



COMPTROLLER'S INVESTMENT ADVISORY BOARD

ENDOWMENT PORTFOLIO REVIEW

Q⁴
2018

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As of December 31, 2018

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Asset Allocation Summary¹

As of December 31, 2018

Asset Class	Strategy	Number of Funds ^{2,3}	Number of Managers ^{2,3}	Current Market Value	Weight	Long-Term Target	Policy Range
Fixed Income		69	44	\$1,201,844,818	30.2%	35.0%	20-50%
	Global Fixed Income ⁴	10	10	201,419,601	5.1%	10.0%	
	Alternative Fixed Income	10	9	604,779,594	15.2%	15.0%	
	Private Debt	49	29	395,645,623	10.0%	10.0%	
Equity		101	47	\$1,961,072,218	49.3%	45.0%	30-60%
	Global Public Equity	7	4	577,733,733	14.5%	15.0%	
	Hedged Equity	15	13	932,338,009	23.5%	20.0%	
	Private Equity	79	31	451,000,476	11.3%	10.0%	
Real Assets		72	29	\$537,947,482	13.5%	20.0%	10-30%
	Stable Value Real Estate	26	12	368,138,329	9.3%	10.0%	
	Enhanced Real Estate	46	19	169,809,153	4.3%	10.0%	
Strategic All Asset & Overlays		10	9	\$274,414,462	6.9%	0.0%	0-10%
	All Asset Strategies	3	3	42,689,020	1.1%	0.0%	
	Overlays	7	6	231,725,442	5.8%	0.0%	
Total Portfolio		252	115	\$3,975,278,981	100.0%	100.0%	

¹ Exposures obtained through derivatives are reported on a notional basis. Cash exposure is offset by the total notional derivative exposure.

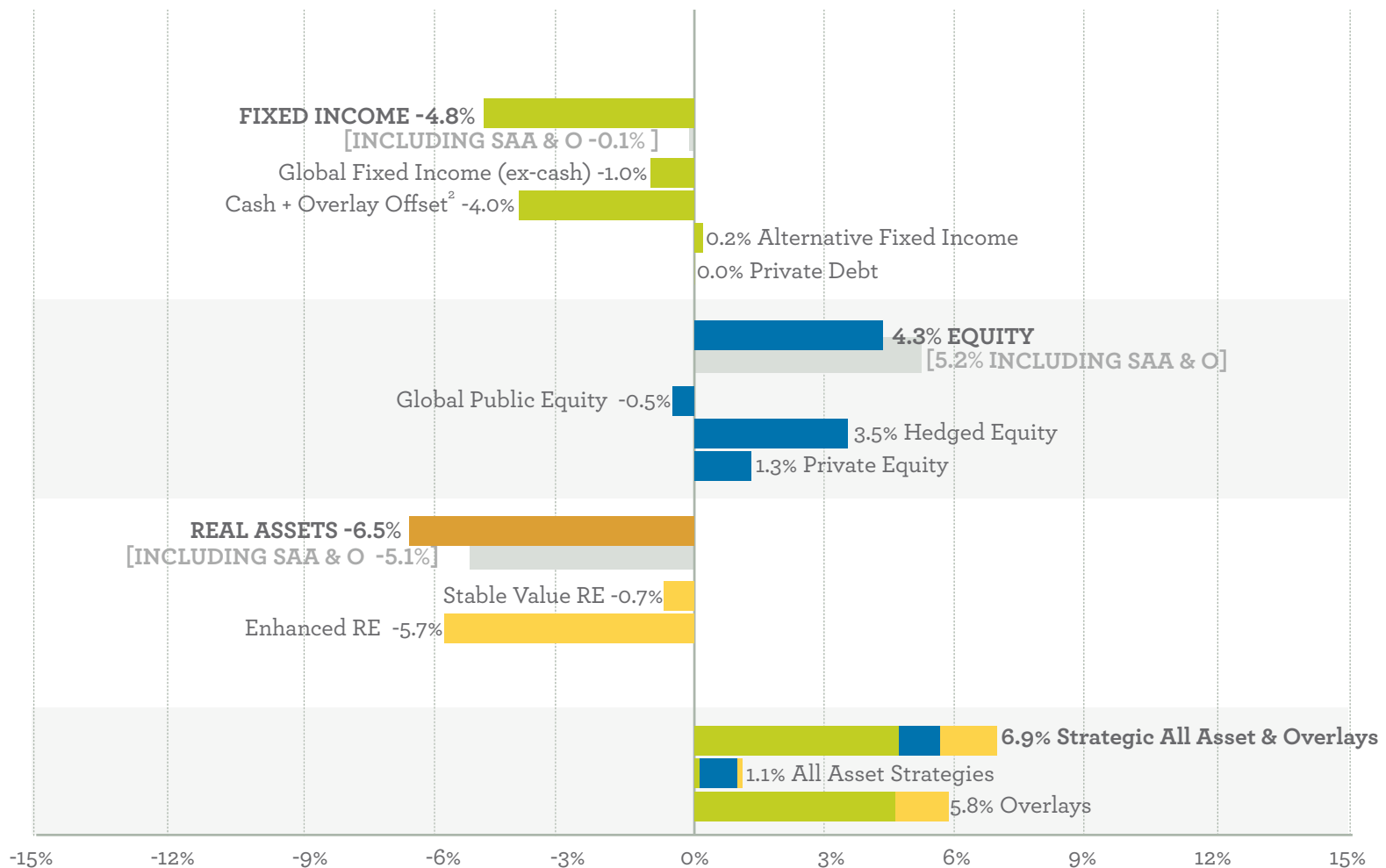
² Does not include funds in wind down or redemption.

³ Manager count for aggregates are less than sum of components due to managers with multiple strategy allocations.

