ATTACHMENT A:
PFRS INVESTMENT PERFORMANCE REPORT
AS OF SEPTEMBER 30, 2019

Q3 2019

Oakland Police and Fire Retirement System

Quarterly Report

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As of September 30, 2019, the City of Oakland Police and Fire Retirement System (OPFRS) portfolio had an aggregate value of $391.2 million. This represents a $6.2 million increase in investment value and ($3.7) million in benefit payments over the quarter. During the previous one-year period, the OPFRS Total Portfolio decreased in value by ($0.2) million and withdrew ($13.9) million for benefit payments.

Asset Allocation Trends

The asset allocation targets (see table on page 21) reflect those as of September 30, 2019. Target weightings reflect the interim phase (CRO = 10%) of the Plan's previously approved asset allocation (effective 5/31/2017).

With respect to policy targets, the portfolio ended the latest quarter **on target International Equity, overweight Covered Calls, Cash, Crisis Risk Offset, and Domestic Equity, while underweight Fixed Income.**

Recent Investment Performance

During the most recent quarter, the OPFRS Total Portfolio generated an absolute return of 1.6%, gross of fees, outperforming its policy benchmark by 20 basis points. The portfolio outperformed its benchmark by 1.4% and 1.0% over the 1- and 3-year periods, respectively, and outperformed by 40 basis points over the 5-year period.

The Total Portfolio outperformed the Median fund's return over the most recent quarter. The Total Portfolio underperformed the Median fund over the 1-year period by (0.5%), but outperformed over the 3- and 5-year periods by 1.8% and 1.2% respectively. Performance differences with respect to the Median Fund continue to be attributed largely to differences in asset allocation.

	Quarter	Fiscal Year	1 Year	3 Year	5 Year
Total Portfolio[1]	1.6	1.6	3.8	9.8	7.6
Policy Benchmark[2]	*1.4*	*1.4*	*2.4*	*8.8*	*7.2*
Excess Return	**0.2**	**0.2**	**1.4**	**1.0**	**0.4**
Reference: Median Fund[3]	0.8	0.8	4.3	8.0	6.4
Reference: Total Net of Fees[4]	1.5	1.5	3.4	9.4	7.3

[1] Gross of Fees. Performance since 2005 includes securities lending.
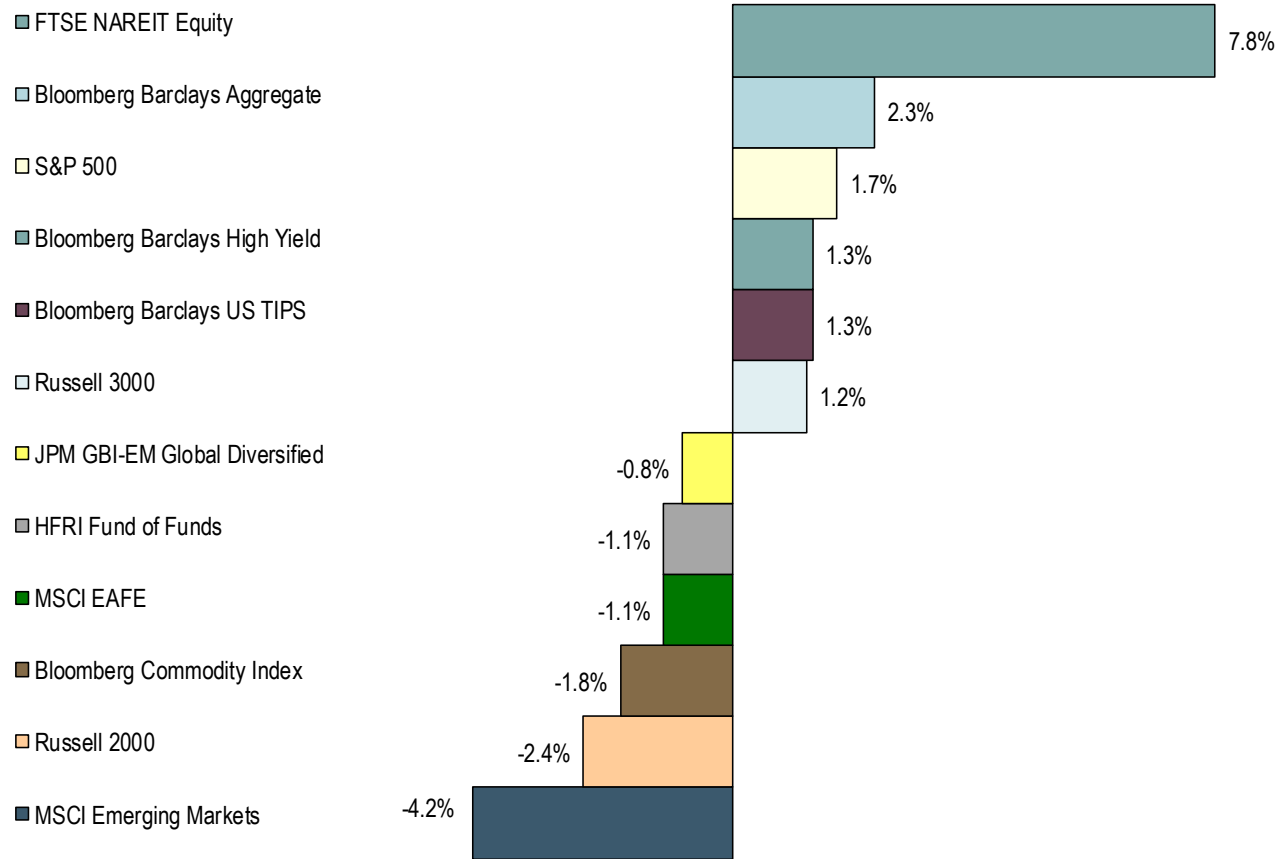[2] Evolving Policy Benchmark consists of 40% Russell 3000, 12% MSCI ACWI ex U.S., 33% Bbg BC Universal, 5% CBOE BXM , 6.7% SG Multi Asset Risk Premia, 3.3% Bbg BC Long Treasury
[3] Investment Metrics < $1 Billion Public Plan Universe.
[4] Longer-term (>1 year) Net of fee returns are estimated based on OPFRS manager fee schedule (approximately 34 bps)

The World Markets
Third Quarter of 2019

The World Markets[1]
Third Quarter of 2019

Index	Return
FTSE NAREIT Equity	7.8%
Bloomberg Barclays Aggregate	2.3%
S&P 500	1.7%
Bloomberg Barclays High Yield	1.3%
Bloomberg Barclays US TIPS	1.3%
Russell 3000	1.2%
JPM GBI-EM Global Diversified	-0.8%
HFRI Fund of Funds	-1.1%
MSCI EAFE	-1.1%
Bloomberg Commodity Index	-1.8%
Russell 2000	-2.4%
MSCI Emerging Markets	-4.2%

Index Returns[1]

	3Q19 (%)	YTD (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
Domestic Equity						
S&P 500	1.7	20.6	4.3	13.4	10.8	13.2
Russell 3000	1.2	20.1	2.9	12.8	10.4	13.1
Russell 1000	1.4	20.5	3.9	13.2	10.6	13.2
Russell 1000 Growth	1.5	23.3	3.7	16.9	13.4	14.9
Russell 1000 Value	1.4	17.8	4.0	9.4	7.8	11.5
Russell MidCap	0.5	21.9	3.2	10.7	9.1	13.1
Russell MidCap Growth	-0.7	25.2	5.2	14.5	11.1	14.1
Russell MidCap Value	1.2	19.5	1.6	7.8	7.6	12.3
Russell 2000	-2.4	14.2	-8.9	8.2	8.2	11.2
Russell 2000 Growth	-4.2	15.3	-9.6	9.8	9.1	12.2
Russell 2000 Value	-0.6	12.8	-8.2	6.5	7.2	10.1
Foreign Equity						
MSCI ACWI (ex. US)	-1.8	11.6	-1.2	6.3	2.9	4.5
MSCI EAFE	-1.1	12.8	-1.3	6.5	3.3	4.9
MSCI EAFE (Local Currency)	1.8	15.7	1.6	8.3	6.0	7.0
MSCI EAFE Small Cap	-0.4	12.1	-5.9	5.9	6.0	7.5
MSCI Emerging Markets	-4.2	5.9	-2.0	6.0	2.3	3.4
MSCI Emerging Markets (Local Currency)	-2.1	7.8	-0.2	7.6	5.5	5.9
Fixed Income						
Bloomberg Barclays Universal	2.1	8.8	10.1	3.2	3.6	4.1
Bloomberg Barclays Aggregate	2.3	8.5	10.3	2.9	3.4	3.7
Bloomberg Barclays US TIPS	1.3	7.6	7.1	2.2	2.4	3.5
Bloomberg Barclays High Yield	1.3	11.4	6.4	6.1	5.4	7.9
JPM GBI-EM Global Diversified	-0.8	7.9	10.1	3.1	0.6	2.4
Other						
FTSE NAREIT Equity	7.8	27.0	18.4	7.4	10.3	13.0
Bloomberg Commodity Index	-1.8	3.1	-6.6	-1.5	-7.2	-4.3
HFRI Fund of Funds	-1.1	5.0	-0.2	3.1	1.9	2.7

[1] Source: InvestorForce.

