

**SUPPLEMENTAL PORTFOLIO MANAGER REVIEW:  
QUARTER ENDING DECEMBER 31, 2017**



**DALLAS POLICE & FIRE  
PENSION SYSTEM**

**March 8, 2018**

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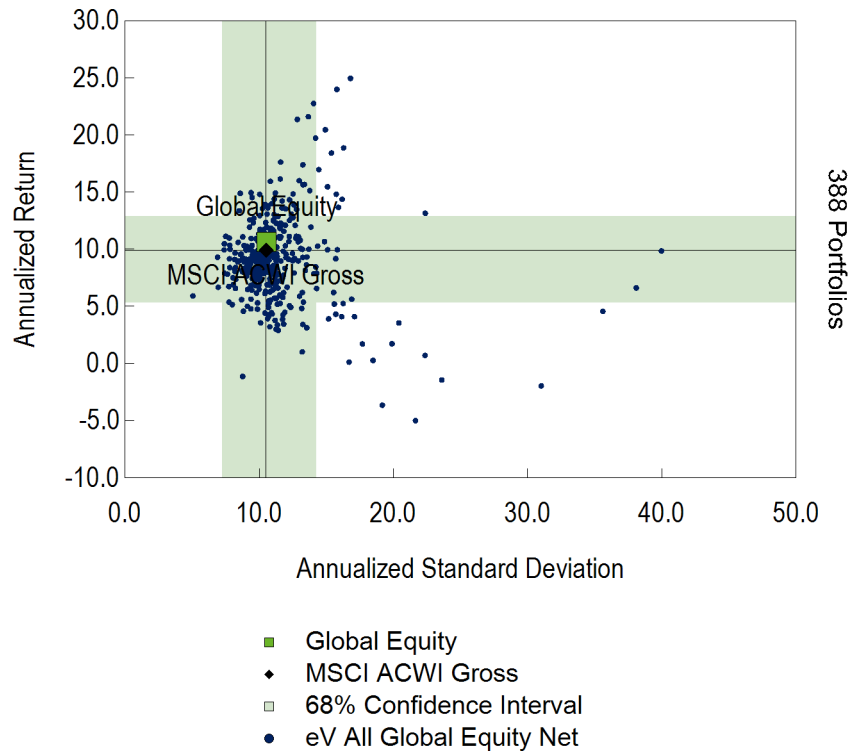
# PUBLIC EQUITY

NEPC, LLC

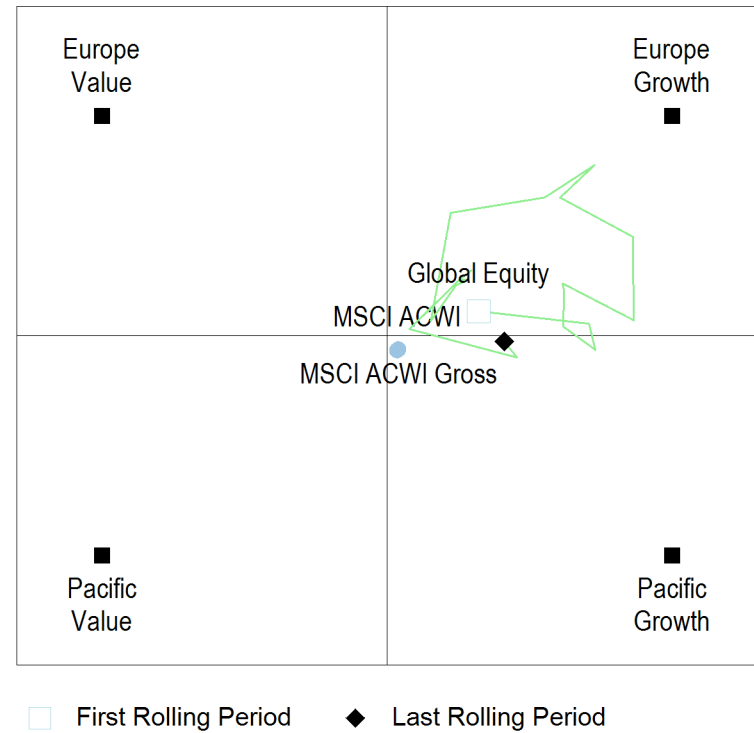
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# GLOBAL EQUITY

## 3 Year Risk Return

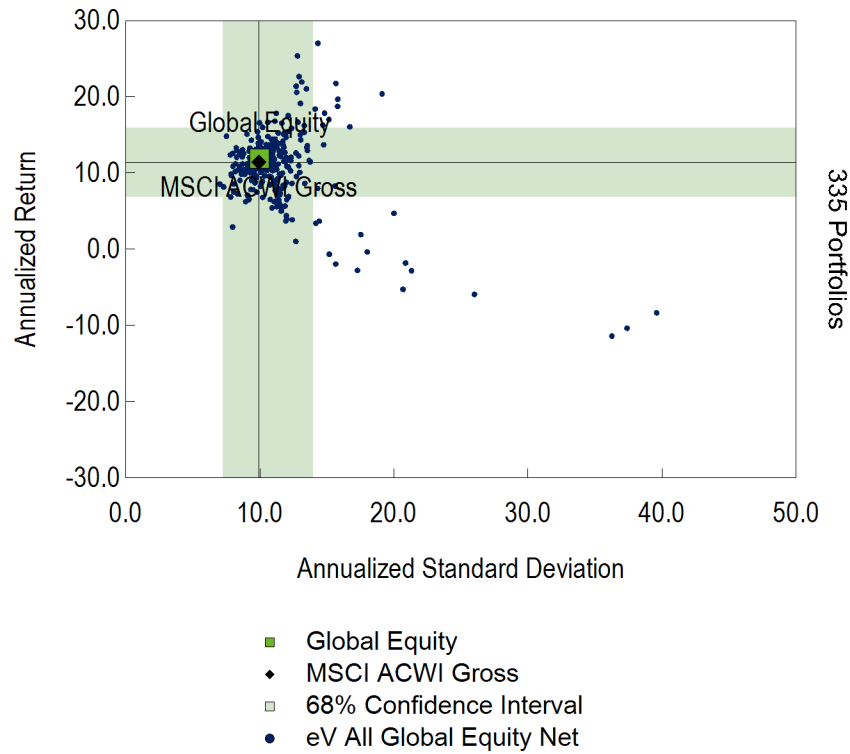


## 3 Year Style Analysis

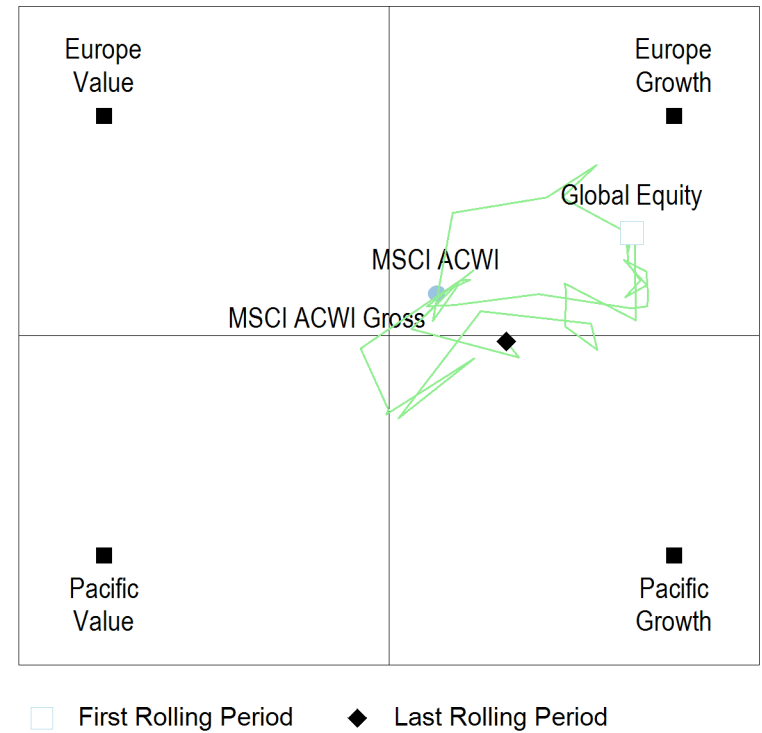


# GLOBAL EQUITY

## 5 Year Risk Return



## 5 Year Style Analysis

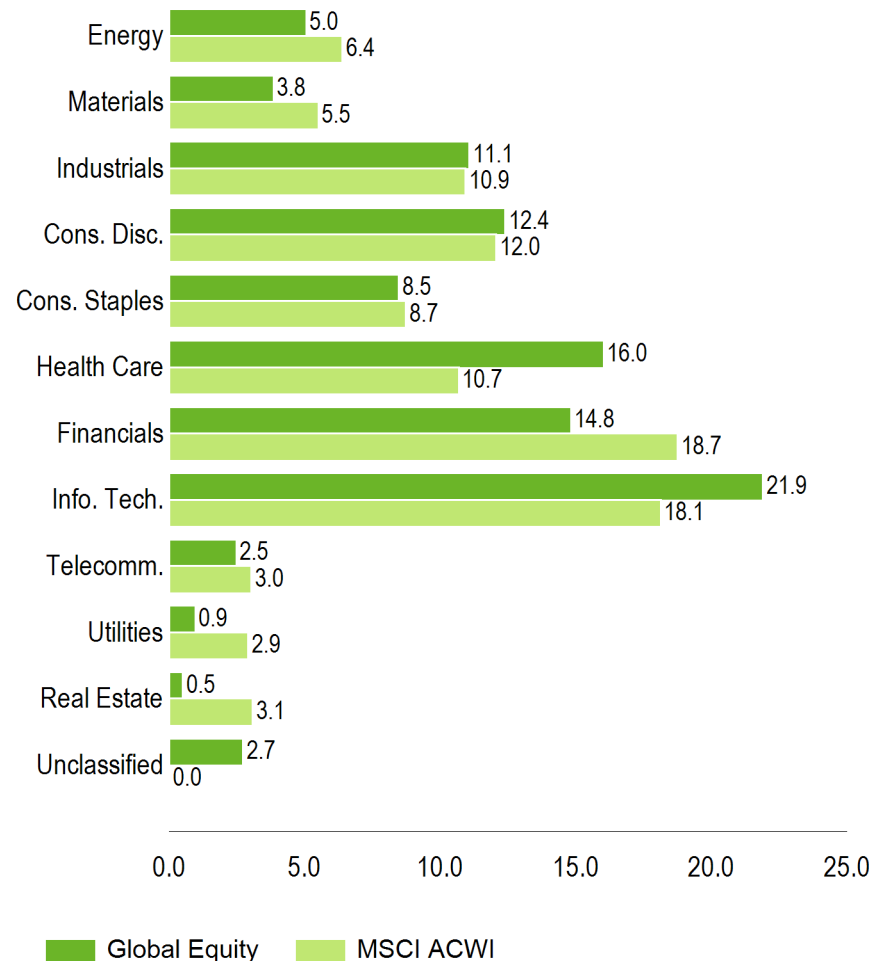


# GLOBAL EQUITY

Characteristics		
	Portfolio	MSCI ACWI
Number of Holdings	259	2,499
Weighted Avg. Market Cap. (\$B)	111.4	121.5
Median Market Cap. (\$B)	41.1	10.6
Price To Earnings	24.8	22.8
Price To Book	5.0	3.8
Price To Sales	3.5	3.0
Return on Equity (%)	20.0	16.7
Yield (%)	1.9	2.2
Beta	1.0	1.0
R-Squared	1.0	1.0

Regional Allocation		
	Global Equity	MSCI ACWI
Region Weighting		
North America ex U.S.	0.00	3.16
United States	52.88	52.57
Europe Ex U.K.	23.61	15.21
United Kingdom	4.92	5.47
Pacific Basin Ex Japan	4.68	5.39
Japan	10.84	7.87
Emerging Markets	2.88	10.10
Other	0.20	0.23

## Equity Sector Allocation



# GLOBAL EQUITY - QUARTERLY ANALYSIS

Top Ten Holdings	
ROCHE HOLDING	2.0%
JP MORGAN U S GOVT MMF AGENCY SHARES - MONTHLY VARIABLE 12312049	2.0%
MICROSOFT	1.9%
ALPHABET 'C'	1.7%
ORACLE	1.7%
NESTLE 'R'	1.4%
LVMH	1.3%
WELLS FARGO & CO	1.3%
CISCO SYSTEMS	1.3%
ADOBE SYSTEMS	1.3%

	Equity Sector Attribution										
	Total Effects	Selection Effect	Attribution Effects			Returns		Sector Weights			
			Allocation Effect	Interaction Effects	Portfolio	Benchmark	Portfolio	Benchmark			
Energy	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%	7.1%	5.0%	6.4%		
Materials	-0.1%	-0.1%	0.0%	0.0%	0.0%	5.9%	7.9%	4.3%	5.3%		
Industrials	0.2%	0.1%	0.0%	0.0%	0.0%	6.7%	5.2%	11.5%	10.8%		
Consumer Discretionary	-0.2%	-0.2%	0.0%	0.0%	0.0%	6.4%	7.8%	12.9%	11.9%		
Consumer Staples	-0.1%	-0.1%	0.0%	0.0%	0.0%	4.8%	5.9%	8.4%	8.8%		
Health Care	0.2%	0.3%	-0.2%	0.1%	0.1%	4.2%	1.4%	15.9%	11.1%		
Financials	0.0%	0.1%	0.0%	-0.1%	-0.1%	6.6%	6.2%	14.5%	18.8%		
Information Technology	0.0%	-0.1%	0.1%	0.0%	0.0%	7.7%	8.2%	21.9%	17.6%		
Telecommunication Services	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	2.2%	2.8%	3.1%		
Utilities	0.1%	0.1%	0.1%	-0.1%	-0.1%	1.9%	-0.2%	1.1%	3.1%		
Real Estate	0.0%	-0.1%	0.0%	0.1%	0.1%	0.1%	4.8%	0.4%	3.1%		
Cash	-0.1%	0.0%	-0.1%	0.0%	0.0%	0.3%	--	1.2%	0.0%		
<b>Portfolio</b>	<b>0.1%</b>	<b>=</b>	<b>0.1%</b>	<b>+</b>	<b>0.0%</b>	<b>+</b>	<b>0.1%</b>	<b>6.0%</b>	<b>5.9%</b>	<b>100.0%</b>	<b>100.0%</b>



# GLOBAL EQUITY - QUARTERLY ANALYSIS

Top Positive Contributors		
	Relative Contribution %	Return %
SAGE THERAPEUTICS	0.2%	164.4%
ADOBE SYSTEMS	0.2%	17.5%
FANUC	0.1%	18.6%
ANTHEM	0.1%	18.9%
CISCO SYSTEMS	0.1%	14.9%
LVMH	0.1%	7.5%
ALPHABET 'C'	0.1%	9.1%
KERING	0.1%	18.4%
DENSO	0.1%	18.7%
NIKE 'B'	0.1%	21.0%

Top Negative Contributors		
	Relative Contribution %	Return %
APPLE	-0.1%	10.2%
INDITEX	-0.1%	-6.7%
BANK OF AMERICA	-0.1%	17.0%
PHILIPS ELTN.KONINKLIJKE	-0.1%	-8.3%
HENNES & MAURITZ 'B'	-0.1%	-18.1%
MURATA MANUFACTURING	0.0%	-8.7%
ACADIA PHARMACEUTICALS	0.0%	-20.1%
GILEAD SCIENCES	0.0%	-11.0%
SOCIETE GENERALE	0.0%	-11.7%
CERNER	0.0%	-5.5%



# GLOBAL EQUITY - QUARTERLY ANALYSIS

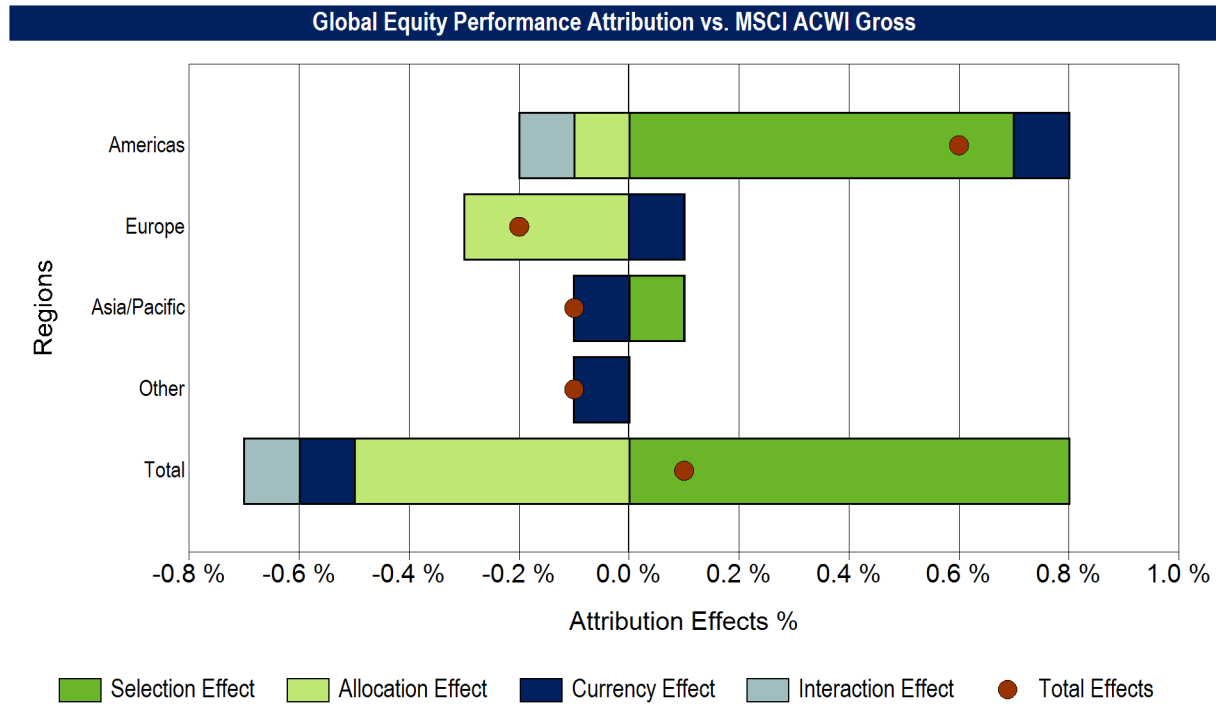
Country Allocation				
	Manager	Index	Manager	Index
	Allocation (USD)	Allocation (USD)	Return (USD)	Return (USD)
<b>Americas</b>				
Argentina**	0.1%	0.0%	2.8%	7.3%
Canada	0.6%	3.2%	6.1%	4.4%
Mexico*	0.1%	0.4%	-17.4%	-7.9%
United States	48.7%	52.1%	7.7%	6.6%
<b>Total-Americas</b>	<b>49.6%</b>	<b>56.8%</b>	<b>7.6%</b>	<b>6.3%</b>
<b>Europe</b>				
Denmark	1.0%	0.6%	9.2%	2.3%
Finland	0.7%	0.3%	1.5%	-2.5%
France	6.8%	3.6%	4.9%	1.6%
Germany	4.3%	3.2%	1.4%	2.5%
Ireland	0.0%	0.2%	1.5%	3.7%
Italy	0.3%	0.8%	-3.5%	-2.2%
Luxembourg	0.2%	0.0%	-13.0%	5.9%
Netherlands	2.5%	1.2%	3.8%	1.2%
Norway	0.1%	0.2%	2.8%	2.3%
Spain	1.7%	1.1%	-3.6%	-1.5%
Sweden	0.7%	1.0%	-12.9%	-3.7%
Switzerland	5.8%	2.7%	1.9%	1.8%
United Kingdom	6.0%	5.9%	3.4%	5.8%
<b>Total-Europe</b>	<b>30.0%</b>	<b>22.1%</b>	<b>2.4%</b>	<b>2.4%</b>

Country Allocation				
Versus MSCI ACWI Gross - Quarter Ending December 31, 2017				
	Manager	Index	Manager	Index
	Allocation (USD)	Allocation (USD)	Return (USD)	Return (USD)
<b>AsiaPacific</b>				
Australia	1.5%	2.3%	3.6%	6.7%
China*	0.8%	3.4%	8.3%	7.7%
Hong Kong	3.6%	1.2%	4.8%	7.7%
India*	0.3%	1.0%	13.7%	11.8%
Indonesia*	0.1%	0.3%	18.3%	8.0%
Japan	11.1%	7.7%	9.1%	8.5%
Korea*	0.9%	1.7%	8.7%	10.2%
Singapore	0.0%	0.4%	14.4%	10.1%
Taiwan*	0.8%	1.3%	5.6%	4.2%
<b>Total-AsiaPacific</b>	<b>19.2%</b>	<b>19.9%</b>	<b>7.8%</b>	<b>8.1%</b>
<b>Totals</b>				
Developed	95.6%	88.5%	6.0%	5.7%
Emerging*	3.1%	11.5%	7.4%	7.3%
Frontier**	0.1%	0.0%	2.8%	--
Cash	1.2%		0.3%	





# GLOBAL EQUITY - QUARTERLY ANALYSIS



	Returns and Weights				Attribution Effects				
	Manager Return	Index Return	Manager Weight	Index Weight	Selection Effect	Allocation Effect	Currency Effect	Interaction Effect	Total Effects
<b>Totals</b>									
Americas	7.6%	6.3%	49.6%	56.8%	0.7%	-0.1%	0.1%	-0.1%	0.6%
Europe	2.4%	2.4%	30.0%	22.1%	0.0%	-0.3%	0.1%	0.0%	-0.2%
Asia/Pacific	7.8%	8.1%	19.2%	19.9%	0.1%	0.0%	-0.1%	0.0%	-0.1%
Other	--	14.1%	0.0%	1.2%	--	0.0%	-0.1%	--	-0.1%
Cash	0.3%	--	1.2%	0.0%	0.0%	-0.1%	0.0%	0.0%	-0.1%
<b>Total</b>	<b>6.0%</b>	<b>5.9%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.8%</b>	<b>-0.5%</b>	<b>-0.1%</b>	<b>-0.1%</b>	<b>0.1%</b>
<b>Totals</b>									
Developed	6.0%	5.7%	95.6%	88.5%	0.3%	0.0%	0.1%	0.0%	0.3%
Emerging*	7.4%	7.3%	3.1%	11.5%	0.0%	0.0%	-0.1%	0.0%	-0.1%
Frontier**	2.8%	--	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cash	0.3%	--	1.2%	0.0%	0.0%	-0.1%	0.0%	0.0%	-0.1%



# BOSTON PARTNERS

- **Role in Portfolio**

- All Cap Value Global Equity mandate (added July 2017).
- Global Equity is comprised of publicly traded stocks across the U.S., developed-international countries, and emerging market countries.
- Invested to outperform the MSCI ACWI Index.

- **Organizational Profile**

- Boston Partners Asset Management, LLC (BPAM) was founded in 1995 by a group of senior professionals who left their predecessor firm.
- In 2002, the firm was acquired by Robeco Investment Management (Robeco), and managed assets under the Robeco name as Robeco Boston Partners.
- In 2013, Robeco Group's parent, Rabobank Group, sold 90.01% of Robeco Group to ORIX Corporation, a Japanese financial services company, and in 2015, was rebranded back to Boston Partners.
- Boston Partners is headquartered in New York, New York.

- **Investment Strategy Commentary**

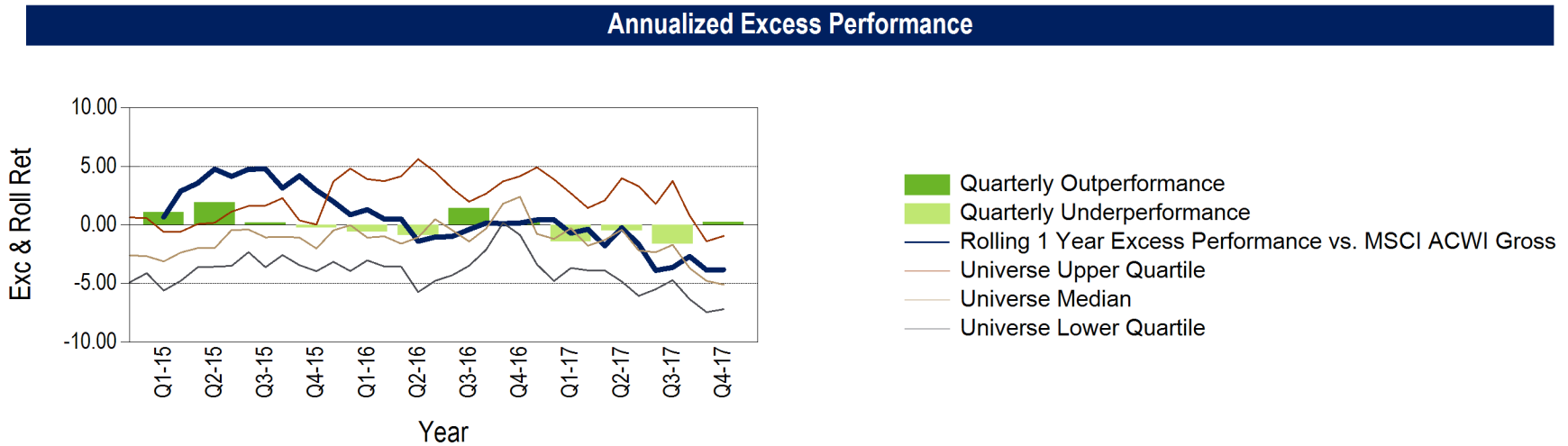
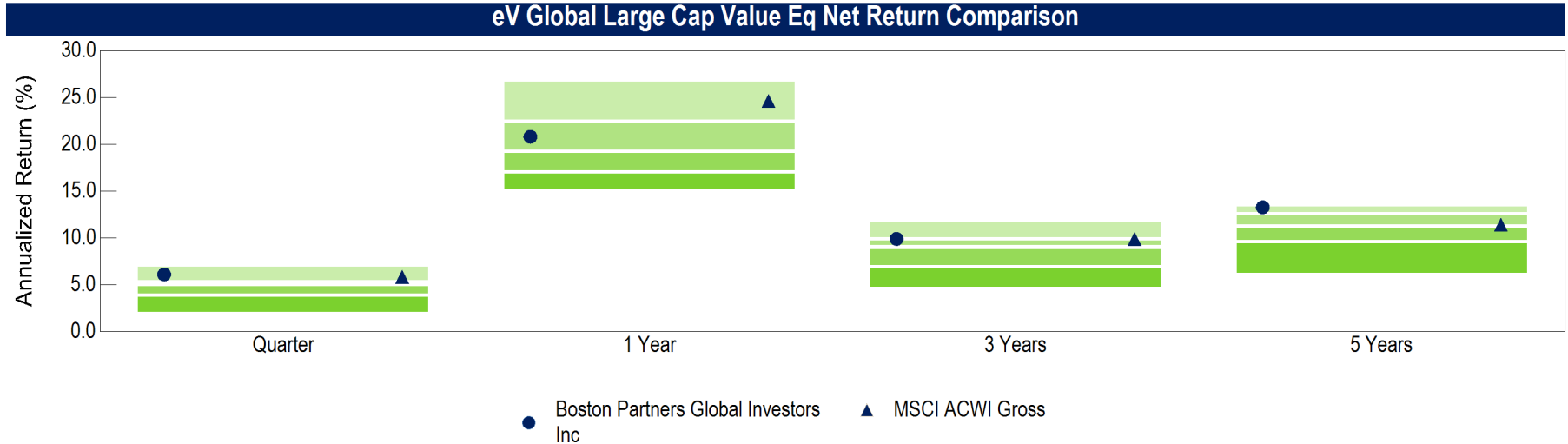
- Boston Partners employs a fundamental, bottom-up approach to equity investing. The process is driven by internal fundamental research streamlined by quantitative screening. The investment goal is to seek opportunities that exhibit attractive valuations, strong fundamentals, and improving business momentum. Holdings and ideas are discussed and viewed against these criteria.
- The strategy should perform well in fundamental markets and offer relative downside protection due to its quality bias.

- **Due Diligence Notes**

- April, 2013: Sale of Robeco Group to ORIX Corp. NEPC recommended 'No Action' with this announcement.

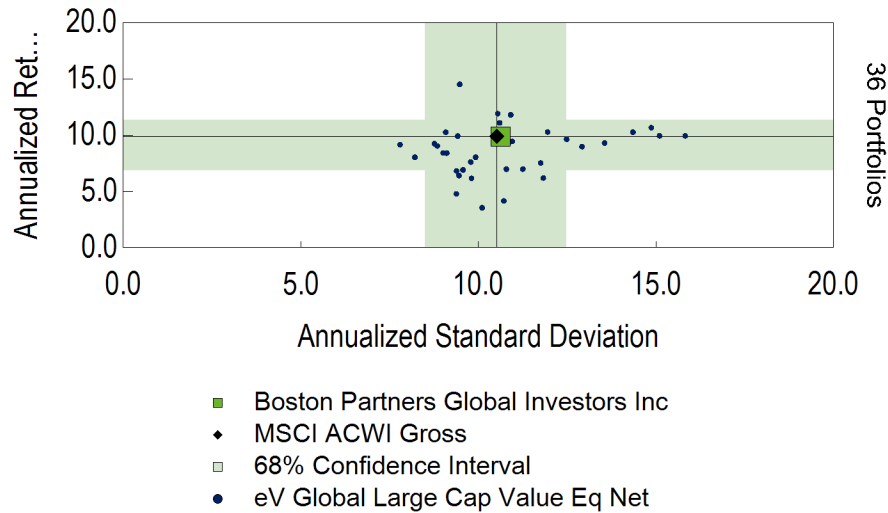


# BOSTON PARTNERS

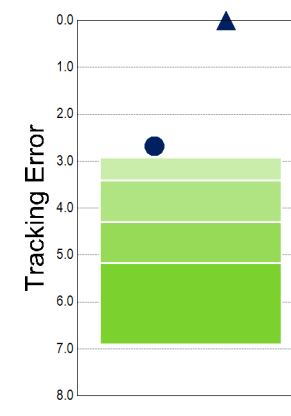
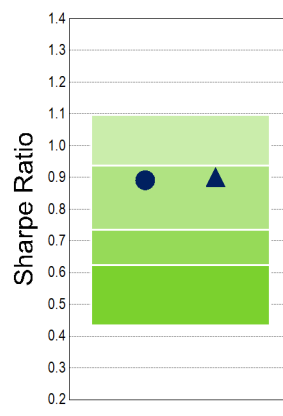
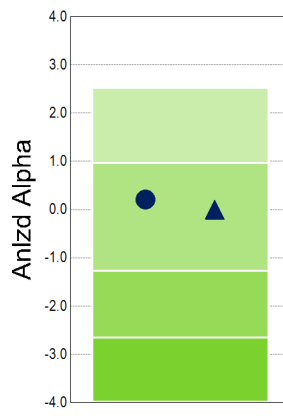
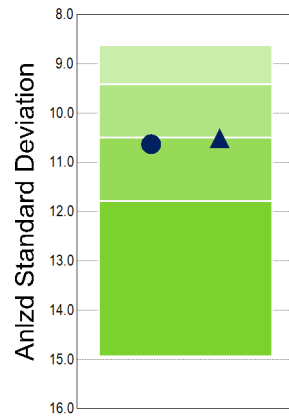
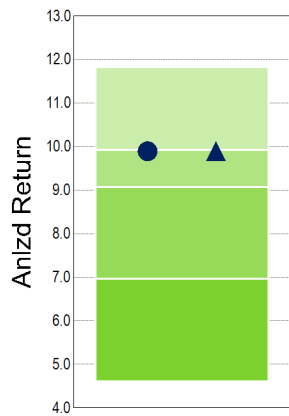
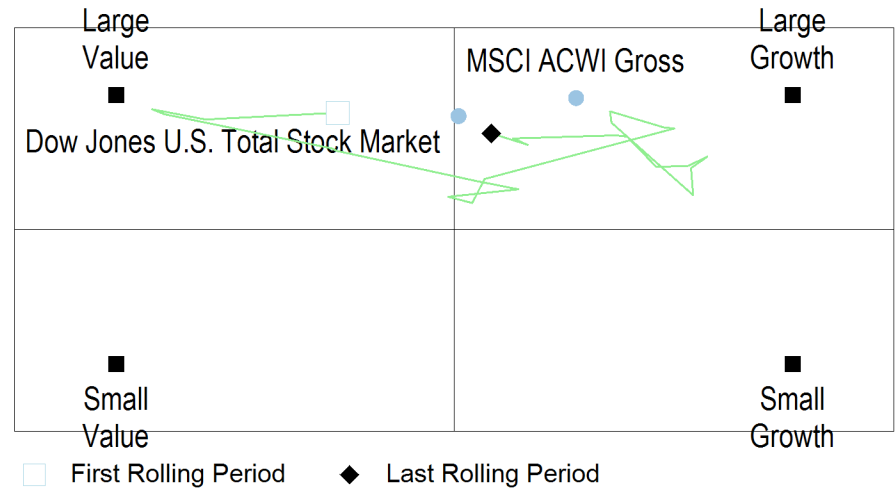


# BOSTON PARTNERS

## 3 Year Risk Return



## 3 Year Style Map



- Boston Partners Global Investors...
- ▲ MSCI ACWI Gross
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Perce...
- 75th to 95th Percentile