⁴ Includes Cash and Derivatives Offset

Actual vs. Target Allocations¹

As of December 31, 2018

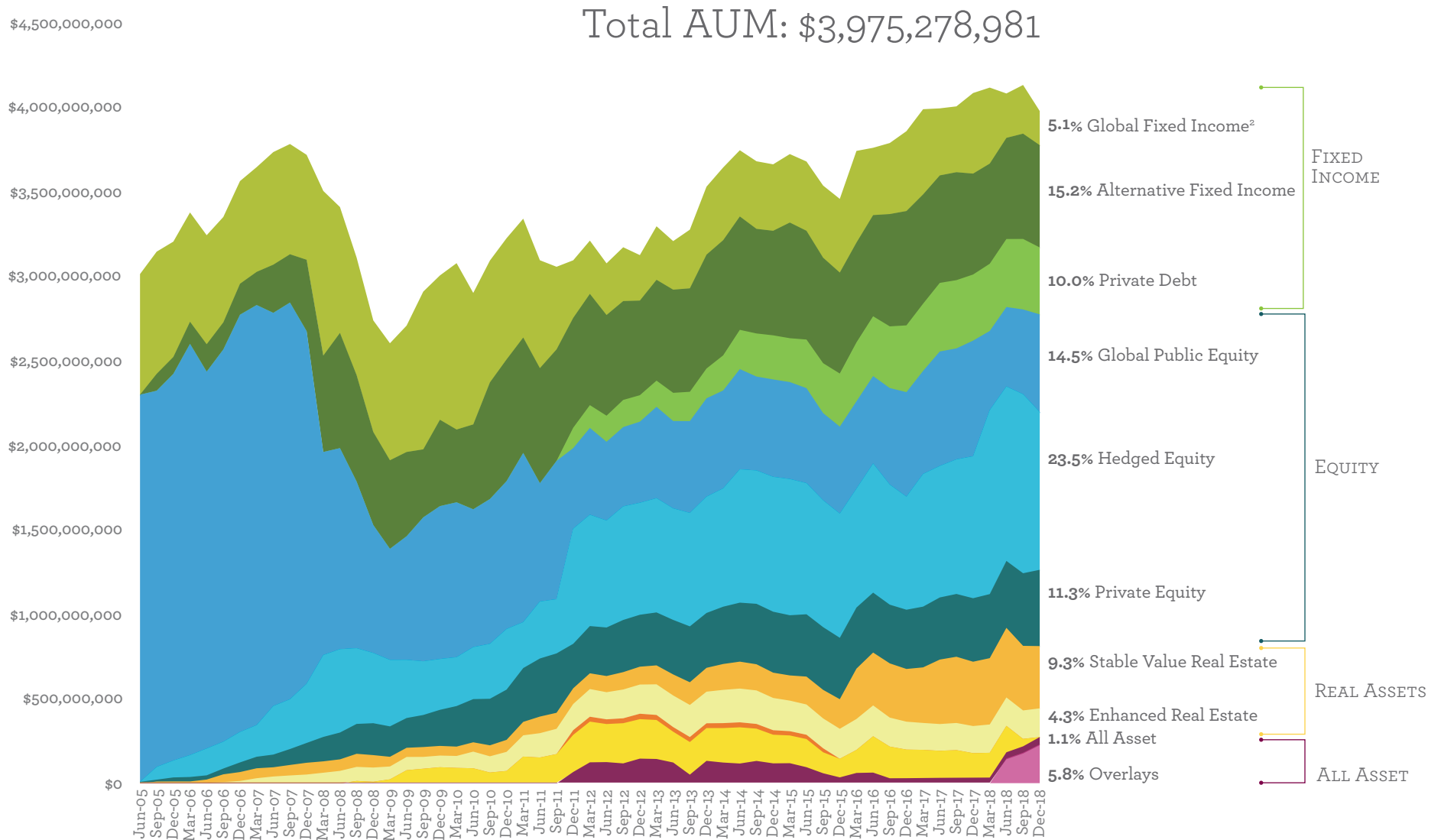


¹Exposures obtained through derivatives are reported on a notional basis. Cash exposure is offset by the total notional derivative exposure.

²Includes Derivatives Offset

Asset Allocation Evolution (Actual)¹

As of December 31, 2018

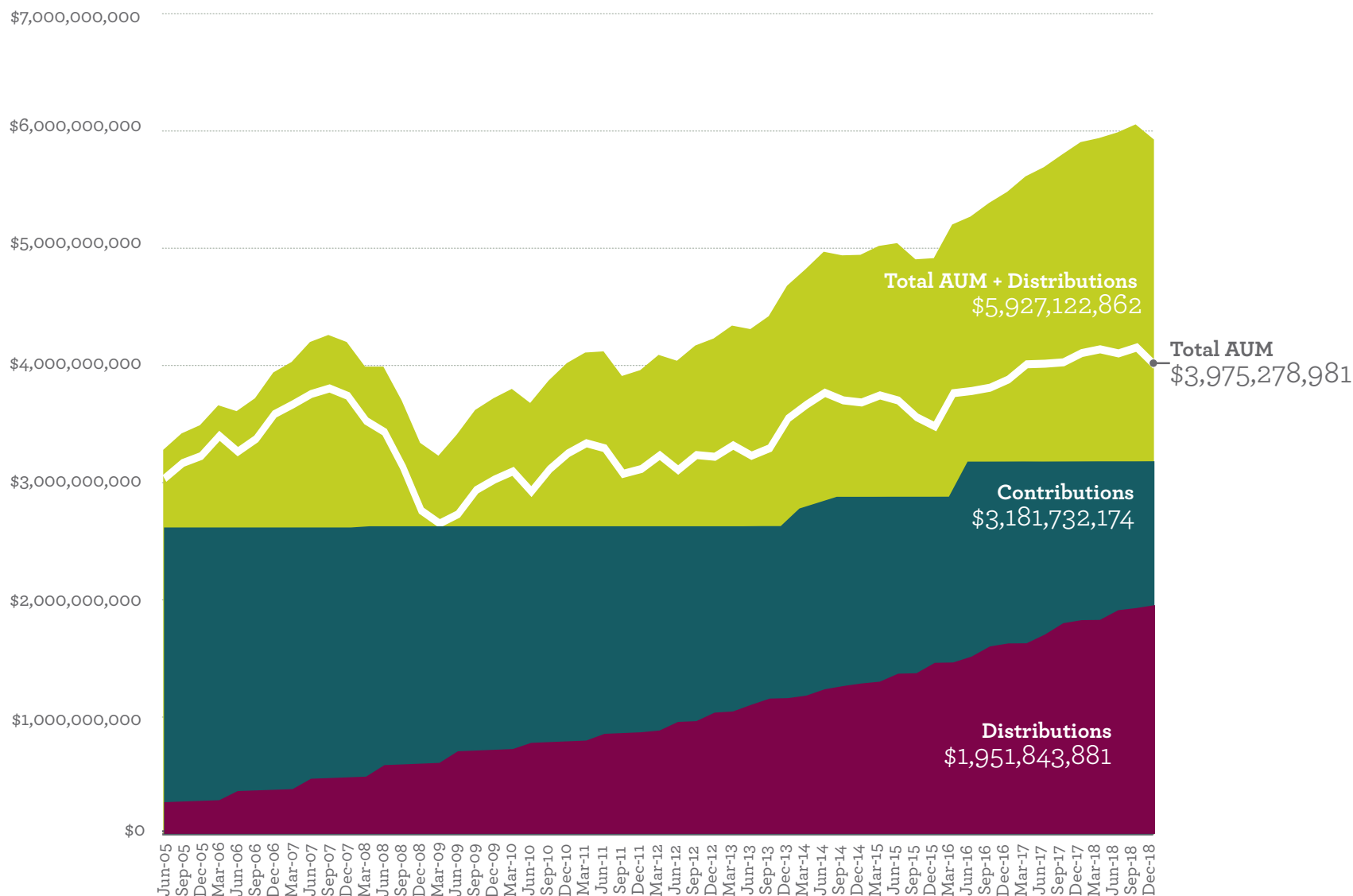


¹Exposures obtained through derivatives are reported on a notional basis. Cash exposure is offset by the total notional derivative exposure.

