

HEALTH WEALTH CAREER

# NORTH CAROLINA SUPPLEMENTAL RETIREMENT PLANS

## LARGE CAP AND SMALL/MID CAP FUND STRUCTURE ANALYSIS

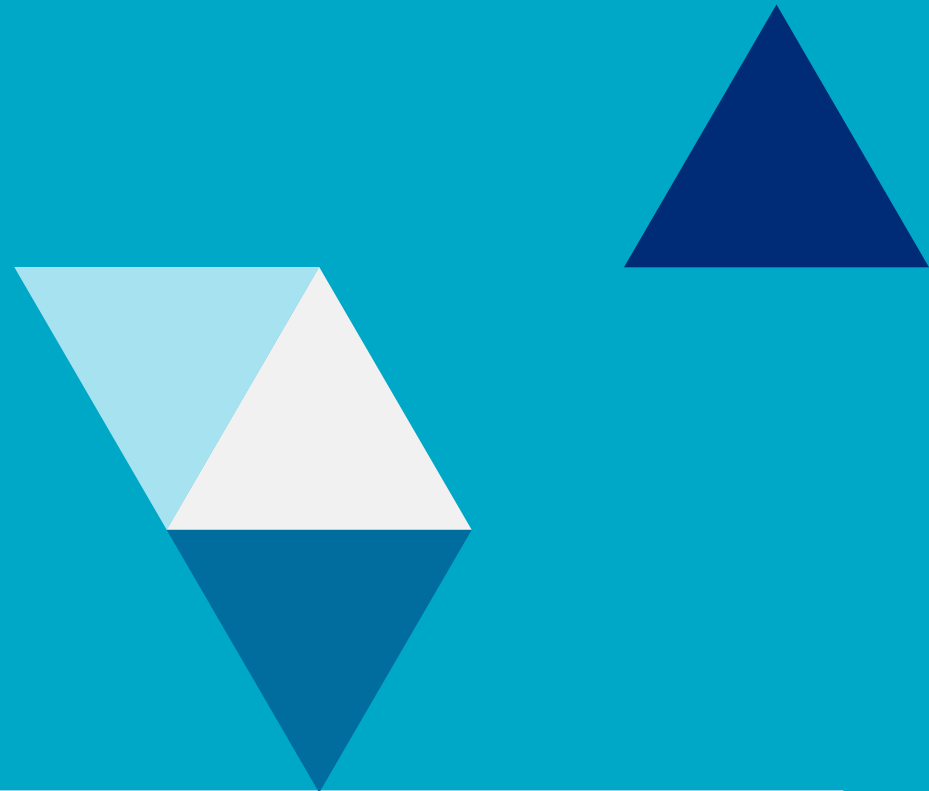
MAY 17<sup>TH</sup>, 2017

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# CONTENT

- Background
- Large Cap Structure Analysis
- Small/Mid Cap Structure Analysis
- Appendix

# BACKGROUND




# KEY TAKEAWAYS FROM SUB-COMMITTEE AND BOARD MEETINGS

Category	Action	Rationale	Next Steps
Plan Structure	Consolidate the style specific domestic equity options into two core offerings (large cap and SMID cap) in order to reduce style biases across participant base.	Value bias exists, particularly among the Small/Mid Cap options. Consolidation could also reduce confusion among participants and improve asset allocation	North Carolina IMD and Mercer to work on the construction of the underlying Large and Small/Mid Cap Funds
Liquidity Sleeve	Consider adding liquidity sleeves to all active funds to manage daily cash flows in the funds and lower fund costs	Currently, participant cash flows are hitting the manager accounts. Adding an index component to each of the funds would limit the need for managers to hold or raise cash unexpectedly.	North Carolina and IMD to work on the target liquidity sleeve allocation in each active Fund.
Brokerage Window	Do not offer a brokerage window in the Supplemental Retirement Plans	Only small percentage of participants actually use brokerage windows. They also come with higher fees, administrative complexities and regulatory concerns	None
Use of ETFs	Do not utilize ETF's in the Supplemental Retirement Plans, although they may be an option for the 403 (b) Plan, which is limited to mutual funds	ETF's are less cost effective (can't use NC's Scale) and can provide administrative complexities for the Supplemental Retirement Plans record-keeper and custodian	None

# NC CURRENT INVESTMENT STRUCTURE

Tier I Target Date Funds	Tier II - A Passive Core Options	Tier II - B Active Core Options	Tier III Specialty Options
Goal Maker		<b>Stable Value Fund</b> Galliard Stable Value	
	<b>Fixed Income</b> BlackRock Debt Index	<b>Fixed Income Fund</b> TCW Core Plus Prudential Core Plus	
		<b>Inflation Responsive Fund</b> PIMCO IRMAF	
	<b>Large Cap Equity</b> BlackRock Equity Index	<b>Large Cap Value Fund</b> Hotchkis & Wiley Large Cap Value Delaware Large Cap Value Robeco BP Large Cap Value	
		<b>Large Cap Growth Fund</b> Sands Capital Large Cap Growth Wellington Opportunistic Growth Loomis Large Cap Growth	
	<b>Small/Mid Cap Equity</b> BlackRock Russell 2500 Index	<b>Small/Mid Cap Value Fund</b> Hotchkis & Wiley SMID Value Earnest Partners SMID Cap Value Wedge SMID Cap Value	
		<b>Small/Mid Cap Growth Fund</b> TimesSquare SMID Growth Brown Advisory SMID Growth	
		<b>Global Equity Fund</b> Wellington Global Opportunities Arrowstreet Global Equity ACWI	
	<b>International Equity</b> BlackRock ACWI ex US Index	<b>International Equity Fund</b> Baillie Gifford ACWI ex US Growth Mondrian ACWI ex US Value	

# NC RECOMMENDED INVESTMENT STRUCTURE

Tier I Target Date Funds	Tier II - A Passive Core Options	Tier II - B Active Core Options	Tier III Specialty Options
<b>Goal Maker</b>		<b>Stable Value Fund</b> Galliard Stable Value	
	<b>Fixed Income</b> BlackRock Debt Index	<b>Fixed Income Fund</b> TCW Core Plus Prudential Core Plus	
		<b>Inflation Responsive Fund</b> PIMCO IRMAF	
	<b>Large Cap Equity</b> BlackRock Equity Index	<b>Large Cap Equity Fund</b>	
	<b>Small/Mid Cap Equity</b> BlackRock Russell 2500 Index	<b>Small/Mid Cap Equity Fund</b>	
		<b>Global Equity Fund</b> Wellington Global Opportunities Arrowstreet Global Equity ACWI	
	<b>International Equity</b> BlackRock ACWI ex US Index	<b>International Equity Fund</b> Baillie Gifford ACWI ex US Growth Mondrian ACWI ex US Value	

# PORTFOLIO CONSTRUCTION CONSIDERATIONS

## DESIRED FACTOR EXPOSURES



### VALUE

Bias towards cheap stocks on a measure of value such as Price to Book or Price to Earnings.

Return enhancing due to (a) behavioral over-extrapolation of earnings growth, (b) “distress” risk premium, and (c) the rebalancing effect.



### SIZE

Bias towards companies with a smaller market capitalization.

Return enhancing due to (a) small company illiquidity and credit risk premia and (b) the rebalancing effect of selling stocks which have risen in price.



### MOMENTUM

Bias towards stocks which have recently performed well.

Return enhancing due to behavioral factors of (a) under-reaction to company news, (b) over-reaction to recent stock price performance, and (c) herding.



### LOW VOLATILITY

Bias towards stocks with historically low absolute variability of returns.

Risk-adjusted return enhancement due to (a) lottery effect whereby high volatility stocks are systematically over-priced, (b) leverage aversion, (c) tracking error constraints causing systematic over-pricing of high volatility stocks (as not owning these disproportionately increases tracking error).



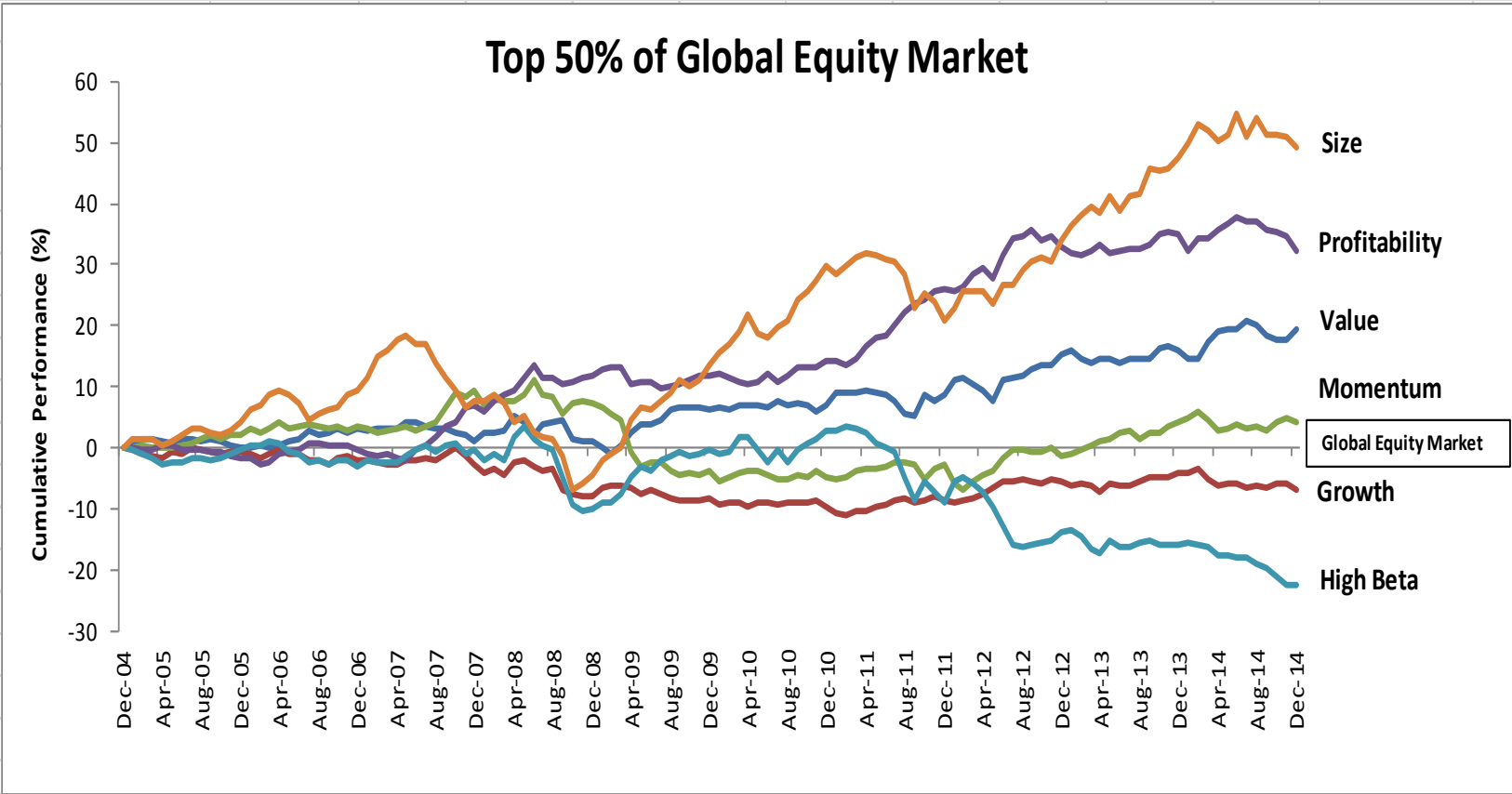
### PROFITABILITY

Bias toward stocks with strong measure of profitability, such as Return on Equity.

Return enhancing due to behavioral under-estimation of the long-term sustainability of high quality businesses.



# FACTOR BASED INVESTING ENHANCING PERFORMANCE



Source: StyleResearch

**Risk factors are additive to performance over time**



# ACTIVE VS. PASSIVE

Asset class	Market opportunity (ex ante)	Actual manager results (ex-post) <sup>1</sup>	Active management conviction	Rationale	Preference
US Large Cap	Low	Low	Low	<ul style="list-style-type: none"> <li>• High institutional ownership, the availability of information, greater number of analyst coverage and liquidity makes the large cap market efficient</li> <li>• No evidence of historic alpha by the median US large cap manager over periods analysed, net of fees</li> </ul>	For passive management (in particular alternative indexation), unless investor has ability to use high tracking error mandates and has robust governance structure
Small Cap	High	High	High	<ul style="list-style-type: none"> <li>• Inefficient market due to less available information, fewer market participants and lower institutional ownership</li> <li>• Long data history available showing strong evidence of added value by active managers</li> </ul>	Clear preference for active management

<sup>1</sup> Based on “alpha ranking” score of fixed income markets on annual rolling 10 year relative returns to 31 December 2015

# LARGE CAP STRUCTURE ANALYSIS

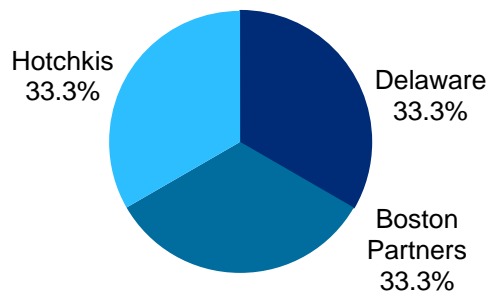


# LARGE CAP FUND OBJECTIVES

- 1) Outperform the Russell 1000 Index over a full market cycle utilizing a diversified portfolio invested in stocks with above average earnings growth potential along with undervalued securities
- 2) Keep the Fund standard deviation below 150% of the benchmark index
- 3) Keep overall investment management expenses low given the efficiency of the large cap market

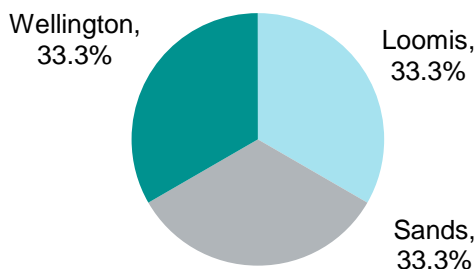
# CURRENT FUNDS

## Large Cap Value



IM Expense: 0.378%

## Large Cap Growth



IM Expense: 0.422%

## INVESTMENT MANAGERS

### Boston Partners (Relative Value, Momentum) (A)

- Relative value approach with focus on principal protection
- Identify securities that have improving business momentum
- Will typically hold 70-100 securities

### Delaware (Quality Value, Low Beta) (A T)

- Attractively valued, high quality companies
- Concentrated portfolio 30-40 holdings
- Focus on downside protection, lower volatility

### Hotchkis (Deep Value, High Beta, Momentum) (A T)

- Identify attractively valued companies with short term mispricing's
- Long-term, low turnover approach leads to deeper value bias
- Concentrated 40-60 holdings; higher volatility and tracking error

### Loomis (High Quality Growth) (A T)

- Focuses on companies with sustainably high free cash flow growth
- Concentrated 30-40 holdings and lower turnover

### Sands (Aggressive Growth) (A T)

- Concentrated 25-35 holdings; buy and hold philosophy with low turnover
- Bias towards companies with high sales and earnings growth
- Higher volatility and tracking error

### Wellington (Diversified Growth) (A)

- Strategy constructed using three sleeves (large, mid and small)
- Larger number of holdings (100-150)
- Smaller market capitalization bias relative to the index

# BACKGROUND

## EXCESS RETURN CORRELATION

Correlation of Excess Returns vs. Russell 1000 in \$US (before fees) over 10 yrs ending December-16  
(monthly calculations)

	Robeco	Hotchkis LCV	Sands	Wellington	Delaware	Loomis
Boston Partners (Robeco)		0.42	-0.28	-0.22	-0.01	-0.18
Hotchkis	-0.8		-0.16	-0.31	-0.02	-0.26
Sands	-2.0	-2.9		0.62	-0.46	0.36
Wellington	-1.7	-2.7	-0.7		-0.47	0.25
Delaware	-1.2	-1.7	-2.9	-2.5		0.07
Loomis	-1.6	-2.5	-1.2	-1.2	-1.4	

- Wellington and Sands have a higher excess return correlation (0.62)
- Sands has a negative excess return correlation with all of the value managers
- Boston Partners and Hotchkis have a higher excess return correlation as well (0.42)