# BOSTON PARTNERS - QUARTERLY ANALYSIS

Characteristics		
	Portfolio	MSCI ACWI
Number of Holdings	112	2,499
Weighted Avg. Market Cap. (\$B)	91.3	121.5
Median Market Cap. (\$B)	27.4	10.6
Price To Earnings	22.9	22.8
Price To Book	3.2	3.8
Price To Sales	2.5	3.0
Return on Equity (%)	16.2	16.7
Yield (%)	1.8	2.2
Beta		1.0
R-Squared		1.0

Equity Sector Attribution											
	Attribution Effects				Returns		Sector Weights				
	Total Effects	Selection Effect	Allocation Effect	Interaction Effects	Portfolio	Benchmark	Portfolio	Benchmark			
Energy	0.2%	0.2%	0.0%	0.0%	9.7%	7.1%	6.5%	6.4%			
Materials	-0.2%	-0.2%	0.1%	-0.1%	4.2%	7.9%	8.8%	5.3%			
Industrials	-0.1%	-0.1%	0.0%	0.0%	4.3%	5.2%	13.0%	10.8%			
Consumer Discretionary	0.0%	0.2%	-0.1%	-0.1%	9.2%	7.8%	6.6%	11.9%			
Consumer Staples	0.2%	0.3%	0.0%	-0.1%	9.0%	5.9%	7.4%	8.8%			
Health Care	0.1%	0.1%	0.0%	0.0%	2.2%	1.4%	11.0%	11.1%			
Financials	0.0%	0.0%	0.0%	0.0%	6.1%	6.2%	19.7%	18.8%			
Information Technology	0.2%	0.2%	0.0%	0.1%	9.4%	8.2%	18.8%	17.6%			
Telecommunication Services	0.2%	0.1%	0.0%	0.0%	7.5%	2.2%	2.6%	3.1%			
Utilities	0.1%	-0.1%	0.1%	0.1%	-3.5%	-0.2%	0.8%	3.1%			
Real Estate	0.0%	--	0.0%	--	--	4.8%	0.0%	3.1%			
Cash	-0.3%	0.0%	-0.3%	0.0%	0.3%	--	4.9%	0.0%			
<b>Portfolio</b>	<b>0.4%</b>	<b>=</b>	<b>0.6%</b>	<b>+</b>	<b>-0.1%</b>	<b>+</b>	<b>-0.2%</b>	<b>6.2%</b>	<b>5.9%</b>	<b>100.0%</b>	<b>100.0%</b>



# BOSTON PARTNERS- QUARTERLY ANALYSIS

Top Positive Contributors		
	Relative Contribution %	Return %
FUJI ELECTRIC	0.3%	36.0%
ANTHEM	0.3%	18.9%
DIAMONDBACK ENERGY	0.2%	28.9%
MICROSOFT	0.2%	15.4%
TOKUYAMA	0.2%	37.7%
MATSUMOTOKIYOSHI HDG.	0.2%	23.1%
STEEL DYNAMICS	0.2%	25.6%
BERKSHIRE HATHAWAY 'B'	0.2%	8.1%
NETEASE ADR 1:25	0.2%	31.1%
FLEX	0.1%	8.6%

Top Negative Contributors		
	Relative Contribution %	Return %
GENERAL ELECTRIC	-0.2%	-27.3%
MERCK & COMPANY	-0.2%	-11.4%
APPLE	-0.1%	10.2%
EQT	-0.1%	-12.7%
CONVATEC GROUP	-0.1%	-24.4%
CEMEX SPN.ADR 1:10	-0.1%	-17.4%
RPC GROUP	-0.1%	-9.5%
CVS HEALTH	-0.1%	-10.3%
CRH	-0.1%	-5.6%
LAFARGEHOLCIM	0.0%	-3.6%



# BOSTON PARTNERS- QUARTERLY ANALYSIS

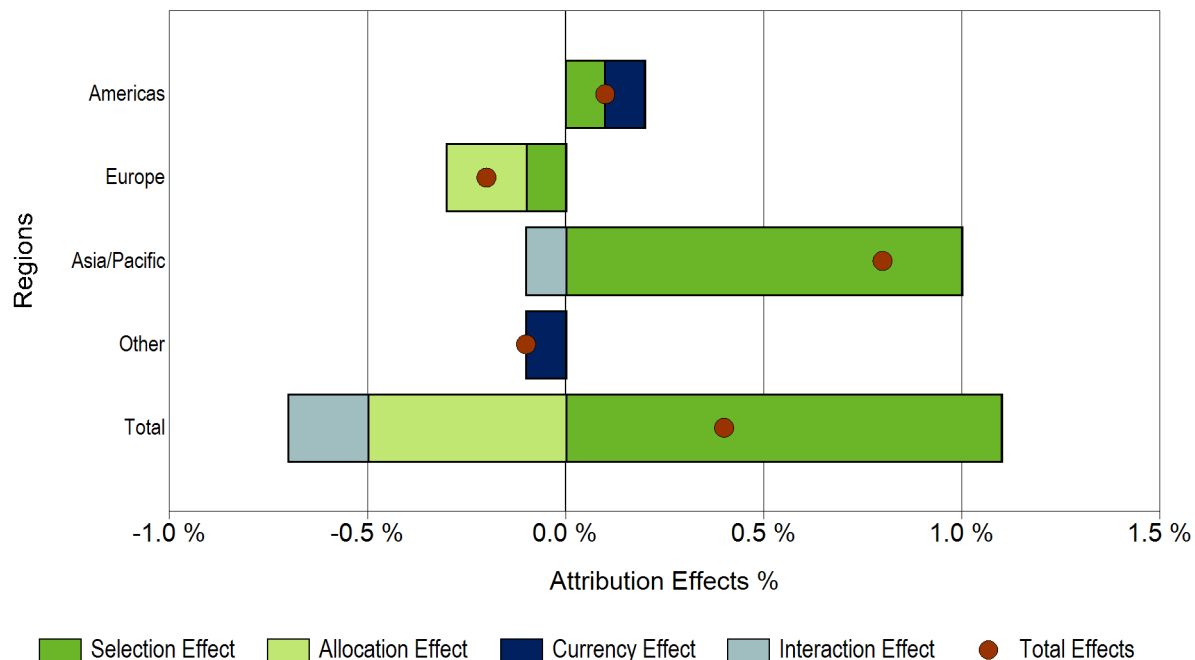
Country Allocation				
	Manager	Index	Manager	Index
	Allocation (USD)	Allocation (USD)	Return (USD)	Return (USD)
<b>Americas</b>				
Argentina**	0.6%	0.0%	2.8%	7.3%
Mexico*	0.6%	0.4%	-17.4%	-7.9%
United States	50.6%	52.1%	6.9%	6.6%
<b>Total-Americas</b>	<b>51.9%</b>	<b>56.8%</b>	<b>6.6%</b>	<b>6.3%</b>
<b>Europe</b>				
Denmark	0.9%	0.6%	12.8%	2.3%
France	4.3%	3.6%	1.8%	1.6%
Germany	4.7%	3.2%	2.0%	2.5%
Italy	0.3%	0.8%	-7.7%	-2.2%
Luxembourg	0.5%	0.0%	2.1%	5.9%
Netherlands	1.7%	1.2%	2.8%	1.2%
Norway	0.4%	0.2%	2.8%	2.3%
Switzerland	3.0%	2.7%	-0.4%	1.8%
United Kingdom	10.3%	5.9%	2.1%	5.8%
<b>Total-Europe</b>	<b>26.1%</b>	<b>22.1%</b>	<b>2.0%</b>	<b>2.4%</b>

Country Allocation				
	Manager	Index	Manager	Index
	Allocation (USD)	Allocation (USD)	Return (USD)	Return (USD)
<b>AsiaPacific</b>				
Australia	0.3%	2.3%	14.3%	6.7%
China*	0.6%	3.4%	31.1%	7.7%
Hong Kong	1.7%	1.2%	6.2%	7.7%
India*	0.4%	1.0%	13.7%	11.8%
Indonesia*	0.5%	0.3%	18.3%	8.0%
Japan	11.0%	7.7%	14.2%	8.5%
Korea*	2.6%	1.7%	8.8%	10.2%
<b>Total-AsiaPacific</b>	<b>17.2%</b>	<b>19.9%</b>	<b>13.2%</b>	<b>8.1%</b>
<b>Totals</b>				
Developed	89.8%	88.5%	6.4%	5.7%
Emerging*	4.8%	11.5%	9.3%	7.3%
Frontier**	0.6%	0.0%	2.8%	--
Cash	4.9%		0.3%	



# BOSTON PARTNERS- QUARTERLY ANALYSIS

**Boston Partners Global Investors Inc Performance Attribution vs. MSCI ACWI**



	Returns and Weights				Attribution Effects				
	Manager Return	Index Return	Manager Weight	Index Weight	Selection Effect	Allocation Effect	Currency Effect	Interaction Effect	Total Effects
<b>Totals</b>									
Americas	6.6%	6.3%	51.9%	56.8%	0.1%	0.0%	0.1%	0.0%	0.1%
Europe	2.0%	2.4%	26.1%	22.1%	-0.1%	-0.2%	0.0%	0.0%	-0.2%
Asia/Pacific	13.2%	8.1%	17.2%	19.9%	1.0%	0.0%	0.0%	-0.1%	0.8%
Other	--	14.1%	0.0%	1.2%	--	0.0%	-0.1%	--	-0.1%
Cash	0.3%	--	4.9%	0.0%	0.0%	-0.3%	0.0%	0.0%	-0.3%
<b>Total</b>	<b>6.2%</b>	<b>5.9%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>1.1%</b>	<b>-0.5%</b>	<b>0.0%</b>	<b>-0.2%</b>	<b>0.4%</b>
<b>Totals</b>									
Developed	6.4%	5.7%	89.8%	88.5%	0.6%	0.0%	0.0%	0.0%	0.7%
Emerging*	9.3%	7.3%	4.8%	11.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Frontier**	2.8%	--	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cash	0.3%	--	4.9%	0.0%	0.0%	-0.3%	0.0%	0.0%	-0.3%





# MANULIFE

- **Role in Portfolio**

- All Cap Value Global Equity mandate (added July 2017).
- Global Equity is comprised of publicly traded stocks across the U.S., developed-international countries, and emerging market countries.
- Invested to outperform the MSCI ACWI Index.

- **Organizational Profile**

- Manulife Asset Management is the global asset management arm of Manulife Financial Corporation. Manulife Asset Management and its affiliates provide asset management solutions for institutional investors and investment funds in key markets around the world across a broad range of asset classes.
- Manulife Asset Management has offices in 17 countries, with more than 300 investment professionals.
- Manulife is headquartered in Toronto, Ontario.

- **Investment Strategy Commentary**

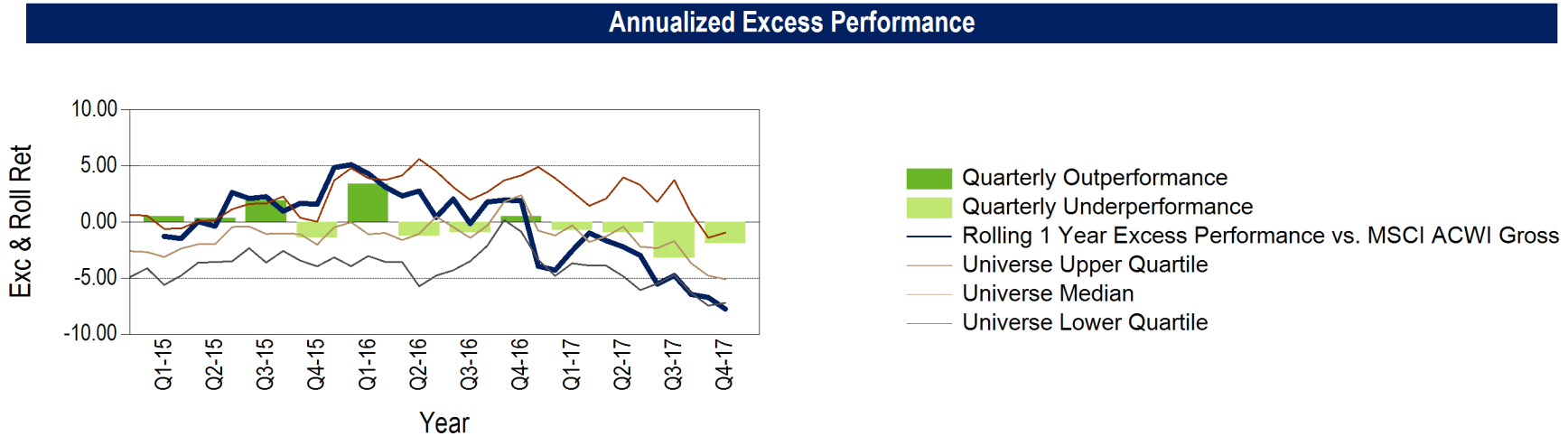
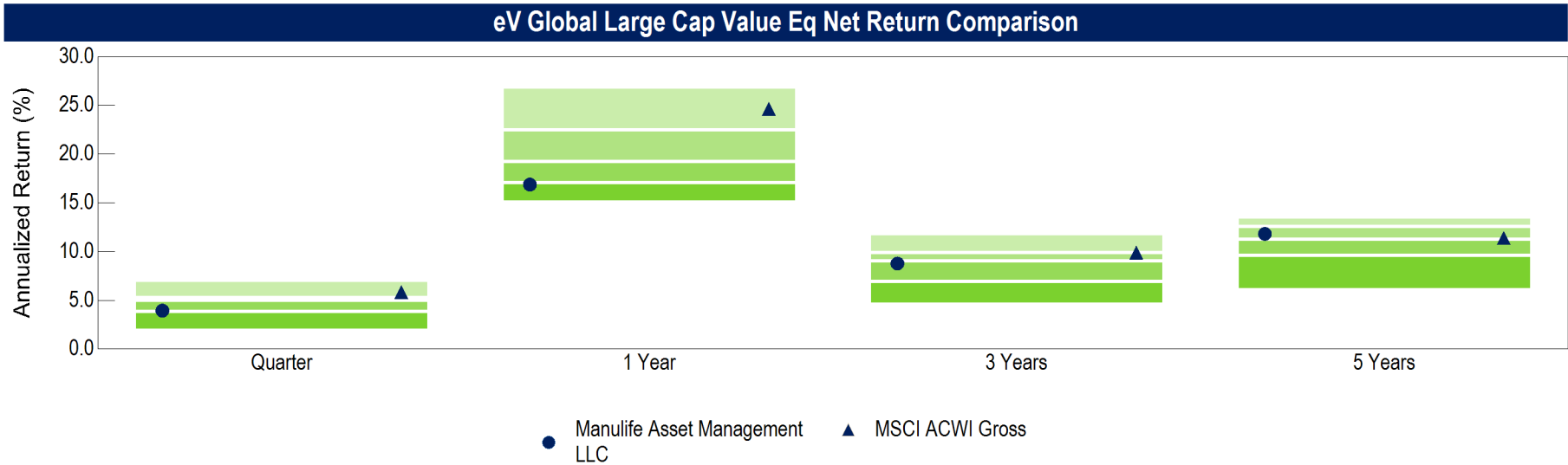
- The investment team believes that long-term outperformance can be achieved by purchasing quality companies with attractive valuations and sustainable cash flows and taking advantage of the market's focus on short-term factors. The process is unconstrained, bottom up stock selection based.
- Approximately 80% of research for the strategy is performed internally by the investment team. The remaining 20% of the research for the strategy is sourced externally. The investment team uses external sources to help validate or complement its research.
- The performance of the strategy will be highly linked to the success of free cash flow yield in the market place. The strategy should also help protect capital on the downside and will typically trail in momentum or rapidly rising markets.

- **Due Diligence Notes**

- None.

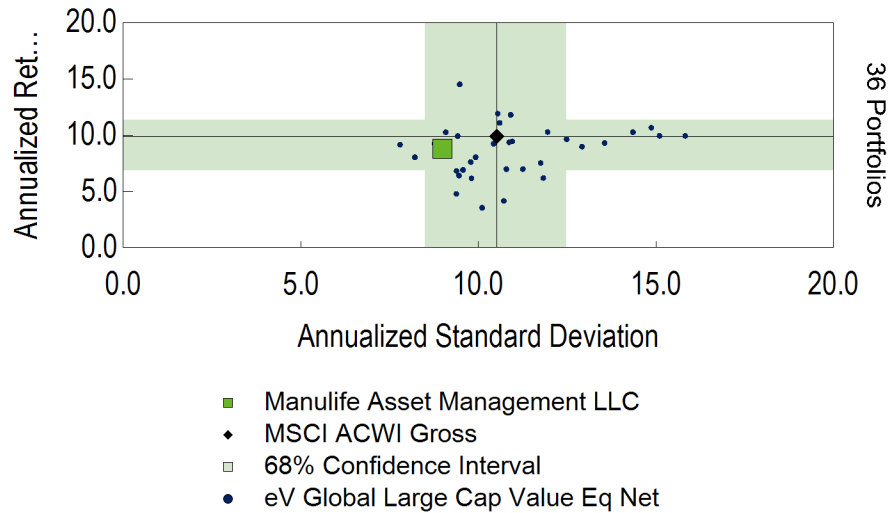


# MANULIFE

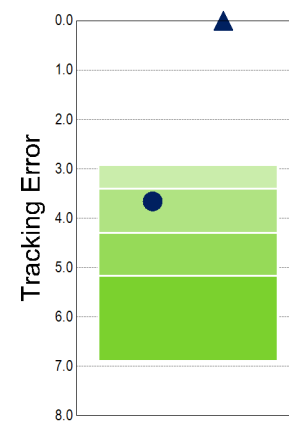
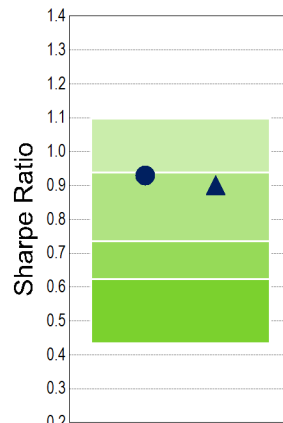
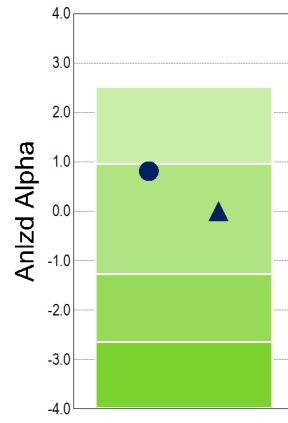
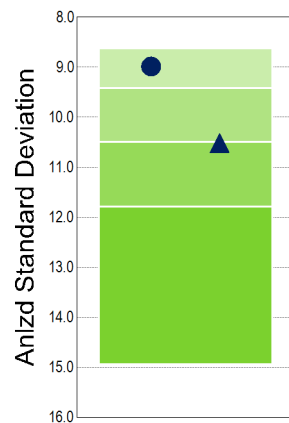
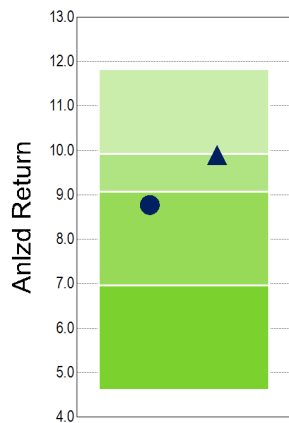
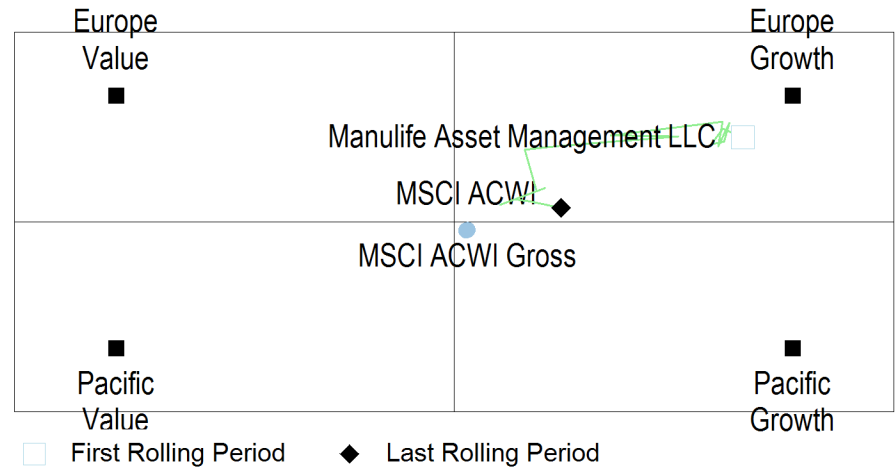


# MANULIFE

## 3 Year Risk Return



## 3 Year Style Map



- Manulife Asset Management...
- ▲ MSCI ACWI Gross
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Perce...
- 75th to 95th Percentile



# MANULIFE - QUARTERLY ANALYSIS

Characteristics		
	Portfolio	MSCI ACWI
Number of Holdings	49	2,499
Weighted Avg. Market Cap. (\$B)	156.2	121.5
Median Market Cap. (\$B)	64.2	10.6
Price To Earnings	21.0	22.8
Price To Book	4.2	3.8
Price To Sales	2.8	3.0
Return on Equity (%)	21.1	16.7
Yield (%)	2.6	2.2
Beta		1.0
R-Squared		1.0

Equity Sector Attribution											
	Total Effects	Attribution Effects				Returns		Sector Weights			
		Selection Effect	Allocation Effect	Interaction Effects	Portfolio	Benchmark	Portfolio	Benchmark			
Energy	-0.2%	-0.3%	0.0%	0.1%	3.7%	7.1%	5.1%	6.4%			
Materials	-0.3%	-0.3%	0.0%	0.0%	1.0%	7.9%	4.4%	5.3%			
Industrials	0.1%	0.1%	0.0%	0.0%	6.4%	5.2%	11.6%	10.8%			
Consumer Discretionary	-0.7%	-0.9%	-0.1%	0.3%	-0.5%	7.8%	6.9%	11.9%			
Consumer Staples	-0.1%	-0.1%	0.0%	0.0%	5.1%	5.9%	16.2%	8.8%			
Health Care	-0.6%	-0.5%	-0.1%	-0.1%	-2.7%	1.4%	12.5%	11.1%			
Financials	0.3%	0.2%	0.0%	0.0%	7.2%	6.2%	22.3%	18.8%			
Information Technology	-0.1%	0.0%	-0.1%	0.0%	8.7%	8.2%	12.3%	17.6%			
Telecommunication Services	-0.1%	0.0%	-0.1%	0.0%	1.8%	2.2%	6.2%	3.1%			
Utilities	0.2%	--	0.2%	--	--	-0.2%	0.0%	3.1%			
Real Estate	-0.1%	-0.1%	0.0%	0.0%	0.1%	4.8%	1.9%	3.1%			
Cash	0.0%	0.0%	0.0%	0.0%	0.3%	--	0.6%	0.0%			
<b>Portfolio</b>	<b>-1.6%</b>	<b>=</b>	<b>-1.8%</b>	<b>+</b>	<b>-0.2%</b>	<b>+</b>	<b>0.4%</b>	<b>4.2%</b>	<b>5.9%</b>	<b>100.0%</b>	<b>100.0%</b>



# MANULIFE - QUARTERLY ANALYSIS

Top Positive Contributors		
	Relative Contribution %	Return %
WELLS FARGO & CO	0.5%	10.8%
WOLTERS KLUWER	0.3%	13.0%
AFFILIATED MANAGERS	0.3%	8.2%
JP MORGAN CHASE & CO.	0.3%	12.6%
UNITED TECHNOLOGIES	0.2%	10.6%
BRITISH AMERICAN TOBACCO	0.2%	9.2%
EXPERIAN	0.2%	10.0%
HONDA MOTOR	0.2%	16.5%
CISCO SYSTEMS	0.2%	14.9%
KONINKLIJKE AHOLD DELHAIZE	0.2%	17.7%

Top Negative Contributors		
	Relative Contribution %	Return %
PHILIPS ELTN.KONINKLIJKE	-0.2%	-8.3%
SANOFI	-0.2%	-13.1%
WHIRLPOOL	-0.2%	-7.9%
SES FDR (PAR)	-0.1%	-28.6%
JOHNSON CONTROLS INTL.	-0.1%	-4.8%
KDDI	-0.1%	-5.5%
AON CLASS A	-0.1%	-8.1%
ORACLE	0.0%	-1.8%
ROCHE HOLDING	0.0%	-1.0%
NOVARTIS 'R'	0.0%	-1.3%



# MANULIFE - QUARTERLY ANALYSIS

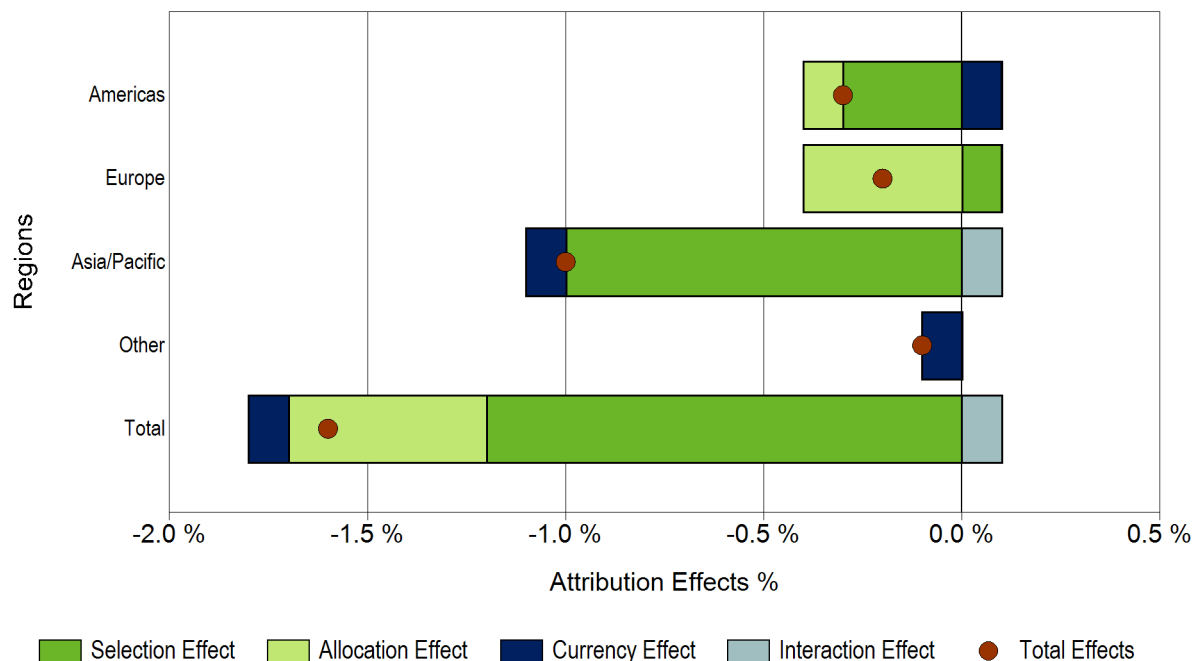
Country Allocation				
	Manager	Index	Manager	Index
	Allocation (USD)	Allocation (USD)	Return (USD)	Return (USD)
<b>Americas</b>				
United States	49.7%	52.1%	5.8%	6.6%
<b>Total-Americas</b>	<b>49.7%</b>	<b>56.8%</b>	<b>5.8%</b>	<b>6.3%</b>
<b>Europe</b>				
France	4.2%	3.6%	-2.2%	1.6%
Germany	2.0%	3.2%	6.9%	2.5%
Luxembourg	0.5%	0.0%	-28.6%	5.9%
Netherlands	10.0%	1.2%	4.0%	1.2%
Switzerland	9.6%	2.7%	0.4%	1.8%
United Kingdom	4.8%	5.9%	9.6%	5.8%
<b>Total-Europe</b>	<b>31.1%</b>	<b>22.1%</b>	<b>2.6%</b>	<b>2.4%</b>

Country Allocation				
	Manager	Index	Manager	Index
	Allocation (USD)	Allocation (USD)	Return (USD)	Return (USD)
<b>AsiaPacific</b>				
Australia	3.3%	2.3%	1.1%	6.7%
Hong Kong	3.9%	1.2%	1.0%	7.7%
Japan	8.8%	7.7%	3.1%	8.5%
Korea*	1.6%	1.7%	8.4%	10.2%
Taiwan*	1.0%	1.3%	5.6%	4.2%
<b>Total-AsiaPacific</b>	<b>18.6%</b>	<b>19.9%</b>	<b>2.9%</b>	<b>8.1%</b>
<b>Totals</b>				
Developed	96.7%	88.5%	4.2%	5.7%
Emerging*	2.6%	11.5%	7.3%	7.3%
Cash	0.6%		0.3%	



# MANULIFE - QUARTERLY ANALYSIS

Manulife Asset Management LLC Performance Attribution vs. MSCI ACWI



	Returns and Weights				Attribution Effects				Total Effects
	Manager Return	Index Return	Manager Weight	Index Weight	Selection Effect	Allocation Effect	Currency Effect	Interaction Effect	
<b>Totals</b>									
Americas	5.8%	6.3%	49.7%	56.8%	-0.3%	-0.1%	0.1%	0.0%	-0.3%
Europe	2.6%	2.4%	31.1%	22.1%	0.1%	-0.4%	0.0%	0.0%	-0.2%
Asia/Pacific	2.9%	8.1%	18.6%	19.9%	-1.0%	0.0%	-0.1%	0.1%	-1.0%
Other	--	14.1%	0.0%	1.2%	--	0.0%	-0.1%	--	-0.1%
Cash	0.3%	--	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
<b>Total</b>	<b>4.2%</b>	<b>5.9%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>-1.2%</b>	<b>-0.5%</b>	<b>-0.1%</b>	<b>0.1%</b>	<b>-1.6%</b>
<b>Totals</b>									
Developed	4.2%	5.7%	96.7%	88.5%	-1.3%	0.0%	0.0%	-0.1%	-1.4%
Emerging*	7.3%	7.3%	2.6%	11.5%	-0.3%	0.0%	-0.1%	0.2%	-0.2%
Cash	0.3%	--	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%



# OFI

- **Role in Portfolio**

- All Cap Growth Global Equity mandate (added October 2007).
- Global Equity is comprised of publicly traded stocks across the U.S., developed-international countries, and emerging market countries.
- Invested to outperform the MSCI ACWI Index.

- **Organizational Profile**

- OFI is a wholly owned subsidiary of Oppenheimer Funds, Inc. with primary office locations in Boston, New York, Denver, and Bellefonte, PA.
- OppenheimerFunds is owned by Oppenheimer Acquisition Corporation, a holding company that is controlled by Massachusetts Mutual Life Insurance Company, a provider of life insurance, money management and asset accumulation services for individuals and institutions.
- OFI is headquartered in New York, New York.

- **Investment Strategy Commentary**

- OFI utilizes a bottom-up, fundamental, theme oriented investment approach, and seeks to invest in high-quality companies that are temporarily out of favor; trading at attractive valuations; and demonstrate sustainable, above-average growth potential over a three- to five-year time horizon.
- The strategy is benchmark agnostic, searching for companies with high growth rates and high quality balance sheets, with minimal focus on the benchmark.

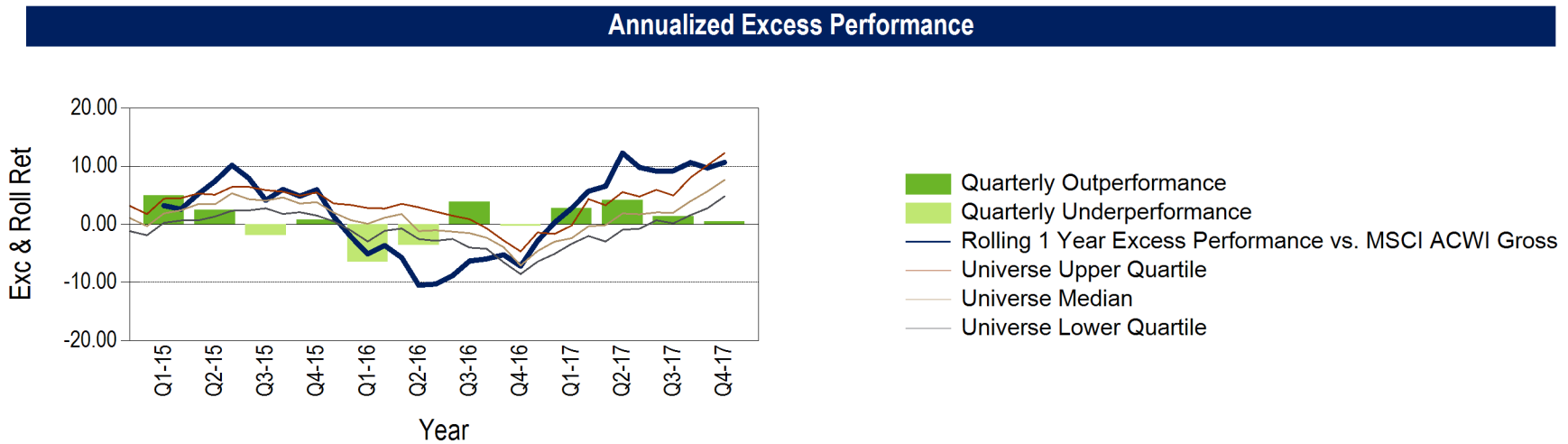
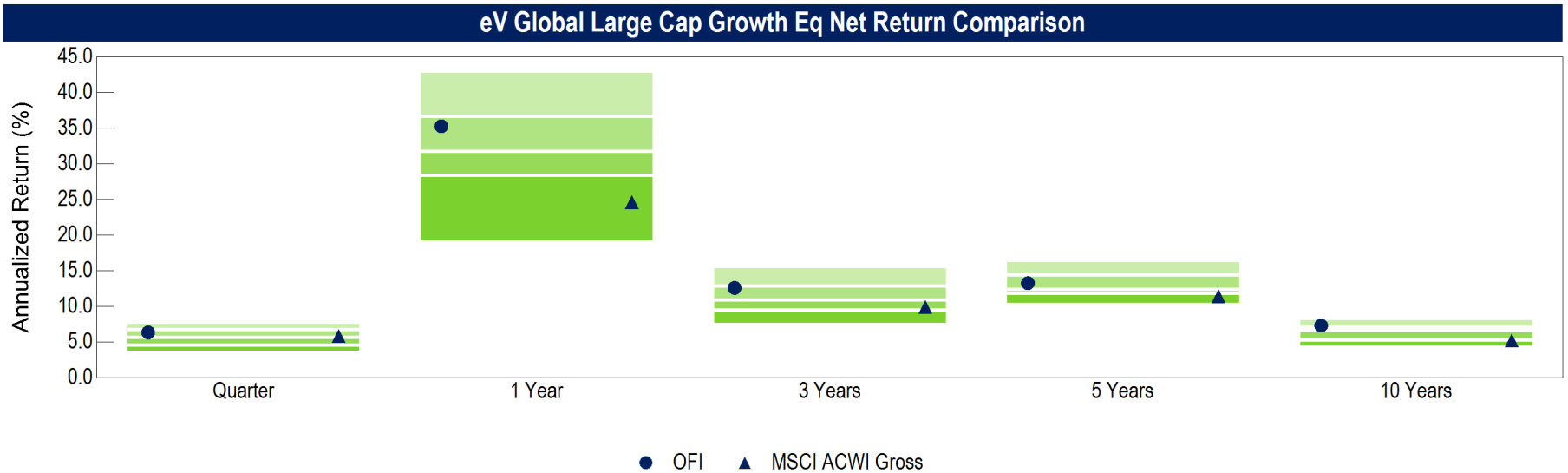
- **Due Diligence Notes**

- None.

