

# FUND EVALUATION REPORT

---

## City of Marlborough Contributory Retirement System

Quarterly Review  
September 30, 2018



---

M E K E T A     I N V E S T M E N T     G R O U P

BOSTON  
MASSACHUSETTS

CHICAGO  
ILLINOIS

MIAMI  
FLORIDA

PORTLAND  
OREGON

SAN DIEGO  
CALIFORNIA

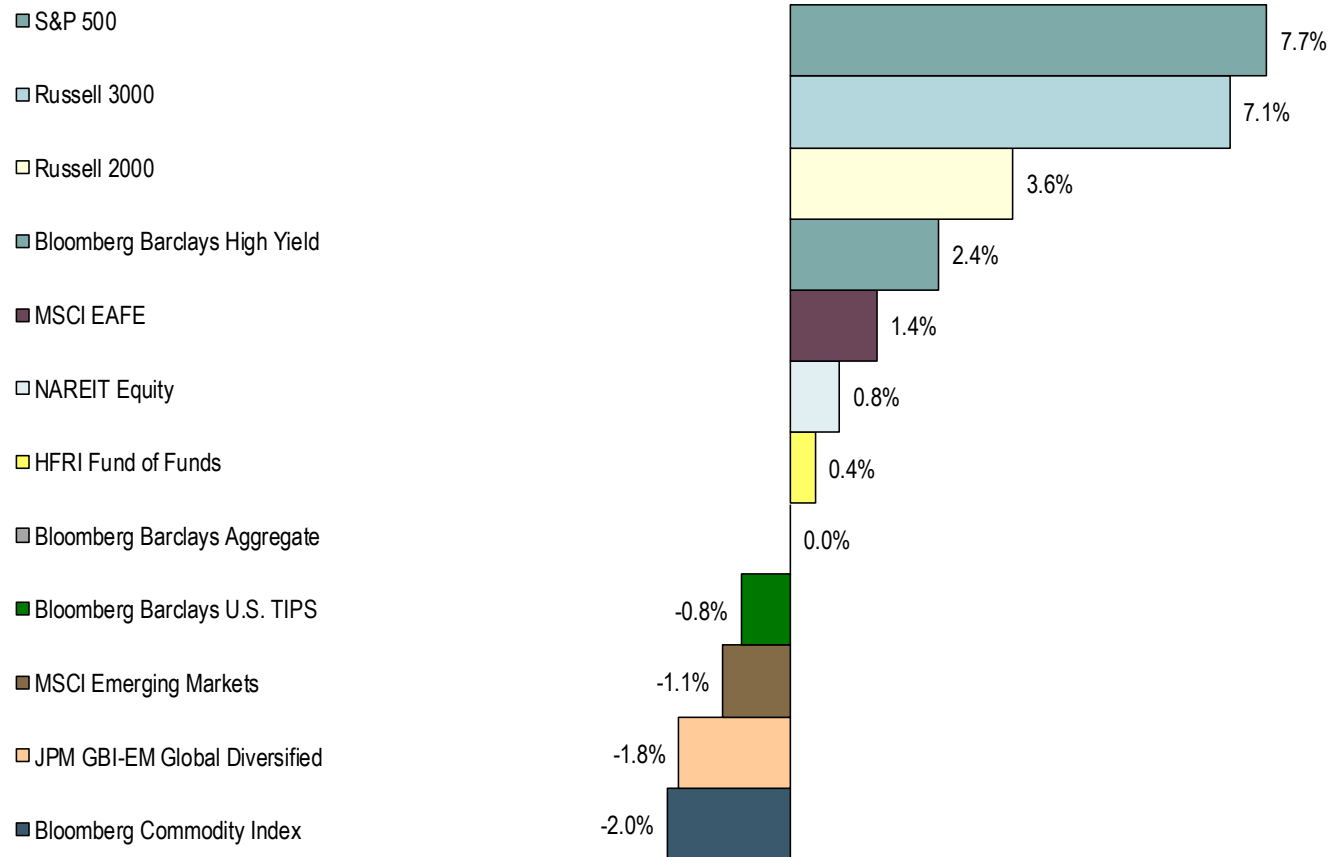
LONDON  
UNITED KINGDOM

[www.meketagroup.com](http://www.meketagroup.com)

- 1. The World Markets in the Third Quarter of 2018**
- 2. Interim Update as of October 31, 2018**
- 3. Retirement System Summary**
- 4. Retirement System Detail**
- 5. Portfolio Reviews**
- 6. Non-Core Real Estate Recommendation**
- 7. Appendices**
  - Corporate Update
  - Disclaimer, Glossary, and Notes

## **The World Markets Third Quarter of 2018**

## The World Markets<sup>1</sup> Third Quarter of 2018



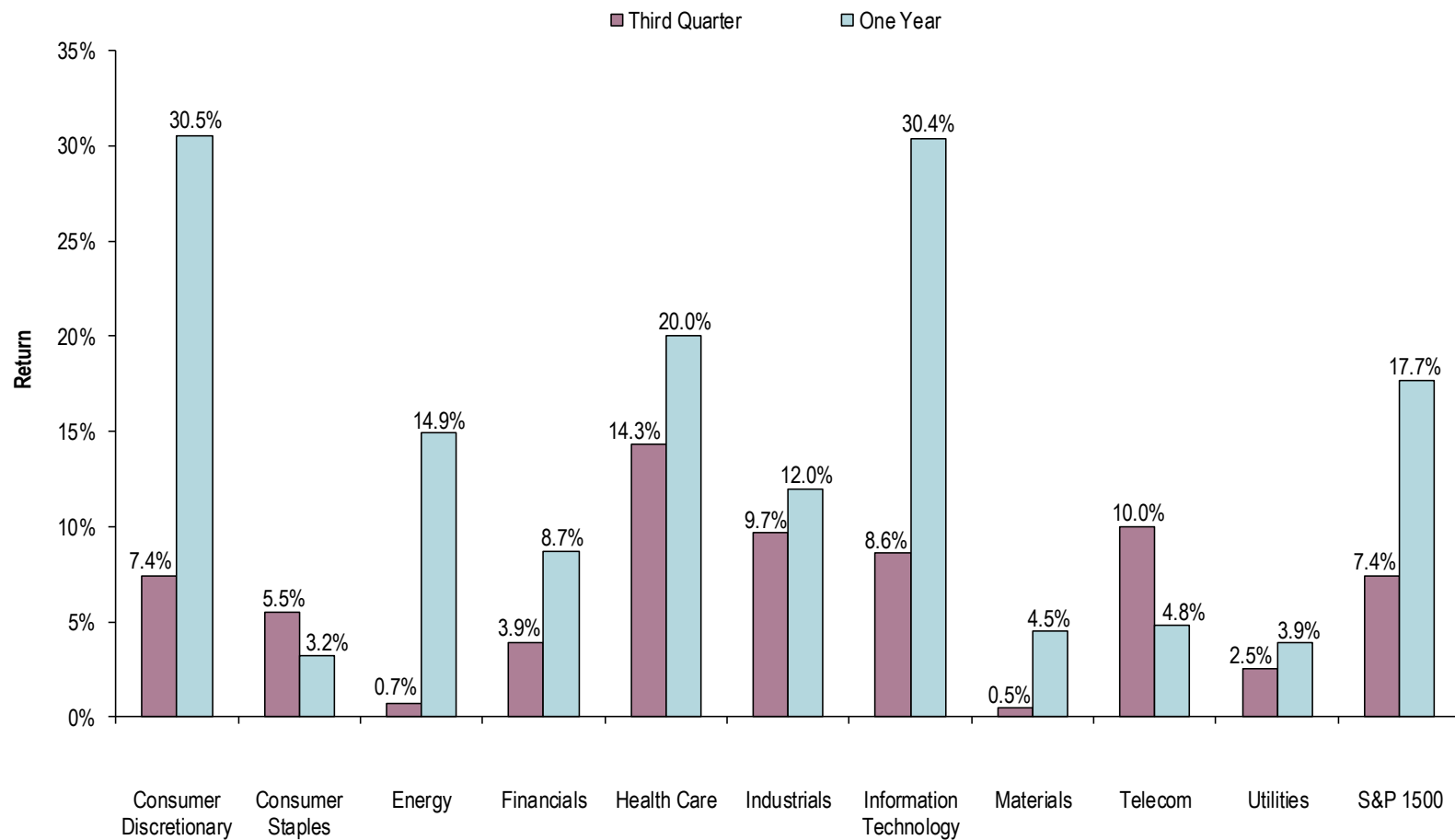
<sup>1</sup> Source: InvestorForce.

Index Returns<sup>1</sup>

	3Q18 (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
<b>Domestic Equity</b>						
Russell 3000	7.1	10.6	17.6	17.1	13.5	12.0
Russell 1000	7.4	10.5	17.8	17.1	13.7	12.1
Russell 1000 Growth	9.2	17.1	26.3	20.6	16.6	14.3
Russell 1000 Value	5.7	3.9	9.5	13.6	10.7	9.8
Russell MidCap	5.0	7.5	14.0	14.5	11.7	12.3
Russell MidCap Growth	7.6	13.4	21.1	16.6	13.0	13.5
Russell MidCap Value	3.3	3.1	8.8	13.1	10.7	11.3
Russell 2000	3.6	11.5	15.2	17.1	11.1	11.1
Russell 2000 Growth	5.5	15.8	21.1	18.0	12.1	12.7
Russell 2000 Value	1.6	7.1	9.3	16.1	9.9	9.5
<b>Foreign Equity</b>						
MSCI ACWI (ex. U.S.)	0.7	-3.1	1.8	10.0	4.1	5.2
MSCI EAFE	1.4	-1.4	2.7	9.2	4.4	5.4
MSCI EAFE (Local Currency)	2.4	1.4	5.1	9.4	7.9	6.7
MSCI EAFE Small Cap	-0.9	-2.2	3.7	12.4	8.0	9.7
MSCI Emerging Markets	-1.1	-7.7	-0.8	12.4	3.6	5.4
MSCI Emerging Markets (Local Currency)	0.0	-2.9	2.7	12.2	7.3	7.7
<b>Fixed Income</b>						
Bloomberg Barclays Universal	0.3	-1.4	-1.0	2.0	2.5	4.2
Bloomberg Barclays Aggregate	0.0	-1.6	-1.2	1.3	2.2	3.8
Bloomberg Barclays U.S. TIPS	-0.8	-0.8	0.4	2.0	1.4	3.3
Bloomberg Barclays High Yield	2.4	2.6	3.0	8.1	5.5	9.5
JPM GBI-EM Global Diversified	-1.8	-8.1	-7.4	5.2	-1.7	2.7
<b>Other</b>						
NAREIT Equity	0.8	1.8	3.3	7.6	9.2	7.4
Bloomberg Commodity Index	-2.0	-2.0	2.6	-0.1	-7.2	-6.2
HFRI Fund of Funds	0.4	1.2	3.3	3.3	3.2	2.6

<sup>1</sup> Source: InvestorForce.

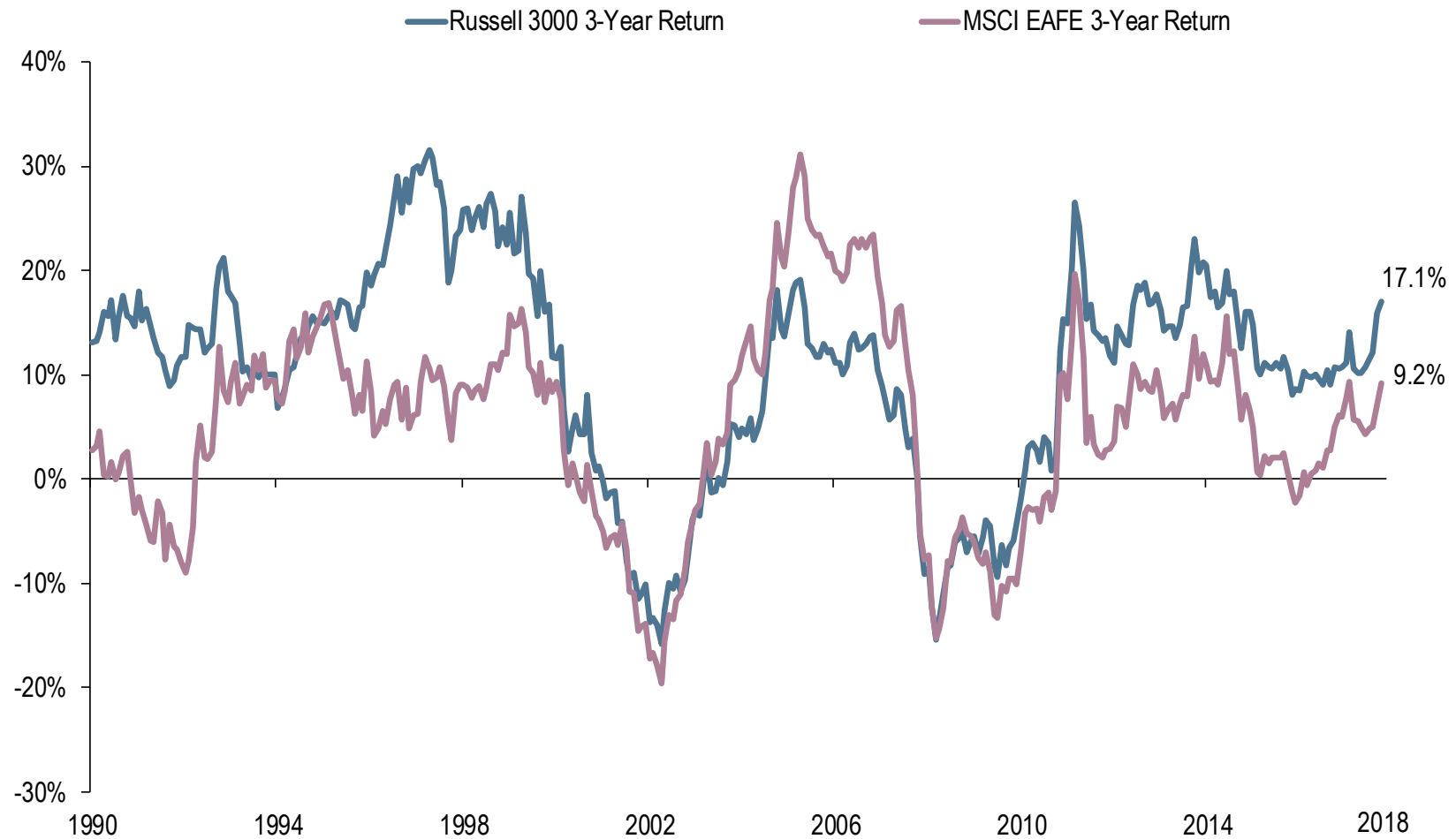
## S&P Sector Returns<sup>1</sup>



<sup>1</sup> Source: InvestorForce. Represents S&P 1500 (All Cap) data.



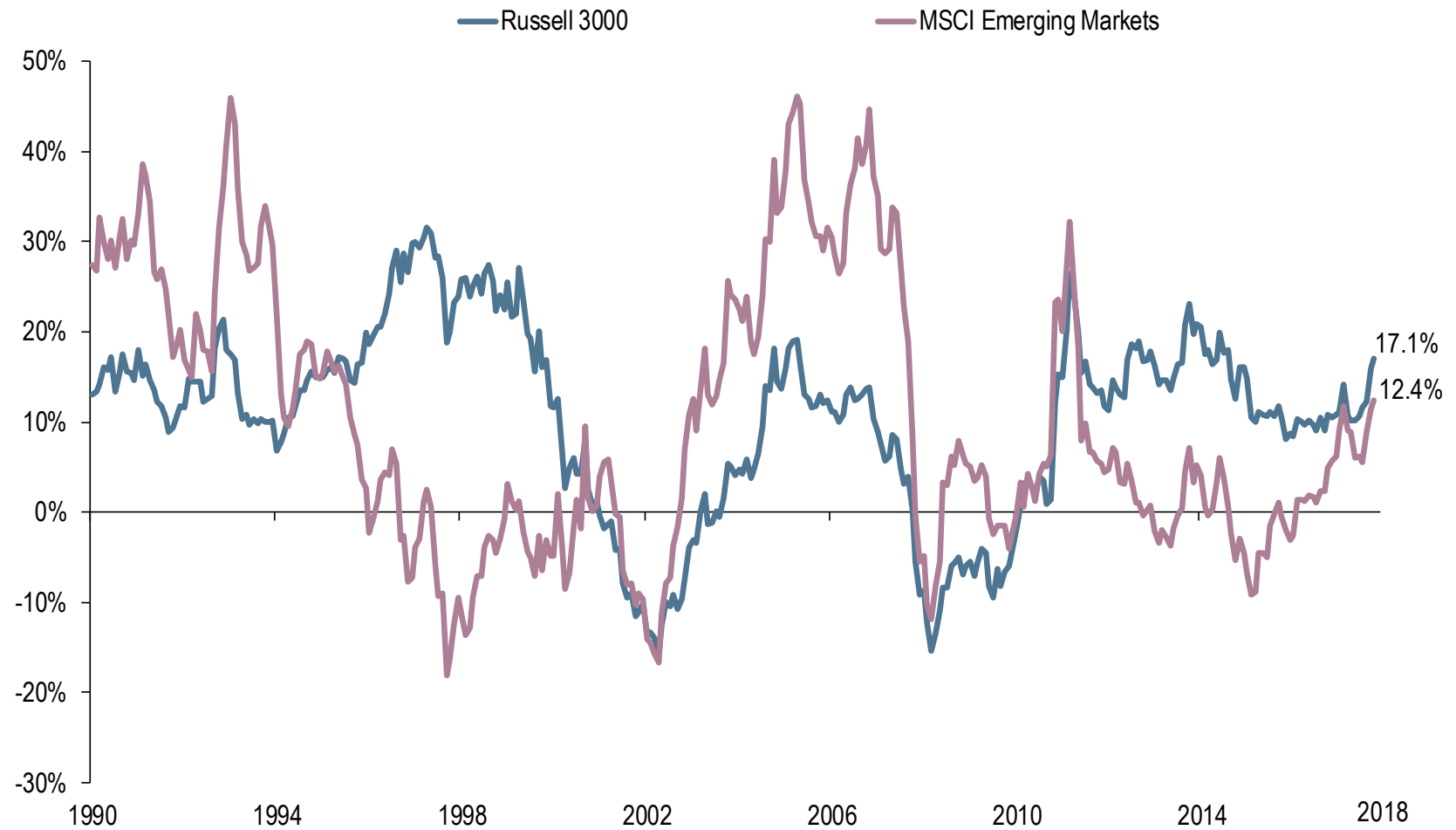
## U.S. and Developed Market Foreign Equity Rolling Three-Year Returns<sup>1</sup>



<sup>1</sup> Source: InvestorForce.



## U.S. and Emerging Market Equity Rolling Three-Year Returns<sup>1</sup>

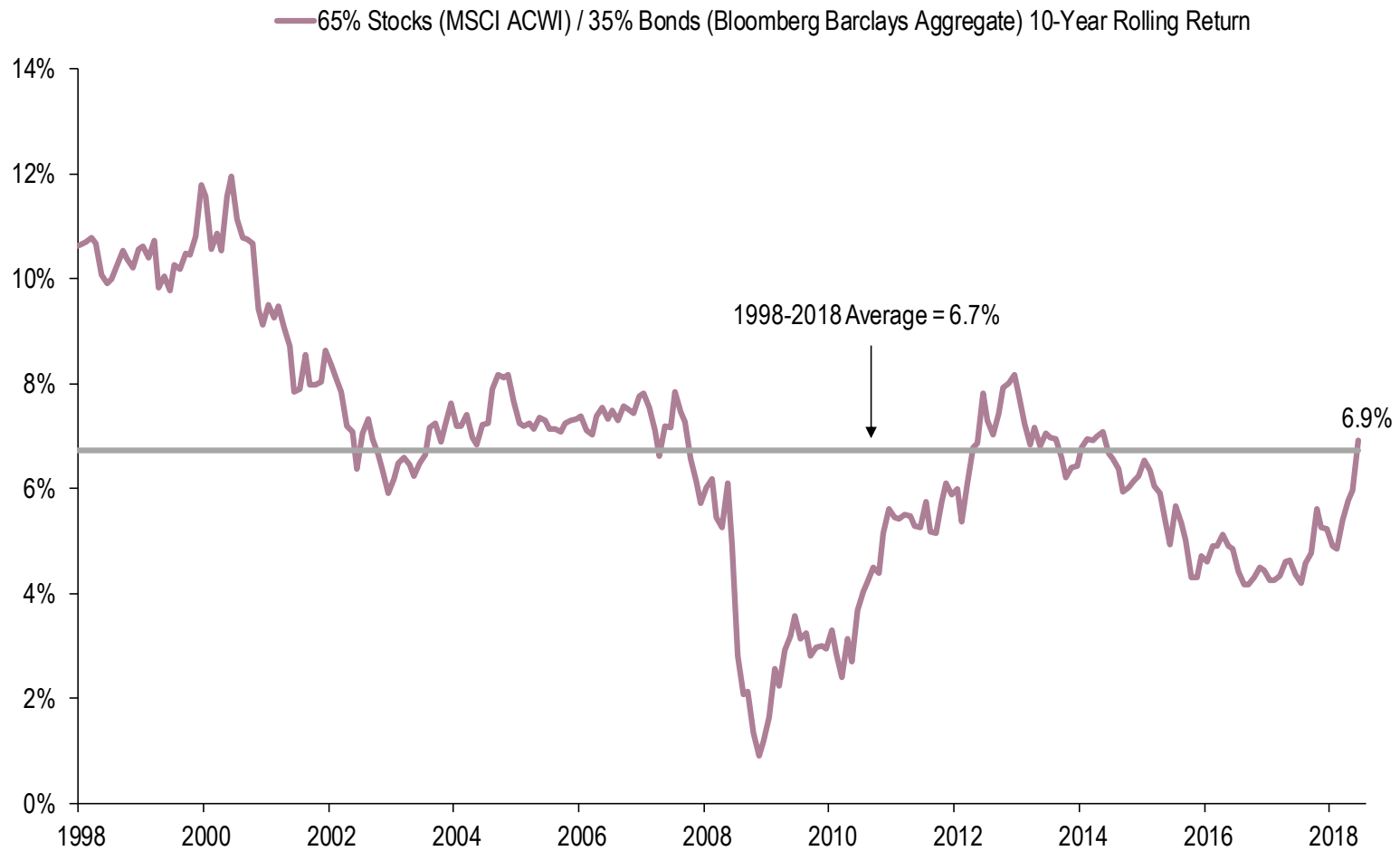


<sup>1</sup> Source: InvestorForce.