²Includes Cash and Derivatives Offset

Contributions & Distributions

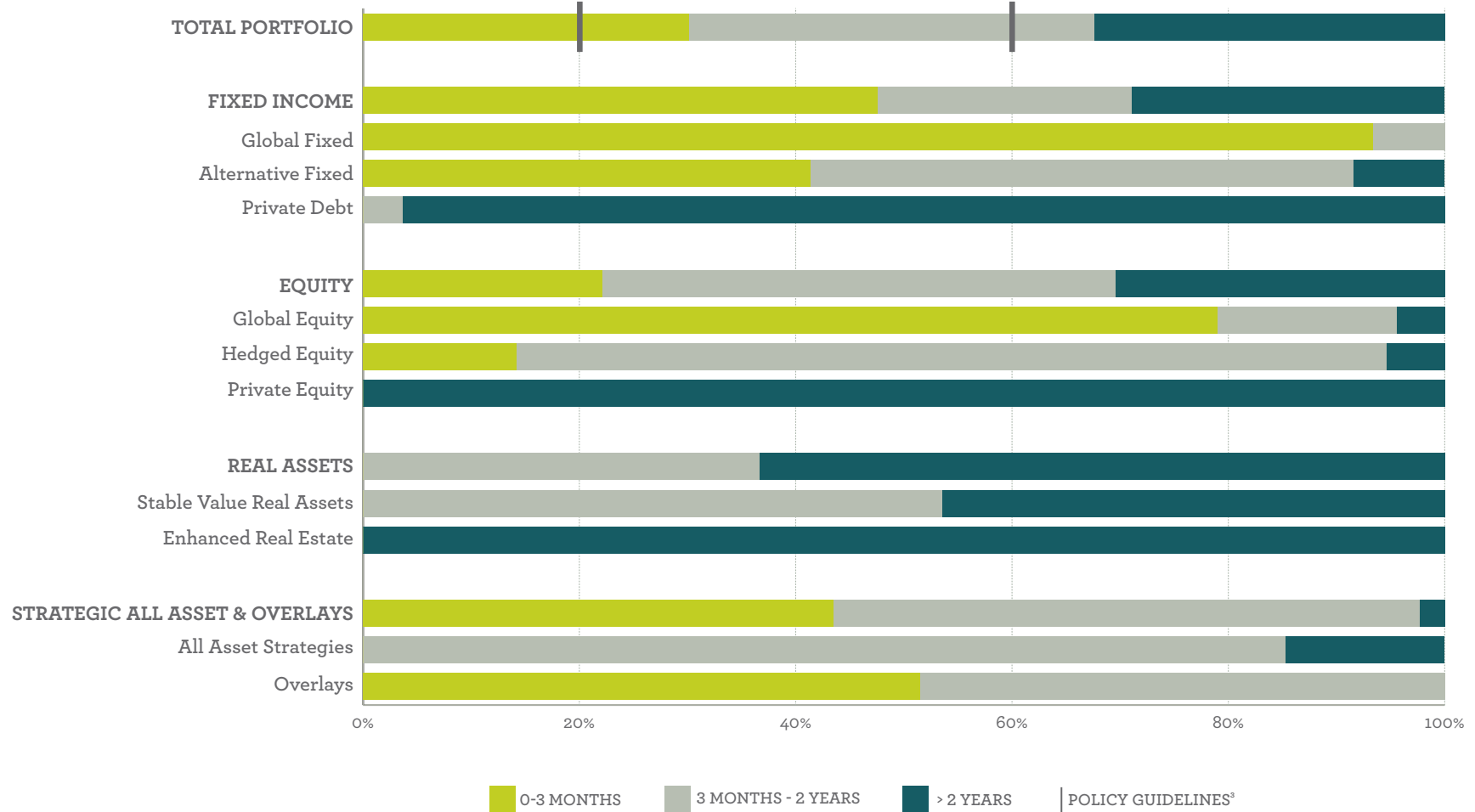
As of December 31, 2018





Portfolio Liquidity^{1,2}

As of December 31, 2018



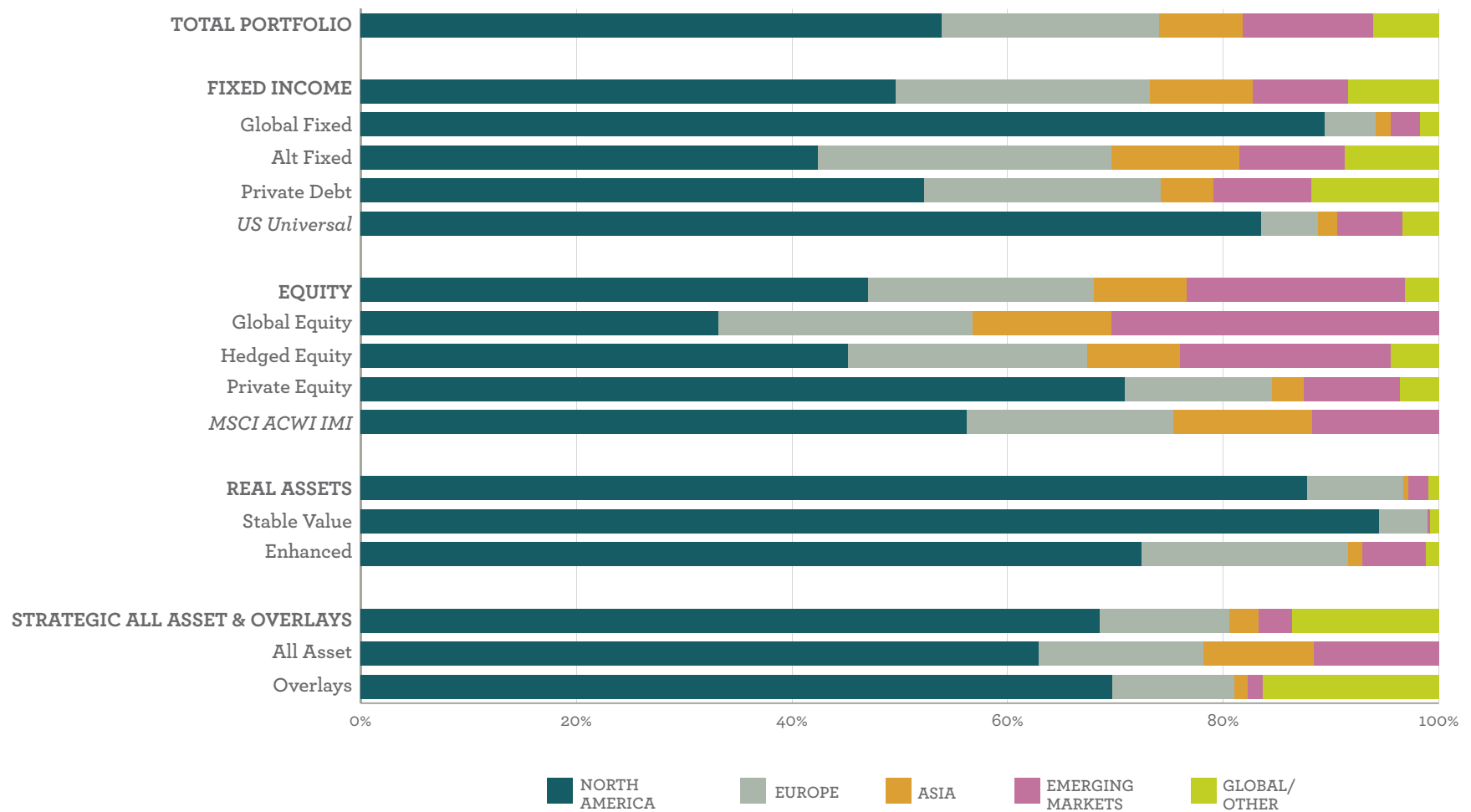
¹ Projected liquidity takes hard lock, notice and payout periods into consideration.

² Physical cash is included in the global fixed bucket. Notional derivative exposures are not included.

³ Policy Guidelines: Minimum of 20% in 0-3 months and minimum of 60% in less than 2 years.

Portfolio Geographic Allocation¹

As of December 31, 2018



¹ Calculated using gross exposures except commodities, which are calculated using net exposures.

Fixed Income Summary

As of December 31, 2018

Strategy	Market Value	Portfolio Weight	Standard Deviation ¹	Sharpe Ratio ¹	Downside Deviation ¹	Max Drawdown ¹	% Positive Months ¹	US Universal		HFRI Conservative		MSCI ACWI IMI	
								Beta ¹	Correlation ¹	Beta ¹	Correlation ¹	Beta ¹	Correlation ¹
Global Fixed Income & Cash	\$201,419,601	5.1%	1.5%	1.3	2.0%	-1.3%	80.6%	0.3	0.6	0.3	0.4	0.1	0.5
Global Fixed Income (ex-cash)	318,752,224	8.0%	2.0%	1.4	1.9%	-0.8%	77.8%	0.4	0.6	0.4	0.4	0.1	0.6
Global Fixed Manager	165,675,316	4.2%	2.2%	1.1	1.8%	-1.7%	69.4%	0.3	0.4	0.5	0.5	0.1	0.7
Global Fixed Derivatives	153,076,908	3.9%	-	-	-	-	-	-	-	-	-	-	-
Cash + Overlay Offset	-117,332,623	-3.0%	-	-	-	-	-	-	-	-	-	-	-
Cash (Physical)	326,279,590	8.2%	-	-	-	-	-	-	-	-	-	-	-
Overlay Offset	-443,612,213	-11.2%	-	-	-	-	-	-	-	-	-	-	-
US Universal			2.7%	0.6	3.1%	-2.9%	66.7%	-	-	-0.2	-0.2	0.0	0.0
Alternative Fixed Income	\$604,779,594	15.2%	2.5%	2.2	2.1%	-1.3%	80.6%	-0.3	-0.4	0.7	0.6	0.1	0.3
Event Driven	132,918,542	3.3%	4.8%	0.5	5.0%	-4.1%	61.1%	-0.6	-0.3	1.2	0.6	0.2	0.5
HFRI Event Driven (Total) Index			4.2%	1.1	5.1%	-4.9%	72.2%	-0.1	-0.1	1.4	0.8	0.3	0.8
Relative Value	275,430,314	6.9%	2.7%	2.2	7.2%	-3.6%	91.7%	0.0	0.0	0.9	0.7	0.2	0.7
HFRI Relative Value (Total) Index			2.7%	1.1	3.4%	-3.2%	75.0%	0.0	0.0	1.0	0.8	0.2	0.8
Tactical Trading	194,822,037	4.9%	7.6%	0.7	5.9%	-7.5%	55.6%	-0.5	-0.2	0.1	0.0	-0.2	-0.3
HFRI Macro (Total) Index			4.2%	-0.3	4.1%	-6.8%	44.4%	0.6	0.4	0.5	0.3	0.1	0.3
Fund of Funds	1,608,702	0.0%	163.9%	0.6	4.6%	-9.2%	47.2%	-9.5	-0.2	-1.8	0.0	1.4	0.1
HFRI FoF: Conservative			2.2%	0.3	3.3%	-3.2%	75.0%	-0.1	-0.2	-	-	0.2	0.7
Private Debt	\$395,645,623	10.0%	-	-	-	-	-	-	-	-	-	-	-
Total Fixed Income	\$1,201,844,818	30.2%	1.9%	2.6	2.0%	-1.6%	80.6%	-0.2	-0.3	0.6	0.7	0.1	0.6