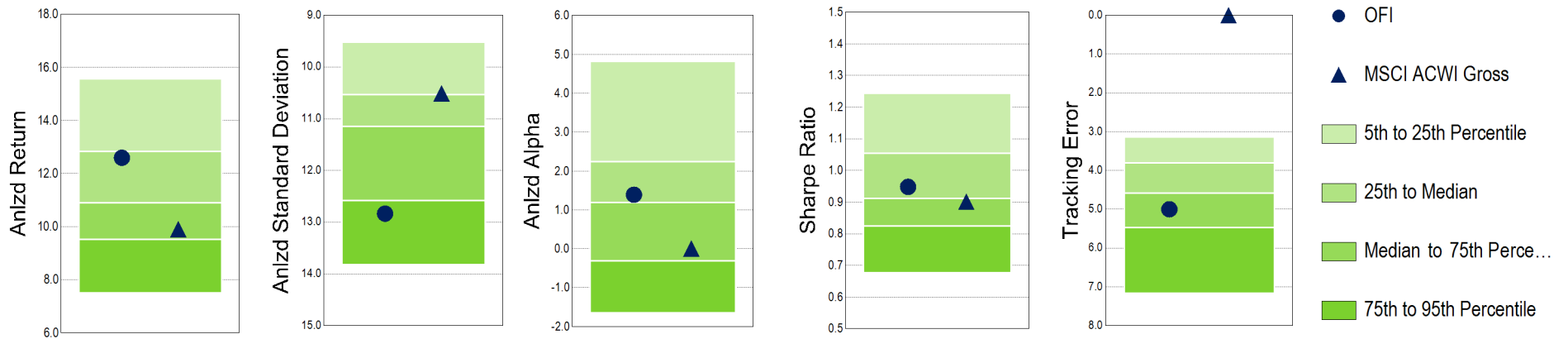
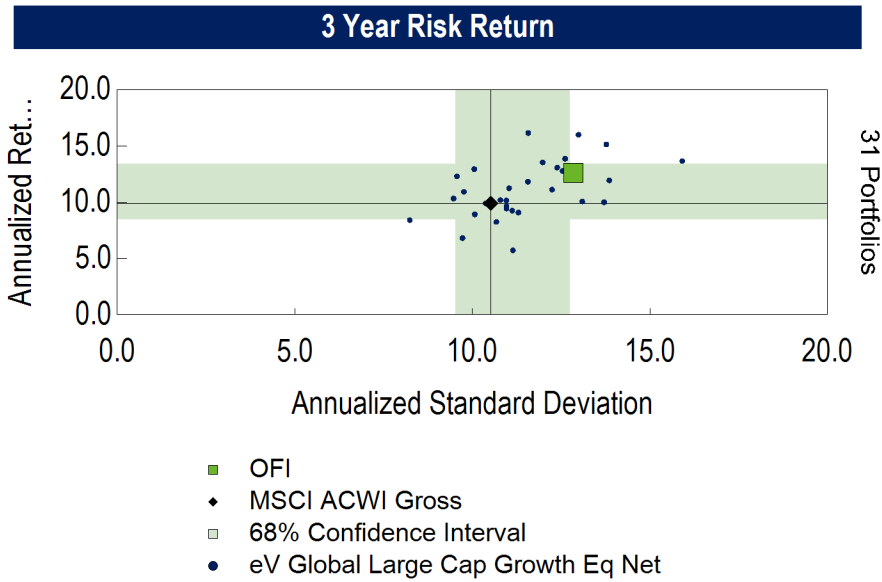




# OFI



# OFI



# OFI - QUARTERLY ANALYSIS

Characteristics		
	Portfolio	MSCI World
Number of Holdings	87	1,653
Weighted Avg. Market Cap. (\$B)	88.8	125.7
Median Market Cap. (\$B)	40.3	13.3
Price To Earnings	24.3	23.0
Price To Book	5.4	3.9
Price To Sales	3.8	3.0
Return on Equity (%)	15.7	16.5
Yield (%)	1.5	2.3
Beta		1.0
R-Squared		1.0

Equity Sector Attribution											
	Total Effects	Attribution Effects				Returns		Sector Weights			
		Selection Effect	Allocation Effect	Interaction Effects	Portfolio	Benchmark	Portfolio	Benchmark			
Energy	-0.1%	--	-0.1%	--	--	7.1%	0.0%	6.4%			
Materials	-0.1%	-0.3%	-0.1%	0.2%	4.2%	7.9%	1.0%	5.3%			
Industrials	0.1%	0.0%	0.0%	0.1%	5.7%	5.2%	13.9%	10.8%			
Consumer Discretionary	0.0%	-0.1%	0.1%	0.0%	7.0%	7.8%	16.4%	11.9%			
Consumer Staples	-0.3%	-0.5%	0.0%	0.2%	0.7%	5.9%	4.5%	8.8%			
Health Care	1.1%	0.9%	-0.2%	0.4%	9.8%	1.4%	15.7%	11.1%			
Financials	0.0%	0.0%	0.0%	0.0%	5.9%	6.2%	19.2%	18.8%			
Information Technology	-0.1%	-0.2%	0.2%	-0.2%	6.8%	8.2%	28.0%	17.6%			
Telecommunication Services	0.0%	-0.2%	0.1%	0.1%	-5.5%	2.2%	1.3%	3.1%			
Utilities	0.2%	--	0.2%	--	--	-0.2%	0.0%	3.1%			
Real Estate	0.0%	--	0.0%	--	--	4.8%	0.0%	3.1%			
Cash	0.0%	--	--	--	--	--	0.0%	0.0%			
<b>Portfolio</b>	<b>0.7%</b>	<b>=</b>	<b>-0.3%</b>	<b>+</b>	<b>0.2%</b>	<b>+</b>	<b>0.8%</b>	<b>6.5%</b>	<b>5.9%</b>	<b>100.0%</b>	<b>100.0%</b>



# OFI - QUARTERLY ANALYSIS

Top Positive Contributors		
	Relative Contribution %	Return %
SAGE THERAPEUTICS	0.8%	164.4%
KERING	0.4%	18.4%
ANTHEM	0.3%	18.9%
ADOBE SYSTEMS	0.3%	17.5%
AETNA	0.3%	13.8%
NIDEC	0.3%	14.3%
INTUIT	0.2%	11.3%
LVMH	0.2%	7.5%
BLUEBIRD BIO	0.2%	29.7%
S&P GLOBAL	0.2%	8.6%

Top Negative Contributors		
	Relative Contribution %	Return %
MURATA MANUFACTURING	-0.2%	-8.7%
ACADIA PHARMACEUTICALS	-0.2%	-20.1%
SOCIETE GENERALE	-0.2%	-11.7%
INDITEX	-0.1%	-6.7%
BAYER	-0.1%	-8.6%
ASSA ABLOY 'B'	-0.1%	-8.7%
EARTHPORT	-0.1%	-57.9%
GILEAD SCIENCES	-0.1%	-11.0%
KDDI	-0.1%	-5.5%
FLSMIDTH & CO.'B'	-0.1%	-11.9%



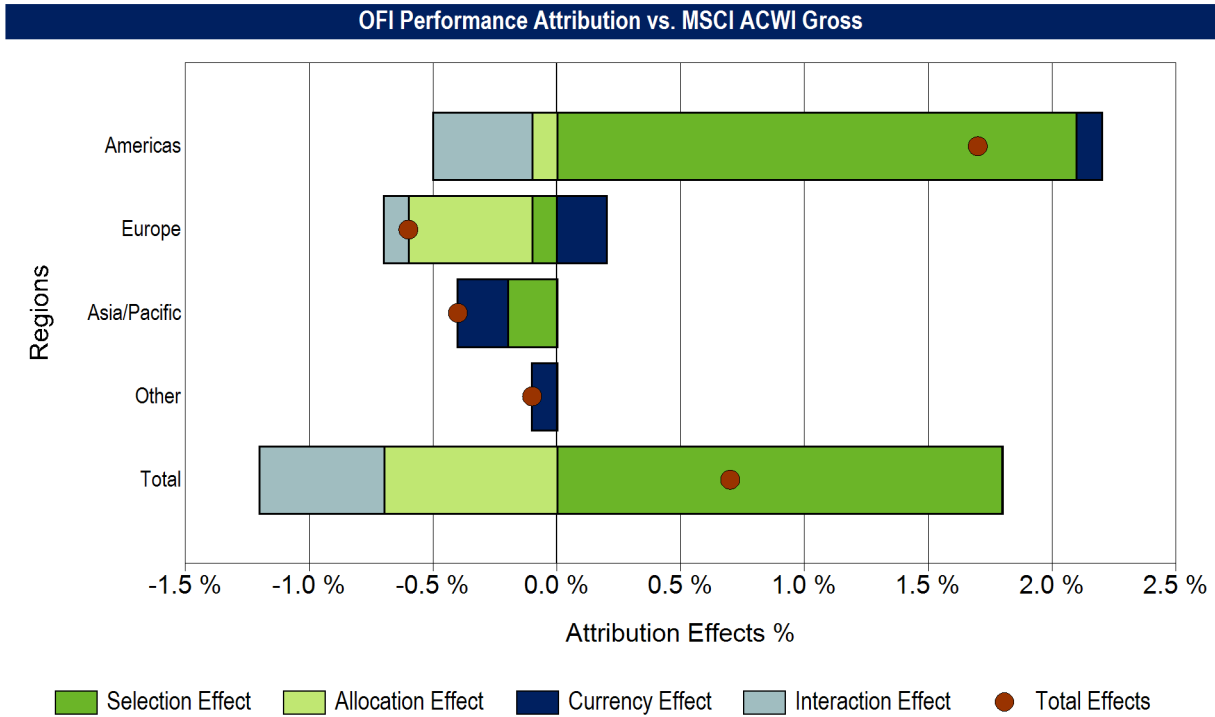
# OFI - QUARTERLY ANALYSIS

Country Allocation				
	Manager	Index	Manager	Index
	Allocation (USD)	Allocation (USD)	Return (USD)	Return (USD)
<b>Americas</b>				
United States	46.6%	52.1%	10.1%	6.6%
<b>Total-Americas</b>	<b>46.6%</b>	<b>56.8%</b>	<b>10.1%</b>	<b>6.3%</b>
<b>Europe</b>				
Denmark	0.6%	0.6%	-11.9%	2.3%
France	10.1%	3.6%	6.2%	1.6%
Germany	10.2%	3.2%	0.5%	2.5%
Italy	0.7%	0.8%	-2.0%	-2.2%
Spain	3.7%	1.1%	-1.4%	-1.5%
Sweden	1.5%	1.0%	-8.7%	-3.7%
Switzerland	3.0%	2.7%	7.3%	1.8%
United Kingdom	4.9%	5.9%	0.5%	5.8%
<b>Total-Europe</b>	<b>34.7%</b>	<b>22.1%</b>	<b>1.9%</b>	<b>2.4%</b>

Country Allocation				
	Manager	Index	Manager	Index
	Allocation (USD)	Allocation (USD)	Return (USD)	Return (USD)
<b>AsiaPacific</b>				
China*	2.4%	3.4%	4.2%	7.7%
India*	0.8%	1.0%	13.7%	11.8%
Japan	15.4%	7.7%	6.1%	8.5%
<b>Total-AsiaPacific</b>	<b>18.7%</b>	<b>19.9%</b>	<b>6.2%</b>	<b>8.1%</b>
<b>Totals</b>				
Developed	96.8%	88.5%	6.5%	5.7%
Emerging*	3.2%	11.5%	6.7%	7.3%



# OFI - QUARTERLY ANALYSIS



	Returns and Weights				Attribution Effects				
	Manager Return	Index Return	Manager Weight	Index Weight	Selection Effect	Allocation Effect	Currency Effect	Interaction Effect	Total Effects
<b>Totals</b>									
Americas	10.1%	6.3%	46.6%	56.8%	2.1%	-0.1%	0.1%	-0.4%	1.7%
Europe	1.9%	2.4%	34.7%	22.1%	-0.1%	-0.5%	0.2%	-0.1%	-0.6%
Asia/Pacific	6.2%	8.1%	18.7%	19.9%	-0.2%	0.0%	-0.2%	0.0%	-0.4%
Other	--	14.1%	0.0%	1.2%	--	0.0%	-0.1%	--	-0.1%
<b>Total</b>	<b>6.5%</b>	<b>5.9%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>1.8%</b>	<b>-0.7%</b>	<b>0.0%</b>	<b>-0.5%</b>	<b>0.7%</b>
<b>Totals</b>									
Developed	6.5%	5.7%	96.8%	88.5%	0.6%	0.0%	0.2%	0.1%	0.8%
Emerging*	6.7%	7.3%	3.2%	11.5%	0.1%	0.0%	-0.2%	-0.1%	-0.2%



# WALTER SCOTT

- **Role in Portfolio**

- All Cap Global Equity mandate (added December 2009).
- Global Equity is comprised of publicly traded stocks across the U.S., developed-international countries, and emerging market countries.
- Invested to outperform the MSCI ACWI Index.

- **Organizational Profile**

- Walter Scott was established in 1983 as an investment management firm specializing in equity investment across global mandates. In October, 2006, Walter Scott became a wholly owned subsidiary within The Mellon Financial Corporation (Mellon). Similar to Mellon's other investment management subsidiaries, Walter Scott operates autonomously in terms of business activities, investment research, portfolio management and investment administration. The investment decisions reflected within WS client portfolios reflect its independent investment research.
- In July of 2007, The Bank of New York Company, Inc. and Mellon Financial Corporation completed their merger with senior managers from both organizations heading business and support functions.
- Walter Scott is headquartered in Edinburgh, Scotland.

- **Investment Strategy Commentary**

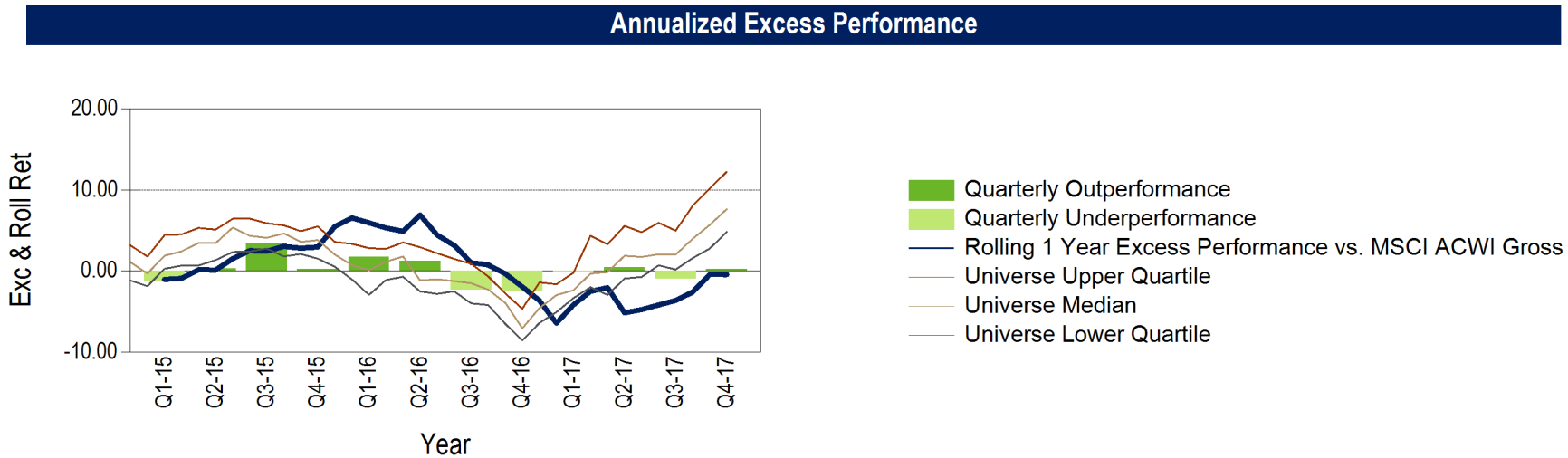
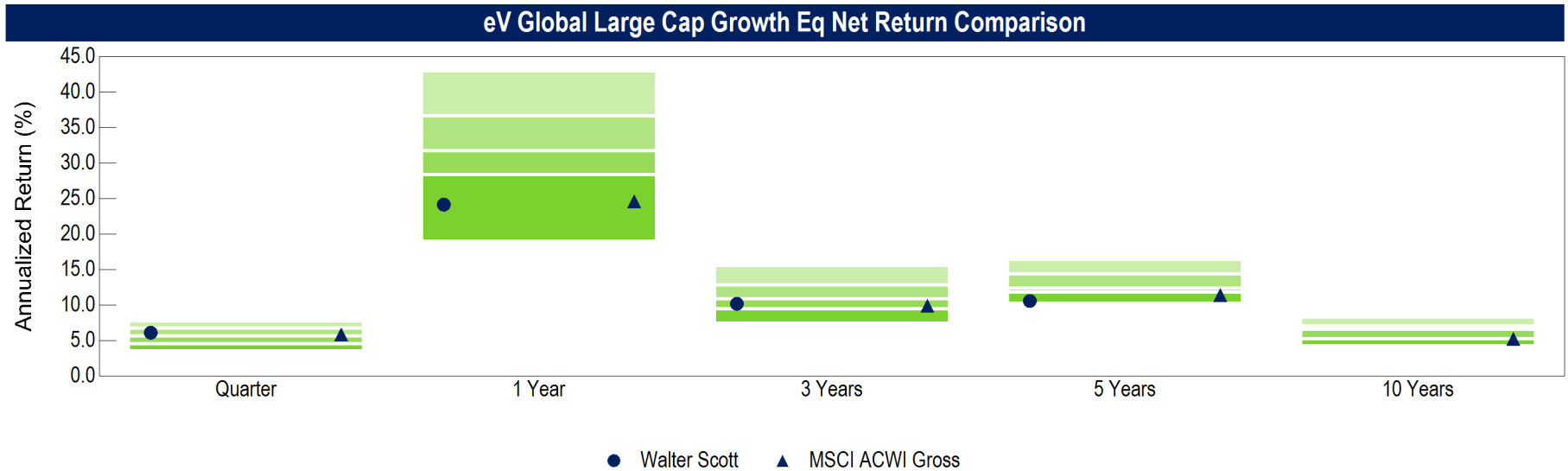
- Walter Scott's fundamental, bottoms-up approach combines detailed financial research with business and industry analysis. The primary focus is stock selection, finding companies capable of generating growth internally at 20% per annum, and compounding at this rate into the future.
- Walter Scott employs a concentrated, low turnover approach that seeks to target companies that have a long term compounded real rate of return of 7-10% per year.
- Stocks will be sold when the investment rationale deteriorates, the stock position size reaches 5% of the portfolio, the stock price has rapidly appreciated, or a better idea surfaces.

- **Due Diligence Notes**

- May, 2013: Alistair Lyon-Dean retired from the firm. NEPC recommended 'No Action' with this announcement.
- June, 2013: Dr. Kenneth Lyall, Chairman, passed away. NEPC recommended 'No Action' with this announcement.

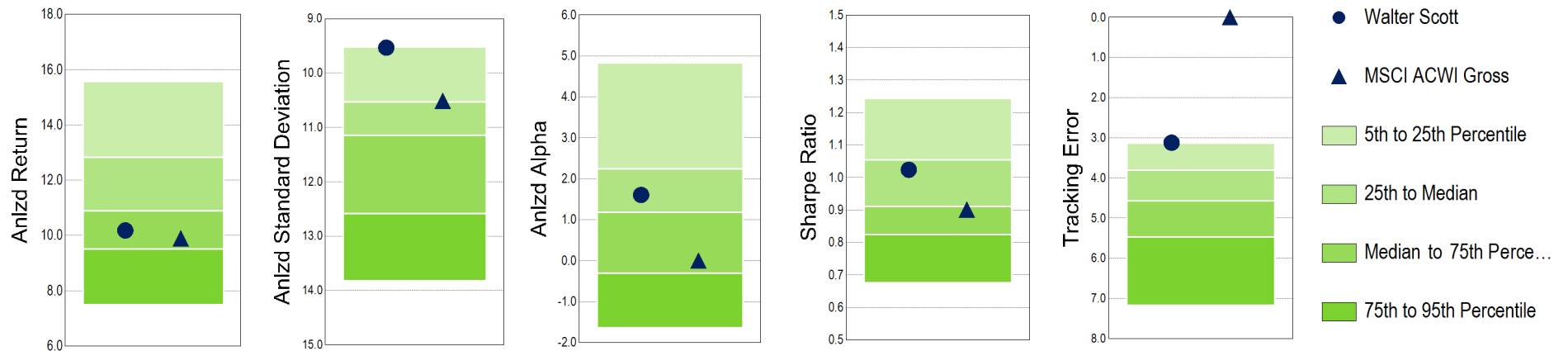
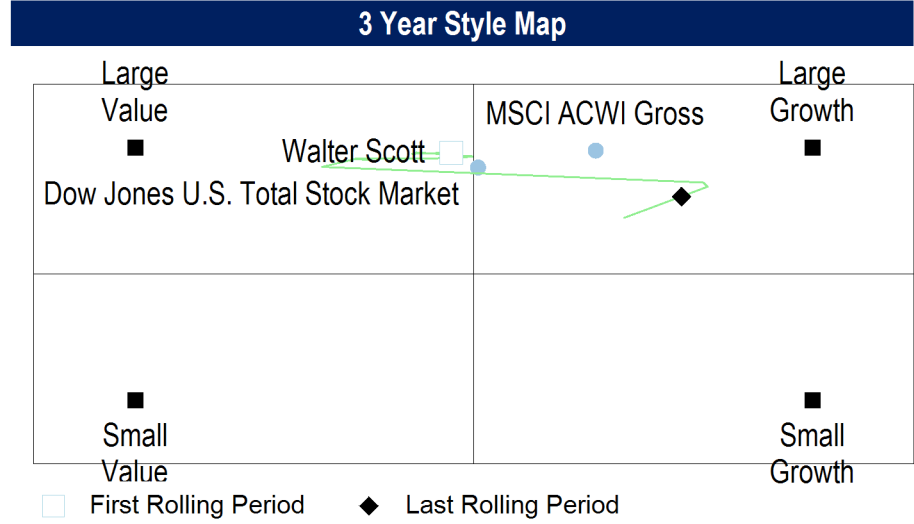
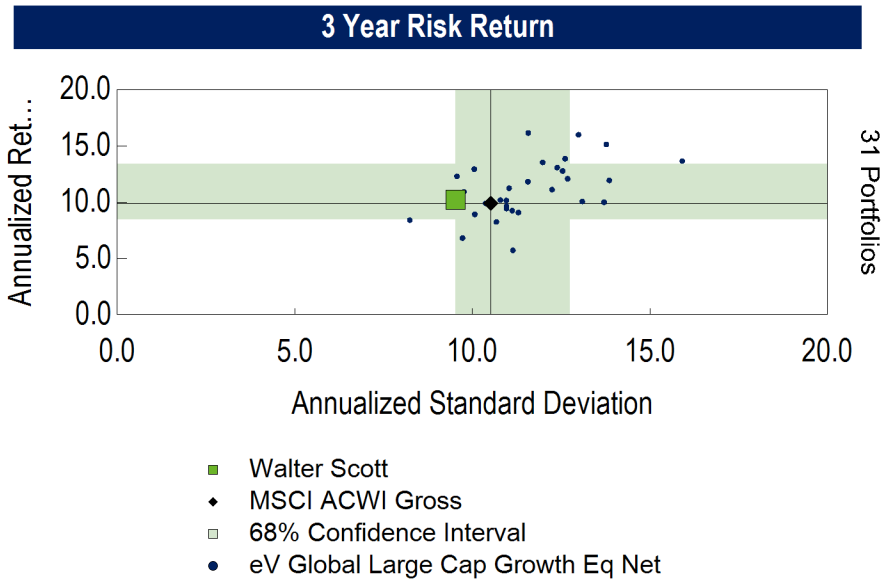


# WALTER SCOTT





# WALTER SCOTT



# WALTER SCOTT - QUARTERLY ANALYSIS

Characteristics		
	Portfolio	MSCI ACWI
Number of Holdings	54	2,499
Weighted Avg. Market Cap. (\$B)	110.2	121.5
Median Market Cap. (\$B)	63.2	10.6
Price To Earnings	30.7	22.8
Price To Book	6.7	3.8
Price To Sales	4.5	3.0
Return on Equity (%)	26.4	16.7
Yield (%)	1.8	2.2
Beta		1.0
R-Squared		1.0

Equity Sector Attribution											
	Attribution Effects					Returns		Sector Weights			
	Total Effects	Selection Effect	Allocation Effect	Interaction Effects		Portfolio	Benchmark	Portfolio	Benchmark		
Energy	0.0%	0.0%	0.0%	0.0%		7.0%	7.1%	8.4%	6.4%		
Materials	0.2%	0.3%	0.0%	-0.1%		12.5%	7.9%	4.1%	5.3%		
Industrials	0.5%	0.6%	0.0%	-0.2%		11.1%	5.2%	8.3%	10.8%		
Consumer Discretionary	0.0%	-0.1%	0.1%	0.0%		6.9%	7.8%	18.6%	11.9%		
Consumer Staples	-0.2%	-0.2%	0.0%	0.0%		3.4%	5.9%	7.3%	8.8%		
Health Care	0.1%	0.3%	-0.5%	0.3%		3.8%	1.4%	22.1%	11.1%		
Financials	0.0%	1.9%	-0.1%	-1.8%		15.6%	6.2%	0.9%	18.8%		
Information Technology	0.0%	-0.1%	0.2%	-0.1%		7.5%	8.2%	25.3%	17.6%		
Telecommunication Services	0.0%	-0.1%	0.0%	0.0%		0.0%	2.2%	1.9%	3.1%		
Utilities	0.1%	0.1%	0.0%	0.0%		2.8%	-0.2%	3.1%	3.1%		
Real Estate	0.0%	--	0.0%	--		--	4.8%	0.0%	3.1%		
Cash	0.0%	--	--	--		--	--	0.0%	0.0%		
<b>Portfolio</b>	<b>0.7%</b>	<b>=</b>	<b>2.7%</b>	<b>+</b>	<b>-0.1%</b>	<b>+</b>	<b>-1.9%</b>	<b>6.5%</b>	<b>5.9%</b>	<b>100.0%</b>	<b>100.0%</b>



# WALTER SCOTT - QUARTERLY ANALYSIS

Top Positive Contributors		
	Relative Contribution %	Return %
FANUC	0.4%	18.6%
ADOBE SYSTEMS	0.4%	17.5%
NIKE 'B'	0.4%	21.0%
DENSO	0.3%	18.7%
TRACTOR SUPPLY	0.3%	18.6%
NOVO NORDISK 'B'	0.3%	12.8%
SHIN-ETSU CHEMICAL	0.3%	13.7%
CISCO SYSTEMS	0.3%	14.9%
EOG RES.	0.2%	11.7%
CNOOC	0.2%	11.2%

Top Negative Contributors		
	Relative Contribution %	Return %
HENNES & MAURITZ 'B'	-0.2%	-18.1%
INDITEX	-0.2%	-6.7%
CERNER	-0.1%	-5.5%
GILEAD SCIENCES	-0.1%	-11.0%
SCHLUMBERGER	0.0%	-2.6%
COGNIZANT TECH.SLTN.'A'	0.0%	-1.9%
ORACLE	0.0%	-1.8%
NOVARTIS 'R'	0.0%	-1.3%
HONDA MOTOR	0.0%	16.5%
ROCHE HOLDING	0.0%	-1.0%



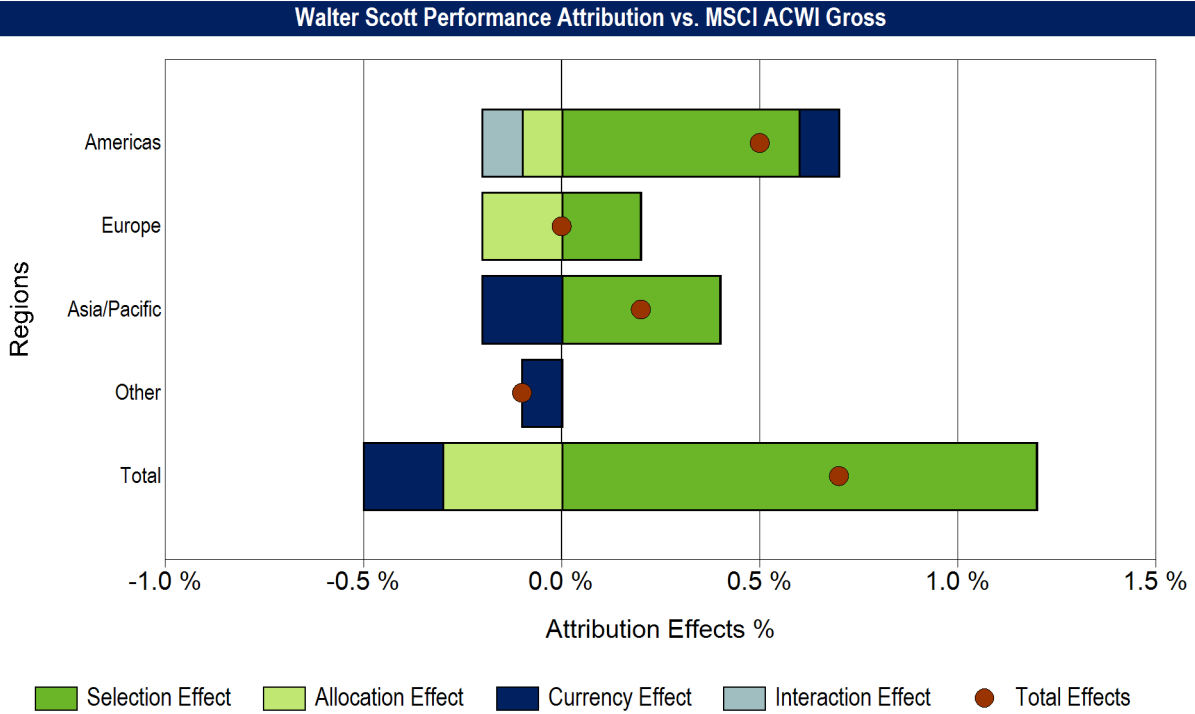
# WALTER SCOTT - QUARTERLY ANALYSIS

Country Allocation				
	Manager	Index	Manager	Index
	Allocation (USD)	Allocation (USD)	Return (USD)	Return (USD)
<b>Americas</b>				
Canada	2.1%	3.2%	6.1%	4.4%
United States	48.7%	52.1%	7.5%	6.6%
<b>Total-Americas</b>	<b>50.8%</b>	<b>56.8%</b>	<b>7.4%</b>	<b>6.3%</b>
<b>Europe</b>				
Denmark	2.4%	0.6%	12.8%	2.3%
Finland	2.2%	0.3%	1.5%	-2.5%
France	7.3%	3.6%	7.4%	1.6%
Spain	2.4%	1.1%	-6.7%	-1.5%
Sweden	1.1%	1.0%	-18.1%	-3.7%
Switzerland	7.7%	2.7%	2.0%	1.8%
United Kingdom	4.6%	5.9%	3.8%	5.8%
<b>Total-Europe</b>	<b>27.7%</b>	<b>22.1%</b>	<b>3.0%</b>	<b>2.4%</b>

Country Allocation				
	Manager	Index	Manager	Index
	Allocation (USD)	Allocation (USD)	Return (USD)	Return (USD)
<b>AsiaPacific</b>				
Australia	2.4%	2.3%	5.1%	6.7%
Hong Kong	8.2%	1.2%	5.9%	7.7%
Japan	8.8%	7.7%	13.5%	8.5%
Taiwan*	2.1%	1.3%	5.6%	4.2%
<b>Total-AsiaPacific</b>	<b>21.4%</b>	<b>19.9%</b>	<b>8.9%</b>	<b>8.1%</b>
<b>Totals</b>				
Developed	97.9%	88.5%	6.5%	5.7%
Emerging*	2.1%	11.5%	5.6%	7.3%



# WALTER SCOTT - QUARTERLY ANALYSIS



	Returns and Weights				Attribution Effects				
	Manager Return	Index Return	Manager Weight	Index Weight	Selection Effect	Allocation Effect	Currency Effect	Interaction Effect	Total Effects
<b>Totals</b>									
Americas	7.4%	6.3%	50.8%	56.8%	0.6%	-0.1%	0.1%	-0.1%	0.5%
Europe	3.0%	2.4%	27.7%	22.1%	0.2%	-0.2%	0.0%	0.0%	0.0%
Asia/Pacific	8.9%	8.1%	21.4%	19.9%	0.4%	0.0%	-0.2%	0.0%	0.2%
Other	--	14.1%	0.0%	1.2%	--	0.0%	-0.1%	--	-0.1%
Cash	--	--	0.0%	0.0%	--	0.0%	0.0%	--	0.0%
<b>Total</b>	<b>6.5%</b>	<b>5.9%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>1.2%</b>	<b>-0.3%</b>	<b>-0.2%</b>	<b>0.0%</b>	<b>0.7%</b>
<b>Totals</b>									
Developed	6.5%	5.7%	97.9%	88.5%	0.8%	0.0%	0.0%	0.1%	0.9%
Emerging*	5.6%	7.3%	2.1%	11.5%	0.0%	0.0%	-0.2%	0.0%	-0.2%



# RBC

- **Role in Portfolio**

- Emerging Markets Equity Mandate (Added December 2017).
- Emerging Markets Equity is comprised of publicly traded stocks across emerging market countries.
- Invested to outperform the MSCI Emerging Markets Equity Index.