## BACKGROUND

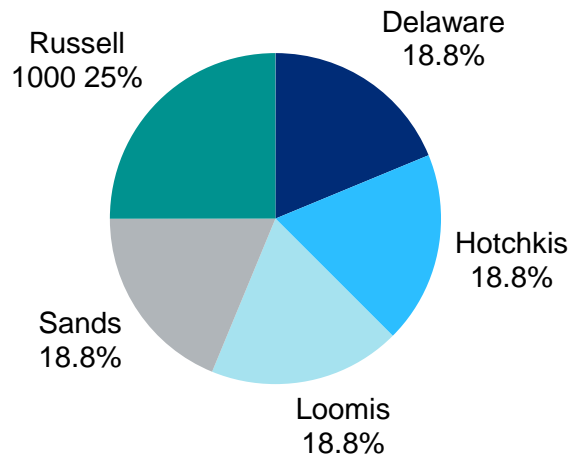
### ACTIVE SHARE

Manager	Active Share vs. Style Specific Benchmark	Active Share vs. Russell 1000
Boston Partners	71.3%	75.8%
Delaware	80.9%	87.5%
Hotchkis & Wiley	83.5%	87.0%
Loomis	80.6%	85.4%
Sands	84.1%	91.7%
Wellington	71.4%	82.0%

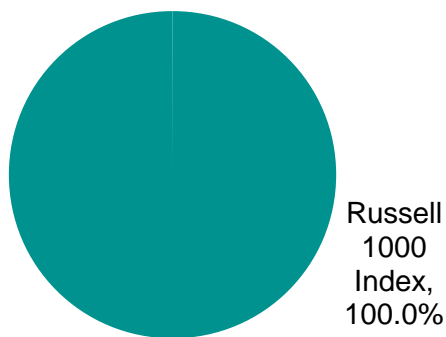
- Active Share is a measure of the percentage of stock holdings in a portfolio that differs from the benchmark
- The measure is used to highlight which active manager portfolios truly differ from their reference index
- This measure largely depends on the benchmark construction (benchmarks where the largest companies account for a large portion of index will generally result in a lower active share )

# RECOMMENDED LARGE CAP FUND

## 75% High Active Share



Estimated Expense 0.286%



Estimated Expense 0.007%

## INVESTMENT MANAGERS

### Delaware (Quality Value, Low Beta) (A T)

- Attractively valued, high quality companies
- Concentrated portfolio 30-40 holdings
- Focus on downside protection, lower volatility

### Hotchkis (Deep Value, High Beta, Momentum) (A T)

- Identify attractively valued companies with short term mispricing's
- Long-term, low turnover approach leads to deeper value bias
- Concentrated 40-60 holdings; higher volatility and tracking error

### Loomis (High Quality Growth) (A T)

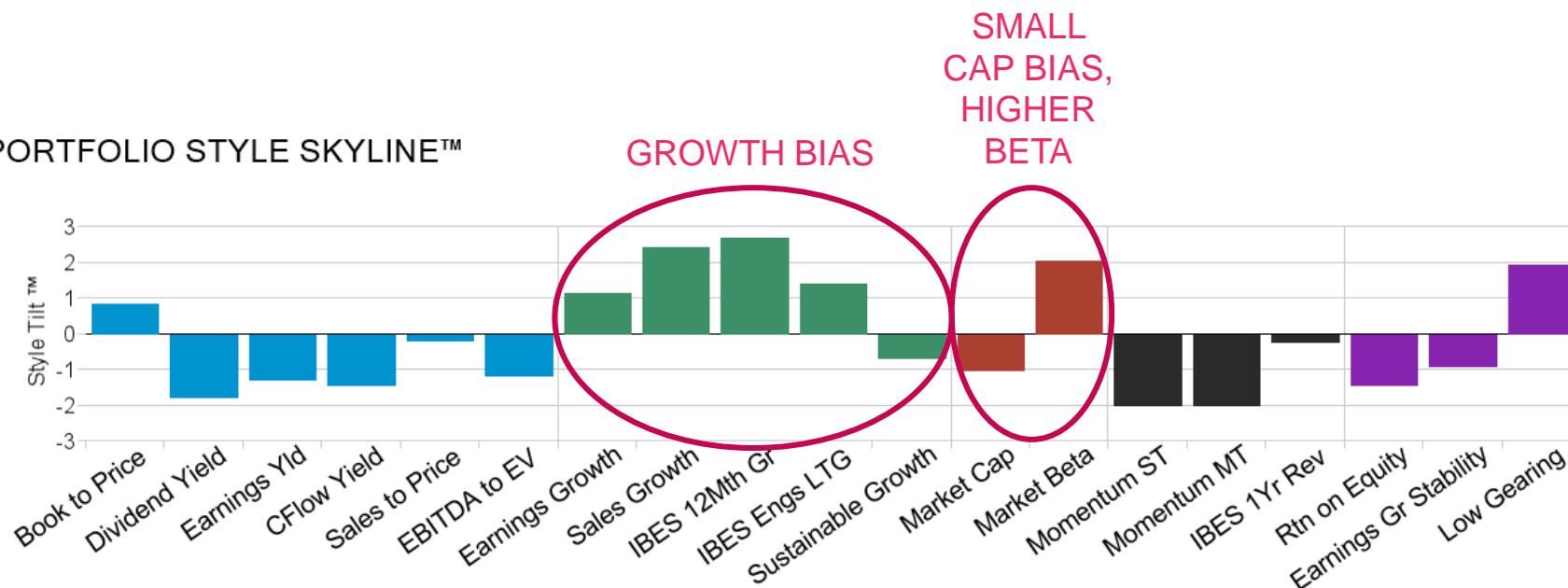
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### Sands (Aggressive Growth) (A T)

- Concentrated 25-35 holdings; buy and hold philosophy with low turnover
- Bias towards companies with high sales and earnings growth
- Higher volatility and tracking error

# STYLE ANALYSIS

PORTFOLIO STYLE SKYLINE™



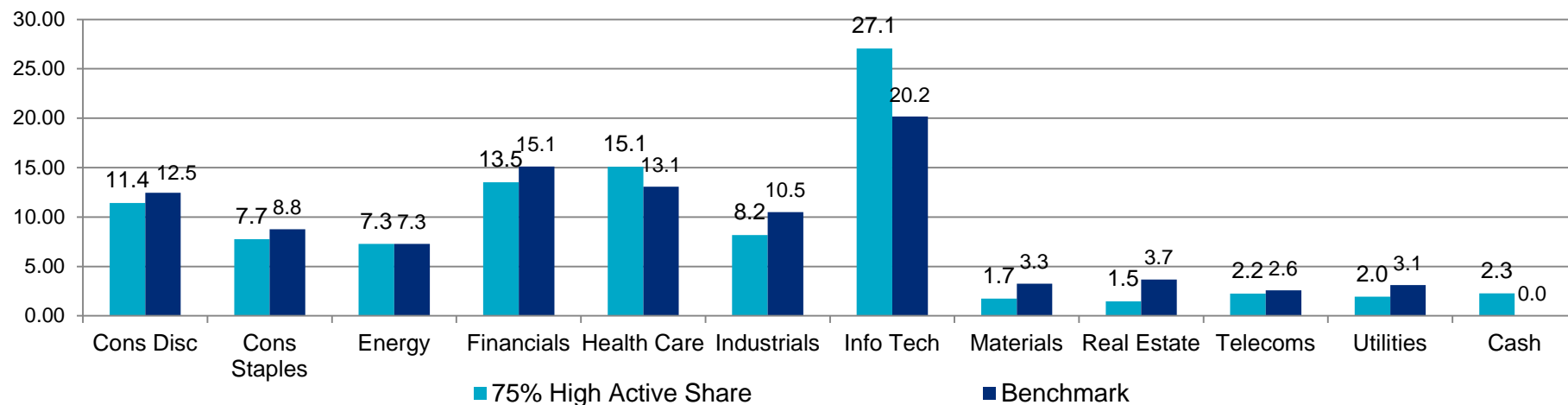
Portfolio: 75% HAS  
 Benchmark: Russell 1000  
 Snapshot Date: 31/Dec/2016  
 Currency: USD



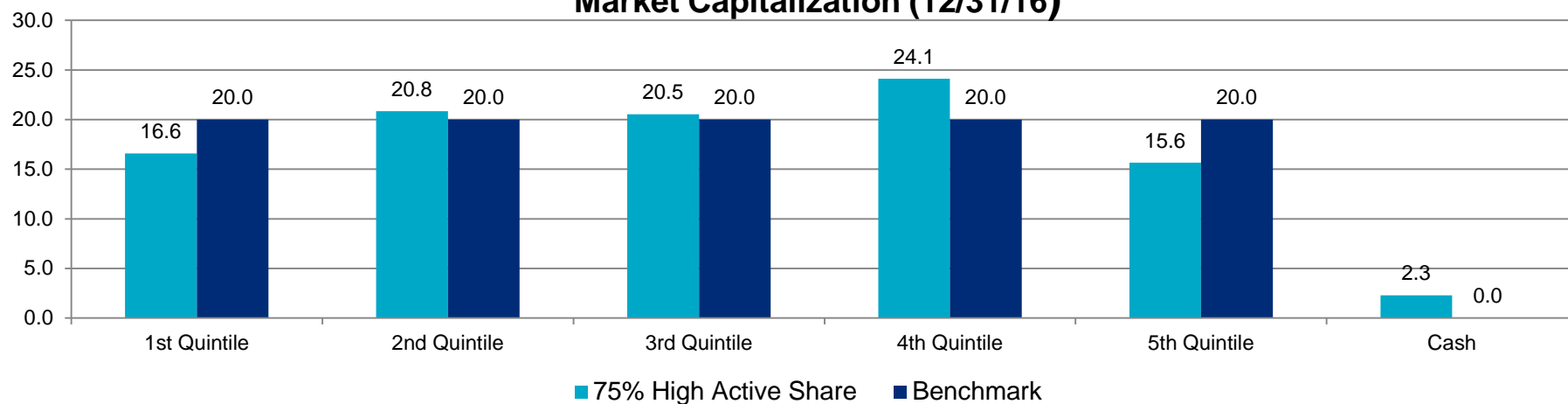


# STYLE ANALYSIS

## Sector Allocation (12/31/16)



## Market Capitalization (12/31/16)



# PORTFOLIO STATISTICS

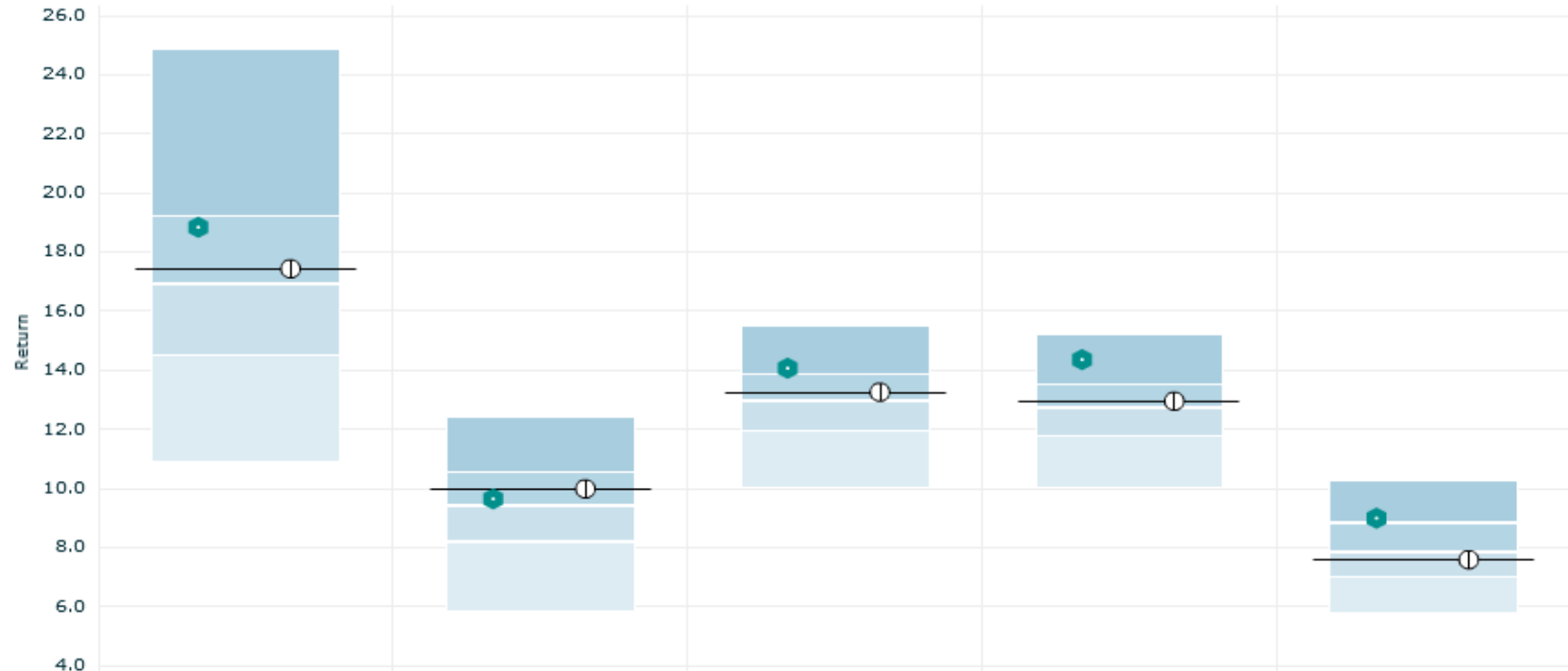
	75% High AS	Russell 1000 Index	50/50 Split of Current LCV & LCG Funds
Tracking Error	2.04%	0.0%	
Coverage	49.41%	100.0%	
Persistence Ratio	0.94	0.83	
Portfolio Beta	1.02	1.00	
Portfolio Volatility	10.88%	10.46%	
Benchmark Volatility	10.46%	10.46%	
Correlation (Port, BM)	0.98	1.00	
Active Share	50.6%	0.0%	
<b>Estimated Fee</b>	<b>0.286%</b>	<b>0.007%</b>	<b>0.400%</b>

- Recommended Fund IM fee is 28.5% lower than what is currently offered

# PERFORMANCE ANALYSIS

Return in \$US (before fees) over 1 yr, 3 yrs, 5 yrs, 7 yrs, 10 yrs ending March-17

Comparison with the US Equity Large Cap Equity universe (Percentile Ranking)



	1 yr (%)	3 yrs (%pa)	5 yrs (%pa)	7 yrs (%pa)	10 yrs (%pa)
75% High Act	18.8 (28)	9.7 (46)	14.1 (20)	14.4 (10)	9.0 (23)
RU1000	17.4 (43)	10.0 (39)	13.3 (43)	13.0 (45)	7.6 (61)
5th Percentile	24.9	12.4	15.5	15.2	10.2
Upper Quartile	19.2	10.6	13.8	13.5	8.8
Median	16.9	9.4	13.0	12.8	7.9
Lower Quartile	14.5	8.2	11.9	11.8	7.0
95th Percentile	10.9	5.8	10.0	10.0	5.8
Number	739	660	587	529	491