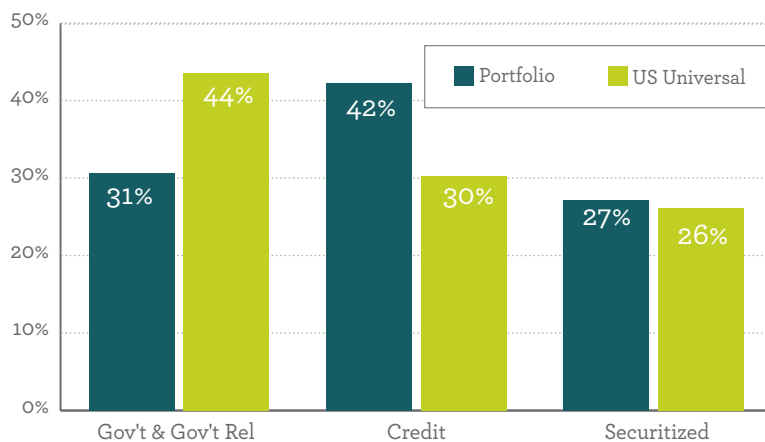
¹Trailing 36 months.

Fixed Income Detail

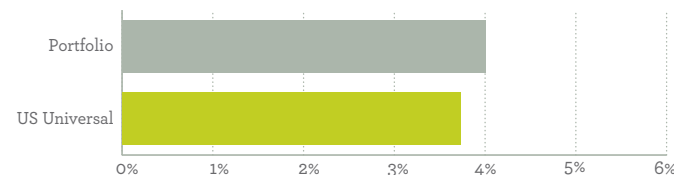
As of December 31, 2018

Global Fixed
ex-cash

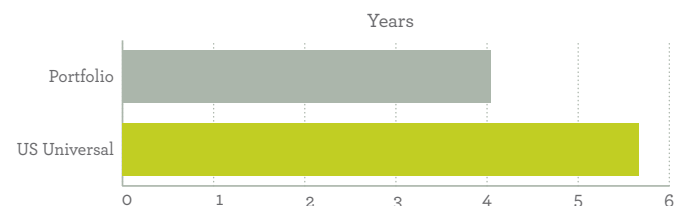
Sector Allocation



Yield

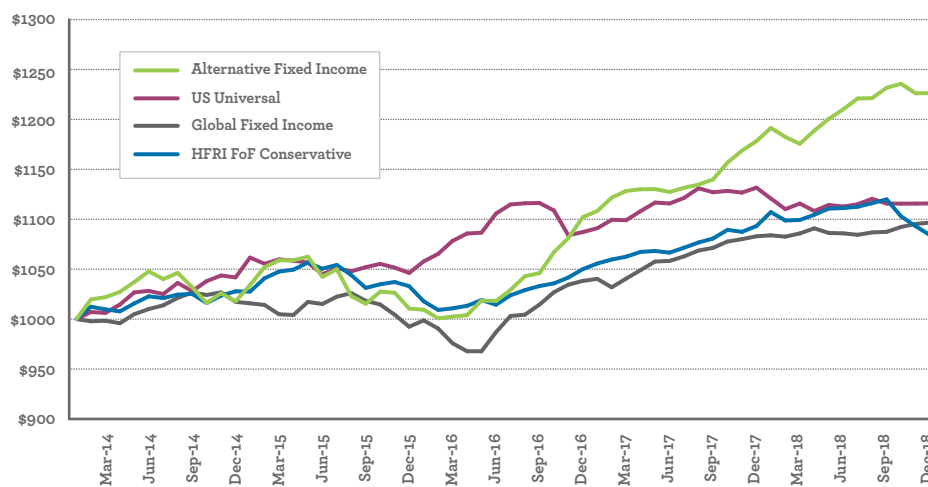


Duration



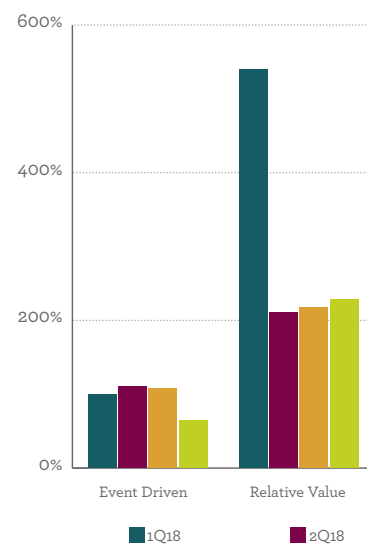
Growth of \$1,000¹

Fixed Income

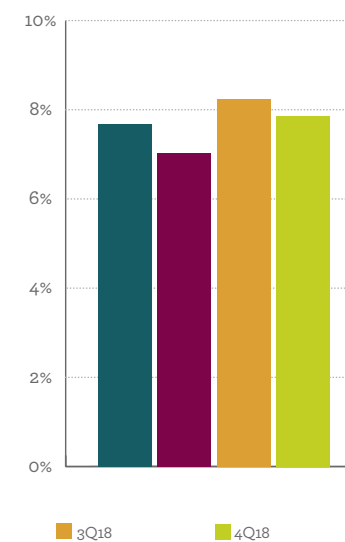


¹ Trailing 5 year.

Gross Exposure by Strategy



VaR of Tactical Trading Strategy¹



¹ One month 95% confidence extrapolated ex-ante VaR provided by the managers.

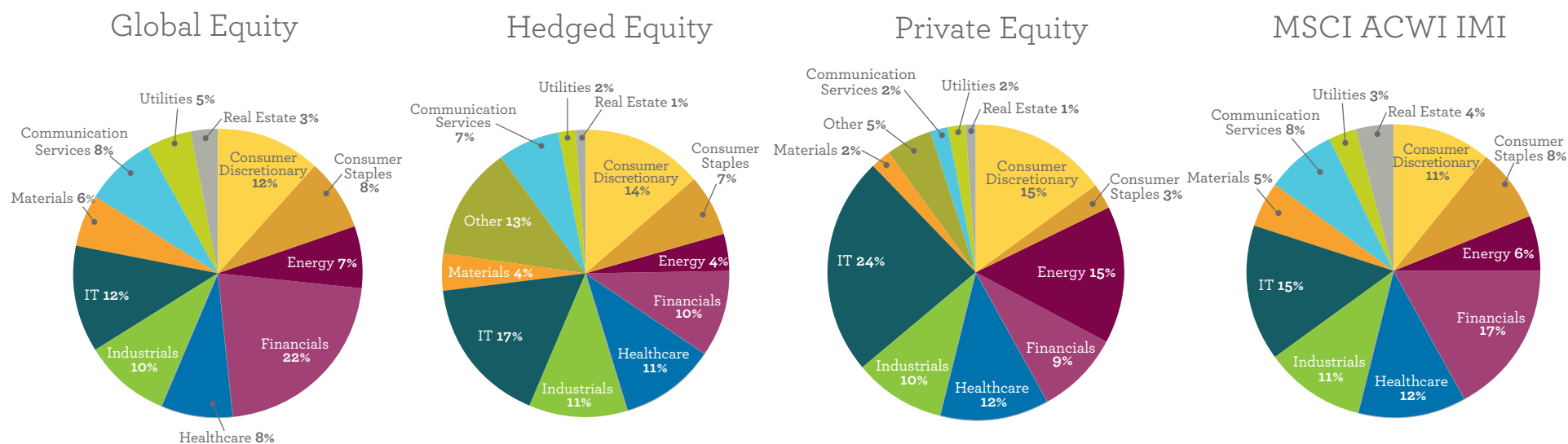
Equity Summary

As of December 31, 2018

Strategy	Market Value	Portfolio Weight	Standard Deviation ¹	Sharpe Ratio ¹	Downside Deviation ¹	Max Drawdown ¹	% Positive Months ¹	MSCI ACWI IMI		HFRI Strategic	
								Beta ¹	Correlation ¹	Beta ¹	Correlation ¹
Global Equity	\$577,733,733	14.5%	10.2%	0.4	12.4%	-17.5%	63.9%	0.9	1.0	1.7	0.9
Global Equity Managers	305,588,756	7.7%	10.5%	0.3	12.1%	-18.1%	61.1%	0.9	0.9	1.7	0.9
Global Equity Derivatives	272,144,977	6.8%	-	-	-	-	-	-	-	-	-
<i>MSCI ACWI IMI</i>			10.8%	0.5	16.4%	-14.7%	75.0%	-	-	1.8	0.9
Hedged Equity	\$932,338,009	23.5%	5.7%	0.5	7.8%	-7.6%	69.4%	0.4	0.8	1.0	0.9
<i>HFRI FoF: Strategic</i>			5.4%	0.0	7.4%	-9.3%	63.9%	0.5	0.9	-	-
Private Equity	\$451,000,476	11.3%	-	-	-	-	-	-	-	-	-
Total Equity	\$1,961,072,218	49.3%	5.5%	1.0	7.6%	-6.0%	75.0%	0.5	1.0	1.0	1.0

¹ Trailing 36 months.

