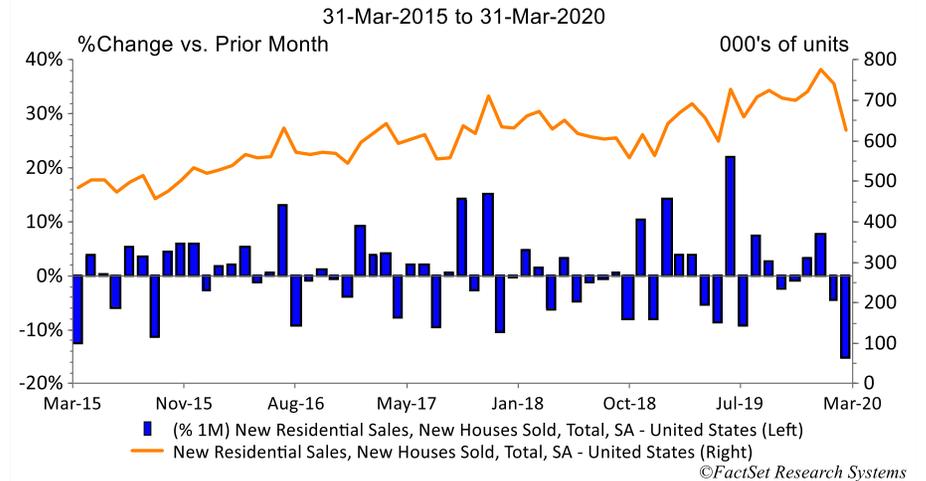


US Economic Environment

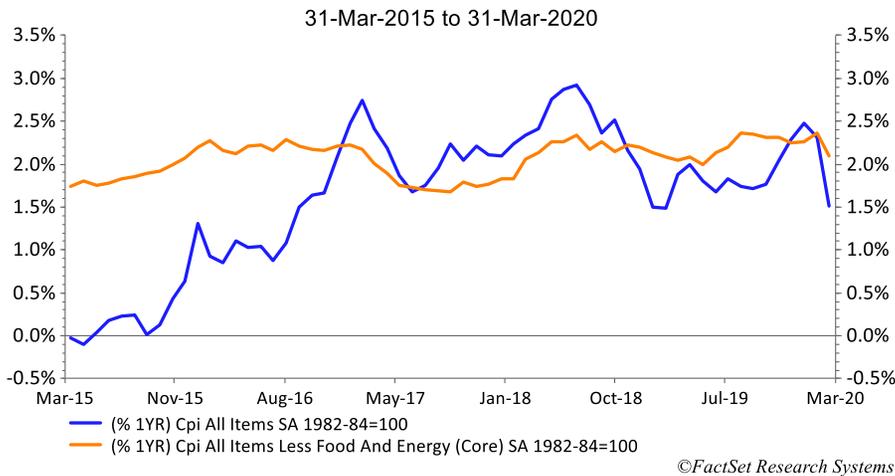
US Existing Home Sales



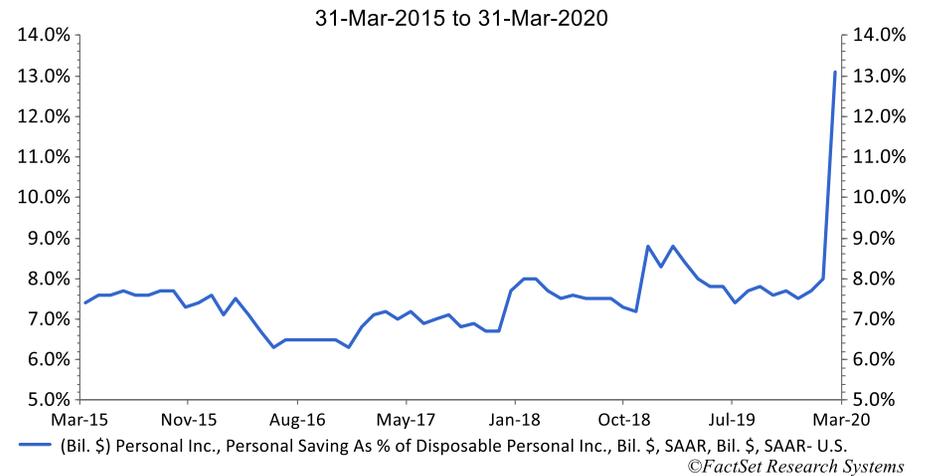
US New Home Sales



US Consumer Price Inflation

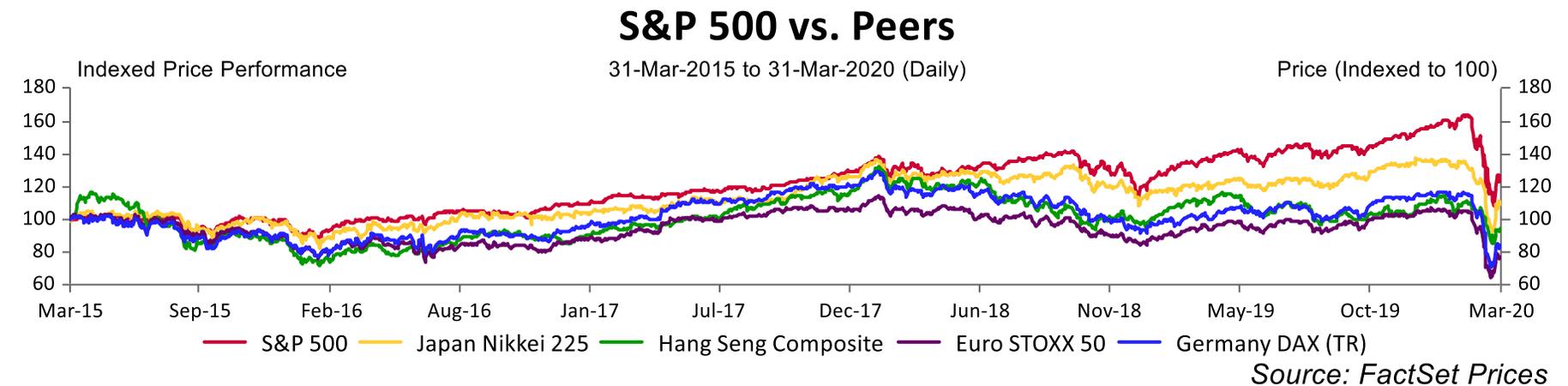
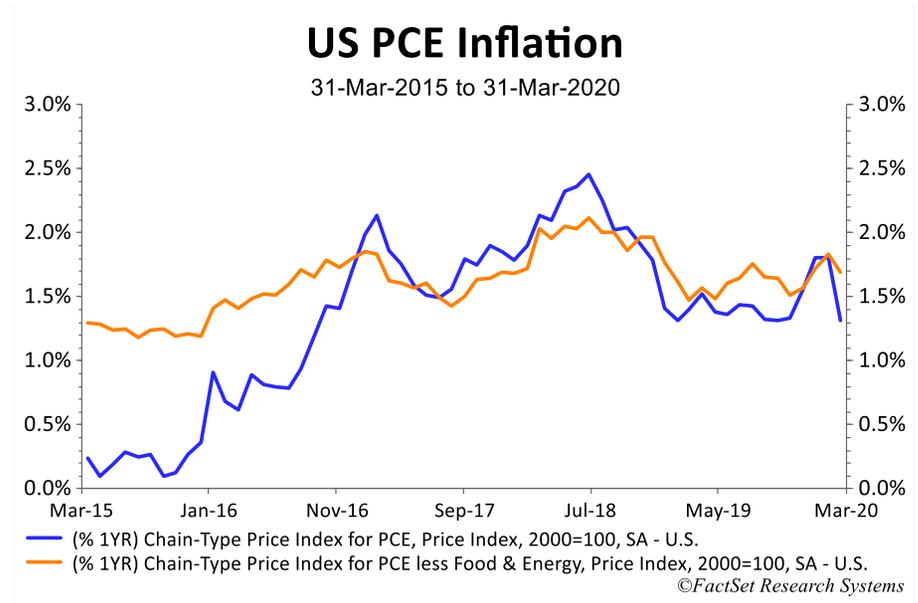
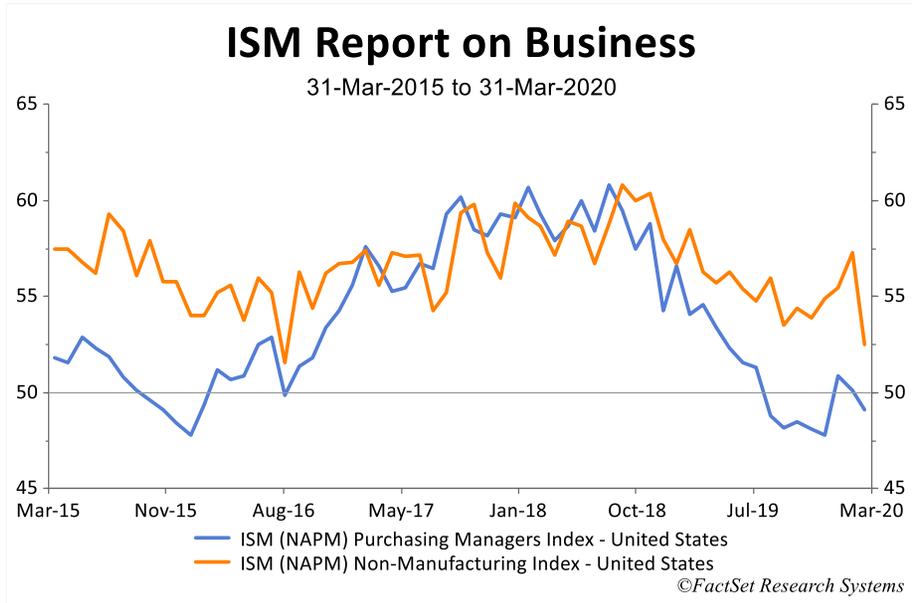


US Personal Savings Rate





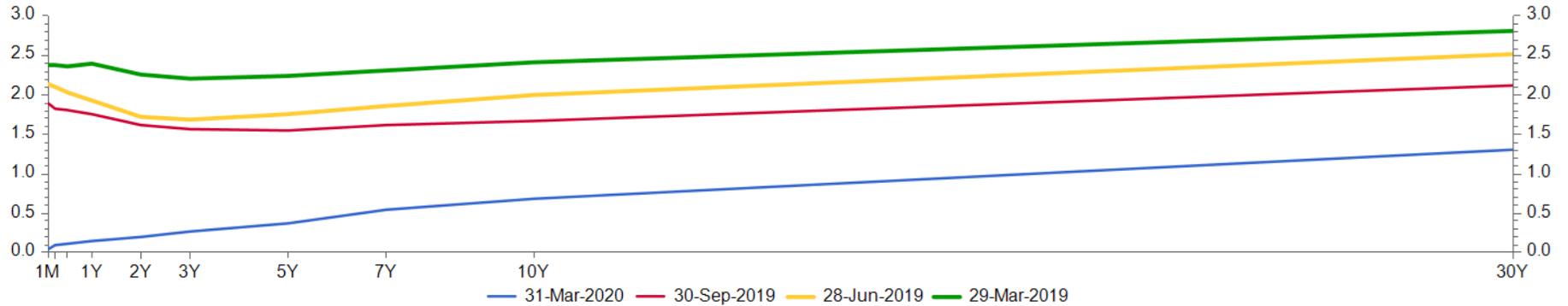
US and Global Economic Environment





Market Environment

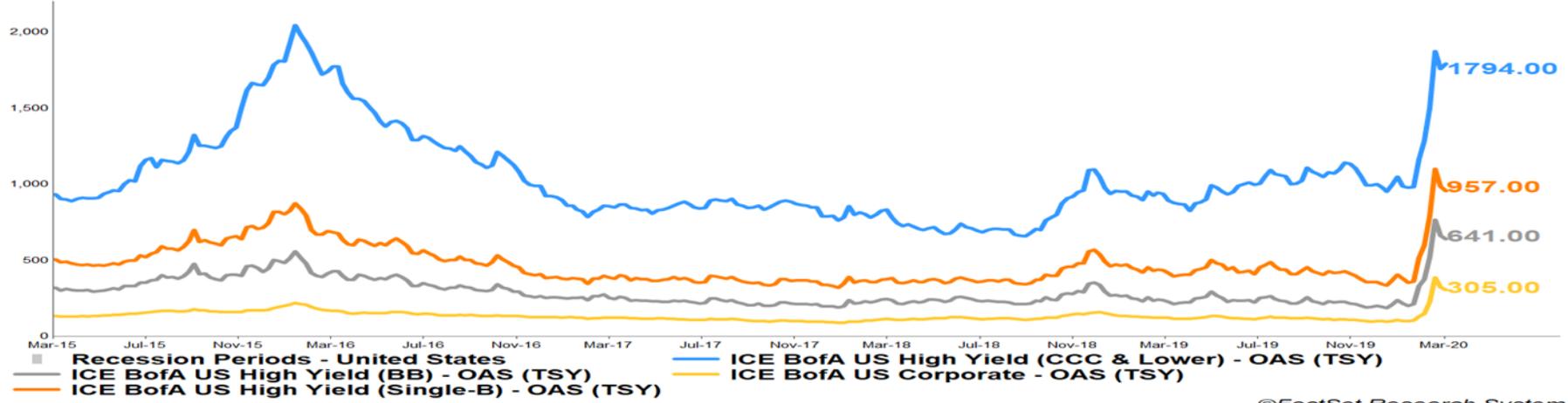
United States Treasury Yield Curve



Source: FactSet Interest Rate Database

Corporate Credit OAS (BofAML Indices)