- **Organizational Profile**

- RBC Global Asset Management (GAM) was founded in 1983 under the name Voyageur Asset Management and was owned by Dougherty Financial Group, LLC before being acquired by Dain Rauscher Corp. in 2000.
- In 2001, Royal Bank of Canada (RBC) acquired Dain Rauscher Corp. and renamed it RBC Dain Rauscher Corp. In 2008, RBC Dain Rauscher Corp. was renamed RBC Capital Markets Holdings (USA) Inc. RBC GAM is a wholly owned subsidiary of RBC Capital Markets Holdings (USA) Inc., which is owned by Royal Bank of Canada (RBC). RBC is publicly owned and traded on the New York and Toronto Stock Exchanges.
- RBC Global Asset Management (GAM)-US is a Minnesota corporation headquartered in Minneapolis.

- **Investment Strategy Commentary**

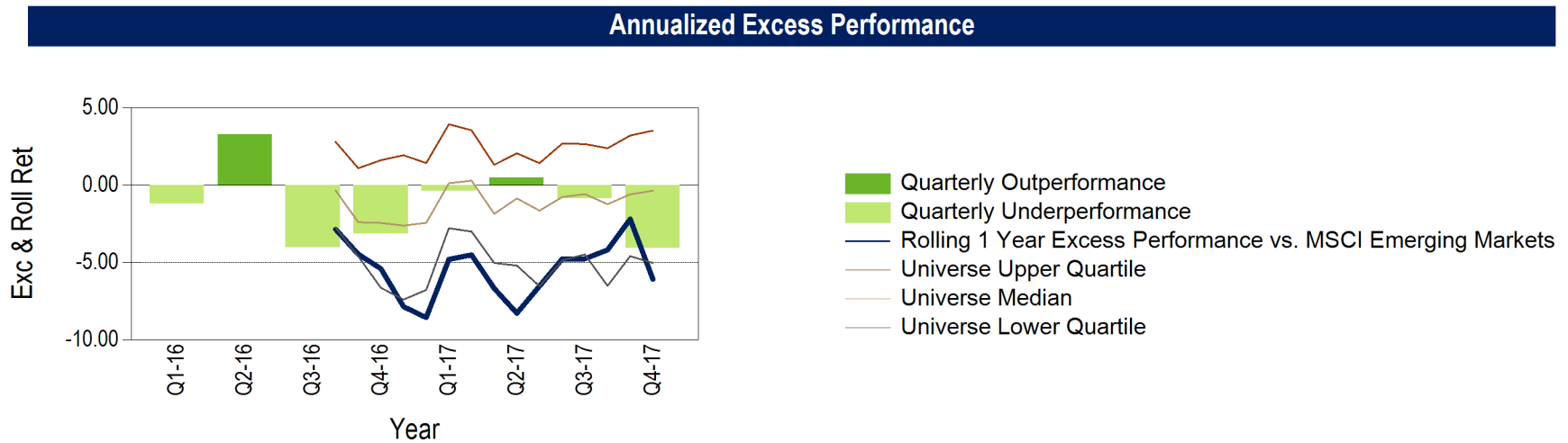
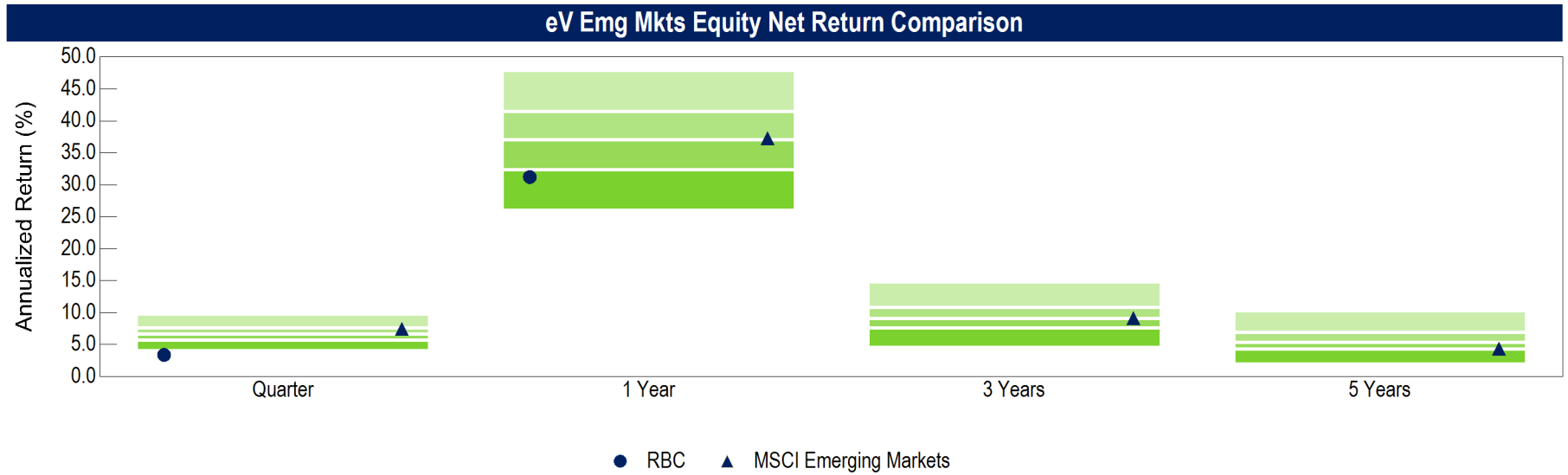
- RBC blends top down and bottom up research focused on companies with high return on cash flow. The team is focused on identifying strong company managements; especially those that have delivered in the past.
- The strategy looks for companies that have strong franchises and a real sustainable competitive edge.
- The final portfolio will contain 40-80 names.

- **Due Diligence Notes**

- October, 2017: Junior team member departure. NEPC recommended 'No Action' with this announcement.

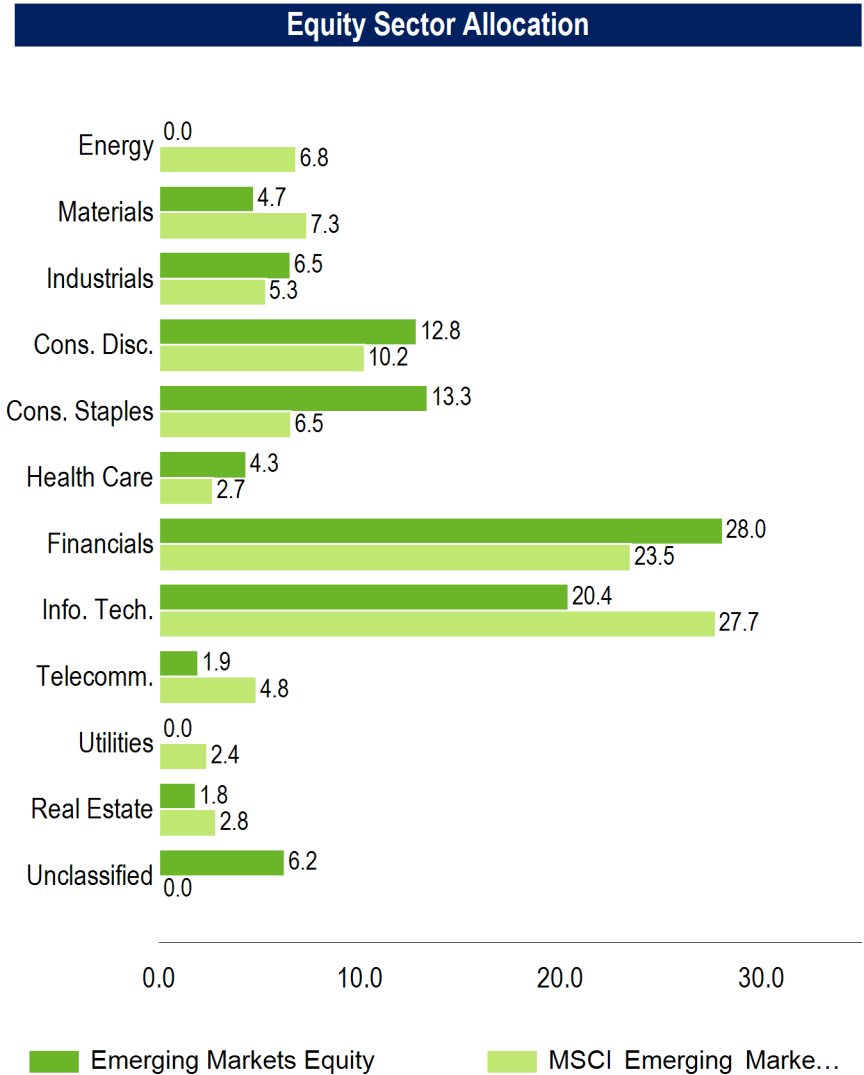


# RBC



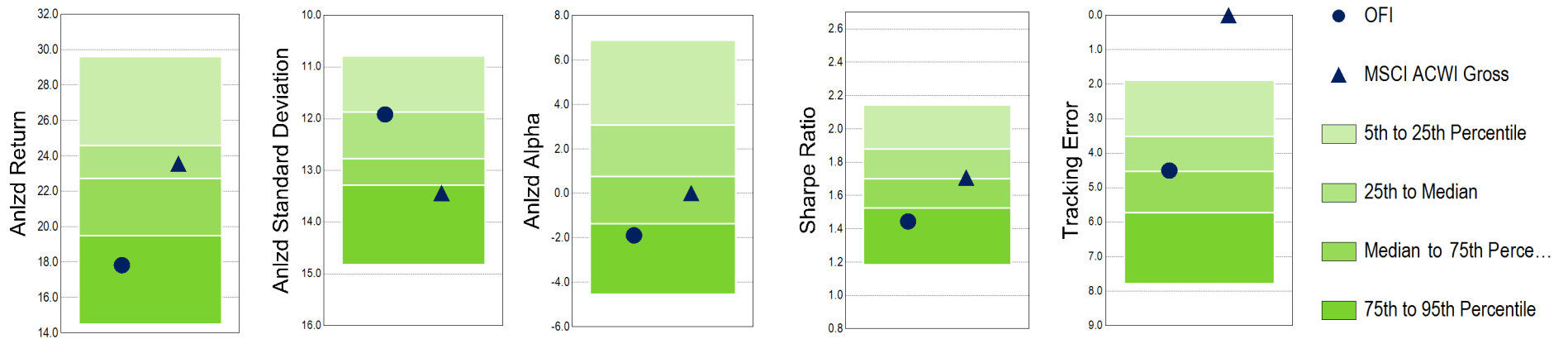
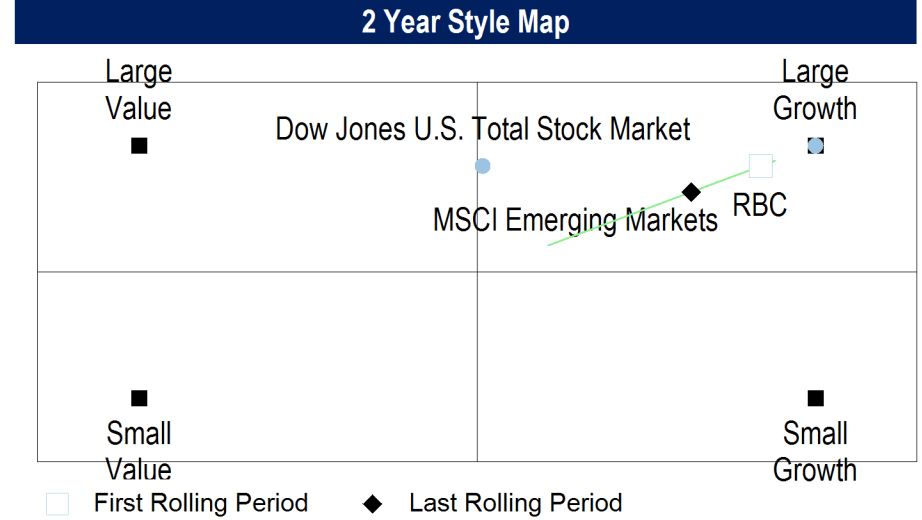
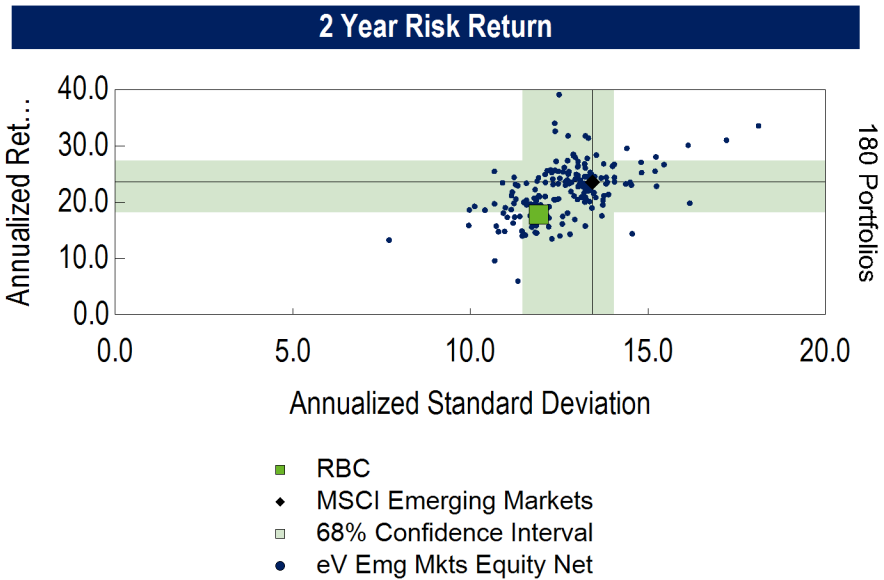
Characteristics		
	Portfolio	MSCI Emerging Markets Gross
Number of Holdings	52	846
Weighted Avg. Market Cap. (\$B)	62.1	89.8
Median Market Cap. (\$B)	11.8	6.0
Price To Earnings	23.7	22.1
Price To Book	4.8	3.3
Price To Sales	3.8	2.7
Return on Equity (%)	21.7	18.1
Yield (%)	1.8	2.1
Beta		1.0
R-Squared		1.0

Regional Allocation		
	Emerging Markets Equity	MSCI Emerging Markets Gross
Region Weighting		
North America ex U.S.	0.00	0.00
United States	6.23	0.52
Europe Ex U.K.	0.00	0.33
United Kingdom	5.69	0.00
Pacific Basin Ex Japan	8.93	12.67
Japan	0.00	0.00
Emerging Markets	76.61	85.81
Other	2.53	0.67





# RBC



# PUBLIC FIXED INCOME

NEPC, LLC

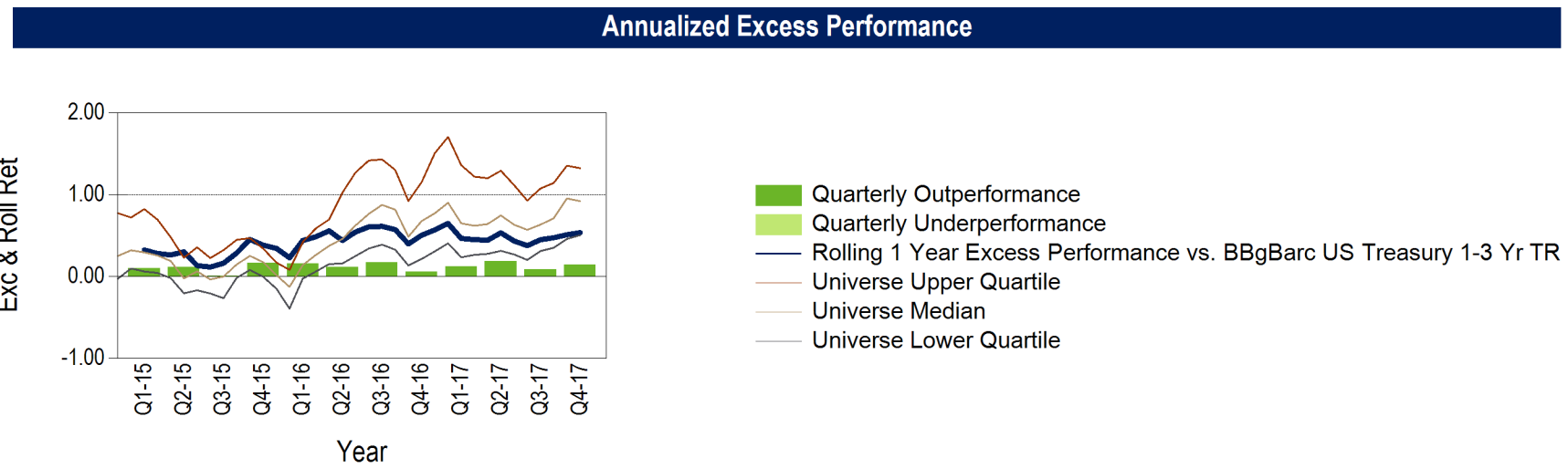
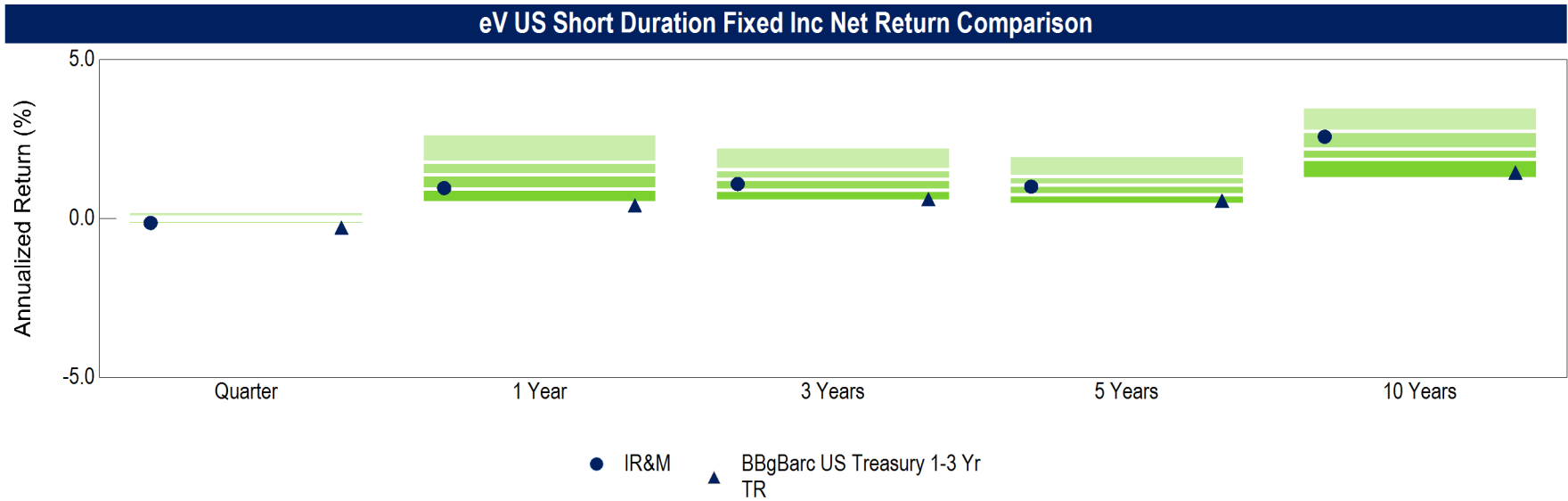
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# IR&M

- **Role in Portfolio**
  - Short Term Core Bonds mandate (added July 2017).
  - Short Term Core Bonds provide a measure of liquidity to the portfolio through investing mainly in US Treasuries.
  - Invested to outperform the Barclays US Treasury 1-3 Year Index.
- **Organizational Profile**
  - IR&M is a boutique investment manager focused on fixed income products and solutions. Domestic investment grade fixed income products are its sole line of business.
  - The firm was founded in 1987 by John and Jack Sommers, and is 85% employee owned with the remaining 15% stake held by the Sommers family.
  - IR&M is headquartered in Boston, MA.
- **Investment Strategy Commentary**
  - IR&M's Treasury strategy seeks to add incremental yield spread to portfolios through allocations to U.S. Treasury securities, while seeking to keep the duration and yield curve exposure similar to the benchmark.
  - The security selection process emphasizes securities with higher yields, attractive roll-down, and slight liquidity concessions. The strategy also incorporates technical factors into the investment process, including overweighting securities pressured by supply, underweighting technically expensive securities, as well as positioning for potential benchmark changes.
- **Due Diligence Notes**
  - None.

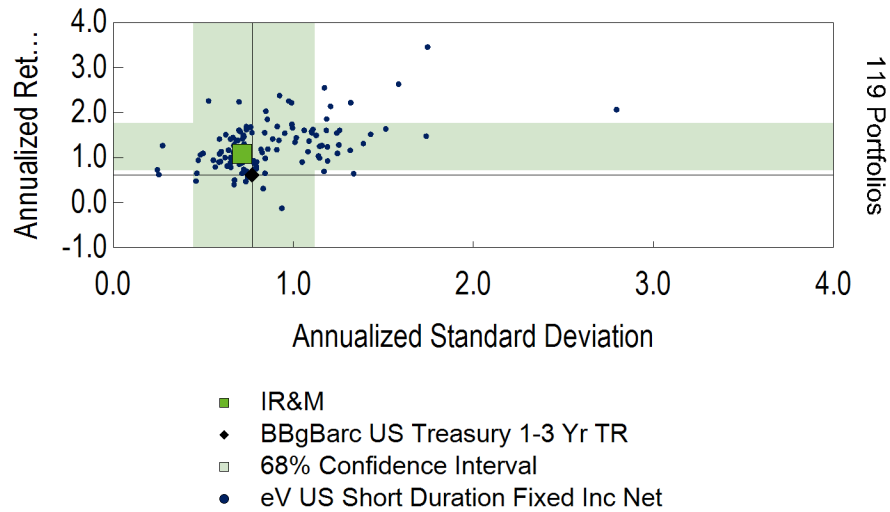


# IR&M

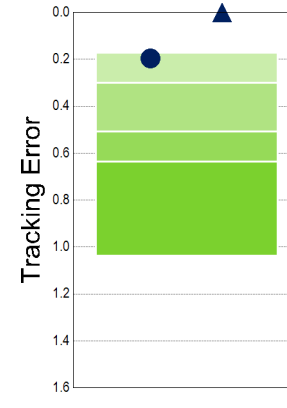
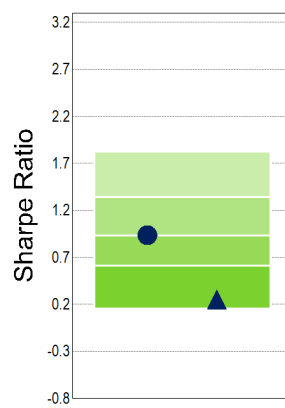
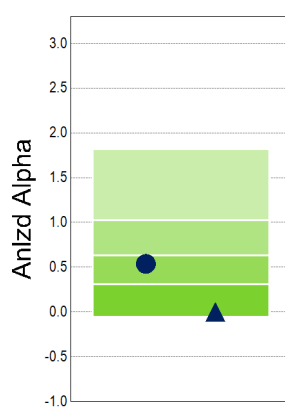
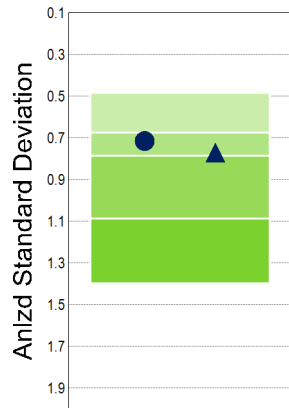
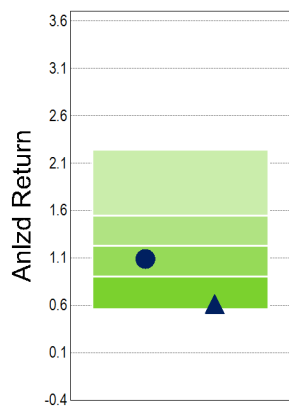
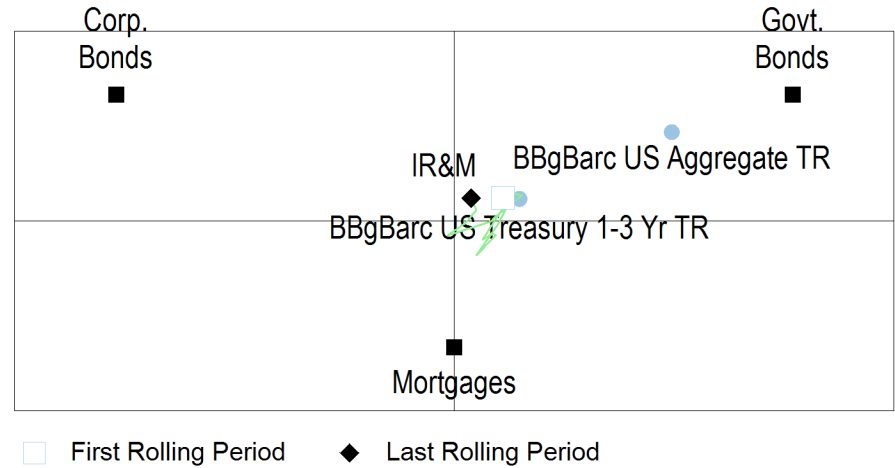


# IR&M

**3 Year Risk Return**



**3 Year Style Map**



- IR&M
- ▲ BBgBarc US Treasury 1-3 Yr...
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Perce...
- 75th to 95th Percentile



# IR&M

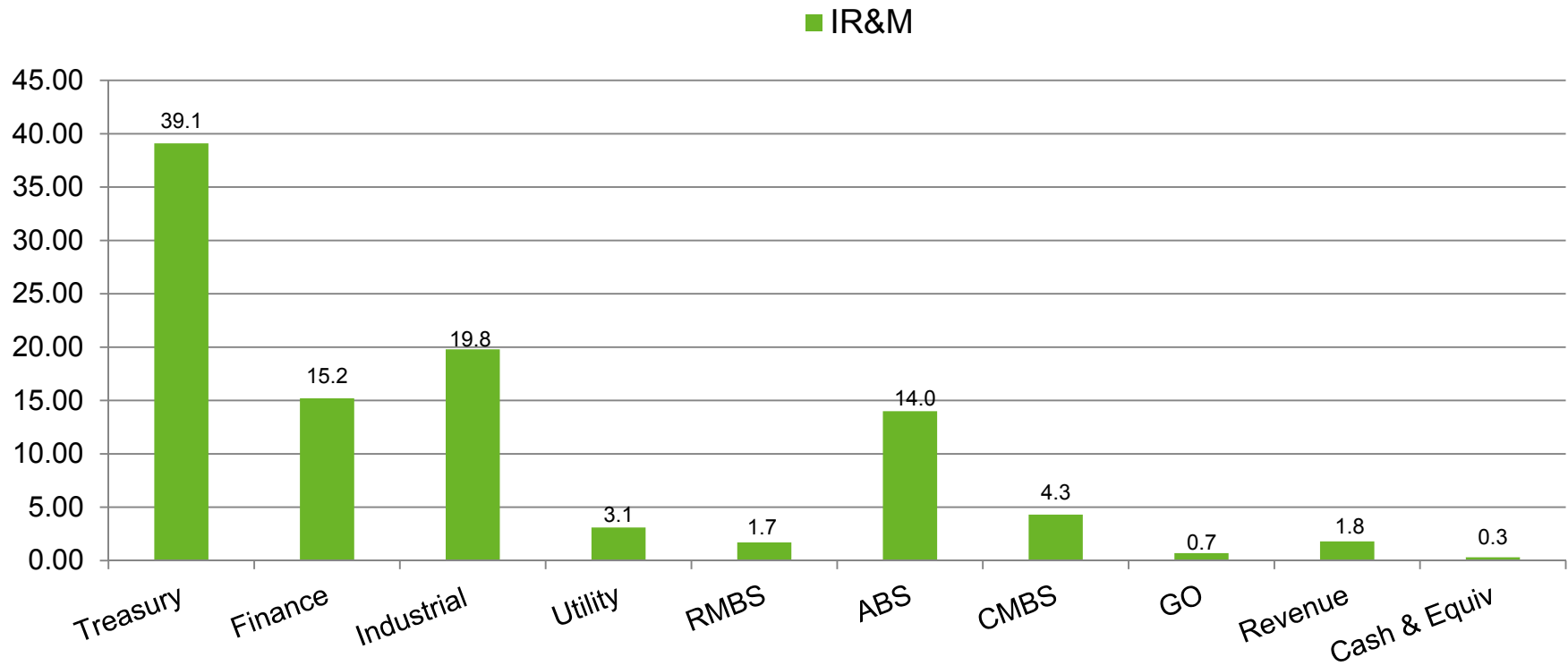
<b>Characteristics</b>	<b>IR&amp;M</b>	<b>Benchmark</b>
Duration(Yrs)	1.82	1.94
Average Quality	Aa2/AA-	Aaa/AA+
Yield(%)	2.11	1.89



Source: IR&M, December 2017

# IR&M

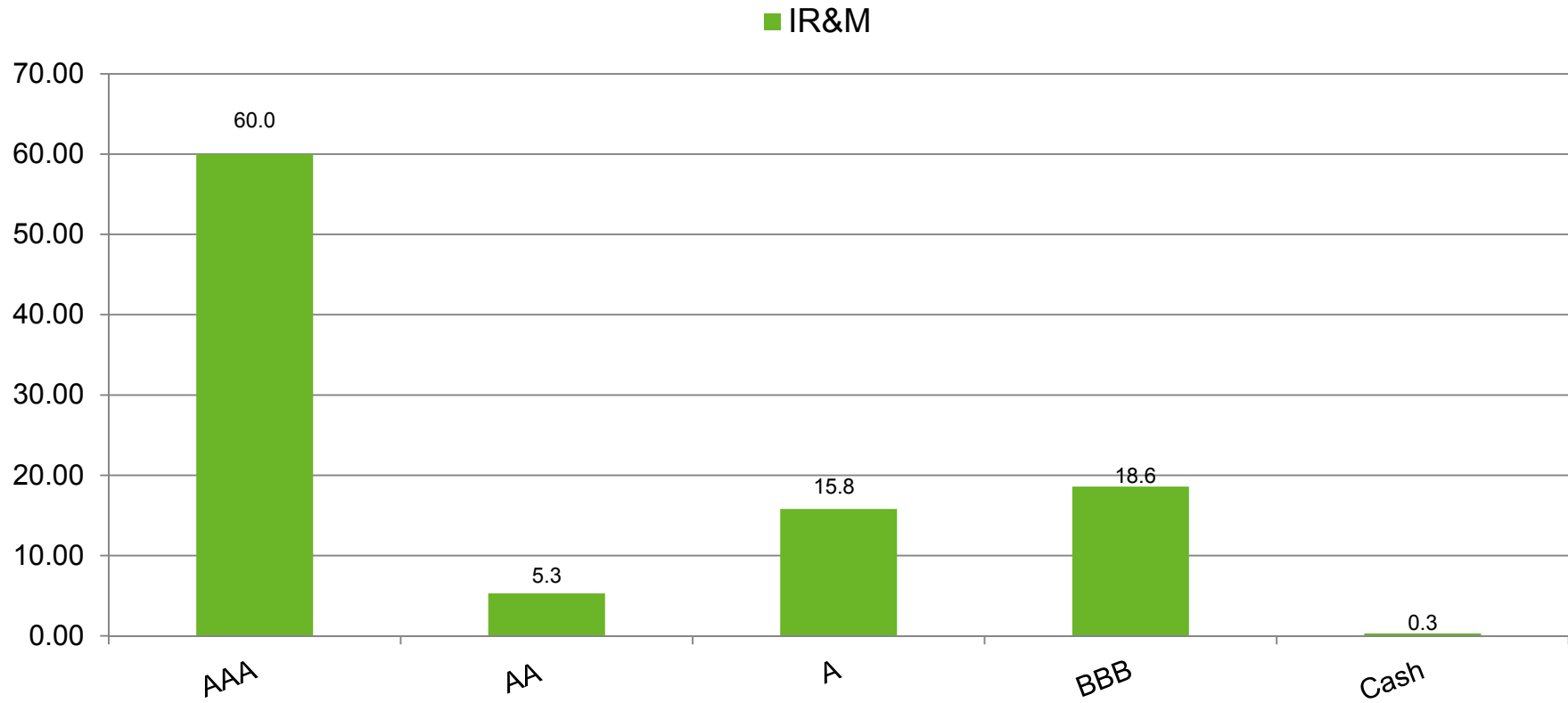
## Sector Distribution



Source: IR&M, December 2017

# IR&M

## Credit Distribution



Source: IR&M, December 2017



# BRANDYWINE

- **Role in Portfolio**

- Global Public Fixed Income mandate (added October 2004).
- Global Fixed Income provides a broad exposure to investment grade debt from currency markets around the world through treasury, government-related, corporate and securitized fixed-rate bonds from both developed and emerging markets issuers.
- Invested to outperform the Barclays Global Aggregate Index.