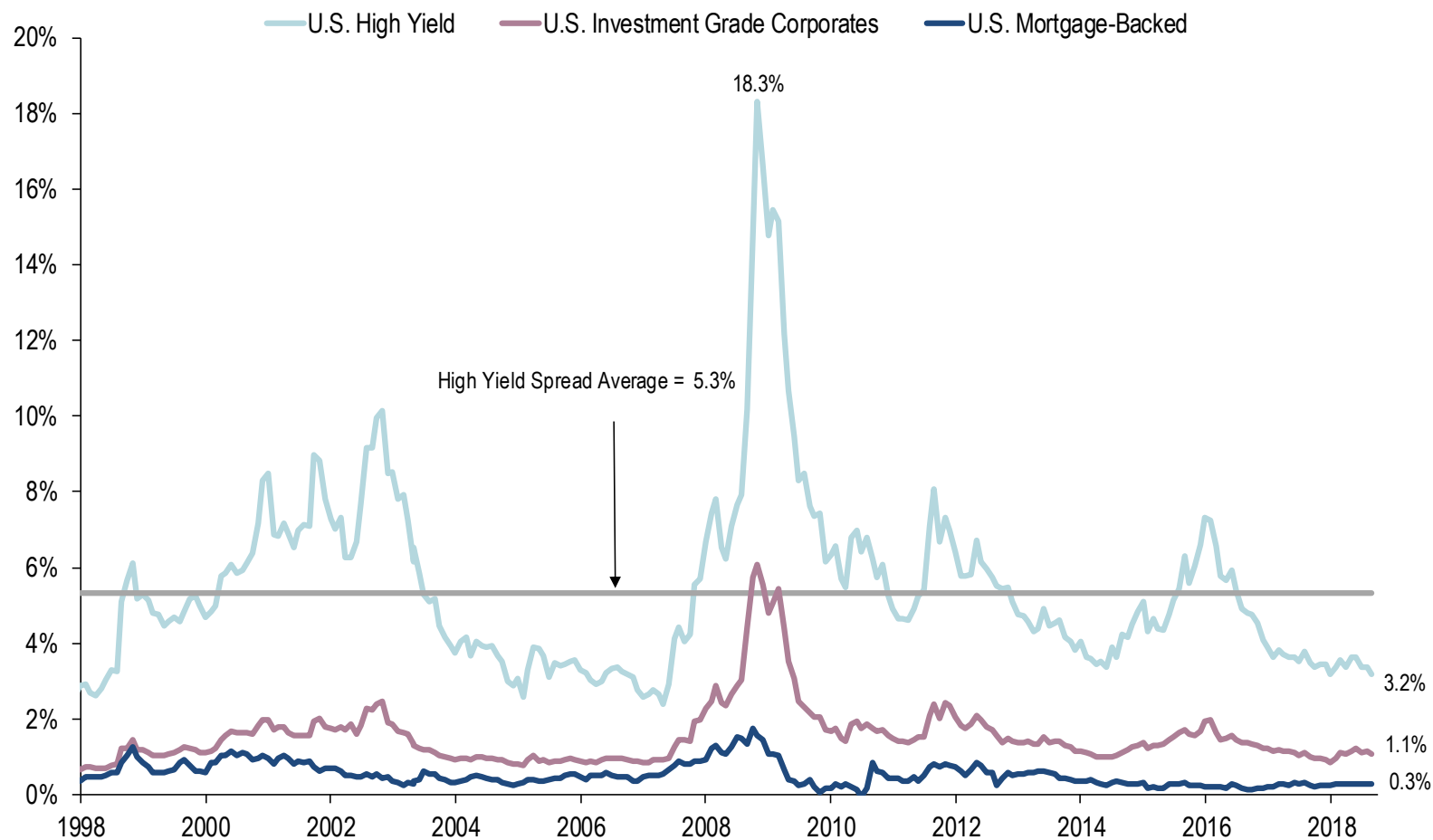
## Rolling Ten-Year Returns: 65% Stocks and 35% Bonds<sup>1</sup>



<sup>1</sup> Source: InvestorForce.



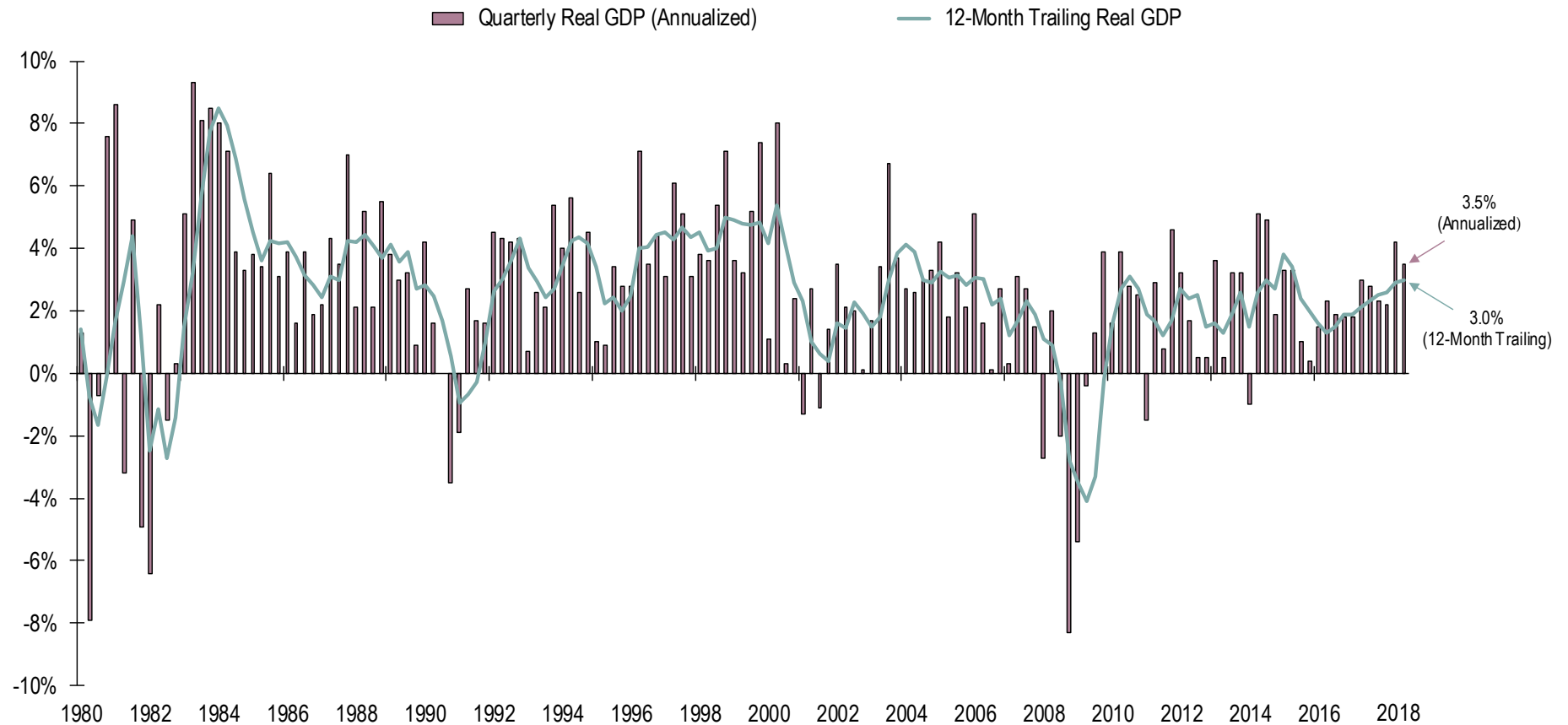
## Credit Spreads vs. U.S. Treasury Bonds<sup>1,2</sup>



<sup>1</sup> Source: Barclays Live.

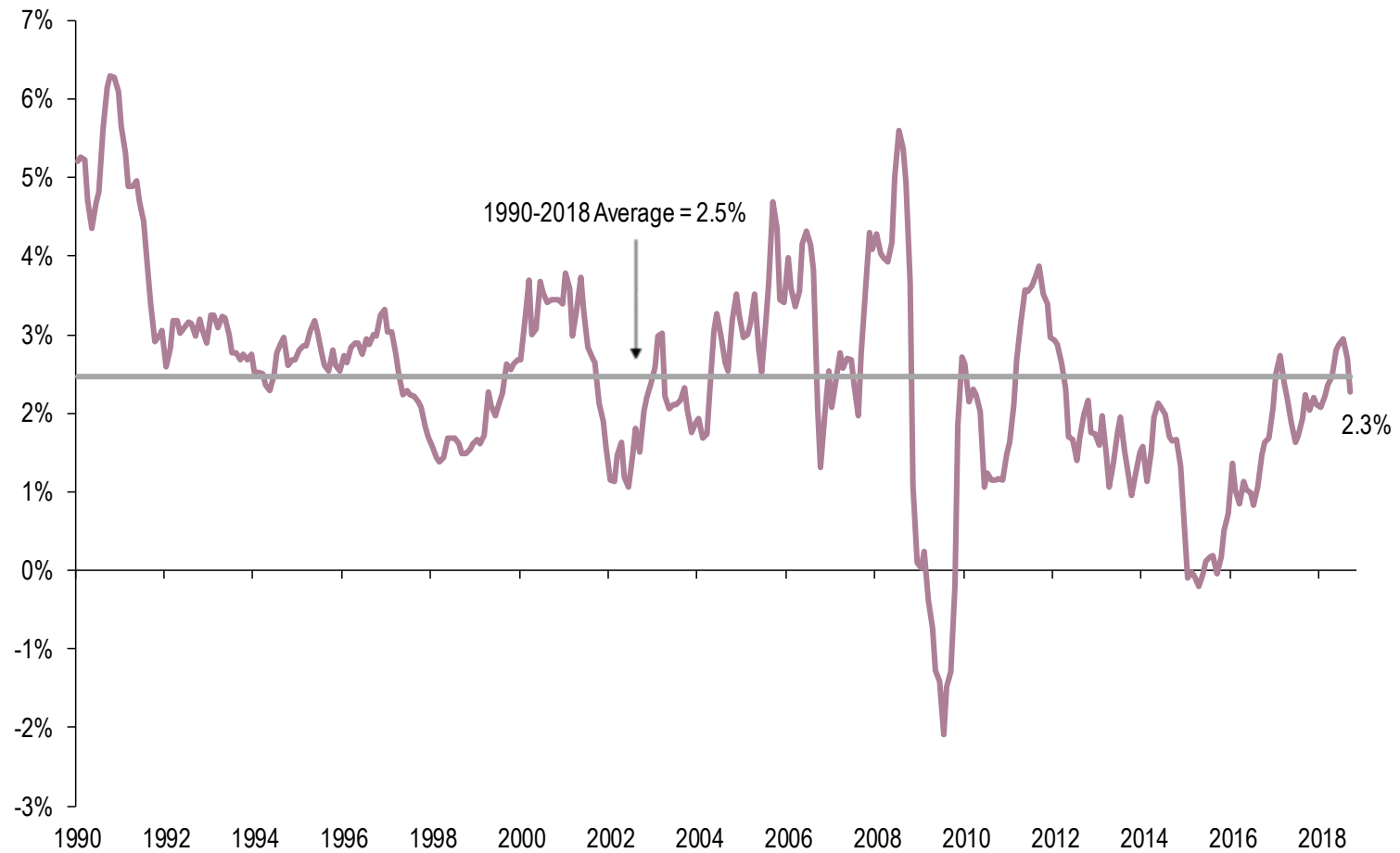
<sup>2</sup> The median high yield spread was 4.8% from 1997-2018.

## U.S. Real Gross Domestic Product (GDP) Growth<sup>1</sup>



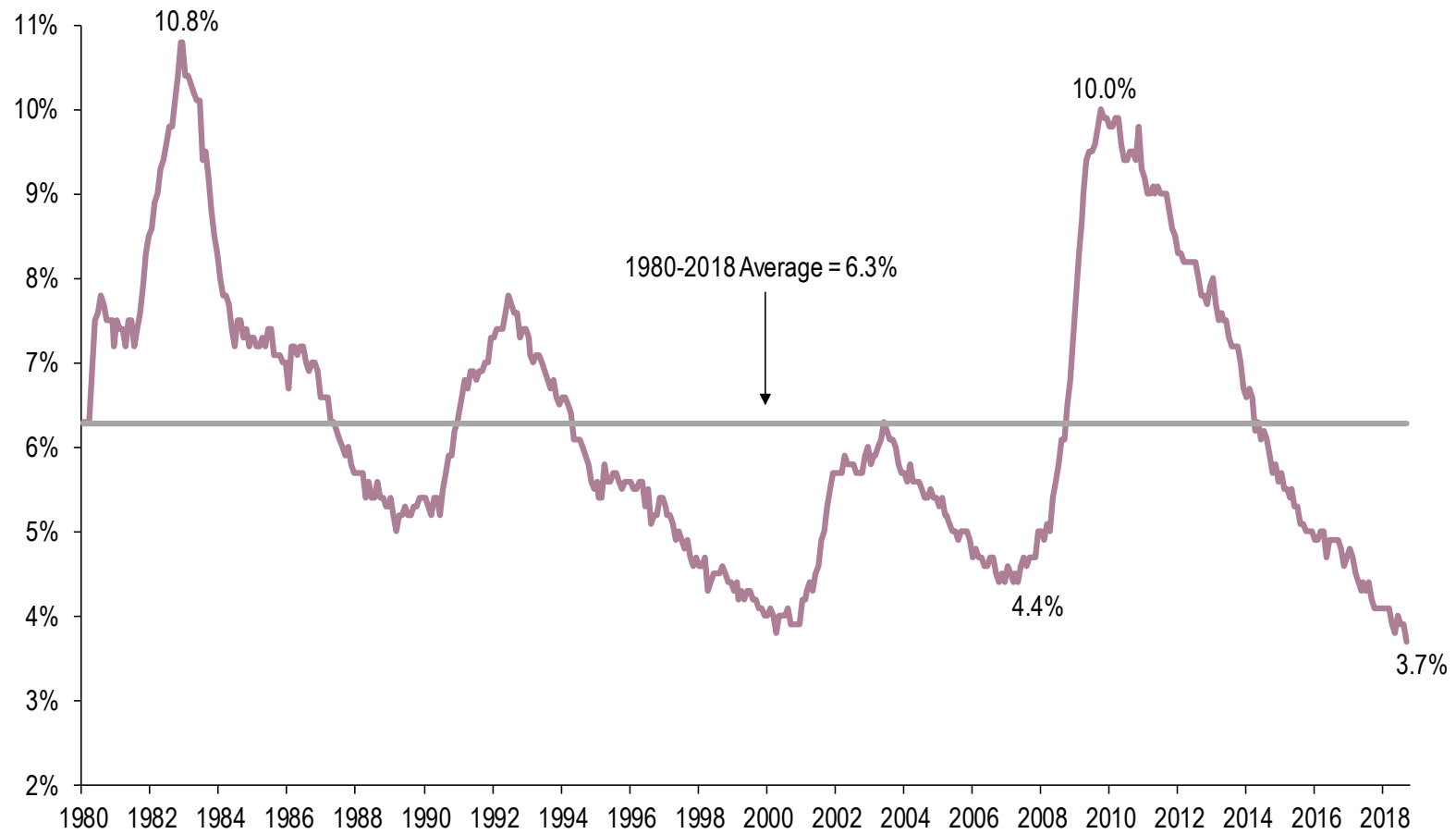
<sup>1</sup> Source: Bureau of Economic Analysis. Data is as of Q3 2018 and represents the first estimate.

## U.S. Inflation (CPI) Trailing Twelve Months<sup>1</sup>



<sup>1</sup> Source: Bureau of Labor Statistics. Data is non-seasonally adjusted CPI, which may be volatile in the short-term. Data is as of September 30, 2018.

## U.S. Unemployment<sup>1</sup>












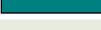
<sup>1</sup> Source: Bureau of Labor Statistics. Data is as of September 30, 2018.

**Interim Update**  
**As of October 31, 2018**

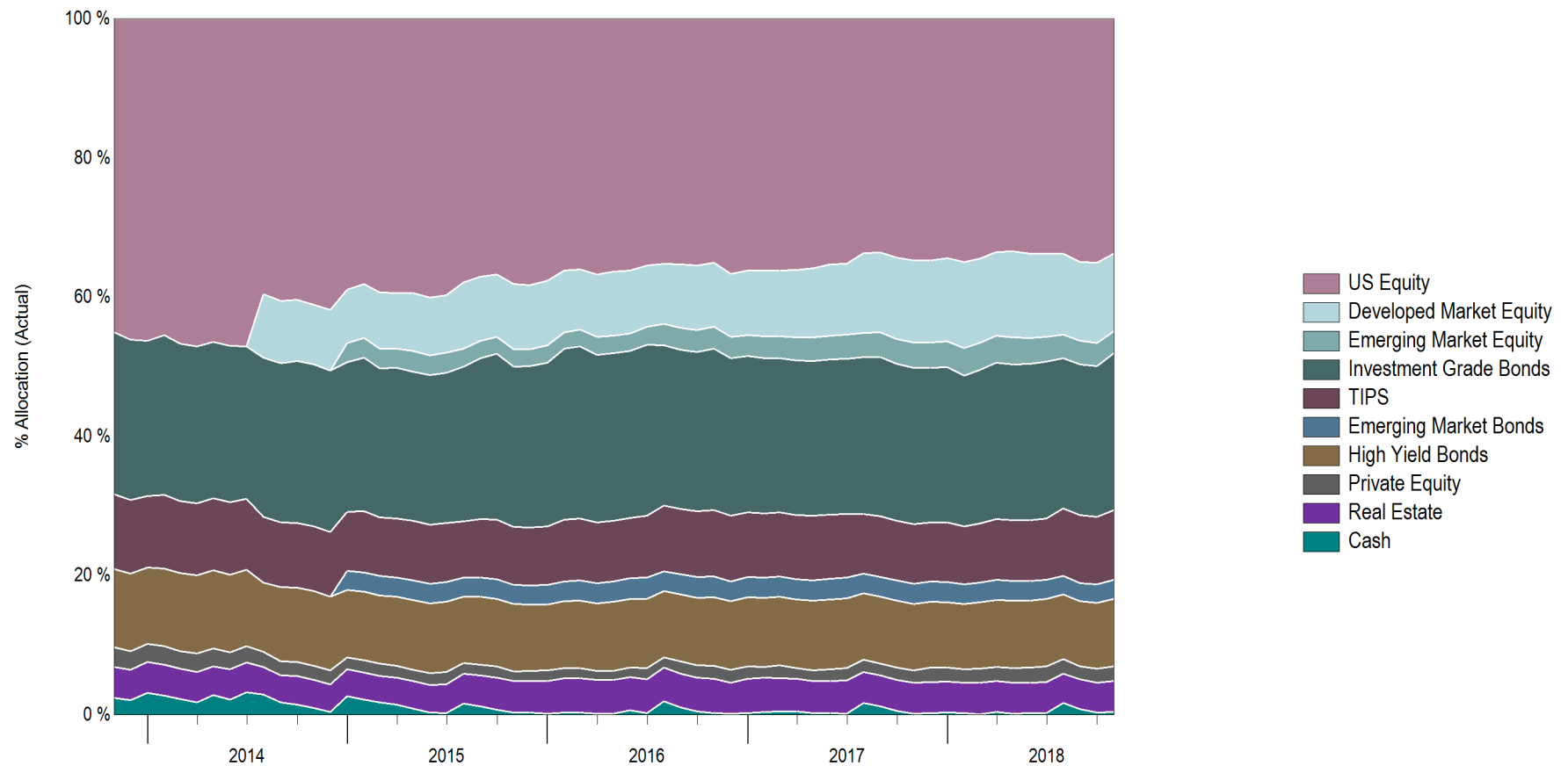
## Total Retirement System

As of October 31, 2018

## Allocation vs. Targets and Policy

	Current Balance	Current Allocation	Policy	Policy Range	Within IPS Range?
 US Equity	\$56,835,722	34%	33%	28% - 38%	Yes
 Developed Market Equity	\$18,693,759	11%	9%	5% - 13%	Yes
 Emerging Market Equity	\$5,367,772	3%	3%	1% - 5%	Yes
 Investment Grade Bonds	\$37,877,367	23%	22%	17% - 27%	Yes
 TIPS	\$16,820,849	10%	10%	7% - 13%	Yes
 Emerging Market Bonds	\$4,638,278	3%	3%	1% - 5%	Yes
 High Yield Bonds	\$16,326,965	10%	10%	7% - 13%	Yes
 Private Equity	\$3,527,660	2%	5%	3% - 7%	No
 Real Estate	\$7,557,798	4%	5%	2% - 8%	Yes
 Cash	\$590,642	0%	0%	0% - 100%	Yes
<b>Total</b>	<b>\$168,236,813</b>	<b>100%</b>	<b>100%</b>		