31-Mar-2010 to 31-Mar-2020



©FactSet Research Systems

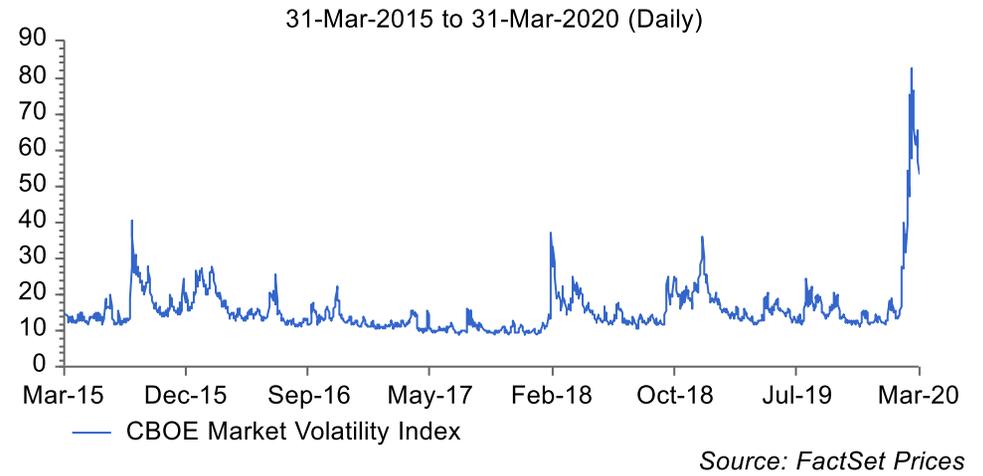


Market Environment

Closing Price Fed Nominal Broad Dollar Index



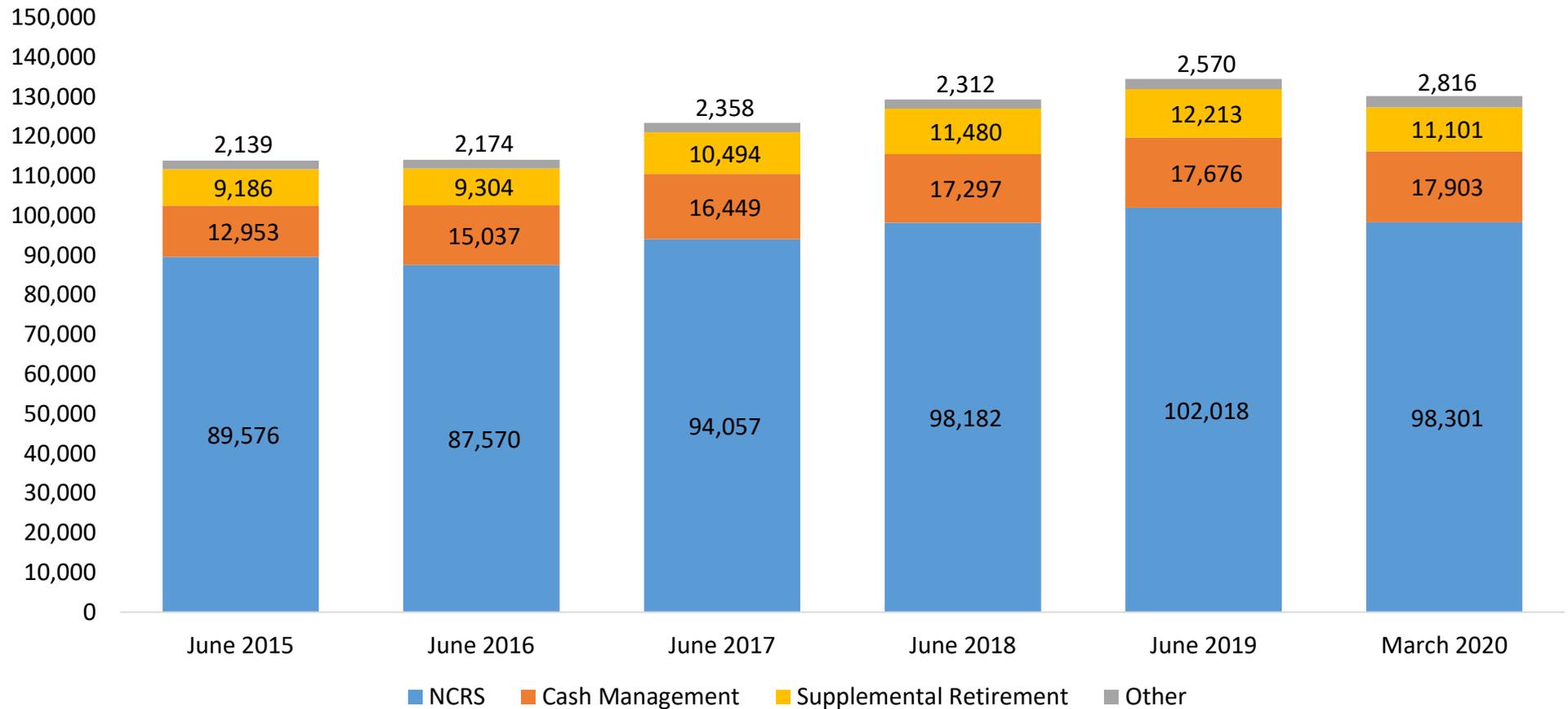
Closing Price CBOE VIX Index



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.	03/20	0.3	03/20	4.4	03/20	1.5	Asia/Pacific/Latam						
Europe							China	03/20	-6.8			03/20	4.3
Germany	12/19	0.4	03/20	5.0	03/20	1.4	India	12/19	4.7			03/20	5.5
France	03/20	-5.4	03/20	8.4	03/20	0.7	Japan	12/19	-0.7	03/20	2.5	03/20	0.4
U.K.	12/19	1.1	02/20	4.0	03/20	1.5	Indonesia	03/20	3.0			03/20	3.0
Italy	03/20	-4.8	03/20	8.4	03/20	0.1	Brazil	12/19	1.7			03/20	3.3
Spain	03/20	-4.1	03/20	14.5	03/20	0.0	Australia	12/19	2.2	03/20	5.2	03/20	2.2

Assets Under Management (\$MM)

\$130.1 billion as of March 31, 2020



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 March 31, 2020

	Market Value (\$MM)	%	Target	Range		Relative %	Relative \$ (\$MM)
				Minimum	Maximum		
Growth	\$43,498	44.25%	58.00%	37.00%	71.00%	-13.75%	(\$13,517)
Public Equity	28,923	29.42%	42.00%	37.00%	47.00%	-12.58%	(12,364)
Private Equity	5,627	5.72%	6.00%	0.00%	8.75%	-0.28%	(271)
Non Core Real Estate	3,263	3.32%	3.00%	0.00%	8.00%	0.32%	314
Opportunistic Fixed Income	5,686	5.78%	7.00%	0.00%	7.50%	-1.22%	(1,196)
Rates & Liquidity	41,380	42.10%	29.00%	24.00%	42.00%	13.10%	12,873
IG Fixed Income & Cash	32,251	32.81%	28.00%	24.00%	32.00%	4.81%	4,727
Pension Cash	9,129	9.29%	1.00%	0.00%	10.00%	8.29%	8,146
Inflation Sensitive & Diversifiers	11,409	11.61%	11.00%	4.00%	16.00%	0.61%	596
Inflation Sensitive	5,822	5.92%	6.00%	2.00%	7.50%	-0.08%	(76)
Core Real Estate	5,587	5.68%	5.00%	2.00%	10.00%	0.68%	672
Multi-Strategy	2,014	2.05%	2.00%	0.00%	4.00%	0.05%	48
Grand Total	\$98,301	100.00%					



NCRS Asset Allocation (Unaudited)

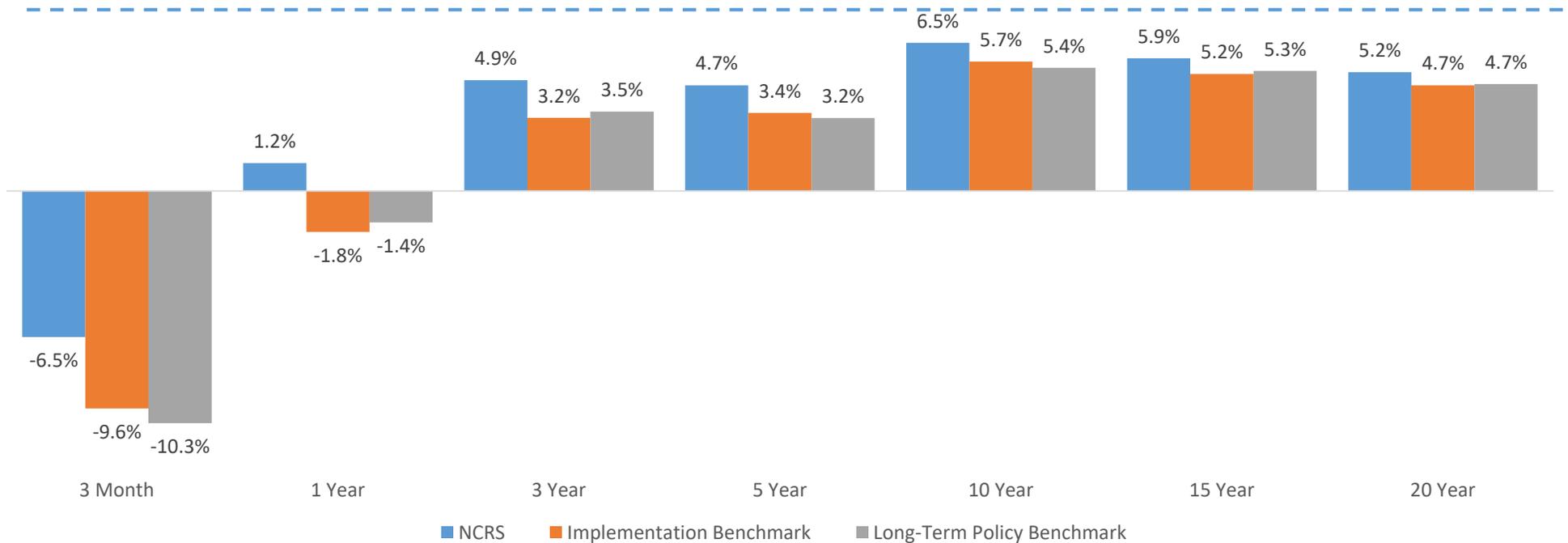
As of May 13, 2020

	Market Value (\$MM)	%	Target	Range		Relative %	Relative \$ (\$000)
				Minimum	Maximum		
Growth	\$45,113	44.75%	58.00%	37.00%	71.00%	-13.25%	(\$13,357)
Public Equity	30,068	29.83%	42.00%	37.00%	47.00%	-12.17%	(12,272)
Private Equity	5,670	5.62%	6.00%	0.00%	8.75%	-0.38%	(379)
Non Core Real Estate	3,252	3.23%	3.00%	0.00%	8.00%	0.23%	228
Opportunistic Fixed Income	6,122	6.07%	7.00%	0.00%	7.50%	-0.93%	(934)
Rates & Liquidity	42,561	42.22%	29.00%	24.00%	42.00%	13.22%	13,326
IG Fixed Income & Cash	32,861	32.60%	28.00%	24.00%	32.00%	4.60%	4,635
Pension Cash	9,699	9.62%	1.00%	0.00%	10.00%	8.62%	8,691
Inflation Sensitive & Diversifiers	11,169	11.08%	11.00%	4.00%	16.00%	0.08%	80
Inflation Sensitive	5,594	5.55%	6.00%	2.00%	7.50%	-0.45%	(454)
Core Real Estate	5,575	5.53%	5.00%	2.00%	10.00%	0.53%	534
Multi-Strategy	1,967	1.95%	2.00%	0.00%	4.00%	-0.05%	(49)
Grand Total	\$100,810	100.00%					



NCRS Total Net Portfolio Return vs. Benchmarks

As of March 31, 2020



Notes:

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

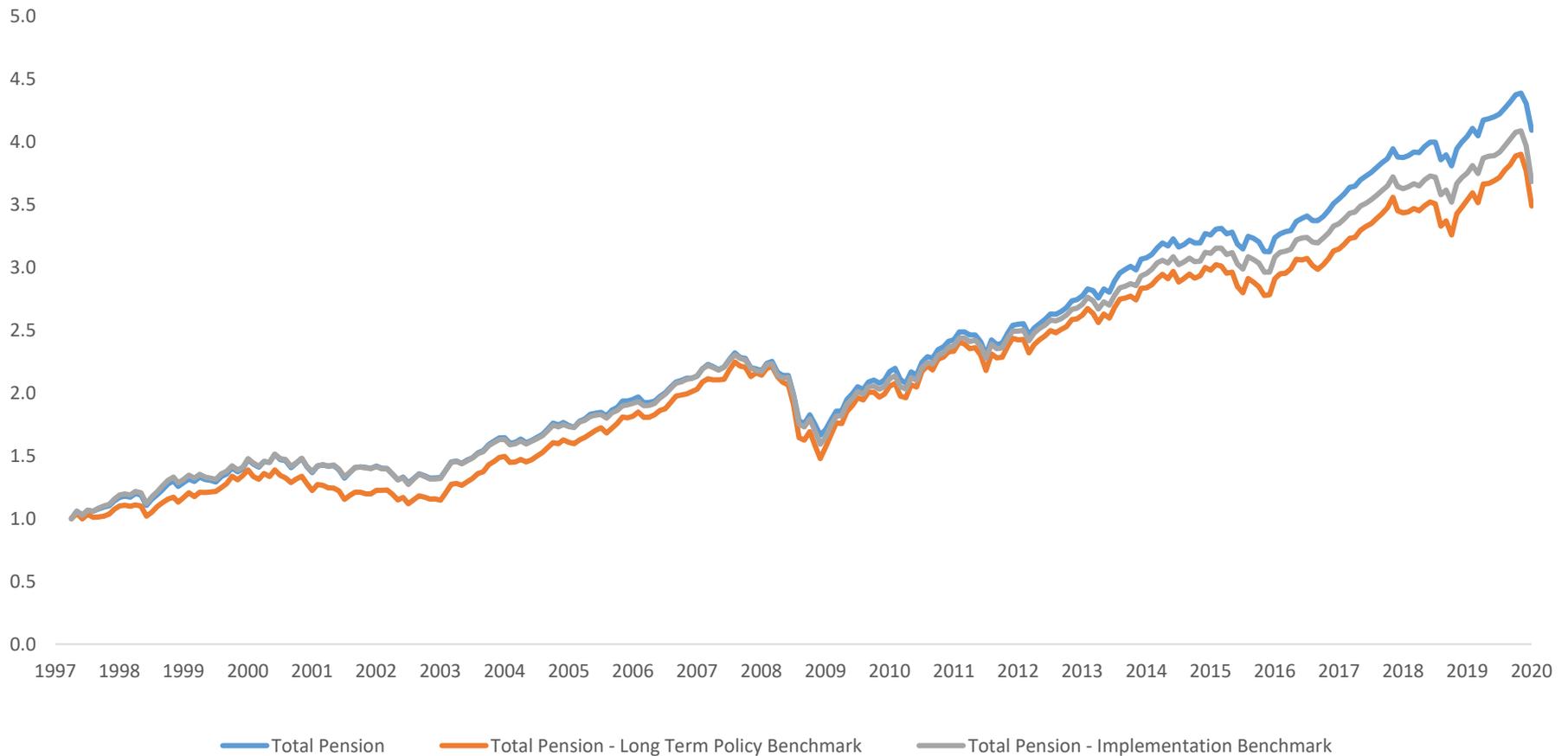
Returns for periods greater than one year are annualized.

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 March 31, 2020



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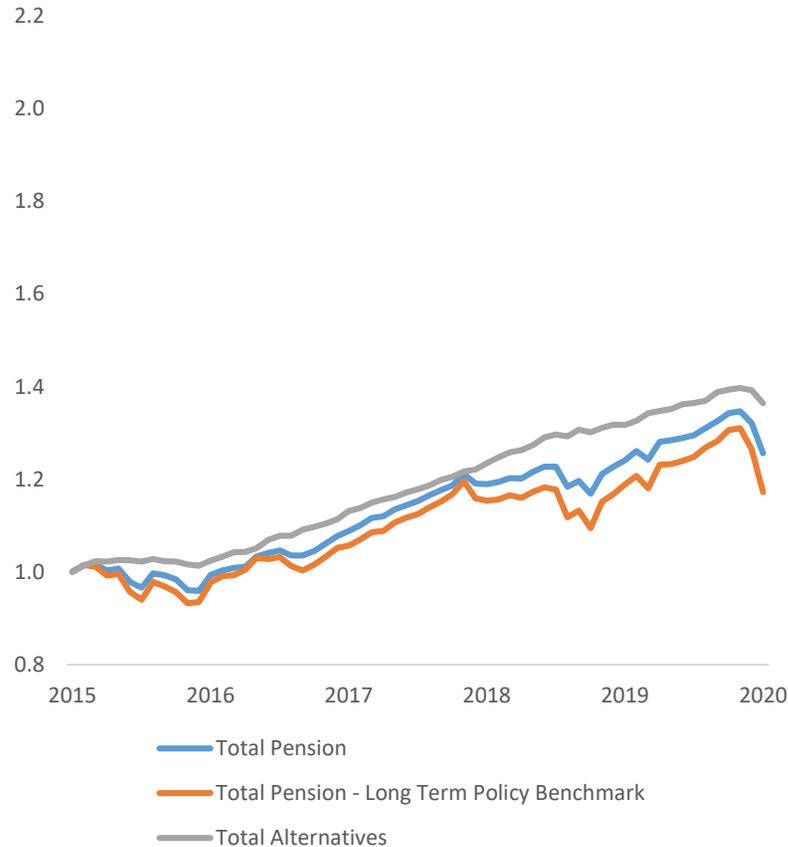
Notes:

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.