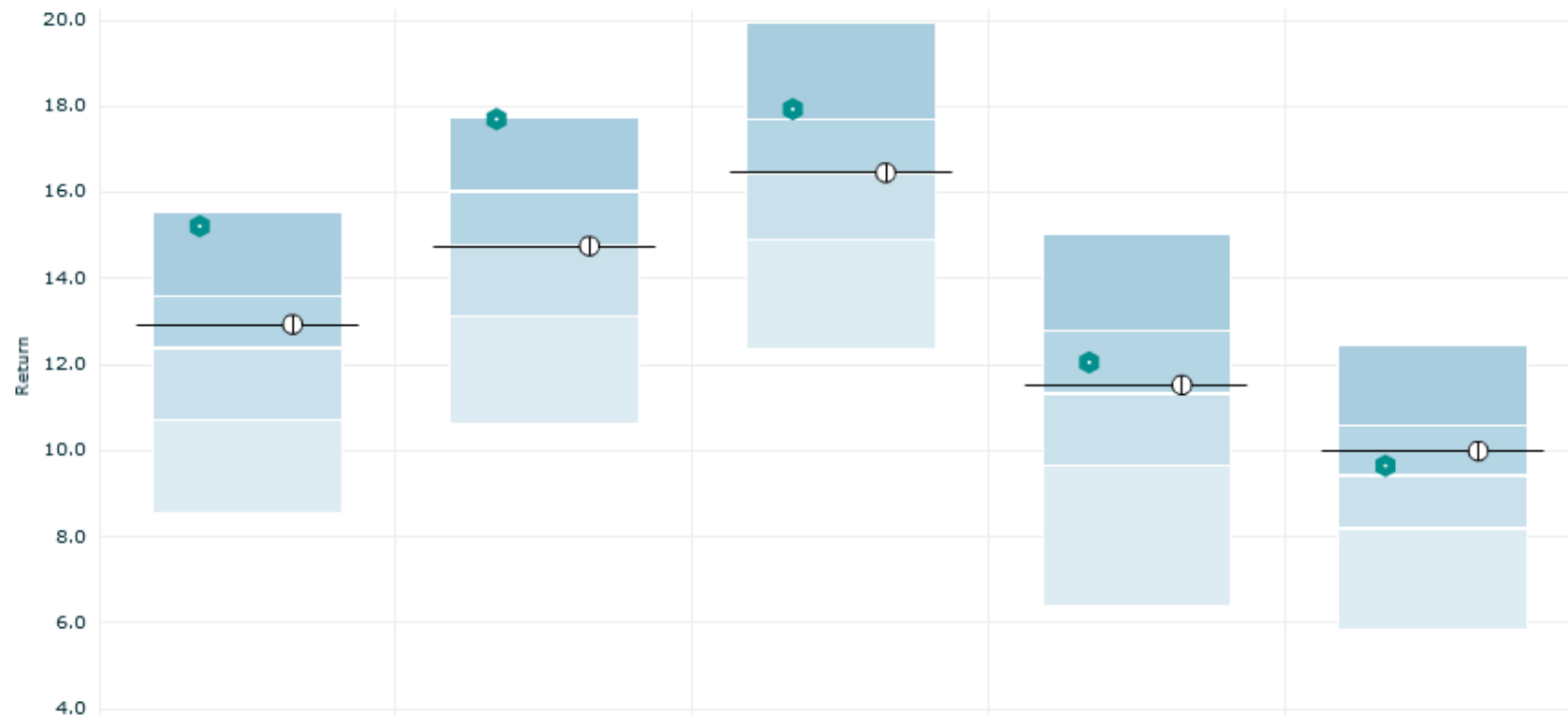
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# PERFORMANCE ANALYSIS

Return in \$US (before fees) over 5 annual rolling periods ending March-17

Comparison with the US Equity Large Cap Equity universe (Percentile Ranking)



	3 yrs to 3/2013 (%pa)	3 yrs to 3/2014 (%pa)	3 yrs to 3/2015 (%pa)	3 yrs to 3/2016 (%pa)	3 yrs to 3/2017 (%pa)
75% High Act	15.2 (7)	17.7 (5)	17.9 (22)	12.1 (35)	9.7 (46)
RU1000	12.9 (40)	14.7 (50)	16.4 (50)	11.5 (46)	10.0 (39)
5th Percentile	15.5	17.7	19.9	15.0	12.4
Upper Quartile	13.6	16.0	17.7	12.8	10.6
Median	12.4	14.8	16.5	11.3	9.4
Lower Quartile	10.7	13.1	14.9	9.7	8.2
95th Percentile	8.6	10.6	12.4	6.4	5.8
Number	756	730	748	751	660

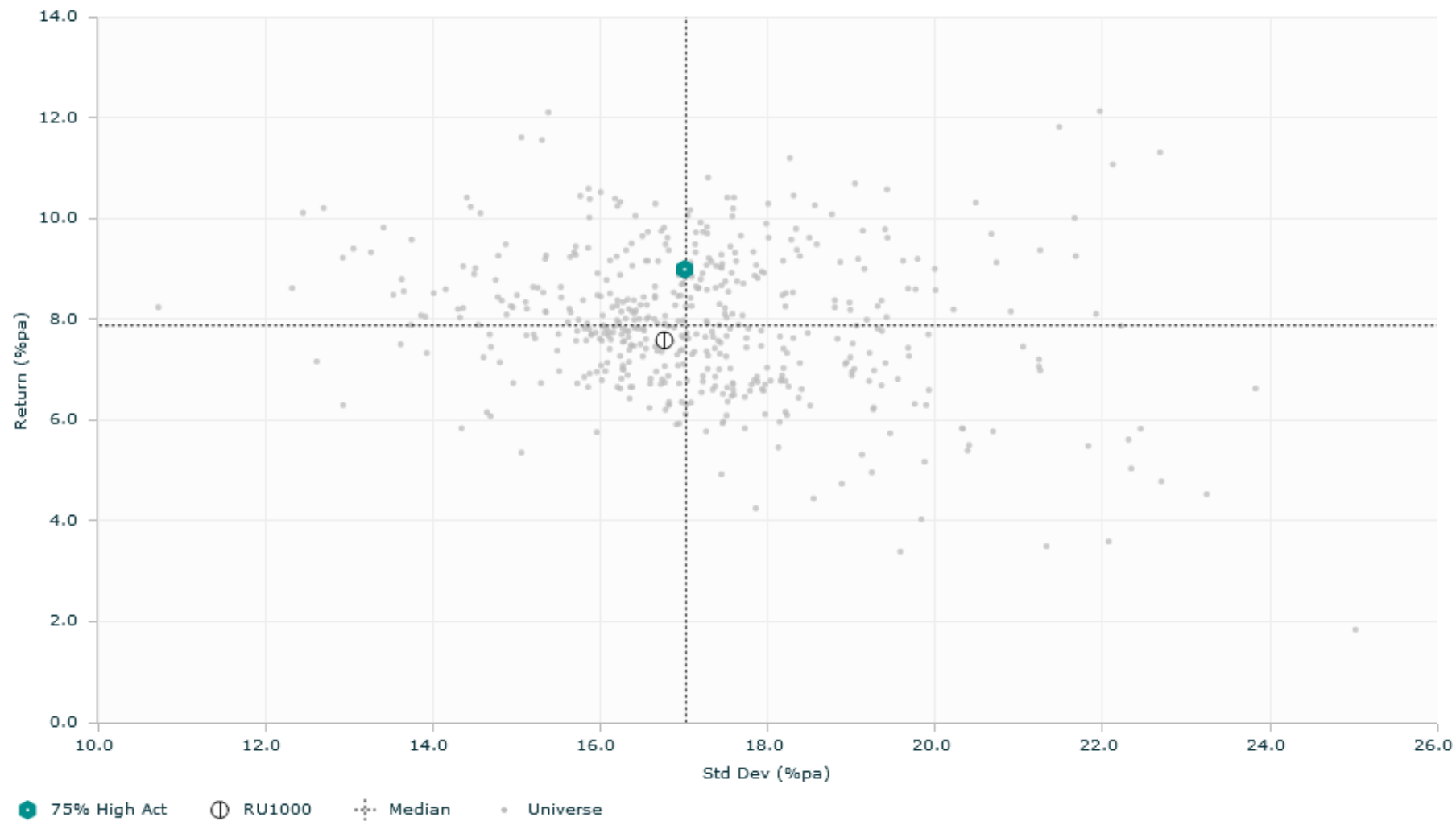
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# PERFORMANCE ANALYSIS

Return and Std Deviation in \$US (before fees) over 10 yrs ending March-17

Comparison with the US Equity Large Cap Equity universe (quarterly calculations)



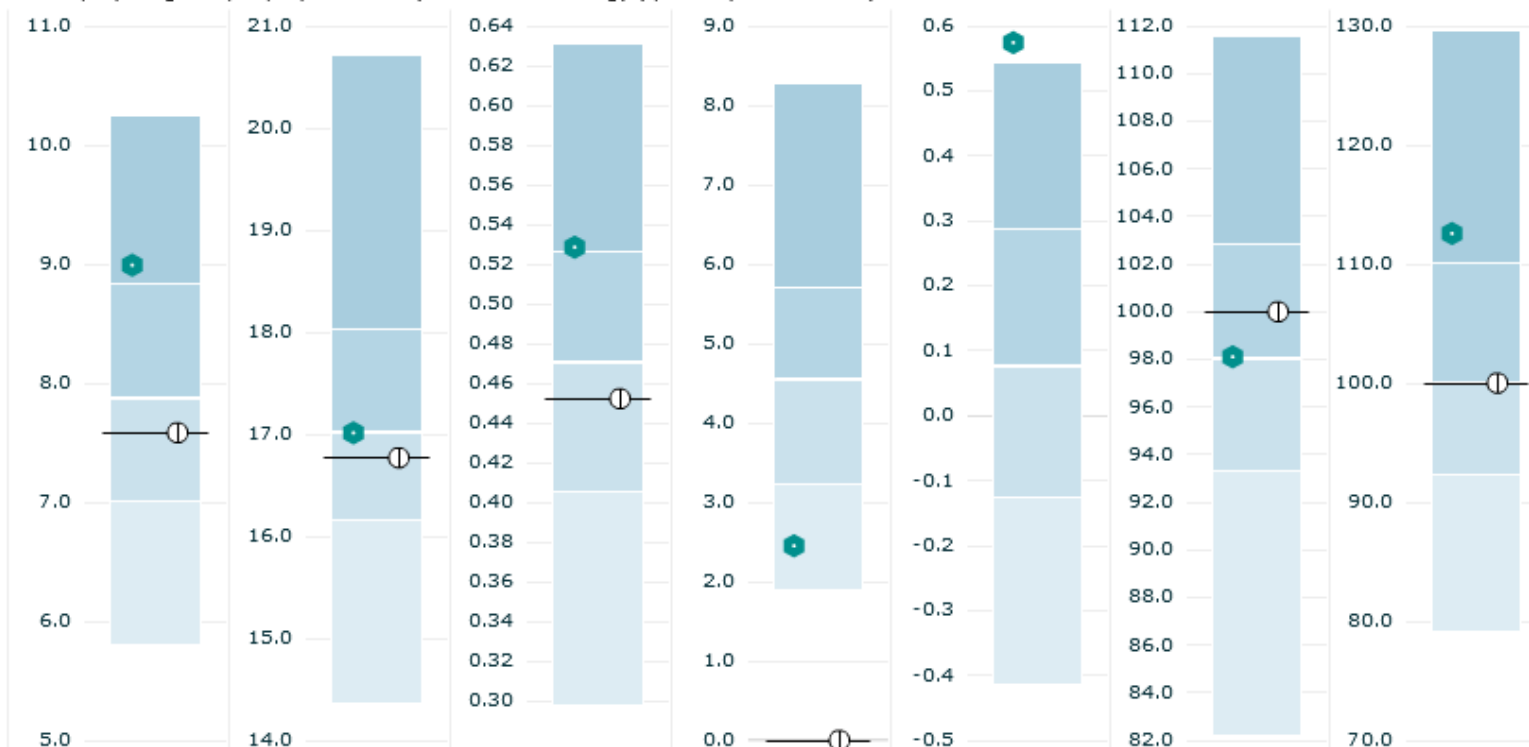
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# PERFORMANCE ANALYSIS

Performance characteristics vs. Russell 1000 in \$US (before fees) over 10 yrs ending March-17

Comparison with the US Equity Large Cap Equity universe (Percentile Ranking) (quarterly calculations)

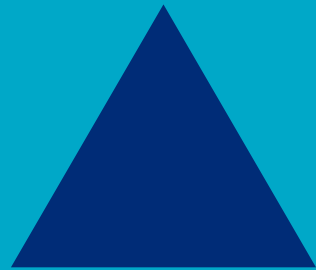


	Ret (%pa)	Std Dev (%pa)	Ret/SD	TE (%pa)	IR	Down Cap (%)	Up Cap (%)
75% High Act	9.0(23)	17.0 (50)	0.5 (24)	2.5 (89)	0.6 (4)	98.1 (50)	112.6(21)
RU1000	7.6(61)	16.8 (58)	0.5 (57)	0.0 (100)	-	100.0 (37)	100.0(50)
5th Percentile	10.2	20.7	0.6	8.3	0.5	111.6	129.5
Upper Quartile	8.8	18.0	0.5	5.7	0.3	102.8	110.1
Median	7.9	17.0	0.5	4.5	0.1	98.1	99.9
Lower Quartile	7.0	16.2	0.4	3.2	-0.1	93.3	92.2
95th Percentile	5.8	14.4	0.3	1.9	-0.4	82.2	79.2
Number	491	491	491	491	491	491	491

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# SMALL/MID CAP EQUITY FUND STRUCTURE ANALYSIS



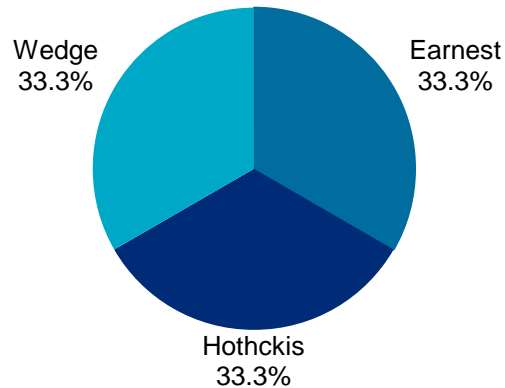
# SMALL/MID CAP FUND OBJECTIVES

- 1) Outperform the Russell 2500 Index over a full market cycle utilizing a diversified portfolio invested in stocks with above-average earnings growth potential along with undervalued securities
- 2) Keep the Fund standard deviation below 150% of the benchmark index
- 3) Keep overall investment management expenses low



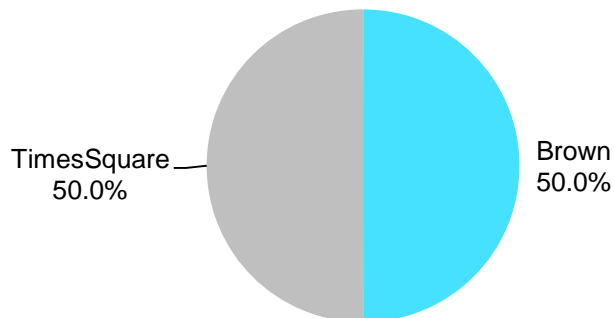
# CURRENT FUNDS

## Current Mid/Small Cap Value Fund



**IM Expense: 0.609%**

## Current Mid/Small Cap Growth Fund



**IM Expense: 0.664%**

## INVESTMENT MANAGERS

### EARNEST (Relative Value) (B+)

- Believe stock prices follow identifiable patterns
- Value bias as a by-product of return pattern recognition and fundamental analysis
- Seeks companies with relatively strong profitability measures and higher quality characteristics

### Hothckis (Deep Value, High Beta, Momentum) (B+ T)

- Identify attractively valued companies with short term mispricing's
- Long-term, low turnover approach leads to deeper value bias
- More concentrated 50-100 holdings; higher volatility and tracking error

### WEDGE (Higher Quality Value) (B+)

- Combination of quantitative and fundamental research
- 50/50 blend of mid and small cap strategies
- Both small and mid cap teams adhere to consistent approach to identify stocks that meet their fundamental and quality parameters

### Brown (Growth at a Reasonable Price) (B+)

- Seek companies that can compound earnings for an extended period of time
- Typically will hold 75 securities with modest turnover

### TimesSquare (Traditional Growth, Profitability) (A)

- Diversified portfolio of high quality growth companies
- Higher quality approach has protected well in down markets
- Will typically hold 90-120 securities

# BACKGROUND

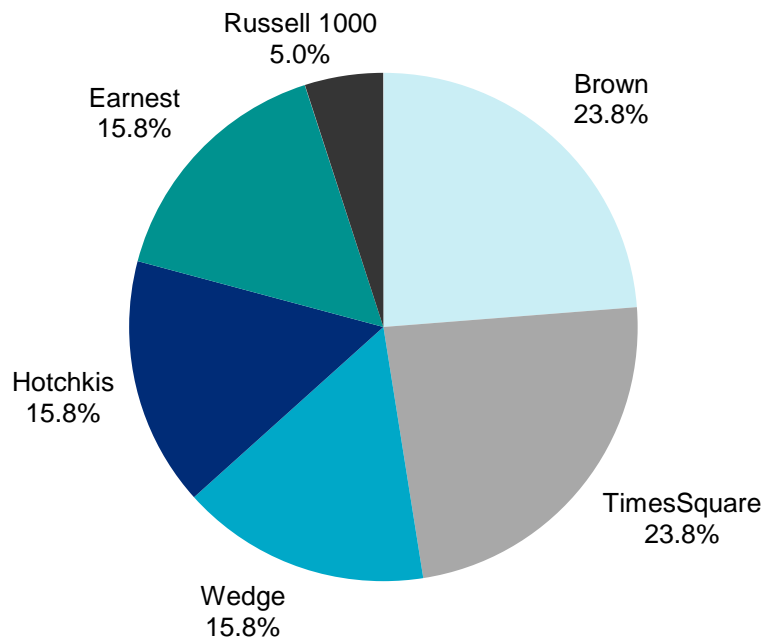
**Correlation of Excess Returns vs. Russell 2500 in \$US (before fees) over 10 yrs ending December-16 (monthly calculations)**