Asset Allocation History  
5 Years Ending October 31, 2018





## Total Retirement System

As of October 31, 2018

## Asset Class Performance Summary

	Market Value (\$)	% of Portfolio	1 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
<b>Total Retirement System</b>	<b>168,236,813</b>	<b>100.0</b>	<b>-4.4</b>	<b>-2.3</b>	<b>-0.2</b>	<b>5.8</b>	<b>5.5</b>	<b>8.0</b>	<b>7.6</b>	<b>Jul-88</b>
55% MSCI World & 45% Barclays Aggregate			-4.4	-2.2	-0.1	4.9	4.7	7.5	6.8	Jul-88
Consumer Price Index			0.2	2.6	2.5	2.1	1.6	1.6	2.5	Jul-88
<b>Domestic Equity Assets</b>	<b>56,835,722</b>	<b>33.8</b>	<b>-7.7</b>	<b>-0.4</b>	<b>3.6</b>	<b>10.5</b>	<b>10.0</b>	<b>12.9</b>	<b>7.8</b>	<b>Oct-06</b>
Russell 3000			-7.4	2.4	6.6	11.3	10.8	13.3	8.3	Oct-06
<b>International Developed Markets Equity Assets</b>	<b>18,693,759</b>	<b>11.1</b>	<b>-8.0</b>	<b>-9.0</b>	<b>-6.7</b>	<b>3.8</b>	<b>1.3</b>	<b>6.6</b>	<b>2.1</b>	<b>Oct-06</b>
MSCI EAFE			-8.0	-9.3	-6.9	3.6	2.0	6.9	2.5	Oct-06
<b>International Emerging Markets Equity Assets</b>	<b>5,367,772</b>	<b>3.2</b>	<b>-8.1</b>	<b>-16.6</b>	<b>-13.0</b>	<b>6.4</b>	<b>--</b>	<b>--</b>	<b>2.8</b>	<b>Jan-15</b>
MSCI Emerging Markets			-8.7	-15.7	-12.5	6.5	0.8	7.8	2.4	Jan-15
<b>Investment Grade Bonds Assets</b>	<b>37,877,367</b>	<b>22.5</b>	<b>-0.8</b>	<b>-2.4</b>	<b>-2.0</b>	<b>1.1</b>	<b>1.9</b>	<b>4.0</b>	<b>6.0</b>	<b>Jul-88</b>
BBgBarc US Aggregate TR			-0.8	-2.4	-2.1	1.0	1.8	3.9	6.0	Jul-88
<b>High Yield Bond Assets</b>	<b>16,326,965</b>	<b>9.7</b>	<b>-1.6</b>	<b>0.6</b>	<b>0.4</b>	<b>4.9</b>	<b>4.2</b>	<b>9.0</b>	<b>6.6</b>	<b>Sep-03</b>
BBgBarc US High Yield TR			-1.6	0.9	1.0	6.6	4.7	11.2	7.7	Sep-03
<b>TIPS Assets</b>	<b>16,820,849</b>	<b>10.0</b>	<b>-1.4</b>	<b>-2.3</b>	<b>-1.3</b>	<b>1.4</b>	<b>0.9</b>	<b>4.1</b>	<b>3.4</b>	<b>Oct-05</b>
BBgBarc US TIPS TR			-1.4	-2.3	-1.2	1.5	1.0	4.1	3.4	Oct-05
<b>Emerging Market Debt Assets</b>	<b>4,638,278</b>	<b>2.8</b>	<b>-2.7</b>	<b>-6.5</b>	<b>-5.5</b>	<b>4.7</b>	<b>--</b>	<b>--</b>	<b>3.9</b>	<b>Jan-15</b>
JP Morgan EMBI Global Diversified			-2.2	-5.1	-4.4	4.3	4.3	9.2	4.1	Jan-15
<b>Open-Ended Real Estate</b>	<b>5,562,602</b>	<b>3.3</b>	<b>0.0</b>	<b>7.5</b>	<b>9.7</b>	<b>9.4</b>	<b>11.3</b>	<b>4.3</b>	<b>8.2</b>	<b>Oct-95</b>
NCREIF-ODCE			0.0	6.5	8.7	8.8	10.7	5.6	9.2	Oct-95
<b>Total Closed End Real Estate</b>	<b>1,995,196</b>	<b>1.2</b>	<b>0.0</b>	<b>3.0</b>	<b>9.7</b>	<b>11.3</b>	<b>12.8</b>	<b>--</b>	<b>14.1</b>	<b>Jan-13</b>
NCREIF ODCE			0.0	6.5	8.7	8.8	10.7	5.6	11.0	Jan-13
<b>Private Equity Assets</b>	<b>3,527,660</b>	<b>2.1</b>								
<b>Cash</b>	<b>590,642</b>	<b>0.4</b>								

## Total Retirement System

As of October 31, 2018

## Trailing Net Performance

	Market Value (\$)	% of Portfolio	% of Sector	1 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
<b>Total Retirement System</b>	<b>168,236,813</b>	<b>100.0</b>	<b>--</b>	<b>-4.4</b>	<b>-2.3</b>	<b>-0.2</b>	<b>5.8</b>	<b>5.5</b>	<b>8.0</b>	<b>7.6</b>	<b>Jul-88</b>
55% MSCI World & 45% Barclays Aggregate				-4.4	-2.2	-0.1	4.9	4.7	7.5	6.8	Jul-88
<b>Domestic Equity Assets</b>	<b>56,835,722</b>	<b>33.8</b>	<b>33.8</b>	<b>-7.7</b>	<b>-0.4</b>	<b>3.6</b>	<b>10.5</b>	<b>10.0</b>	<b>12.9</b>	<b>7.8</b>	<b>Oct-06</b>
Russell 3000				-7.4	2.4	6.6	11.3	10.8	13.3	8.3	Oct-06
RhumbLine S&P 500 Index	18,710,954	11.1	32.9	-6.8	3.0	7.3	11.5	11.3	13.2	6.1	Mar-99
S&P 500				-6.8	3.0	7.3	11.5	11.3	13.2	6.1	Mar-99
Fiduciary Large Cap Equity	21,938,896	13.0	38.6	-5.5	0.6	6.4	9.9	9.5	--	11.9	Sep-12
Russell 3000				-7.4	2.4	6.6	11.3	10.8	13.3	13.4	Sep-12
Frontier Capital Appreciation	16,185,872	9.6	28.5	-11.5	-5.2	-3.7	10.4	8.7	--	11.6	Feb-13
Russell 2500 Growth				-12.0	1.9	5.5	11.1	9.5	15.1	12.4	Feb-13
<b>International Developed Markets Equity Assets</b>	<b>18,693,759</b>	<b>11.1</b>	<b>11.1</b>	<b>-8.0</b>	<b>-9.0</b>	<b>-6.7</b>	<b>3.8</b>	<b>1.3</b>	<b>6.6</b>	<b>2.1</b>	<b>Oct-06</b>
MSCI EAFE				-8.0	-9.3	-6.9	3.6	2.0	6.9	2.5	Oct-06
Rhumblin MSCI EAFE Index	18,693,759	11.1	100.0	-8.0	-9.0	-6.7	3.8	--	--	1.3	Aug-14
MSCI EAFE				-8.0	-9.3	-6.9	3.6	2.0	6.9	1.2	Aug-14
<b>International Emerging Markets Equity Assets</b>	<b>5,367,772</b>	<b>3.2</b>	<b>3.2</b>	<b>-8.1</b>	<b>-16.6</b>	<b>-13.0</b>	<b>6.4</b>	<b>--</b>	<b>--</b>	<b>2.8</b>	<b>Jan-15</b>
MSCI Emerging Markets				-8.7	-15.7	-12.5	6.5	0.8	7.8	2.4	Jan-15
DFA Emerging Markets	2,619,909	1.6	48.8	-8.5	-17.1	-13.5	6.3	--	--	2.1	Jan-15
MSCI Emerging Markets				-8.7	-15.7	-12.5	6.5	0.8	7.8	2.4	Jan-15
Driehaus Emerging Market Equity	2,747,862	1.6	51.2	-7.9	-16.1	-12.5	6.6	--	--	3.5	Jan-15
MSCI Emerging Markets				-8.7	-15.7	-12.5	6.5	0.8	7.8	2.4	Jan-15
<b>Investment Grade Bonds Assets</b>	<b>37,877,367</b>	<b>22.5</b>	<b>22.5</b>	<b>-0.8</b>	<b>-2.4</b>	<b>-2.0</b>	<b>1.1</b>	<b>1.9</b>	<b>4.0</b>	<b>6.0</b>	<b>Jul-88</b>
BBgBarc US Aggregate TR				-0.8	-2.4	-2.1	1.0	1.8	3.9	6.0	Jul-88

## Total Retirement System

As of October 31, 2018

	Market Value (\$)	% of Portfolio	% of Sector	1 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
SSgA U.S. Aggregate Bond Index	37,877,367	22.5	100.0	-0.8	-2.4	-2.0	1.1	1.9	4.0	4.3	May-01
BBgBarc US Aggregate TR				-0.8	-2.4	-2.1	1.0	1.8	3.9	4.3	May-01
<b>High Yield Bond Assets</b>	<b>16,326,965</b>	<b>9.7</b>	<b>9.7</b>	<b>-1.6</b>	<b>0.6</b>	<b>0.4</b>	<b>4.9</b>	<b>4.2</b>	<b>9.0</b>	<b>6.6</b>	<b>Sep-03</b>
BBgBarc US High Yield TR				-1.6	0.9	1.0	6.6	4.7	11.2	7.7	Sep-03
Shenkman Capital	16,326,965	9.7	100.0	-1.6	0.6	0.4	4.9	4.2	9.0	6.5	Apr-06
BBgBarc US High Yield TR				-1.6	0.9	1.0	6.6	4.7	11.2	7.3	Apr-06
<b>TIPS Assets</b>	<b>16,820,849</b>	<b>10.0</b>	<b>10.0</b>	<b>-1.4</b>	<b>-2.3</b>	<b>-1.3</b>	<b>1.4</b>	<b>0.9</b>	<b>4.1</b>	<b>3.4</b>	<b>Oct-05</b>
BBgBarc US TIPS TR				-1.4	-2.3	-1.2	1.5	1.0	4.1	3.4	Oct-05
SSgA TIPS Index-NL	16,820,849	10.0	100.0	-1.4	-2.3	-1.3	1.4	0.9	4.1	3.4	Oct-05
BBgBarc US TIPS TR				-1.4	-2.3	-1.2	1.5	1.0	4.1	3.4	Oct-05
<b>Emerging Market Debt Assets</b>	<b>4,638,278</b>	<b>2.8</b>	<b>2.8</b>	<b>-2.7</b>	<b>-6.5</b>	<b>-5.5</b>	<b>4.7</b>	<b>--</b>	<b>--</b>	<b>3.9</b>	<b>Jan-15</b>
JP Morgan EMBI Global Diversified				-2.2	-5.1	-4.4	4.3	4.3	9.2	4.1	Jan-15
Payden Emerging Market Bond	4,638,278	2.8	100.0	-2.7	-6.5	-5.5	4.7	--	--	3.9	Jan-15
JP Morgan EMBI Global Diversified				-2.2	-5.1	-4.4	4.3	4.3	9.2	4.1	Jan-15
<b>Open-Ended Real Estate</b>	<b>5,562,602</b>	<b>3.3</b>	<b>3.3</b>	<b>0.0</b>	<b>7.5</b>	<b>9.7</b>	<b>9.4</b>	<b>11.3</b>	<b>4.3</b>	<b>8.2</b>	<b>Oct-95</b>
NCREIF-ODCE				0.0	6.5	8.7	8.8	10.7	5.6	9.2	Oct-95
Clarion Partners	5,562,602	3.3	100.0	0.0	7.5	9.7	9.4	11.3	4.3	7.4	Oct-02
NCREIF-ODCE				0.0	6.5	8.7	8.8	10.7	5.6	8.3	Oct-02
<b>Total Closed End Real Estate</b>	<b>1,995,196</b>	<b>1.2</b>	<b>1.2</b>	<b>0.0</b>	<b>3.0</b>	<b>9.7</b>	<b>11.3</b>	<b>12.8</b>	<b>--</b>	<b>14.1</b>	<b>Jan-13</b>
NCREIF ODCE				0.0	6.5	8.7	8.8	10.7	5.6	11.0	Jan-13
Colony Realty Partners IV	1,995,196	1.2	100.0	0.0	3.0	9.7	11.3	--	--	--	Jan-13
NCREIF-ODCE				0.0	6.5	8.7	8.8	10.7	5.6	11.0	Jan-13

As of October 31, 2018

**Statistics Summary**  
**5 Years Ending October 31, 2018**

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Total Retirement System	5.5%	5.5%	0.6	0.9	0.9	1.2%
55% MSCI World & 45% Barclays Aggregate	4.7%	5.7%	--	1.0	0.7	0.0%
Equity Assets	7.6%	10.1%	-1.4	1.0	0.7	2.2%
Russell 3000	10.8%	10.3%	--	1.0	1.0	0.0%
Domestic Equity Assets	10.0%	10.3%	-0.5	1.0	0.9	1.7%
Russell 3000	10.8%	10.3%	--	1.0	1.0	0.0%
RhumbLine S&P 500 Index	11.3%	10.0%	-0.8	1.0	1.1	0.0%
S&P 500	11.3%	10.1%	--	1.0	1.1	0.0%
Fiduciary Large Cap Equity	9.5%	9.6%	-0.4	0.9	0.9	3.5%
Russell 3000	10.8%	10.3%	--	1.0	1.0	0.0%
Frontier Capital Appreciation	8.7%	14.1%	-0.2	1.0	0.6	4.9%
Russell 2500 Growth	9.5%	13.9%	--	1.0	0.6	0.0%
International Developed Markets Equity Assets	1.3%	11.6%	-0.7	1.0	0.1	1.0%
MSCI EAFE	2.0%	11.6%	--	1.0	0.1	0.0%
Rhumblin MSCI EAFE Index	--	--	--	--	--	--
MSCI EAFE	2.0%	11.6%	--	1.0	0.1	0.0%
International Emerging Markets Equity Assets	--	--	--	--	--	--
MSCI Emerging Markets	0.8%	15.1%	--	1.0	0.0	0.0%
DFA Emerging Markets	--	--	--	--	--	--
MSCI Emerging Markets	0.8%	15.1%	--	1.0	0.0	0.0%
Driehaus Emerging Market Equity	--	--	--	--	--	--

## Total Retirement System

As of October 31, 2018

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
MSCI Emerging Markets	0.8%	15.1%	--	1.0	0.0	0.0%
Investment Grade Bonds Assets	1.9%	2.7%	1.1	1.0	0.5	0.0%
BBgBarc US Aggregate TR	1.8%	2.7%	--	1.0	0.5	0.0%
SSgA U.S. Aggregate Bond Index	1.9%	2.7%	1.1	1.0	0.5	0.0%
BBgBarc US Aggregate TR	1.8%	2.7%	--	1.0	0.5	0.0%
High Yield Bond Assets	4.2%	4.5%	-0.5	0.9	0.8	1.0%
BBgBarc US High Yield TR	4.7%	4.9%	--	1.0	0.8	0.0%
Shenkman Capital	4.2%	4.5%	-0.5	0.9	0.8	1.0%
BBgBarc US High Yield TR	4.7%	4.9%	--	1.0	0.8	0.0%
TIPS Assets	0.9%	3.7%	-0.4	1.0	0.1	0.0%
BBgBarc US TIPS TR	1.0%	3.7%	--	1.0	0.1	0.0%
SSgA TIPS Index-NL	0.9%	3.7%	-0.4	1.0	0.1	0.1%
BBgBarc US TIPS TR	1.0%	3.7%	--	1.0	0.1	0.0%
Emerging Market Debt Assets	--	--	--	--	--	--
JP Morgan EMBI Global Diversified	4.3%	5.4%	--	1.0	0.7	0.0%
Payden Emerging Market Bond	--	--	--	--	--	--
JP Morgan EMBI Global Diversified	4.3%	5.4%	--	1.0	0.7	0.0%
Open-Ended Real Estate	11.3%	4.8%	0.6	1.1	2.2	1.0%
NCREIF-ODCE	10.7%	4.5%	--	1.0	2.3	0.0%
Clarion Partners	11.3%	4.8%	0.6	1.1	2.2	1.0%
NCREIF-ODCE	10.7%	4.5%	--	1.0	2.3	0.0%
Total Closed End Real Estate	12.8%	6.5%	0.6	1.2	1.9	3.6%
NCREIF ODCE	10.7%	4.5%	--	1.0	2.3	0.0%

## Total Retirement System

As of October 31, 2018








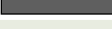


	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Colony Realty Partners IV	--	--	--	--	--	--
NCREIF-ODCE	10.7%	4.5%	--	1.0	2.3	0.0%
Comerica Short Term Fund	0.2%	0.1%	-1.8	0.0	-4.3	0.2%
91 Day T-Bills	0.6%	0.2%	--	1.0	0.0	0.0%

## **Retirement System Summary**

## Total Retirement System

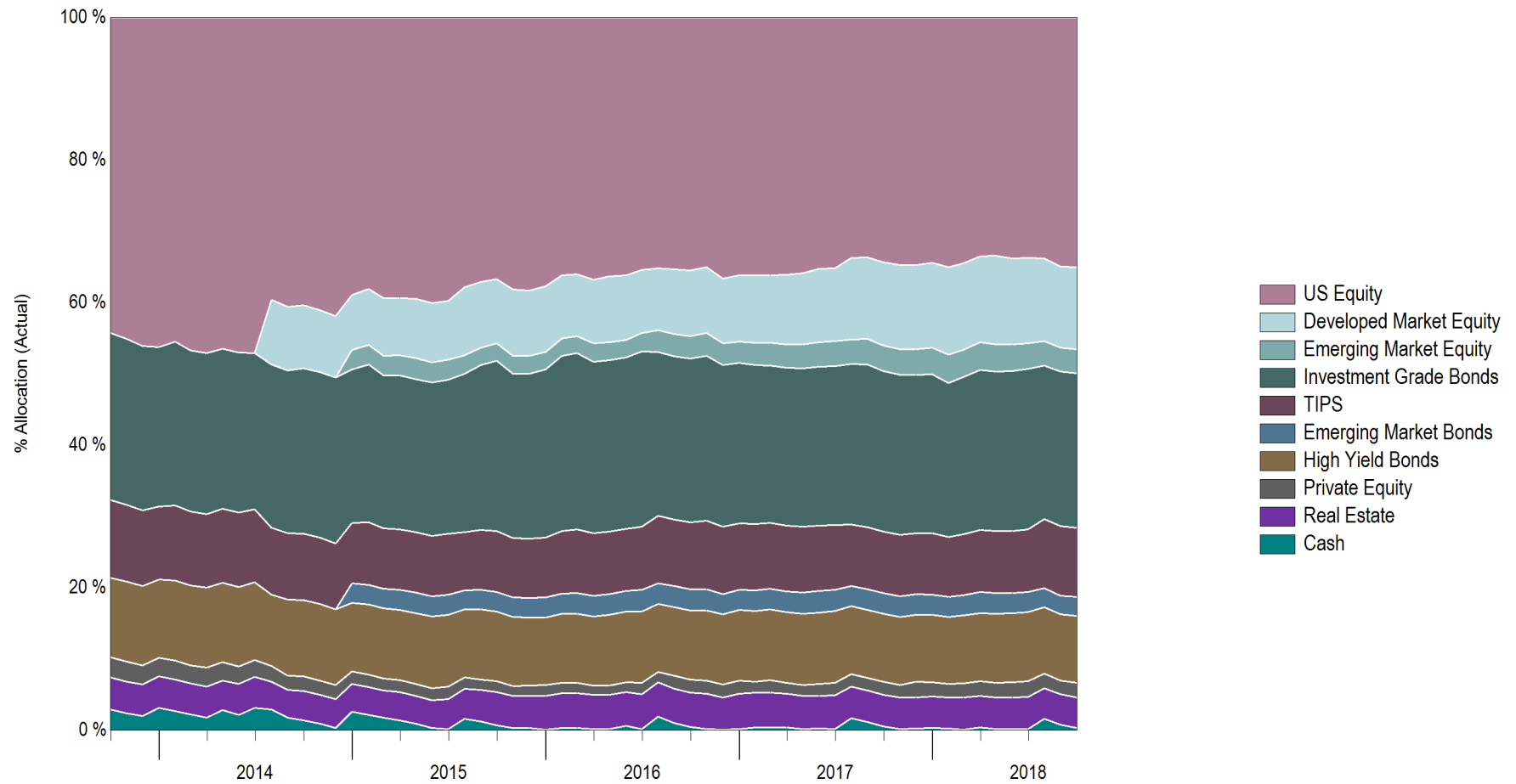
As of September 30, 2018

## Allocation vs. Targets and Policy

	Current Balance	Current Allocation	Policy	Policy Range
 US Equity	\$61,724,026	35%	33%	28% - 38%
 Developed Market Equity	\$20,310,605	12%	9%	5% - 13%
 Emerging Market Equity	\$5,843,967	3%	3%	1% - 5%
 Investment Grade Bonds	\$38,178,809	22%	22%	17% - 27%
 TIPS	\$17,065,816	10%	10%	7% - 13%
 Emerging Market Bonds	\$4,764,720	3%	3%	1% - 5%
 High Yield Bonds	\$16,592,192	9%	10%	7% - 13%
 Private Equity	\$3,527,660	2%	5%	3% - 7%
 Real Estate	\$7,557,798	4%	5%	2% - 8%
 Cash	\$590,642	0%	0%	0% - 100%
<b>Total</b>	<b>\$176,156,234</b>	<b>100%</b>	<b>100%</b>	