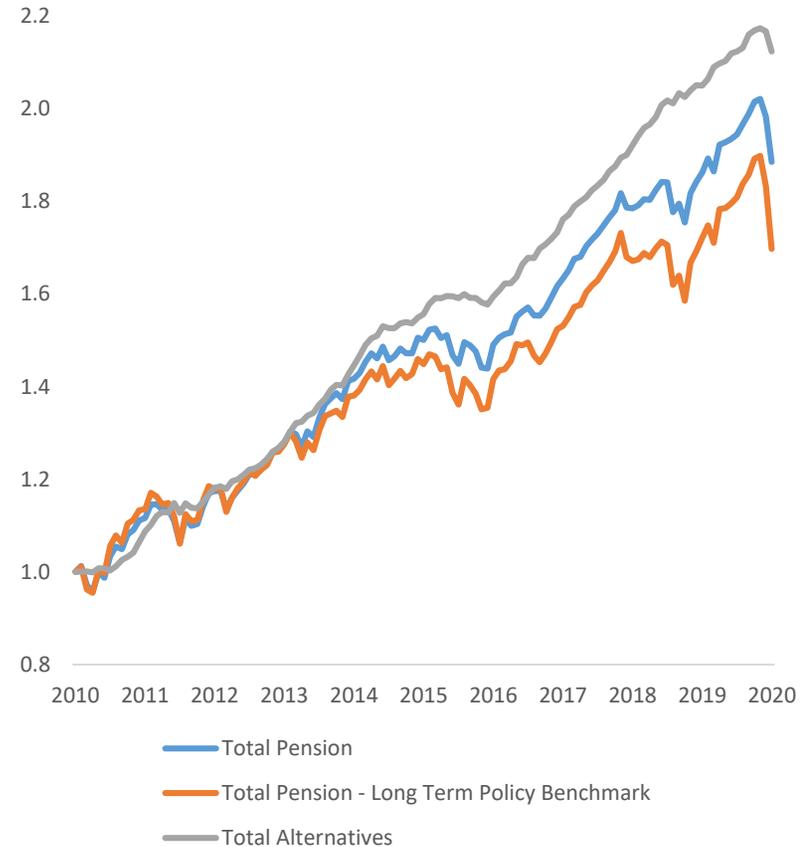
Growth of a Dollar

5 Years Ending March 31, 2020



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10 Years Ending March 31, 2020



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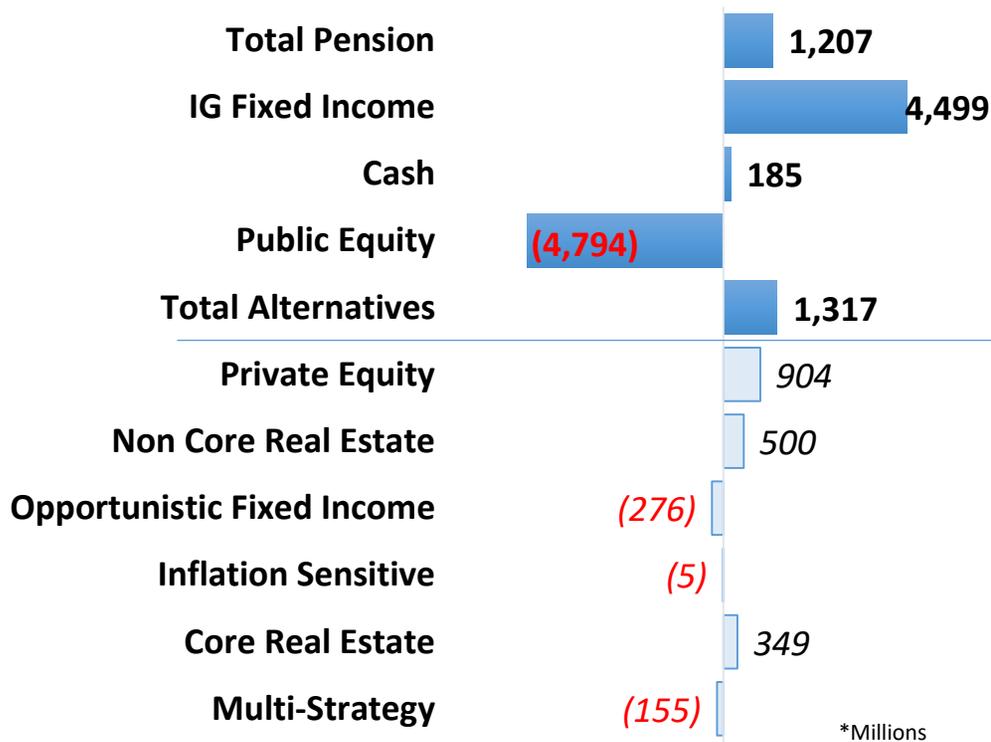
Note: NCRS Alternatives includes the following: Core Real Estate; Inflation Sensitive – Private Natural Resources; Inflation Sensitive – Real Assets and Other Diversifiers; Multi-Strategy Investments; Non Core Real Estate; Opportunistic Fixed Income; Private Equity; Equity Hedge Strategies; and closed-end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



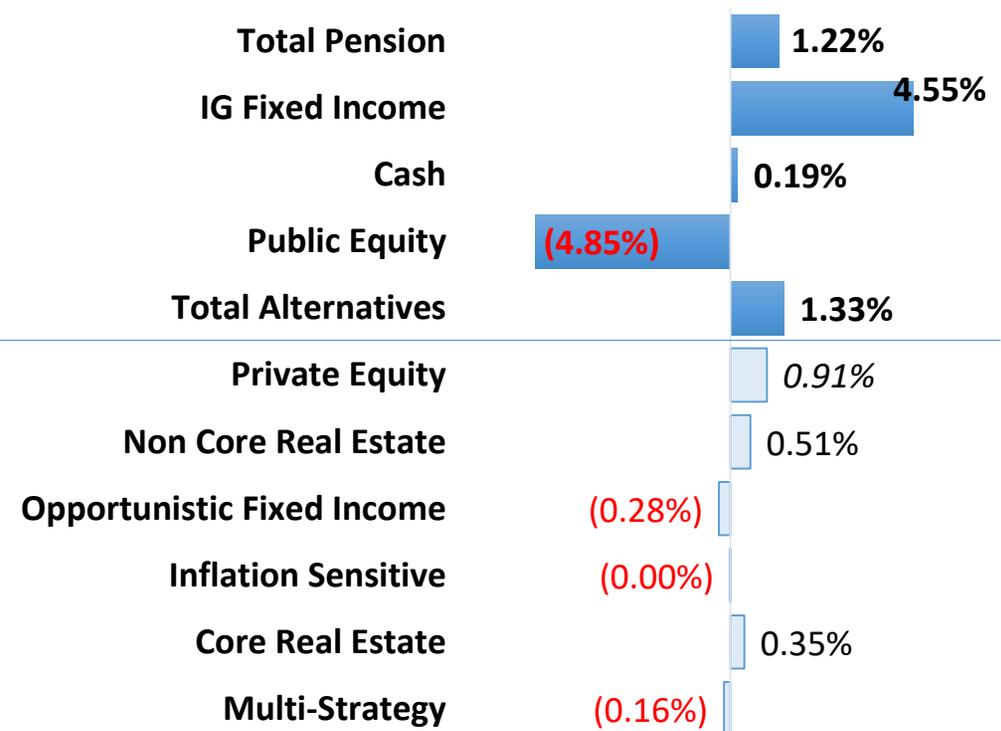
Estimated Contribution to Total Plan Return – 1 Year

As of March 31, 2020

Contribution to Total Plan \$ Earnings



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

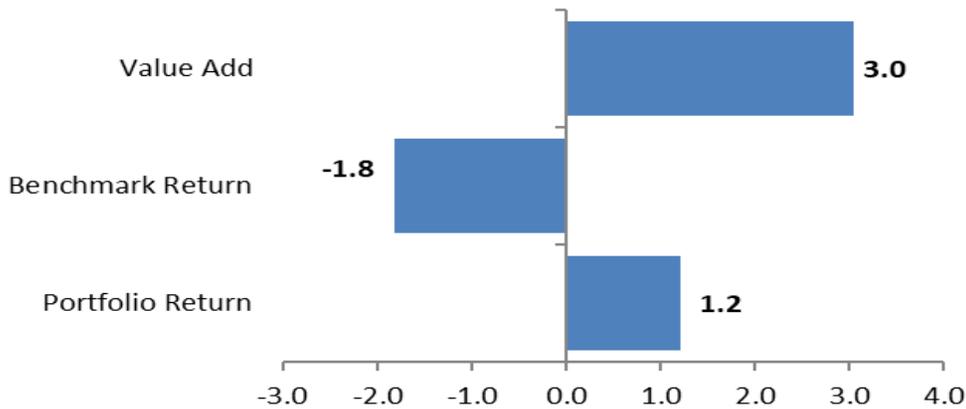
Contribution to Total Plan % Returns = Average Market Value % weight * % Total Return for each asset class

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.