- **Organizational Profile**

- Brandywine Global Investment Management, LLC was founded as Brandywine Asset Management by a group of partners in 1986.
- In 1998, Legg Mason Inc. acquired Brandywine as a wholly-owned subsidiary. Brandywine retains complete investment autonomy and full control over all management, investment, and employment decisions.
- In October of 2001, Brandywine Asset Management transitioned from a subchapter S corporation to its present limited liability corporation status, and in 2006, Brandywine Asset Management, LLC changed its name to Brandywine Global Investment Management, LLC to reflect the firm's global focus.
- Brandywine is headquartered in Philadelphia, Pennsylvania.

- **Investment Strategy Commentary**

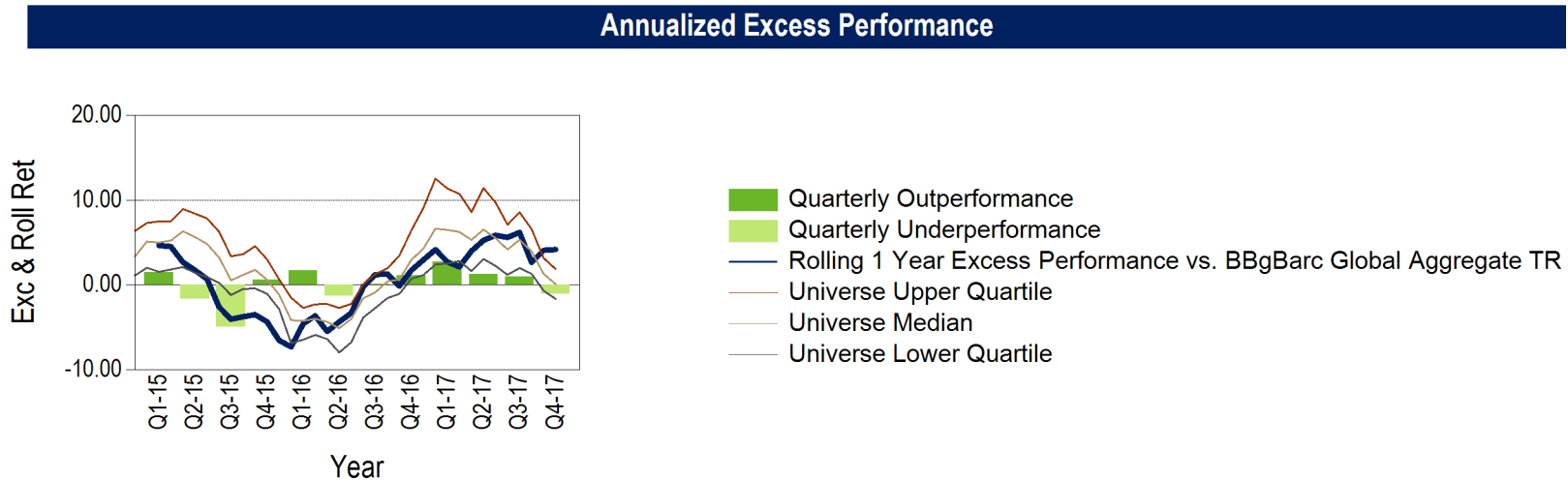
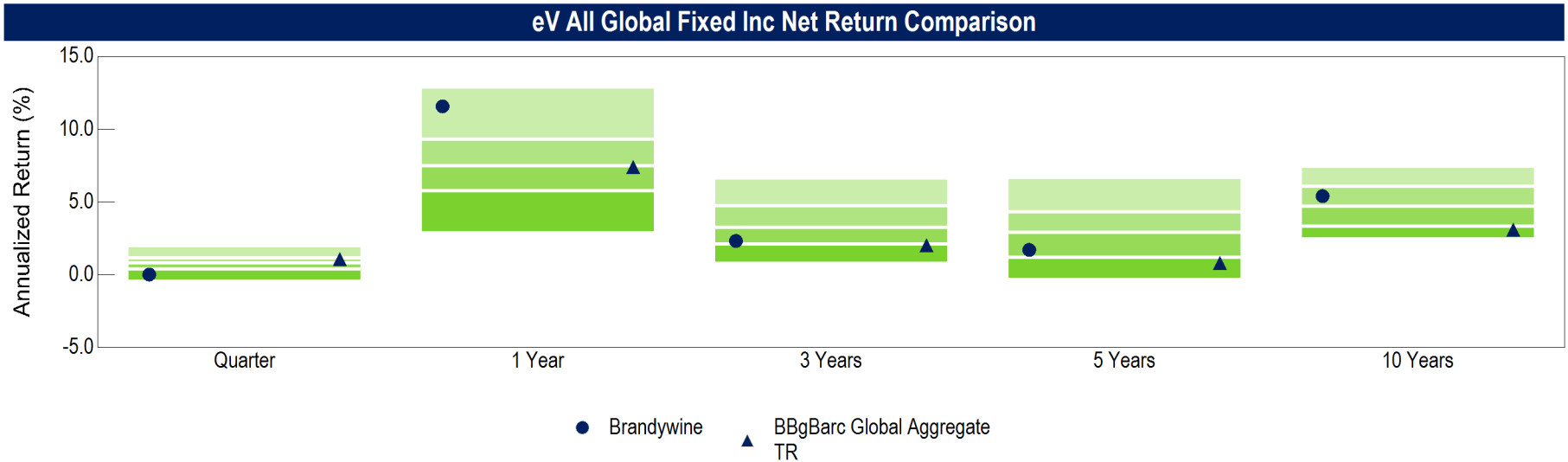
- Brandywine's Global Fixed Income philosophy is a value-driven, active, strategic approach.
- Brandywine defines value as a combination of above-average real interest rates and an under-valued currency. Investments are concentrated where existing economic and market conditions can potentially enable that value to be realized in an intermediate time frame.
- The strategy uses macro-economic analysis of conditions on a country-by-country basis in order to rank opportunities according to real interest rate levels. Further analysis is centered on those countries that exhibit the highest real interest rates. Currency valuations are then examined relative to historic averages in an effort to determine if that valuation is supportive to investments.

- **Due Diligence Notes**

- January, 2017: Chen Zhao, co-director of global macro research, announced his resignation. NEPC recommended 'No Action'.

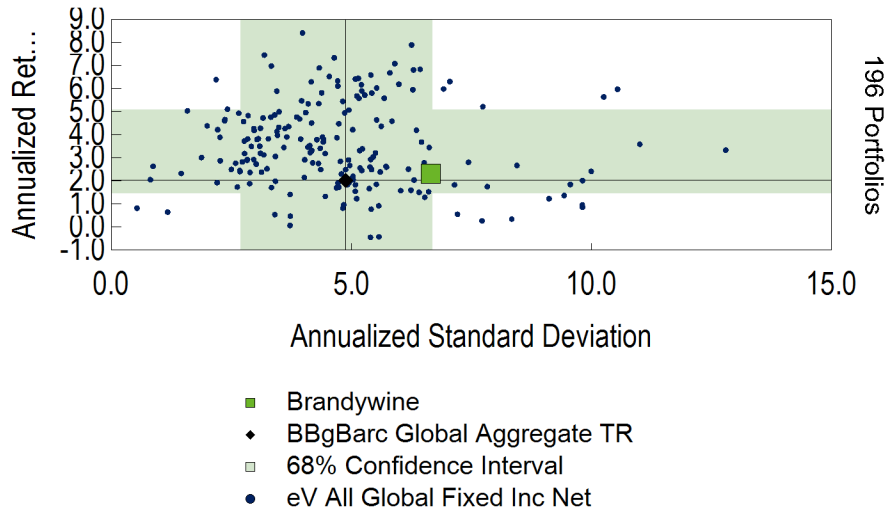


Dallas Police & Fire Pension  
**BRANDYWINE**

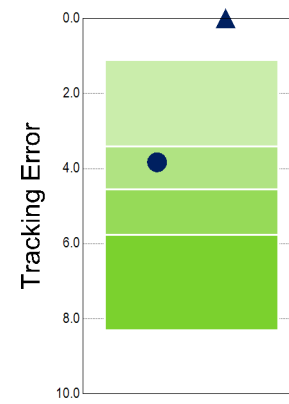
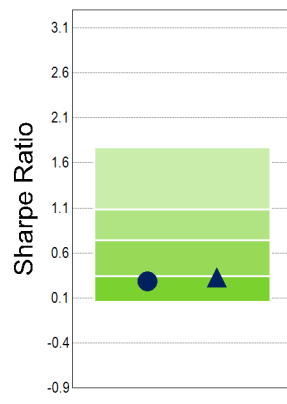
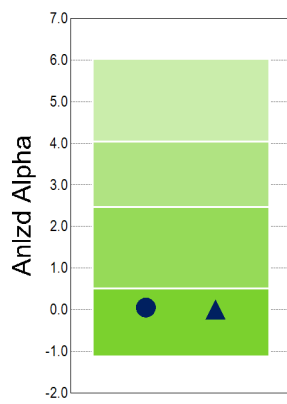
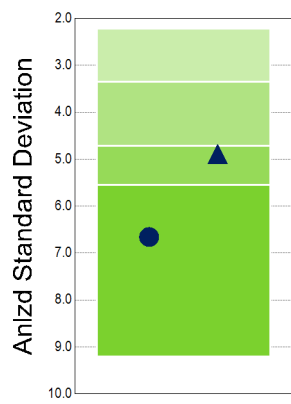
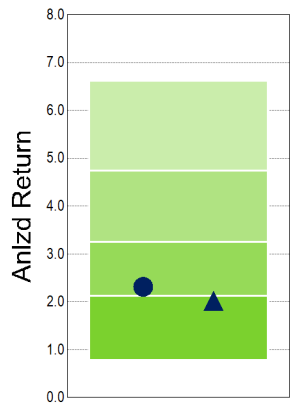
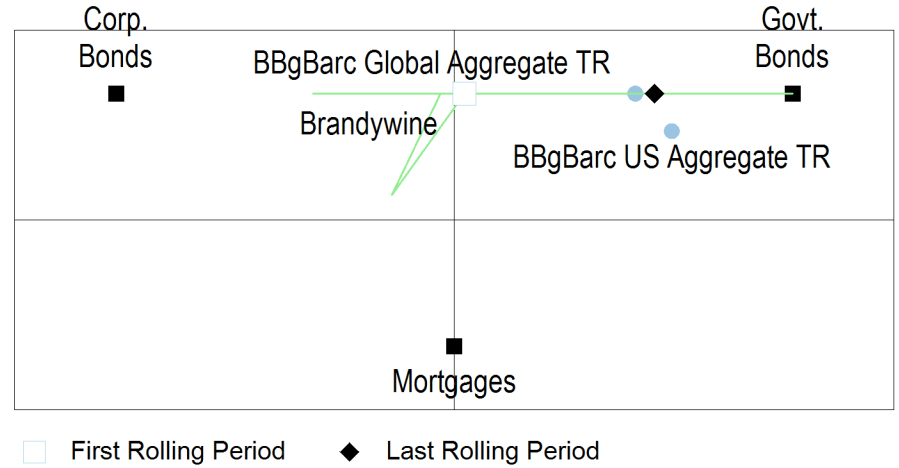


Dallas Police & Fire Pension  
**BRANDYWINE**

**3 Year Risk Return**



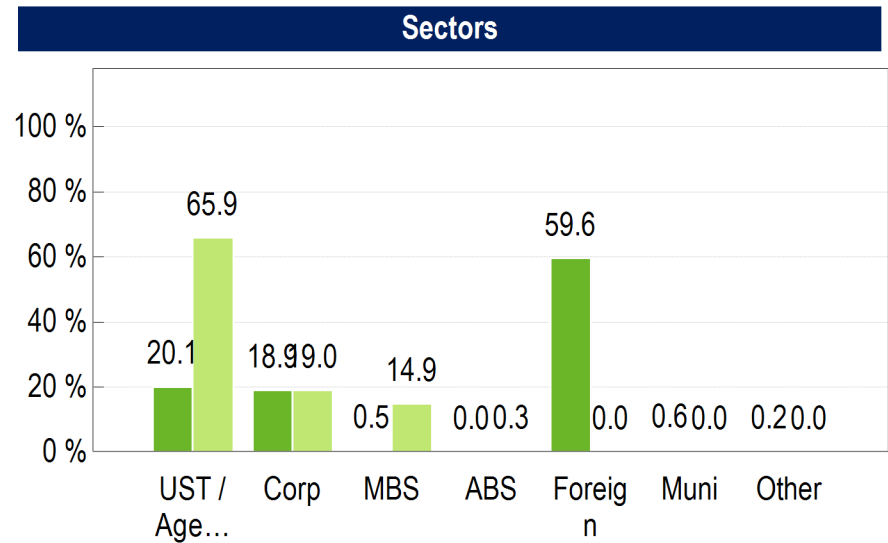
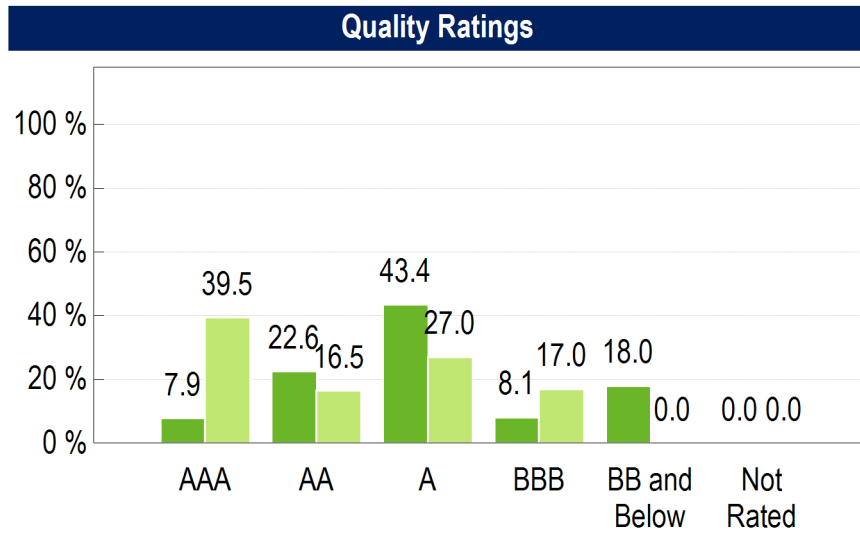
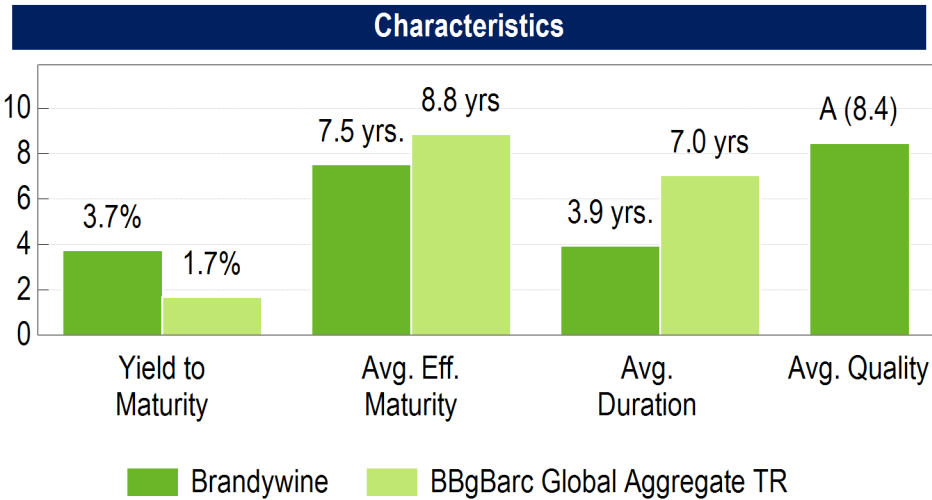
**3 Year Style Map**



- Brandywine
- ▲ BBgBarc Global Aggregate...
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Perce...
- 75th to 95th Percentile



Dallas Police & Fire Pension  
**BRANDYWINE**



# BRANDYWINE

## Characteristics

## Brandywine

Average Coupon	4.1
Average Maturity	7.7
Modified Duration	3.8
Number of Issues	46
Yield to Maturity	3.6

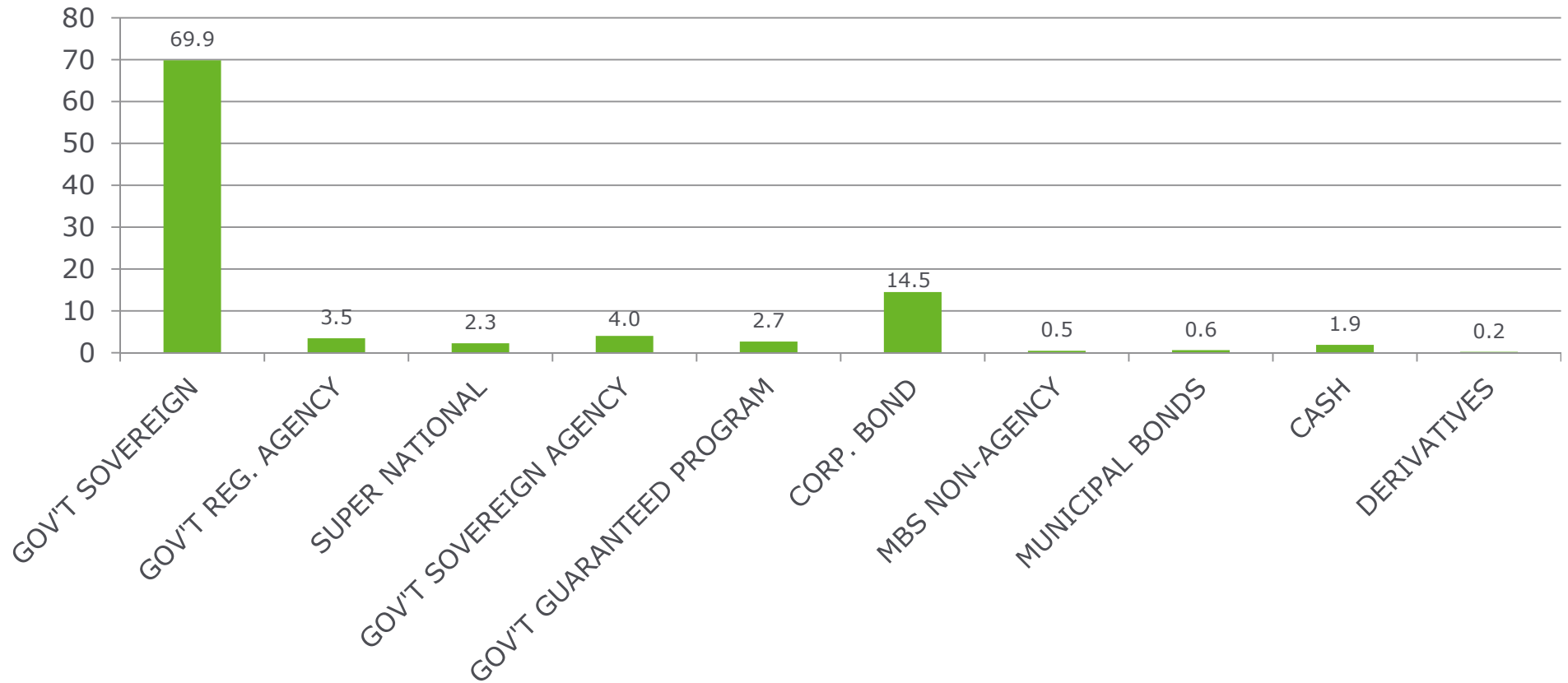


Source: Brandywine, December 2017

# BRANDYWINE

## Sector Allocation

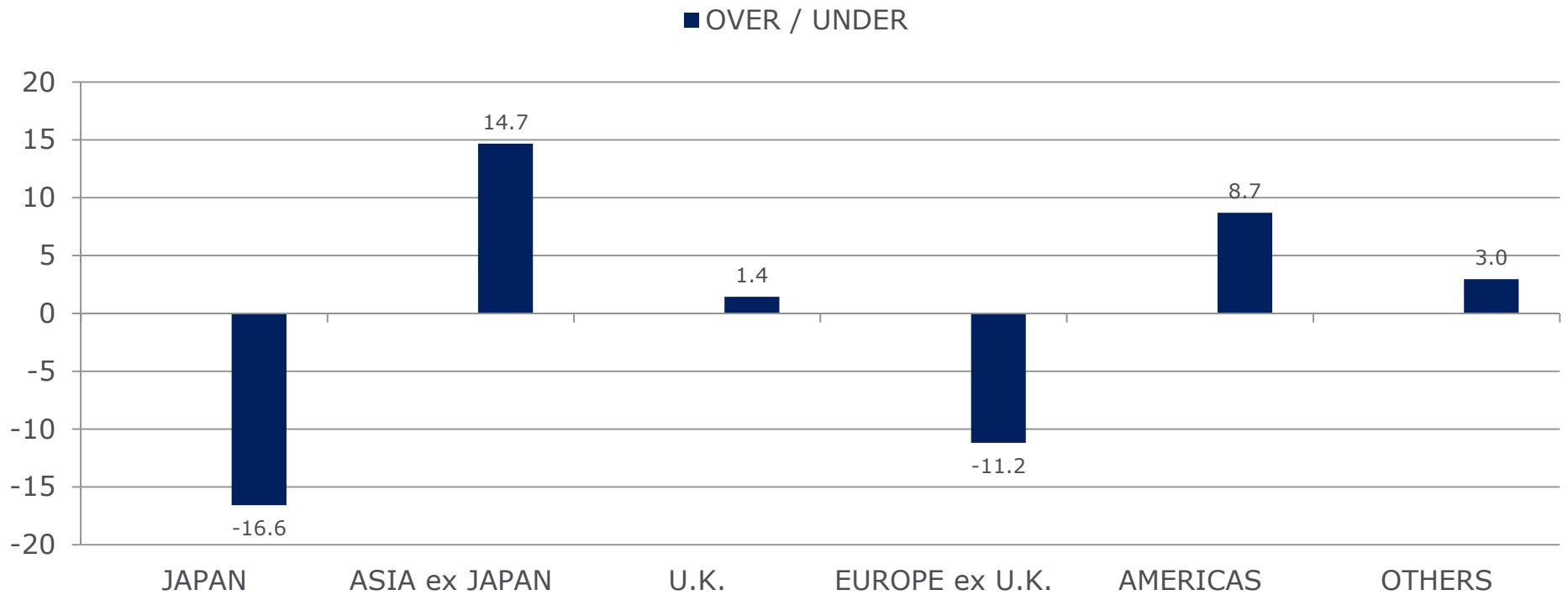
■ Brandywine



Source: Brandywine, December 2017

# BRANDYWINE

## Country Allocation



Source: Brandywine, December 2017

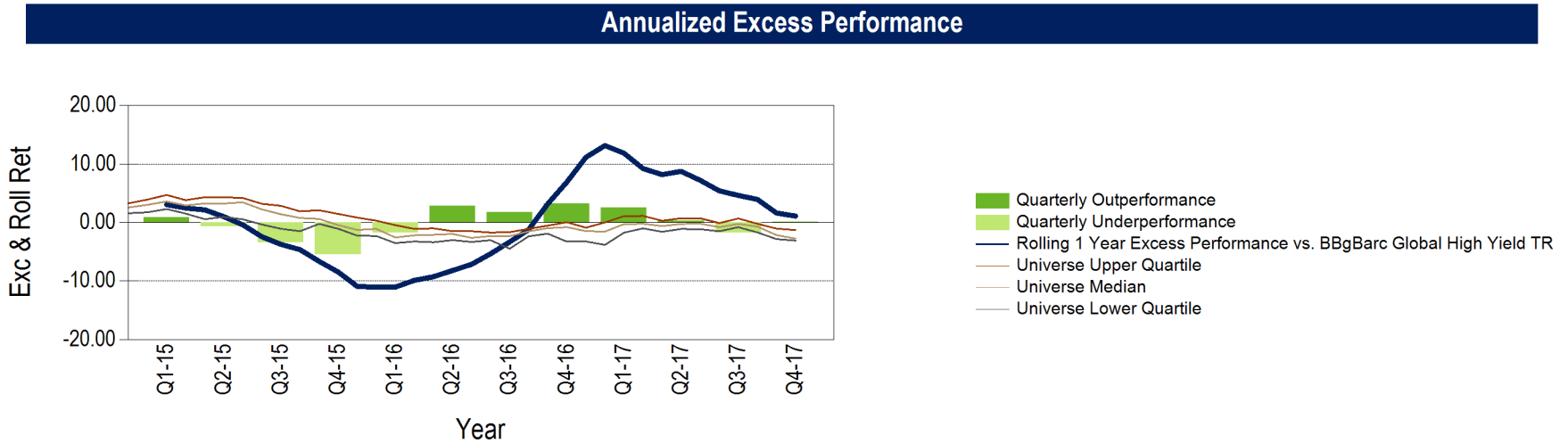
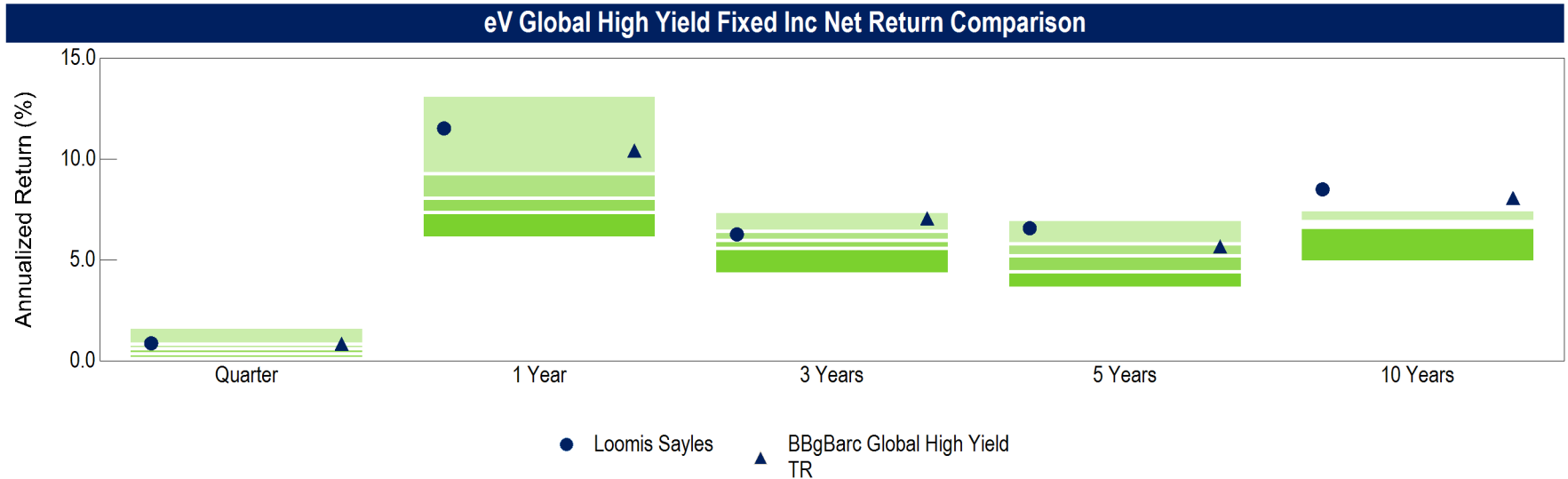
# LOOMIS SAYLES – HIGH YIELD

- **Role in Portfolio**
  - High Yield mandate (added October 1998).
  - High Yield bonds have a lower credit rating than investment-grade corporate bonds, Treasury bonds and municipal bonds. Because of the higher risk of default, these bonds pay a higher yield than investment grade bonds.
  - Invested to outperform the Barclays Global High Yield Index.
- **Organizational Profile**
  - Loomis, Sayles & Company was founded as an investment management company in 1926. Throughout its history, the firm has grown to become a primarily institutional investment manager with specialized products in domestic/international fixed income, equities and alternatives.
  - Currently, the firm is a wholly owned subsidiary of NATIXIS Global Asset Management.
  - Loomis Sayles is headquartered in Boston, MA.
- **Investment Strategy Commentary**
  - The High Yield Full Discretion strategy seeks to exploit the insights identified by the Loomis Sayles Fixed Income credit research organization. Portfolio guidelines are broad, offering the team significant investment flexibility. Portfolio managers collaborate with a full team of in-house credit analysts to identify attractive investment opportunities in the global corporate fixed income sector. Security selection is the primary driver of performance.
  - The bottom-up investment evaluation process drives the portfolio investments and resulting sector allocations. This process results in allocations to non-benchmark yield sectors including busted convertible debt, preferred equity, emerging markets, investment grade corporate debt and non-US dollar issues on an opportunistic basis.
  - The strategy is biased towards issues that have stable and improving credit prospects and favorable call protection. The team does not attempt to forecast interest rates, although they do seek to take advantage of cyclical and secular trends in interest rates.
- **Due Diligence Notes**
  - October, 2012: Kathleen Gaffney departed the firm. NEPC recommended 'Hold' with no searches allowed.
  - December, 2012: After meeting with Loomis, NEPC recommended the strategy be upgraded to 'Watch', with searches allowed.
  - February, 2013: Changes to full discretion team. NEPC upgraded the DD status of the strategy to 'No Action'.