Prepared by Meketa Investment Group

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S&P Sector Returns[1]

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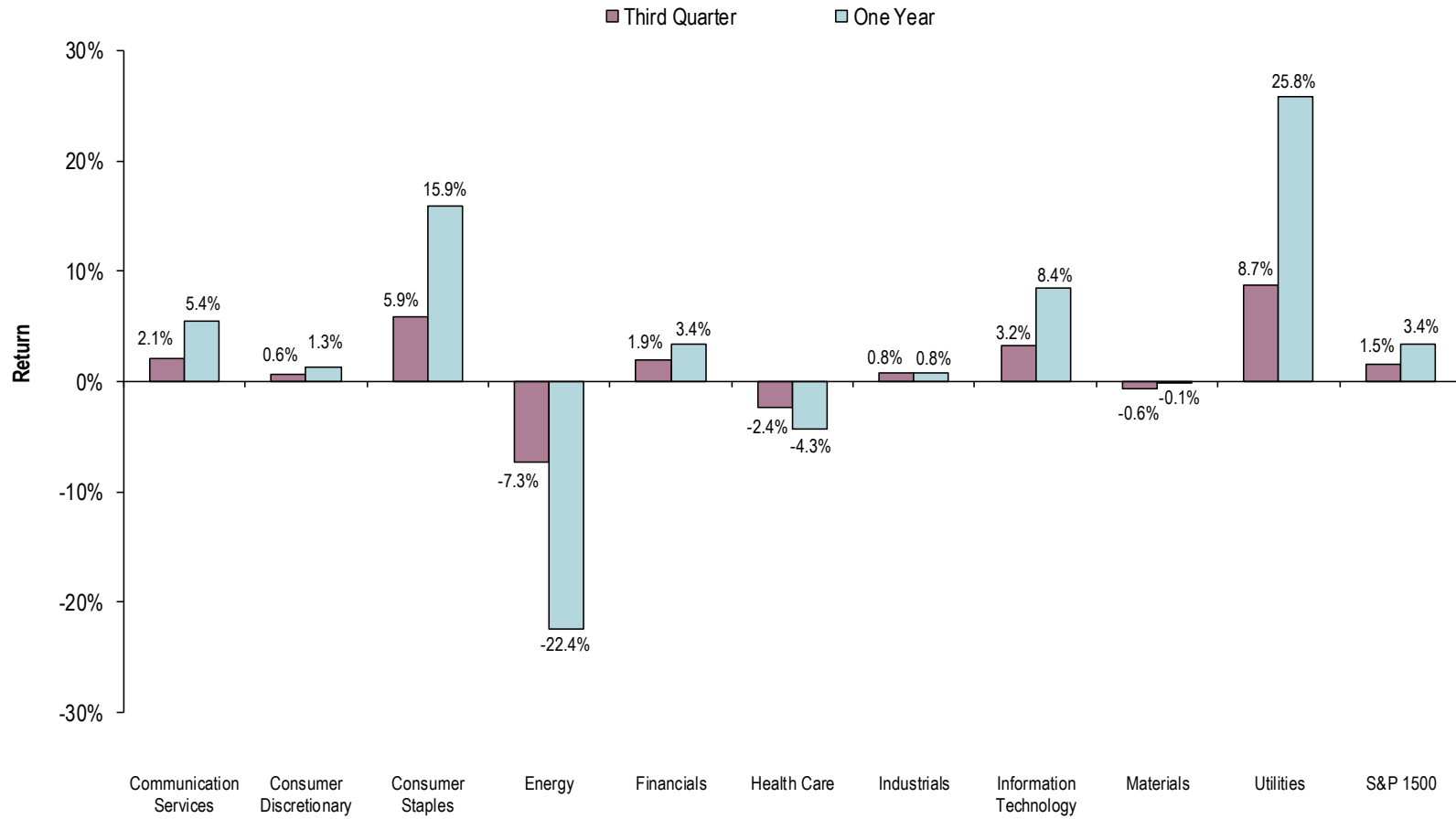
[1] Source: InvestorForce. Represents S&P 1500 (All Cap) data.

Prepared by Meketa Investment Group

US and Developed Market Foreign Equity Rolling Three-Year Returns[1]

Legend: Russell 3000 3-Year Return — MSCI EAFE 3-Year Return

Data labels on right: 12.8%, 6.5%
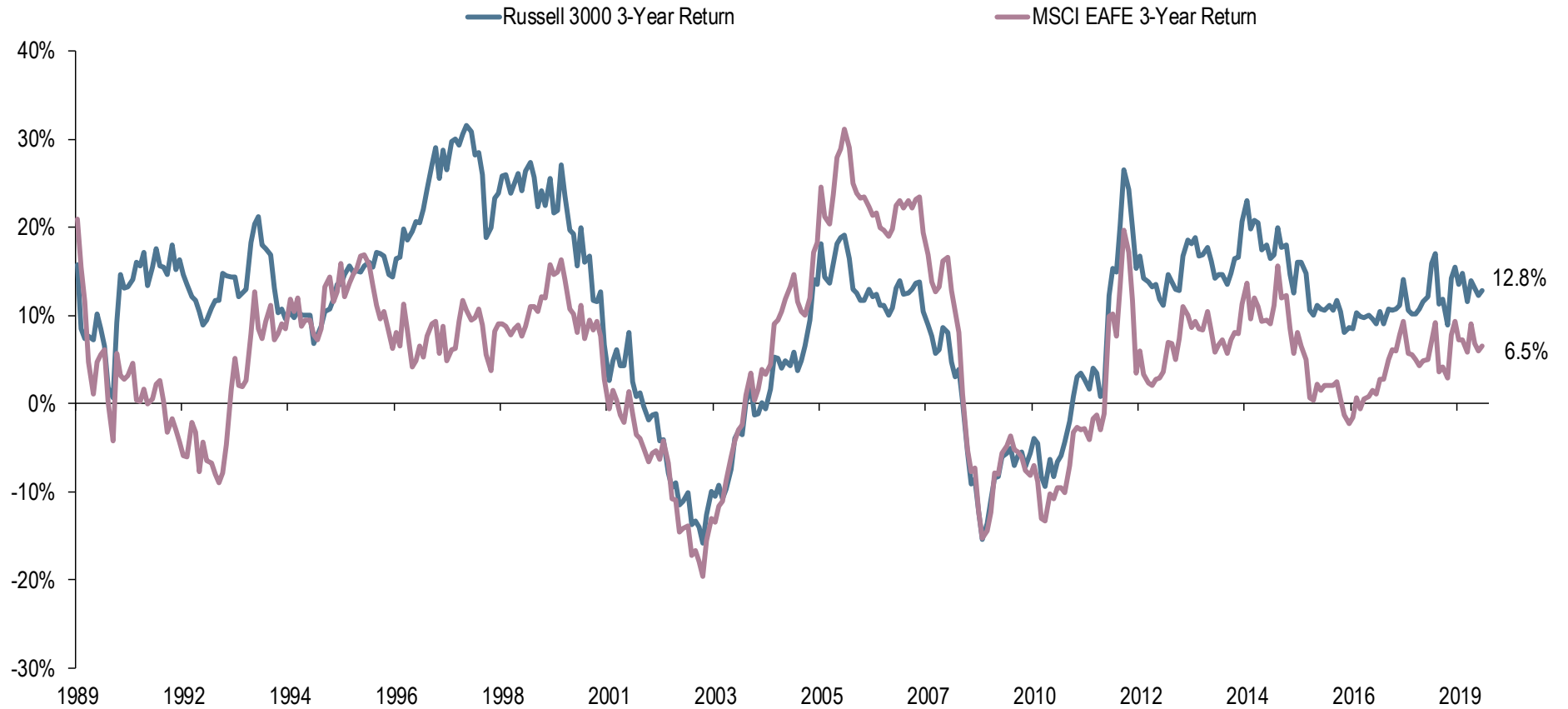
US and Emerging Market Equity Rolling Three-Year Returns[1]

— Russell 3000   — MSCI Emerging Markets

12.8%

6.0%
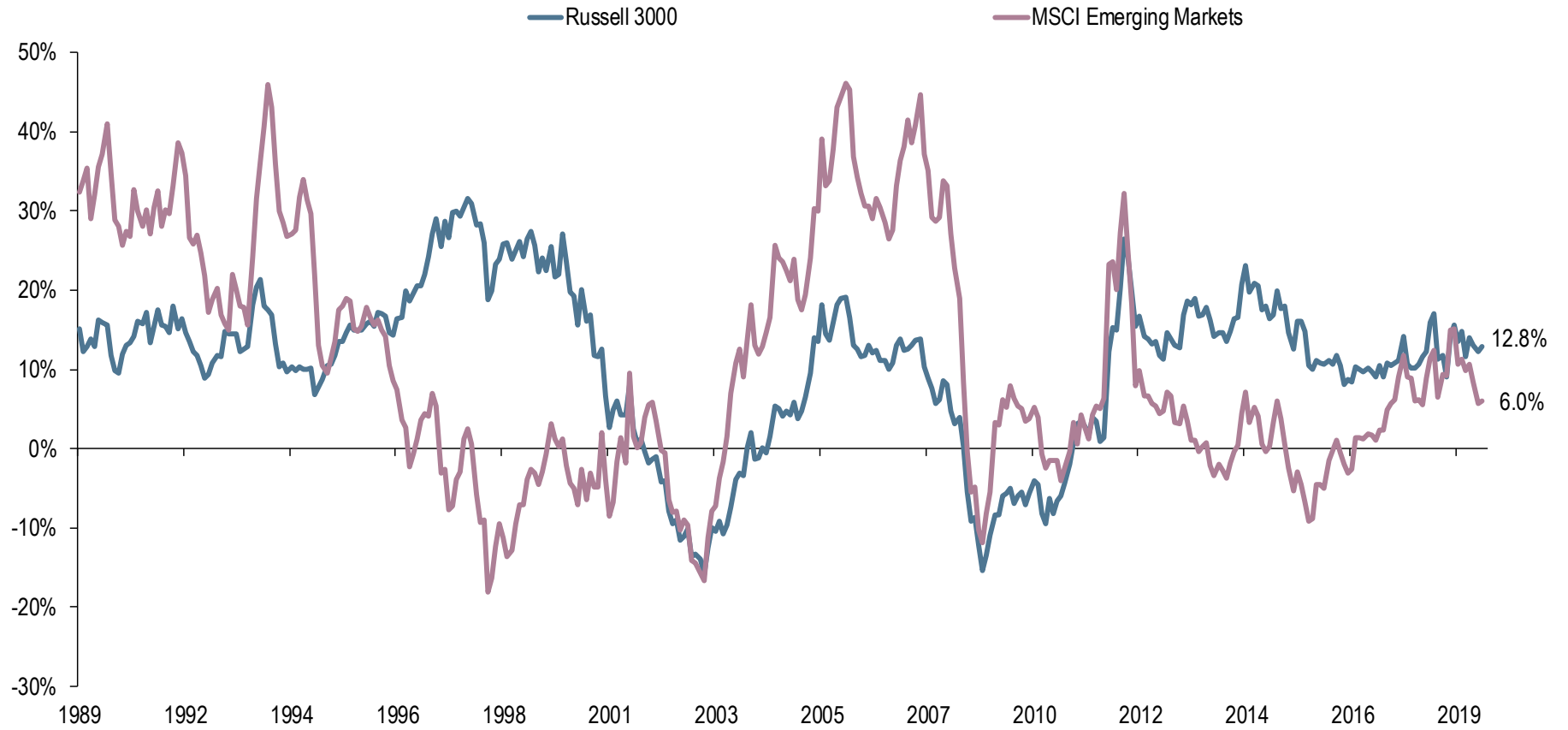
Rolling Ten-Year Returns: 65% Stocks and 35% Bonds[1]

—— 65% Stocks (MSCI ACWI) / 35% Bonds (Bloomberg Barclays Aggregate) 10-Year Rolling Return