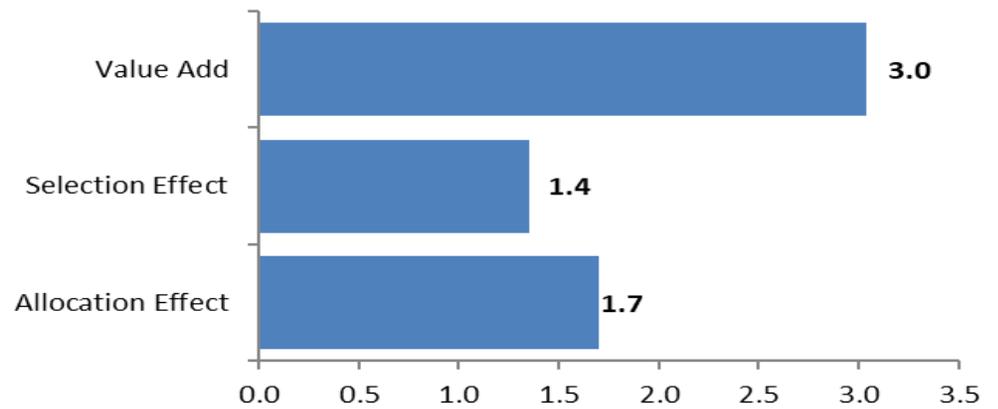
NCRS Net of Fees Return Attribution

Total Fund vs. Implementation Benchmark: 1 Year Ending March 31, 2020

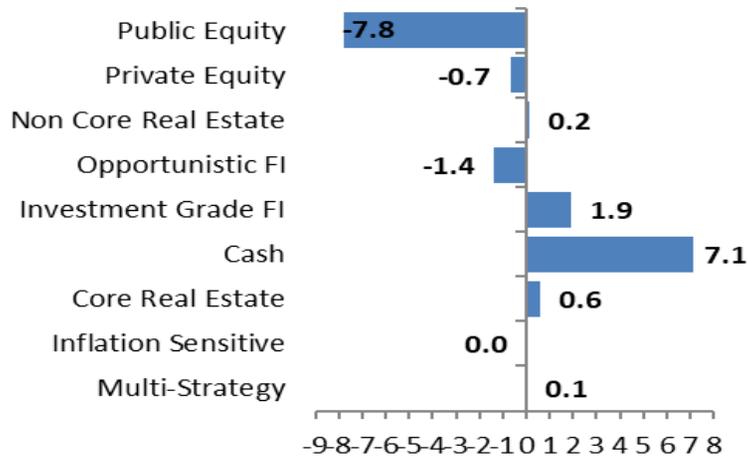
Total Fund Performance



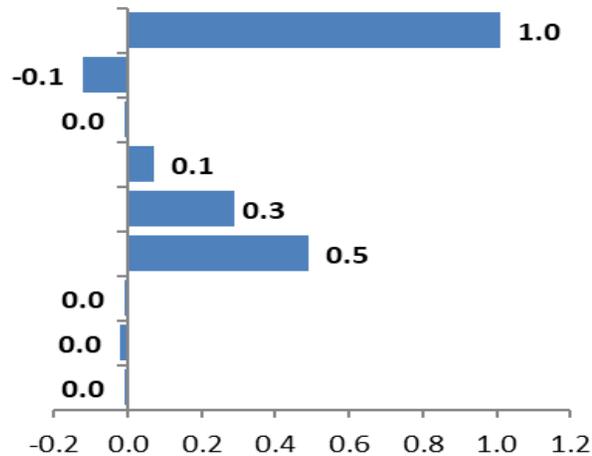
Attribution



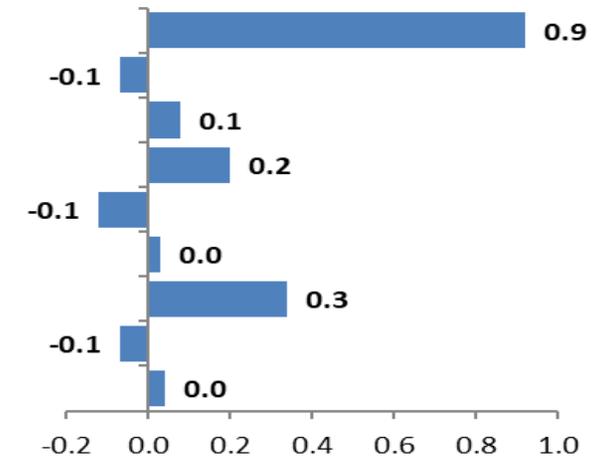
Avg Active Weight



Allocation Effect



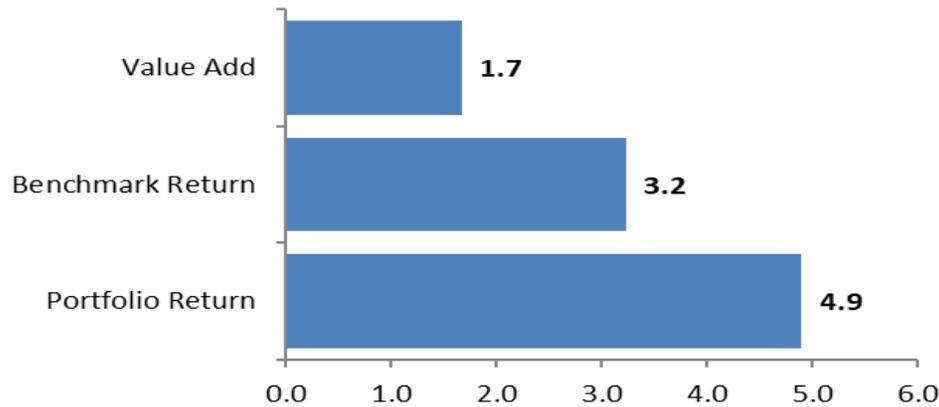
Selection Effect



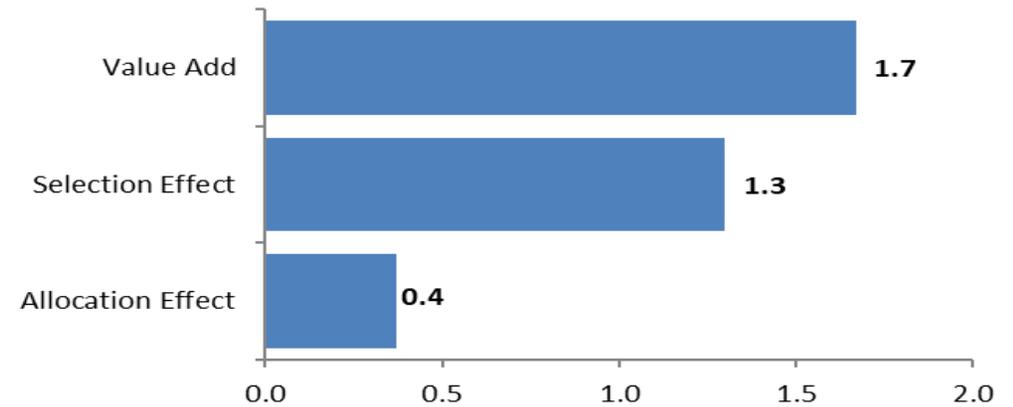
NCRS Net of Fees Return Attribution

Total Fund vs. Implementation Benchmark: 3 Years Ending March 31, 2020

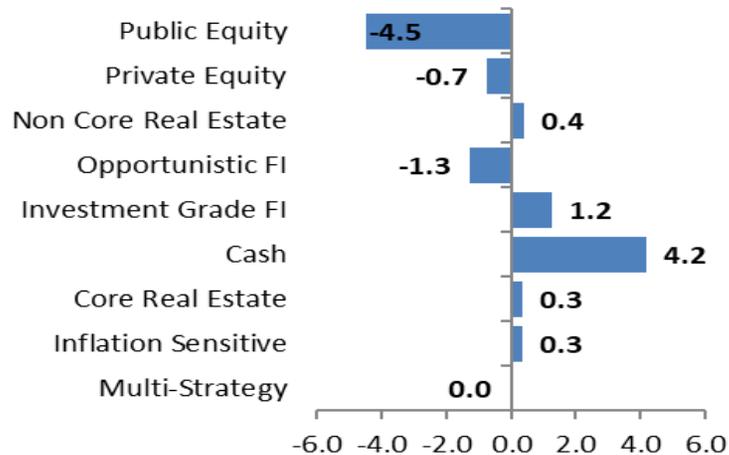
Total Fund Performance



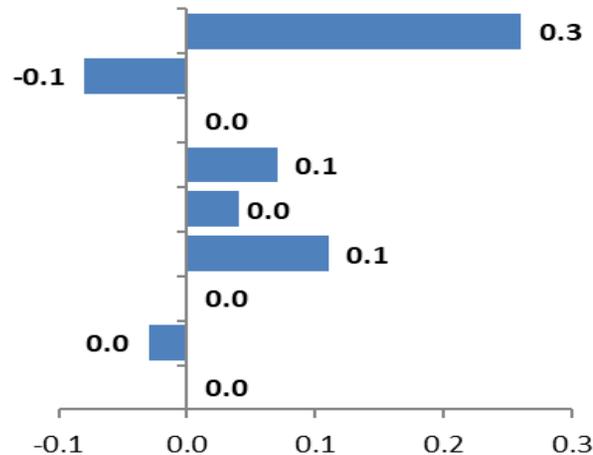
Attribution



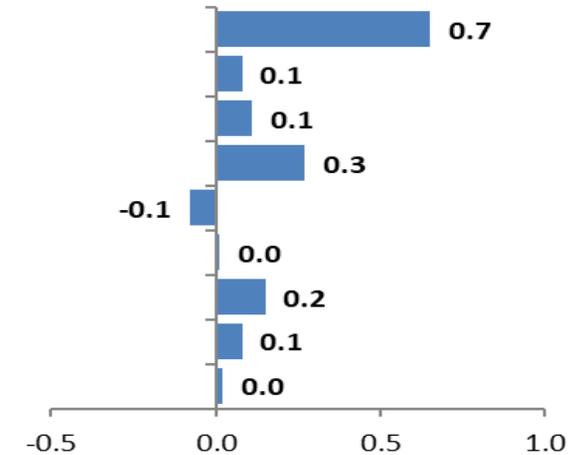
Avg Active Weight



Allocation Effect



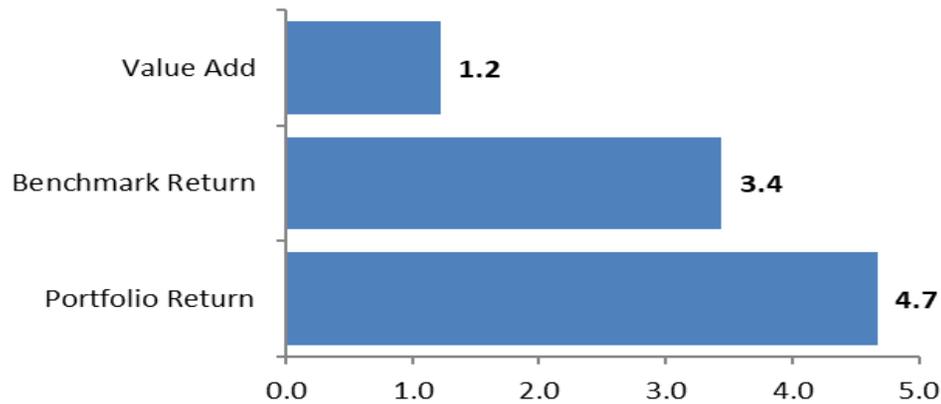
Selection Effect



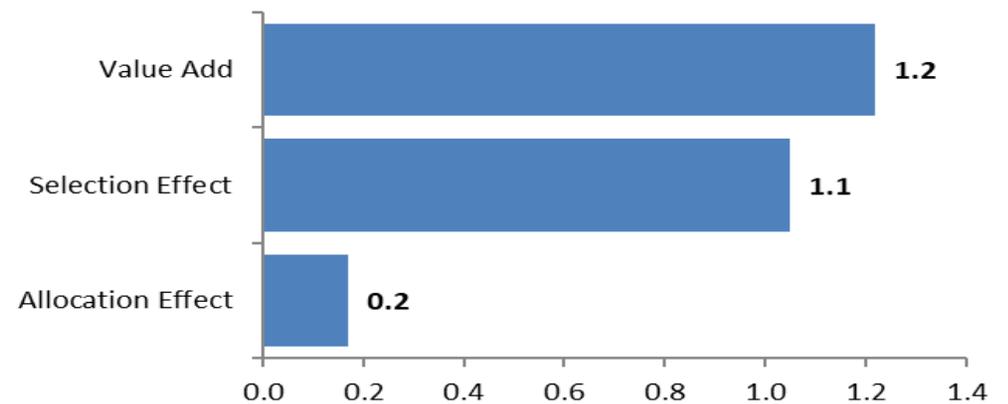
NCRS Net of Fees Return Attribution

Total Fund vs. Implementation Benchmark: 5 Years Ending March 31, 2020

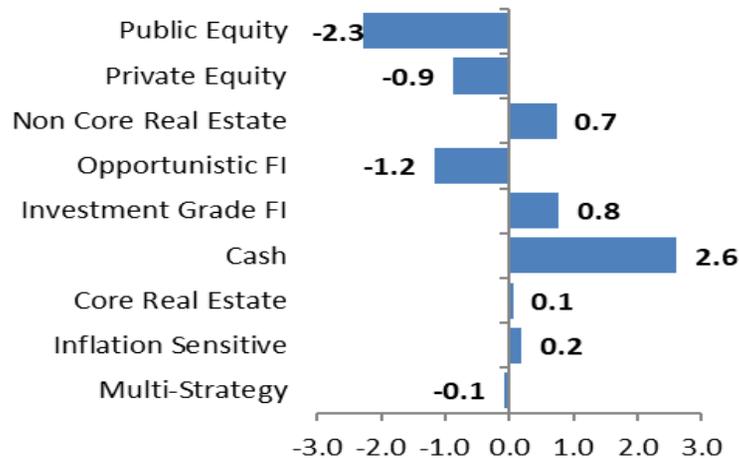
Total Fund Performance



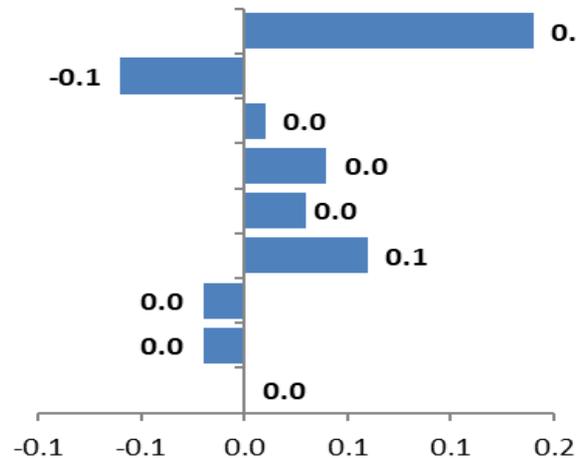
Attribution



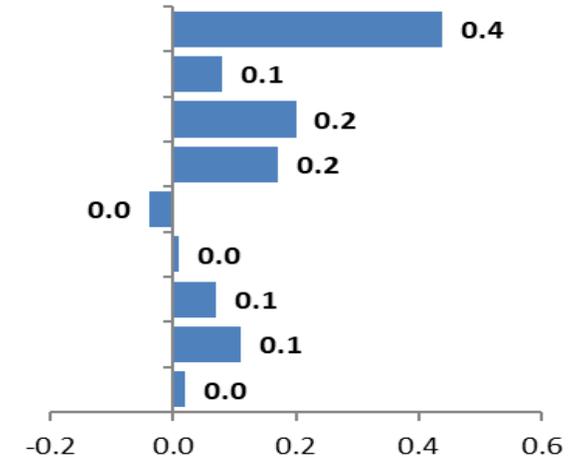
Avg Active Weight



Allocation Effect



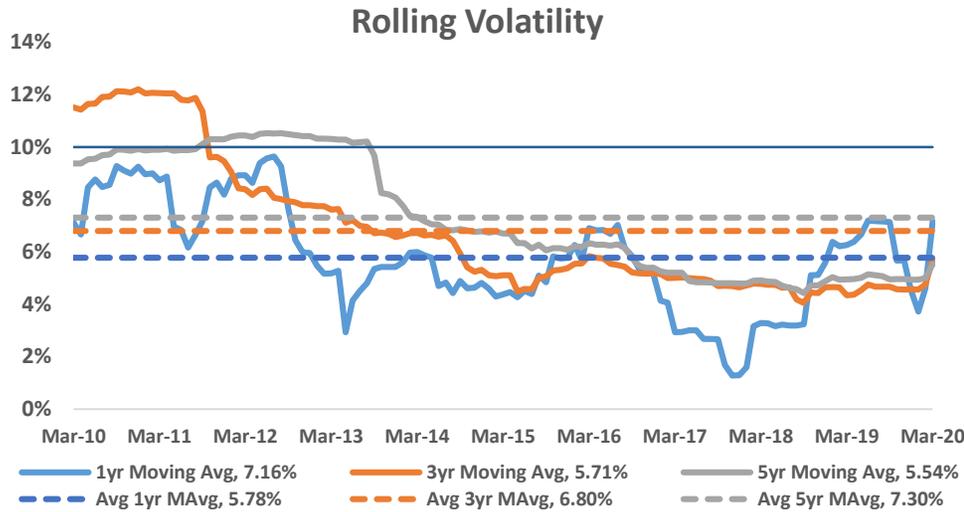
Selection Effect



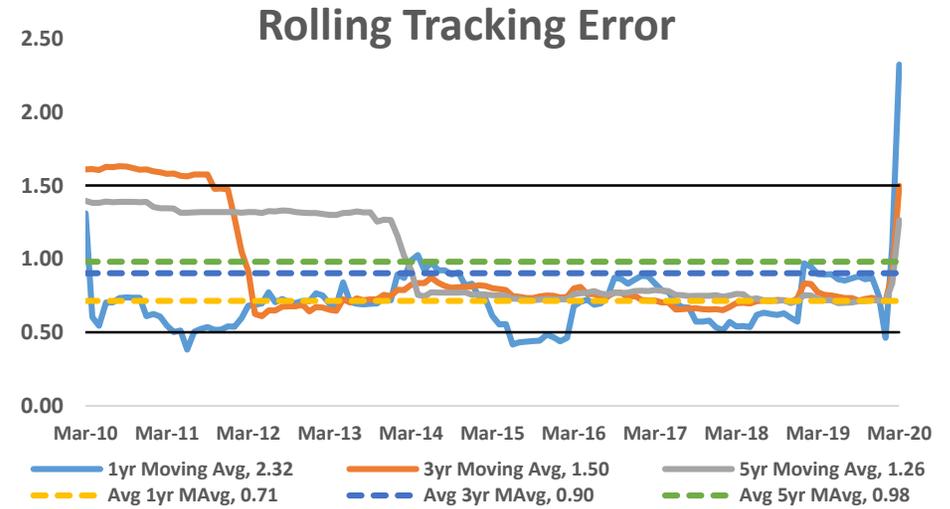


NCRS Net of Fees Risk Metrics

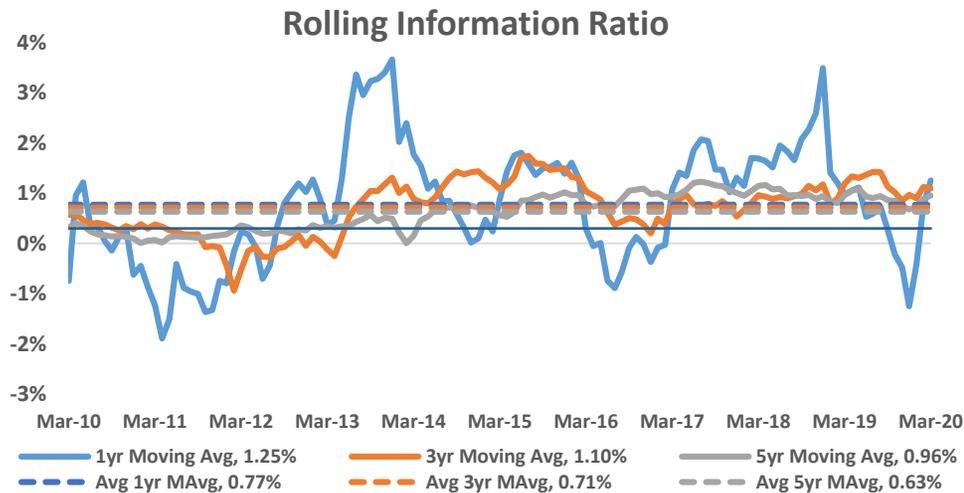
As of March 31, 2020



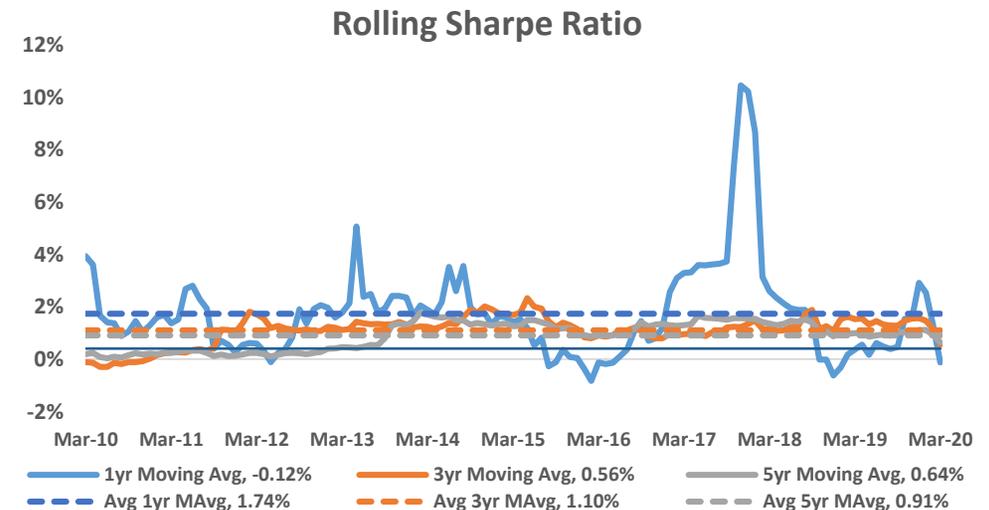
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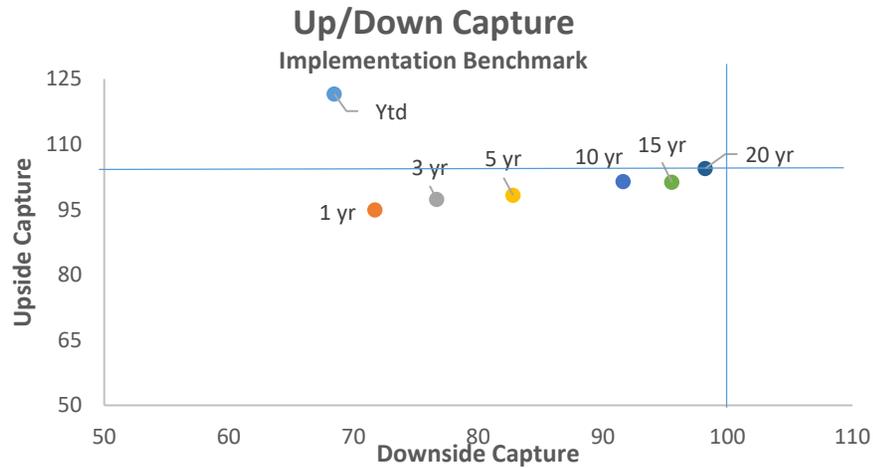
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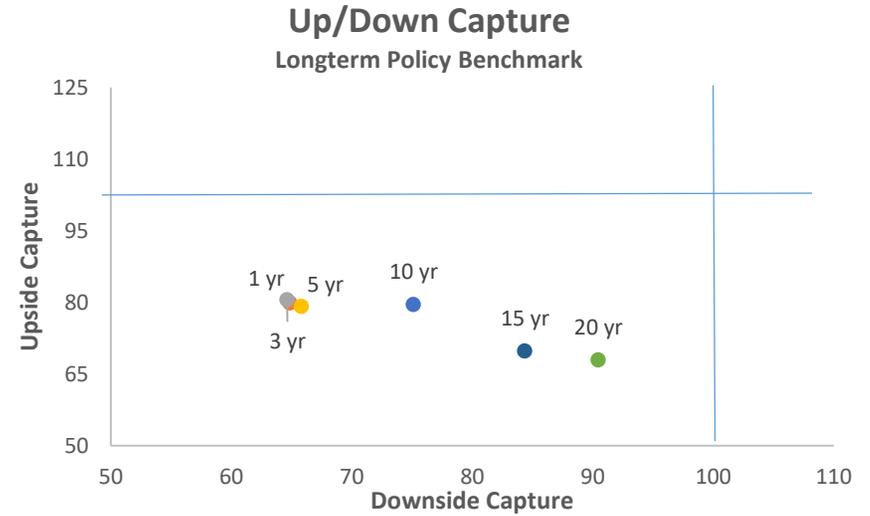
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NCRS Net of Fees Risk Metrics

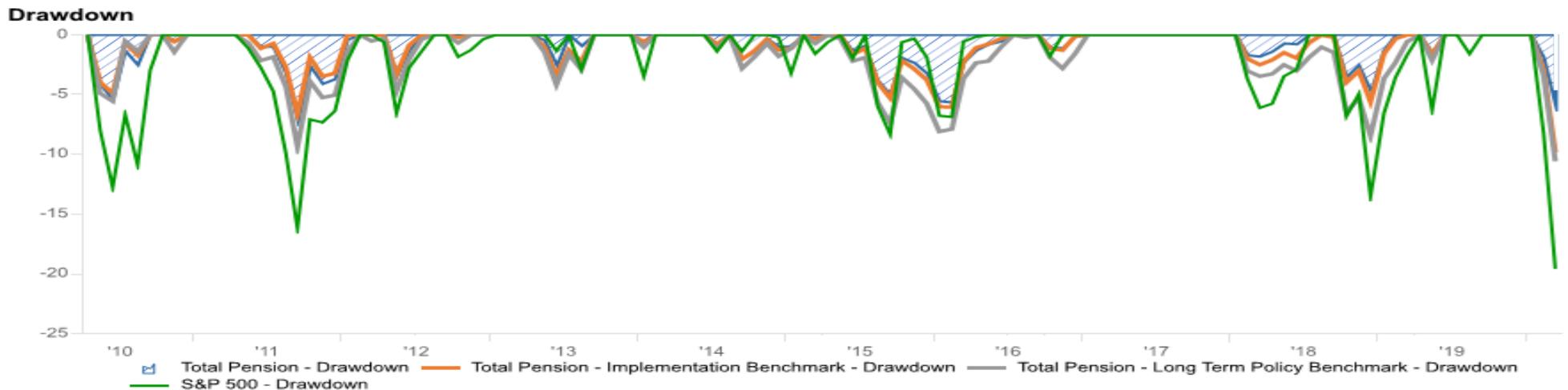
As of March 31, 2020