Sector Allocation¹

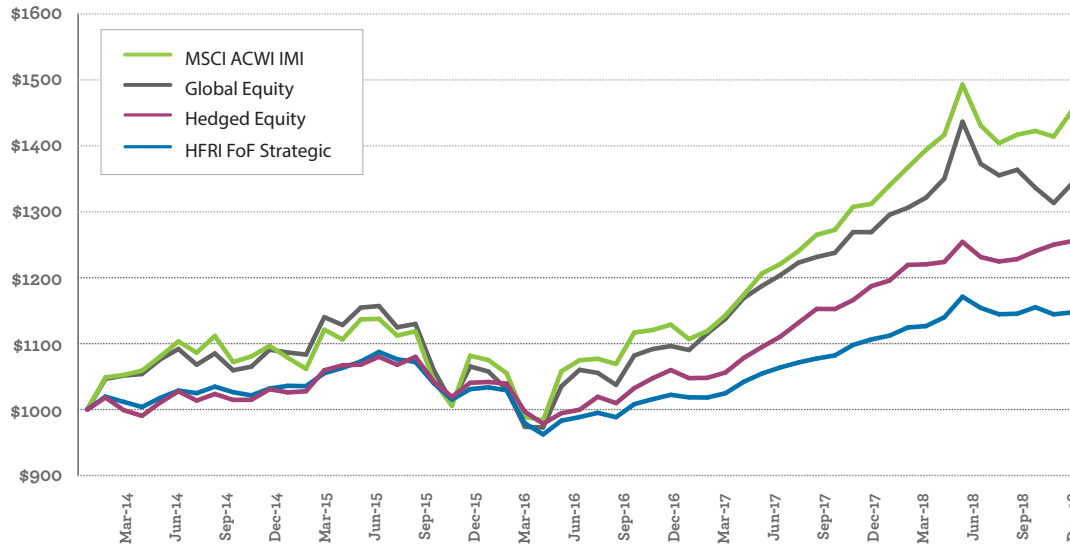


¹ Calculated using gross exposures.

Public Equity Detail

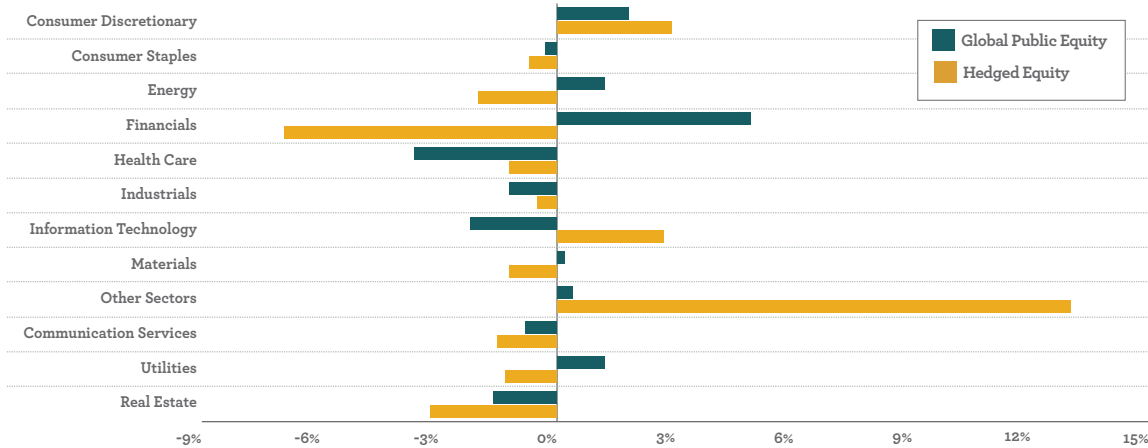
As of December 31, 2018

Growth of \$1,000¹



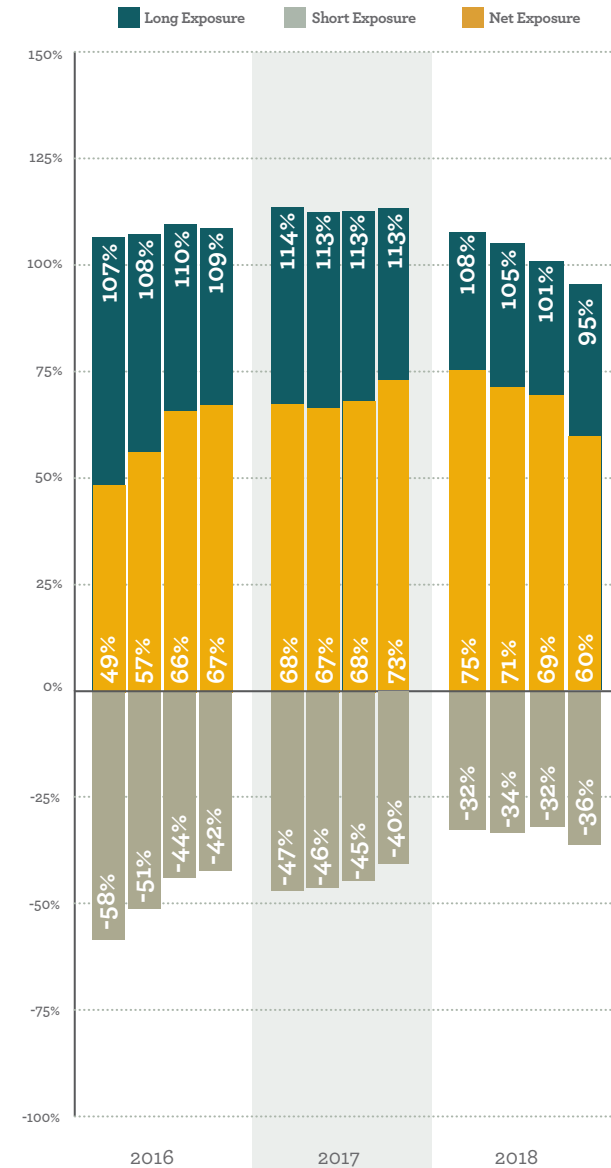
¹ Trailing 5 year.

Sector Under/Over Allocation¹



¹ Relative to MSCI ACWI IMI

Exposure by Quarter - Hedged Equity



Private Equity Detail

As of December 31, 2018

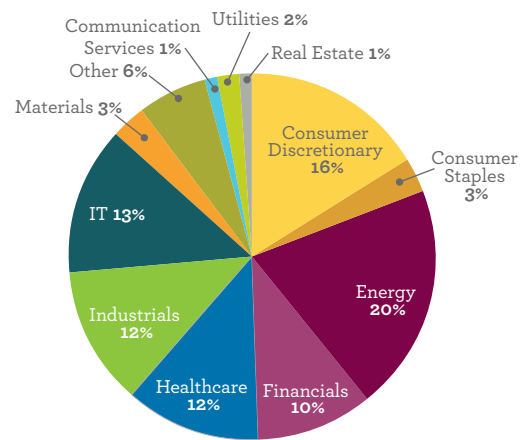
Strategy	Number of Current Fund Commitments	Portfolio Weight	Commitments	Unfunded Commitments	Total Contributions ¹	Distributions	Remaining Value ²	Total Value
Buyout	62	8.6%	\$722,486,896	\$181,807,623	\$590,798,337	\$496,721,747	\$342,699,281	\$839,421,027
Venture Capital	17	2.7%	202,050,000	56,826,595	145,847,067	99,787,310	108,301,195	208,088,505
Total Private Equity	79	11.3%	\$924,536,896	\$238,634,218	\$736,645,404	\$596,509,057	\$451,000,476	\$1,047,509,533

¹Total Contributions include fees and expenses that may not reduce or lower unfunded commitment.