	Brown	Hotchkis MCV	TimesSquare	Wedge	Earnest SMIV
Brown		-0.26	0.48	-0.10	0.15
Hotchkis	-3.0		-0.28	0.09	0.09
TimesSquare	-0.8	-2.4		-0.01	0.23
Wedge	-1.5	-1.4	-1.2		0.16
Earnest	-1.2	-1.4	-0.9	-0.9	

- Earnest has a positive excess return correlation with all other managers in the fund
- Hotchkis and Wiley has a strong negative excess return correlation with both growth managers

# RECOMMENDED MID/SMALL CAP FUND

## 95% Current (50/50 Growth Value Split)



**Estimated Expense 0.530%**

## INVESTMENT MANAGERS

### Hotchkis (Deep Value, High Beta, Momentum) (B+ T)

- Identify attractively valued companies with short term mispricing's
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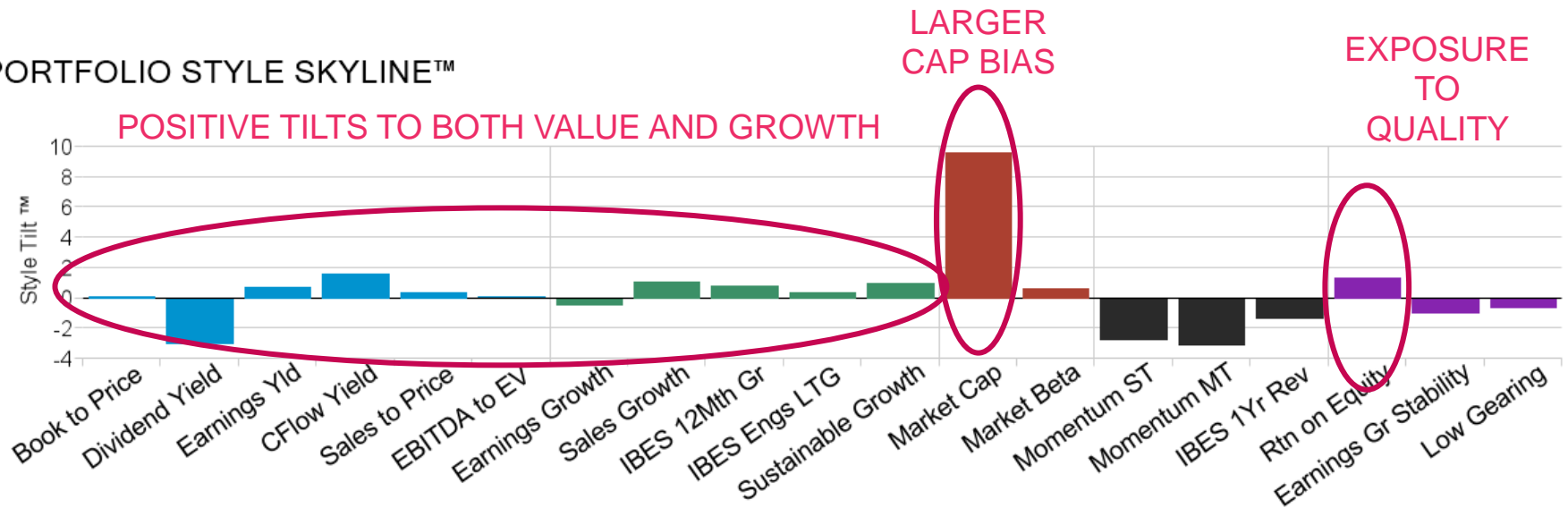
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# STYLE ANALYSIS

## PORTFOLIO STYLE SKYLINE™

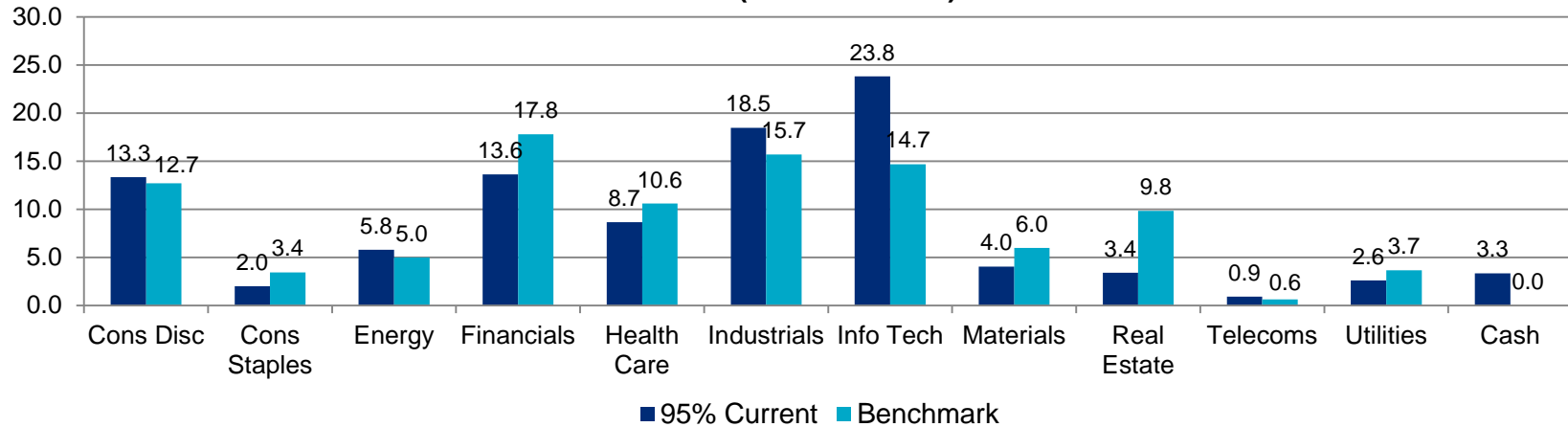


Portfolio: 95% SMID Core  
 Benchmark: Russell 2500  
 Snapshot Date: 31/Dec/2016  
 Currency: USD

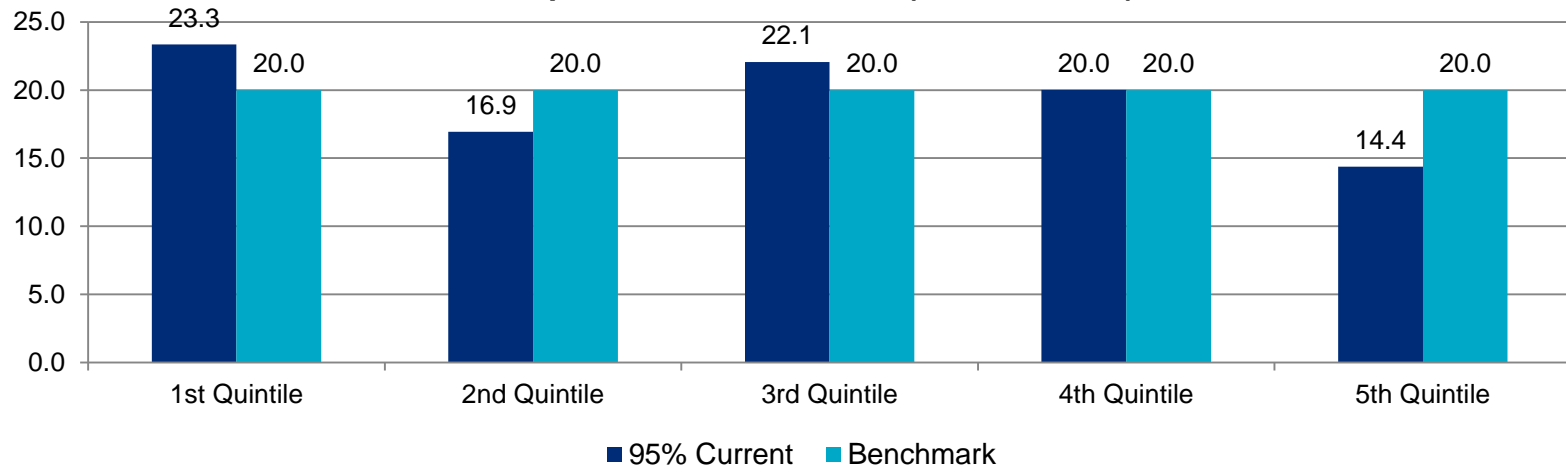


# STYLE ANALYSIS

**Sector Allocation (as of 12/31/16)**



**Market Capitalization Breakdown (as of 12/31/16)**



# STYLE ANALYSIS

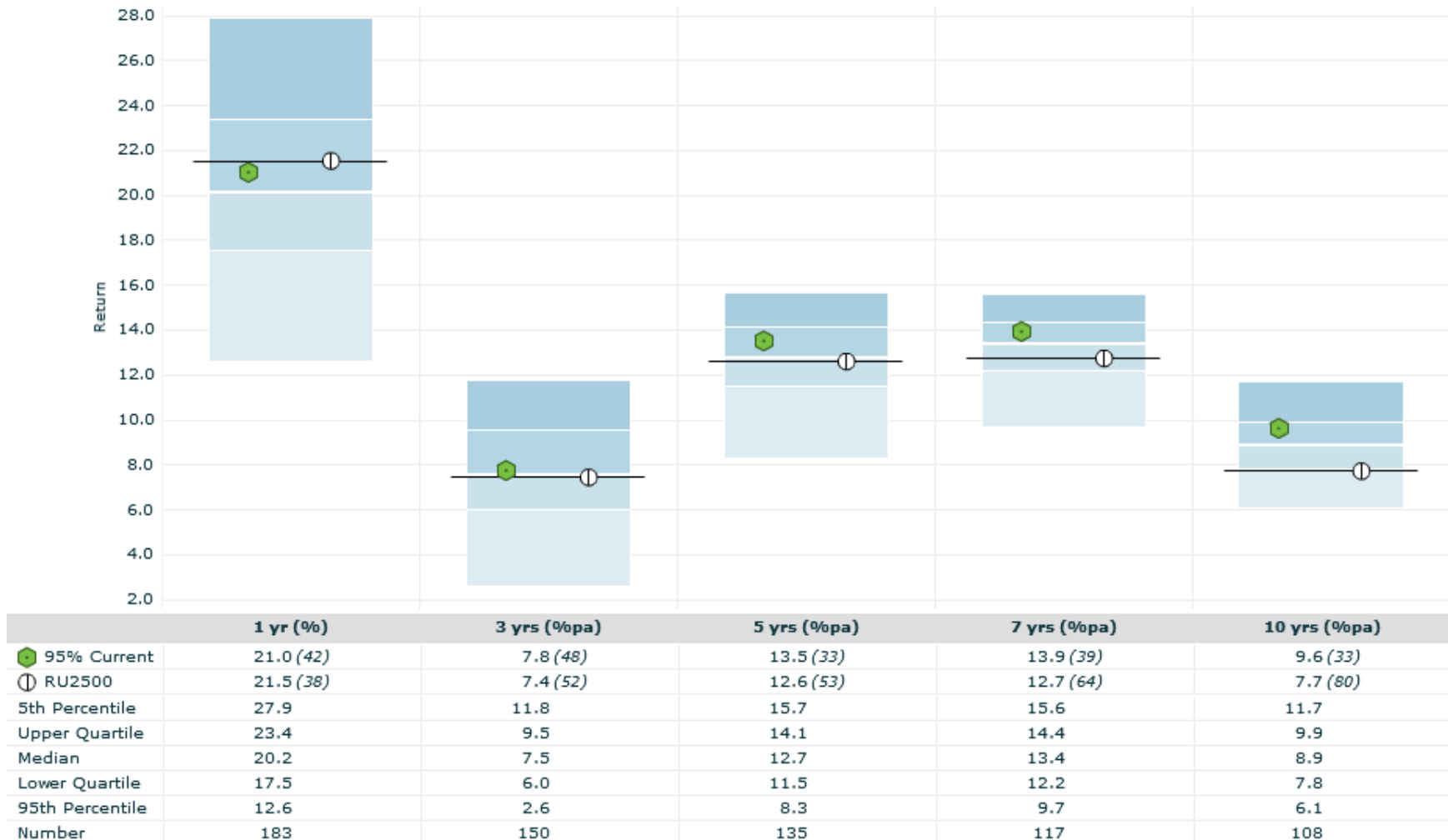
	95% Current	Russell 2500	50/50 Split between SMID Growth and Value Funds
Tracking Error	1.84%	0.00%	
Coverage	25.4%	100.0%	
Persistence Ratio	0.86	1.05	
Portfolio Beta	0.99	1.00	
Portfolio Volatility	12.45%	12.38%	
Benchmark Volatility	12.39%	12.38%	
Correlation (Port, BM)	0.99	1.00	
Active Share	74.6%	0.0%	
<b>Estimated Fee</b>	<b>0.530%</b>	<b>0.007%</b>	<b>0.637%</b>

- Recommended Fund IM fee is 16.8% lower than what is currently offered

# PERFORMANCE ANALYSIS

Return in \$US (before fees) over 1 yr, 3 yrs, 5 yrs, 7 yrs, 10 yrs ending March-17

Comparison with the US Equity SMID universe (Percentile Ranking)



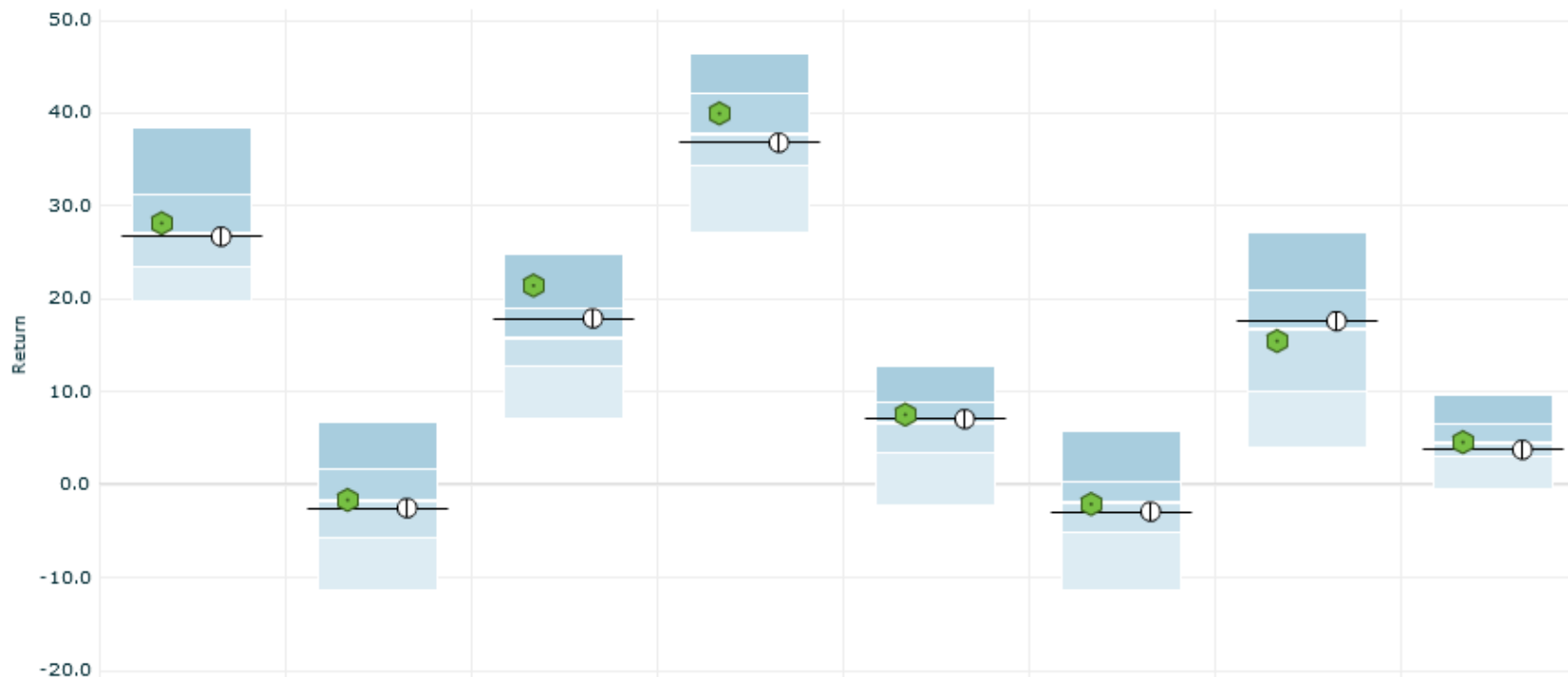
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# PERFORMANCE ANALYSIS