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NCRS Gross of Fees Return and Risk

BNY Mellon Universe: U.S. Public Funds > \$20B; Data as of March 31, 2020

Returns	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
25th Percentile	-0.22	5.19	5.16	7.41	6.45	5.73
Median Percentile	-2.34	4.47	4.69	7.03	6.28	5.47
75th Percentile	-3.52	3.92	4.48	6.61	5.97	5.20
NCRS	1.57	5.37	5.21	7.07	6.31	5.59
Percentile Rank (1 = highest performance)	12	12	24	42	44	32

Risk	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
25th Percentile	11.21	8.50	7.75	8.00	9.24	9.39
Median Percentile	9.99	7.77	7.11	7.35	8.84	8.68
75th Percentile	8.56	6.49	6.09	6.17	8.08	8.21
NCRS	6.90	5.62	5.46	6.10	7.32	7.55
Percentile Rank (1 = highest risk)	95	89	89	77	94	94

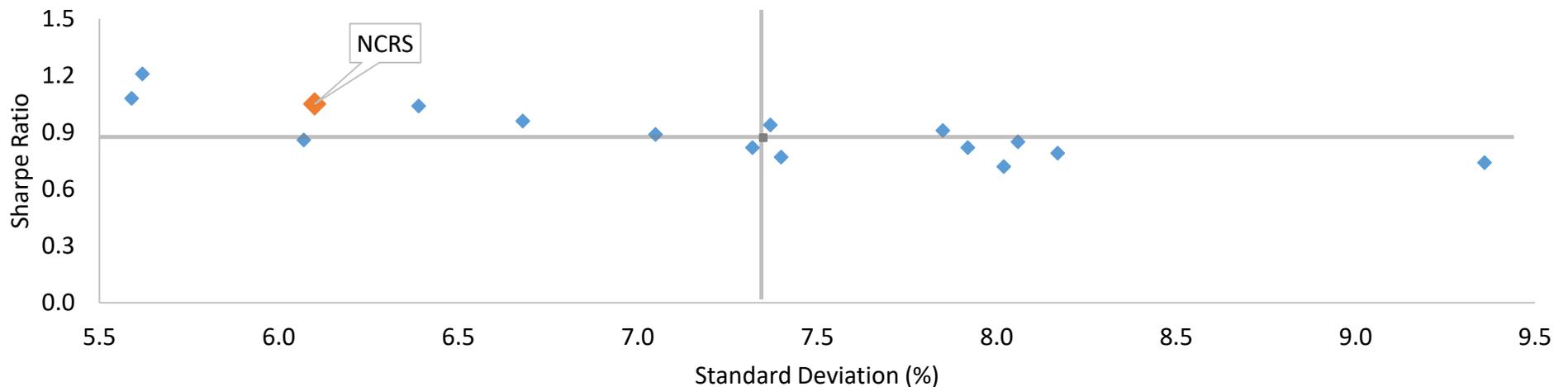


NCRS Gross of Fees Sharpe Ratio

BNY Mellon Universe: U.S. Public Funds > \$20B; Data as of March 31, 2020

Sharpe	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
25th Percentile	-0.24	0.52	0.62	1.02	0.64	0.49
Median Percentile	-0.39	0.38	0.54	0.87	0.58	0.47
75th Percentile	-0.51	0.29	0.47	0.80	0.52	0.42
NCRS	-0.06	0.64	0.74	1.05	0.69	0.53
Percentile Rank (1 = highest performance)	12	6	12	18	7	13

10 Year Plot: Sharpe Ratio vs. Volatility

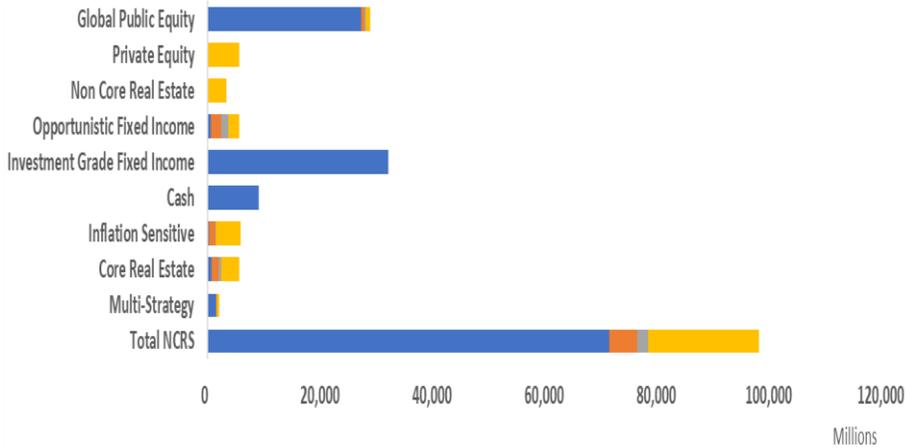


Note: Data shown is gross of fees with the exception of incentive payments, which have been deducted from NAV when applicable.

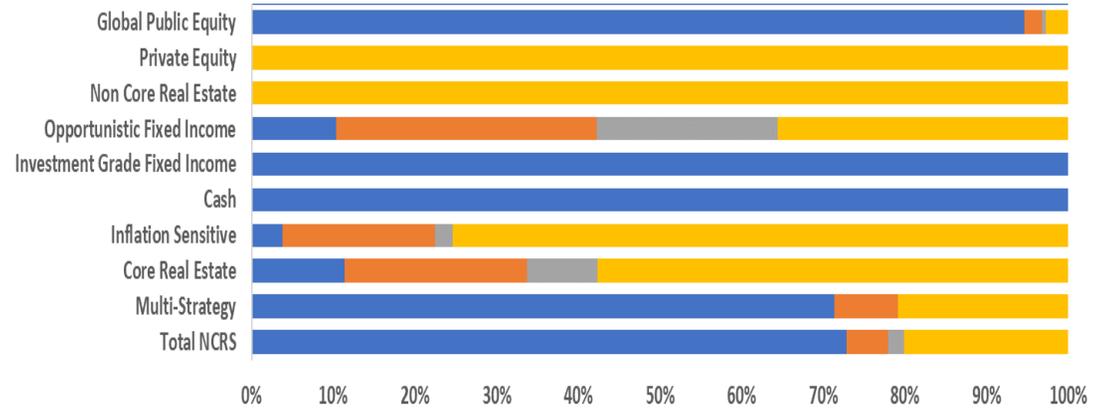
NCRS Liquidity Profile

As of March 31, 2020

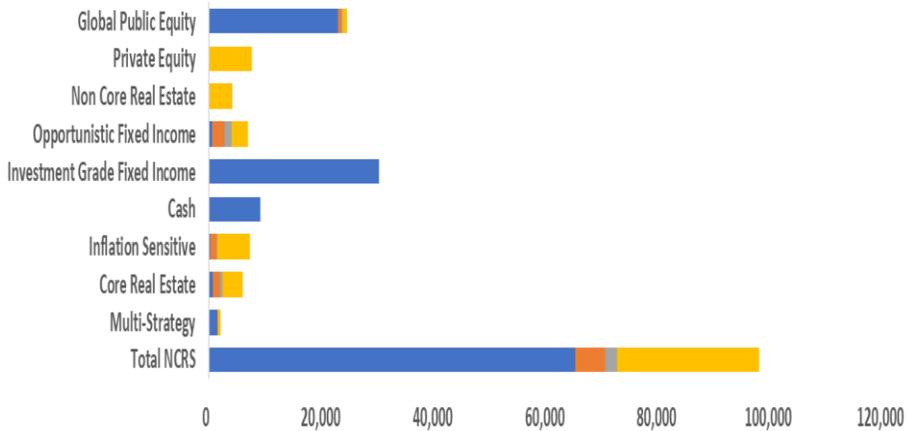
Liquidity Allocation (\$ Market Value)



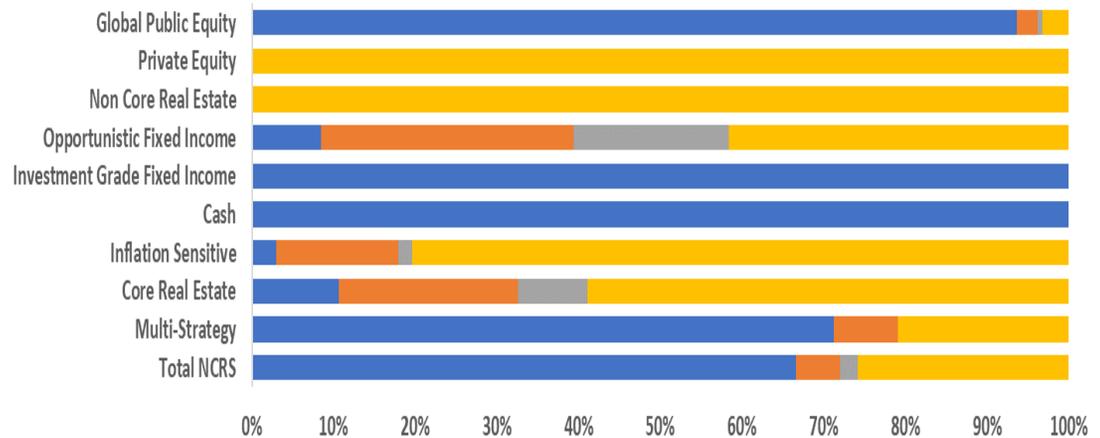
Liquidity Allocation (% Market Value)



Liquidity Allocation (\$ Market Value + Unfunded)



Liquidity Allocation (% Market Value + Unfunded)