1998-2019 Average = 6.8%

7.0%
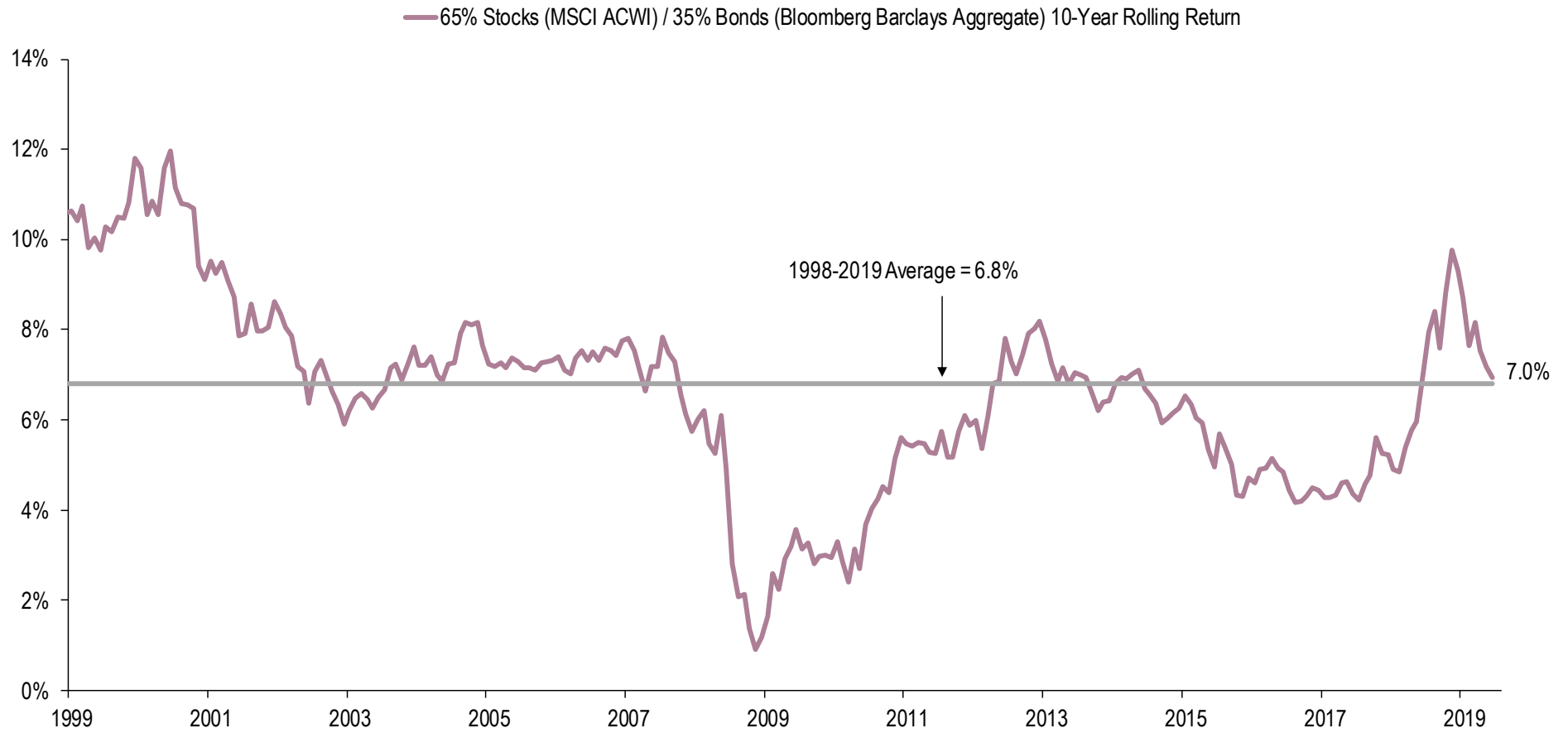
Credit Spreads vs. US Treasury Bonds[1,2]

US High Yield — U.S. Investment Grade Corporates — U.S. Mortgage-Backed

18.3%

High Yield Spread Average = 5.3%

3.7%

1.2%

0.5%

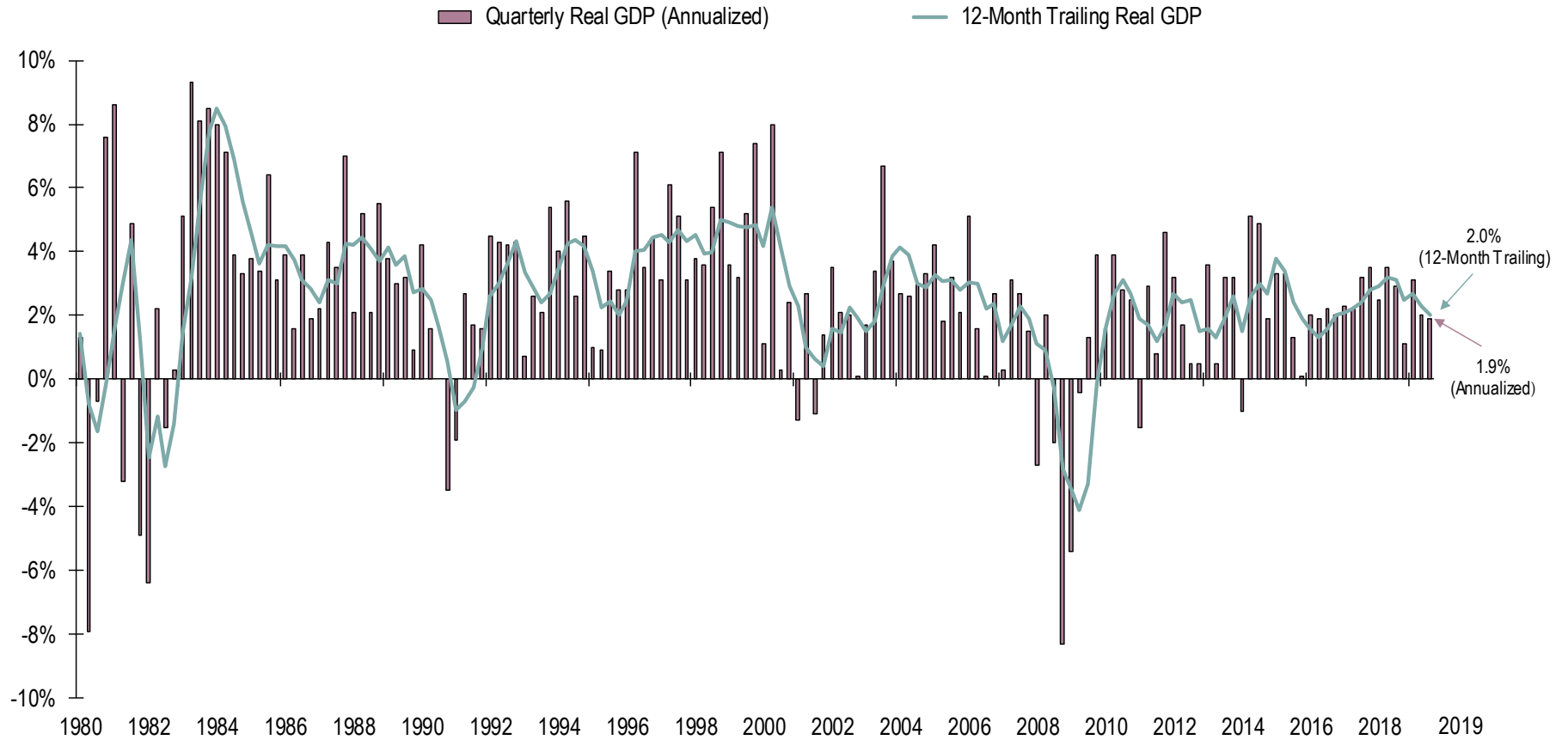1998   2001   2004   2007   2010   2013   2016   2019

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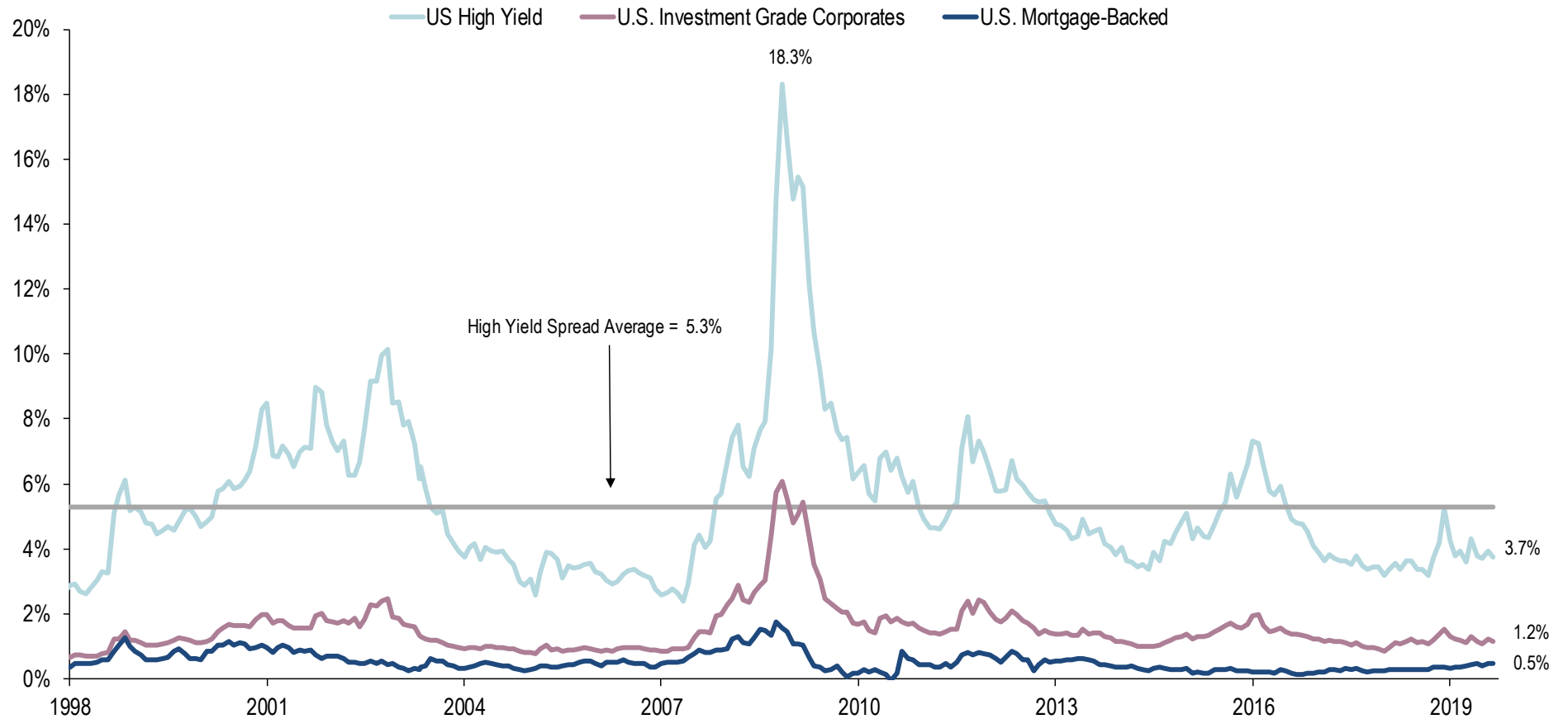
1   Source: Barclays Live.
2   The median high yield spread was 4.8% from 1997-2019.