Return in \$US (before fees) over last 8 calendar years ending March-17

Comparison with the US Equity SMID universe (Percentile Ranking)



	2010 (%)	2011 (%)	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)	3 mths to 3/2017 (%)
95% Current	28.2 (42)	-1.6 (50)	21.4 (13)	40.0 (34)	7.5 (38)	-2.1 (52)	15.5 (55)	4.6 (50)
RU2500	26.7 (53)	-2.5 (55)	17.9 (34)	36.8 (58)	7.1 (46)	-2.9 (62)	17.6 (43)	3.8 (65)
5th Percentile	38.4	6.8	24.9	46.4	12.9	5.9	27.1	9.7
Upper Quartile	31.2	1.8	19.0	42.1	9.0	0.4	21.0	6.5
Median	27.1	-1.7	15.8	37.8	6.7	-1.8	16.7	4.6
Lower Quartile	23.6	-5.8	12.7	34.4	3.5	-5.1	10.1	3.0
95th Percentile	19.7	-11.4	7.2	27.1	-2.2	-11.2	4.0	-0.4
Number	192	190	196	188	180	186	188	189

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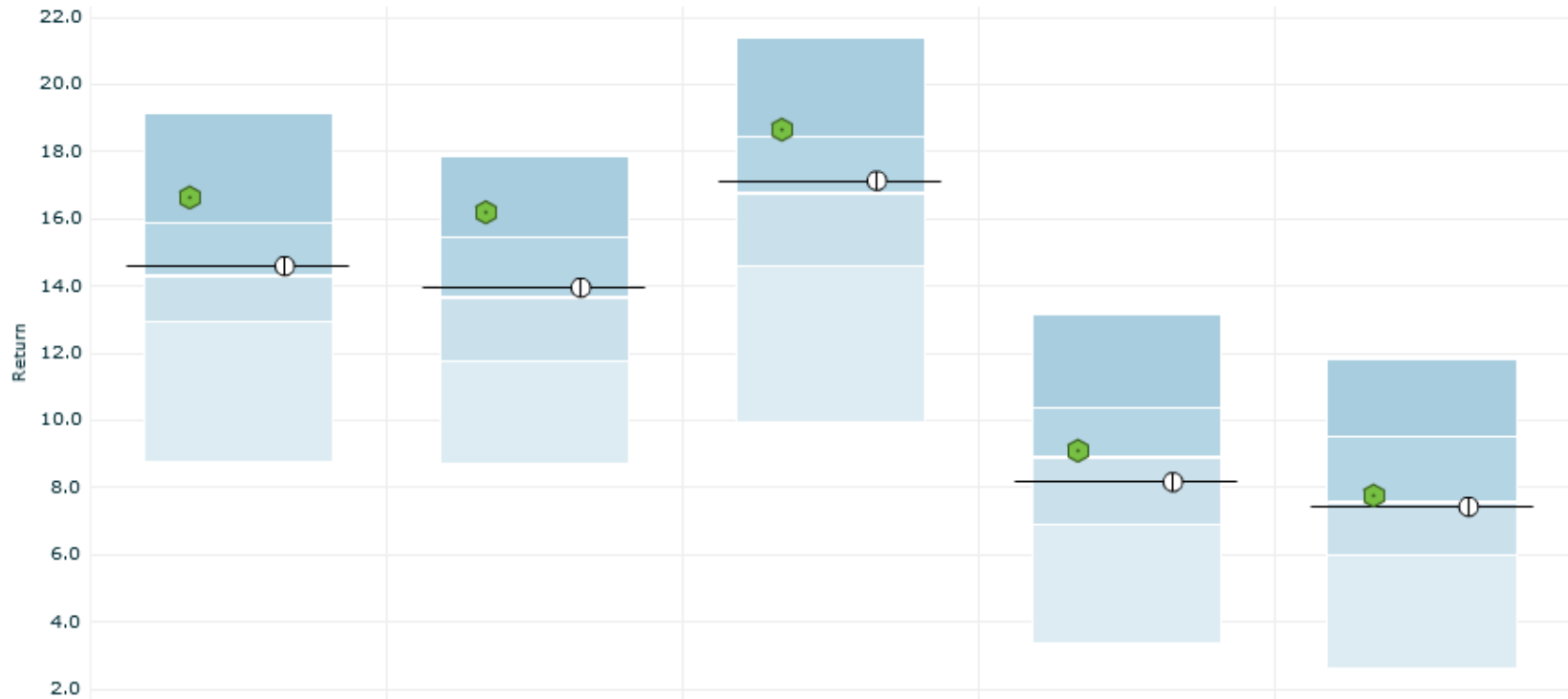




# PERFORMANCE ANALYSIS

Return in \$US (before fees) over 5 annual rolling periods ending March-17

Comparison with the US Equity SMID universe (Percentile Ranking)



	3 yrs to 3/2013 (%pa)	3 yrs to 3/2014 (%pa)	3 yrs to 3/2015 (%pa)	3 yrs to 3/2016 (%pa)	3 yrs to 3/2017 (%pa)
95% Current	16.6 (19)	16.2 (16)	18.7 (21)	9.1 (44)	7.8 (48)
RU2500	14.6 (46)	13.9 (45)	17.1 (45)	8.2 (58)	7.4 (52)
5th Percentile	19.1	17.8	21.4	13.1	11.8
Upper Quartile	15.9	15.4	18.5	10.4	9.5
Median	14.3	13.6	16.8	8.9	7.5
Lower Quartile	12.9	11.8	14.6	6.9	6.0
95th Percentile	8.8	8.7	10.0	3.4	2.6
Number	171	164	163	163	150

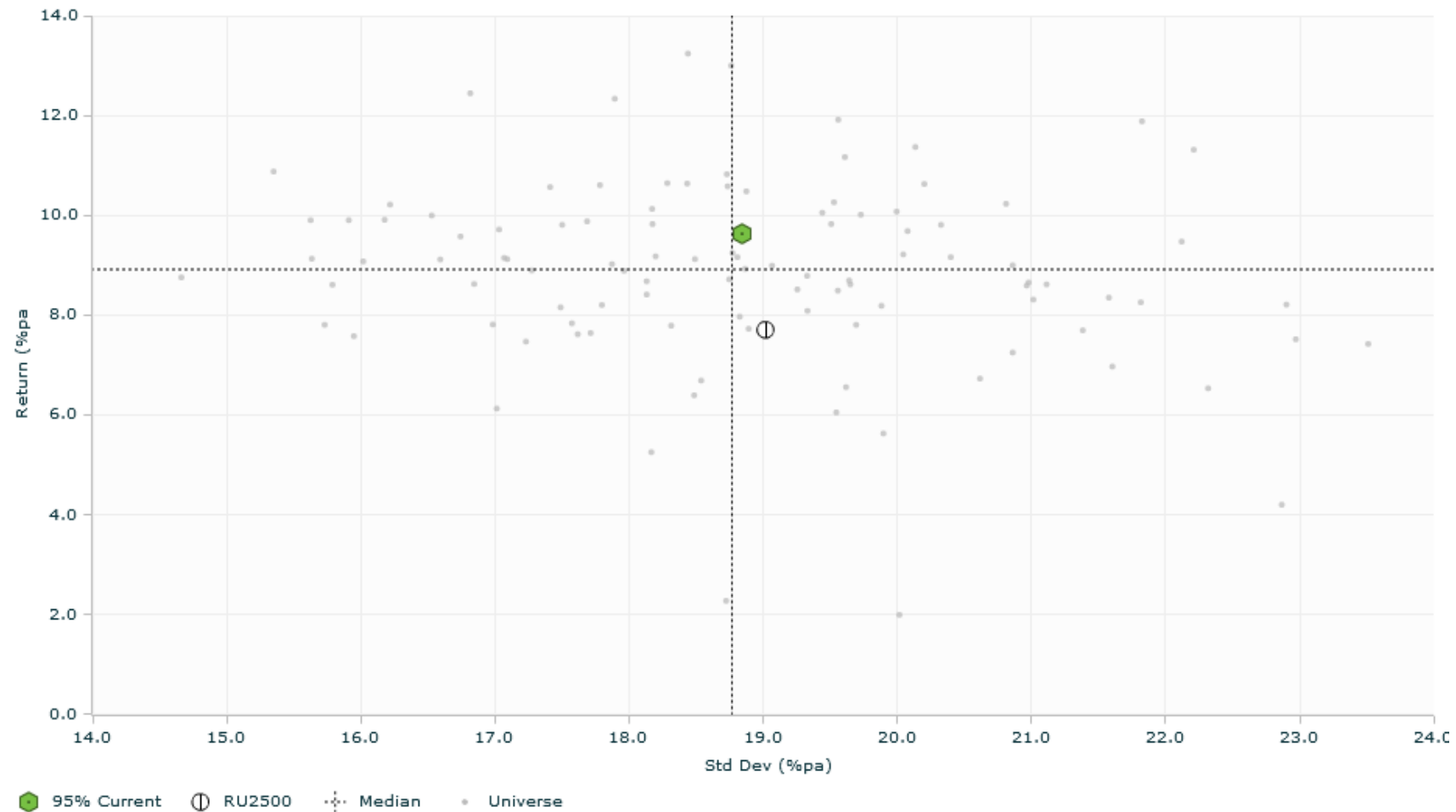
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# PERFORMANCE ANALYSIS

Return and Std Deviation in \$US (before fees) over 10 yrs ending March-17

Comparison with the US Equity SMID universe (monthly calculations)



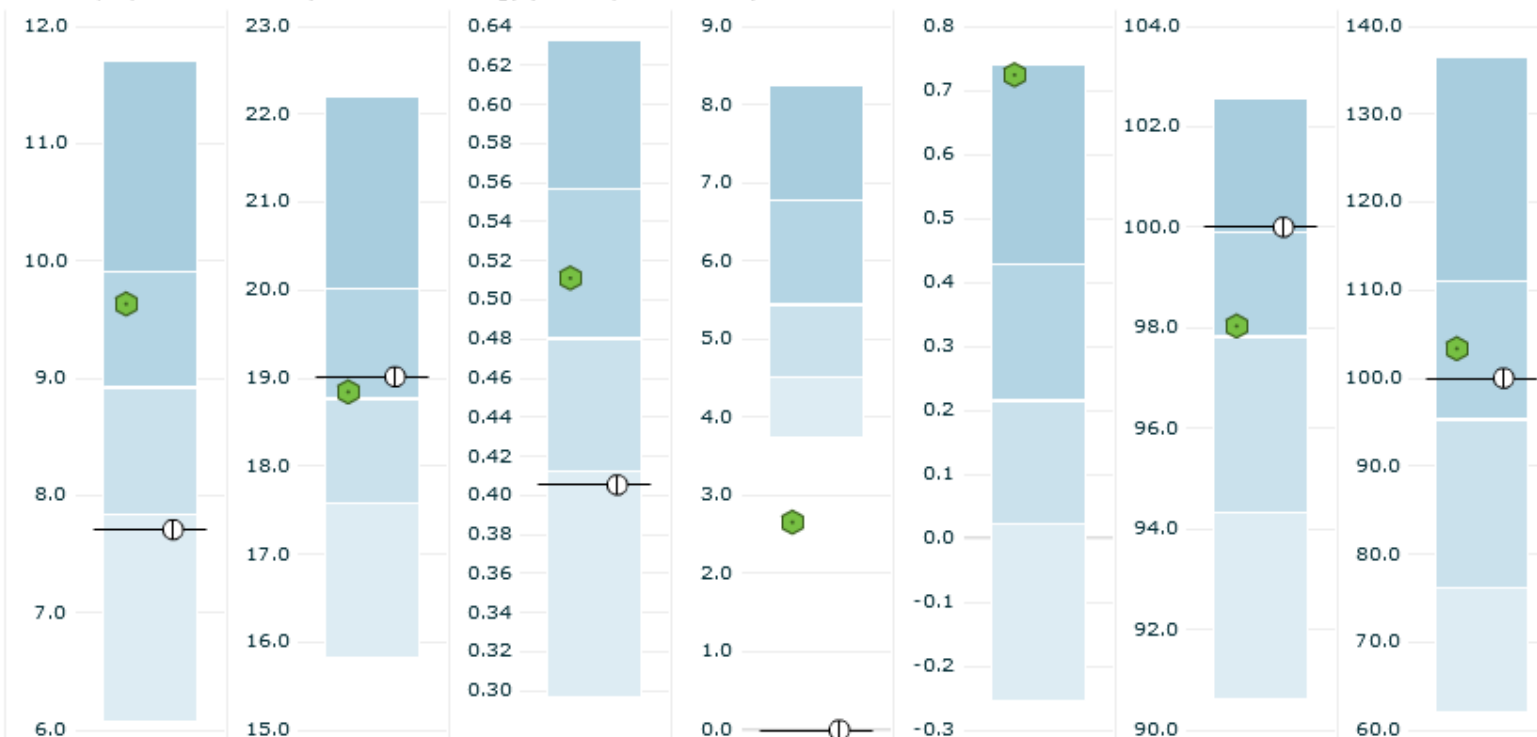
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# PERFORMANCE ANALYSIS

Performance characteristics vs. Russell 2500 in \$US (before fees) over 10 yrs ending March-17

Comparison with the US Equity SMID universe (Percentile Ranking) (monthly calculations)

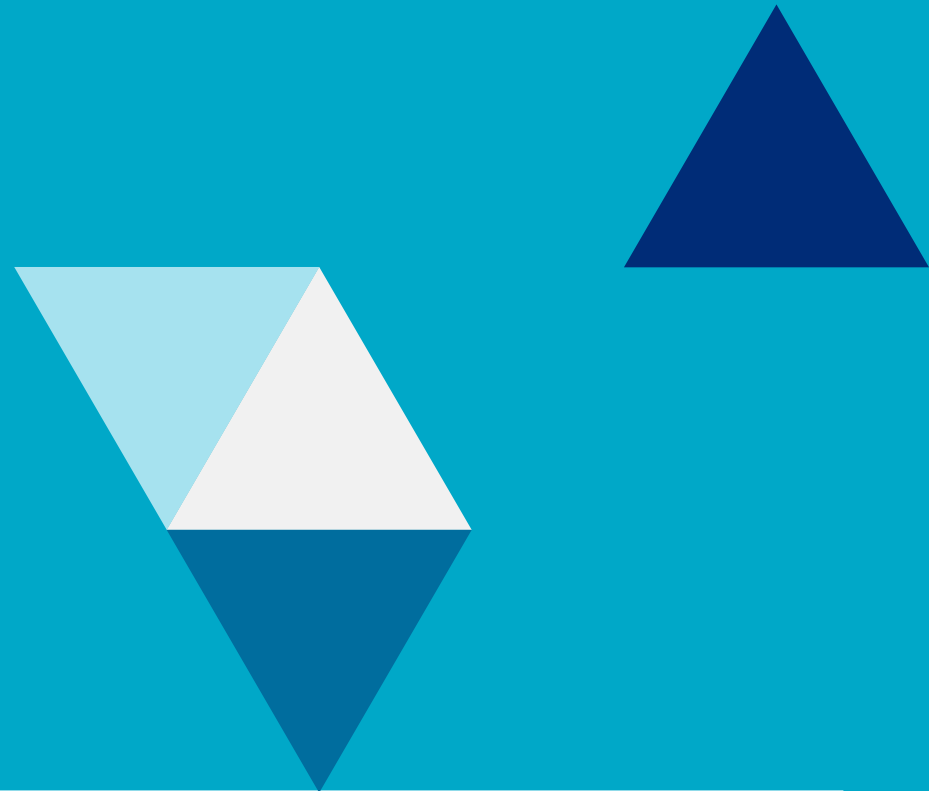


	Ret (%pa)	Std Dev (%pa)	Ret/SD	TE (%pa)	IR	Down Cap (%)	Up Cap (%)
95% Current	9.6 (33)	18.8 (47)	0.5 (37)	2.7 (100)	0.7 (5)	98.0 (47)	103.3 (34)
RU2500	7.7 (80)	19.0 (43)	0.4 (79)	0.0 (100)	-	100.0 (23)	100.0 (40)
5th Percentile	11.7	22.2	0.6	8.2	0.7	102.5	136.4
Upper Quartile	9.9	20.0	0.6	6.8	0.4	99.9	110.9
Median	8.9	18.8	0.5	5.4	0.2	97.8	95.2
Lower Quartile	7.8	17.6	0.4	4.5	0.0	94.3	76.1
95th Percentile	6.1	15.8	0.3	3.7	-0.3	90.6	62.1
Number	108	106	106	106	106	106	106