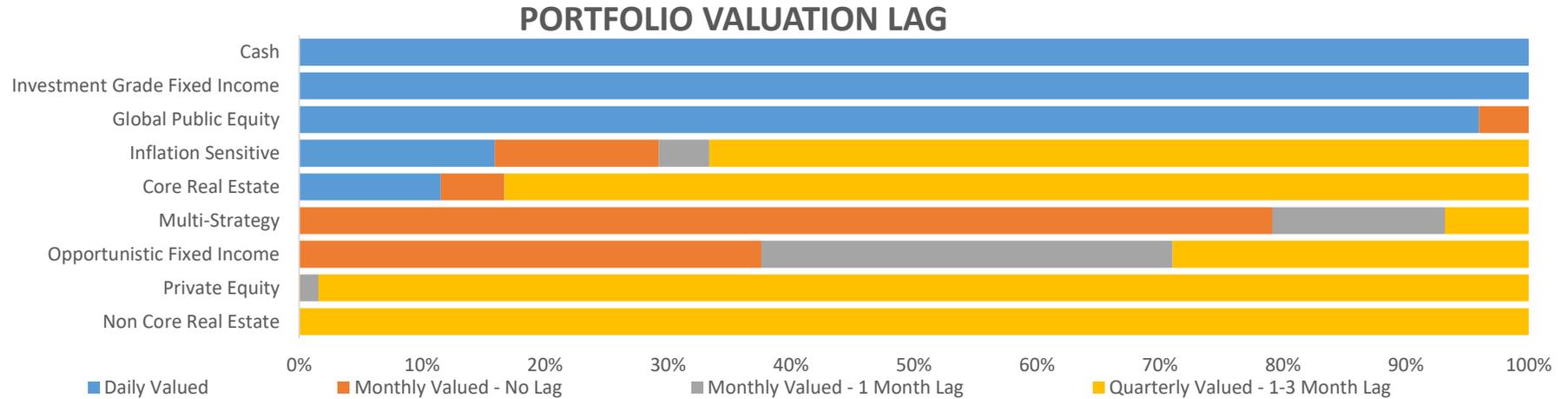


Note: ■ Level 1 Liquidity = T+3; ■ Level 2 = T+3 to 12 Months; ■ Level 3 = 12 to 24 Months; ■ Level 4 = Greater than 24 Months

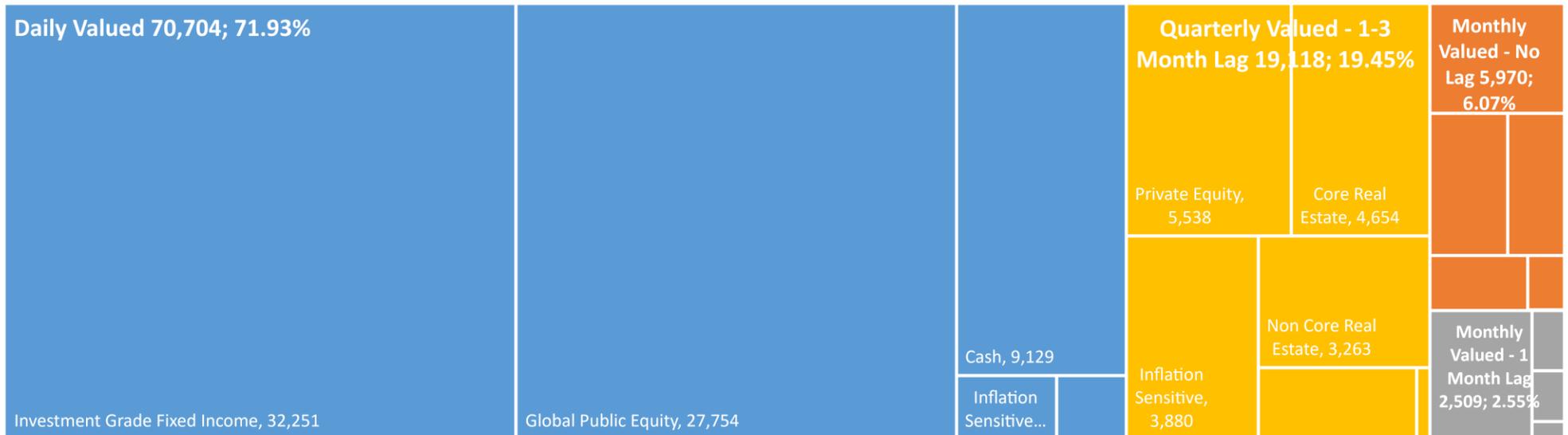


NCRS Valuation Lag Profile

As of March 31, 2020



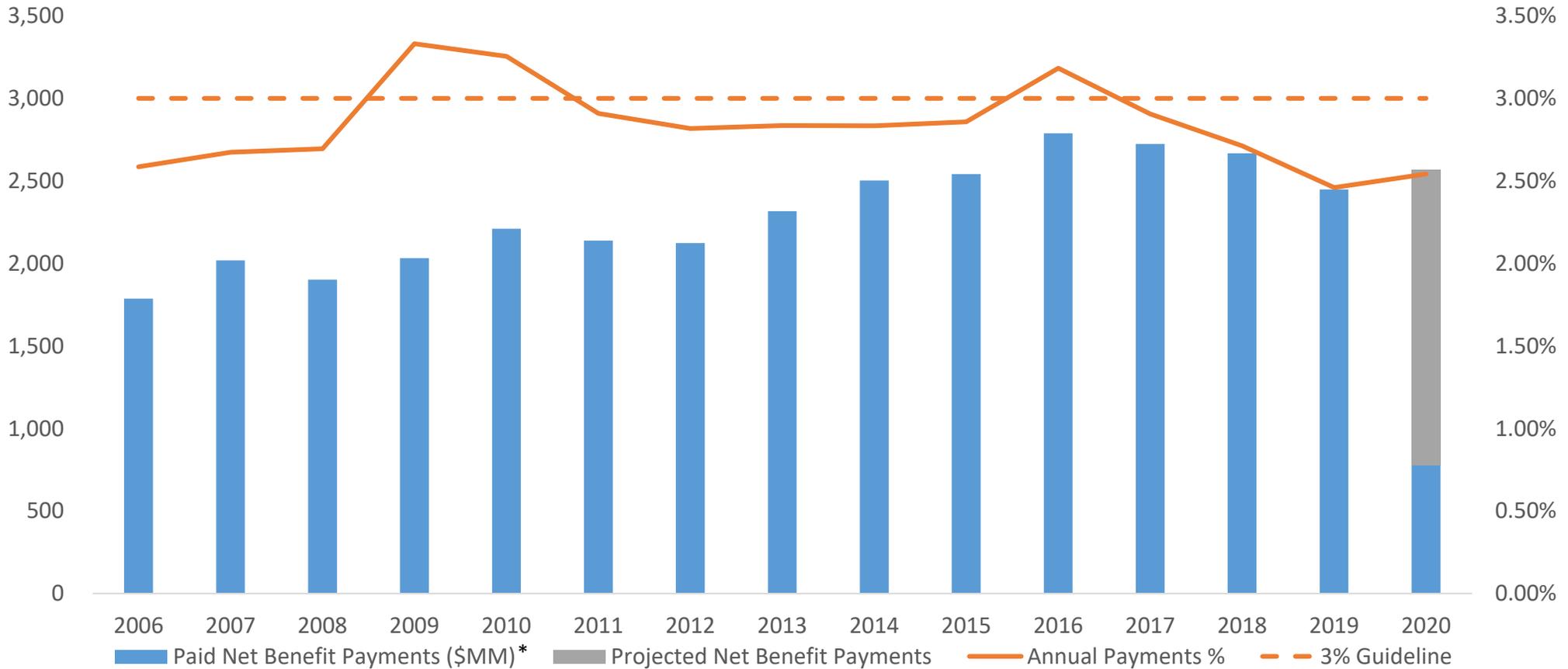
VALUATION LAG BY PORTFOLIO
in Millions





NCRS Liquidity Profile

Net benefit payments by calendar year

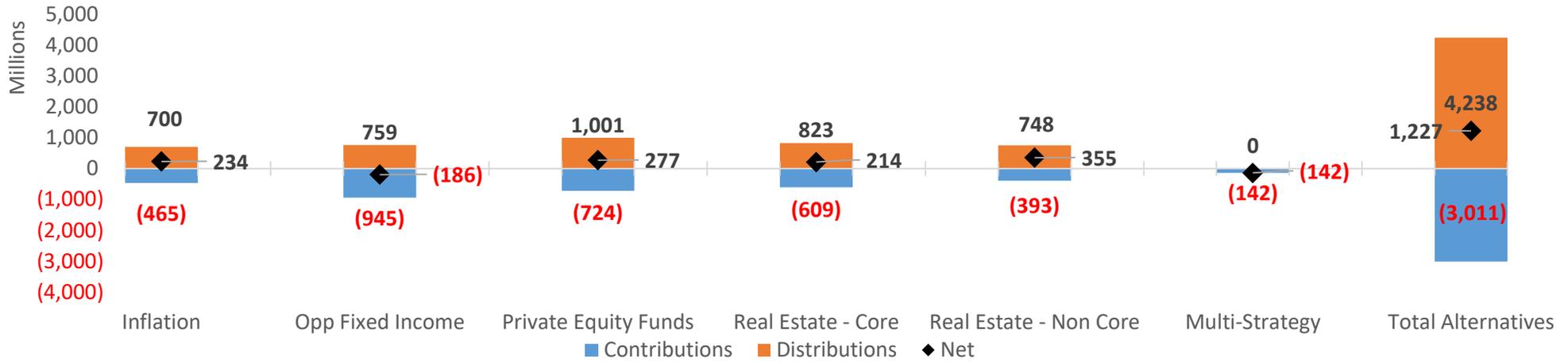


*Net Benefit Payments through April 30, 2020

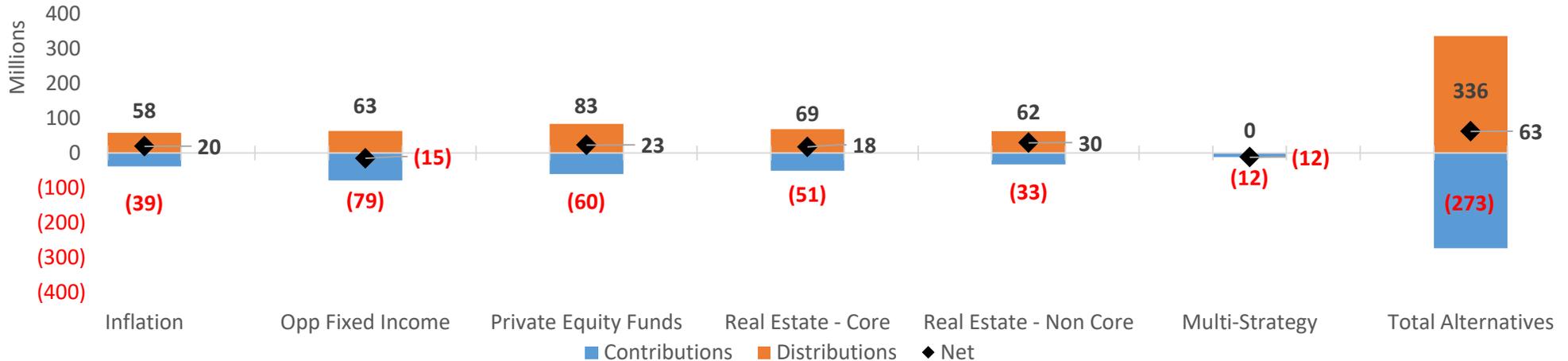
NCRS Alternatives Liquidity Profile

Through March 31, 2020

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 March 31, 2020

	Market Value (\$MM)	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
Growth	\$43,498	-5.37	4.20	4.77	7.40	5.75	4.12
Benchmark ¹		-8.16	1.88	3.04	6.14	4.93	3.22
Public Equity	\$28,923	-10.17	2.27	3.36	6.64	5.39	3.86
Benchmark ²		-12.63	0.51	2.19	5.68	4.61	2.86
Private Equity	\$5,627	11.83	13.21	10.88	10.62	9.19	2.39
Benchmark ³		13.25	11.61	9.23	11.03	10.67	9.12
Non-Core Real Estate	\$3,263	10.98	11.84	12.54	12.44	7.47	6.81
Benchmark ⁴		8.24	8.30	7.05	9.22	5.91	6.97
Opportunistic Fixed Income	\$5,686	-3.48	2.33	2.63	6.12	-	-
Benchmark ⁵		-7.00	-2.33	-0.18	1.12	-	-
Rates & Liquidity	\$41,380	8.84	4.92	3.45	4.84	5.35	6.12
Benchmark ⁶		10.68	5.71	3.87	5.12	5.29	6.03
IG Fixed Income	\$32,251	10.55	5.59	3.86	5.07	5.51	6.24
Benchmark ⁷		11.01	5.86	3.97	5.19	5.34	6.06
Cash	\$9,129	2.07	1.82	1.42	-	-	-
Benchmark ⁸		1.81	1.64	1.08	-	-	-
Inflation Sensitive & Diversifiers	\$11,409	2.15	4.78	4.80	3.32	3.61	4.29
Benchmark ⁹		-0.07	2.85	3.47	4.06	2.77	4.17
Inflation Sensitive	\$5,822	-0.06	3.11	2.91	-1.06	2.47	3.05
Benchmark ¹⁰		1.10	1.88	1.30	-0.48	3.31	3.44
Core Real Estate	\$5,587	4.50	6.73	7.17	9.23	6.41	6.41
Benchmark ¹¹		-1.53	3.98	6.07	9.34	6.22	6.78
Multi-Strategy	\$2,014	-5.56	1.20	2.57	6.40	4.91	-
Benchmark ¹²		-7.58	0.29	1.38	4.70	6.07	-
Total Pension Plan	\$98,301	1.22	4.90	4.67	6.55	5.86	5.25
Implementation Benchmark ¹³		-1.82	3.23	3.44	5.71	5.16	4.67
Long-Term Policy Benchmark ¹⁴		-1.39	3.51	3.22	5.43	5.30	4.72



NCRS Calendar Year Asset Class Return Diversification

As of March 31, 2020

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Opportunistic Fixed Income 15.89%	Non-Core Real Estate 17.28%	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 27.91%	IG Fixed Income & Cash 3.75%
Public Equity 15.24%	Private Equity 13.87%	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 14.88%	Private Equity 3.65%
Total Pension 11.61%	IG Fixed Income & Cash 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 13.53%	Inflation Sensitive 6.88%	Multi-Strategy 14.82%	Non-Core Real Estate 3.51%
IG Fixed Income & Cash 9.45%	Core Real Estate 7.89%	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%	Core Real Estate 10.71%	Pension Cash 0.45%
Core Real Estate 8.48%	Multi-Strategy 6.15%	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%	IG Fixed Income & Cash 10.33%	Core Real Estate -2.66%
Multi-Strategy 6.90%	Opportunistic Fixed Income 2.22%	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%	Non-Core Real Estate 9.93%	Inflation Sensitive -3.34%
Private Equity 5.70%	Total Pension 2.12%	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 8.15%	Opportunistic Fixed Income -6.13%
Non-Core Real Estate -4.23%	Inflation Sensitive -5.47%	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 3.61%	Total Pension -6.46%
Inflation Sensitive -13.21%	Public Equity -7.20%	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 2.20%	Multi-Strategy -12.69%
				Inflation Sensitive -0.65%	Inflation Sensitive -9.05%	Pension Cash 0.98%	Pension Cash 1.12%	Public Equity -9.32%	Inflation Sensitive 2.09%	Public Equity -20.71%