US Real Gross Domestic Product (GDP) Growth[1]

Legend: Quarterly Real GDP (Annualized) — 12-Month Trailing Real GDP

2.0%
(12-Month Trailing)

1.9%
(Annualized)

[1] Source: Bureau of Economic Analysis. Data is as of Q3 2019 and represents the first estimate.

US Inflation (CPI)
Trailing Twelve Months[1]
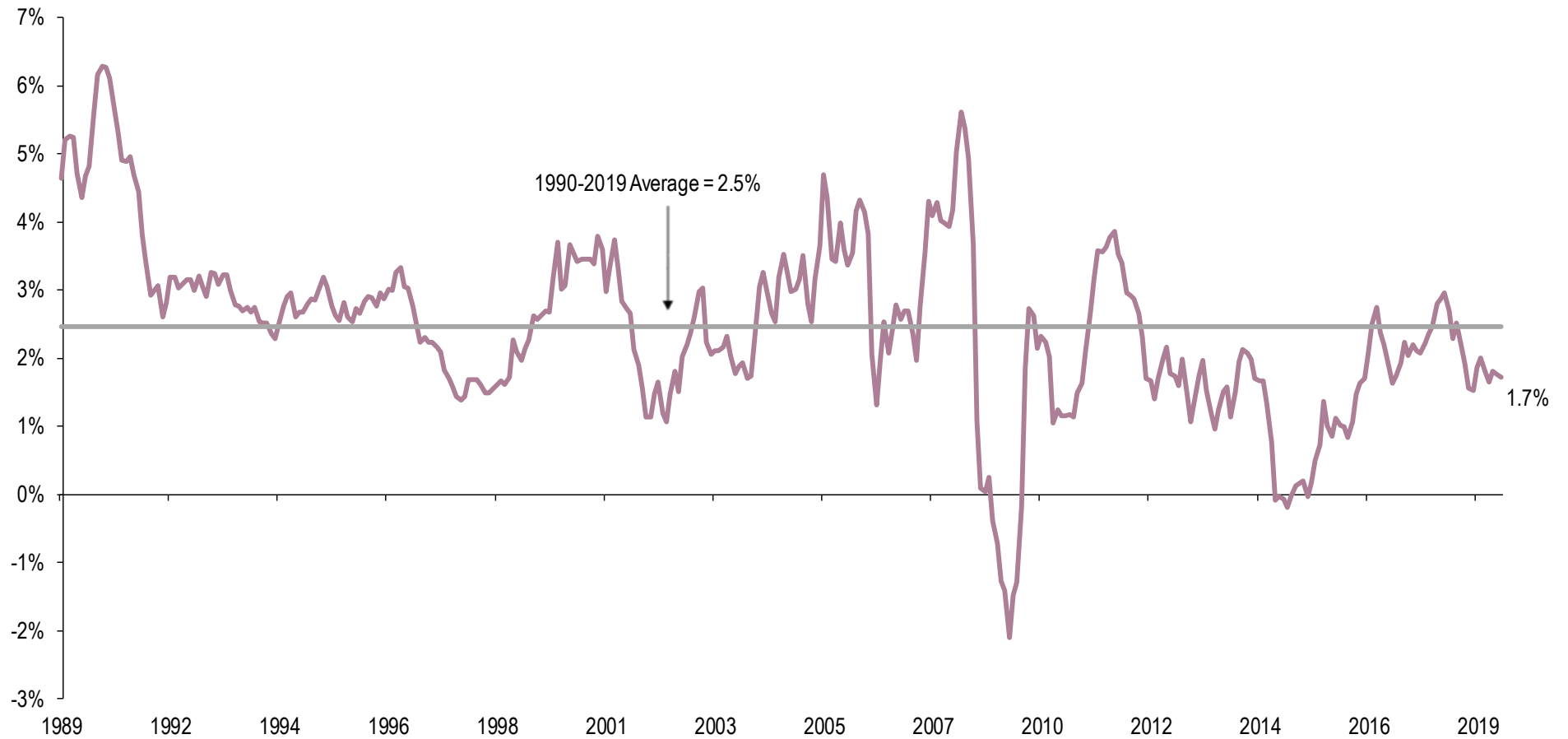
1990-2019 Average = 2.5%

7%

6%

5%

4%

3%

2%

1%

0%

-1%

-2%

-3%

1.7%

1989 1992 1994 1996 1998 2001 2003 2005 2007 2010 2012 2014 2016 2019

Prepared by Meketa Investment Group

US Unemployment[1]

1980-2019 Average = 6.2%

10.8%

10.0%

4.4%

3.5%
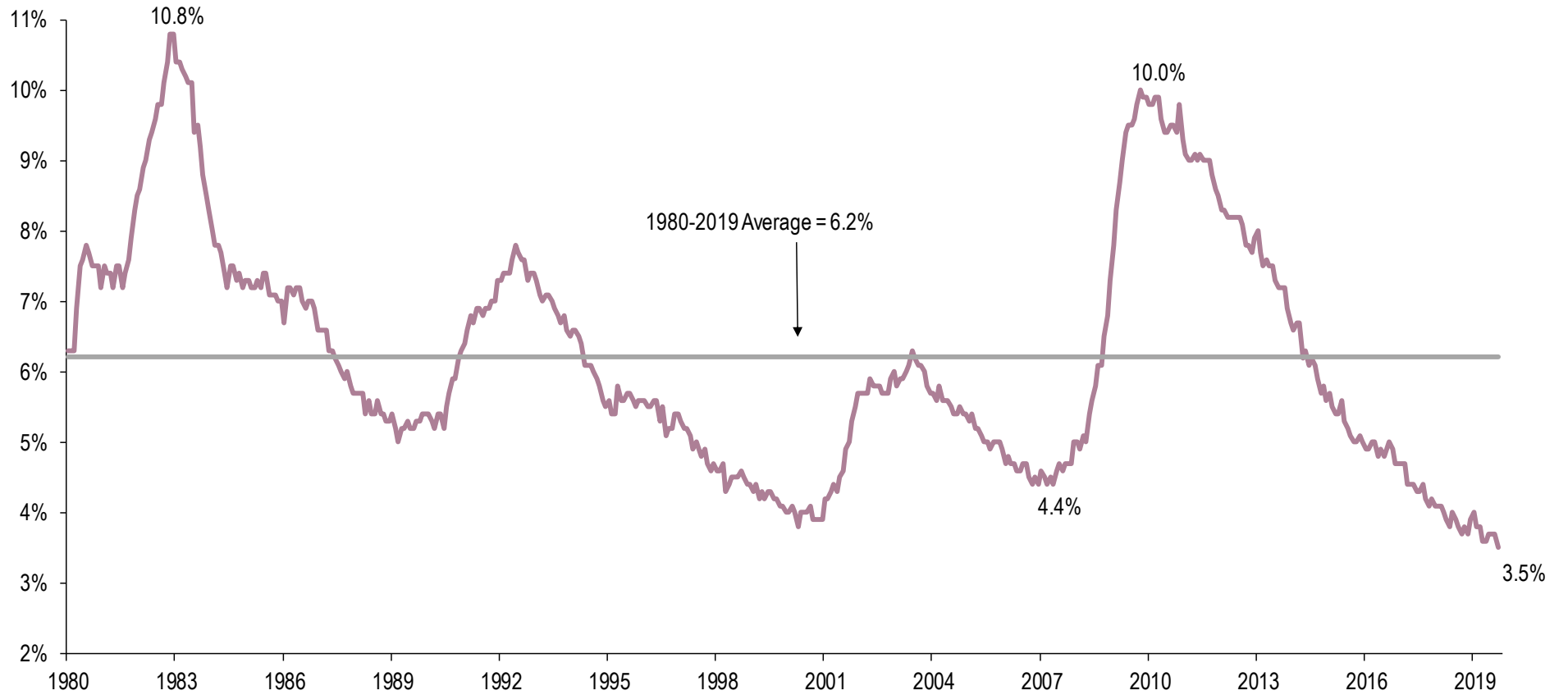
Capital Markets Outlook & Risk Metrics

As of September 30, 2019

Capital Markets Outlook

Takeaways

- From a market performance perspective, September was a relatively normal "risk-on" month as most Global Equity markets produced positive returns whereas most sovereign-oriented Fixed Income markets produced negative returns. On a year-to-date basis, however, most indices across Global Equity and Global Fixed Income markets have produced unusually high returns.

- Recent interest rate movements are historically consistent with oncoming recessions. However, economic data remains extremely mixed and shifting political rhetoric regarding global trade has added to short-term uncertainty. In the face of all this, Global Equity markets have continued to deliver positive returns.

- While there continues to be significant discussion regarding interest rates (e.g., yield curve inversions, central bank policy, etc.), the complexity of the current environment has increased what is always an immense challenge for forecasting.

- US Equity markets remain expensive whereas Non-US Equity markets remain reasonably valued relative to their history.

- Implied equity market volatility[1] remained lower than its historical average (≈19) throughout the entire month of September, although this metric did steadily rise from mid-month (≈13) to the end of the month (≈17).

- The Market Sentiment Indicator[2] stayed at neutral at month end.

- Market uncertainty, as measured by Systemic Risk, decreased during September. With that said, recent economic data suggests that the global economy is in a slowing, but not yet recessionary, phase. The potential for negative surprises exists as global economies navigate their respective "late-cycle" dynamics and geopolitical events continue to unfold, as evidenced by recent market movements.

- *New Addition: We incorporated a measure of Fixed Income Volatility to the Dashboard.*

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[1] As measured by VIX Index.
[2] See Appendix for the rationale for selection and calculation methodology used for the risk metrics.