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# APPENDIX

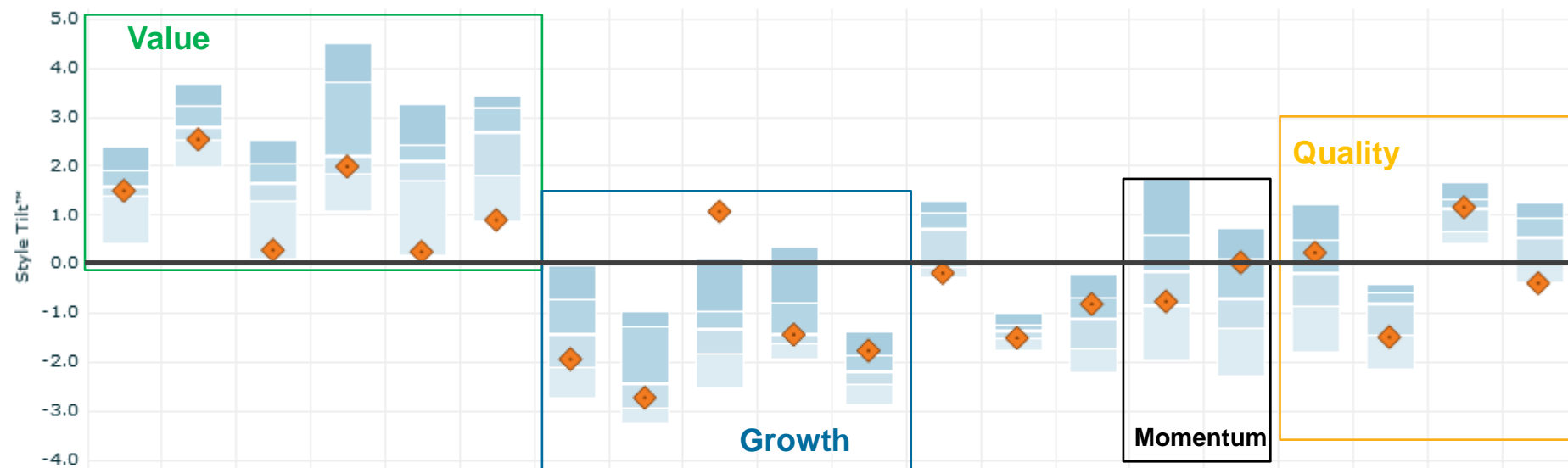


# MANAGER STYLE

## State of North Carolina Retirement System - Delaware Investments (Delaware) - Large Cap Value Focus

Mercer Selected Style Skyline™ vs. Russell 1000 as at December-16

Comparison with historical range (September-04 to December-16)



	Book to Price	Div	C'Flow Yld	Sales to Price	IBES Eng Yld	EBITD A/EV	Erng Gr	Sales Gr	IBES 1y Gr	IBES Erng	Sustai nable Gr	Carbon FP	Market Cap	Market Beta	Mom ST	Mom MT	IBES 1y Rev	Rtn on Equity	Low Gear	Erngs Gr Stabili ty
◆	1.5	2.6	0.3	2.0	0.3	0.9	-1.9	-2.7	1.1	-1.4	-1.8	-0.2	-1.5	-0.8	-0.8	0.0	0.2	-1.5	1.2	-0.4
5th	2.4	3.7	2.5	4.5	3.3	3.4	0.0	-1.0	0.1	0.3	-1.4	1.3	-1.0	-0.2	1.7	0.7	1.2	-0.4	1.7	1.2
25th	1.9	3.2	2.0	3.7	2.4	3.2	-0.7	-1.3	-1.0	-0.8	-1.9	1.1	-1.2	-0.7	0.6	0.1	0.5	-0.6	1.3	0.9
50th	1.6	2.8	1.6	2.2	2.1	2.7	-1.4	-2.4	-1.3	-1.4	-2.2	0.7	-1.4	-1.1	-0.1	-0.7	-0.2	-0.8	1.1	0.5
75th	1.4	2.5	1.3	1.9	1.7	1.8	-2.1	-2.9	-1.8	-1.6	-2.5	-0.1	-1.5	-1.7	-0.8	-1.3	-0.9	-1.4	0.7	0.0
95th	0.4	2.0	0.1	1.1	0.2	0.9	-2.7	-3.2	-2.5	-1.9	-2.9	-0.3	-1.8	-2.2	-2.0	-2.3	-1.8	-2.1	0.4	-0.4
#	50	50	50	50	50	50	50	50	50	50	50	19	50	50	50	50	50	50	43	50

◆ Delaware

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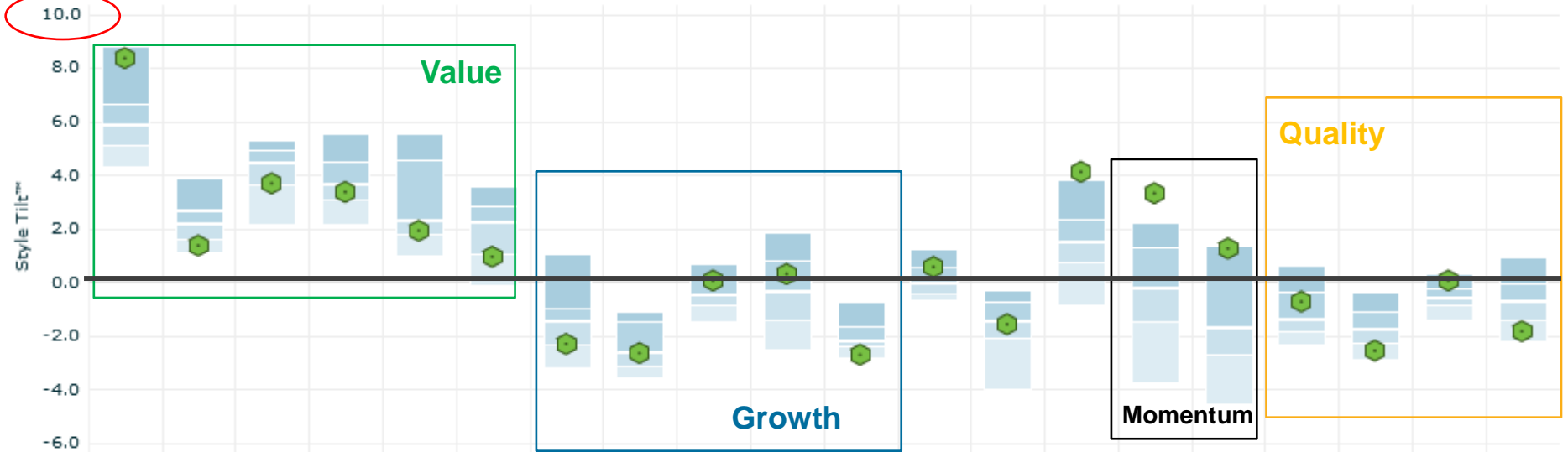
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# MANAGER STYLE

## State of North Carolina Retirement System - Hotchkis & Wiley Large Cap Value

Mercer Selected Style Skyline™ vs. Russell 1000 as at December-16

Comparison with historical range (December-03 to December-16)



	Book to Price	Div	C'Flow Yld	Sales to Price	IBES Engs Yld	EBITD A/EV	Erng Gr	Sales Gr	IBES 1y Gr	IBES Erng	Sustai nable Gr	Carbon FP	Market Cap	Market Beta	Mom ST	Mom MT	IBES 1y Rev	Rtn on Equity	Low Gear	Erngs Gr Stabili ty
Hotchkis LCV	8.4	1.4	3.7	3.4	1.9	1.0	-2.3	-2.6	0.1	0.3	-2.7	0.6	-1.6	4.1	3.4	1.3	-0.7	-2.5	0.1	-1.8
5th	8.8	3.9	5.3	5.5	5.5	3.6	1.1	-1.1	0.7	1.8	-0.7	1.2	-0.3	3.8	2.2	1.4	0.6	-0.3	0.4	1.0
25th	6.6	2.7	4.9	4.5	4.6	2.8	-1.0	-1.5	0.2	0.8	-1.7	0.6	-0.7	2.4	1.3	0.2	-0.4	-1.1	-0.2	0.0
50th	5.9	2.2	4.5	3.7	2.3	2.3	-1.4	-2.6	-0.5	-0.3	-2.1	0.0	-1.4	1.5	-0.2	-1.7	-1.4	-1.7	-0.6	-0.7
75th	5.1	1.7	3.7	3.1	1.8	1.1	-2.3	-3.1	-0.8	-1.4	-2.4	-0.4	-2.1	0.7	-1.5	-2.7	-1.8	-2.3	-0.9	-1.4
95th	4.3	1.1	2.2	2.2	1.0	-0.1	-3.2	-3.6	-1.4	-2.5	-2.8	-0.6	-4.0	-0.9	-3.7	-4.5	-2.3	-2.9	-1.4	-2.2
#	45	45	45	45	42	42	45	45	45	42	42	17	45	45	45	45	45	45	36	42

Hotchkis LCV

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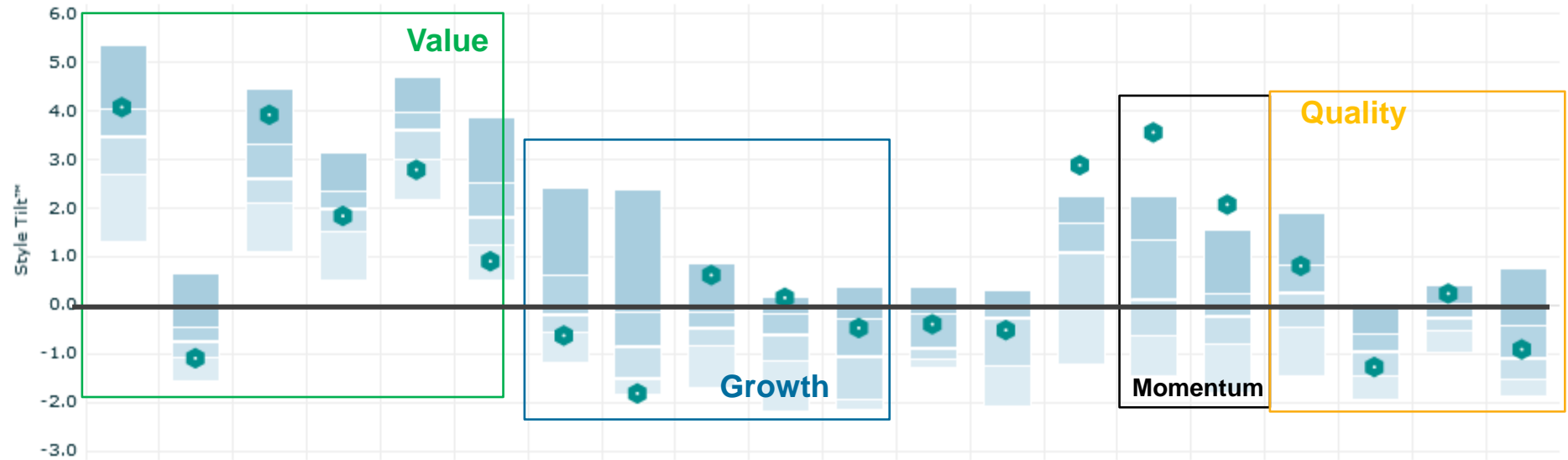
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# MANAGER STYLE

## State of North Carolina Retirement System - Robeco Investment Management - Robeco BP Large Cap Value

Mercer Selected Style Skyline™ vs. Russell 1000 as at December-16

Comparison with historical range (June-03 to December-16)



	Book to Price	Div	C'Flow Yld	Sales to Price	IBES Eng Yld	EBITD A/EV	Erng Gr	Sales Gr	IBES 1y Gr	IBES Erng	Sustainable Gr	Carbon FP	Market Cap	Market Beta	Mom ST	Mom MT	IBES 1y Rev	Rtn on Equity	Low Gear	Erngs Gr Stability
Robeco	4.1	-1.1	3.9	1.8	2.8	0.9	-0.6	-1.8	0.6	0.2	-0.5	-0.4	-0.5	2.9	3.6	2.1	0.8	-1.3	0.2	-0.9
5th	5.4	0.7	4.4	3.1	4.7	3.9	2.4	2.4	0.9	0.2	0.4	0.4	0.3	2.3	2.2	1.5	1.9	0.0	0.4	0.7
25th	4.0	-0.5	3.3	2.3	4.0	2.5	0.6	-0.2	-0.2	-0.2	-0.3	-0.2	0.0	1.7	1.4	0.2	0.8	-0.6	0.0	-0.4
50th	3.5	-0.7	2.6	2.0	3.6	1.8	-0.2	-0.9	-0.5	-0.6	-1.1	-0.9	-0.3	1.1	0.1	-0.2	0.2	-1.0	-0.3	-1.1
75th	2.7	-1.1	2.1	1.5	3.0	1.2	-0.6	-1.5	-0.8	-1.2	-2.0	-1.1	-1.2	-0.1	-0.6	-0.8	-0.5	-1.5	-0.5	-1.5
95th	1.3	-1.6	1.1	0.5	2.2	0.5	-1.2	-1.8	-1.7	-2.2	-2.1	-1.3	-2.1	-1.2	-1.5	-1.8	-1.5	-1.9	-1.0	-1.9
#	51	51	51	51	46	46	51	51	51	46	46	20	51	51	51	51	51	51	40	46

Robeco

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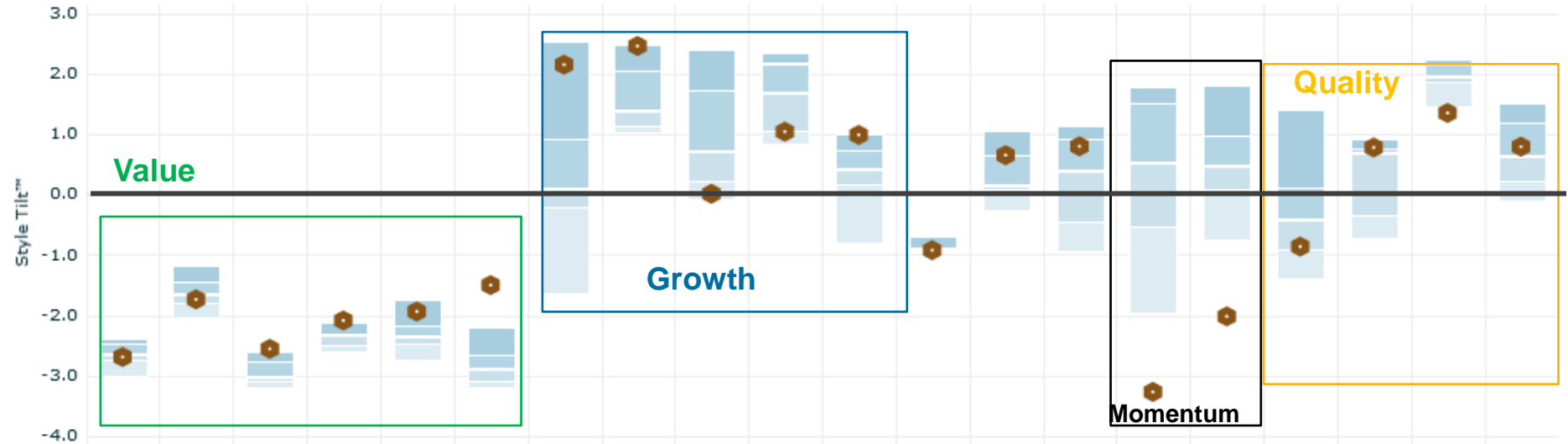