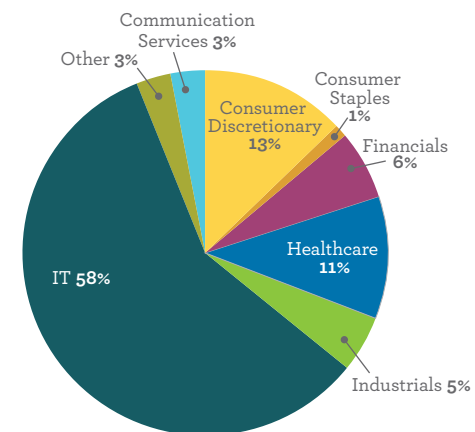
²Remaining Value is equal to the last actual reported capital account value plus subsequent capital calls less subsequent distributions through the indicated date, with no valuation changes.

Strategy	Distributed/Paid In (DPI)	Total Value/Paid In (TVPI)	1 Year IRR	ITD IRR	Time Weighted Returns		
					1 Year	3 Year	5 Year
Buyout	0.84	1.42	17.2%	9.6%	17.1%	13.8%	12.6%
Venture	0.68	1.43	16.2%	5.9%	16.2%	10.4%	13.3%
Total Private Equity	0.81	1.42	17.0%	8.4%	16.9%	13.0%	12.7%
<i>Private Equity Blend</i>					16.3%	13.9%	12.4%

Buyout Sector Allocation



Venture Sector Allocation



Real Estate Detail

As of December 31, 2018

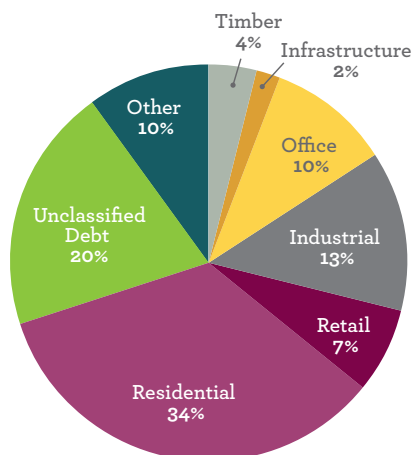
Strategy	Number of Current Fund Commitments	Portfolio Weight	Commitments	Unfunded Commitments	Total Contributions ¹	Distributions	Remaining Value ²	Total Value
Stable Value	26	9.3%	\$788,501,071	\$231,369,128	\$649,594,349	\$453,567,245	\$368,138,329	\$821,705,573
Enhanced Return	46	4.3%	626,862,536	250,104,270	422,030,050	372,339,050	169,809,153	542,148,203
Total Real Estate	72	13.5%	\$1,415,363,607	\$481,473,398	\$1,071,624,399	\$825,906,294	\$537,947,482	\$1,363,853,777

Strategy	Distributed/Paid In (DPI)	Total Value/Paid In (TVPI)	1 Year IRR	ITD IRR	Time Weighted Returns		
					1 Year	3 Year	5 Year
Stable Value	0.70	1.26	10.1%	9.1%	10.0%	11.0%	10.1%
<i>Stable Value RE Blend</i>					7.7%	7.8%	9.7%
Enhanced Return	0.88	1.28	5.1%	6.5%	5.1%	7.1%	11.2%
<i>Enhanced RE Blend</i>					9.5%	9.8%	11.3%
Total Real Estate	0.77	1.27	8.6%	7.7%	8.5%	9.8%	11.3%
<i>Real Estate Blend</i>					8.2%	8.4%	10.3%

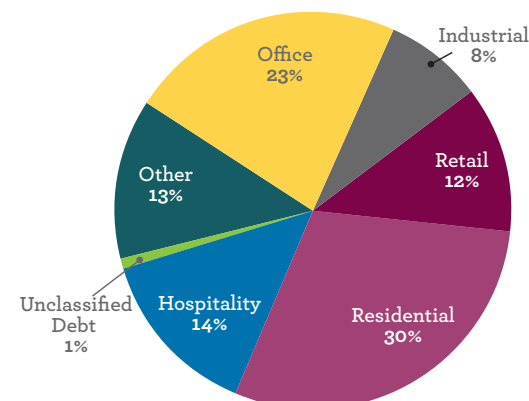
¹Total Contributions include fees and expenses that may not reduce or lower unfunded commitment.

² Remaining Value is equal to the last actual reported capital account value plus subsequent capital calls less subsequent distributions through the indicated date, with no valuation changes.

Stable Value Sector Allocation



Enhanced Sector Allocation



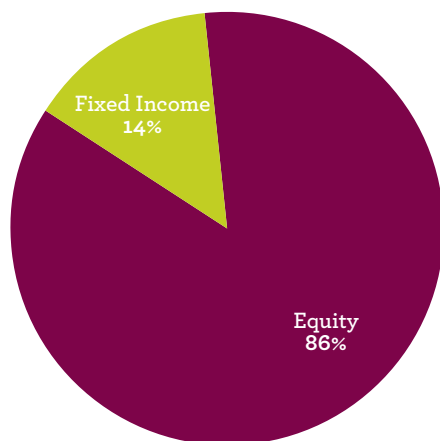
Strategic All Asset & Overlays

As of December 31, 2018

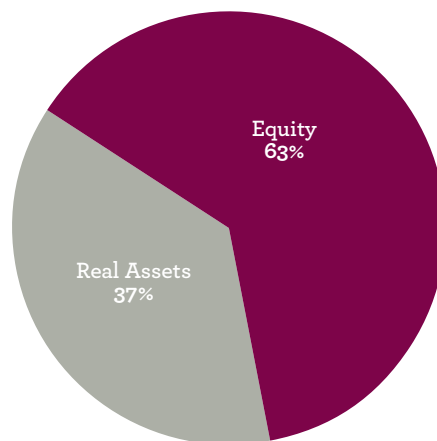
Strategy	Market Value	Portfolio Weight	Standard Deviation ¹	Sharpe Ratio ¹	Downside Deviation ¹	Max Drawdown ¹	% Positive Months ¹	Total Policy Benchmark	
								Beta ¹	Correlation ¹
All Asset Strategies	\$42,689,020	1.1%	3.6%	2.0	5.5%	-2.4%	86.1%	0.7	0.7
Multi Strategy	36,371,124	0.9%	3.8%	1.5	5.0%	-2.6%	77.8%	0.7	0.6
Opportunistic	6,317,896	0.2%	-	-	-	-	-	-	-
Overlays	231,725,442	5.8%	-	-	-	-	-	-	-
Strategic All Asset & Overlays	\$274,414,462	6.9%	3.2%	1.9	3.9%	-1.7%	83.3%	0.5	0.6
<i>TTSTC Blended Endowment</i>			<i>3.4%</i>	<i>1.3</i>	<i>5.4%</i>	<i>-2.9%</i>	<i>83.3%</i>	-	-

¹ Trailing 36 months.