Risk Overview/Dashboard (1)
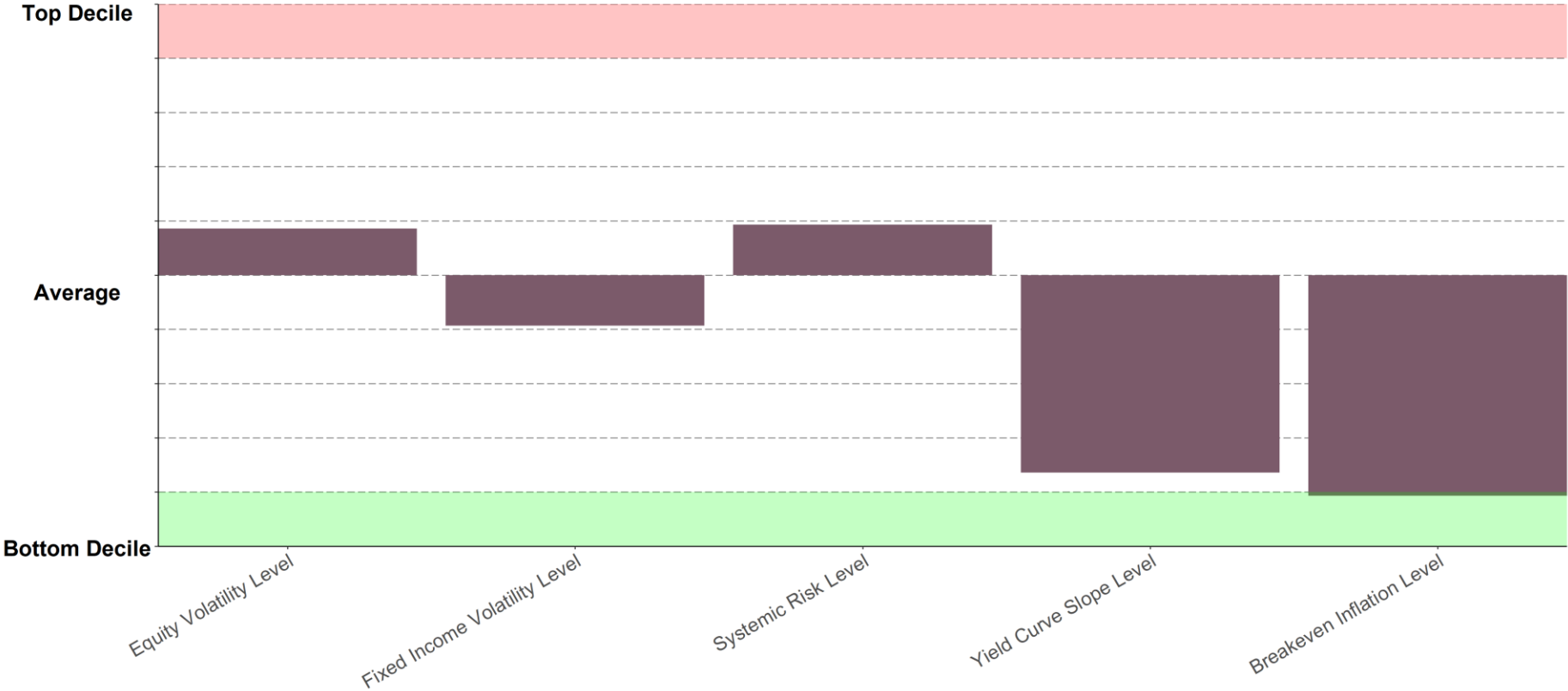### (As of September 30, 2019)[1]
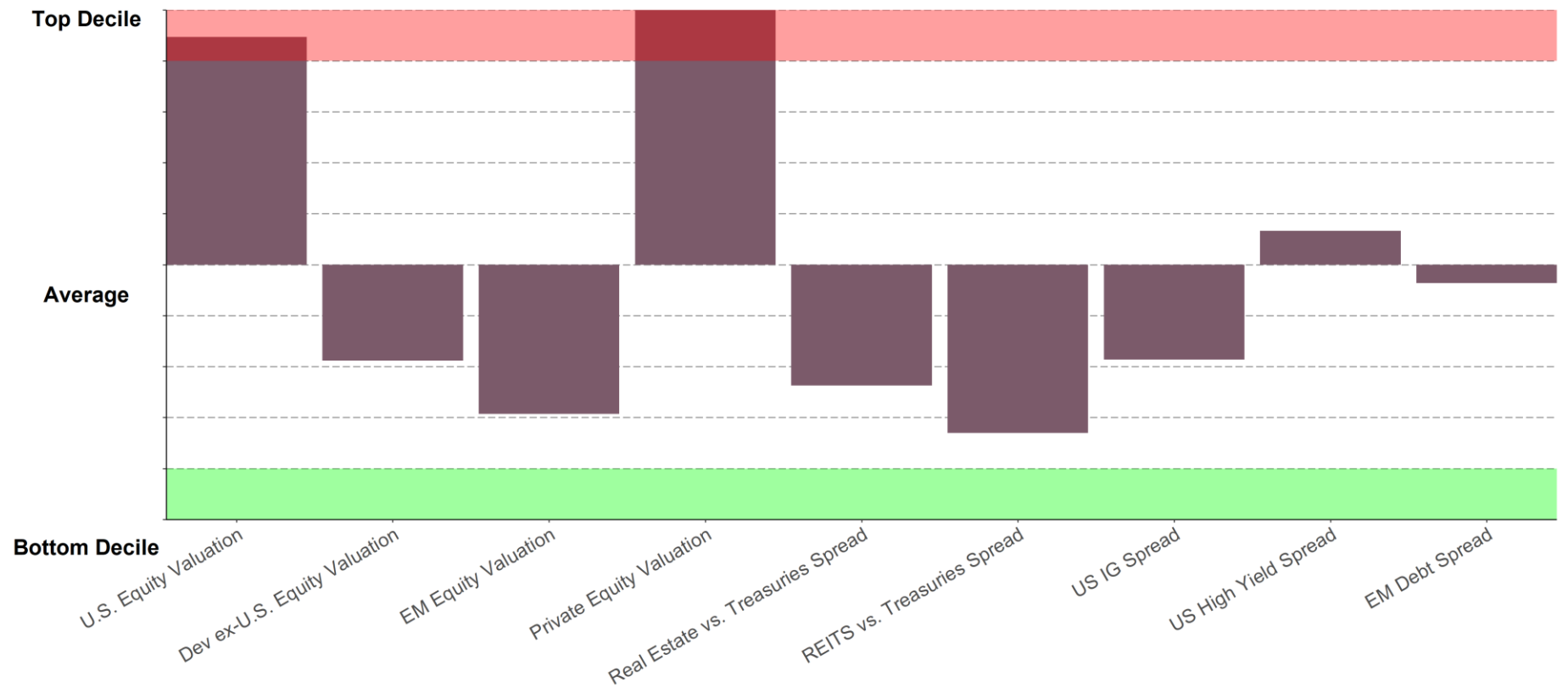
- Dashboard (1) summarizes the current state of the different valuation metrics per asset class relative to their own history.

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[1] With the exception of Private Equity Valuation that are available annually and data is as of December 31, 2018.
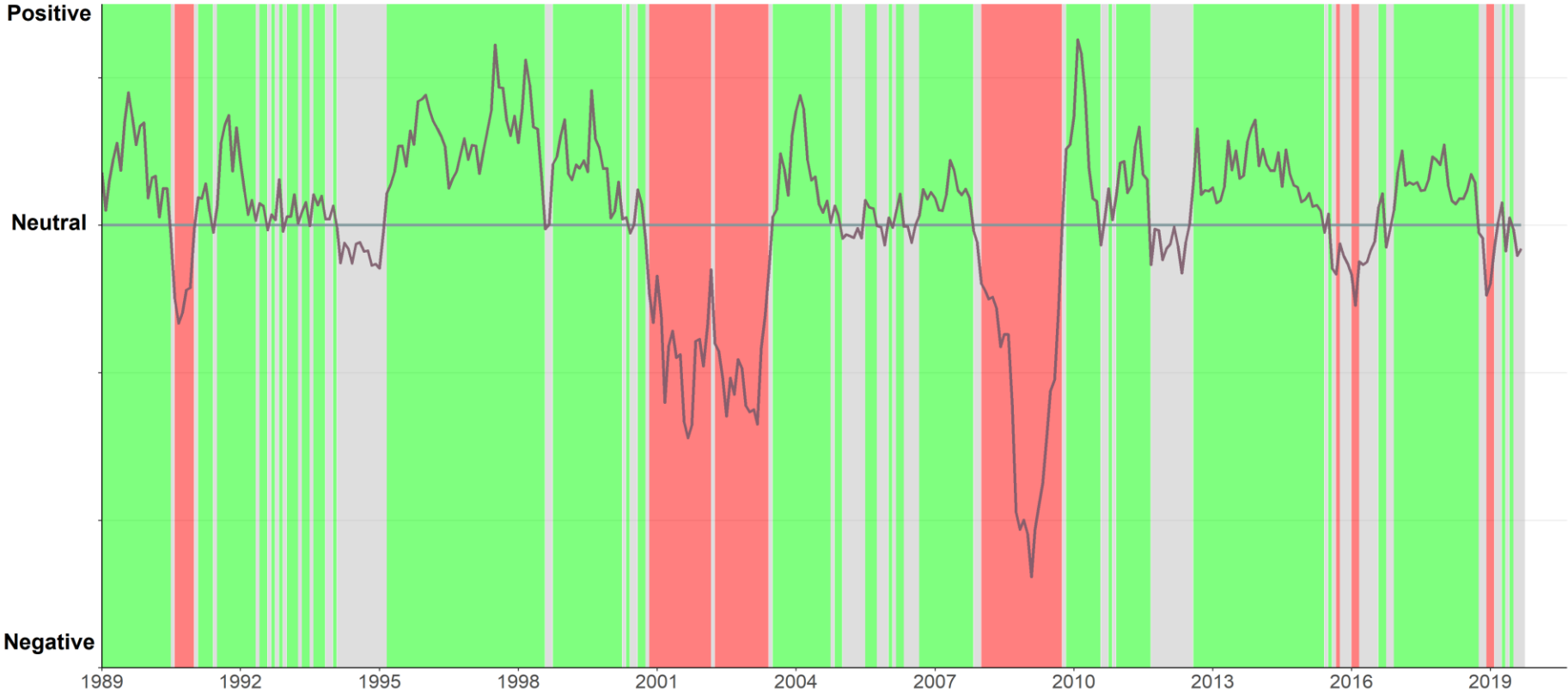
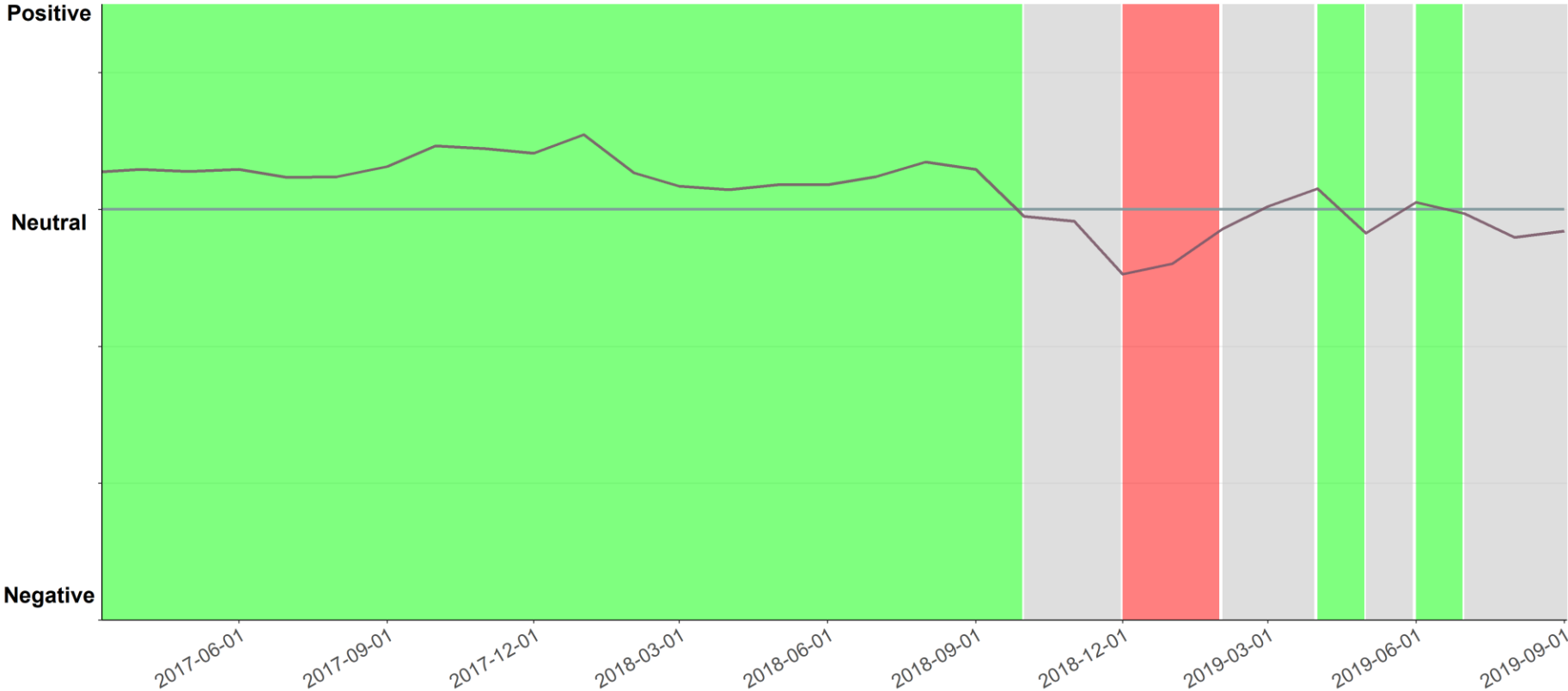**Risk Overview/Dashboard (2)**
(As of September 30, 2019)