# MANAGER STYLE

## State of North Carolina Retirement System - Loomis, Sayles & Company - Large Cap Growth

Mercer Selected Style Skyline™ vs. Russell 1000 as at December-16

Comparison with historical range (December-12 to December-16)



	Book to Price	Div	C'Flow Yld	Sales to Price	IBES Engrs Yld	EBITD A/EV	Erng Gr	Sales Gr	IBES 1y Gr	IBES Erng	Sustai nable Gr	Carbon FP	Market Cap	Market Beta	Mom ST	Mom MT	IBES 1y Rev	Rtn on Equity	Low Gear	Erngs Gr Stabili ty
	-2.7	-1.7	-2.6	-2.1	-1.9	-1.5	2.2	2.5	0.0	1.1	1.0	-0.9	0.7	0.8	-3.3	-2.0	-0.9	0.8	1.4	0.8
5th	-2.4	-1.2	-2.6	-2.1	-1.7	-2.2	2.5	2.5	2.4	2.4	1.0	-0.7	1.1	1.1	1.8	1.8	1.4	0.9	2.2	1.5
25th	-2.5	-1.5	-2.8	-2.3	-2.2	-2.7	0.9	2.0	1.7	2.2	0.7	-0.9	0.7	0.9	1.5	1.0	0.1	0.8	2.2	1.2
50th	-2.6	-1.7	-3.0	-2.3	-2.4	-2.9	0.1	1.4	0.7	1.7	0.4	-0.9	0.2	0.4	0.5	0.5	-0.4	0.7	2.0	0.6
75th	-2.7	-1.8	-3.1	-2.5	-2.5	-3.1	-0.2	1.1	0.2	1.1	0.2	-0.9	0.1	-0.5	-0.5	0.1	-0.9	-0.3	1.9	0.2
95th	-3.0	-2.0	-3.2	-2.6	-2.7	-3.2	-1.6	1.0	-0.1	0.8	-0.8	-0.9	-0.3	-0.9	-1.9	-0.8	-1.4	-0.7	1.5	-0.1
#	17	17	17	17	17	17	17	17	17	17	17	5	17	17	17	17	17	17	17	17

Loomis

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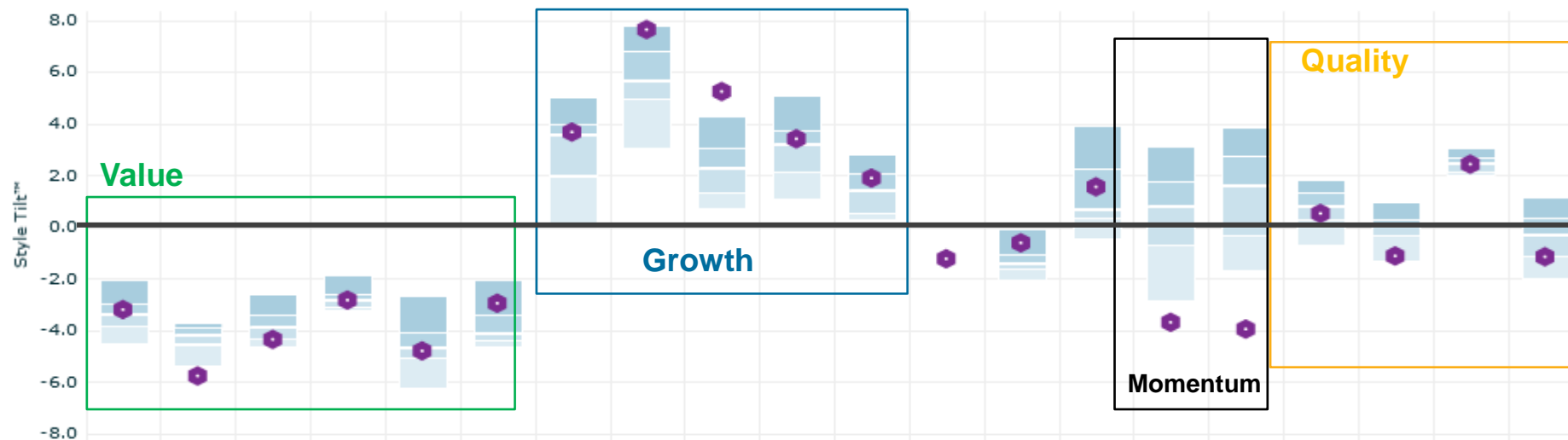


# MANAGER STYLE

## State of North Carolina Retirement System - Sands Capital Large Cap Growth

Mercer Selected Style Skyline™ vs. Russell 1000 as at December-16

Comparison with historical range (June-03 to December-16)



	Book to Price	Div	C'Flow Yld	Sales to Price	IBES Engs Yld	EBITD A/EV	Erng Gr	Sales Gr	IBES 1y Gr	IBES Erng	Sustai nable Gr	Carbon FP	Market Cap	Market Beta	Mom ST	Mom MT	IBES 1y Rev	Rtn on Equity	Low Gear	Erngs Gr Stabili ty
■	-3.2	-5.7	-4.3	-2.8	-4.8	-2.9	3.7	7.7	5.3	3.4	1.9	-1.2	-0.6	1.6	-3.7	-3.9	0.5	-1.1	2.5	-1.1
5th	-2.1	-3.7	-2.6	-1.9	-2.6	-2.0	5.0	7.8	4.3	5.1	2.8	-1.1	-0.1	3.9	3.1	3.9	1.9	1.0	3.1	1.1
25th	-3.0	-3.9	-3.4	-2.6	-4.1	-3.4	4.0	6.8	3.1	3.7	2.1	-1.1	-1.0	2.2	1.8	2.7	1.4	0.3	2.7	0.4
50th	-3.4	-4.2	-3.9	-2.8	-4.6	-4.1	3.6	5.7	2.3	3.2	1.4	-1.2	-1.4	0.7	0.8	1.6	0.8	0.1	2.5	-0.3
75th	-3.8	-4.5	-4.3	-3.1	-5.1	-4.4	2.0	5.0	1.4	2.1	0.5	-1.2	-1.6	0.3	-0.7	-0.3	0.3	-0.3	2.2	-1.1
95th	-4.5	-5.3	-4.6	-3.2	-6.2	-4.6	0.0	3.1	0.7	1.1	0.3	-1.3	-2.0	-0.4	-2.8	-1.7	-0.7	-1.3	2.0	-2.0
#	49	49	49	49	44	44	49	49	49	44	44	19	49	49	49	49	49	49	38	44

■ Sands

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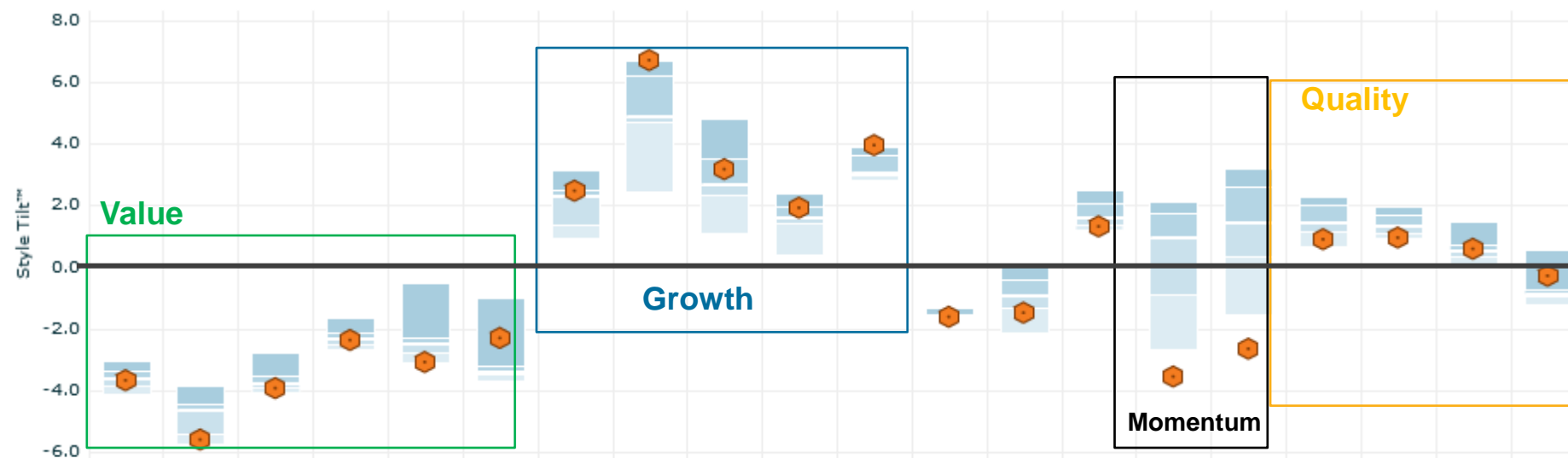


# MANAGER STYLE

## State of North Carolina Retirement System - Wellington Opportunistic Growth

Mercer Selected Style Skyline™ vs. Russell 3000 as at December-16

Comparison with historical range (March-09 to December-16)



	Book to Price	Div	C'Flow Yld	Sales to Price	IBES Engrs Yld	EBITD A/EV	Erng Gr	Sales Gr	IBES 1y Gr	IBES Erng	Sustai nable Gr	Carbon FP	Market Cap	Market Beta	Mom ST	Mom MT	IBES 1y Rev	Rtn on Equity	Low Gear	Erngs Gr Stability
Wellington	-3.7	-5.6	-3.9	-2.4	-3.1	-2.3	2.5	6.7	3.2	1.9	4.0	-1.6	-1.5	1.3	-3.5	-2.6	0.9	1.0	0.6	-0.3
5th	-3.0	-3.8	-2.8	-1.6	-0.5	-1.0	3.1	6.7	4.8	2.4	3.9	-1.3	0.1	2.5	2.1	3.2	2.3	2.0	1.5	0.6
25th	-3.4	-4.5	-3.5	-2.1	-2.3	-3.2	2.5	6.2	3.5	2.0	3.6	-1.5	-0.4	2.0	1.7	2.6	2.0	1.7	0.7	-0.7
50th	-3.6	-4.7	-3.8	-2.3	-2.5	-3.4	2.3	4.9	2.7	1.6	3.0	-1.5	-0.9	1.6	1.0	1.5	1.5	1.4	0.6	-0.9
75th	-3.9	-5.4	-3.9	-2.5	-2.8	-3.5	1.4	4.7	2.3	1.4	3.0	-1.6	-1.3	1.3	-0.9	0.3	1.2	1.1	0.4	-1.0
95th	-4.1	-5.8	-4.0	-2.7	-3.1	-3.7	0.9	2.4	1.1	0.4	2.8	-1.6	-2.1	1.2	-2.7	-1.5	0.7	0.9	0.0	-1.2
#	10	10	10	10	10	10	10	10	10	10	10	6	10	10	10	10	10	10	10	10

Wellington

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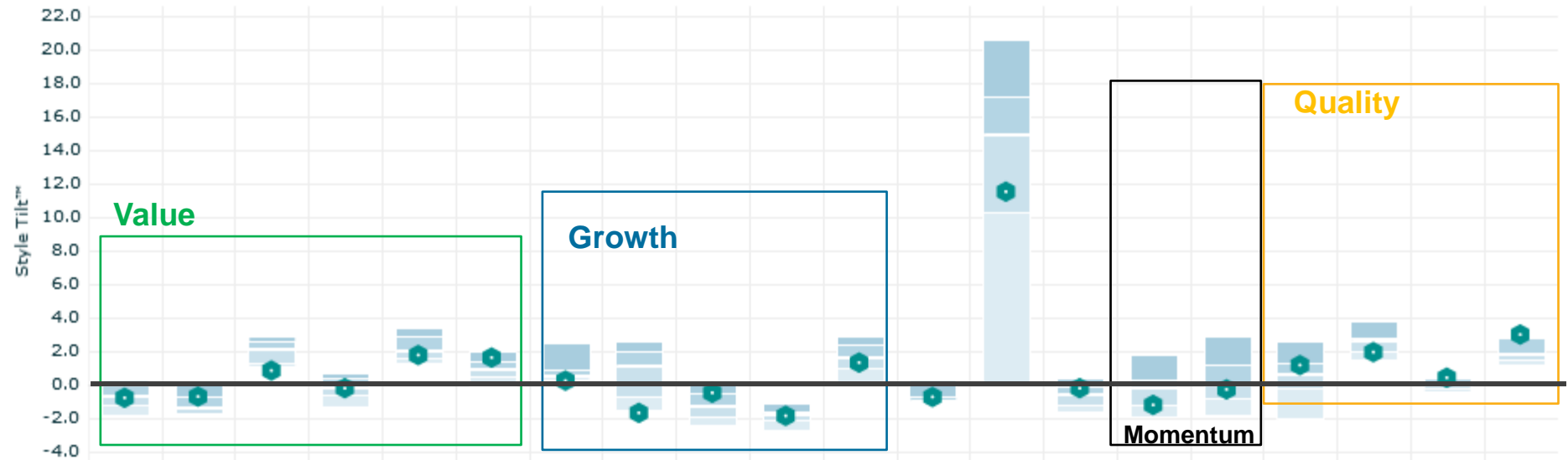


# MANAGER STYLE

## State of North Carolina Retirement System - EARNEST - Small Cap Value

Mercer Selected Style Skyline™ vs. Russell 2000 as at December-16

Comparison with historical range (March-04 to December-16)



	Book to Price	Div	C'Flow Yld	Sales to Price	IBES Eng Yld	EBITD A/EV	Erng Gr	Sales Gr	IBES 1y Gr	IBES Erng	Sustai nable Gr	Carbon FP	Market Cap	Market Beta	Mom ST	Mom MT	IBES 1y Rev	Rtn on Equity	Low Gear	Erngs Gr Stabili ty
•	-0.8	-0.7	0.9	-0.2	1.8	1.6	0.3	-1.7	-0.5	-1.8	1.3	-0.7	11.5	-0.2	-1.2	-0.3	1.2	2.0	0.4	3.0
5th	0.3	0.0	2.9	0.7	3.4	2.0	2.5	2.6	0.1	-1.1	2.9	0.3	20.6	0.4	1.8	2.9	2.6	3.7	0.5	2.9
25th	0.0	-0.7	2.6	0.4	2.9	1.4	0.9	2.0	-0.5	-1.6	2.4	-0.8	17.2	-0.1	0.3	1.2	1.3	2.8	0.4	2.8
50th	-0.7	-1.4	2.2	-0.2	2.0	0.9	0.6	1.1	-1.2	-1.8	1.7	-1.0	14.9	-0.6	-0.2	0.1	0.7	2.6	0.1	1.9
75th	-1.2	-1.7	1.3	-0.6	1.6	0.5	0.5	-0.7	-1.9	-2.1	1.0	-1.1	10.3	-1.2	-1.2	-0.8	-0.2	2.0	-0.2	1.5
95th	-1.8	-1.7	1.1	-1.3	1.3	-0.1	0.3	-1.5	-2.5	-2.7	0.2	-1.2	0.1	-1.6	-2.0	-1.8	-2.0	1.4	-0.4	1.1
#	22	22	22	22	20	20	22	22	22	20	20	6	22	22	22	22	22	22	14	20



ERNSCV

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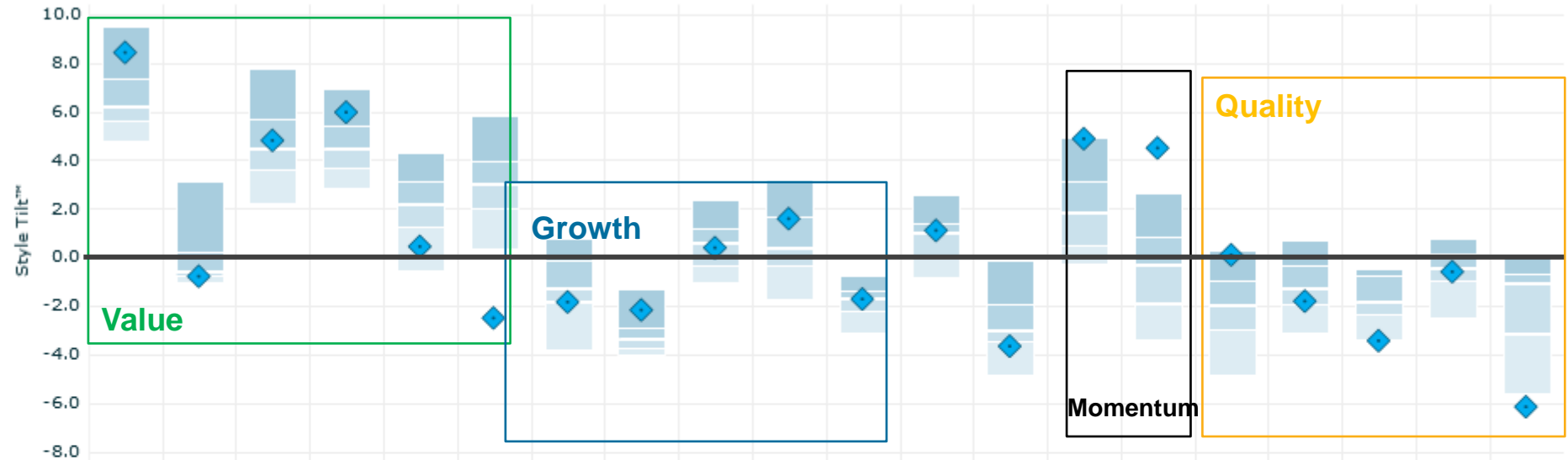
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# MANAGER STYLE