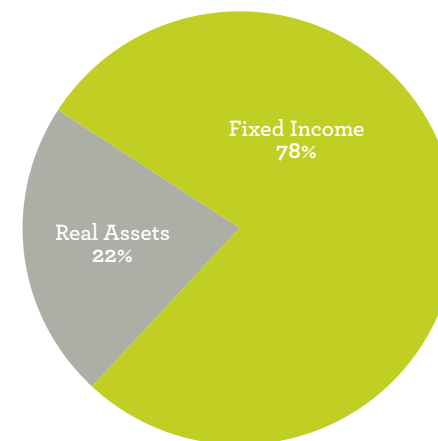
Multi Strategy Breakdown



Opportunistic Breakdown



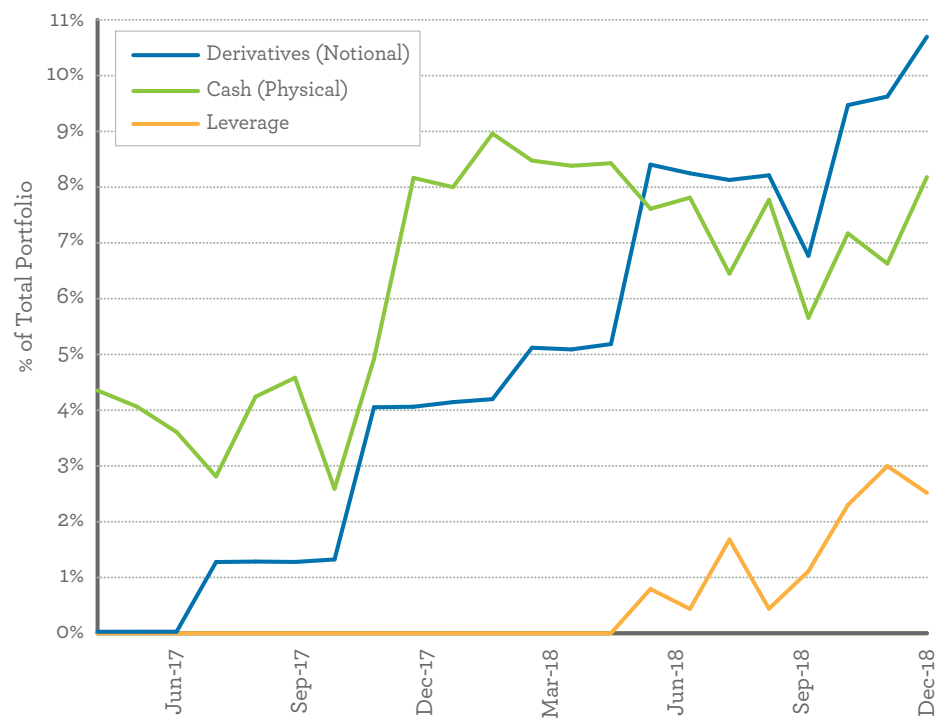
Overlays Breakdown



Strategic All Asset & Overlays Detail

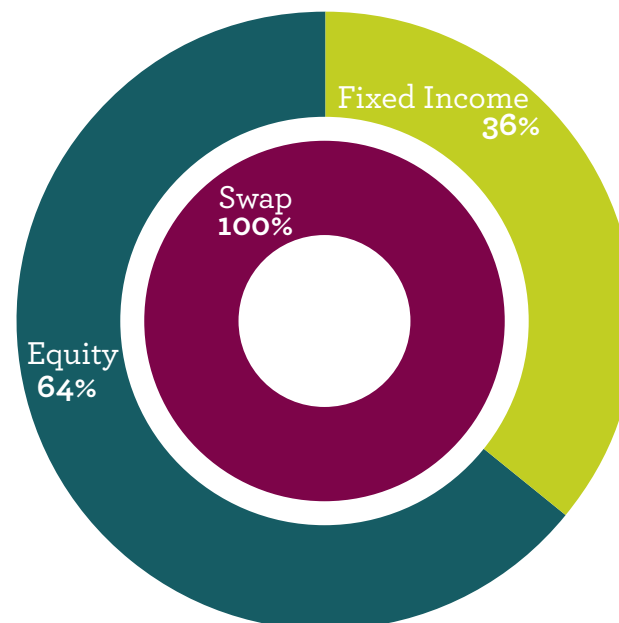
As of December 31, 2018

Smart Leverage Summary¹



¹ In time periods where measured leverage isn't present, we display leverage as 0%.

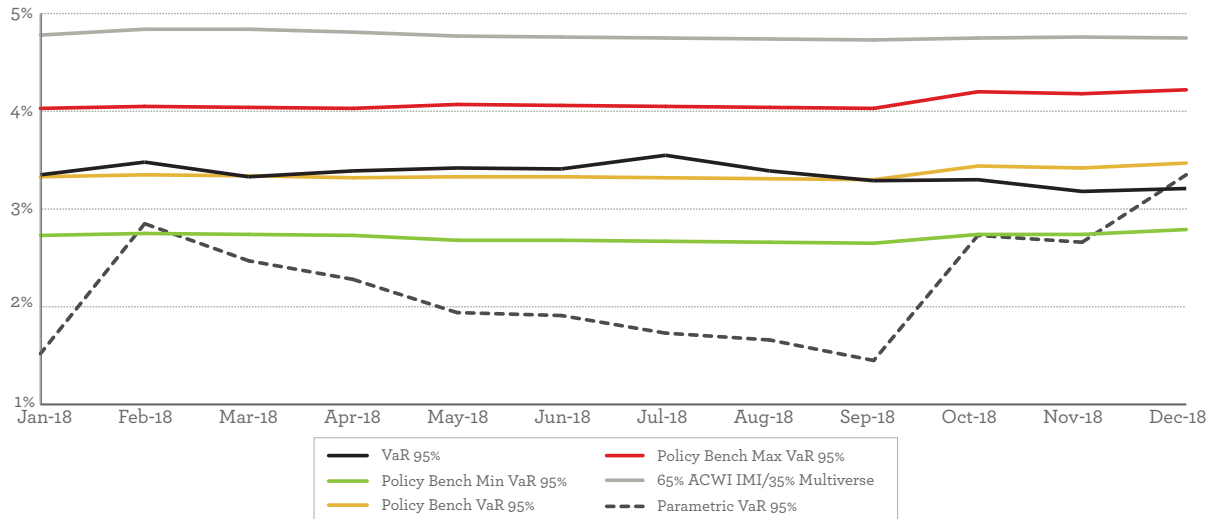
Derivatives Allocation



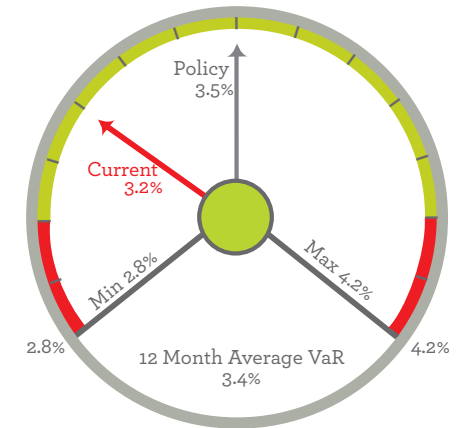
Value at Risk (VaR) Analysis

As of December 31, 2018

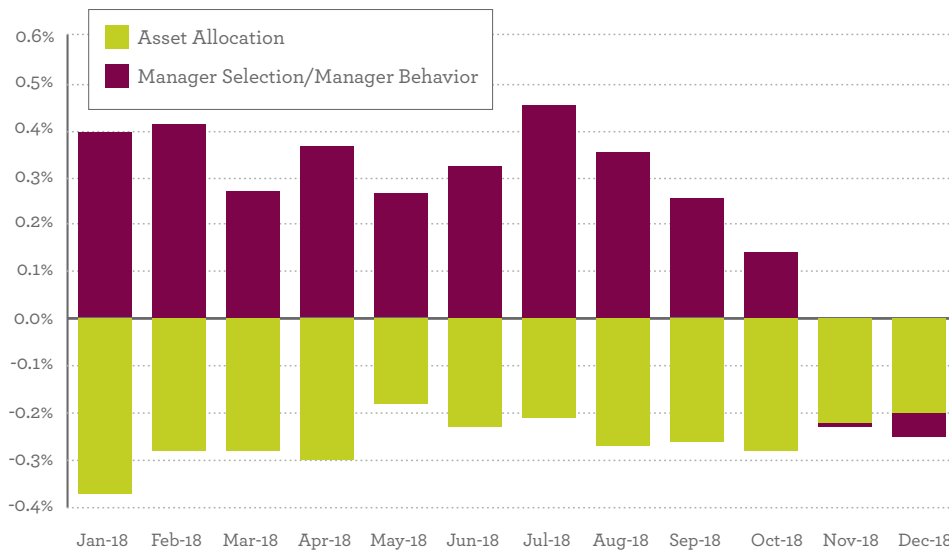
Twelve Month History



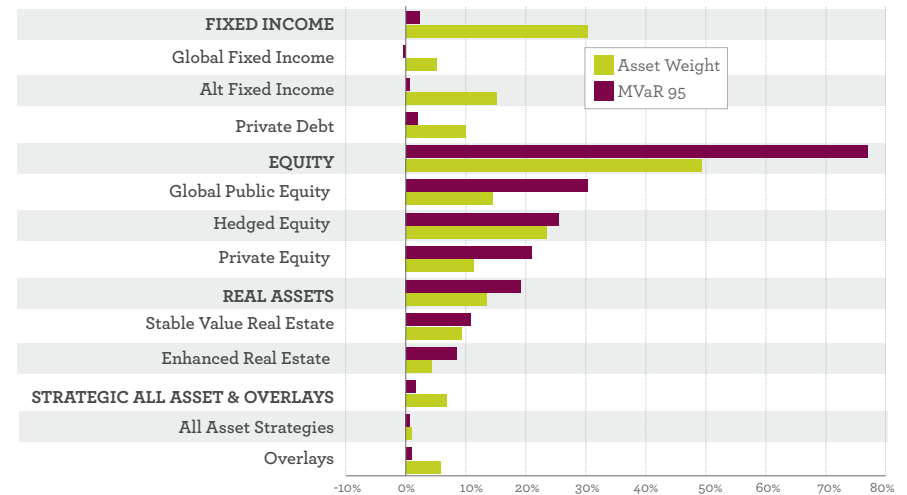
VaR as a Percent of Market Value (One Month, 95% Confidence)