- Dashboard (2) shows how the current level of each indicator compares to its respective history.

Market Sentiment Indicator (All History)
(As of September 30, 2019)

Market Sentiment Indicator (Last Three Years)
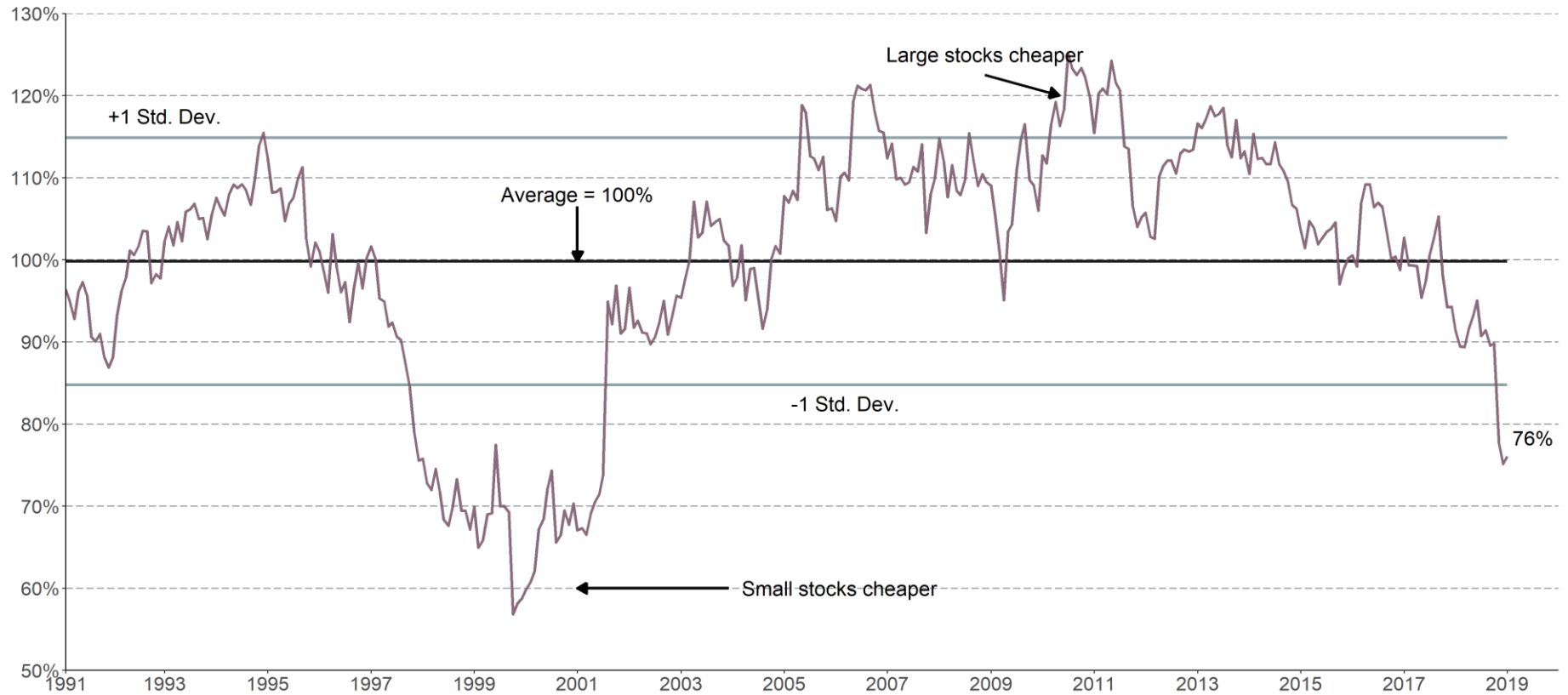### (As of September 30, 2019)

US Equity Cyclically Adjusted P/E[1]
(As of September 30, 2019)

- This chart details one valuation metric for US Equities. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

Prepared by Meketa Investment Group

Small Cap P/E vs. Large Cap P/E[1]
(As of September 30, 2019)

- This chart compares the relative attractiveness of Small Cap US Equities vs. Large Cap US Equities on a valuation basis. A higher (lower) figure indicates that Large Cap (Small Cap) is more attractive.

[1] Small Cap P/E (Russell 2000 Index) vs. Large Cap P/E (Russell 1000 Index) - Source: Russell Investments. Earnings figures represent 12-month "as reported" earnings.

Growth P/E vs. Value P/E[1]
(As of September 30, 2019)

- This chart compares the relative attractiveness of US Growth Equities vs. US Value Equities on a valuation basis. A higher (lower) figure indicates that Value (Growth) is more attractive.

[1] Growth P/E (Russell 3000 Growth Index) vs. Value (Russell 3000 Value Index) P/E - Source: Bloomberg, MSCI, and Meketa Investment Group. Earnings figures represent 12-month "as reported" earnings.

Developed International Equity Cyclically Adjusted P/E[1]
(As of September 30, 2019)

- This chart details one valuation metric for Developed International Equities. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

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[1] Developed International Equity (MSCI EAFE ex Japan Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years.

Emerging Market Equity Cyclically Adjusted P/E[1]
(As of September 30, 2019)
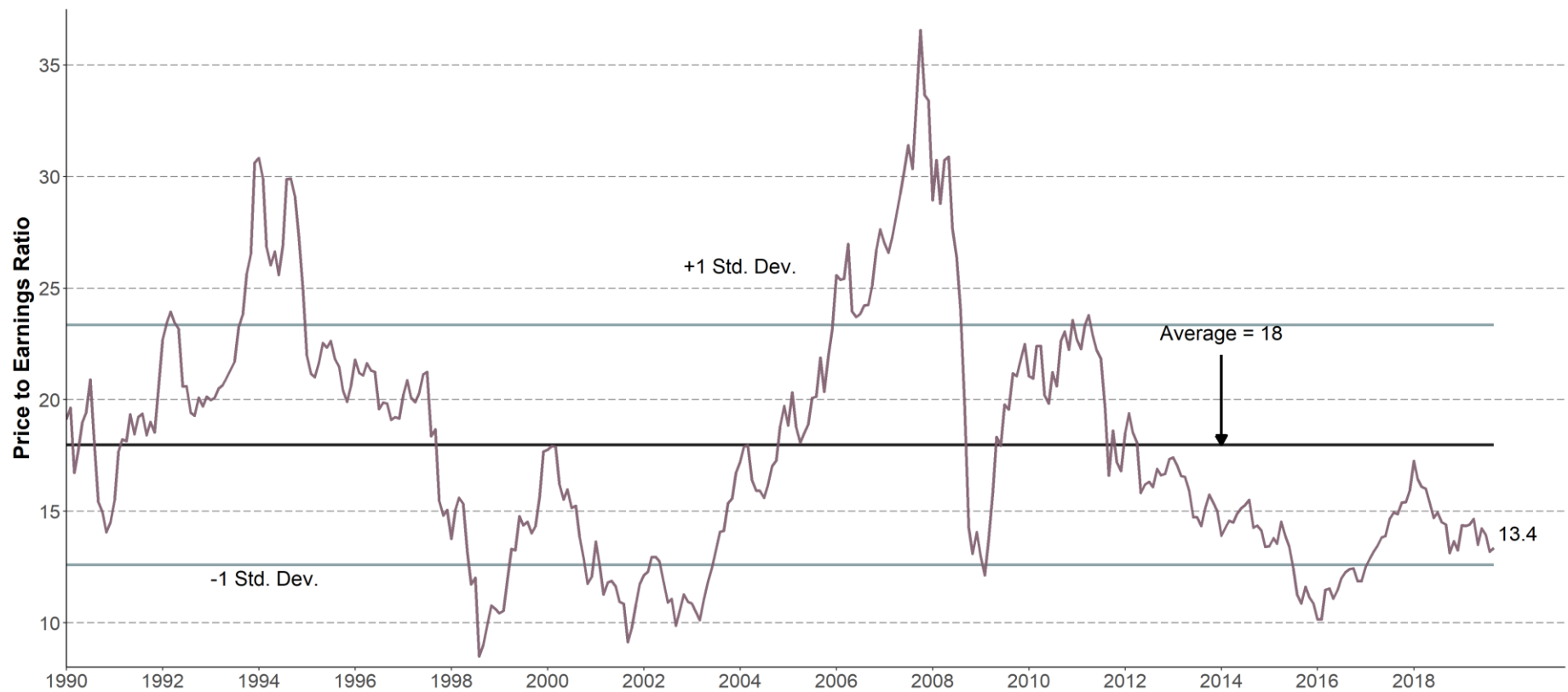
- This chart details one valuation metric for Emerging Markets Equities. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