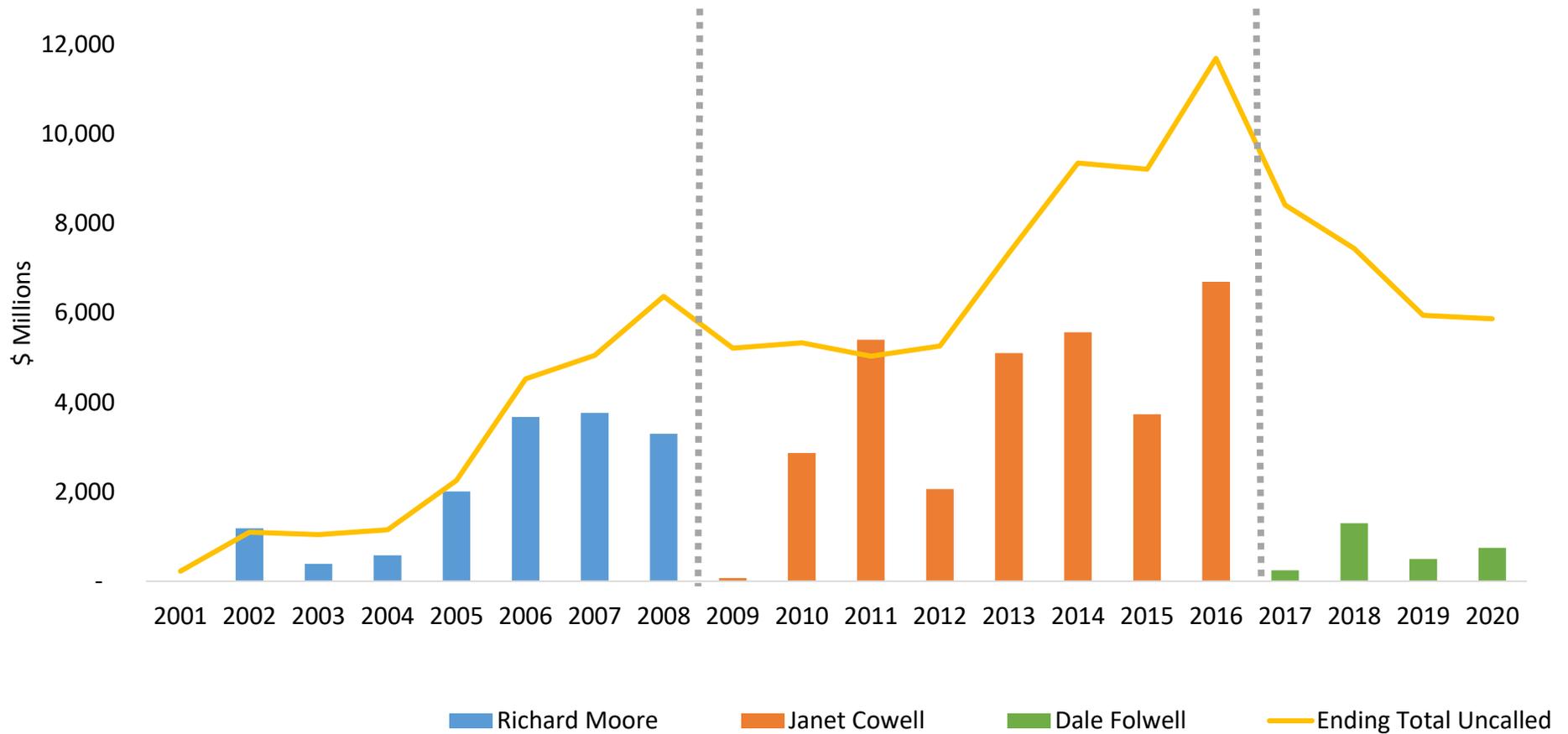
New, Incremental, & Unfunded Investment Commitments

Since February 19th IAC Meeting As of March 31, 2020

<u>Fund Name</u>	<u>Firm Name</u>	<u>New or Incremental Commitment (\$MM)</u>	<u>Closing Date</u>
Public Equity			
Russell Top 200	Internal	500	3/12/2020
Russell Midcap	Internal	1,000	3/12/2020
Private Equity			
None			
Non-Core Real Estate			
None			
Opportunistic Fixed Income			
HPS Cardinal Fund	HPS Investment Ptnrs	300	3/24/2020
Panther BCM Series B	Brigade Cap Mgmt	250	4/01/2020
AG Pisgah, LP	Angelo, Gordon & Co	200	3/25/2020
Inflation Sensitive			
None			
Core Real Estate			
None			
Multi-Strategy			
None			

<u>Asset Class</u>	<u>Unfunded Commitments (\$MM)</u>
Public Equity	0
Private Equity	2,056
Non-Core Real Estate	931
Opportunistic Fixed Income	1,005
Inflation Sensitive	1,475
Core Real Estate	397
Multi Strategy	3
Total	5,867

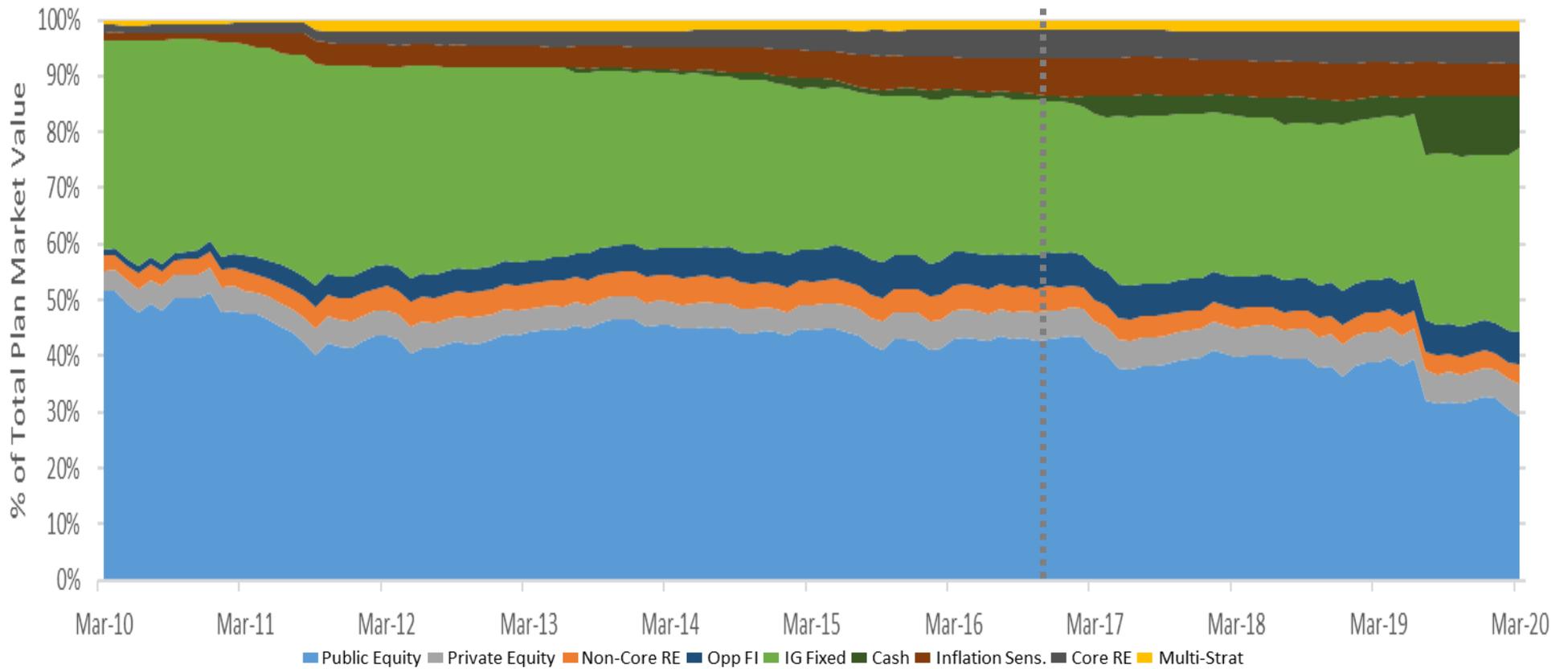
New and Total Unfunded Private Asset Class Commitments By Calendar Year of Closing





Asset Allocation History

as of March 31, 2020





Exited Investments

Since February 19th IAC Meeting

<u>Fund Name</u>	<u>Redemption Amount (\$MM)</u>	<u>Redemption Effective</u>
Public Equity		
Russell Top 200	1,200	4/29/2020
Russell Midcap	300	4/29/2020
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 March 31, 2020

	Manager	Market Value (\$)	Uncalled (\$)	% MV	% MV Cum.
1	Internal Fixed Income	41,380,302,263	-	42.1%	42.1%
2	Internal Equity	11,260,501,838	-	11.5%	53.6%
3	BlackRock, Inc.	8,328,283,551	-	8.5%	62.0%
4	Rockwood Capital	2,796,377,229	181,813,800	2.8%	64.9%
5	Blackstone Group	2,732,394,070	1,214,544,225	2.8%	67.6%
6	Baillie Gifford	2,362,020,906	-	2.4%	70.1%
7	Mondrian Investment Partners Limited	1,978,135,060	-	2.0%	72.1%
8	Wellington Management	1,953,523,752	-	2.0%	74.0%
9	Walter Scott & Partners	1,806,803,028	-	1.8%	75.9%
10	Gladius Capital Management LP	1,730,963,120	3,327,917	1.8%	77.6%
11	Angelo, Gordon & Co.	1,684,200,761	51,716,462	1.7%	79.4%
12	Landmark Partners, Inc.	902,872,748	1,288,656,868	0.9%	80.3%
13	ValueAct Capital	809,141,285	-	0.8%	81.1%
14	Campbell Group LLC, The	710,458,606	-	0.7%	81.8%
15	DoubleLine Capital LP	707,292,158	-	0.7%	82.5%
16	Rockpoint Group, LLC	691,862,155	102,128,323	0.7%	83.2%
17	LBA Realty	625,701,009	27,524,752	0.6%	83.9%
18	HPS Investment Partners, LLC	607,862,939	377,887,955	0.6%	84.5%
19	Marathon Asset Management	576,952,188	64,355,914	0.6%	85.1%
20	Providence Equity Partners	562,638,552	159,847,769	0.6%	85.7%
	102 Remaining Managers*	14,092,579,771	2,395,060,496	14.3%	100.0%
Total		98,300,866,991	5,866,864,482	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 March 31, 2020

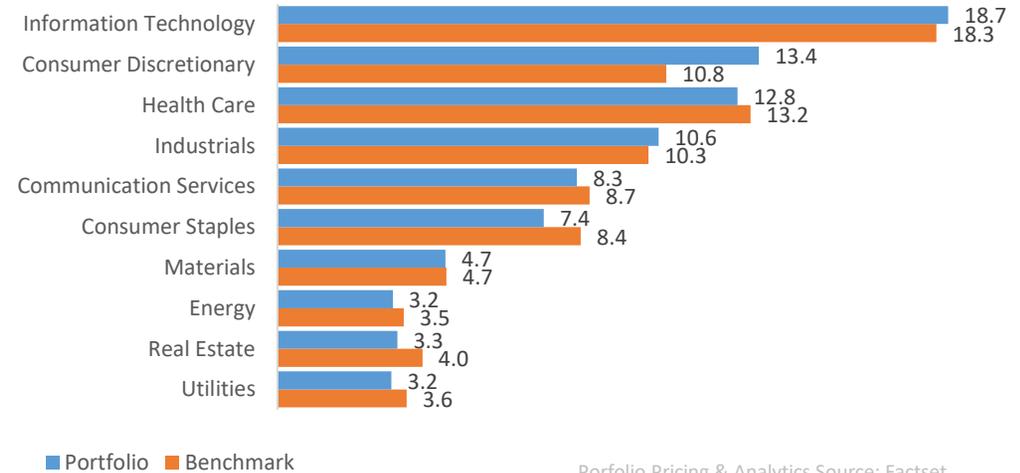
	Market Value (\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Public Equity	\$28,923	(20.71)	(10.17)	2.27	3.36	6.64
Benchmark ²		(22.28)	(12.63)	0.51	2.19	5.68
Domestic Portfolio	\$13,768	(19.72)	(7.41)	5.05	6.14	10.38
Russell 3000		(20.90)	(9.13)	4.00	5.77	10.15
Non-US Portfolio	\$14,794	(22.18)	(13.36)	0.11	1.13	3.06
Custom Benchmark		(24.11)	(16.32)	(2.34)	(0.66)	1.98
Equity Hedge	\$359	(19.43)	(12.90)	(3.00)	(1.15)	-
MSCI ACWI (Beta Adjusted)		(9.32)	(4.80)	0.59	0.99	-

NCRS Public Equity Portfolio Characteristics

As of March 31, 2020

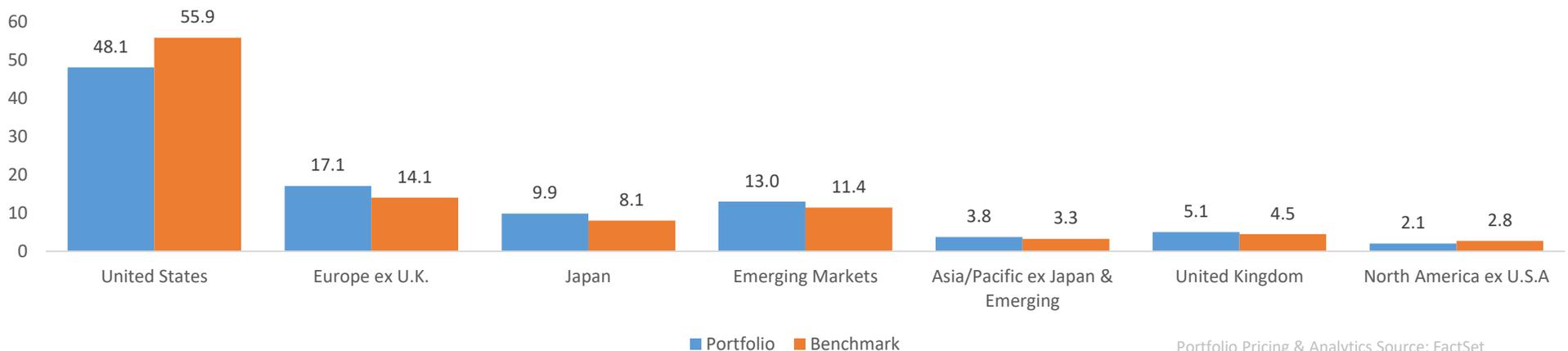
Portfolio Characteristics		
	Portfolio	MSCI ACWI IMI
Price/Earnings	15.9	15.4
Dividend Yield	2.7	2.9
Price/Book	1.8	1.8
Market Capitalization	152,240.0	164,010.0
Return On Equity	17.7	18.8

@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 March 31, 2020

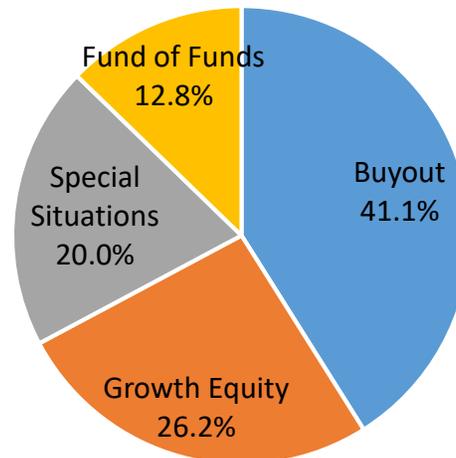
Net of Fees Performance (%)