Differential from Policy VaR

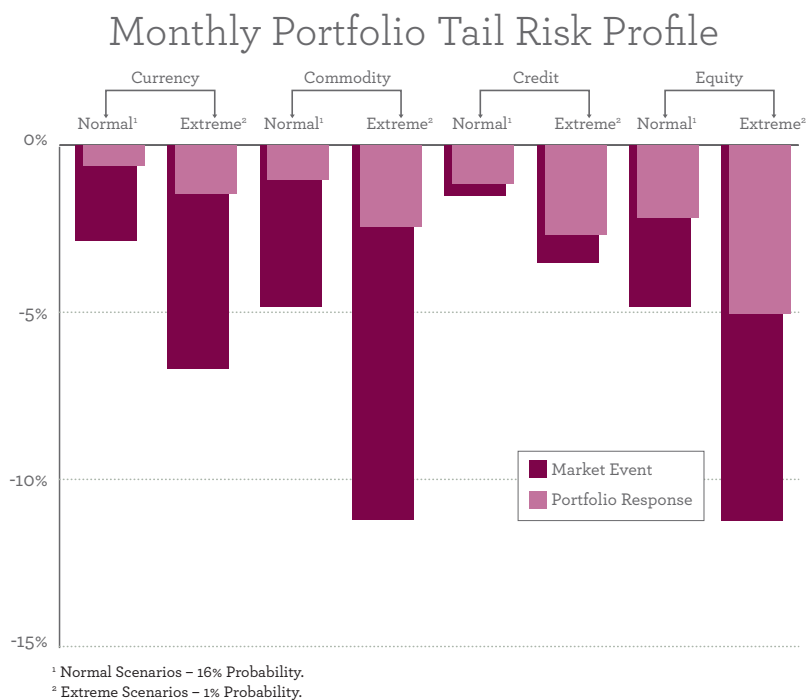
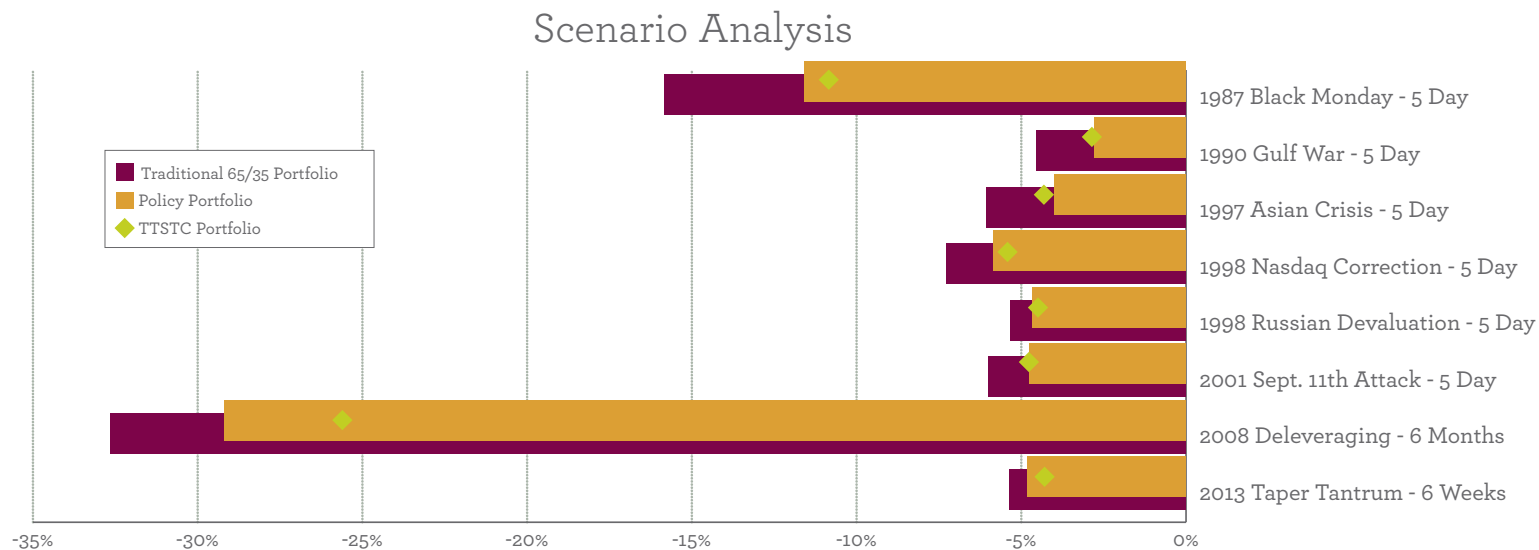


VaR Contribution



Portfolio Risk Summary

As of December 31, 2018



TTSTC Performance Table

As of December 31, 2018

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
2002	-0.8%	-0.1%	1.9%	-1.8%	-0.5%	-4.5%	-4.7%	0.7%	-6.0%	3.7%	4.0%	-2.8%	-10.9%
2003	-1.6%	-0.9%	0.4%	5.9%	4.8%	1.3%	1.4%	2.1%	0.3%	4.4%	1.6%	3.6%	25.8%
2004	2.0%	1.4%	0.1%	-2.4%	0.8%	2.1%	-2.8%	0.6%	2.2%	1.6%	4.1%	2.9%	13.1%
2005	-1.7%	2.0%	-1.6%	-2.1%	2.9%	1.3%	3.2%	0.2%	1.2%	-1.9%	2.8%	1.4%	7.8%
2006	3.8%	0.0%	1.8%	1.5%	-2.5%	-0.2%	0.2%	1.8%	1.2%	2.8%	2.2%	1.3%	14.7%
2007	1.2%	-0.1%	1.4%	3.0%	2.7%	-0.7%	-1.7%	0.3%	3.0%	2.0%	-3.2%	-0.2%	7.7%
2008	-4.2%	-0.5%	-1.1%	2.3%	1.3%	-3.4%	-1.2%	-0.8%	-6.6%	-9.6%	-2.9%	0.6%	-23.8%
2009	-2.0%	-3.6%	1.9%	3.2%	3.1%	0.6%	4.0%	1.3%	2.5%	0.1%	2.2%	1.1%	15.0%
2010	-1.0%	1.0%	2.6%	1.0%	-3.9%	-1.1%	3.4%	-0.7%	4.1%	2.1%	-0.4%	3.0%	10.3%
2011	0.7%	1.6%	0.6%	2.2%	-0.5%	-1.1%	0.1%	-2.2%	-4.4%	3.1%	-0.8%	-0.5%	-1.6%
2012	2.3%	2.0%	0.0%	0.2%	-2.8%	1.1%	1.3%	1.6%	1.4%	0.1%	0.9%	0.9%	9.3%
2013	2.1%	0.2%	1.1%	1.0%	0.1%	-2.1%	1.9%	0.0%	1.8%	1.9%	0.8%	0.6%	9.8%
2014	-0.1%	2.5%	0.2%	0.6%	1.3%	1.1%	-0.3%	0.9%	-1.5%	0.0%	1.0%	-0.8%	4.9%
2015	0.2%	2.1%	-0.2%	1.4%	0.4%	-1.1%	0.1%	-2.1%	-1.7%	1.7%	-0.3%	-1.0%	-0.6%
2016	-1.7%	-0.5%	1.9%	1.2%	0.6%	0.1%	1.7%	0.7%	0.7%	0.6%	0.8%	1.2%	7.5%
2017	1.5%	1.1%	0.8%	1.0%	1.0%	0.1%	1.3%	0.7%	0.8%	1.3%	0.7%	0.7%	11.5%
2018	1.9%	-0.9%	-0.1%	0.8%	0.3%	0.2%	1.3%	0.3%	0.2%	-1.7%	0.1%	-1.5%	0.8%



DISCLAIMER

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