## State of North Carolina Retirement System - Hotchkis & Wiley Mid Cap Value

Mercer Selected Style Skyline™ vs. Russell Midcap as at December-16

Comparison with historical range (June-05 to December-16)



	Book to Price	Div	C'Flow Yld	Sales to Price	IBES Engs Yld	EBITD A/EV	Erng Gr	Sales Gr	IBES 1y Gr	IBES Eng	Sustai nable Gr	Carbon FP	Market Cap	Market Beta	Mom ST	Mom MT	IBES 1y Rev	Rtn on Equity	Low Gear	Erngs Gr Stabili ty
◆	8.4	-0.8	4.8	6.0	0.5	-2.5	-1.8	-2.1	0.4	1.6	-1.7	1.1	-3.6	4.9	4.5	0.1	-1.8	-3.4	-0.6	-6.1
5th	9.5	3.1	7.8	7.0	4.3	5.8	0.8	-1.3	2.4	3.2	-0.7	2.6	-0.1	4.9	2.6	0.3	0.7	-0.5	0.7	0.1
25th	7.3	0.2	5.7	5.4	3.1	4.0	-0.1	-2.9	1.2	1.7	-1.4	1.4	-2.0	3.1	0.9	-1.0	-0.3	-0.7	0.1	-0.6
50th	6.2	-0.6	4.5	4.5	2.2	3.0	-1.3	-3.4	0.6	0.4	-1.7	1.0	-3.0	1.9	-0.3	-2.0	-1.2	-1.8	-0.5	-1.1
75th	5.6	-0.8	3.6	3.7	1.2	2.0	-1.8	-3.7	-0.3	-0.4	-2.2	0.0	-3.4	0.5	-1.9	-2.9	-1.9	-2.3	-1.0	-3.1
95th	4.8	-1.0	2.2	2.8	-0.5	0.4	-3.8	-4.0	-1.0	-1.7	-3.1	-0.8	-4.8	-0.3	-3.4	-4.8	-3.1	-3.3	-2.5	-5.6
#	39	39	39	39	39	39	39	39	39	39	39	17	39	39	39	39	39	39	36	39

◆ Hotchkis MCV

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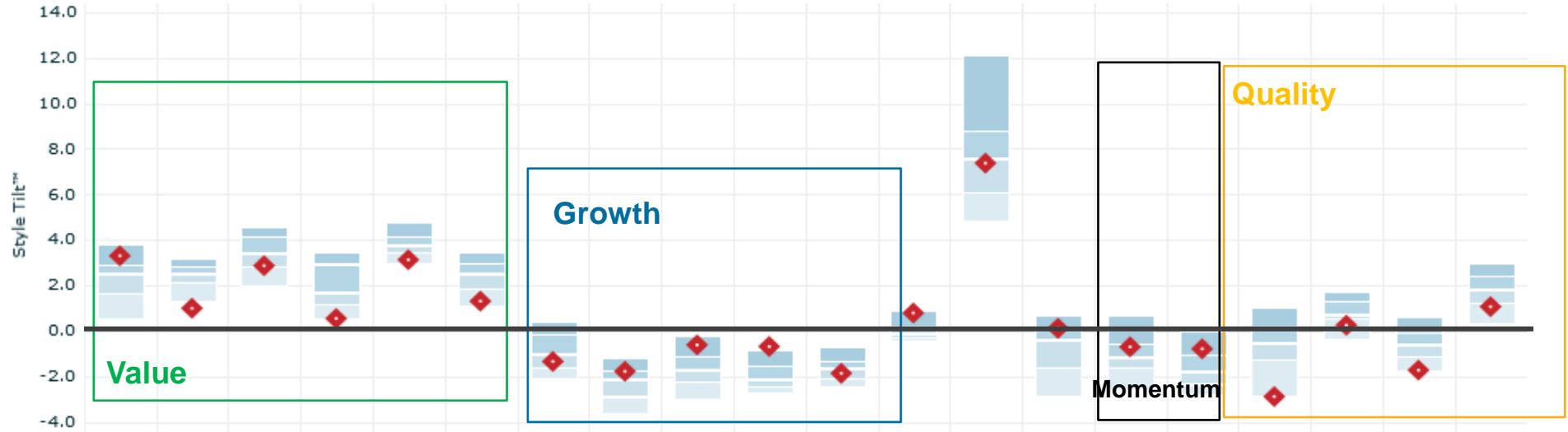


# MANAGER STYLE

## State of North Carolina Retirement System - WEDGE Capital Management - Small/Mid Cap Value

Mercer Selected Style Skyline™ vs. Russell 2500 as at December-16

Comparison with historical range (March-06 to December-16)



	Book to Price	Div	C'Flow Yld	Sales to Price	IBES Engs Yld	EBITD A/EV	Erng Gr	Sales Gr	IBES 1y Gr	IBES Erng	Sustai nable Gr	Carbon FP	Market Cap	Market Beta	Mom ST	Mom MT	IBES 1y Rev	Rtn on Equity	Low Gear	Erngs Gr Stabili ty
◆	3.3	1.0	2.9	0.6	3.2	1.3	-1.3	-1.7	-0.6	-0.6	-1.8	0.8	7.4	0.2	-0.7	-0.8	-2.9	0.3	-1.7	1.1
5th	3.8	3.2	4.6	3.5	4.8	3.5	0.4	-1.2	-0.2	-0.8	-0.7	0.9	12.1	0.7	0.7	0.0	1.1	1.8	0.6	3.0
25th	2.9	2.8	4.2	2.9	4.2	3.0	-0.1	-1.7	-1.1	-1.6	-1.3	0.2	8.8	0.1	-0.6	-1.0	0.2	1.4	-0.1	2.4
50th	2.5	2.6	3.5	1.7	3.7	2.6	-1.0	-2.1	-1.7	-2.1	-1.6	-0.1	7.6	-0.4	-1.1	-1.8	-0.5	0.8	-0.6	1.8
75th	1.7	2.2	2.9	1.2	3.4	1.9	-1.6	-2.9	-2.2	-2.4	-2.1	-0.2	6.1	-1.6	-1.6	-2.3	-1.2	0.6	-1.1	1.2
95th	0.6	1.3	2.0	0.6	3.0	1.1	-2.1	-3.6	-3.0	-2.7	-2.4	-0.4	4.8	-2.8	-2.5	-2.7	-2.9	-0.4	-1.7	0.3
#	41	41	41	41	41	41	41	41	41	41	41	20	41	41	41	41	41	41	40	41

◆ Wedge

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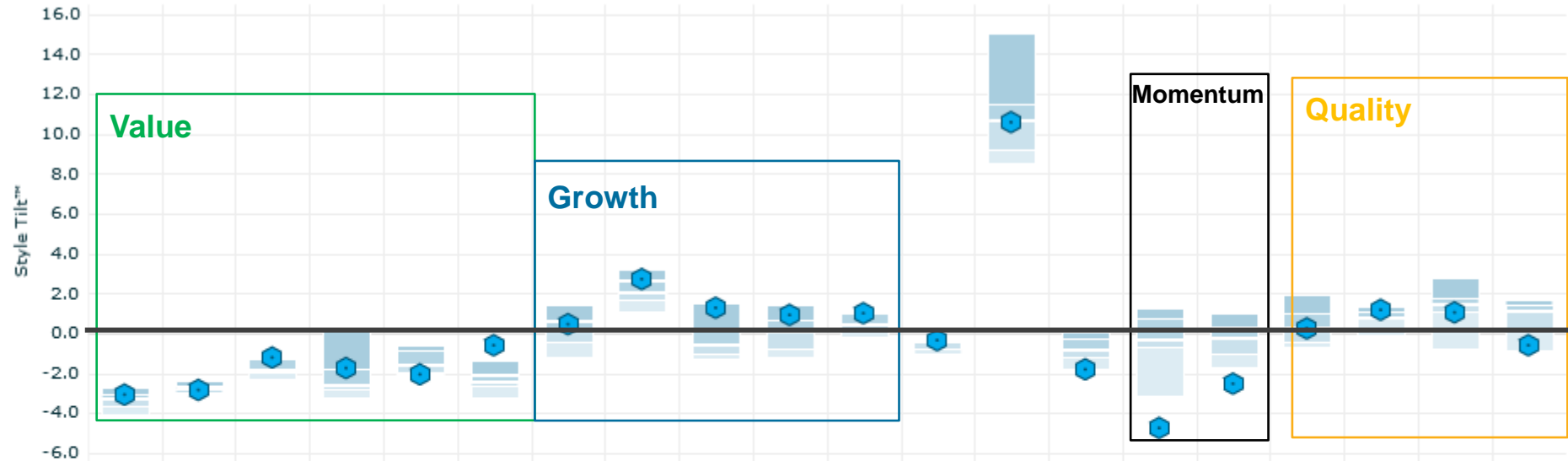


# MANAGER STYLE

## State of North Carolina Retirement System - Brown Advisory

Merger Selected Style Skyline™ vs. Russell 2000 as at December-16

Comparison with historical range (December-11 to December-16)



	Book to Price	Div	C'Flow Yld	Sales to Price	IBES Eng Yld	EBITD A/EV	Erng Gr	Sales Gr	IBES 1y Gr	IBES Erng	Sustainable Gr	Carbon FP	Market Cap	Market Beta	Mom ST	Mom MT	IBES 1y Rev	Rtn on Equity	Low Gear	Erngs Gr Stabili ty
■	-3.0	-2.8	-1.2	-1.7	-2.0	-0.6	0.5	2.8	1.3	1.0	1.0	-0.3	10.6	-1.8	-4.7	-2.5	0.3	1.2	1.1	-0.6
5th	-2.7	-2.4	-1.2	0.2	-0.6	-1.4	1.4	3.2	1.5	1.4	1.1	-0.3	15.1	0.1	1.3	1.0	2.0	1.3	2.7	1.7
25th	-3.0	-2.6	-1.3	-1.8	-0.9	-2.1	0.6	2.7	0.2	0.7	1.0	-0.3	11.5	-0.3	0.8	0.3	1.0	1.1	1.7	1.4
50th	-3.2	-2.8	-1.8	-2.6	-1.6	-2.4	0.2	2.1	-0.5	0.1	0.5	-0.4	10.7	-0.8	-0.3	-0.2	0.3	0.8	1.5	1.1
75th	-3.6	-2.9	-2.0	-2.8	-2.0	-2.6	-0.4	1.7	-1.0	-0.8	0.2	-0.8	9.2	-1.2	-0.7	-1.1	-0.4	0.8	1.1	0.2
95th	-4.0	-3.0	-2.3	-3.3	-2.1	-3.2	-1.2	1.1	-1.3	-1.2	-0.1	-1.0	8.5	-1.8	-3.1	-1.7	-0.7	-0.1	-0.7	-0.9
#	15	15	15	15	15	15	15	15	15	15	15	6	15	15	15	15	15	15	15	15

■ Brown

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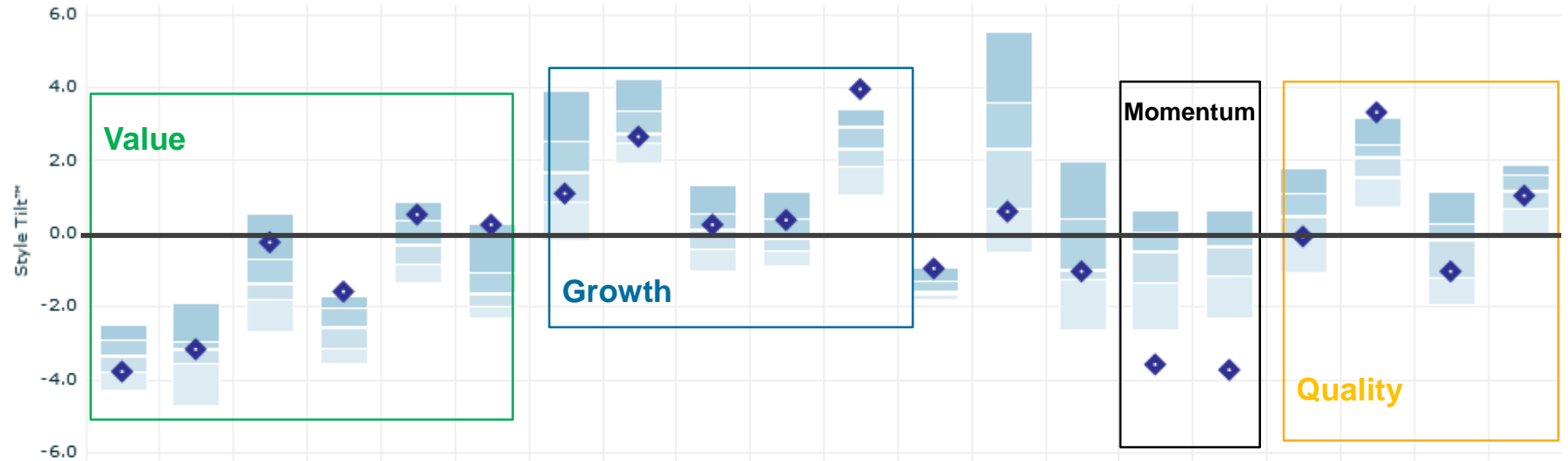


# MANAGER STYLE

## State of North Carolina Retirement System - TimesSquare SMID Cap Growth

Mercer Selected Style Skyline™ vs. Russell 2500 as at December-16

Comparison with historical range (March-04 to December-16)



	Book to Price	Div	C'Flow Yld	Sales to Price	IBES Engrs Yld	EBITD A/EV	Erng Gr	Sales Gr	IBES 1y Gr	IBES Erng	Sustai nable Gr	Carbon FP	Market Cap	Market Beta	Mom ST	Mom MT	IBES 1y Rev	Rtn on Equity	Low Gear	Erngs Gr Stabili ty
◆	-3.8	-3.2	-0.2	-1.6	0.5	0.3	1.1	2.7	0.3	0.4	4.0	-1.0	0.6	-1.0	-3.6	-3.7	-0.1	3.3	-1.0	1.0
5th	-2.5	-1.9	0.5	-1.7	0.9	0.3	3.9	4.2	1.3	1.1	3.4	-1.0	5.5	2.0	0.7	0.6	1.8	3.2	1.1	1.9
25th	-2.9	-3.0	-0.7	-2.0	0.4	-1.1	2.5	3.3	0.6	0.4	2.9	-1.3	3.6	0.4	0.0	-0.1	1.1	2.4	0.3	1.6
50th	-3.3	-3.2	-1.4	-2.6	-0.3	-1.6	1.7	2.7	0.1	-0.1	2.3	-1.6	2.3	-1.0	-0.5	-0.4	0.5	2.1	-0.2	1.2
75th	-3.8	-3.5	-1.8	-3.1	-0.8	-2.0	0.9	2.5	-0.4	-0.5	1.8	-1.7	0.7	-1.3	-1.3	-1.2	-0.1	1.5	-1.2	0.7
95th	-4.3	-4.7	-2.7	-3.6	-1.4	-2.3	-0.2	1.9	-1.0	-0.9	1.1	-1.8	-0.5	-2.7	-2.7	-2.3	-1.1	0.7	-2.0	0.0
#	50	50	50	50	48	48	50	50	50	48	48	20	50	50	50	50	50	50	43	48

◆ TimesSquare

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**TODAY**