	(\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Private Equity	\$5,627	3.65	11.83	13.21	10.88	10.62
Benchmark ³		4.95	13.25	11.61	9.23	11.03
Buyout	\$2,310	3.78	17.45	13.90	11.74	9.82
Growth	\$1,472	9.44	15.01	16.70	12.24	14.07
Special Situations	\$1,127	(1.18)	2.23	8.14	6.70	6.46
Fund of Funds	\$718	(0.02)	4.76	12.01	10.79	12.00

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	6.90	5.28	3.32	9.51	9.38	8.81	20.41	9.52	13.93	12.03	15.47	16.64	18.27	9.98	6.89	0.00	8.75
# 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)



*Private Equity returns include a stock distribution account, in the amount of roughly \$6.5 million, which does not fall under any specific sub-section. 36



NCRS Non-Core Real Estate Portfolio

As of March 31, 2020

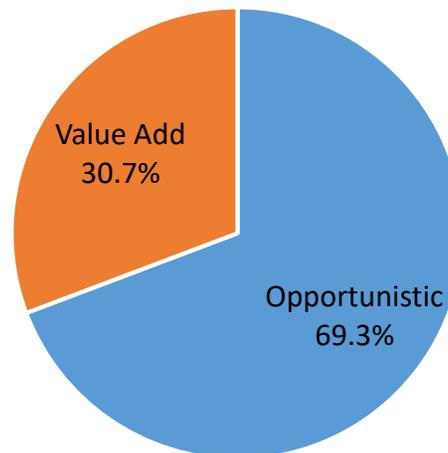
Net of Fees Performance (%)

	(\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Non-Core Real Estate	\$3,263	3.51	10.98	11.84	12.54	12.44
Benchmark ⁴		3.43	8.24	8.30	7.05	9.22
Opportunistic	\$2,260	4.47	12.05	12.54	12.50	11.93
Value Add	\$1,003	1.45	8.63	10.12	12.37	13.16

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	9.11	15.69	-1.43	2.92	2.49	15.93	N/A	16.26	18.07	17.76	15.21	7.69	8.83	14.28	N/A	12.74	2.33	6.94
# of Funds	16	3	15	13	8	6	N/A	6	7	5	7	7	6	7	N/A	1	1	107

Strategy Allocation (Based on Valuation)





NCRS Opportunistic Fixed Income Portfolio

As of March 31, 2020

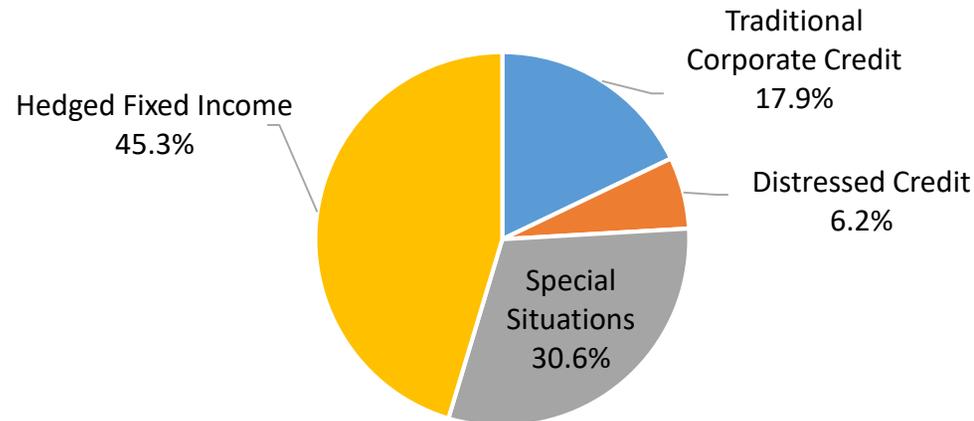
Net of Fees Performance (%)

	(\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Opportunistic Fixed Income	\$5,686	(6.13)	(3.48)	2.33	2.63	6.12
Benchmark ⁵		(10.53)	(7.00)	(2.33)	(0.18)	1.12
Traditional Corporate Credit	\$1,018	1.51	3.20	5.18	4.95	7.72
Distressed Credit	\$352	(5.94)	(5.27)	3.46	4.66	7.77
Special Situations	\$1,738	(11.15)	(4.98)	3.84	5.77	13.09
Hedged Fixed Income	\$2,578	(5.64)	(4.75)	0.28	0.62	-

IRR by Vintage Year

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
NCRS	2.87	N/A	16.94	7.95	22.42	5.01	3.97	2.89	4.88	4.37	7.88	3.36	3.09	N/A	-16.60	5.84
# 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 March 31, 2020

Net of Fees Performance (%)

	(\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Rates & Liquidity	\$41,380	2.87	8.84	4.92	3.45	4.84
Benchmark ⁶		3.80	10.68	5.71	3.87	5.12
IG Fixed Income	\$32,251	3.75	10.55	5.59	3.86	5.07
Core Fixed Income	\$29,874	4.12	11.56	6.05	4.17	5.29
IG Fixed Income Cash	\$2,377	0.48	2.04	1.69	1.32	-
Pension Cash	\$9,129	0.45	2.07	1.82	1.42	-

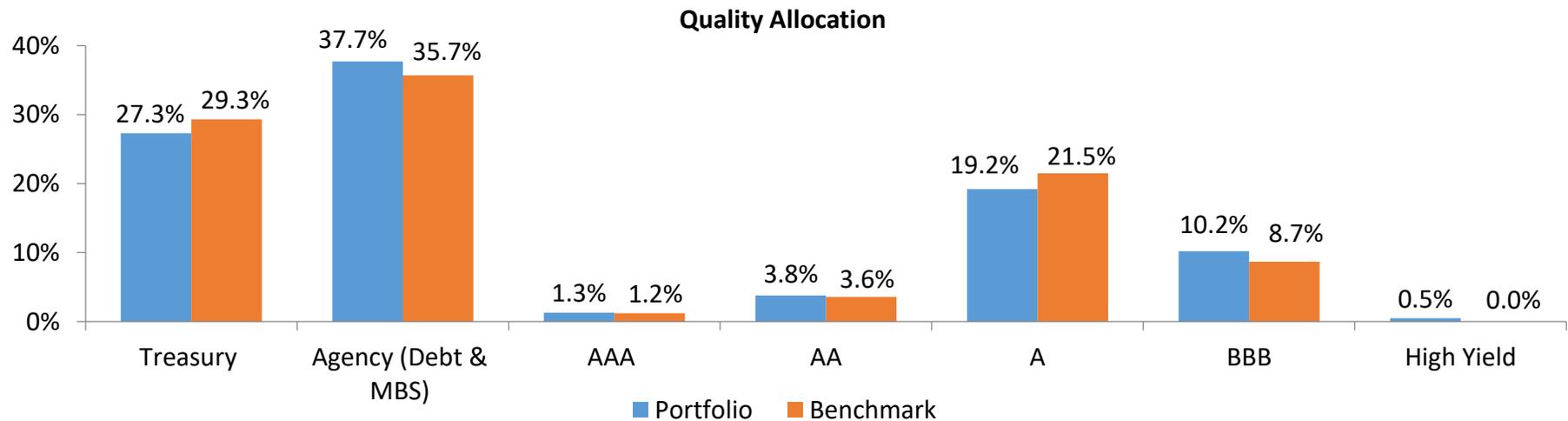
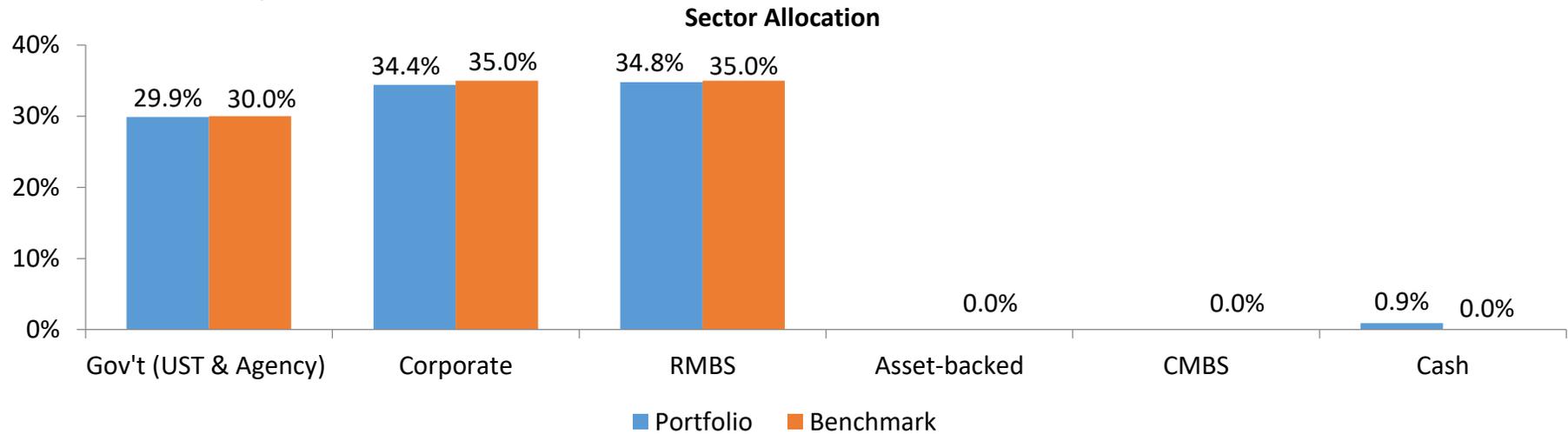
Core Fixed Income Portfolio Characteristics

	<u>Avg. Coupon</u>	<u>Yield to Worst</u>	<u>Effective Duration</u>
Government (Treasury & Agency)	3.80%	0.92%	11.8
Corporate	4.34%	3.36%	9.9
Mortgage	3.59%	1.73%	2.2
Total	3.99%	2.63%	8.0



NCRS Core Fixed Income Portfolio Characteristics

As of March 31, 2020



NCRS Inflation Sensitive Portfolio

As of March 31, 2020

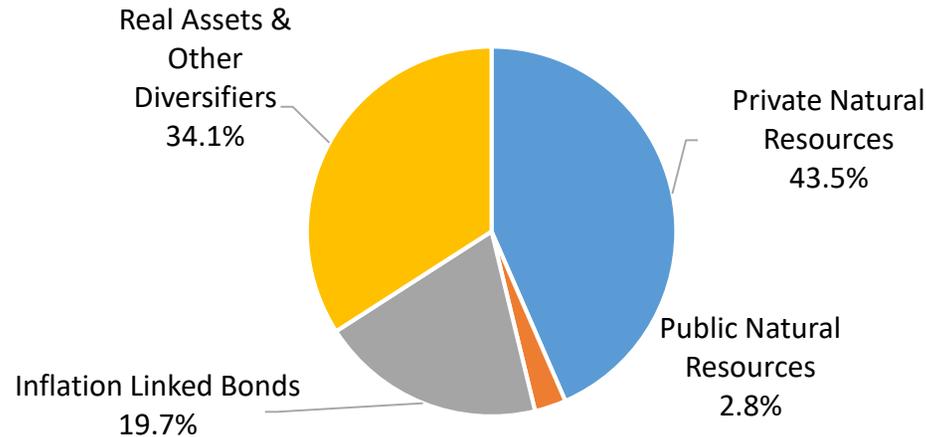
Net of Fees Performance (%)

	(\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Inflation Sensitive	\$5,822	(3.34)	(0.06)	3.11	2.91	(1.06)
Benchmark ¹⁰		(0.83)	1.10	1.88	1.30	(0.48)
Private Natural Resources	\$2,530	(1.17)	(1.98)	0.53	1.53	0.68
Public Natural Resources	\$160	(25.75)	(24.18)	(11.24)	(9.25)	-
Inflation Linked Bonds	\$58	(1.32)	1.53	1.20	-	-
Real Assets & Other Diversifiers	\$1,984	1.22	9.38	9.67	8.80	-

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	0.47	-8.19	-5.54	N/A	-11.30	-6.50	6.73	6.51	8.62	5.38	-0.33	10.57	30.69	1.33	1.31
# of Funds	3	2	2	N/A	3	9	7	11	12	4	4	1	3	2	61

Strategy Allocation (Based on Valuation)





NCRS Core Real Estate Portfolio

As of March 31, 2020

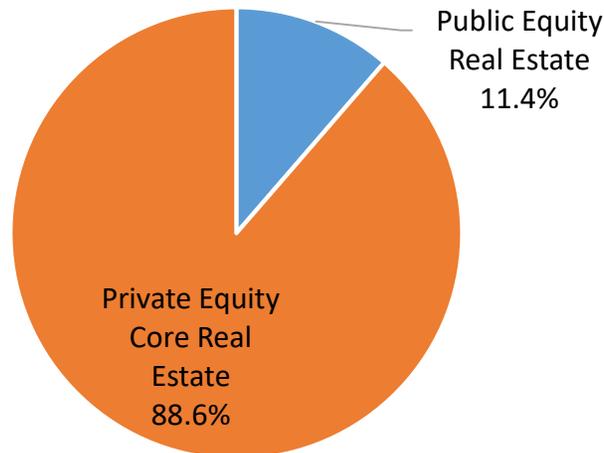
Net of Fees Performance (%)

	(\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Core Real Estate	\$5,587	(2.66)	4.50	6.73	7.17	9.23
Benchmark ¹¹		(5.37)	(1.53)	3.98	6.07	9.34
Public Equity Real Estate	\$635	(24.72)	(18.71)	(0.29)	0.40	6.32
Private Equity Core Real Estate	\$4,952	1.12	8.46	7.79	8.35	9.98

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	4.54	1.39	9.90	N/A	23.62	N/A	N/A	6.78	7.18	8.93	6.55	N/A	7.46	N/A	7.30
# 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)





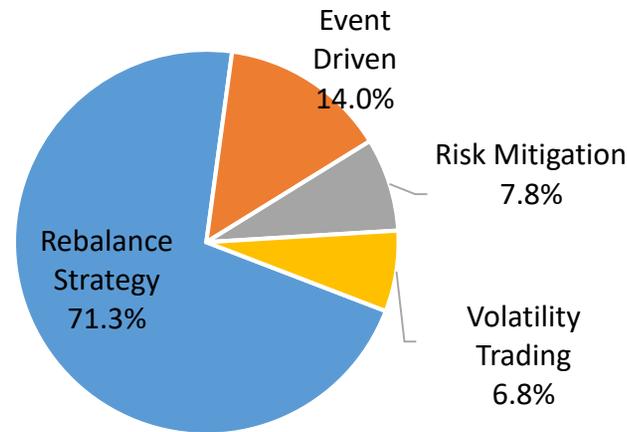
NCRS Multi-Strategy Portfolio

As of March 31, 2020

Net of Fees Performance (%)

	(\$MM)	3 Month	1 Year	3 Years	5 Years	10 Years
Multi-Strategy	\$2,014	(12.69)	(5.56)	1.20	2.57	6.40
Benchmark ¹²		(13.30)	(7.58)	0.29	1.38	4.70
Rebalance Strategy	\$1,436	(18.48)	(9.39)	0.94	2.61	-
Event Driven	\$283	(0.18)	0.92	1.14	-	-
Risk Mitigation	\$158	29.69	14.45	1.85	-	-
Volatility Trading	\$137	(0.67)	6.35	(14.21)	-	-

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 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 & 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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