Asset Allocation History  
5 Years Ending September 30, 2018



## Total Retirement System

As of September 30, 2018

## Asset Class Performance Summary

	Market Value (\$)	% of Portfolio	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
<b>Total Retirement System</b>	<b>176,156,234</b>	<b>100.0</b>	<b>2.4</b>	<b>2.3</b>	<b>5.5</b>	<b>8.9</b>	<b>6.9</b>	<b>7.3</b>	<b>6.7</b>	<b>7.7</b>	<b>Jul-88</b>
55% MSCI World & 45% Barclays Aggregate			2.7	2.3	5.6	8.0	6.2	6.7	5.7	7.0	Jul-88
Consumer Price Index			0.2	2.4	2.3	2.0	1.5	1.4	2.2	2.5	Jul-88
PRIT Core Fund			2.7	4.5	8.7	10.8	8.8	7.9	7.9	9.0	Jul-88
<b>Domestic Equity Assets</b>	<b>61,724,026</b>	<b>35.0</b>	<b>5.7</b>	<b>8.2</b>	<b>14.3</b>	<b>16.3</b>	<b>12.7</b>	<b>11.6</b>	<b>--</b>	<b>8.6</b>	<b>Oct-06</b>
Russell 3000			7.1	10.6	17.6	17.1	13.5	12.0	7.8	9.1	Oct-06
PRIT Domestic Equity			7.1	11.3	18.3	17.2	13.4	11.3	7.8	8.1	Oct-06
<b>International Developed Markets Equity Assets</b>	<b>20,310,605</b>	<b>11.5</b>	<b>1.4</b>	<b>-1.2</b>	<b>2.7</b>	<b>9.4</b>	<b>3.6</b>	<b>5.2</b>	<b>--</b>	<b>2.8</b>	<b>Oct-06</b>
MSCI EAFE			1.4	-1.4	2.7	9.2	4.4	5.4	5.2	3.2	Oct-06
<b>International Emerging Markets Equity Assets</b>	<b>5,843,967</b>	<b>3.3</b>	<b>-2.5</b>	<b>-9.2</b>	<b>-2.4</b>	<b>11.5</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>5.2</b>	<b>Jan-15</b>
MSCI Emerging Markets			-1.1	-7.7	-0.8	12.4	3.6	5.4	9.9	5.0	Jan-15
<b>Investment Grade Bonds Assets</b>	<b>38,178,809</b>	<b>21.7</b>	<b>0.0</b>	<b>-1.6</b>	<b>-1.2</b>	<b>1.3</b>	<b>2.2</b>	<b>3.8</b>	<b>4.4</b>	<b>6.0</b>	<b>Jul-88</b>
BBgBarc US Aggregate TR			0.0	-1.6	-1.2	1.3	2.2	3.8	4.5	6.1	Jul-88
PRIT Core Fixed Income			-1.0	-2.0	-0.4	2.2	3.9	4.8	5.2	6.8	Jul-88
<b>High Yield Bond Assets</b>	<b>16,592,192</b>	<b>9.4</b>	<b>2.4</b>	<b>2.6</b>	<b>2.9</b>	<b>6.8</b>	<b>5.2</b>	<b>7.9</b>	<b>--</b>	<b>6.8</b>	<b>Sep-03</b>
BBgBarc US High Yield TR			2.4	2.6	3.0	8.1	5.5	9.5	6.9	7.9	Sep-03
PRIT Public Value-Added Fixed Income			1.6	0.6	1.4	6.8	3.3	6.3	--	6.8	Sep-03
<b>TIPS Assets</b>	<b>17,065,816</b>	<b>9.7</b>	<b>-0.9</b>	<b>-0.9</b>	<b>0.3</b>	<b>2.0</b>	<b>1.4</b>	<b>3.3</b>	<b>--</b>	<b>3.5</b>	<b>Oct-05</b>
BBgBarc US TIPS TR			-0.8	-0.8	0.4	2.0	1.4	3.3	5.2	3.5	Oct-05
<b>Emerging Market Debt Assets</b>	<b>4,764,720</b>	<b>2.7</b>	<b>2.4</b>	<b>-4.0</b>	<b>-2.6</b>	<b>6.6</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>4.7</b>	<b>Jan-15</b>
JP Morgan EMBI Global Diversified			2.3	-3.0	-1.9	6.0	5.4	7.5	9.8	4.8	Jan-15
<b>Open-Ended Real Estate</b>	<b>5,562,602</b>	<b>3.2</b>	<b>2.1</b>	<b>7.5</b>	<b>9.7</b>	<b>9.4</b>	<b>11.3</b>	<b>4.3</b>	<b>7.7</b>	<b>8.2</b>	<b>Oct-95</b>
NCREIF-ODCE			2.1	6.5	8.7	8.8	10.7	5.6	8.6	9.2	Oct-95
<b>Total Closed End Real Estate</b>	<b>1,995,196</b>	<b>1.1</b>	<b>0.0</b>	<b>3.0</b>	<b>9.7</b>	<b>11.3</b>	<b>12.8</b>	<b>--</b>	<b>--</b>	<b>14.4</b>	<b>Jan-13</b>
NCREIF ODCE			2.1	6.5	8.7	8.8	10.7	5.6	8.6	11.2	Jan-13
<b>Private Equity Assets</b>	<b>3,527,660</b>	<b>2.0</b>									
<b>Cash</b>	<b>590,642</b>	<b>0.3</b>									

## Total Retirement System

As of September 30, 2018

## Trailing Performance

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
<b>Total Retirement System</b>	<b>176,156,234</b>	<b>100.0</b>	<b>--</b>	<b>2.4</b>	<b>2.3</b>	<b>5.5</b>	<b>8.9</b>	<b>6.9</b>	<b>7.3</b>	<b>6.7</b>	<b>7.7</b>	<b>Jul-88</b>
55% MSCI World & 45% Barclays Aggregate				2.7	2.3	5.6	8.0	6.2	6.7	5.7	7.0	Jul-88
Consumer Price Index				0.2	2.4	2.3	2.0	1.5	1.4	2.2	2.5	Jul-88
PRIT Core Fund				2.7	4.5	8.7	10.8	8.8	7.9	7.9	9.0	Jul-88
<b>Domestic Equity Assets</b>	<b>61,724,026</b>	<b>35.0</b>	<b>35.0</b>	<b>5.7</b>	<b>8.2</b>	<b>14.3</b>	<b>16.3</b>	<b>12.7</b>	<b>11.6</b>	<b>--</b>	<b>8.6</b>	<b>Oct-06</b>
Russell 3000				7.1	10.6	17.6	17.1	13.5	12.0	7.8	9.1	Oct-06
PRIT Domestic Equity				7.1	11.3	18.3	17.2	13.4	11.3	7.8	8.1	Oct-06
RhumbLine S&P 500 Index	20,209,017	11.5	32.7	7.7	10.5	17.9	17.3	13.9	12.0	--	6.5	Mar-99
S&P 500				7.7	10.6	17.9	17.3	13.9	12.0	7.4	6.5	Mar-99
Fiduciary Large Cap Equity	23,219,251	13.2	37.6	4.1	6.4	12.8	14.3	11.5	--	--	13.1	Sep-12
Russell 3000				7.1	10.6	17.6	17.1	13.5	12.0	7.8	15.0	Sep-12
Frontier Capital Appreciation	18,295,758	10.4	29.6	5.6	7.7	12.0	17.8	11.9	--	--	14.4	Feb-13
Russell 2500 Growth				7.2	15.8	23.1	18.0	12.9	13.6	10.0	15.1	Feb-13
<b>International Developed Markets Equity Assets</b>	<b>20,310,605</b>	<b>11.5</b>	<b>11.5</b>	<b>1.4</b>	<b>-1.2</b>	<b>2.7</b>	<b>9.4</b>	<b>3.6</b>	<b>5.2</b>	<b>--</b>	<b>2.8</b>	<b>Oct-06</b>
MSCI EAFE				1.4	-1.4	2.7	9.2	4.4	5.4	5.2	3.2	Oct-06
Rhumblin MSCI EAFE Index	20,310,605	11.5	100.0	1.4	-1.2	2.7	9.4	--	--	--	3.4	Aug-14
MSCI EAFE				1.4	-1.4	2.7	9.2	4.4	5.4	5.2	3.3	Aug-14
<b>International Emerging Markets Equity Assets</b>	<b>5,843,967</b>	<b>3.3</b>	<b>3.3</b>	<b>-2.5</b>	<b>-9.2</b>	<b>-2.4</b>	<b>11.5</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>5.2</b>	<b>Jan-15</b>
MSCI Emerging Markets				-1.1	-7.7	-0.8	12.4	3.6	5.4	9.9	5.0	Jan-15
DFA Emerging Markets	2,861,853	1.6	49.0	-1.2	-9.5	-2.5	11.5	--	--	--	4.6	Jan-15
MSCI Emerging Markets				-1.1	-7.7	-0.8	12.4	3.6	5.4	9.9	5.0	Jan-15

## Total Retirement System

As of September 30, 2018

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
Driehaus Emerging Market Equity	2,982,113	1.7	51.0	-3.8	-8.9	-2.3	11.5	--	--	--	5.9	Jan-15
MSCI Emerging Markets				-1.1	-7.7	-0.8	12.4	3.6	5.4	9.9	5.0	Jan-15
<b>Investment Grade Bonds Assets</b>	<b>38,178,809</b>	<b>21.7</b>	<b>21.7</b>	<b>0.0</b>	<b>-1.6</b>	<b>-1.2</b>	<b>1.3</b>	<b>2.2</b>	<b>3.8</b>	<b>4.4</b>	<b>6.0</b>	<b>Jul-88</b>
BBgBarc US Aggregate TR				0.0	-1.6	-1.2	1.3	2.2	3.8	4.5	6.1	Jul-88
PRIT Core Fixed Income				-1.0	-2.0	-0.4	2.2	3.9	4.8	5.2	6.8	Jul-88
SSgA U.S. Aggregate Bond Index	38,178,809	21.7	100.0	0.0	-1.6	-1.2	1.3	2.2	3.8	--	4.4	May-01
BBgBarc US Aggregate TR				0.0	-1.6	-1.2	1.3	2.2	3.8	4.5	4.4	May-01
<b>High Yield Bond Assets</b>	<b>16,592,192</b>	<b>9.4</b>	<b>9.4</b>	<b>2.4</b>	<b>2.6</b>	<b>2.9</b>	<b>6.8</b>	<b>5.2</b>	<b>7.9</b>	<b>--</b>	<b>6.8</b>	<b>Sep-03</b>
BBgBarc US High Yield TR				2.4	2.6	3.0	8.1	5.5	9.5	6.9	7.9	Sep-03
PRIT Public Value-Added Fixed Income				1.6	0.6	1.4	6.8	3.3	6.3	--	6.8	Sep-03
Shenkman Capital	16,592,192	9.4	100.0	2.4	2.6	3.0	6.8	5.2	7.9	--	6.8	Apr-06
BBgBarc US High Yield TR				2.4	2.6	3.0	8.1	5.5	9.5	6.9	7.5	Apr-06
<b>TIPS Assets</b>	<b>17,065,816</b>	<b>9.7</b>	<b>9.7</b>	<b>-0.9</b>	<b>-0.9</b>	<b>0.3</b>	<b>2.0</b>	<b>1.4</b>	<b>3.3</b>	<b>--</b>	<b>3.5</b>	<b>Oct-05</b>
BBgBarc US TIPS TR				-0.8	-0.8	0.4	2.0	1.4	3.3	5.2	3.5	Oct-05
SSgA TIPS Index-NL	17,065,816	9.7	100.0	-0.9	-0.9	0.3	2.0	1.4	3.3	--	3.5	Oct-05
BBgBarc US TIPS TR				-0.8	-0.8	0.4	2.0	1.4	3.3	5.2	3.5	Oct-05
<b>Emerging Market Debt Assets</b>	<b>4,764,720</b>	<b>2.7</b>	<b>2.7</b>	<b>2.4</b>	<b>-4.0</b>	<b>-2.6</b>	<b>6.6</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>4.7</b>	<b>Jan-15</b>
JP Morgan EMBI Global Diversified				2.3	-3.0	-1.9	6.0	5.4	7.5	9.8	4.8	Jan-15
Payden Emerging Market Bond	4,764,720	2.7	100.0	2.4	-4.0	-2.6	6.6	--	--	--	4.7	Jan-15
JP Morgan EMBI Global Diversified				2.3	-3.0	-1.9	6.0	5.4	7.5	9.8	4.8	Jan-15

## Total Retirement System

As of September 30, 2018

	Market Value (\$)	% of Portfolio	% of Sector	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	20 Yrs (%)	Inception (%)	Inception Date
<b>Open-Ended Real Estate</b>	<b>5,562,602</b>	<b>3.2</b>	<b>3.2</b>	<b>2.1</b>	<b>7.5</b>	<b>9.7</b>	<b>9.4</b>	<b>11.3</b>	<b>4.3</b>	<b>7.7</b>	<b>8.2</b>	<b>Oct-95</b>
<i>NCREIF-ODCE</i>				2.1	6.5	8.7	8.8	10.7	5.6	8.6	9.2	Oct-95
Clarion Partners	5,562,602	3.2	100.0	2.1	7.5	9.7	9.4	11.3	4.3	--	7.4	Oct-02
<i>NCREIF-ODCE</i>				2.1	6.5	8.7	8.8	10.7	5.6	8.6	8.3	Oct-02
<b>Total Closed End Real Estate</b>	<b>1,995,196</b>	<b>1.1</b>	<b>1.1</b>	<b>0.0</b>	<b>3.0</b>	<b>9.7</b>	<b>11.3</b>	<b>12.8</b>	<b>--</b>	<b>--</b>	<b>14.4</b>	<b>Jan-13</b>
<i>NCREIF ODCE</i>				2.1	6.5	8.7	8.8	10.7	5.6	8.6	11.2	Jan-13
Colony Realty Partners IV	1,995,196	1.1	100.0	0.0	3.0	9.7	11.3	--	--	--	--	Jan-13
<i>NCREIF-ODCE</i>				2.1	6.5	8.7	8.8	10.7	5.6	8.6	11.2	Jan-13
<b>Private Equity Assets</b>	<b>3,527,660</b>	<b>2.0</b>	<b>2.0</b>									
North American Strategic Partners 2006	1,043,610	0.6	29.6									
Ironsides Partnership Fund IV	286,211	0.2	8.1									
Ironsides Direct Investment Fund IV	2,197,840	1.2	62.3									
<b>Cash</b>	<b>590,642</b>	<b>0.3</b>	<b>0.3</b>									

## Total Retirement System

As of September 30, 2018

## Calendar Year Performance

	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)	2011 (%)	2010 (%)	2009 (%)	2008 (%)
<b>Total Retirement System</b>	<b>13.1</b>	<b>8.7</b>	<b>-0.2</b>	<b>6.3</b>	<b>14.0</b>	<b>10.9</b>	<b>2.4</b>	<b>12.3</b>	<b>16.8</b>	<b>-20.8</b>
55% MSCI World & 45% Barclays Aggregate	13.6	5.5	0.0	5.5	13.0	10.7	0.7	10.0	19.2	-22.5
Consumer Price Index	2.1	2.1	0.7	0.8	1.5	1.7	3.0	1.5	2.7	0.1
PRIT Core Fund	17.7	8.0	1.1	8.1	15.2	13.9	0.1	13.6	17.7	-29.5
<b>Domestic Equity Assets</b>	<b>20.3</b>	<b>14.6</b>	<b>-1.6</b>	<b>13.1</b>	<b>33.1</b>	<b>15.3</b>	<b>0.0</b>	<b>18.8</b>	<b>29.8</b>	<b>-38.9</b>
Russell 3000	21.1	12.7	0.5	12.6	33.6	16.4	1.0	16.9	28.3	-37.3
PRIT Domestic Equity	20.8	12.9	0.3	11.7	33.7	16.9	1.1	16.8	25.4	-42.3
RhumbLine S&P 500 Index	21.8	11.9	1.4	13.6	32.2	16.0	2.1	15.0	26.6	-36.6
S&P 500	21.8	12.0	1.4	13.7	32.4	16.0	2.1	15.1	26.5	-37.0
Fiduciary Large Cap Equity (net)	19.2	13.8	-2.4	12.4	30.5	--	--	--	--	--
Russell 3000	21.1	12.7	0.5	12.6	33.6	16.4	1.0	16.9	28.3	-37.3
Frontier Capital Appreciation (net)	19.1	20.5	-6.5	12.4	--	--	--	--	--	--
Russell 2500 Growth	24.5	9.7	-0.2	7.1	40.6	16.1	-1.6	28.9	41.7	-41.5
<b>International Developed Markets Equity Assets</b>	<b>24.9</b>	<b>1.4</b>	<b>-0.8</b>	<b>-8.7</b>	<b>21.2</b>	<b>15.0</b>	<b>-14.1</b>	<b>10.6</b>	<b>34.1</b>	<b>-40.0</b>
MSCI EAFE	25.0	1.0	-0.8	-4.9	22.8	17.3	-12.1	7.8	31.8	-43.4
Rhumblin MSCI EAFE Index (net)	24.9	1.4	-0.8	--	--	--	--	--	--	--
MSCI EAFE	25.0	1.0	-0.8	-4.9	22.8	17.3	-12.1	7.8	31.8	-43.4
<b>International Emerging Markets Equity Assets</b>	<b>39.7</b>	<b>9.4</b>	<b>-12.7</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
MSCI Emerging Markets	37.3	11.2	-14.9	-2.2	-2.6	18.2	-18.4	18.9	78.5	-53.3
DFA Emerging Markets (net)	36.6	12.4	-14.9	--	--	--	--	--	--	--
MSCI Emerging Markets	37.3	11.2	-14.9	-2.2	-2.6	18.2	-18.4	18.9	78.5	-53.3

## Total Retirement System

As of September 30, 2018

	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)	2011 (%)	2010 (%)	2009 (%)	2008 (%)
Driehaus Emerging Market Equity (net)	42.9	6.5	-10.6	--	--	--	--	--	--	--
<i>MSCI Emerging Markets</i>	37.3	11.2	-14.9	-2.2	-2.6	18.2	-18.4	18.9	78.5	-53.3
<b>Investment Grade Bonds Assets</b>	<b>3.6</b>	<b>2.6</b>	<b>0.6</b>	<b>6.0</b>	<b>-2.0</b>	<b>4.3</b>	<b>7.8</b>	<b>6.6</b>	<b>6.0</b>	<b>5.3</b>
<i>BBgBarc US Aggregate TR</i>	3.5	2.6	0.5	6.0	-2.0	4.2	7.8	6.5	5.9	5.2
<i>PRIT Core Fixed Income</i>	5.4	4.0	-2.0	15.2	-2.8	6.4	8.1	7.5	11.9	-5.2
SSgA U.S. Aggregate Bond Index	3.6	2.6	0.6	6.0	-2.0	4.3	7.8	6.6	6.0	5.3
<i>BBgBarc US Aggregate TR</i>	3.5	2.6	0.5	6.0	-2.0	4.2	7.8	6.5	5.9	5.2
<b>High Yield Bond Assets</b>	<b>7.0</b>	<b>12.7</b>	<b>-2.3</b>	<b>2.9</b>	<b>6.4</b>	<b>12.4</b>	<b>6.0</b>	<b>12.8</b>	<b>34.3</b>	<b>-14.2</b>
<i>BBgBarc US High Yield TR</i>	7.5	17.1	-4.5	2.5	7.4	15.8	5.0	15.1	58.2	-26.2
<i>PRIT Public Value-Added Fixed Income</i>	9.0	11.7	-4.7	-0.2	-1.5	14.7	5.3	13.6	39.7	-22.3
Shenkman Capital	7.2	12.7	-2.3	2.9	6.4	12.4	6.0	12.8	34.3	-14.2
<i>BBgBarc US High Yield TR</i>	7.5	17.1	-4.5	2.5	7.4	15.8	5.0	15.1	58.2	-26.2
<b>TIPS Assets</b>	<b>3.0</b>	<b>4.7</b>	<b>-1.4</b>	<b>3.6</b>	<b>-8.6</b>	<b>6.9</b>	<b>13.5</b>	<b>6.3</b>	<b>11.3</b>	<b>-2.3</b>
<i>BBgBarc US TIPS TR</i>	3.0	4.7	-1.4	3.6	-8.6	7.0	13.6	6.3	11.4	-2.4
SSgA TIPS Index-NL	3.0	4.7	-1.4	3.6	-8.6	6.9	13.5	6.3	11.3	-2.3
<i>BBgBarc US TIPS TR</i>	3.0	4.7	-1.4	3.6	-8.6	7.0	13.6	6.3	11.4	-2.4
<b>Emerging Market Debt Assets</b>	<b>12.0</b>	<b>11.5</b>	<b>-0.8</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<i>JP Morgan EMBI Global Diversified</i>	10.3	10.2	1.2	7.4	-5.3	17.4	7.3	12.2	29.8	-12.0
Payden Emerging Market Bond (net)	12.0	11.5	-0.8	--	--	--	--	--	--	--
<i>JP Morgan EMBI Global Diversified</i>	10.3	10.2	1.2	7.4	-5.3	17.4	7.3	12.2	29.8	-12.0