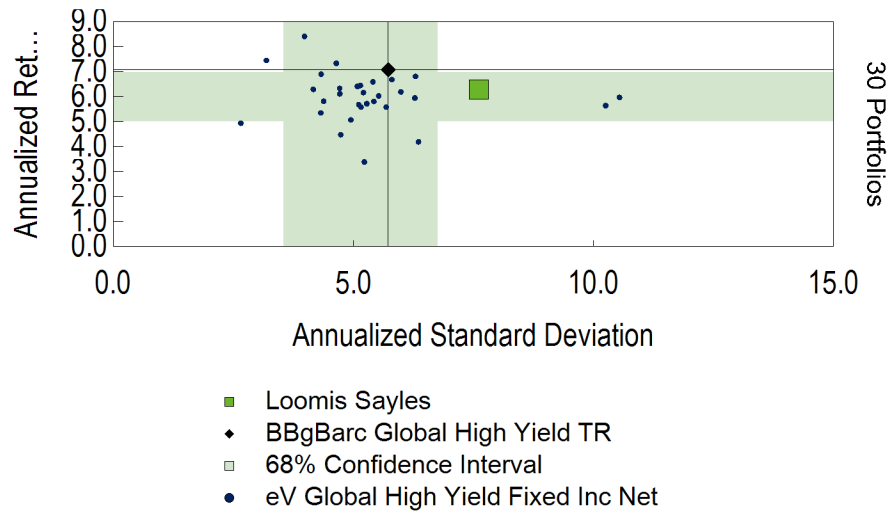


# LOOMIS SAYLES - HIGH YIELD

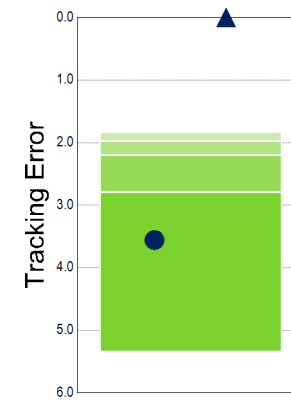
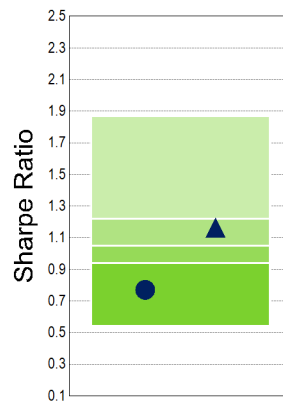
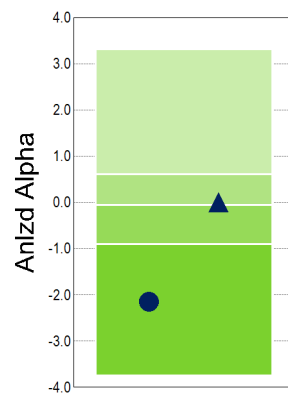
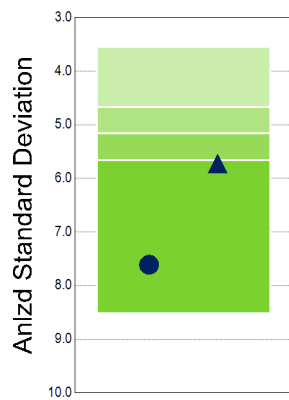
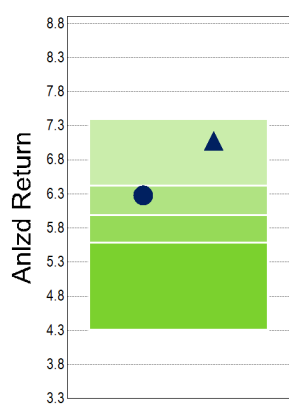
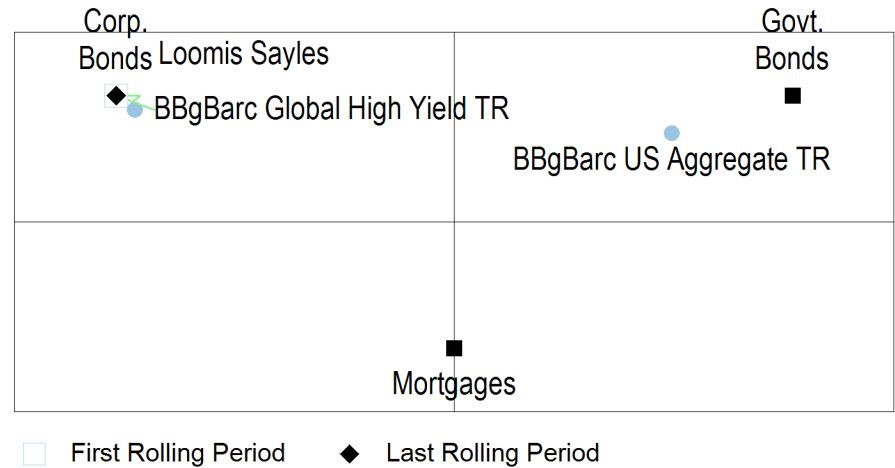


# LOOMIS SAYLES - HIGH YIELD

**3 Year Risk Return**



**3 Year Style Map**



- Loomis Sayles
- ▲ BBgBarc Global High Yield...
- 5th to 25th Percentile
- 25th to Median
- Median to 75th Perce...
- 75th to 95th Percentile



# LOOMIS SAYLES – HIGH YIELD

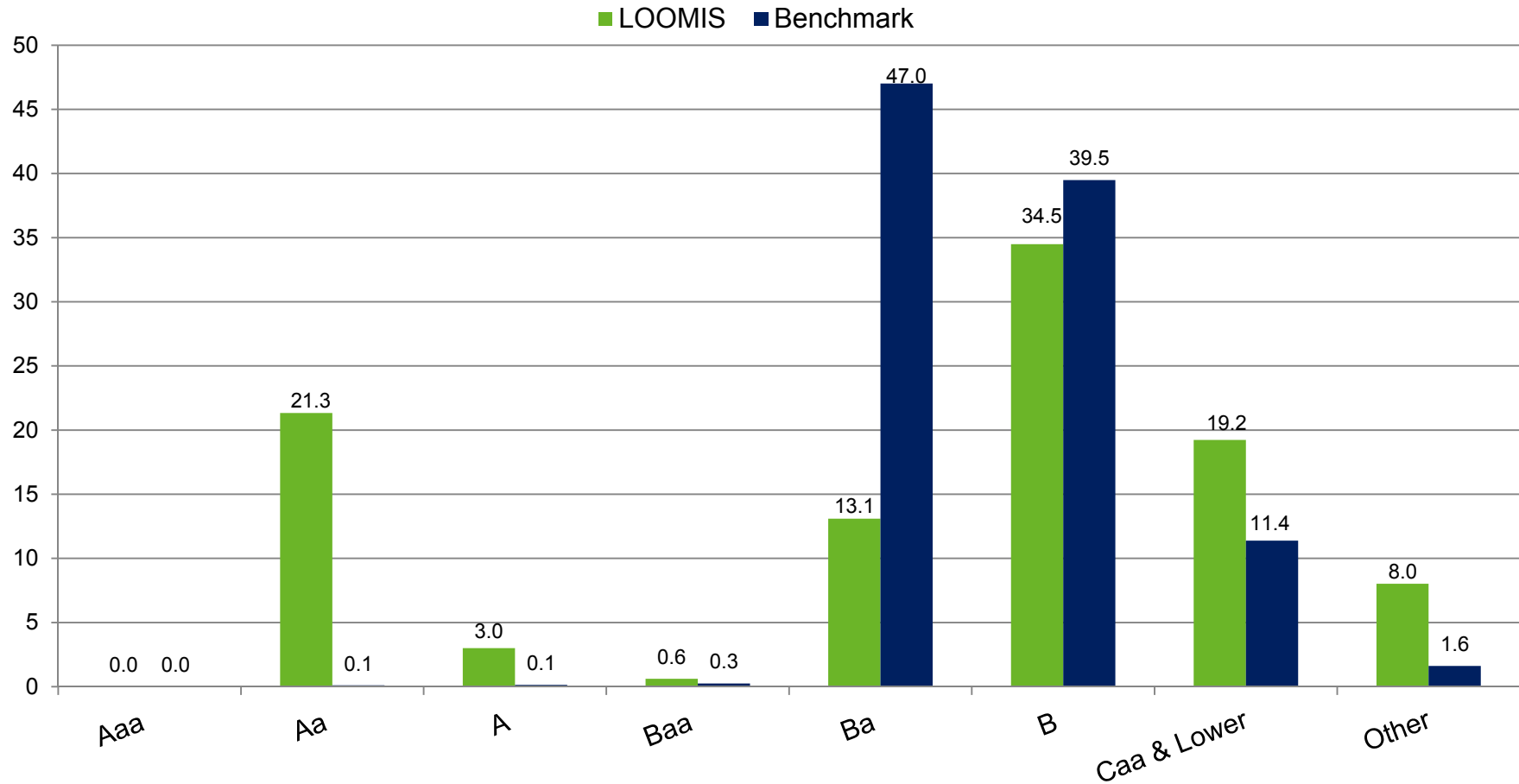
<b>Characteristics</b>	<b>Loomis</b>	<b>Benchmark</b>
Effective Maturity (Yrs)	5.9	5.8
Duration(Yrs)	3.9	4.3
Average Quality	B1	B2
Yield(%)	5.7	6.0



Source: Loomis Sayles, December 2017

# LOOMIS SAYLES – HIGH YIELD

## Quality Allocation



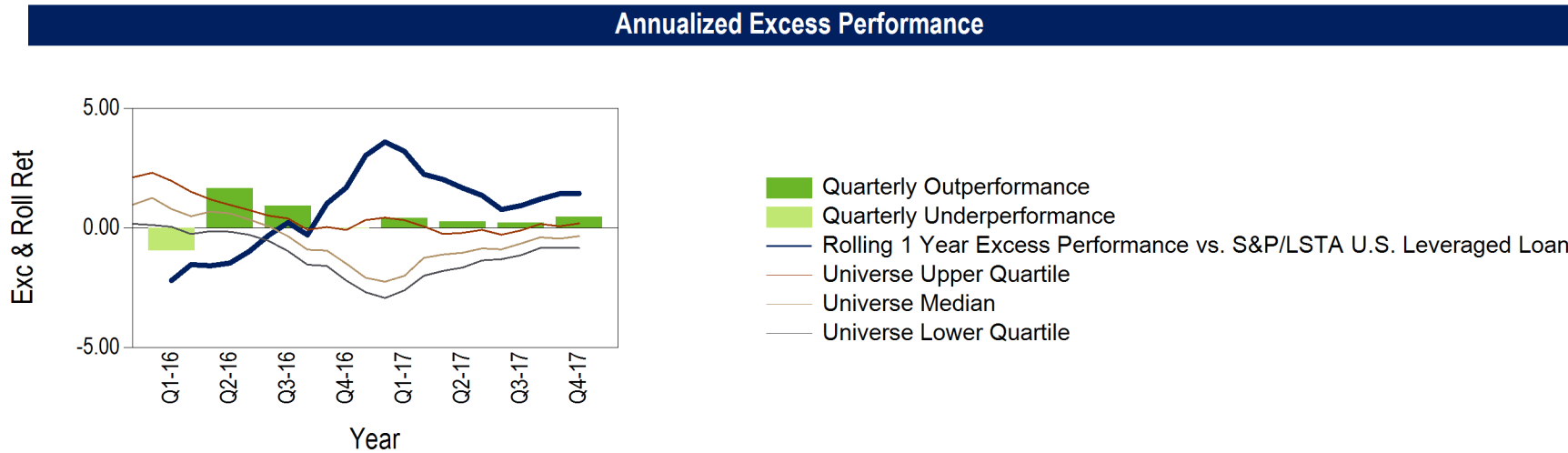
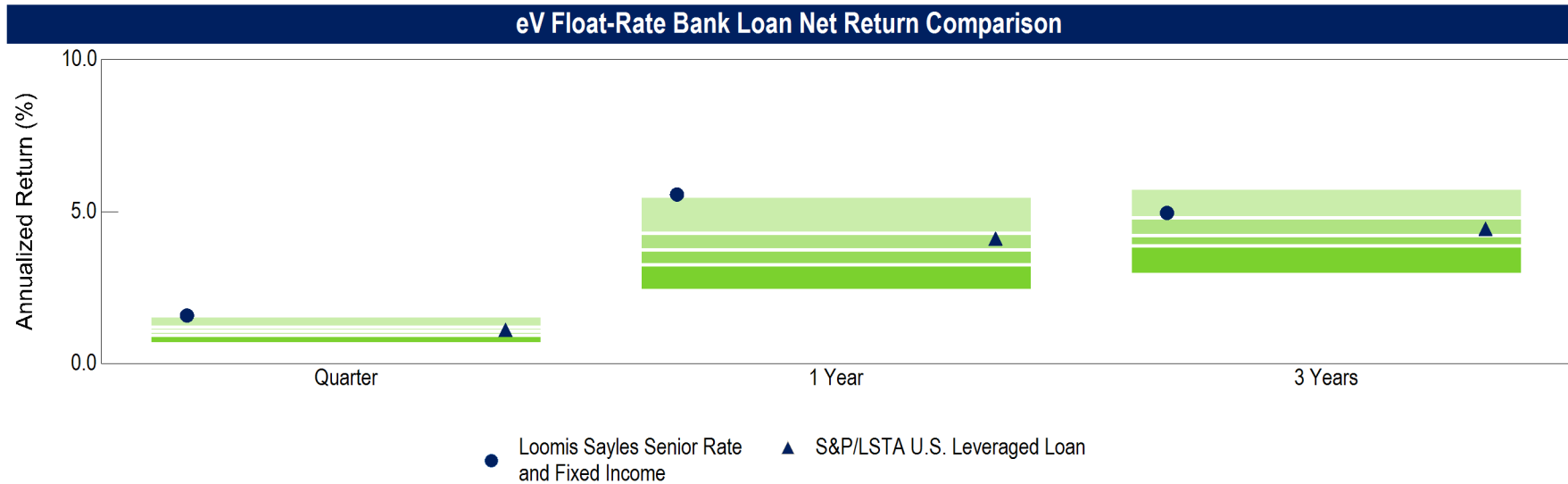
Source: Loomis Sayles, December 2017

# LOOMIS SAYLES – BANK LOANS

- **Role in Portfolio**
  - Bank Loan mandate (added January 2014).
  - Bank loans are typically issued with interest payments that float above a commonly used short-term benchmark such as the London Interbank Offered Rate, or LIBOR, by at least 300 basis points; typically senior to nearly all other debt and equity in a company's capital structure; and very often secured by specific assets or cash flows.
  - Invested to outperform the S&P/LSTA US Leveraged Loan Index.
- **Organizational Profile**
  - Loomis, Sayles & Company was founded as an investment management company in 1926. Throughout its history, the firm has grown to become a primarily institutional investment manager with specialized products in domestic/international fixed income, equities and alternatives.
  - Currently, the firm is a wholly owned subsidiary of NATIXIS Global Asset Management.
  - Loomis Sayles is headquartered in Boston, MA.
- **Investment Strategy Commentary**
  - The investment team believes that high quality bank loans have a more attractive risk adjust return profile than lower quality loans.
  - The strategy combines macro and bottom-up investment analysis to estimate potential returns across potential investments throughout the cycle.
  - The investment team focuses on the probability of default in the next 12-24 months, and in the event of a default, whether or not the bank loan be covered by value (a combination of collateral and enterprise value).
- **Due Diligence Notes**
  - None.

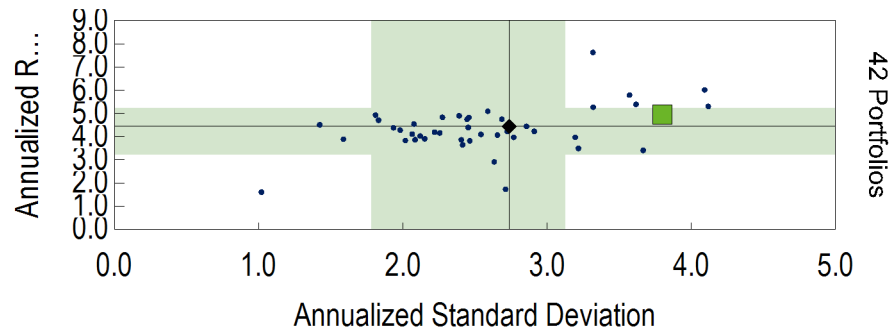


# LOOMIS SAYLES - BANK LOANS



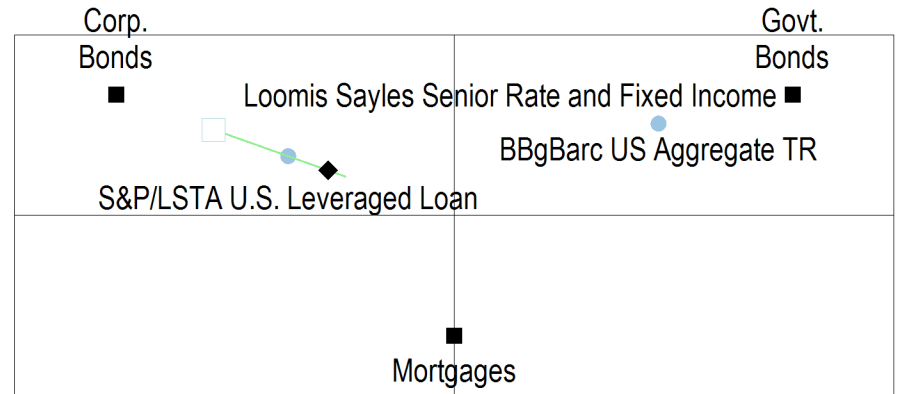
# LOOMIS SAYLES - BANK LOANS

**3 Year Risk Return**

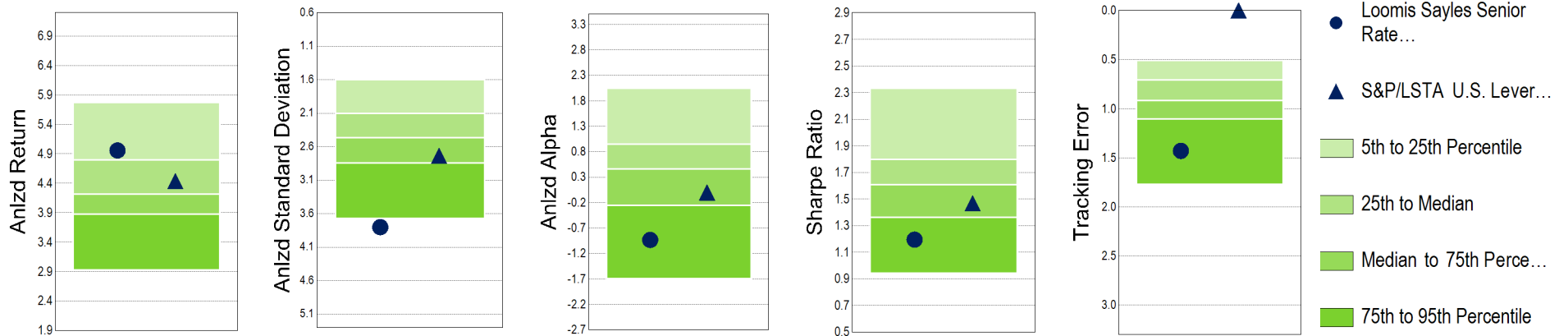


- Loomis Sayles Senior Rate and Fixed Income
- ◆ S&P/LSTA U.S. Leveraged Loan
- 68% Confidence Interval
- eV Float-Rate Bank Loan Net

**3 Year Style Map**



- First Rolling Period
- ◆ Last Rolling Period



# LOOMIS SAYLES – BANK LOANS

<b>Characteristics</b>	<b>Loomis Sayles</b>
Current Yield	6.3
Stated Maturity	5.0
Duration	0.3
Number of Issues	274
Average Quality	B

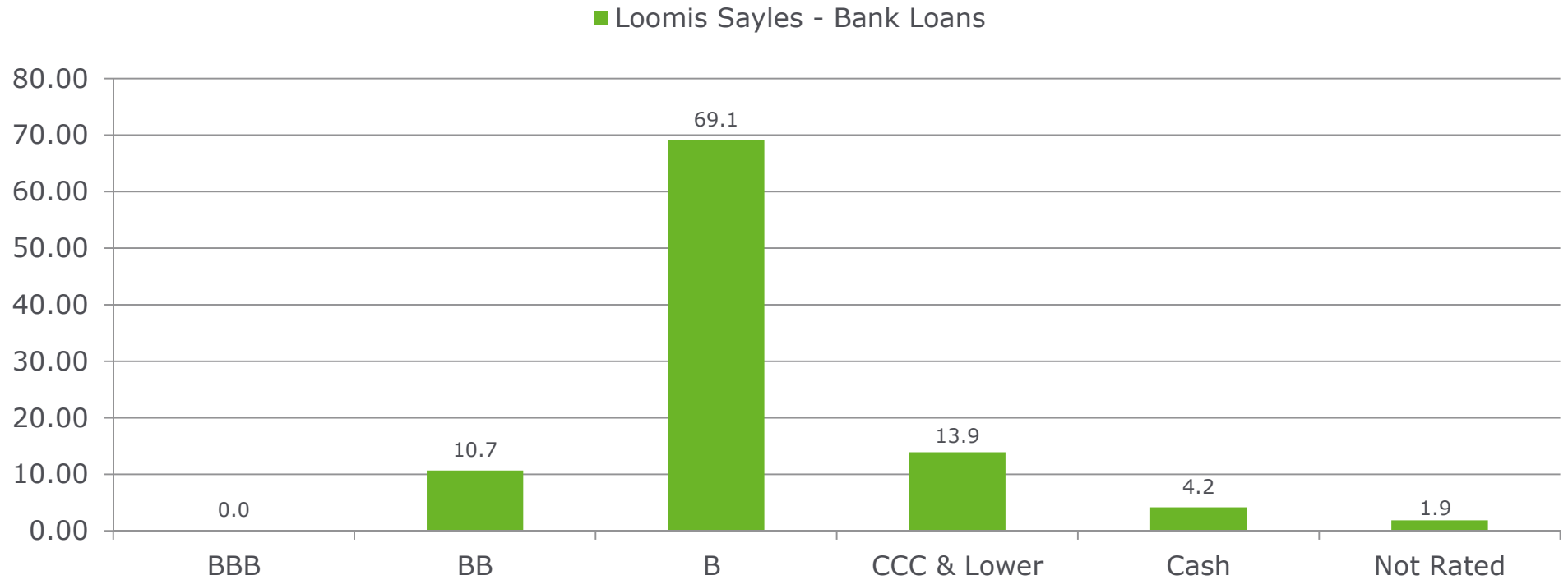


Source: Loomis Sayles, December 2017



# LOOMIS SAYLES – BANK LOANS

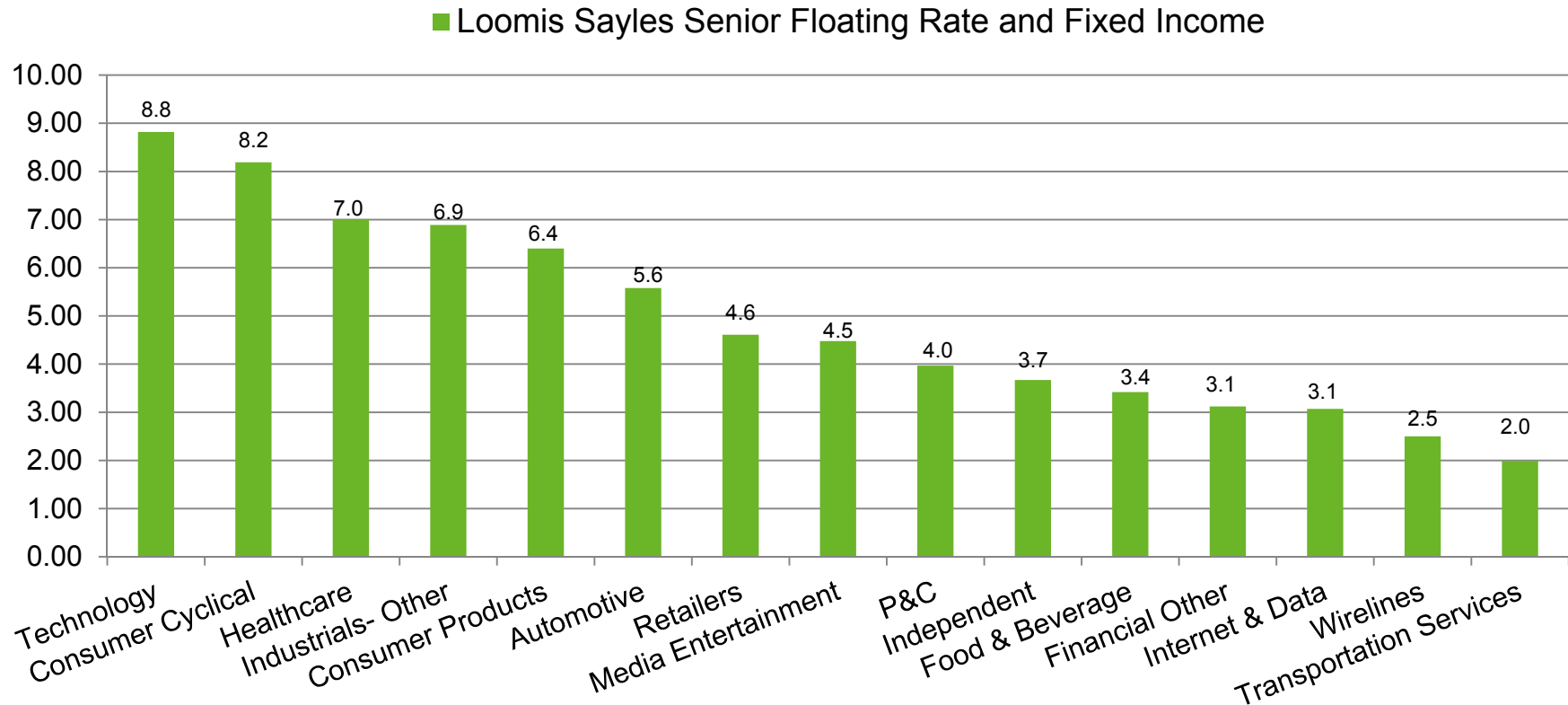
## Credit Distribution



Source: Loomis Sayles, December 2017

# LOOMIS SAYLES – BANK LOANS

## Sector Distribution



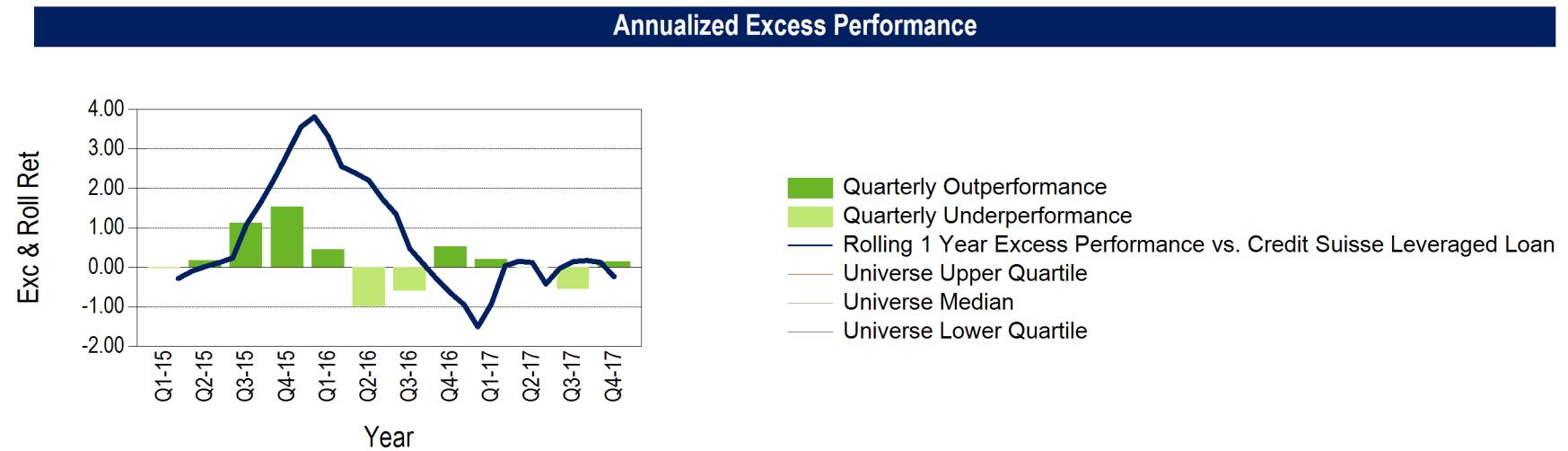
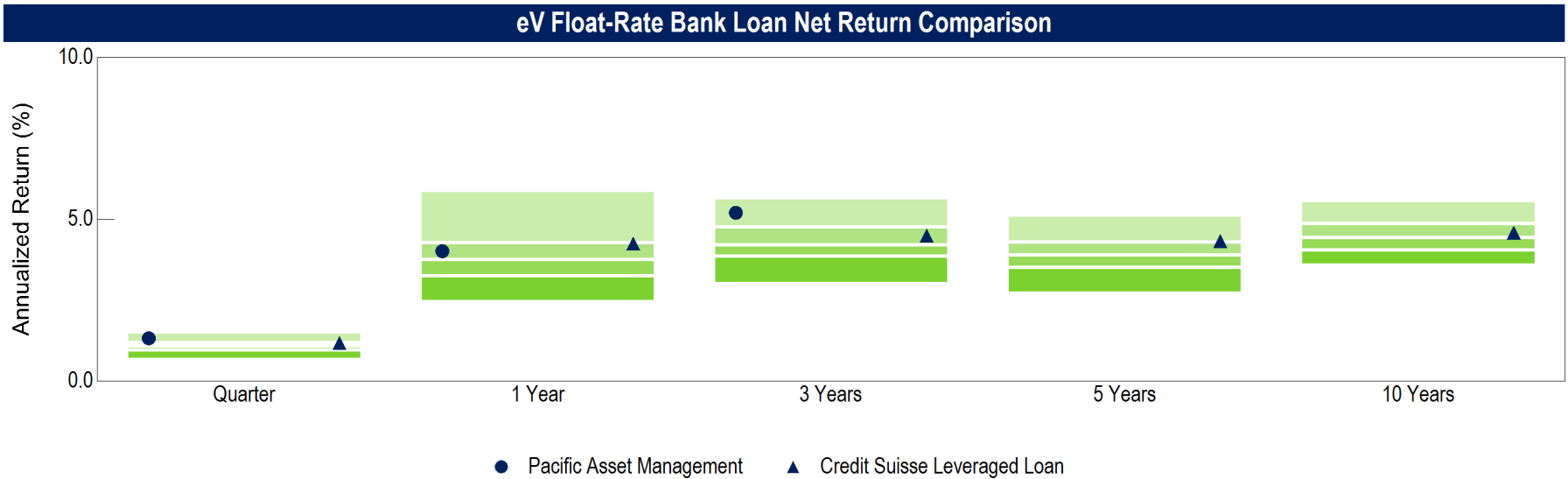
Source: Loomis Sayles, December 2017

# PACIFIC ASSET MANAGEMENT

- **Role in Portfolio**
  - Bank Loan mandate (added August 2017).
  - Bank loans are typically issued with interest payments that float above a commonly used short-term benchmark such as the London Interbank Offered Rate, or LIBOR, by at least 300 basis points; typically senior to nearly all other debt and equity in a company's capital structure; and very often secured by specific assets or cash flows.
  - Invested to outperform the Credit Suisse Leveraged Loan Index.
- **Organizational Profile**
  - Pacific Asset Management ("PAM") is a fixed income advisor specializing in corporate debt strategies. PAM is a business division of Pacific Life Advisors, a wholly owned subsidiary of Pacific Life Insurance Company ("Pacific Life"). Prior to being formed in 2007, PAM managed fixed income assets for the general account of Pacific Life. PAM now manages third-party assets in addition to the general account of the parent.
  - Pacific Asset Management is headquartered in Port Orchard, WA.
- **Investment Strategy Commentary**
  - Fundamental credit research is the foundation by which bank loan strategies are managed.
  - The investment process starts with a screening process seeking to remove the smaller and less liquid issuers from the universe. From there, securities are screened based on fundamental credit analysis; of particular importance are enterprise valuations, leverage, EBITDA trends, free cash flow, competitive position, industry dynamics, and the management teams.
  - Additionally, each strategy is supported by a minimum of two portfolio managers with the underlying investments discussed regularly by the investment team.
- **Due Diligence Notes**
  - February, 2016: Jason Rosiak, Managing Director, departed the firm. NEPC recommended a 'watch' status.
  - October, 2016: PAM finalized a long-term compensation structure agreement. NEPC upgraded the DD status to 'No Action'.