[1] Emerging Market Equity (MSCI Emerging Markets Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years.
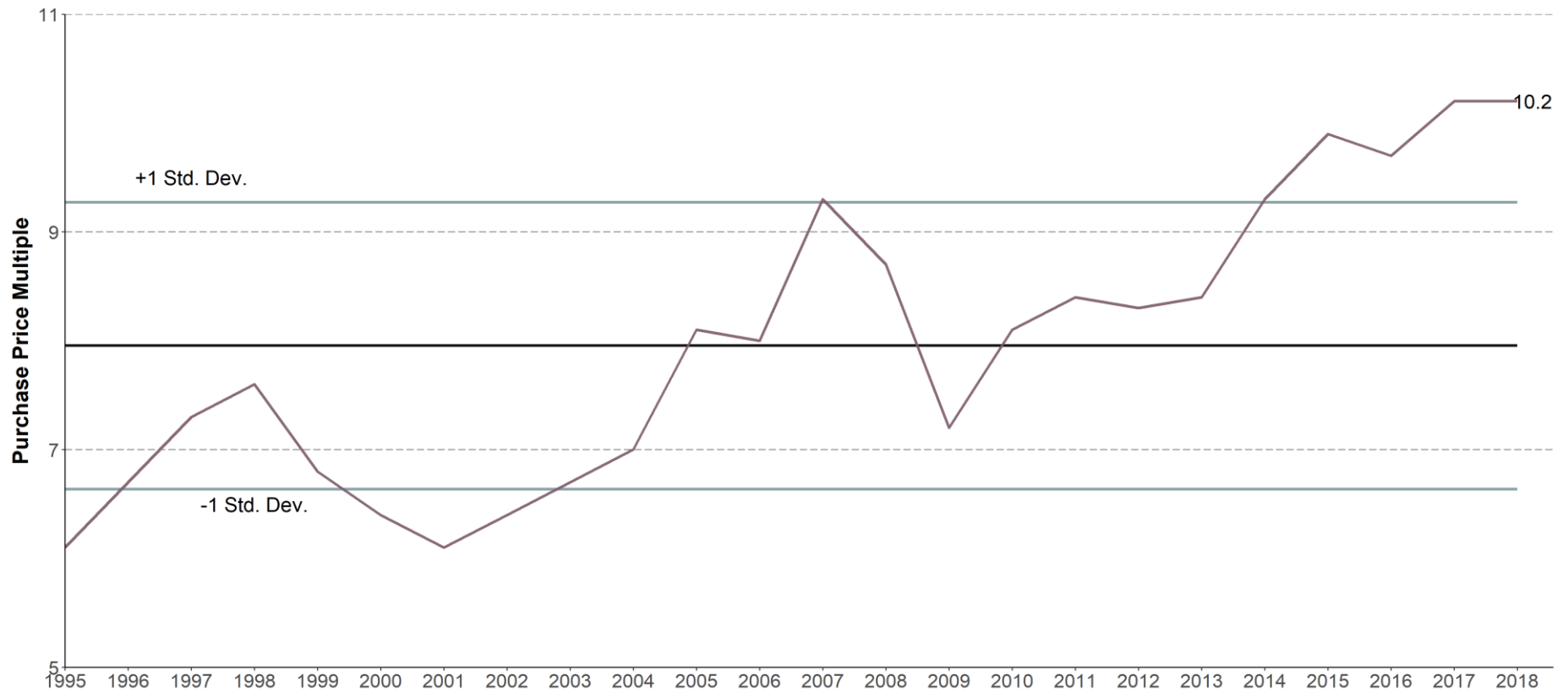
Prepared by Meketa Investment Group

Private Equity Multiples[1]
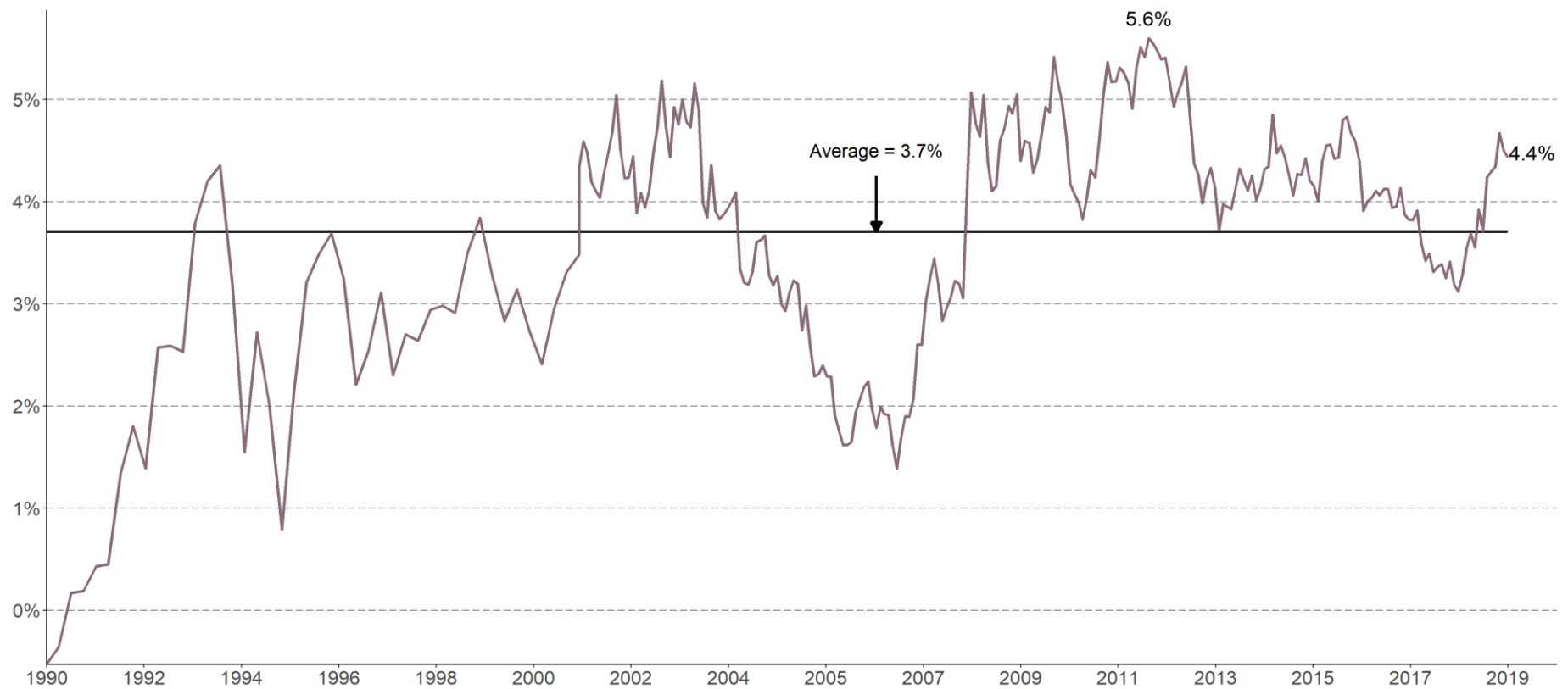### (As of December 31, 2018)[2]

- This chart details one valuation metric for the Private Equity market. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

[1] Private Equity Multiples – Source: S&P LCD Average EBITDA Multiples Paid in All LBOs.
[2] Only annual figures available.

Core Real Estate Spread vs. Ten-Year Treasury[1]
(As of September 30, 2019)

- This chart details one valuation metric for the Private Core Real Estate market. A higher (lower) figure indicates cheaper (more expensive) valuation.

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[1] Core Real Estate Spread vs. Ten-Year Treasury – Source: Real Capital Analytics, US Treasury, Bloomberg, and Meketa Investment Group. Core Real Estate is proxied by weighted sector transaction based indices from Real Capital Analytics and Meketa Investment Group.

Prepared by Meketa Investment Group

REITs Dividend Yield Spread vs. Ten-Year Treasury[1]
(As of September 30, 2019)

- This chart details one valuation metric for the Public REITs market. A higher (lower) figure indicates cheaper (more expensive) valuation.

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[1] REITs Dividend Yield Spread vs. Ten-Year Treasury – Source: NAREIT, US Treasury. REITs are proxied by the yield for the NAREIT Equity index.