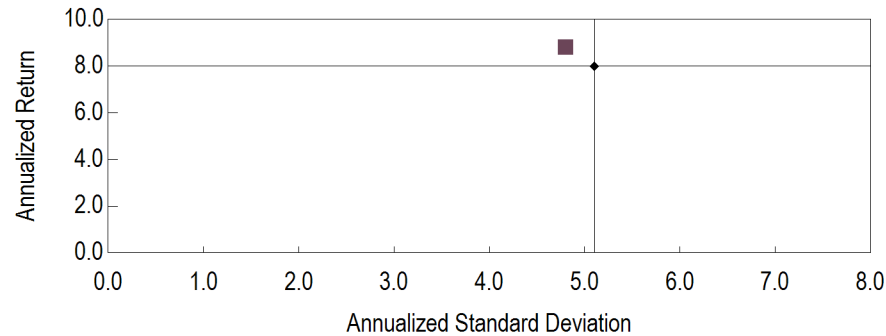
## Total Retirement System

As of September 30, 2018

	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)	2011 (%)	2010 (%)	2009 (%)	2008 (%)
<b>Open-Ended Real Estate</b>	<b>7.9</b>	<b>9.1</b>	<b>15.7</b>	<b>13.2</b>	<b>12.8</b>	<b>10.9</b>	<b>18.7</b>	<b>19.2</b>	<b>-38.6</b>	<b>-12.5</b>
NCREIF-ODCE	7.6	8.8	15.0	12.5	13.9	10.9	16.0	16.4	-29.8	-10.0
Clarion Partners	7.9	9.1	15.7	13.2	12.8	10.9	18.7	19.2	-38.6	-12.5
NCREIF-ODCE	7.6	8.8	15.0	12.5	13.9	10.9	16.0	16.4	-29.8	-10.0
<b>Total Closed End Real Estate</b>	<b>15.1</b>	<b>9.5</b>	<b>23.8</b>	<b>13.3</b>	<b>18.8</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
NCREIF ODCE	7.6	8.8	15.0	12.5	13.9	10.9	16.0	16.4	-29.8	-10.0
Colony Realty Partners IV	15.1	9.5	23.8	13.3	--	--	--	--	--	--
NCREIF-ODCE	7.6	8.8	15.0	12.5	13.9	10.9	16.0	16.4	-29.8	-10.0
<b>Private Equity Assets</b>										
North American Strategic Partners 2006 (net)										
Ironsides Partnership Fund IV (net)										
Ironsides Direct Investment Fund IV (net)										
<b>Cash</b>										

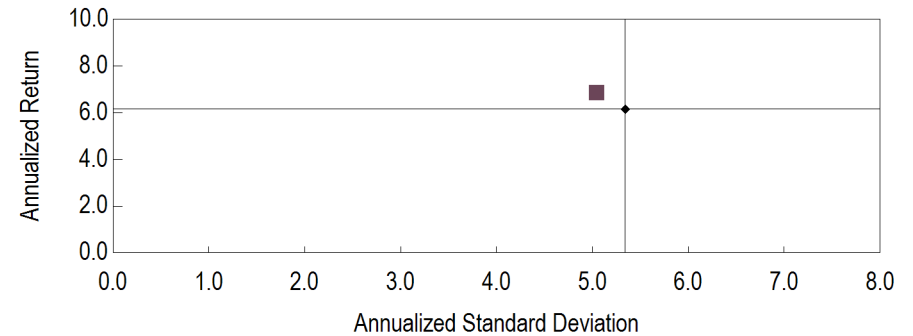


Annualized Return vs. Annualized Standard Deviation  
3 Years Ending September 30, 2018



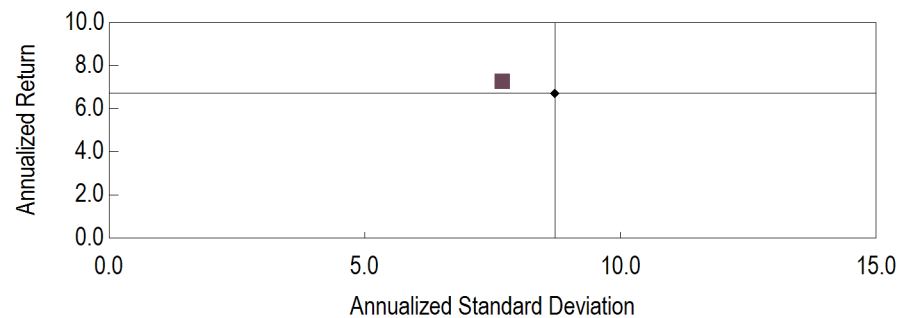
- Total Retirement System
- ◆ 55% MSCI World & 45% Barclays Aggregate

Annualized Return vs. Annualized Standard Deviation  
5 Years Ending September 30, 2018



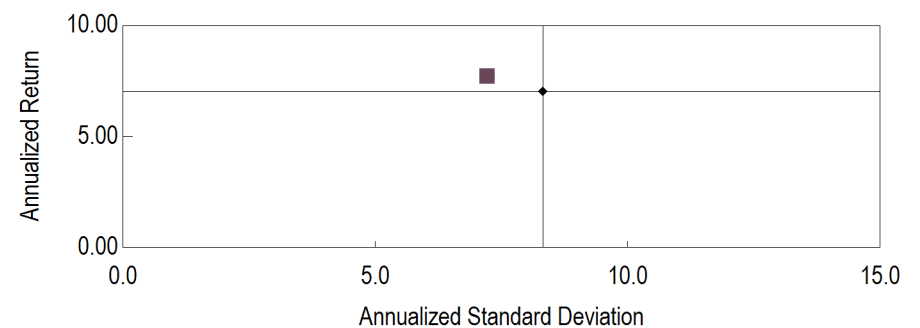
- Total Retirement System
- ◆ 55% MSCI World & 45% Barclays Aggregate

Annualized Return vs. Annualized Standard Deviation  
10 Years Ending September 30, 2018



- Total Retirement System
- ◆ 55% MSCI World & 45% Barclays Aggregate

Annualized Return vs. Annualized Standard Deviation  
Since Inception



- Total Retirement System
- ◆ 55% MSCI World & 45% Barclays Aggregate

As of September 30, 2018

**Statistics Summary**  
**5 Years Ending September 30, 2018**

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Total Retirement System	6.9%	5.0%	0.6	0.9	1.3	1.2%
55% MSCI World & 45% Barclays Aggregate	6.2%	5.3%	--	1.0	1.1	0.0%
Equity Assets	10.1%	9.4%	-1.5	0.9	1.0	2.3%
Russell 3000	13.5%	9.7%	--	1.0	1.3	0.0%
Domestic Equity Assets	12.6%	9.6%	-0.5	1.0	1.3	1.7%
Russell 3000	13.5%	9.7%	--	1.0	1.3	0.0%
RhumbLine S&P 500 Index	13.9%	9.5%	-0.7	1.0	1.4	0.0%
S&P 500	13.9%	9.6%	--	1.0	1.4	0.0%
Fiduciary Large Cap Equity	11.5%	9.2%	-0.6	0.9	1.2	3.4%
Russell 3000	13.5%	9.7%	--	1.0	1.3	0.0%
Frontier Capital Appreciation	11.7%	13.0%	-0.2	1.0	0.9	4.9%
Russell 2500 Growth	12.9%	12.7%	--	1.0	1.0	0.0%
International Developed Markets Equity Assets	3.6%	11.1%	-0.8	1.0	0.3	1.0%
MSCI EAFE	4.4%	11.0%	--	1.0	0.4	0.0%
Rhumblne MSCI EAFE Index	--	--	--	--	--	--
MSCI EAFE	4.4%	11.0%	--	1.0	0.4	0.0%
International Emerging Markets Equity Assets	--	--	--	--	--	--
MSCI Emerging Markets	3.6%	14.7%	--	1.0	0.2	0.0%
DFA Emerging Markets	--	--	--	--	--	--
MSCI Emerging Markets	3.6%	14.7%	--	1.0	0.2	0.0%

## Total Retirement System

As of September 30, 2018

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Driehaus Emerging Market Equity	--	--	--	--	--	--
MSCI Emerging Markets	3.6%	14.7%	--	1.0	0.2	0.0%
Investment Grade Bonds Assets	2.2%	2.7%	0.8	1.0	0.6	0.0%
BBgBarc US Aggregate TR	2.2%	2.7%	--	1.0	0.6	0.0%
SSgA U.S. Aggregate Bond Index	2.2%	2.7%	0.8	1.0	0.6	0.0%
BBgBarc US Aggregate TR	2.2%	2.7%	--	1.0	0.6	0.0%
High Yield Bond Assets	5.0%	4.5%	-0.5	0.9	1.0	1.0%
BBgBarc US High Yield TR	5.5%	5.0%	--	1.0	1.0	0.0%
Shenkman Capital	5.0%	4.5%	-0.5	0.9	1.0	1.0%
BBgBarc US High Yield TR	5.5%	5.0%	--	1.0	1.0	0.0%
TIPS Assets	1.4%	3.6%	-0.3	1.0	0.2	0.0%
BBgBarc US TIPS TR	1.4%	3.6%	--	1.0	0.2	0.0%
SSgA TIPS Index-NL	1.3%	3.6%	-0.4	1.0	0.2	0.1%
BBgBarc US TIPS TR	1.4%	3.6%	--	1.0	0.2	0.0%
Emerging Market Debt Assets	--	--	--	--	--	--
JP Morgan EMBI Global Diversified	5.4%	5.4%	--	1.0	0.9	0.0%
Payden Emerging Market Bond	--	--	--	--	--	--
JP Morgan EMBI Global Diversified	5.4%	5.4%	--	1.0	0.9	0.0%
Open-Ended Real Estate	11.3%	4.8%	0.6	1.1	2.2	1.0%
NCREIF-ODCE	10.7%	4.5%	--	1.0	2.3	0.0%
Clarion Partners	11.3%	4.8%	0.6	1.1	2.2	1.0%
NCREIF-ODCE	10.7%	4.5%	--	1.0	2.3	0.0%

## Total Retirement System

As of September 30, 2018

	Anlzd Return	Anlzd Standard Deviation	Information Ratio	Beta	Sharpe Ratio	Tracking Error
Total Closed End Real Estate	12.8%	6.5%	0.6	1.2	1.9	3.6%
NCREIF ODCE	10.7%	4.5%	--	1.0	2.3	0.0%
Colony Realty Partners IV	--	--	--	--	--	--
NCREIF-ODCE	10.7%	4.5%	--	1.0	2.3	0.0%
Comerica Short Term Fund	0.2%	0.1%	-1.7	0.1	-3.9	0.2%
91 Day T-Bills	0.5%	0.2%	--	1.0	0.0	0.0%

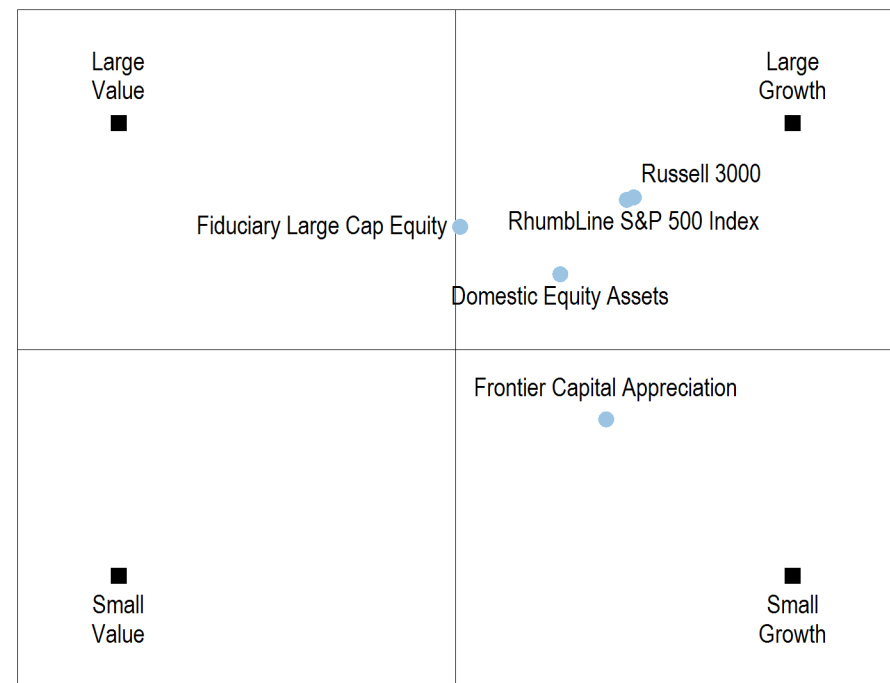
## Retirement System Detail

## Domestic Equity Assets

As of September 30, 2018

## Asset Allocation on September 30, 2018

	Actual	Actual
Fiduciary Large Cap Equity	\$23,219,251	37.6%
Frontier Capital Appreciation	\$18,295,758	29.6%
RhumbLine S&P 500 Index	\$20,209,017	32.7%
<b>Total</b>	<b>\$61,724,026</b>	<b>100.0%</b>

Domestic Equity Assets Style Map  
3 Years Ending September 30, 2018

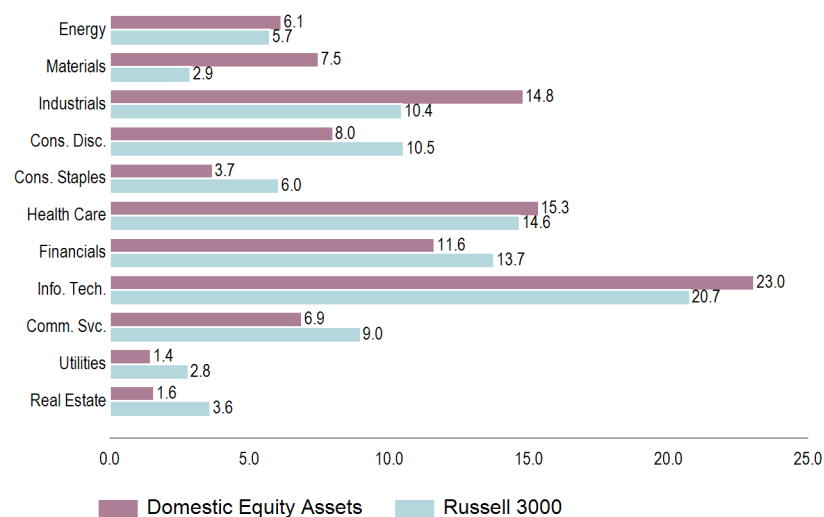
## Domestic Equity Assets

As of September 30, 2018

## Domestic Equity Assets Characteristics

	Portfolio Q3-18	Index Q3-18	Portfolio Q2-18
<b>Market Value</b>			
Market Value (\$M)	61.7	--	56.4
Number Of Holdings	634	3024	632
<b>Characteristics</b>			
Weighted Avg. Market Cap. (\$B)	123.7	191.0	102.7
Median Market Cap (\$B)	16.0	1.8	16.2
P/E Ratio	26.4	24.1	25.6
Yield	1.4	1.8	1.3
EPS Growth - 5 Yrs.	16.0	9.2	15.6
Price to Book	5.8	4.9	5.2
Beta (holdings; domestic)	1.2	1.1	1.2

## Sector Allocation (%) vs Russell 3000



## Top 10 Holdings

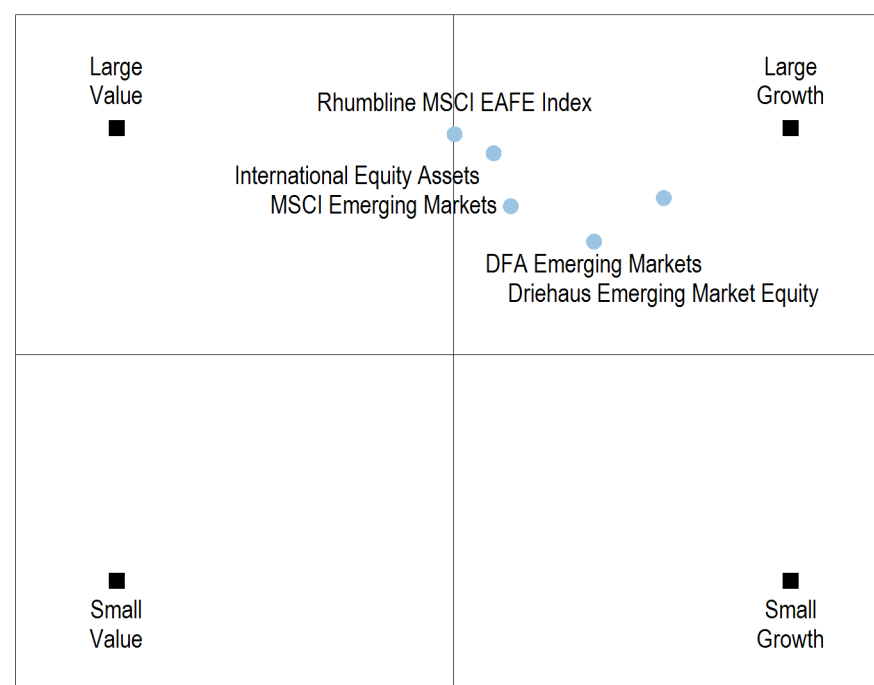
APPLE	2.2%
MICROSOFT	1.9%
UNITED CONTINENTAL HOLDINGS	1.8%
AMAZON.COM	1.8%
INSULET	1.2%
ALLEGHENY TECHS.	1.1%
COOPER COS.	0.9%
BERKSHIRE HATHAWAY 'B'	0.9%
TANDEM DIABETES CARE	0.9%
FACEBOOK CLASS A	0.9%
<b>Total</b>	<b>13.6%</b>

## International Equity Assets

As of September 30, 2018

## Asset Allocation on September 30, 2018

	Actual	Actual
DFA Emerging Markets	\$2,861,853	10.9%
Driehaus Emerging Market Equity	\$2,982,113	11.4%
Rhumblin MSCI EAFE Index	\$20,310,605	77.7%
<b>Total</b>	<b>\$26,154,571</b>	<b>100.0%</b>

International Equity Assets Style Map  
3 Years Ending September 30, 2018

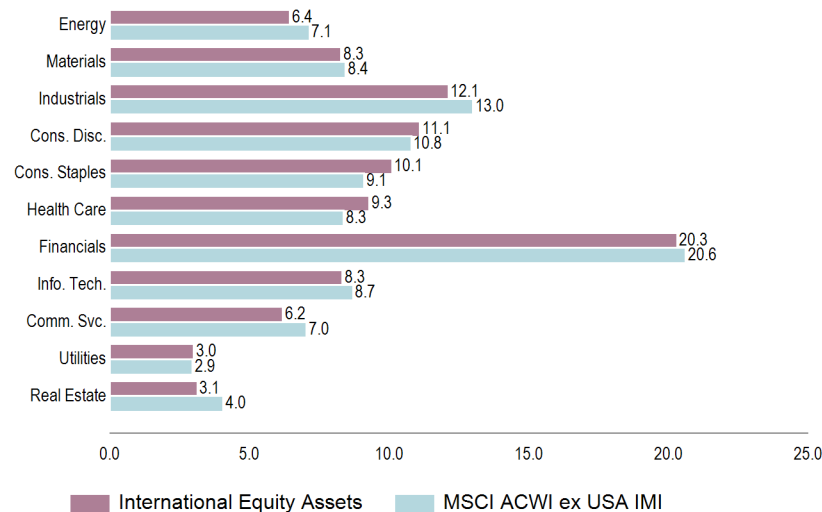


## International Equity Assets

As of September 30, 2018

International Equity Characteristics			
	Portfolio Q3-18	Index Q3-18	Portfolio Q2-18
<b>Market Value</b>			
Market Value (\$M)	26.2	--	26.0
Number Of Holdings	5985	6456	5933
<b>Characteristics</b>			
Weighted Avg. Market Cap. (\$B)	60.2	53.9	60.6
Median Market Cap (\$B)	0.6	1.5	0.7
P/E Ratio	20.4	18.8	21.0
Yield	3.0	2.9	3.0
EPS Growth - 5 Yrs.	10.4	10.1	10.6
Price to Book	3.1	2.6	3.2
Beta (holdings; domestic)	1.1	1.1	1.1

## Sector Allocation (%) vs MSCI ACWI ex USA IMI



## Top 10 Holdings

NESTLE 'R'	1.4%
NOVARTIS 'R'	1.0%
ISHARES MSCI EAFE	1.0%
HSBC HOLDINGS	0.9%
ROCHE HOLDING	0.9%
SAMSUNG ELECTRONICS	0.9%
AIA GROUP	0.9%
ROYAL DUTCH SHELL A(LON)	0.8%
TOTAL	0.8%
BP	0.8%
<b>Total</b>	<b>9.5%</b>