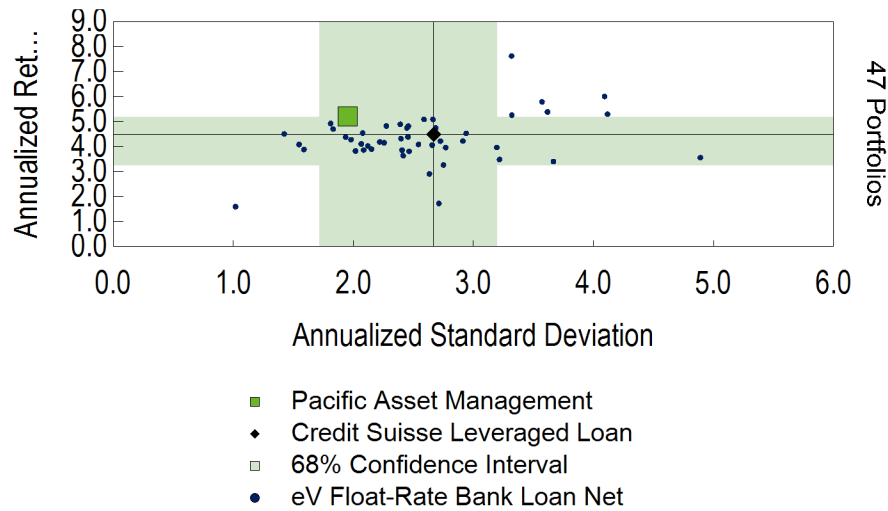


# PACIFIC ASSET MANAGEMENT

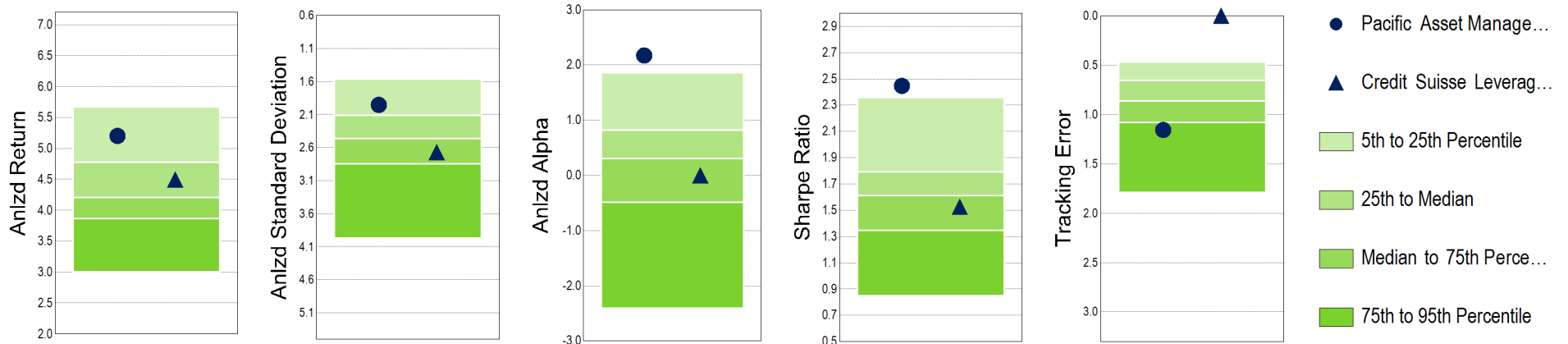
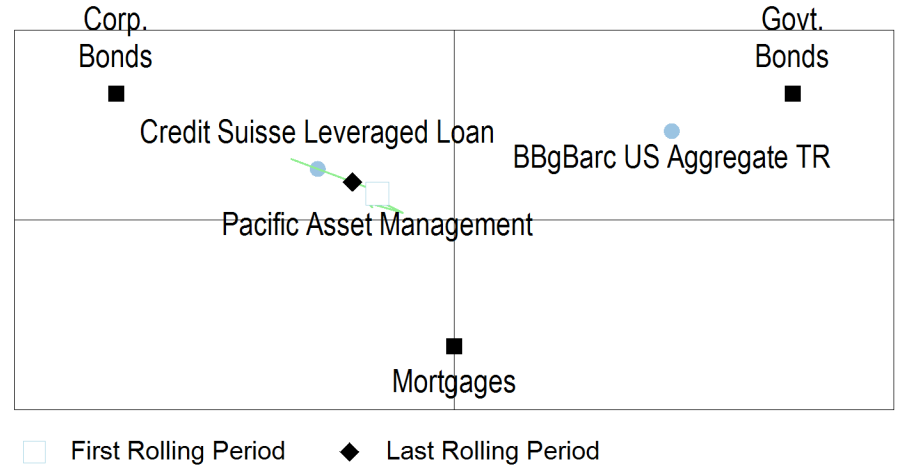


# PACIFIC ASSET MANAGEMENT

**3 Year Risk Return**



**3 Year Style Map**



# PACIFIC ASSET MANAGEMENT

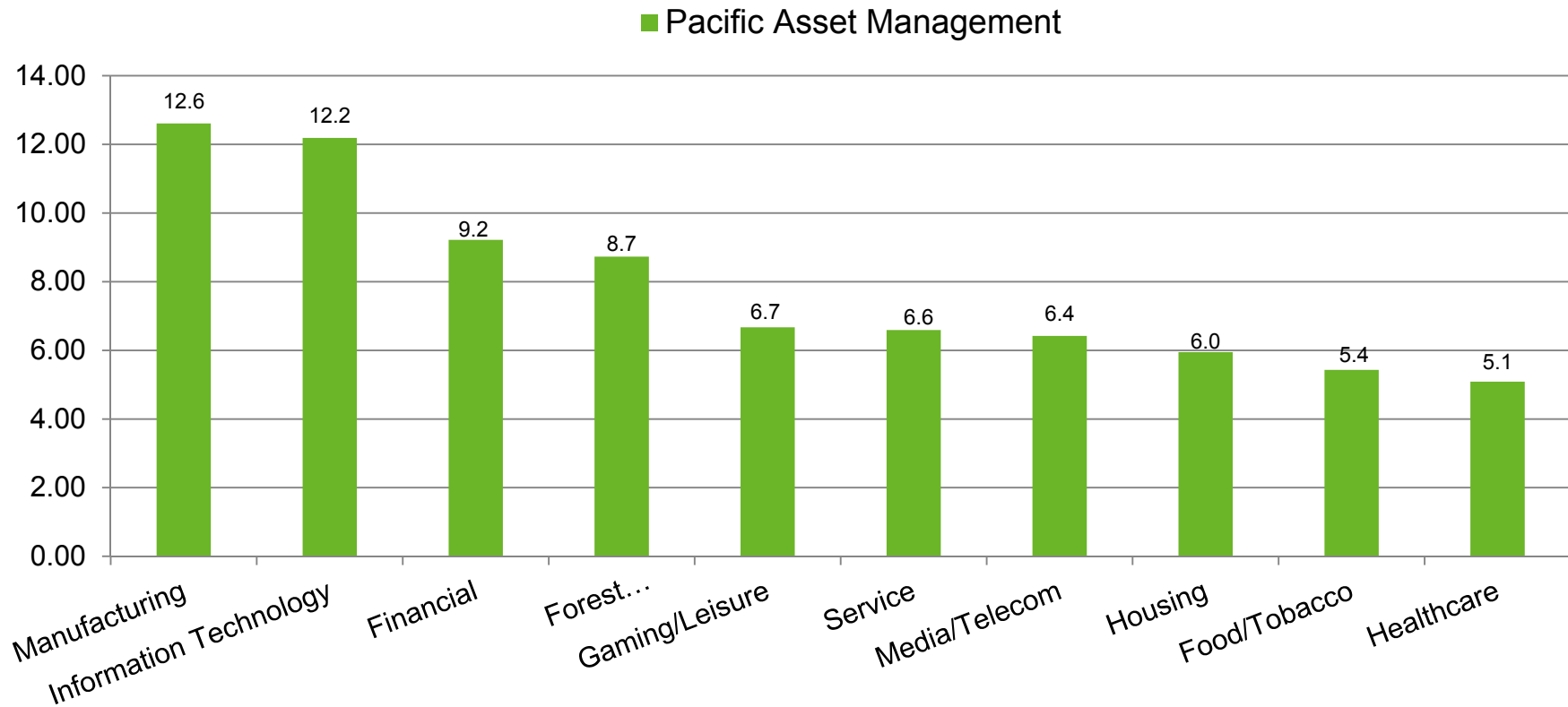
<b>Characteristics</b>	<b>Pacific</b>	<b>Benchmark</b>
Duration(Yrs)	0.28	0.25
Average Quality	B+	BB-
Yield(%)	4.9	5.7



Source: Pacific Asset Management, December 2017

# PACIFIC ASSET MANAGEMENT

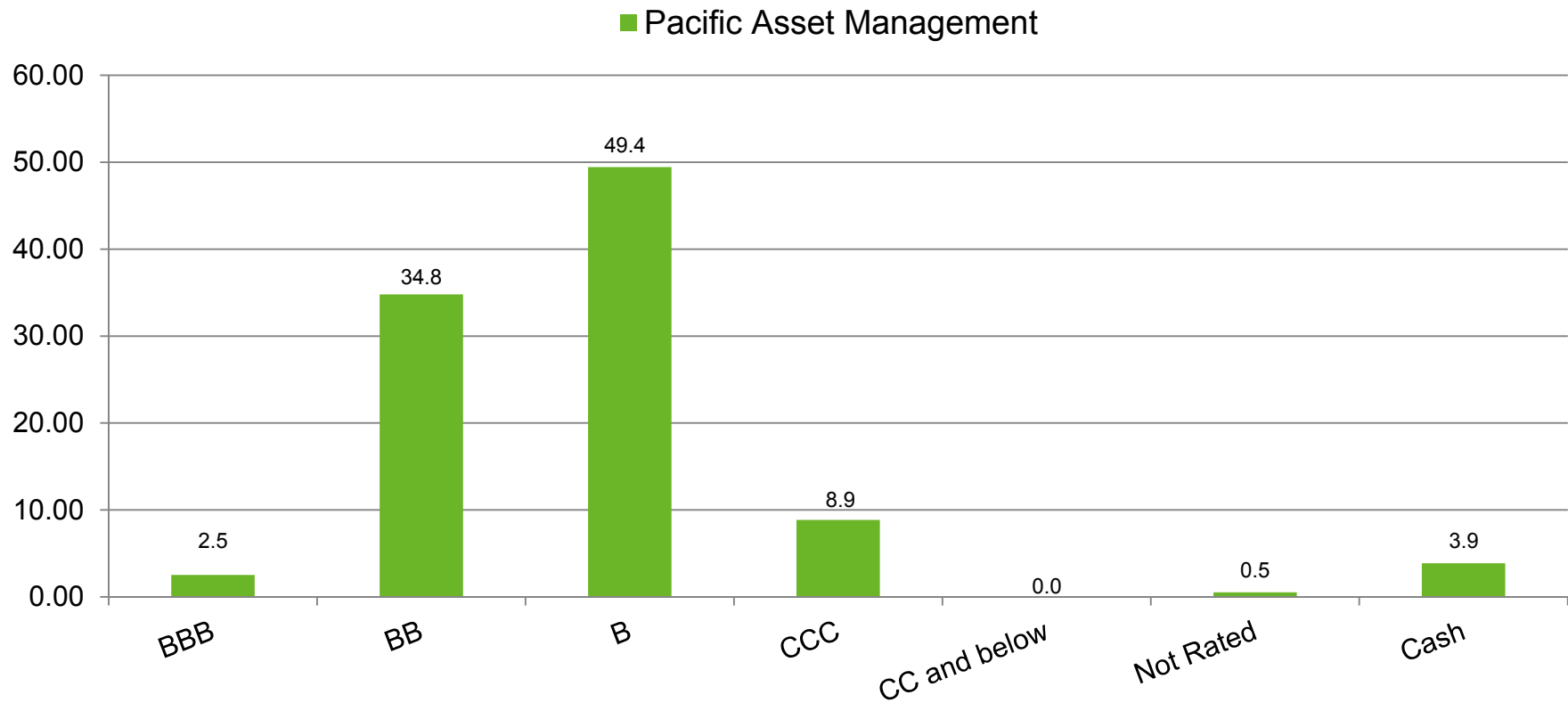
## Sector Distribution



Source: Pacific Asset Management, December 2017

# PACIFIC ASSET MANAGEMENT

## Credit Distribution



Source: Pacific Asset Management, December 2017



# ASHMORE EM BLENDED DEBT

- **Role in Portfolio**
  - Blended Currency Emerging Market Debt mandate (added December 2017).
  - Emerging market debt encompasses bonds issued by less developed countries and by the corporations within them.
  - Invested to outperform the Ashmore Blended Debt Index<sup>1</sup>.
- **Organizational Profile**
  - Ashmore Group plc, the parent company of Ashmore Investment Management Limited (“AIML” or “Ashmore”), was listed on the London Stock Exchange in October 2006. The Fund Management business was originally formed by the current Managing Director, as a division of Australia and New Zealand Banking Group Limited (ANZ) in 1992, and was separately incorporated in 1997, as a 100% ANZ-owned subsidiary company under the name ANZ Emerging Markets Fund Management Limited (EMFM). In 1998, EMFM’s senior management sought and undertook (in February 1999) a management buy-out (“MBO”) of the business, which included all the EMFM managed offshore funds. EMFM was then renamed Ashmore Investment Management Limited (“Ashmore” or “AIML”).
  - The firm is also one of the largest managers of emerging markets debt in the world and has offices in the US, UK, South America, India, the Middle East, and several location throughout Asia.
  - Ashmore is headquartered in London, UK.
- **Investment Strategy Commentary**
  - The strategy employs a top-down investment philosophy and an active management style with a strong focus on liquidity management.
  - The Investment Committee oversees the process and meets on a weekly basis.
  - The Committee first considers overall global macro-economic, liquidity and interest rate conditions. This is followed by an extensive discussion on individual emerging countries, with a particular emphasis on politics. The second part of the meeting covers the micro bottom up analysis of special situations, corporates and sovereigns.
  - Country selection comprises about 80% of the strategy’s alpha or value added. The remaining sources of added value come from duration, yield curve management, and instrument selection.
- **Due Diligence Notes**
  - None.

<sup>1</sup>Ashmore Blended Benchmark consists of 50% JPM EMBI / 50% JPM GBI-EM



# ASHMORE EM BLENDED DEBT

## Characteristics

## Ashmore Blended Debt

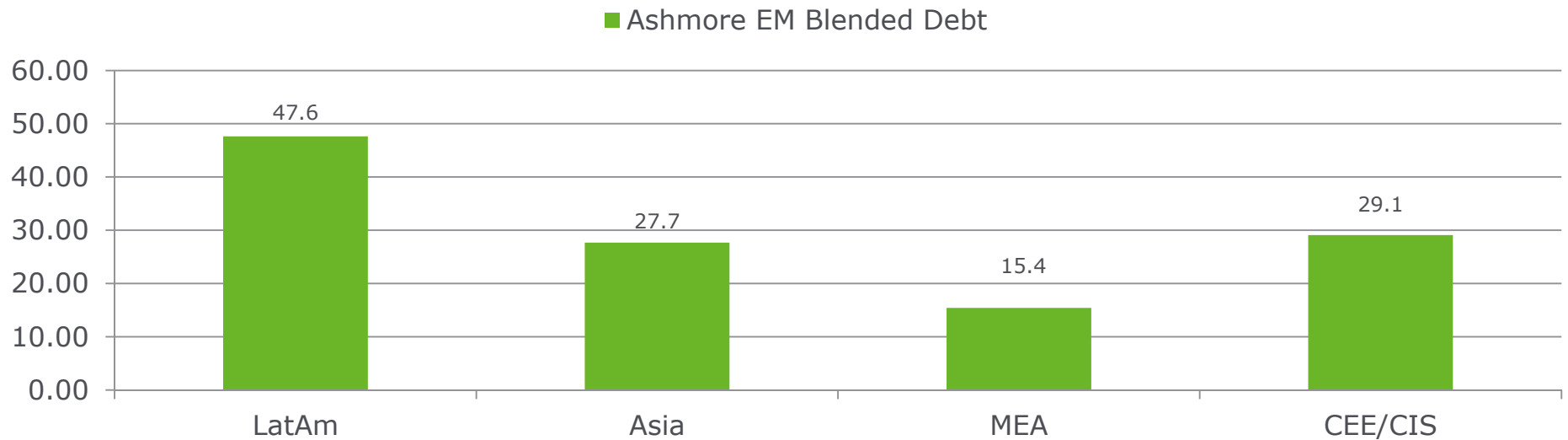
Average Modified Duration	5.5
Average Life (years)	9.0
Yield to Maturity	6.4
Average Credit Rating	BB



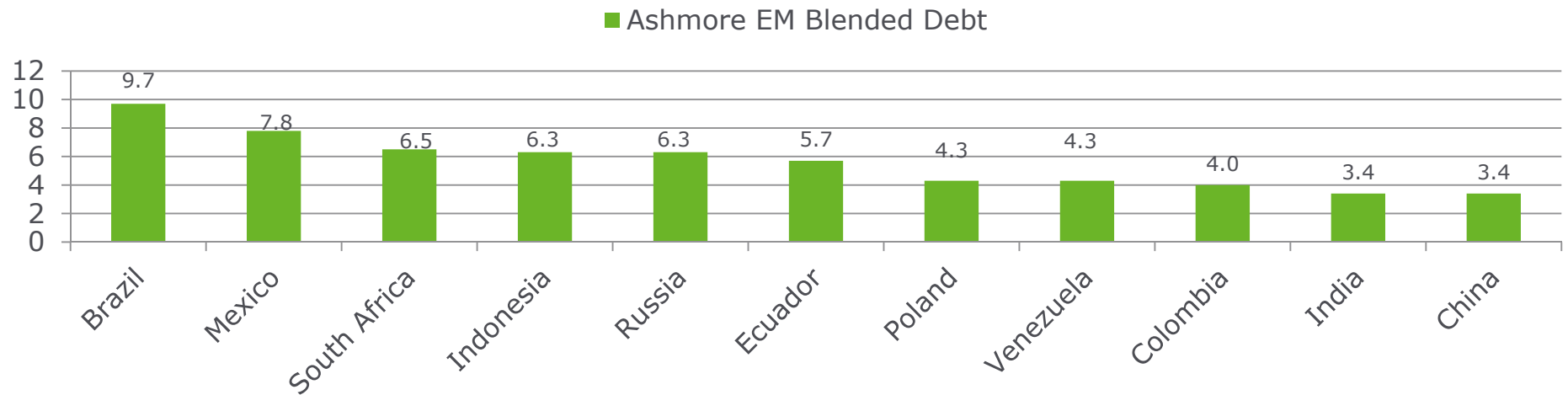
Source: Ashmore, December 2017

# ASHMORE EM BLENDED DEBT

## Exposure by Region



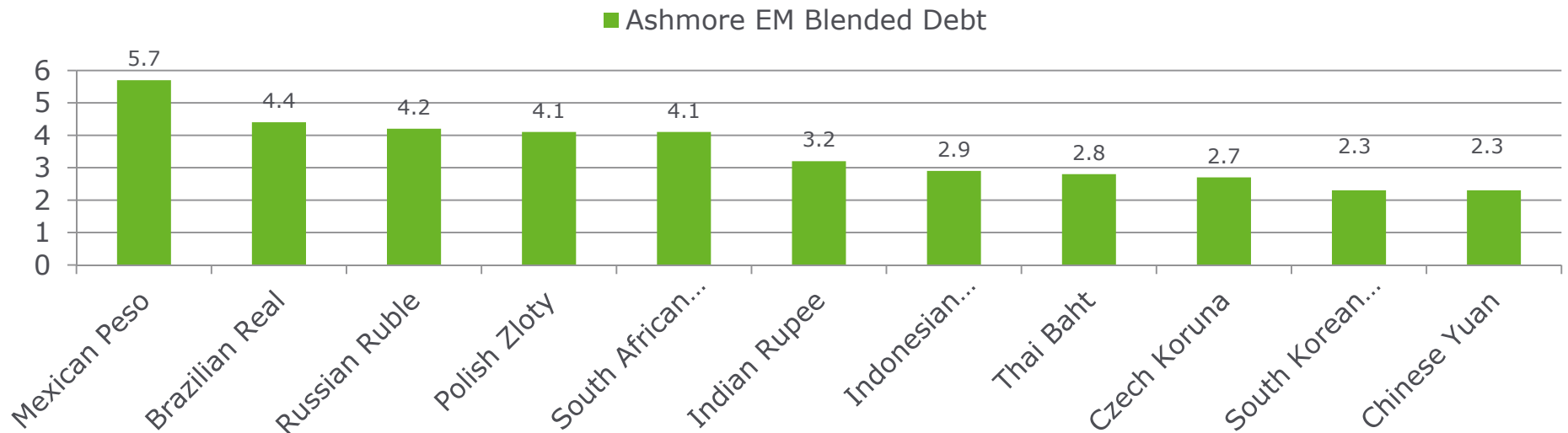
## Top 10 Country Exposures (% of NAV)



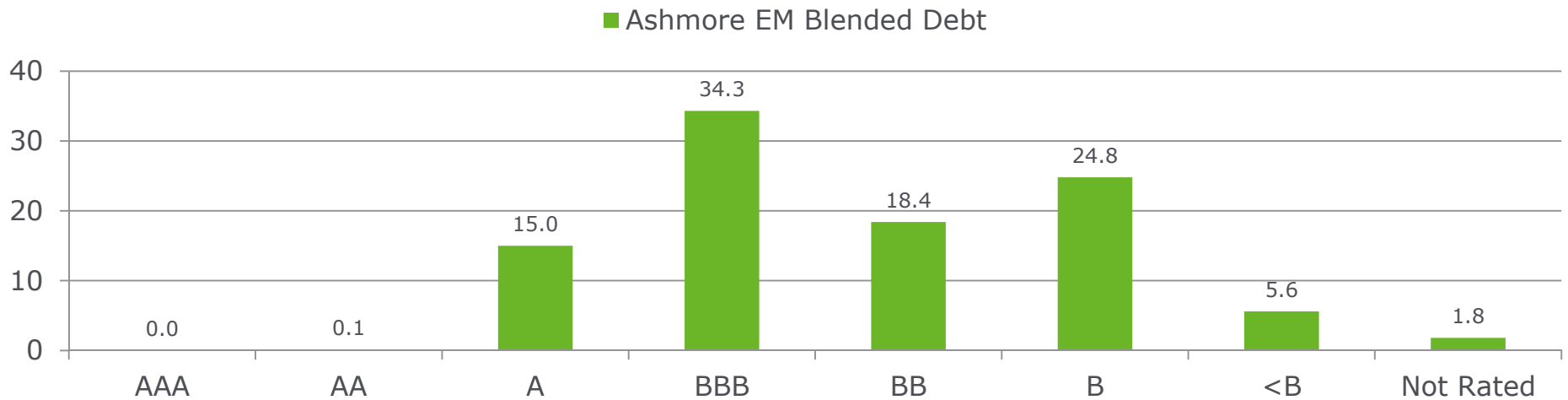
Source: Ashmore, December 2017

# ASHMORE EM BLENDED DEBT

## Top 10 Currency Exposures (% of NAV)



## Credit Rating of Debt Instruments (% of NAV)



Source: Ashmore, December 2017

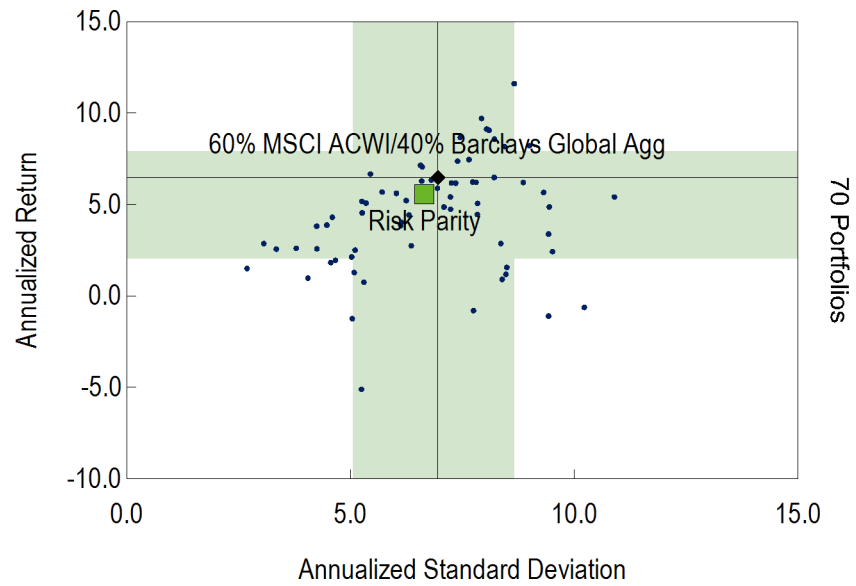
# GLOBAL ASSET ALLOCATION

NEPC, LLC

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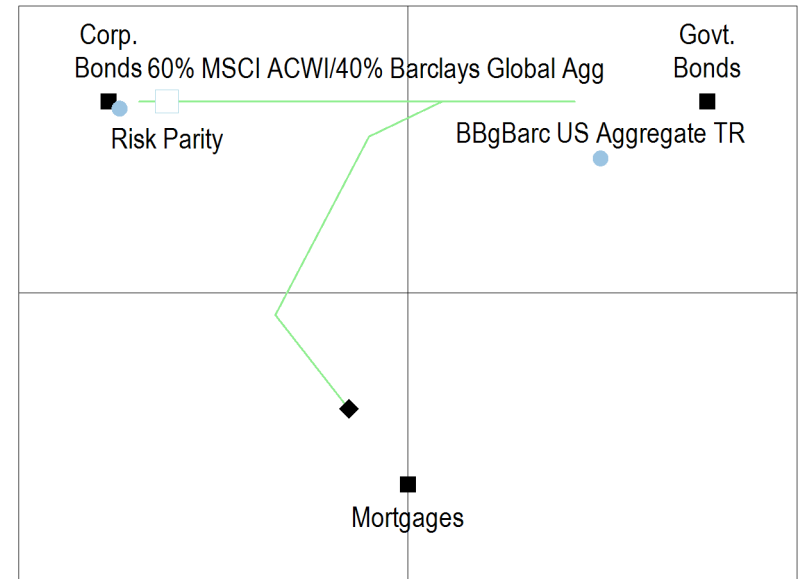
# RISK PARITY

## 3 Year Risk Return



- Risk Parity
- ◆ 60% MSCI ACWI/40% Barclays Global Agg
- 68% Confidence Interval
- eV All Global Balanced / TAA Net

## 3 Year Style Analysis

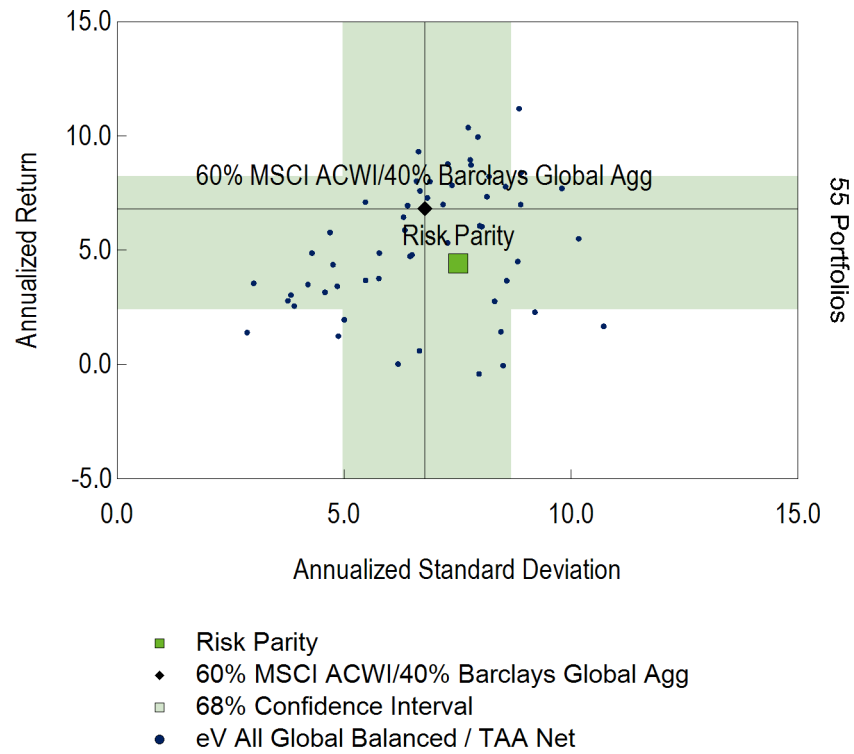


- First Rolling Period
- ◆ Last Rolling Period

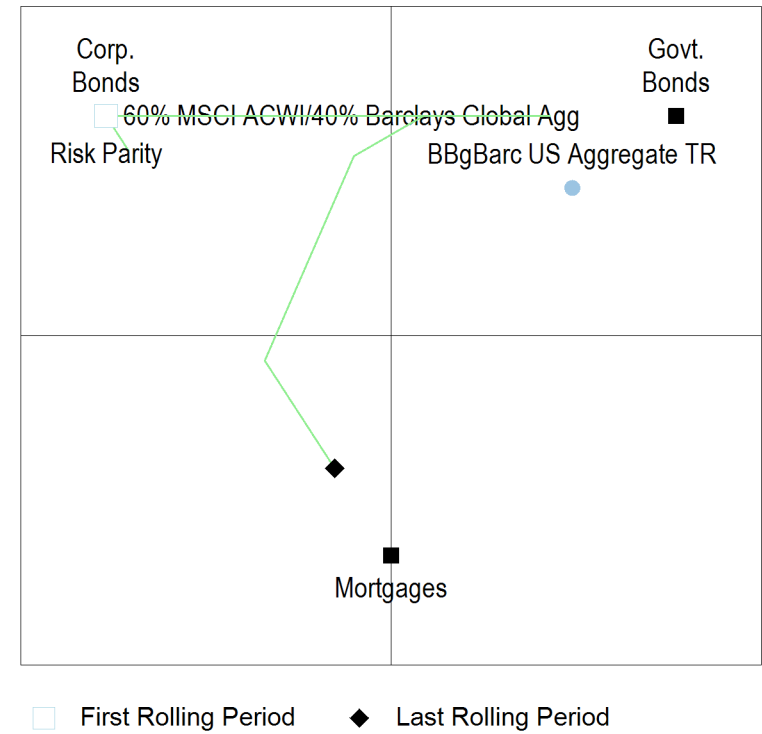


# RISK PARITY

## 5 Year Risk Return



## 5 Year Style Analysis



# BRIDGEWATER - ALL WEATHER FUND

- **Role in Portfolio**

- Risk Parity mandate (added September 2007).
- Risk Parity is a financially-engineered balanced fund, which NEPC expects to outperform a simple 60/40 solution on a total return and a risk-adjusted basis over the long term. Bridgewater views All Weather as their 'optimal beta portfolio.'
- DPF is invested in the 12% volatility approach.

- **Organizational Profile**

- Bridgewater Associates is a portfolio management firm focused on institutional investors, providing optimal beta solutions and alpha strategies. They began offering investment services in 1975, initially providing money management and consulting services in the global credit and currency markets to corporations in the management of income statement and balance sheet exposures. Bridgewater registered with the SEC as an investment advisor in 1990 and has been managing assets for institutional investors ever since. As a privately held company, Bridgewater does not disclose any other information regarding its ownership structure. Bridgewater has no parent, affiliate, or joint venture relationships.
- Bridgewater is headquartered in Westport, Connecticut.

- **Investment Strategy Commentary**

- Passive balanced risk exposure to high/low growth environments and high/low inflation environments. Notional exposures do not change significantly.
- Interest rate exposure tends to be greater than other Risk Parity strategies. Potential headwind in rising rate environment but better balance in growth and inflation shocks.
- Size of asset class positions are based on strength of relationship to growth and inflation factors. Fund notional exposure ranges between 150% and 200%. Implemented with both physical and synthetics.

- **Due Diligence Notes**

- March, 2016: Jon Rubinstein joined as Co-CEO. NEPC recommended 'No Action'.
- March 2017: Several changes at the management level occurred including the departure of recently appointed Co-CEO, Jon Rubinstein. NEPC recommended 'No Action'.





# BRIDGEWATER – ALL WEATHER FUND

## Bridgewater All Weather 12% Strategy

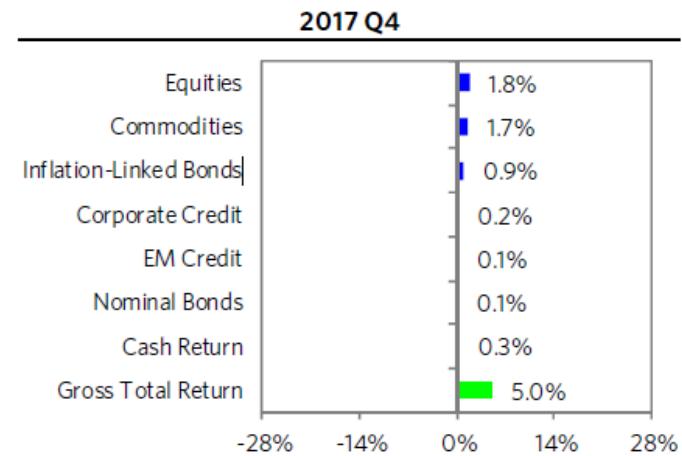
Gross Excess Return Attribution by Economic Environment

	Growth	Inflation
Rising	Return 1.7%	Return 1.8%
Falling	Return 0.9%	Return 0.3%
= Risk Premiums & Discount Rates 4.8% Excess Return Over Cash		

Plus Cash Return = 0.3%  
 Gross Total All Weather Return = 5.0%  
 Net Total All Weather Return = 4.4%

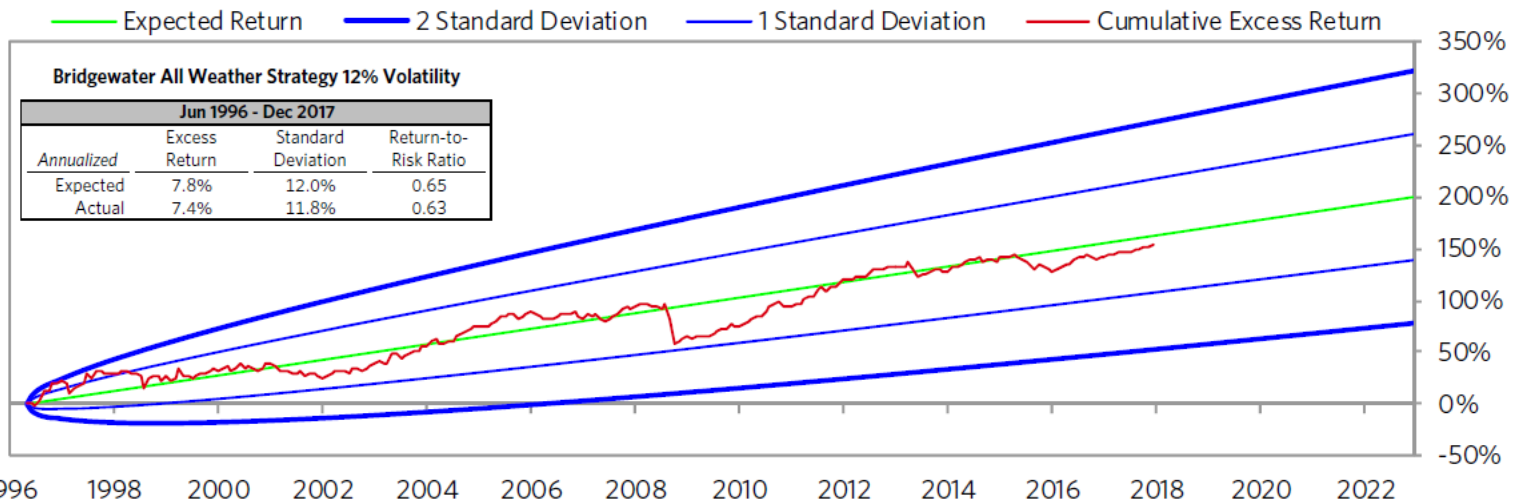
## Bridgewater All Weather 12% Strategy

Gross Excess Return Attribution by Asset Class



## Gross Cumulative Excess Return vs. Expectations (In)

(Returns Based on Related Fund Performance Prior to July 2006)



Source: Bridgewater, December 2017

# BRIDGEWATER - ALL WEATHER FUND

Exposure as a % of  
Portfolio Value

## Nominal Interest Rates

Africa	0.4%
Asia	2.0%
Australia	4.0%
Canada	0.7%
Eastern Europe	1.4%
Euroland	0.0%
Japan	0.0%
Latin America	0.5%
United Kingdom	0.0%
United States	27.0%
Western Europe ex Euroland	0.1%

**Total Nominal Interest Rates** **36.1%**

**Corporate Credit** **12.9%**

## Inflation-Linked Bonds

Australia	1.3%
Canada	1.7%
Euroland	10.9%
Sweden	1.2%
United Kingdom	7.5%
United States	16.8%

**Total Inflation-Linked Bonds** **39.4%**

## Emerging Market Credit

Argentina	1.4%
Brazil	2.2%
Colombia	0.5%
Indonesia	0.8%
Mexico	0.9%
Peru	0.3%
Philippines	0.1%
Russia	1.4%
South Africa	0.8%
Turkey	1.9%
Venezuela	0.0%

**Total Emerging Market Credit** **10.2%**

## Equities

Australia	2.8%
Canada	1.3%
Emerging Markets	4.1%
France	1.2%
Germany	2.5%
Hong Kong	0.5%
Japan	2.4%
United Kingdom	2.8%
United States	8.3%
Western Europe	2.6%

**Total Equities** **28.6%**

## Commodities

Aluminum	2.2%
Coffee	0.3%
Copper	2.1%
Corn	0.3%
Cotton	0.2%
Gold	7.7%
Lean Hogs	0.3%
Live Cattle	0.4%
Natural Gas	1.1%
Nickel	0.8%
Oil and Petroleum Products	4.9%
Silver	0.1%
Soybeans and Soybean Products	0.8%
Sugar	0.3%
Wheat	0.3%
Zinc	0.8%

**Total Commodities** **22.8%**



Source: Bridgewater

# PUTNAM

- **Role in Portfolio**

- Risk Parity mandate (added December 2009)
- Risk Parity is a financially-engineered balanced fund, which NEPC expects to outperform a simple 60/40 solution on a total return and a risk-adjusted basis over the long term.
- Total Return targets a 10% volatility.

- **Organizational Profile**

- Putnam was founded in 1937, and registered with the Securities and Exchange Commission in 1968 as an investment advisor. In 1970, the firm was acquired by Marsh & McLennan Companies, Inc. In August 2007, the sale of Putnam Investments by Marsh and McLennan Companies (MMC) to Great-West Lifeco Inc., a subsidiary of Power Financial Corporation, was completed. At the present time, Putnam is 90% owned by Great-West Lifeco Inc., the remaining 10% is owned by senior Putnam investment professionals and other key people.
- Putnam is headquartered in Boston, Massachusetts.

- **Investment Strategy Commentary**

- The strategy seeks to outperform one-month LIBOR by 5% to 8% over a full market cycle, while targeting a risk level of approximately 10%.
- The Fund is expected to deliver a more efficient asset allocation by balancing the sources of portfolio risk across asset class risk exposures. In addition, the expertise of the Putnam Global Asset Allocation team enables a dynamic allocation process that seeks to identify the most attractive asset allocation throughout different economic cycles. Bringing the beta and alpha allocations together, the strategy seeks to deliver higher risk-adjusted returns than a traditional balanced portfolio.
- A fundamental process is used to inform active views and tactically shift positions across asset classes or to adjust notional exposure. The Fund targets a notional exposure of 150% and is implemented using physical and synthetics.

- **Due Diligence Notes**

- January, 2013: Jeff Knight, CIO, resigned. NEPC placed the product on 'Client Review'.
- March, 2014: NEPC upgraded DD status to 'Watch' as asset flows stabilized and Co-CIO structure seen as working.
- February, 2015: NEPC upgraded DD status from 'Watch' to 'No Action'. New Co-CIO structure working well.
- July, 2015: Due to senior team member departure, NEPC placed the product back on 'Watch', with searches allowed.
- March, 2016: Product upgraded from 'Watch' to 'No Action'.
- July, 2017: Bob Kea, Co-Head of GAA, announced his retirement at the end of December, 2017. NEPC recommended 'No Action' with this announcement.



# PUTNAM

## *Risk weight summary as of December 31, 2017*

	Risk factor weight (%)
Common factor risk	
Credit	15.22
Inflation	24.09
Equity	59.29
Rates	1.39



Source: Putnam, December 2017

# PUTNAM

## Portfolio weight summary as of December 31, 2017

Asset Class	Physical Weight	Derivative Exposure	Total Current Weight	Index Proxy
U.S. Equity	19.48%	0.57%	20.05%	Russell 3000 Index
Non-U.S. Equity	10.85%	1.83%	12.68%	MSCI EAFE Index
Emerging-Market Equity	5.70%	0.00%	5.70%	MSCI Emerging Markets Index
U.S. High-Yield Bond	12.64%	-3.10%	9.53%	JP Morgan High Yield Developed Index
Emerging-Market Bond	0.00%	4.95%	4.95%	JPM EM Global Bond Index
U.S. Investment-Grade Bond	13.59%	6.32%	19.90%	Barclays Aggregate Bond Index
Non-U.S. Government Bond	0.00%	24.68%	24.68%	Citi WGBI ex US Index
U.S. TIPS	0.00%	29.71%	29.71%	Barclays TIPS Index
Commodities	0.00%	15.20%	15.20%	GSCI Index
REITs	3.02%	0.00%	3.02%	MSCI REIT Index
Cash	34.72%	-80.16%	-45.43%	3 month U.S. Treasury Bill

data as of December 31, 2017



Source: Putnam, December 2017

# GMO

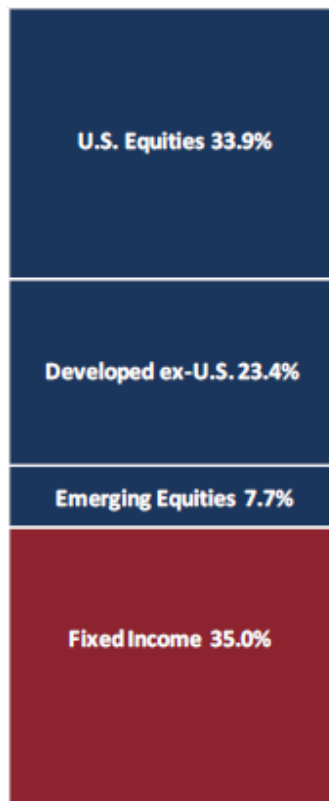
- **Role in Portfolio**
  - Global Tactical Asset Allocation (GTAA) mandate.
    - In September 2007, DPFP invested in GMO's GTAA service Real Return Global Balanced Asset Allocation.
    - In December 2010, DPFP transitioned to GAAR, GMO's unconstrained GTAA product.
  - GTAA funds use top down views and portfolio management techniques in an effort to outperform a balanced 60/40 benchmark or an absolute return benchmark such as CPI + 5%.
  - GAAR is invested to outperform a CPI + 5% benchmark.
- **Organizational Profile**
  - GMO was founded in 1977 as a private investment firm to serve institutional clients.
  - Initial products were designed around the firm's value-oriented discipline until GMO's quantitative division was launched in 1982, providing a way to augment existing strategies and disciplines.
  - GMO has a wide range of products across global asset classes, and are known for their contrarian, often bearish view of the marketplace.
  - GMO is headquartered in Boston, Massachusetts.
- **Investment Strategy Commentary**
  - Real Return Global Balanced Asset Allocation (Sep-2007 through Nov-2010)
    - Portfolio construction based on seven year asset class forecasts developed by GMO's quantitative team.
    - Product seeks to add 2-3% above a blended benchmark (60% MSCI World, 20% BC Agg', 20% Cash).
  - GAAR (invested in Dec-2010)
    - GMO's Asset Allocation team seeks to add value on an absolute return basis.
    - The team focuses on identifying opportunities for mean reversion and contrarian investments.
    - The goal is to generate strong real returns over a market cycle by allocating to a potentially wide range of asset classes, including diversifying ones such as Int'l Small Cap, Emerging Market equities, REITs, and TIPS.
    - GMO expects volatility to lie in same range as traditional balanced portfolios, although the pattern of returns can be very different.
- **Due Diligence Notes**
  - October, 2013: Global Equity and Asset Allocation strategy teams joined together. NEPC placed the product on 'Watch' with this announcement.
  - December, 2013: NEPC upgraded the DD status on the strategy from 'Watch' to 'No Action'.
  - June, 2016: NEPC placed the product on 'Hold' due to organizational changes.
  - February, 2018: NEPC upgraded the DD status on the strategy from 'Hold' to 'No Action'.



## Asset Allocation

### Benchmark

65% Equities/35% Bonds <sup>1</sup>



### GMO Active Weighting Decisions<sup>2\*</sup>



### Strategy

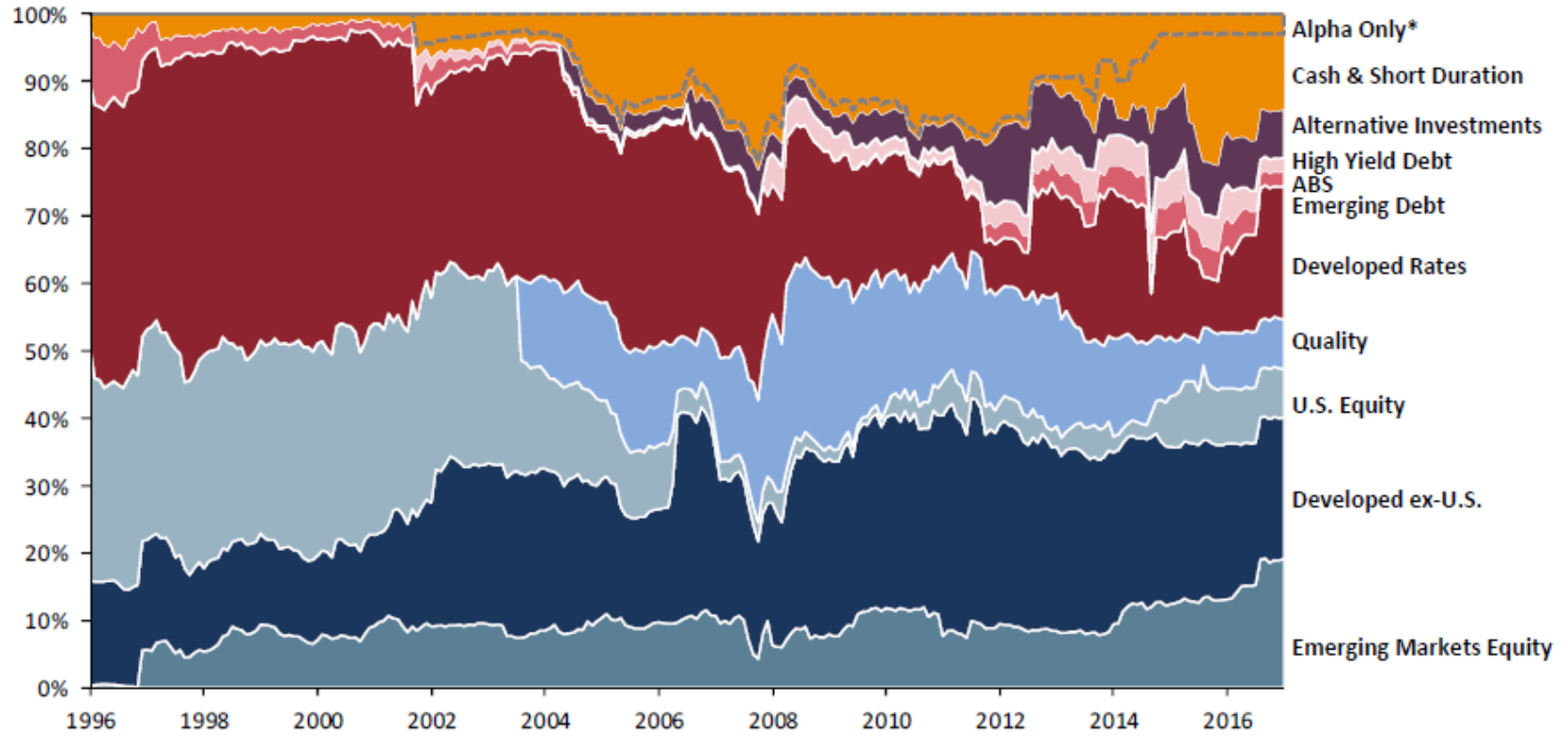


Relative Value Interest Rates & FX 1.7%

Source: GMO



## Historical Allocation



Source: GMO





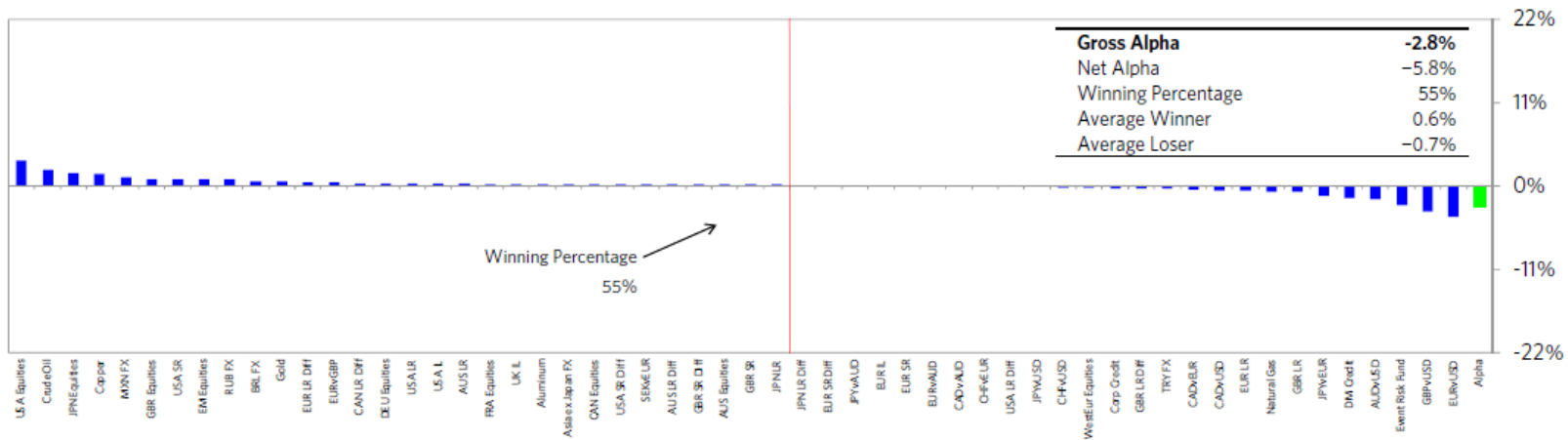
# BRIDGEWATER – PURE ALPHA MAJOR MARKETS II (PAMM)

- **Role in Portfolio**
  - Absolute Return mandate (added August 2011).
  - Absolute return funds seek to earn an uncorrelated, positive return regardless of market conditions.
  - PAMM is invested to provide an excess return over cash of 12% with a Sharpe Ratio of 0.85, over the long term. The DFPF policy benchmark for PAMM is the HFRX Absolute Return Index.
- **Organizational Profile**
  - Bridgewater Associates is a portfolio management firm focused on institutional investors, providing optimal beta solutions and alpha strategies. They began offering investment services in 1975, initially providing money management and consulting services in the global credit and currency markets to corporations in the management of income statement and balance sheet exposures. Bridgewater registered with the SEC as an investment advisor in 1990 and has been managing assets for institutional investors ever since. As a privately held company, Bridgewater does not disclose any other information regarding its ownership structure. Bridgewater has no parent, affiliate, or joint venture relationships.
  - Bridgewater is headquartered in Westport, Connecticut.
- **Investment Strategy Commentary**
  - Launched in 2010, PAMM is an extension of Bridgewater's Pure Alpha strategy.
  - PAMM stems from the same investment process and investment professionals but trades a subset of the markets in which Pure Alpha invests; in particular, PAMM trades in deeper markets with more capacity.
  - PAMM is a global, active hedge fund strategy designed to generate high and consistent returns, which are expected to be uncorrelated to markets.
- **Due Diligence Notes**
  - March, 2016: Jon Rubinstein joined as Co-CEO. NEPC recommended 'No Action'.
  - March 2017: Several changes at the management level occurred including the departure of recently appointed Co-CEO, Jon Rubinstein. NEPC recommended 'No Action'.

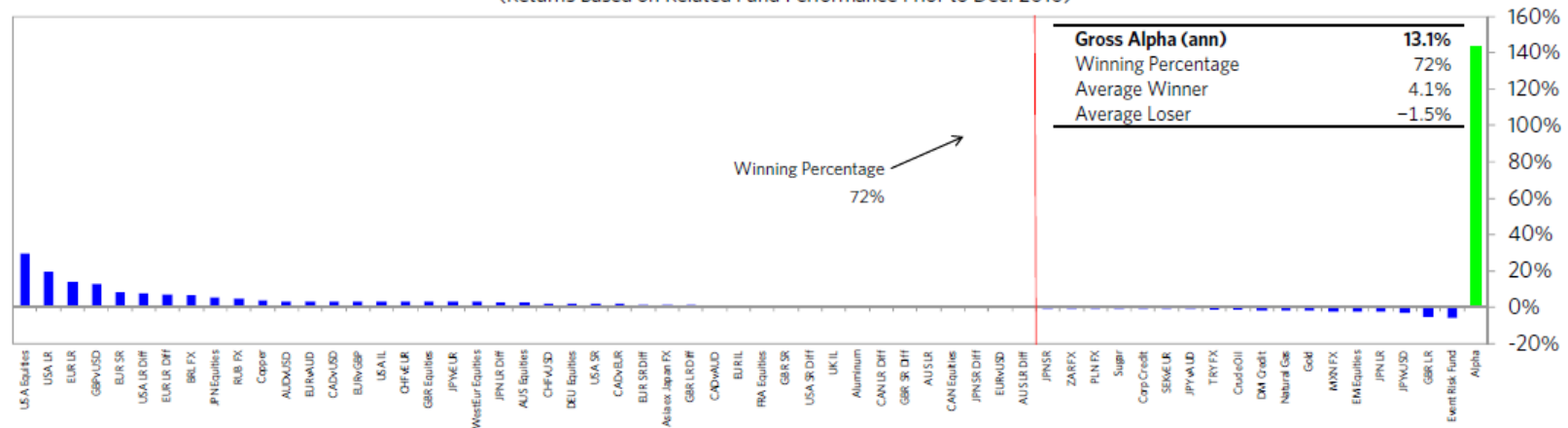


# BRIDGEWATER–PURE ALPHA MAJOR MARKETS II (PAMM)

**Bridgewater Pure Alpha Major Markets Strategy 21% Volatility: 2017  
Gross Value Added Attribution by Market**



**Bridgewater Pure Alpha Major Markets Strategy 21% Volatility: Since Nov-10  
Gross Value Added Attribution by Market**  
(Returns Based on Related Fund Performance Prior to Dec. 2010)



Source: Bridgewater, December 2017

# APPENDIX

NEPC, LLC

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# GLOSSARY OF INVESTMENT TERMINOLOGY

**Alpha** - Measures the relationship between the fund performance and the performance of another fund or benchmark index and equals the excess return while the other fund or benchmark index is zero.

**Alpha Jensen** - The average return on a portfolio over and above that predicted by the capital asset pricing model (CAPM), given the portfolio's beta and the average market return. Also known as the abnormal return or the risk adjusted excess return.

**Annualized Excess Return over Benchmark** - Annualized fund return minus the annualized benchmark return for the calculated return.

**Annualized Return** - A statistical technique whereby returns covering periods greater than one year are converted to cover a 12 month time span.

**Beta** - Measures the volatility or systematic risk and is equal to the change in the fund's performance in relation to the change in the assigned index's performance.

**Information Ratio** - A measure of the risk adjusted return of a financial security, asset, or portfolio.

*Formula:*  
*(Annualized Return of Portfolio - Annualized Return of Benchmark)/Annualized Standard Deviation(Period Portfolio Return - Period Benchmark Return). To annualize standard deviation, multiply the deviation by the square root of the number of periods per year where monthly returns per year equals 12 and quarterly returns is four periods per year.*

**R-Squared** - Represents the percentage of a fund's movements that can be explained by movements in an index. R-Squared values range from 0 to 100. An R-Squared of 100 denotes that all movements of a fund are completely explained by movements in the index.

**Sharpe Ratio** - A measure of the excess return or risk premium per unit of risk in an investment asset or trading strategy.

**Sortino Ratio** - A method to differentiate between good and bad volatility in the Sharpe Ratio. The differentiation of up and down volatility allows the calculation to provide a risk adjusted measure of a security or fund's performance without upward price change penalties.

*Formula:*  
*Calculation Average (X-Y)/Downside Deviation (X-Y) \* 2*  
*Where X=Return Series X Y = Return Series Y which is the risk free return (91 day T-bills)*

**Standard Deviation** - The standard deviation is a statistical term that describes the distribution of results. It is a commonly used measure of volatility of returns of a portfolio, asset class, or security. The higher the standard deviation the more volatile the returns are.

*Formula:*  
*(Annualized Return of Portfolio - Annualized Return of Risk Free) / Annualized Standard Deviation (Portfolio Returns)*

**Tracking Error** - Tracking error, also known as residual risk, is a measure of the degree to which a portfolio tracks its benchmark. It is also a measure of consistency of excess returns. Tracking error is computed as the annualized standard deviation of the difference between a portfolio's return and that of its benchmark.

*Formula:*  
*Tracking Error = Standard Deviation (X-Y) \* √( # of periods per year)*  
*Where X = periods portfolio return and Y = the period's benchmark return*  
*For monthly returns, the periods per year = 12*  
*For quarterly returns, the periods per year = 4*

**Treynor Ratio** - A risk-adjusted measure of return based on systematic risk. Similar to the Sharpe ratio with the difference being the Treynor ratio uses beta as the measurement of volatility.

*Formula:*  
*(Portfolio Average Return - Average Return of Risk-Free Rate)/Portfolio Beta*

**Up/Down Capture Ratio** - A measure of what percentage of a market's returns is "captured" by a portfolio. For example, if the market declines 10% over some period, and the manager declines only 9%, then his or her capture ratio is 90%. In down markets, it is advantageous for a manager to have as low a capture ratio as possible. For up markets, the higher the capture ratio the better. Looking at capture ratios can provide insight into how a manager achieves excess returns. A value manager might typically have a lower capture ratio in both up and down markets, achieving excess returns by protecting on the downside, whereas a growth manager might fall more than the overall market in down markets, but achieve above-market returns in a rising market.

*UpsideCapture = TotalReturn(FundReturns)/TotalReturns(BMReturn) when Period Benchmark Return is > = 0*

*DownsideCapture = TotalReturn(FundReturns)/TotalReturns(BMReturn) when Benchmark < 0*



Source: InvestorForce

# GLOSSARY OF INVESTMENT TERMINOLOGY

**# Of Portfolios/Observations<sup>1</sup>** – The total number of data points that make up a specified universe

**Allocation Index<sup>3</sup>** - The allocation index measures the value added (or subtracted) to each portfolio by active management. It is calculated monthly: The portfolio asset allocation to each category from the prior month-end is multiplied by a specified market index.

**Asset Allocation Effect<sup>2</sup>** - Measures an investment manager's ability to effectively allocate their portfolio's assets to various sectors. The allocation effect determines whether the overweighting or underweighting of sectors relative to a benchmark contributes positively or negatively to the overall portfolio return. Positive allocation occurs when the portfolio is over weighted in a sector that outperforms the benchmark and underweighted in a sector that underperforms the benchmark. Negative allocation occurs when the portfolio is over weighted in a sector that underperforms the benchmark and under weighted in a sector that outperforms the benchmark.

**Agency Bonds (Agencies)<sup>3</sup>** - The full faith and credit of the United States government is normally not pledged to payment of principal and interest on the majority of government agencies issuing these bonds, with maturities of up to ten years. Their yields, therefore, are normally higher than government and their marketability is good, thereby qualifying them as a low risk-high liquidity type of investment. They are eligible as security for advances to the member banks by the Federal Reserve, which attests to their standing.

**Asset Backed Securities (ABS)<sup>3</sup>** - Bonds which are similar to mortgage-backed securities but are collateralized by assets other than mortgages; commonly backed by credit card receivables, auto loans, or other types of consumer financing.

**Attribution<sup>3</sup>** - Attribution is an analytical technique that allows us to evaluate the performance of the portfolio relative to the benchmark. A proper attribution tells us where value was added or subtracted as a result of the manager's decisions.

**Average Effective Maturity<sup>4</sup>** - For a single bond, it is a measure of maturity that takes into account the possibility that a bond might be called back to the issuer.

For a portfolio of bonds, average effective maturity is the weighted average of the maturities of the underlying bonds. The measure is computed by weighing each bond's maturity by its market value with respect to the portfolio and the likelihood of any of the bonds being called. In a pool of mortgages, this would also account for the likelihood of prepayments on the mortgages.

**Batting Average<sup>1</sup>** - A measurement representing an investment manager's ability to meet or beat an index.

*Formula: Divide the number of days (or months, quarters, etc.) in which the manager beats or matches the index by the total number of days (or months, quarters, etc.) in the period of question and multiply that factor by 100.*

**Brinson Fachler (BF) Attribution<sup>1</sup>** - The BF methodology is a highly accepted industry standard for calculating the allocation, selection, and interaction effects within a portfolio that collectively explains a portfolio's underlying performance. The main advantage of the BF methodology is that rather than using the overall return of the benchmark, it goes a level deeper than BHB and measures whether the benchmark sector, country, etc. outperformed/or underperformed the overall benchmark.

**Brinson Hood Beebower (BHB) Attribution<sup>1</sup>** - The BHB methodology shows that excess return must be equal to the sum of all other factors (i.e., allocation effect, selection effect, interaction effect, etc.). The advantage to using the BHB methodology is that it is a highly accepted industry standard for calculating the allocation, selection, and interaction effects within a portfolio that collectively explains a portfolio's underlying performance.

**Corporate Bond (Corp)<sup>4</sup>** - A debt security issued by a corporation and sold to investors. The backing for the bond is usually the payment ability of the company, which is typically money to be earned from future operations. In some cases, the company's physical assets may be used as collateral for bonds.

**Correlation<sup>1</sup>** - A range of statistical relationships between two or more random variables or observed data values. A correlation is a single number that describes the degree of relationship between variables.

Data Source: <sup>1</sup>InvestorForce, <sup>2</sup>Interaction Effect Performance Attribution, <sup>3</sup>NEPC, LLC, <sup>4</sup>Investopedia, <sup>5</sup>Hedgeco.net



Source: InvestorForce

# GLOSSARY OF INVESTMENT TERMINOLOGY

**Coupon<sup>4</sup>** – The interest rate stated on a bond when it is issued. The coupon is typically paid semiannually. This is also referred to as the "coupon rate" or "coupon percent rate."

**Currency Effect<sup>1</sup>** - Is the effect that changes in currency exchange rates over time affect excess performance.

**Derivative Instrument<sup>3</sup>** - A financial obligation that derives its precise value from the value of one or more other instruments (or assets) at the same point of time. For example, the relationship between the value of an S&P 500 futures contract (the derivative instrument in this case) is determined by the value of the S&P 500 Index and the value of a U.S. Treasury bill that matures at the expiration of the futures contract.

**Downside Deviation<sup>1</sup>** - Equals the standard deviation of negative return or the measure of downside risk focusing on the standard deviation of negative returns.

*Formula:*

*Annualized Standard Deviation (Fund Return - Average Fund Return) where average fund return is greater than individual fund returns, monthly or quarterly.*

**Duration<sup>3</sup>** - Duration is a measure of interest rate risk. The greater the duration of a bond, or a portfolio of bonds, the greater its price volatility will be in response to a change in interest rates. A bond's duration is inversely related to interest rates and directly related to time to maturity.

**Equity/Debt/Cash Ratio<sup>1</sup>** - The percentage of an investment or portfolio that is in Equity, Debt, and/or Cash (i.e. A 7/89/4 ratio represents an investment that is made up of 7% Equity, 89% Debt, and 4% Cash).

**Foreign Bond<sup>3</sup>** - A bond that is issued in a domestic market by a foreign entity, in the domestic market's currency. A foreign bond is most often issued by a foreign firm to raise capital in a domestic market that would be most interested in purchasing the firm's debt. For foreign firms doing a large amount of business in the domestic market, issuing foreign bonds is a common practice.

**Hard Hurdle<sup>5</sup>** - is a hurdle rate that once beaten allows a fund manager to charge a performance fee on only the funds above the specified hurdle rate.

**High-Water Mark<sup>4</sup>** - The highest peak in value that an investment fund/account has reached. This term is often used in the context of fund manager compensation, which is performance based. Some performance-based fees only get paid when fund performance exceeds the high-water mark. The high-water mark ensures that the manager does not get paid large sums for poor performance.

**Hurdle Rate<sup>4</sup>** - The minimum rate of return on an investment required, in order for a manager to collect incentive fees from the investor, which is usually tied to a benchmark.

**Interaction Effects<sup>2</sup>** - The interaction effect measures the combined impact of an investment manager's selection and allocation decisions within a sector. For example, if an investment manager had superior selection and over weighted that particular sector, the interaction effect is positive. If an investment manager had superior selection, but underweighted that sector, the interaction effect is negative. In this case, the investment manager did not take advantage of the superior selection by allocating more assets to that sector. Since many investment managers consider the interaction effect to be part of the selection or the allocation, it is often combined with the either effect.

**Median<sup>3</sup>** - The value (rate of return, market sensitivity, etc.) that exceeds one-half of the values in the population and that is exceeded by one-half of the values. The median has a percentile rank of 50.

**Modified Duration<sup>3</sup>** - The percentage change in the price of a fixed income security that results from a change in yield.

**Mortgage Backed Securities (MBS)<sup>3</sup>** - Bonds which are a general obligation of the issuing institution but are also collateralized by a pool of mortgages.

**Municipal Bond (Muni)<sup>4</sup>** - A debt security issued by a state, municipality or county to finance its capital expenditures.

**Net Investment Change<sup>1</sup>** - Is the change in an investment after accounting for all Net Cash Flows.

**Performance Fee<sup>4</sup>** - A payment made to a fund manager for generating positive returns. The performance fee is generally calculated as a percentage of investment profits, often both realized and unrealized.

*Data Source: <sup>1</sup>InvestorForce, <sup>2</sup>Interaction Effect Performance Attribution, <sup>3</sup>NEPC, LLC, <sup>4</sup>Investopedia, <sup>5</sup>Hedgeco.net*



Source: InvestorForce

# GLOSSARY OF INVESTMENT TERMINOLOGY

**Policy Index<sup>3</sup>** - A custom benchmark designed to indicate the returns that a passive investor would earn by consistently following the asset allocation targets set forth in this investment policy statement.

**Price to Book (P/B)<sup>4</sup>** - A ratio used to compare a stock's market value to its book value. It is calculated by dividing the current closing price of the stock by the latest quarter's book value per share, also known as the "price-equity ratio".

**Price to Earnings (P/E)<sup>3</sup>** - The weighted equity P/E is based on current price and trailing 12 months earnings per share (EPS).

**Price to Sales (P/S)<sup>4</sup>** - A ratio for valuing a stock relative to its own past performance, other companies, or the market itself. Price to sales is calculated by dividing a stock's current price by its revenue per share for the trailing 12 months.

**Return on Equity (ROE)<sup>4</sup>** - The amount of net income returned as a percentage of shareholders equity. Return on equity measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested.

**Selection (or Manager) Effect<sup>2</sup>** - Measures the investment manager's ability to select securities within a given sector relative to a benchmark. The over or underperformance of the portfolio is weighted by the benchmark weight, therefore, selection is not affected by the manager's allocation to the sector. The weight of the sector in the portfolio determines the size of the effect—the larger the sector, the larger the effect is, positive or negative.

**Soft Hurdle rate<sup>5</sup>** - is a hurdle rate that once beaten allows a fund manager to charge a performance fee based on the entire annualized return.

**Tiered Fee<sup>1</sup>** - A fee structure that is paid to fund managers based on the size of the investment (i.e. 1.00% fee on the first \$10M invested, 0.90% on the next \$10M, and 0.80% on the remaining balance).

**Total Effects<sup>2</sup>** - The active management (total) effect is the sum of the selection, allocation, and interaction effects. It is also the difference between the total portfolio return and the total benchmark return. You can use the active management effect to determine the amount the investment manager has added to a portfolio's return.

**Total Return<sup>1</sup>** - The actual rate of return of an investment over a specified time period. Total return includes interest, capital gains, dividends, and distributions realized over a defined time period.

**Universe<sup>3</sup>** - The list of all assets eligible for inclusion in a portfolio.

**Upside Deviation<sup>1</sup>** - Standard Deviation of Positive Returns

**Weighted Avg. Market Cap.<sup>4</sup>** - A stock market index weighted by the market capitalization of each stock in the index. In such a weighting scheme, larger companies account for a greater portion of the index. Most indexes are constructed in this manner, with the best example being the S&P 500.

**Yield (%)<sup>3</sup>** - The current yield of a security is the current indicated annual dividend rate divided by current price.

**Yield to Maturity<sup>3</sup>** - The discount rate that equates the present value of cash flows, both principal and interest, to market price.

*Data Source: <sup>1</sup>InvestorForce, <sup>2</sup>Interaction Effect Performance Attribution, <sup>3</sup>NEPC, LLC, <sup>4</sup>Investopedia, <sup>5</sup>Hedgeco.net*



Source: InvestorForce

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