As of September 30, 2018

## Country Allocation Report

As of 9/30/2018

Region	% of Total	% of Bench	% Diff
North America ex U.S.	0.0%	6.7%	-6.7%
United States	2.4%	0.0%	2.4%
Europe Ex U.K.	35.9%	31.2%	4.7%
United Kingdom	12.9%	12.3%	0.6%
Pacific Basin Ex Japan	11.7%	8.1%	3.6%
Japan	18.9%	17.5%	1.3%
Emerging Markets	17.8%	23.5%	-5.7%
Other	0.5%	0.8%	-0.3%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>

## International Equity Assets

As of September 30, 2018

## International Equity Country Allocation

vs MSCI ACWI ex USA IMI

Country	% of Total	% of Bench	% Diff
ARGENTINA	0.0%	0.0%	0.0%
AUSTRALIA	5.2%	4.7%	0.5%
AUSTRIA	0.2%	0.2%	-0.1%
BAHRAIN	0.0%	0.0%	0.0%
BANGLADESH	0.0%	0.0%	0.0%
BELGIUM	0.8%	0.8%	0.0%
BRAZIL	1.6%	1.5%	0.2%
BULGARIA	0.0%	0.0%	0.0%
CANADA	0.0%	6.7%	-6.7%
CHILE	0.1%	0.3%	-0.1%
CHINA	2.3%	6.9%	-4.6%
COLOMBIA	0.1%	0.1%	-0.1%
CROATIA	0.0%	0.0%	0.0%
CZECH REPUBLIC	0.0%	0.0%	0.0%
DENMARK	1.3%	1.2%	0.1%
EGYPT	0.1%	0.0%	0.0%
ESTONIA	0.0%	0.0%	0.0%
FINLAND	0.8%	0.8%	0.0%
FRANCE	8.6%	7.1%	1.5%
GERMANY	7.3%	6.2%	1.1%
GREECE	0.0%	0.1%	-0.1%
HONG KONG	5.1%	2.3%	2.9%
HUNGARY	0.1%	0.1%	0.0%
INDIA	2.7%	2.2%	0.6%

## International Equity Assets

As of September 30, 2018

Country	% of Total	% of Bench	% Diff
INDONESIA	0.6%	0.5%	0.1%
IRELAND	0.4%	0.4%	0.0%
ISRAEL	0.4%	0.5%	-0.2%
ITALY	1.7%	1.8%	-0.1%
JAPAN	18.9%	17.5%	1.3%
JORDAN	0.0%	0.0%	0.0%
KAZAKHSTAN	0.0%	0.0%	0.0%
KENYA	0.0%	0.0%	0.0%
KOREA	2.9%	3.7%	-0.8%
KUWAIT	0.0%	0.0%	0.0%
LEBANON	0.0%	0.0%	0.0%
LITHUANIA	0.0%	0.0%	0.0%
LUXEMBOURG	0.1%	0.0%	0.1%
MALAYSIA	0.4%	0.6%	-0.2%
MAURITIUS	0.0%	0.0%	0.0%
MEXICO	0.8%	0.8%	0.0%
MOROCCO	0.0%	0.0%	0.0%
NETHERLANDS	3.4%	2.3%	1.2%
NEW ZEALAND	0.2%	0.2%	0.0%
NIGERIA	0.0%	0.0%	0.0%
NORWAY	0.6%	0.7%	-0.1%
OMAN	0.0%	0.0%	0.0%
OTHER	0.1%	0.0%	0.1%
PAKISTAN	0.0%	0.0%	0.0%
PERU	0.1%	0.1%	0.0%
PHILIPPINES	0.3%	0.2%	0.0%
POLAND	0.2%	0.3%	-0.1%

## International Equity Assets

As of September 30, 2018

Country	% of Total	% of Bench	% Diff
PORTUGAL	0.1%	0.1%	0.0%
QATAR	0.0%	0.2%	-0.2%
ROMANIA	0.0%	0.0%	0.0%
RUSSIA	0.8%	0.8%	0.0%
SERBIA	0.0%	0.0%	0.0%
SINGAPORE	1.2%	0.9%	0.3%
SLOVENIA	0.0%	0.0%	0.0%
SOUTH AFRICA	1.0%	1.4%	-0.4%
SPAIN	2.3%	2.0%	0.2%
SRI LANKA	0.0%	0.0%	0.0%
SWEDEN	2.0%	2.2%	-0.2%
SWITZERLAND	6.3%	5.3%	1.0%
TAIWAN	2.7%	3.1%	-0.4%
THAILAND	0.9%	0.6%	0.2%
TUNISIA	0.0%	0.0%	0.0%
TURKEY	0.2%	0.2%	0.0%
UKRAINE	0.0%	0.0%	0.0%
UNITED ARAB EMIRATES	0.0%	0.2%	-0.2%
UNITED KINGDOM	12.9%	12.3%	0.6%
UNITED STATES	2.4%	0.0%	2.4%
VIETNAM	0.0%	0.0%	0.0%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>0.0%</b>

## Fixed Income Assets

As of September 30, 2018

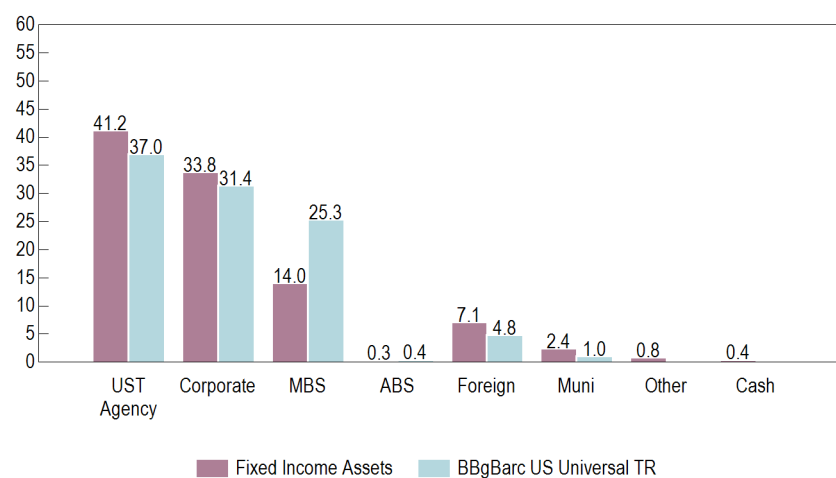
## Asset Allocation on September 30, 2018

	Actual	Actual
Payden Emerging Market Bond	\$4,764,720	6.2%
Shenkman Capital	\$16,592,192	21.7%
SSgA TIPS Index-NL	\$17,065,816	22.3%
SSgA U.S. Aggregate Bond Index	\$38,178,809	49.8%
<b>Total</b>	<b>\$76,601,536</b>	<b>100.0%</b>

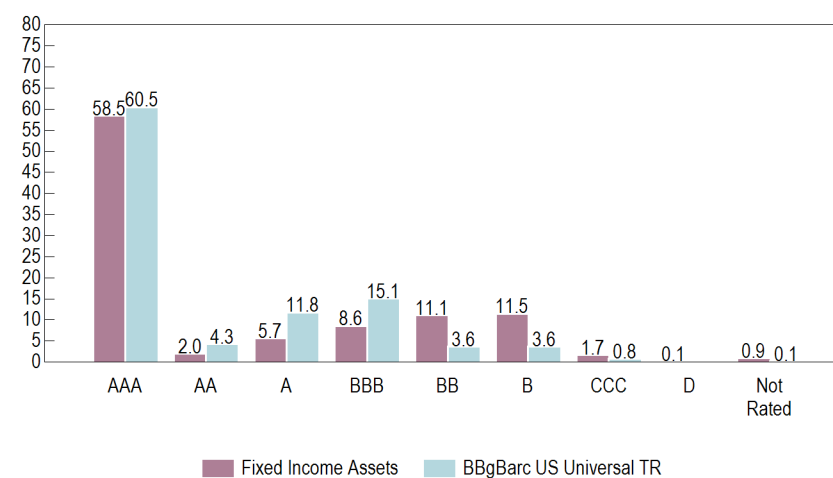
Fixed Income Characteristics  
vs. BBgBarc US Universal TR

	Portfolio Q3-18	Index Q3-18	Portfolio Q2-18
Fixed Income Characteristics			
Yield to Maturity	4.2	3.8	4.2
Average Duration	5.4	5.8	5.3
Average Quality	A	AA	A
Weighted Average Maturity	8.0	11.9	8.0

## Sector Allocation



## Credit Quality Allocation



## Portfolio Reviews

## RhumbLine S&amp;P 500 Index

As of September 30, 2018

## Account Information

Account Name	RhumbLine S&P 500 Index
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	3/01/99
Account Type	US Equity
Benchmark	S&P 500
Universe	eV US Passive S&P 500 Equity Gross

## Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
RhumbLine S&P 500 Index	7.7	10.5	17.9	17.3	13.9	12.0	6.5	Mar-99
S&P 500	7.7	10.6	17.9	17.3	13.9	12.0	6.5	Mar-99

## Top 10 Holdings

APPLE	4.2%
MICROSOFT	3.6%
AMAZON.COM	3.3%
BERKSHIRE HATHAWAY 'B'	1.7%
FACEBOOK CLASS A	1.6%
JP MORGAN CHASE & CO.	1.5%
JOHNSON & JOHNSON	1.5%
ALPHABET 'C'	1.5%
ALPHABET A	1.5%
EXXON MOBIL	1.5%
<b>Total</b>	<b>21.9%</b>

## RhumbLine S&amp;P 500 Index Characteristics

	Portfolio Q3-18	Index Q3-18
<b>Market Value</b>		
Market Value (\$M)	20.2	--
Number Of Holdings	507	505
<b>Characteristics</b>		
Weighted Avg. Market Cap. (\$B)	229.9	228.1
Median Market Cap (\$B)	21.5	21.5
P/E Ratio	32.6	24.5
Yield	1.9	1.9
EPS Growth - 5 Yrs.	15.9	8.4
Price to Book	6.8	5.3
Beta (holdings; domestic)	1.0	1.0

## Sector Distribution

Energy	6.0	6.0
Materials	2.4	2.4
Industrials	9.6	9.7
Consumer Discretionary	10.3	10.3
Consumer Staples	6.7	6.7
Health Care	15.0	15.0
Financials	13.5	13.3
Information Technology	21.0	21.0
Communication Services	10.0	10.0
Utilities	2.7	2.8
Real Estate	2.6	2.7



## Fiduciary Large Cap Equity

As of September 30, 2018

## Account Information

Account Name	Fiduciary Large Cap Equity
Account Structure	Mutual Fund
Investment Style	Active
Inception Date	9/01/12
Account Type	US Equity
Benchmark	Russell 3000
Universe	eV US Large Cap Equity Net

## Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Fiduciary Large Cap Equity	4.1	6.4	12.8	14.3	11.5	--	13.1	Sep-12
Russell 3000	7.1	10.6	17.6	17.1	13.5	12.0	15.0	Sep-12

## Top Holdings as of September 30, 2018

BERKSHIRE HATHAWAY INC B	5.20%
DOLLAR GENERAL CORP	4.93%
UNITEDHEALTH GROUP INC	4.73%
HONEYWELL INTERNATIONAL INC	4.70%
TJX COMPANIES INC	4.33%
TWENTY-FIRST CENTURY FOX INC CLASS B	4.14%
JPMORGAN CHASE & CO	4.03%
ACCENTURE PLC A	3.59%
QUEST DIAGNOSTICS INC	3.39%
NUTRIEN LTD	3.38%

## Fund Characteristics as of September 30, 2018

Versus Russell 3000

Sharpe Ratio (3 Year)	1.52
Average Market Cap (\$mm)	63,425.66
Price/Earnings	18.25
Price/Book	3.07
Price/Sales	1.91
Price/Cash Flow	12.48
Dividend Yield	1.78
Number of Equity Holdings	30
R-Squared (3 Year)	0.84
Alpha (3 Year)	-0.03%

## Sector Allocation as of September 30, 2018

BASIC MATERIALS	5.72%
COMMUNICATION SERVICES	2.93%
CONSUMER CYCLICAL	15.30%
CONSUMER DEFENSIVE	16.78%
ENERGY	2.88%
FINANCIAL SERVICES	16.76%
HEALTHCARE	13.89%
INDUSTRIALS	13.73%
REAL ESTATE	0.00%
TECHNOLOGY	12.02%
UTILITIES	0.00%

## Frontier Capital Appreciation

As of September 30, 2018

## Account Information

Account Name	Frontier Capital Appreciation
Account Structure	Commingled Fund
Investment Style	Active
Inception Date	2/01/13
Account Type	US Equity
Benchmark	Russell 2500 Growth
Universe	eV US Small-Mid Cap Growth Equity Net

## Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Frontier Capital Appreciation	5.4	7.1	11.2	17.5	11.7	--	14.3	Feb-13
Russell 2500 Growth	7.2	15.8	23.1	18.0	12.9	13.6	15.1	Feb-13

## Top 10 Holdings

UNITED CONTINENTAL HOLDINGS	3.7%
INSULET	2.6%
ALLEGHENY TECHS.	2.4%
TANDEM DIABETES CARE	1.9%
COOPER COS.	1.9%
TUTOR PERINI	1.8%
QORVO	1.7%
COGENT COMMS.HOLDINGS	1.6%
MONOLITHIC PWR.SYS.	1.5%
ROGERS	1.5%
<b>Total</b>	<b>20.5%</b>

## Frontier Capital Appreciation Characteristics

	Portfolio Q3-18	Index Q3-18	Portfolio Q2-18
<b>Market Value</b>			
Market Value (\$M)	18.3	--	17.4
Number Of Holdings	143	1501	142
<b>Characteristics</b>			
Weighted Avg. Market Cap. (\$B)	5.9	5.7	5.5
Median Market Cap (\$B)	3.0	1.3	2.9
P/E Ratio	19.1	23.8	17.0
Yield	0.9	0.6	0.7
EPS Growth - 5 Yrs.	16.0	14.8	14.0
Price to Book	3.8	6.9	3.1
Beta (holdings; domestic)	1.3	1.2	1.3

## Sector Distribution

Energy	6.3	1.6	5.3
Materials	13.1	4.6	14.6
Industrials	20.6	16.9	18.6
Consumer Discretionary	5.4	15.3	6.0
Consumer Staples	0.3	2.0	0.2
Health Care	15.7	22.9	14.7
Financials	9.5	6.9	9.8
Information Technology	25.4	23.8	27.5
Communication Services	3.3	3.3	1.6
Utilities	0.0	0.2	0.0
Real Estate	0.4	2.5	0.4

## Rhumbline MSCI EAFE Index

As of September 30, 2018

## Account Information

Account Name	Rhumbline MSCI EAFE Index
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	8/01/14
Account Type	Non-US Stock Developed
Benchmark	MSCI EAFE
Universe	eV EAFE All Cap Equity Net

## Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Rhumbline MSCI EAFE Index	1.4	-1.2	2.7	9.4	--	--	3.4	Aug-14
MSCI EAFE	1.4	-1.4	2.7	9.2	4.4	5.4	3.3	Aug-14

## Top 10 Holdings

NESTLE 'R'	1.8%
NOVARTIS 'R'	1.3%
ISHARES MSCI EAFE	1.3%
HSBC HOLDINGS	1.2%
ROCHE HOLDING	1.1%
ROYAL DUTCH SHELL A(LON)	1.1%
TOTAL	1.1%
BP	1.0%
TOYOTA MOTOR	1.0%
ROYAL DUTCH SHELL B	0.9%
<b>Total</b>	<b>11.8%</b>

## Rhumbline MSCI EAFE Index Characteristics

	Portfolio Q3-18	Index Q3-18	Portfolio Q2-18
<b>Market Value</b>			
Market Value (\$M)	20.3	--	20.0
Number Of Holdings	928	924	928
<b>Characteristics</b>			
Weighted Avg. Market Cap. (\$B)	58.4	57.8	56.9
Median Market Cap (\$B)	10.8	10.8	10.9
P/E Ratio	20.3	19.0	20.5
Yield	3.2	3.1	3.2
EPS Growth - 5 Yrs.	9.9	8.9	9.8
Price to Book	3.0	2.6	3.0
Beta (holdings; domestic)	1.1	1.1	1.1

## Sector Distribution

Energy	6.0	6.2	5.9
Materials	8.0	8.1	8.0
Industrials	13.9	14.5	13.9
Consumer Discretionary	10.9	11.0	12.0
Consumer Staples	10.9	11.1	11.2
Health Care	10.8	11.1	10.3
Financials	19.3	19.8	19.6
Information Technology	6.0	6.1	6.7
Communication Services	5.3	5.5	3.5
Utilities	3.1	3.2	3.2
Real Estate	3.3	3.4	3.3

## DFA Emerging Markets

As of September 30, 2018

## Account Information

Account Name	DFA Emerging Markets
Account Structure	Mutual Fund
Investment Style	Active
Inception Date	1/01/15
Account Type	Non-US Stock Emerging
Benchmark	MSCI Emerging Markets
Universe	eV Emg Mkt Equity Hedged Net

## Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
DFA Emerging Markets	-1.2	-9.5	-2.5	11.5	--	--	4.6	Jan-15
MSCI Emerging Markets	-1.1	-7.7	-0.8	12.4	3.6	5.4	5.0	Jan-15

## Top 10 Holdings

SAMSUNG ELECTRONICS	3.9%
TAIWAN SEMICON.SPN.ADR 1:5	1.7%
TENCENT HOLDINGS	1.6%
TAIWAN SEMICON.MNFG.	1.3%
VALE ON	1.0%
ALIBABA GROUP HLDG.SPN. ADR 1:1	0.9%
SK HYNIX	0.8%
CHINA CON.BANK 'H'	0.7%
PING AN INSURANCE (GROUP) OF CHINA 'H'	0.7%
HON HAI PRECN.IND.	0.5%
<b>Total</b>	<b>13.0%</b>

## DFA Emerging Markets Characteristics

	Portfolio Q3-18	Index Q3-18	Portfolio Q2-18
<b>Market Value</b>			
Market Value (\$M)	2.9	--	2.9
Number Of Holdings	5041	1151	4986
<b>Characteristics</b>			
Weighted Avg. Market Cap. (\$B)	43.3	79.3	43.9
Median Market Cap (\$B)	0.4	5.3	0.4
P/E Ratio	18.8	18.6	19.7
Yield	2.8	2.7	2.7
EPS Growth - 5 Yrs.	11.1	11.7	11.4
Price to Book	2.9	3.1	3.1
Beta (holdings; domestic)	1.1	1.1	1.1

## Sector Distribution

Energy	6.4	8.1	5.5
Materials	11.7	7.9	11.3
Industrials	9.2	5.4	8.9
Consumer Discretionary	10.3	10.6	11.0
Consumer Staples	7.5	6.5	7.6
Health Care	3.6	3.1	3.6
Financials	17.7	23.1	17.3
Information Technology	18.8	15.9	23.2
Communication Services	8.1	14.0	3.6
Utilities	3.1	2.4	3.1
Real Estate	3.5	2.9	3.4

## Driehaus Emerging Market Equity

As of September 30, 2018

## Account Information

Account Name	Driehaus Emerging Market Equity
Account Structure	Mutual Fund
Investment Style	Active
Inception Date	1/01/15
Account Type	Non-US Stock Emerging
Benchmark	MSCI Emerging Markets
Universe	eV Emg Mkt Equity Hedged Net

## Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Driehaus Emerging Market Equity	-3.8	-8.9	-2.3	11.5	--	--	5.9	Jan-15
MSCI Emerging Markets	-1.1	-7.7	-0.8	12.4	3.6	5.4	5.0	Jan-15

## Top 10 Holdings

TAIWAN SEMICON.SPN.ADR 1:5	4.6%
TENCENT HOLDINGS	4.5%
SAMSUNG ELECTRONICS	4.4%
ALIBABA GROUP HLDG.SPN. ADR 1:1	3.7%
AIA GROUP	2.9%
HDFC BANK ADR 1:3	2.8%
PING AN INSURANCE (GROUP) OF CHINA 'H'	2.7%
CNOOC	2.3%
ITAU UNIBANCO BANCO HLDG.ADR 1:1	2.1%
WALMART DE MEXICO 'V'	2.1%
<b>Total</b>	<b>32.0%</b>

## Driehaus Emerging Market Equity Characteristics

	Portfolio Q3-18	Index Q3-18	Portfolio Q2-18
<b>Market Value</b>			
Market Value (\$M)	3.0	--	3.1
Number Of Holdings	98	1151	91
<b>Characteristics</b>			
Weighted Avg. Market Cap. (\$B)	91.2	79.3	104.2
Median Market Cap (\$B)	15.0	5.3	18.6
P/E Ratio	22.5	18.6	26.0
Yield	2.2	2.7	2.0
EPS Growth - 5 Yrs.	13.2	11.7	14.8
Price to Book	4.7	3.1	5.7
Beta (holdings; domestic)	1.1	1.1	1.1

## Sector Distribution

Energy	9.5	8.1	5.3
Materials	6.5	7.9	5.0
Industrials	1.7	5.4	4.3
Consumer Discretionary	13.4	10.6	10.6
Consumer Staples	6.4	6.5	6.5
Health Care	3.8	3.1	4.4
Financials	30.1	23.1	28.7
Information Technology	14.1	15.9	30.3
Communication Services	10.4	14.0	1.2
Utilities	1.7	2.4	1.1
Real Estate	1.2	2.9	0.9

## SSgA U.S. Aggregate Bond Index

As of September 30, 2018

## Account Information

Account Name	SSgA U.S. Aggregate Bond Index
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	5/01/01
Account Type	US Fixed Income Investment Grade
Benchmark	BBgBarc US Aggregate TR
Universe	eV US Core Fixed Inc Gross

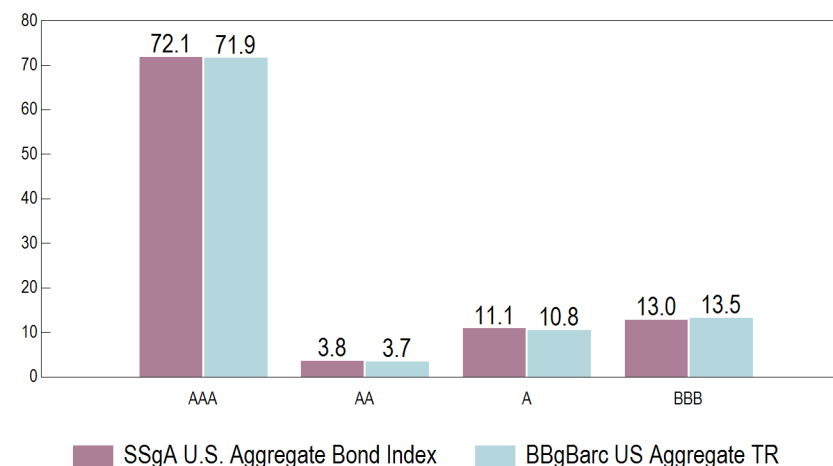
## Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
SSgA U.S. Aggregate Bond Index	0.0	-1.6	-1.2	1.3	2.2	3.8	4.4	May-01
BBgBarc US Aggregate TR	0.0	-1.6	-1.2	1.3	2.2	3.8	4.4	May-01

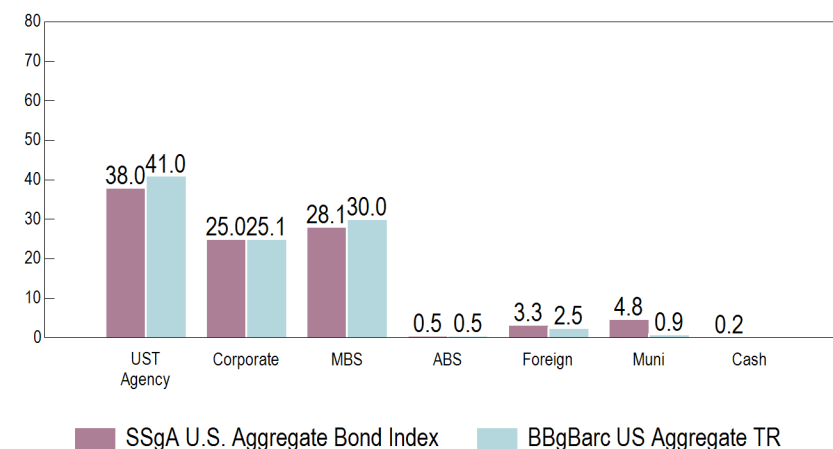
SSgA U.S. Aggregate Bond Index Characteristics  
vs. BBgBarc US Aggregate TR

	Portfolio Q3-18	Index Q3-18	Portfolio Q2-18
Fixed Income Characteristics			
Yield to Maturity	3.5	3.4	3.3
Average Duration	6.0	6.0	6.0
Average Quality	AA	AA	AA
Weighted Average Maturity	8.4	12.9	8.4

## Credit Quality Allocation



## Sector Allocation



## Account Information

Account Name	Shenkman Capital
Account Structure	Commingled Fund
Investment Style	Active
Inception Date	4/01/06
Account Type	US Fixed Income High Yield
Benchmark	BBgBarc US High Yield TR
Universe	eV US High Yield Fixed Inc Gross

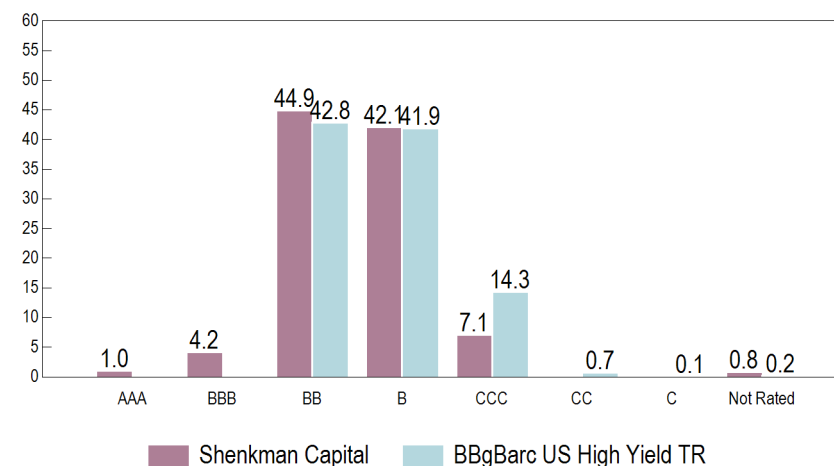
## Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Shenkman Capital	2.2	2.2	2.4	6.4	5.0	7.8	6.7	Apr-06
BBgBarc US High Yield TR	2.4	2.6	3.0	8.1	5.5	9.5	7.5	Apr-06

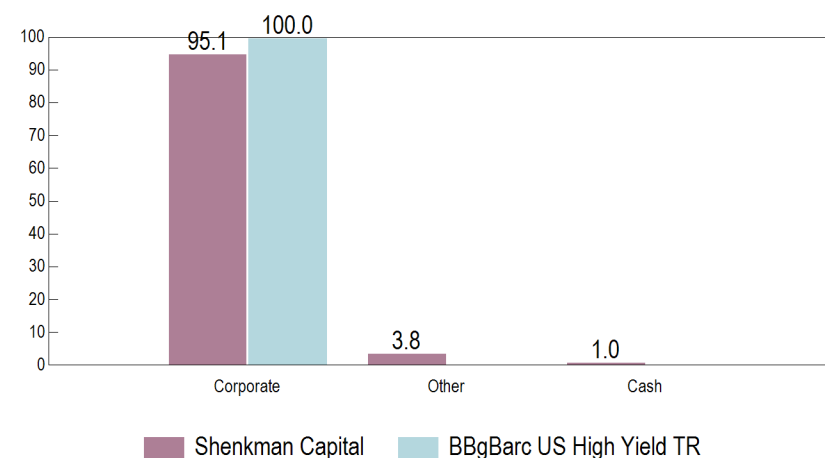
Shenkman Capital Characteristics  
vs. BBgBarc US High Yield TR

	Portfolio Q3-18	Index Q3-18	Portfolio Q2-18
Fixed Income Characteristics			
Yield to Maturity	5.9	6.5	6.1
Average Duration	3.5	3.8	3.9
Average Quality	BB	B	BB
Weighted Average Maturity	5.8	6.0	5.8

## Credit Quality Allocation



## Sector Allocation



## SSgA TIPS Index-NL

As of September 30, 2018

## Account Information

Account Name	SSgA TIPS Index-NL
Account Structure	Commingled Fund
Investment Style	Passive
Inception Date	10/01/05
Account Type	US Inflation Protected Fixed
Benchmark	BBgBarc US TIPS TR
Universe	eV US TIPS / Inflation Fixed Inc Gross

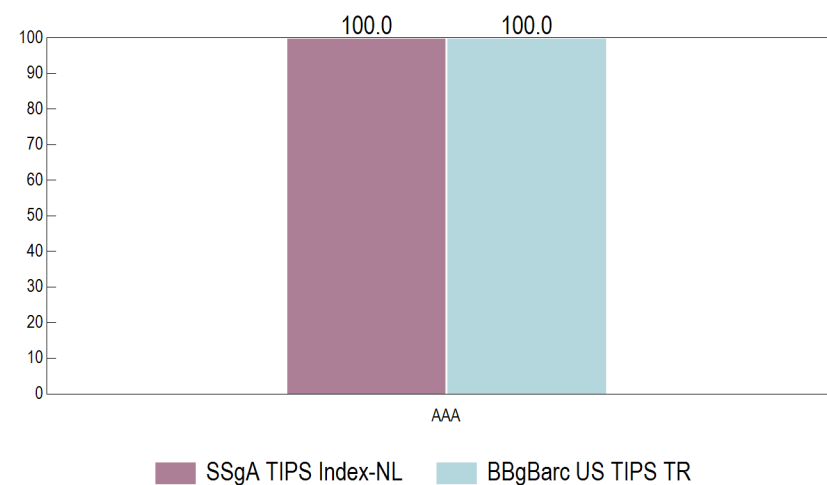
## Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
SSgA TIPS Index-NL	-0.9	-0.9	0.3	2.0	1.3	3.3	3.5	Oct-05
BBgBarc US TIPS TR	-0.8	-0.8	0.4	2.0	1.4	3.3	3.5	Oct-05

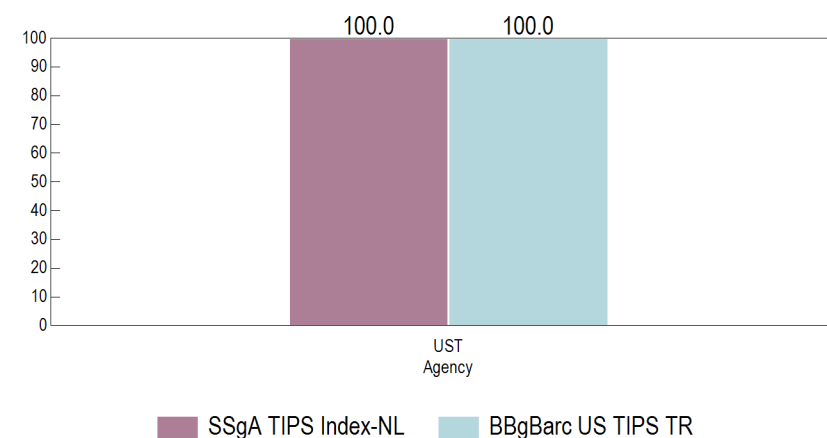
SSgA TIPS Index-NL Characteristics  
vs. BBgBarc US TIPS TR

	Portfolio Q3-18	Index Q3-18	Portfolio Q2-18
Fixed Income Characteristics			
Yield to Maturity	3.1	0.9	3.0
Average Duration	5.4	5.4	4.9
Average Quality	AAA	AAA	AAA
Weighted Average Maturity	8.2	8.2	8.4

## Credit Quality Allocation



## Sector Allocation





## Payden Emerging Market Bond

As of September 30, 2018

## Account Information

Account Name	Payden Emerging Market Bond
Account Structure	Mutual Fund
Investment Style	Active
Inception Date	1/01/15
Account Type	International Emerging Market Debt
Benchmark	JP Morgan EMBI Global Diversified
Universe	eV Emg Mkt Fixed Inc Hedged Net

## Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Payden Emerging Market Bond	2.4	-4.0	-2.6	6.6	--	--	4.7	Jan-15
JP Morgan EMBI Global Diversified	2.3	-3.0	-1.9	6.0	5.4	7.5	4.8	Jan-15

## Fund Characteristics as of September 30, 2018

Versus JP Morgan EMBI Global Diversified

Sharpe Ratio (3 Year)	0.91
Average Duration	6.50
Average Coupon	6.73%
Average Effective Maturity	11.39
R-Squared (3 Year)	0.96
Alpha (3 Year)	-0.01%
Beta (3 Year)	1.10

## Payden Emerging Market Bond Characteristics

vs. JP Morgan EMBI Global TR

	Portfolio Q3-18	Index Q3-18	Portfolio Q2-18
Fixed Income Characteristics			
Yield to Maturity	7.6	6.2	8.1
Average Duration	6.5	6.8	6.6
Average Quality	BB	BB	BB
Weighted Average Maturity	11.4	11.2	11.7

## Fixed Income Sectors as of September 30, 2018

GOVERNMENT	69.64%
MUNICIPAL	0.00%
CORPORATE	16.32%
SECURITIZED	0.00%
CASH & EQUIVALENTS	8.69%
DERIVATIVE	5.35%

## Credit Quality as of September 30, 2018

AAA	2.00%
AA	1.00%
A	3.00%
BBB	22.00%
BB	26.00%
B	36.00%
Below B	7.00%
Not Rated	3.00%

As of September 30, 2018

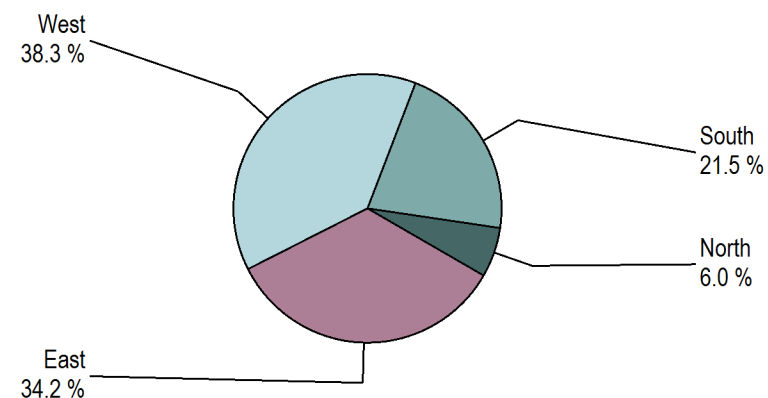
## Account Information

Account Name	Clarion Partners
Account Structure	Commingled Fund
Investment Style	Active
Inception Date	10/01/02
Account Type	Real Estate
Benchmark	NCREIF-ODCE
Universe	US Real Estate Equity

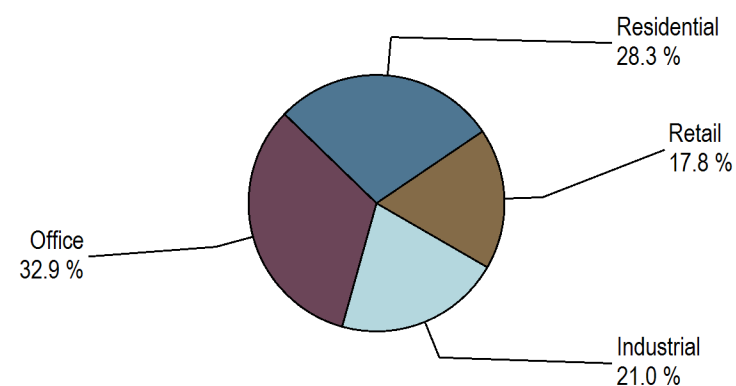
## Portfolio Performance Summary

	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Clarion Partners	2.1	7.5	9.7	9.4	11.3	4.3	7.4	Oct-02
NCREIF-ODCE	2.1	6.5	8.7	8.8	10.7	5.6	8.3	Oct-02

## Geographic Diversification



## Property Type Allocation



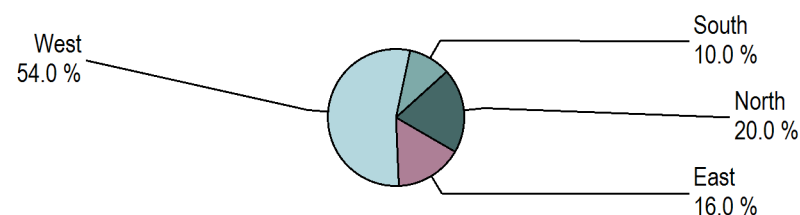
## Colony Realty Partners IV

As of September 30, 2018

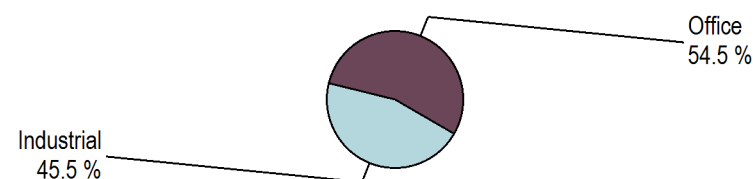
## Account Information

Account Name	Colony Realty Partners IV
Account Structure	Other
Investment Style	Active
Inception Date	1/01/13
Account Type	Real Estate
Benchmark	NCREIF-ODCE
Universe	US Real Estate Equity

## Geographic Diversification



## Property Type Allocation



## Non-Marketable Securities Overview

As of September 30, 2018

Account Type	Account	Vintage Year	Commitment	Cumulative Takedown	Cumulative Distributions	Value (RV)	Total Value (RV + Dist)	Unfunded Commitment
Real Estate	Colony Realty Partners IV	2012	\$2,000,000	\$2,162,030	\$1,404,007	\$1,995,196	\$3,399,203	\$ 0
	<b>Total Account</b>		<b>\$2,000,000</b>	<b>\$2,162,030</b>	<b>\$1,404,007</b>	<b>\$1,995,196</b>	<b>\$3,399,203</b>	<b>\$ 0</b>

Colony IV 's Net IRR since January 2012 was 15% as of June 30, 2018. Geographic Diversification and Property Type Allocation are as of June 30th, 2018

## Private Equity Assets

As of September 30, 2018

## Non-Marketable Securities Overview by Account Type

As of September 30, 2018

Account Type	Account	Vintage Year	Commitment	Cumulative Takedown	Cumulative Distributions	Value (RV)	Total Value (RV + Dist)	Unfunded Commitment
Private Equity	North American Strategic Partners 2006	2006	\$4,539,998	\$4,369,826	\$3,001,282	\$1,043,610	\$4,044,892	\$170,172
	Ironsides Partnership Fund IV	2015	\$2,500,000	\$375,000	\$182,694	\$286,211	\$468,905	\$2,125,000
	Ironsides Direct Investment Fund IV	2015	\$2,500,000	\$2,072,929	\$0	\$2,197,840	\$2,197,840	\$427,071
	<b>Total Account</b>		<b>\$9,539,998</b>	<b>\$6,817,754</b>	<b>\$2,818,588</b>	<b>\$3,527,660</b>	<b>\$6,346,248</b>	<b>\$2,722,244</b>

North American Strategic Partners' net IRR was 7.1% as of June 30, 2018.



As of September 30, 2018

**Annual Investment Expense Analysis**  
**As Of September 30, 2018**

Name	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
<b>Equity Assets</b>		<b>\$87,878,597</b>		
<b>Domestic Equity Assets</b>		<b>\$61,724,026</b>		
RhumbLine S&P 500 Index	0.07% of First 25.0 Mil, 0.05% of Next 25.0 Mil, 0.04% Thereafter	\$20,209,017	\$14,146	0.07%
Fiduciary Large Cap Equity	0.85% of Assets	\$23,219,251	\$197,364	0.85%
Frontier Capital Appreciation	0.79% of Assets	\$18,295,758	\$144,536	0.79%
<b>International Equity Assets</b>		<b>\$26,154,571</b>		
<b>International Developed Markets Equity Assets</b>		<b>\$20,310,605</b>		
Rhumblin MSCI EAFE Index	0.08% of First 25.0 Mil, 0.07% of Next 25.0 Mil, 0.05% Thereafter	\$20,310,605	\$16,248	0.08%
<b>International Emerging Markets Equity Assets</b>		<b>\$5,843,967</b>		
DFA Emerging Markets	0.53% of Assets	\$2,861,853	\$15,168	0.53%
Driehaus Emerging Market Equity	1.47% of Assets	\$2,982,113	\$43,837	1.47%
<b>Fixed Income Assets</b>		<b>\$76,601,536</b>		
<b>Investment Grade Bonds Assets</b>		<b>\$38,178,809</b>		
SSgA U.S. Aggregate Bond Index	0.06% of First 50.0 Mil, 0.05% of Next 50.0 Mil, 0.04% Thereafter	\$38,178,809	\$22,907	0.06%
<b>High Yield Bond Assets</b>		<b>\$16,592,192</b>		
Shenkman Capital	0.45% of Assets	\$16,592,192	\$74,665	0.45%
<b>TIPS Assets</b>		<b>\$17,065,816</b>		
SSgA TIPS Index-NL	0.06% of Assets	\$17,065,816	\$10,239	0.06%
<b>Emerging Market Debt Assets</b>		<b>\$4,764,720</b>		
Payden Emerging Market Bond	0.75% of Assets	\$4,764,720	\$35,735	0.75%

## Total Retirement System

As of September 30, 2018

Name	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
<b>Real Estate Assets</b>		<b>\$7,557,798</b>		
<b>Open-Ended Real Estate</b>		<b>\$5,562,602</b>		
Clarion Partners	1.10% of Assets	\$5,562,602	\$61,189	1.10%
<b>Total Closed End Real Estate</b>		<b>\$1,995,196</b>		
Colony Realty Partners IV	1.5% management fee based on committed equity during the investment period and invested equity thereafter	\$1,995,196		
<b>Private Equity Assets</b>		<b>\$3,527,660</b>		
North American Strategic Partners 2006	0.8% on drawn and undrawn capital less investments sold or written off   5% carried interest, 8% preferred return	\$1,043,610		
Ironsides Partnership Fund IV	0% Management fee, 8% Preferred Return, 5% Carried Interest	\$286,211		
Ironsides Direct Investment Fund IV	0.5% Management fee, 8% Preferred Return, 15% Carried Interest	\$2,197,840		
<b>Cash</b>		<b>\$590,642</b>		
Comerica Short Term Fund		\$590,642		
<b>Total</b>		<b>\$176,156,234</b>	<b>\$636,035</b>	<b>0.36%</b>

## **Non-Core Real Estate Recommendation**

## Overview

	Core	Value-Added	Opportunistic
Property Types Included	4 majors <sup>1</sup>	4 + Limited Specialty <sup>2</sup>	4 + Moderate Specialty <sup>2</sup>
Occupancy at Acquisition	≥ 85%	< 85%	< 85%
Target Markets	Primary	Primary/Secondary	Primary/Secondary/Tertiary
Physical Asset Needs	Minor	Renovation <sup>3</sup>	Enhancement <sup>2</sup> /Development
Holding Period (years)	7+	3 - 7	1 - 5
Income (as % of total return)	≥ 70%	30% - 70%	< 30%
Leverage	0% - 40%	40% - 70%	50% - 80%
Return Expectations	6% - 8%	10% - 12%	12%+

- Core and non-core (value-added and opportunistic) real estate characteristics can vary significantly.
- Core strategies focus on high quality assets with proven income streams.
- Non-core strategies present greater risk:
  - lower occupancy
  - increased leverage
  - greater reliance on improvement of the physical asset
- Non-core vehicles are typically closed-end while core vehicles are typically open-end.

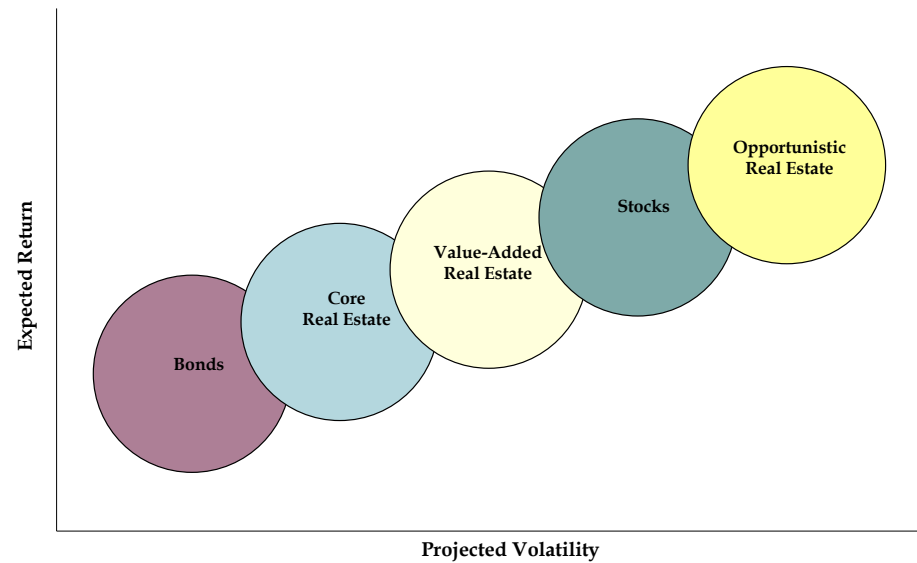
<sup>1</sup> Major property types include: office, retail (mall), multi-family (apartment), and industrial (warehouse).

<sup>2</sup> Specialty property types include: senior housing, college dormitories, self-storage, etc.

<sup>3</sup> Includes repositioning, renovation, and redevelopment.



### Risk/Return Expectations



- Non-core strategies include two categories, value-added and opportunistic. Real estate debt strategies can exhibit characteristics across the risk spectrum.
- Each offers unique characteristics with different risk/reward expectations, relative to traditional asset classes.

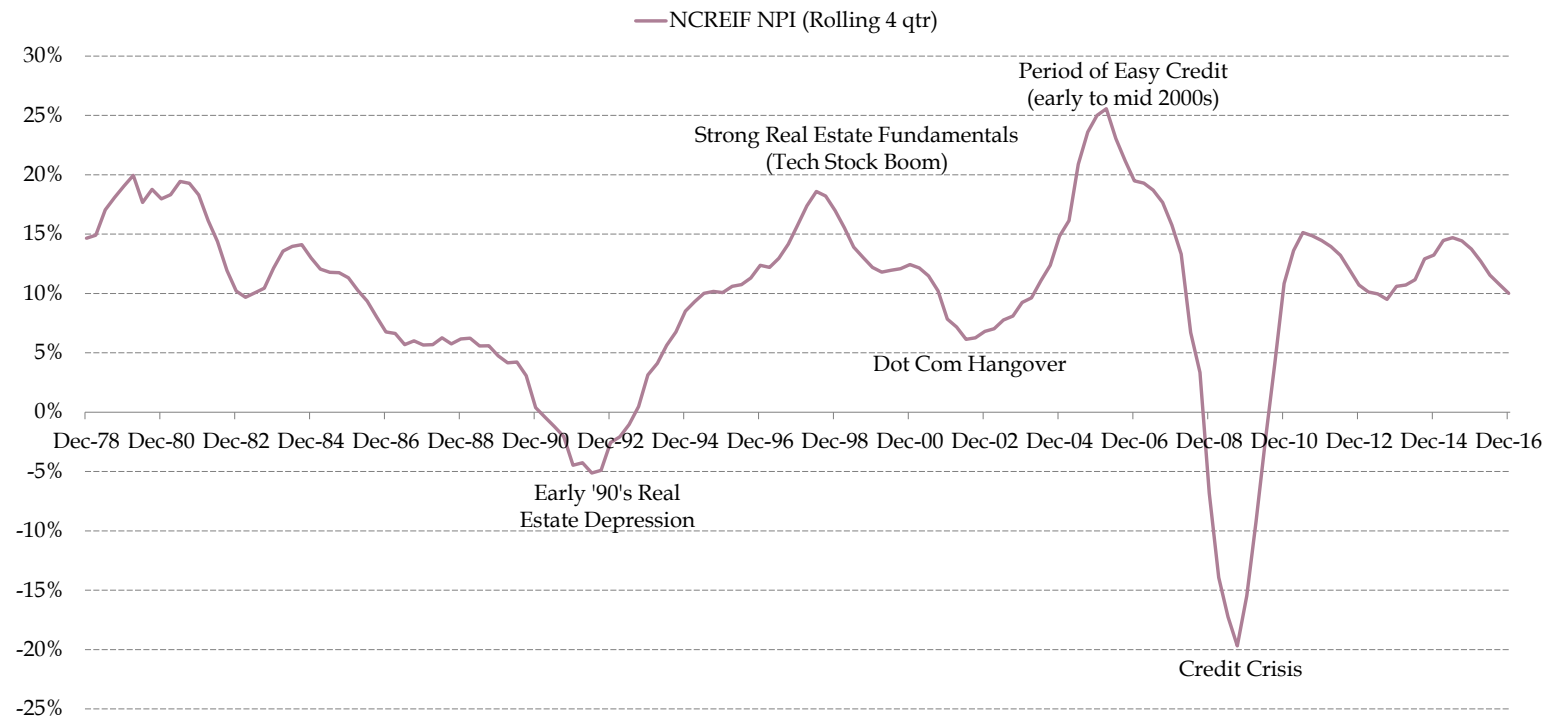
## Value-Added Real Estate

- There is a moderate income return component.
- Investments may be outside of the four main property types<sup>1</sup>.
- There is more focus on capital appreciation via enhancement methods:
  - Repositioning: re-leasing, refurbishment, or operational improvement.
  - Renovation: property enlargement, capital improvement, structural repair, or refinishing.
  - Redevelopment: a major overhaul or conversion of a property for a different use.
- Investments are primarily within the United States.

---

<sup>1</sup> Office, retail (mall), multi-family (apartment), and industrial (warehouse).

## Performance Cycles



- Real Estate has been a cyclical industry historically.
- The cyclical troughs and peaks can persist for extended time periods (i.e., several or more years).
- Since the NCREIF NPI inception, there have been two periods of negative returns: the early 90's real estate downturn and the GFC.

**Portfolio Consideration: Fees**

Typical Fees	
Management Fee	1.25% to 2.0%
Performance Incentive Fee:	
Preferred Return	8%
Carried Interest	20%

- Non-core strategies generally have higher fee schedules than core funds.
- Fee structures tend to resemble those of private equity partnerships.
- The performance fee is called “carried interest,” and represents a percentage of profit for the General Partner if a certain hurdle, or “preferred” rate of return is achieved.

## Recommendation

- The primary reason to invest in non-core real estate is to seek higher returns through appreciation.
- Plan sponsors should consider allocating between 30% and 60% of their real estate portfolio to non-core strategies.
- The allocation amount will depend primarily upon the plan sponsor's risk tolerance and return objectives for their overall portfolio.
- We recommend building a diversified portfolio (by asset type, life-cycle, geography, etc.) over a period of years.
  - For Marlborough, an commitment of \$5 million to a value-added strategy will bring the Retirement System to its 5% real estate target with a 40% allocation to non-core strategies.

## Appendices

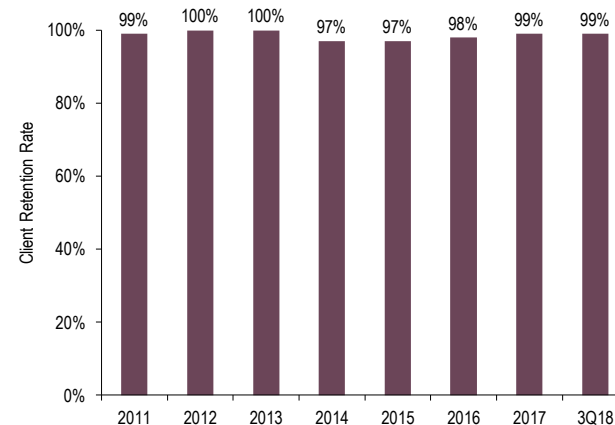
## **Meketa Investment Group Corporate Update**

- Staff of 153, including 102 investment professionals and 32 CFA Charterholders
- 175 clients, with over 300 funds throughout the United States
- Significant investment in staff and resources
- Offices in Boston, Chicago, Miami, Portland (OR), San Diego, and London
- We advise on over \$635 billion in client assets
  - Over \$90 billion in assets committed to alternative investments
    - Private Equity      ▪ Infrastructure      ▪ Natural Resources
    - Real Estate      ▪ Hedge Funds      ▪ Commodities

### Client to Consultant Ratio



### Client Retention Rate<sup>1</sup>



**Meketa Investment Group is proud to work for over 5 million American families everyday.**

<sup>1</sup> Client Retention Rate is one minus the number of clients lost divided by the number of clients at prior year-end.



## Asset Classes Followed Intensively by Meketa Investment Group

Domestic Equities	International Equities	Private Equity	Real Assets	Fixed Income	Hedge Funds
<ul style="list-style-type: none"> <li>- Passive</li> <li>- Enhanced Index</li> <li>- Large Cap</li> <li>- Midcap</li> <li>- Small Cap</li> <li>- Microcap</li> <li>- 130/30</li> </ul>	<ul style="list-style-type: none"> <li>- Large Cap Developed</li> <li>- Small Cap Developed</li> <li>- Emerging Markets</li> <li>- Frontier Markets</li> </ul>	<ul style="list-style-type: none"> <li>- Buyouts</li> <li>- Venture Capital</li> <li>- Private Debt</li> <li>- Special Situations</li> <li>- Secondaries</li> <li>- Fund of Funds</li> </ul>	<ul style="list-style-type: none"> <li>- Public REITs</li> <li>- Core Real Estate</li> <li>- Value Added Real Estate</li> <li>- Opportunistic Real Estate</li> <li>- Infrastructure</li> <li>- Timber</li> <li>- Natural Resources</li> <li>- Commodities</li> </ul>	<ul style="list-style-type: none"> <li>- Short-Term</li> <li>- Core</li> <li>- Core Plus</li> <li>- TIPS</li> <li>- High Yield</li> <li>- Bank Loans</li> <li>- Distressed</li> <li>- Global</li> <li>- Emerging Markets</li> </ul>	<ul style="list-style-type: none"> <li>- Long/Short Equity</li> <li>- Event Driven</li> <li>- Relative Value</li> <li>- Fixed Income Arbitrage</li> <li>- Multi Strategy</li> <li>- Market Neutral</li> <li>- Global Macro</li> <li>- Fund of Funds</li> <li>- Portable Alpha</li> </ul>

## **Disclaimer, Glossary, and Notes**

WE HAVE PREPARED THIS REPORT (THIS "REPORT") FOR THE SOLE BENEFIT OF THE INTENDED RECIPIENT (THE "RECIPIENT").

SIGNIFICANT EVENTS MAY OCCUR (OR HAVE OCCURRED) AFTER THE DATE OF THIS REPORT AND THAT IT IS NOT OUR FUNCTION OR RESPONSIBILITY TO UPDATE THIS REPORT. ANY OPINIONS OR RECOMMENDATIONS PRESENTED HEREIN REPRESENT OUR GOOD FAITH VIEWS AS OF THE DATE OF THIS REPORT AND ARE SUBJECT TO CHANGE AT ANY TIME. ALL INVESTMENTS INVOLVE RISK. THERE CAN BE NO GUARANTEE THAT THE STRATEGIES, TACTICS, AND METHODS DISCUSSED HERE WILL BE SUCCESSFUL.

INFORMATION USED TO PREPARE THIS REPORT WAS OBTAINED FROM INVESTMENT MANAGERS, CUSTODIANS, AND OTHER EXTERNAL SOURCES. WHILE WE HAVE EXERCISED REASONABLE CARE IN PREPARING THIS REPORT, WE CANNOT GUARANTEE THE ACCURACY OF ALL SOURCE INFORMATION CONTAINED HEREIN.

CERTAIN INFORMATION CONTAINED IN THIS REPORT MAY CONSTITUTE "FORWARD - LOOKING STATEMENTS," WHICH CAN BE IDENTIFIED BY THE USE OF TERMINOLOGY SUCH AS "MAY," "WILL," "SHOULD," "EXPECT," "AIM," "ANTICIPATE," "TARGET," "PROJECT," "ESTIMATE," "INTEND," "CONTINUE" OR "BELIEVE," OR THE NEGATIVES THEREOF OR OTHER VARIATIONS THEREON OR COMPARABLE TERMINOLOGY. ANY FORWARD - LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION ARE BASED UPON CURRENT ASSUMPTIONS. CHANGES TO ANY ASSUMPTIONS MAY HAVE A MATERIAL IMPACT ON FORWARD - LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS. ACTUAL RESULTS MAY THEREFORE BE MATERIALLY DIFFERENT FROM ANY FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION.

PERFORMANCE DATA CONTAINED HEREIN REPRESENT PAST PERFORMANCE. PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.

**Credit Risk:** Refers to the risk that the issuer of a fixed income security may default (i.e., the issuer will be unable to make timely principal and/or interest payments on the security.)

**Duration:** Measure of the sensitivity of the price of a bond to a change in its yield to maturity. Duration summarizes, in a single number, the characteristics that cause bond prices to change in response to a change in interest rates. For example, the price of a bond with a duration of three years will rise by approximately 3% for each 1% decrease in its yield to maturity. Conversely, the price will decrease 3% for each 1% increase in the bond's yield. Price changes for two different bonds can be compared using duration. A bond with a duration of six years will exhibit twice the percentage price change of a bond with a three-year duration. The actual calculation of a bond's duration is somewhat complicated, but the idea behind the calculation is straightforward. The first step is to measure the time interval until receipt for each cash flow (coupon and principal payments) from a bond. The second step is to compute a weighted average of these time intervals. Each time interval is measured by the present value of that cash flow. This weighted average is the duration of the bond measured in years.

**Information Ratio:** This statistic is a measure of the consistency of a portfolio's performance relative to a benchmark. It is calculated by subtracting the benchmark return from the portfolio return (excess return), and dividing the resulting excess return by the standard deviation (volatility) of this excess return. A positive information ratio indicates outperformance versus the benchmark, and the higher the information ratio, the more consistent the outperformance.

**Jensen's Alpha:** A measure of the average return of a portfolio or investment in excess of what is predicted by its beta or "market" risk. Portfolio Return-  $[\text{Risk Free Rate} + \text{Beta} * (\text{market return} - \text{Risk Free Rate})]$ .

**Market Capitalization:** For a firm, market capitalization is the total market value of outstanding common stock. For a portfolio, market capitalization is the sum of the capitalization of each company weighted by the ratio of holdings in that company to total portfolio holdings; thus it is a weighted-average capitalization. Meketa Investment Group considers the largest 65% of the broad domestic equity market as large capitalization, the next 25% of the market as medium capitalization, and the smallest 10% of stocks as small capitalization.

**Market Weighted:** Stocks in many indices are weighted based on the total market capitalization of the issue. Thus, the individual returns of higher market-capitalization issues will more heavily influence an index's return than the returns of the smaller market-capitalization issues in the index.

**Maturity:** The date on which a loan, bond, mortgage, or other debt/security becomes due and is to be paid off.

**Prepayment Risk:** The risk that prepayments will increase (homeowners will prepay all or part of their mortgage) when mortgage interest rates decline; hence, investors' monies will be returned to them in a lower interest rate environment. Also, the risk that prepayments will slow down when mortgage interest rates rise; hence, investors will not have as much money as previously anticipated in a higher interest rate environment. A prepayment is any payment in excess of the scheduled mortgage payment.

**Price-Book Value (P/B) Ratio:** The current market price of a stock divided by its book value per share. Meketa Investment Group calculates P/B as the current price divided by Compustat's quarterly common equity. Common equity includes common stock, capital surplus, retained earnings, and treasury stock adjusted for both common and nonredeemable preferred stock. Similar to high P/E stocks, stocks with high P/B's tend to be riskier investments.

**Price-Earnings (P/E) Ratio:** A stock's market price divided by its current or estimated future earnings. Lower P/E ratios often characterize stocks in low growth or mature industries, stocks in groups that have fallen out of favor, or stocks of established blue chip companies with long records of stable earnings and regular dividends. Sometimes a company that has good fundamentals may be viewed unfavorably by the market if it is an industry that is temporarily out of favor. Or a business may have experienced financial problems causing investors to be skeptical about its future. Either of these situations would result in lower relative P/E ratios. Some stocks exhibit above-average sales and earnings growth or expectations for above average growth. Consequently, investors are willing to pay more for these companies' earnings, which results in elevated P/E ratios. In other words, investors will pay more for shares of companies whose profits, in their opinion, are expected to increase faster than average. Because future events are in no way assured, high P/E stocks tend to be riskier and more volatile investments. Meketa Investment Group calculates P/E as the current price divided by the I/B/E/S consensus of twelve-month forecast earnings per share.

**Quality Rating:** The rank assigned a security by such rating services as Fitch, Moody's, and Standard & Poor's. The rating may be determined by such factors as (1) the likelihood of fulfillment of dividend, income, and principal payment of obligations; (2) the nature and provisions of the issue; and (3) the security's relative position in the event of liquidation of the company. Bonds assigned the top four grades (AAA, AA, A, BBB) are considered investment grade because they are eligible bank investments as determined by the controller of the currency.

**Sharpe Ratio:** A commonly used measure of risk-adjusted return. It is calculated by subtracting the risk free return (usually three-month Treasury bill) from the portfolio return and dividing the resulting excess return by the portfolio's total risk level (standard deviation). The result is a measure of return per unit of total risk taken. The higher the Sharpe ratio, the better the fund's historical risk adjusted performance.

**Standard Deviation:** A measure of the total risk of an asset or a portfolio. Standard deviation measures the dispersion of a set of numbers around a central point (e.g., the average return). If the standard deviation is small, the distribution is concentrated within a narrow range of values. For a normal distribution, about two thirds of the observations will fall within one standard deviation of the mean, and 95% of the observations will fall within two standard deviations of the mean.

**STIF Account:** Short-term investment fund at a custodian bank that invests in cash-equivalent instruments. It is generally used to safely invest the excess cash held by portfolio managers.

**Style:** The description of the type of approach and strategy utilized by an investment manager to manage funds. For example, the style for equities is determined by portfolio characteristics such as price-to-book value, price-to-earnings ratio, and dividend yield. Equity styles include growth, value, and core.

**Yield to Maturity:** The yield, or return, provided by a bond to its maturity date; determined by a mathematical process, usually requiring the use of a “basis book.” For example, a 5% bond pays \$5 a year interest on each \$100 par value. To figure its current yield, divide \$5 by \$95—the market price of the bond—and you get 5.26%. Assume that the same bond is due to mature in five years. On the maturity date, the issuer is pledged to pay \$100 for the bond that can be bought now for \$95. In other words, the bond is selling at a discount of 5% below par value. To figure yield to maturity, a simple and approximate method is to divide 5% by the five years to maturity, which equals 1% pro rata yearly. Add that 1% to the 5.26% current yield, and the yield to maturity is roughly 6.26%.

$$\frac{5\% \text{ (discount)}}{5 \text{ (yrs. to maturity)}} = 1\% \text{ pro rata, plus } 5.26\% \text{ (current yield)} = 6.26\% \text{ (yield to maturity)}$$

Sources: Investment Terminology, International Foundation of Employee Benefit Plans, 1999.  
The Handbook of Fixed Income Securities, Fabozzi, Frank J., 1991.

The Russell Indices<sup>®</sup>, TM, SM are trademarks/service marks of the Frank Russell Company.

Throughout this report, numbers may not sum due to rounding.

Returns for periods greater than one year are annualized throughout this report.

Values shown are in millions of dollars, unless noted otherwise.