Prepared by Meketa Investment Group

Credit Spreads[1]
(As of September 30, 2019)
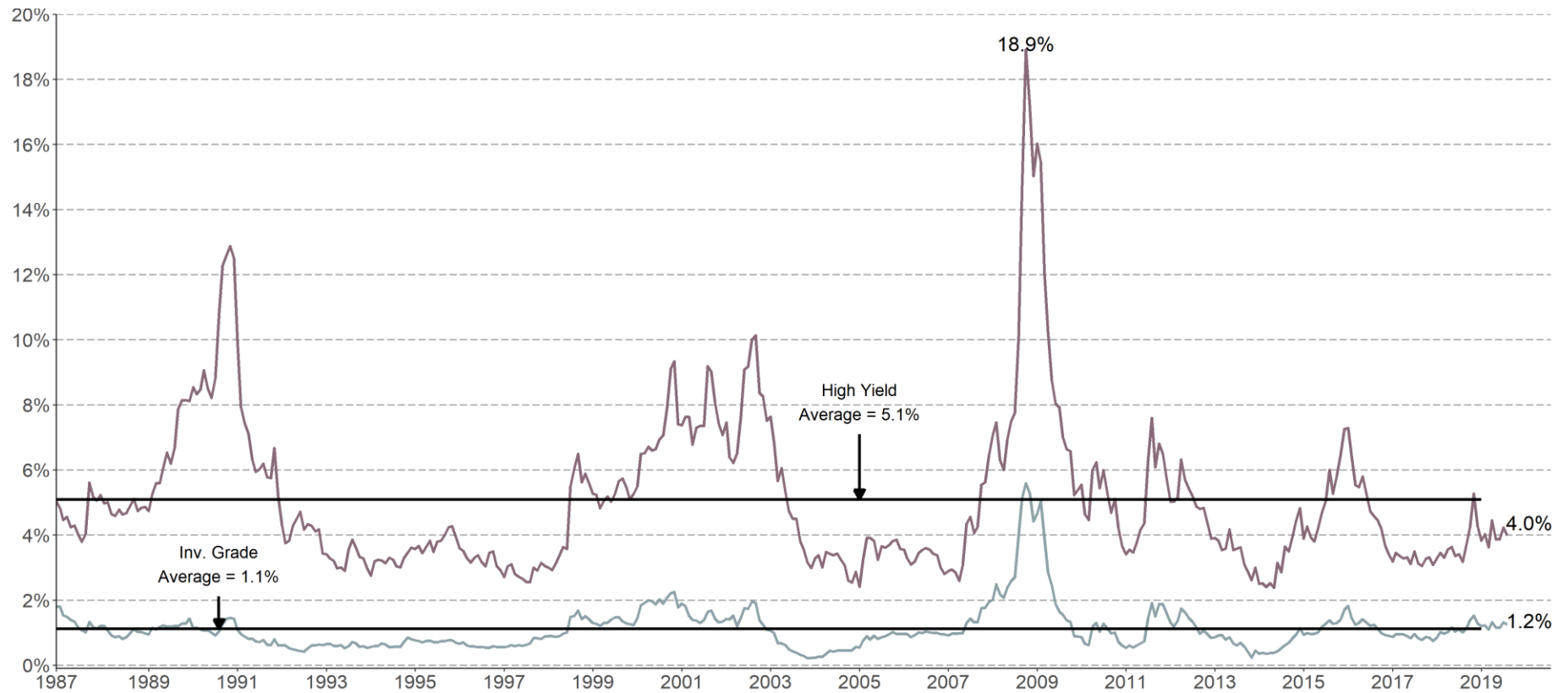
- This chart details one valuation metric for the US Credit markets. A higher (lower) figure indicates cheaper (more expensive) valuation relative to history.

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[1] Credit Spreads – Source: Barclays Capital. High Yield is proxied by the Barclays High Yield index and Investment Grade Corporates are proxied by the Barclays US Corporate Investment Grade index.

Emerging Market Debt Spreads[1]
(As of September 30, 2019)

- This chart details one valuation metric for the EM Debt markets. A higher (lower) figure indicates cheaper (more expensive) valuation relative to history.

[1] EM Spreads – Source: Bloomberg. Option Adjusted Spread (OAS) for the Bloomberg Barclays EM USD Aggregate Index.

Equity Volatility [1]
(As of September 30, 2019)
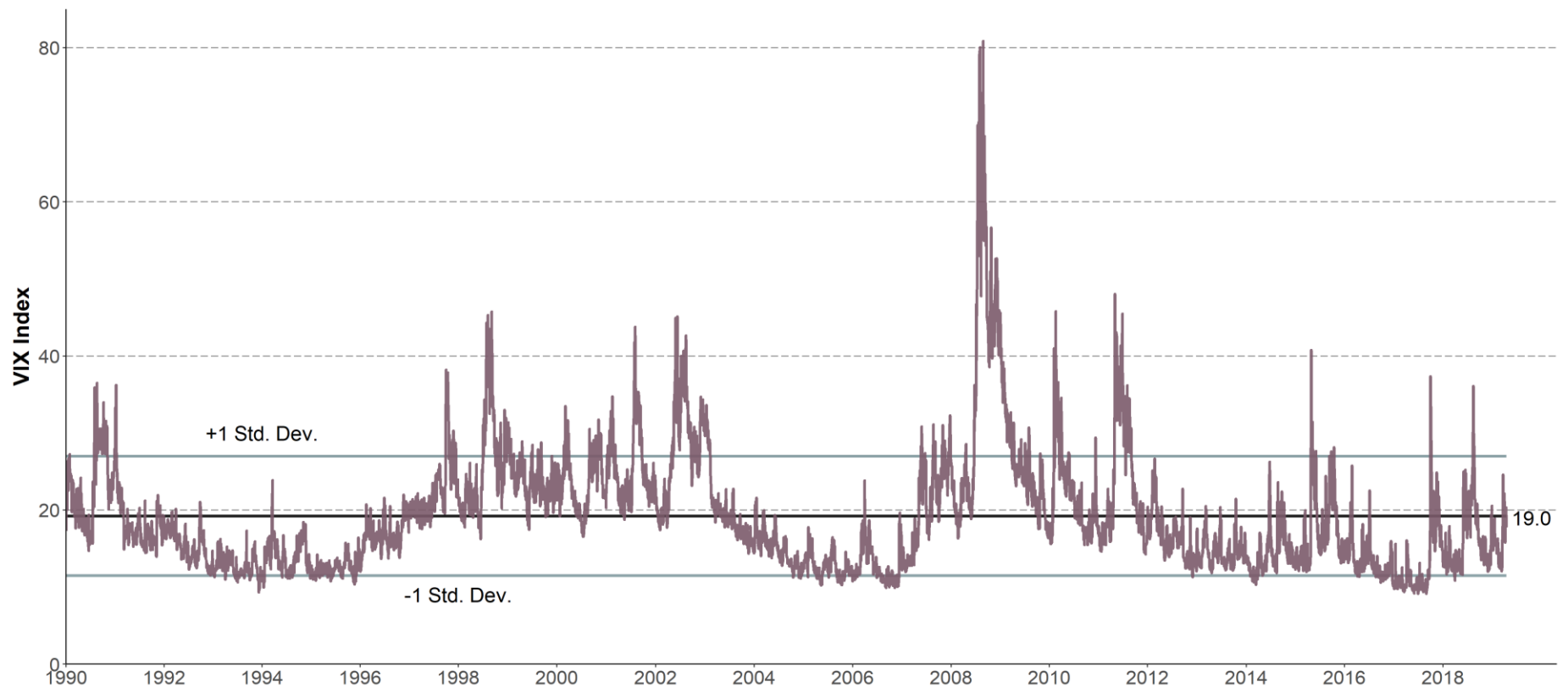
- This chart details historical implied equity market volatility. This metric tends to increase during times of stress/fear and while declining during more benign periods.

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[1] Equity Volatility – Source: Bloomberg, and Meketa Investment Group. Equity Volatility proxied by VIX Index, a Measure of implied option volatility for US equity markets.

Fixed Income Volatility [1]
(As of September 30, 2019)

- This chart details historical implied fixed income market volatility. This metric tends to increase during times of stress/fear and while declining during more benign periods.
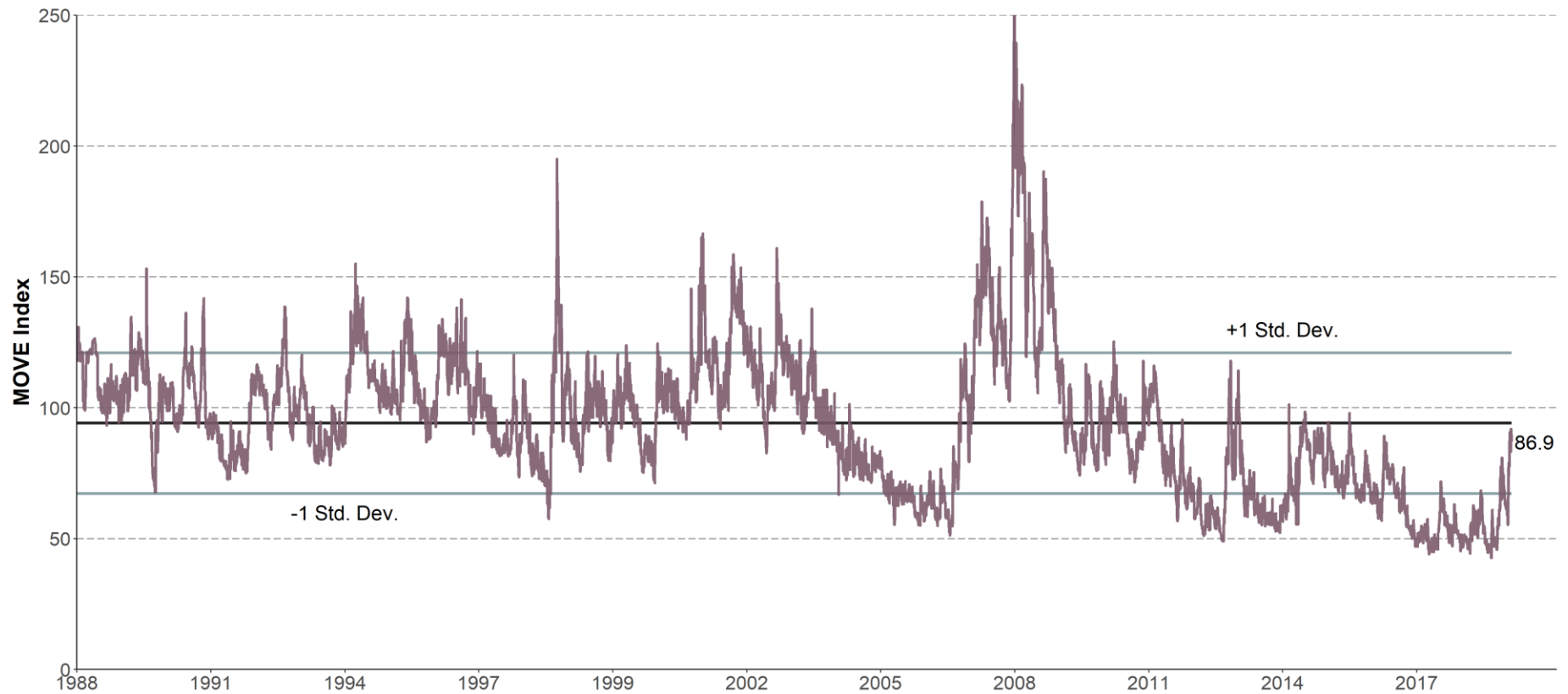
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[1] Fixed Income Volatility – Source: Bloomberg, and Meketa Investment Group. Fixed Income Volatility proxied by MOVE Index, a Measure of implied option volatility for US Treasury markets.

Systemic Risk and Volatile Market Days[1]
(As of September 30, 2019)
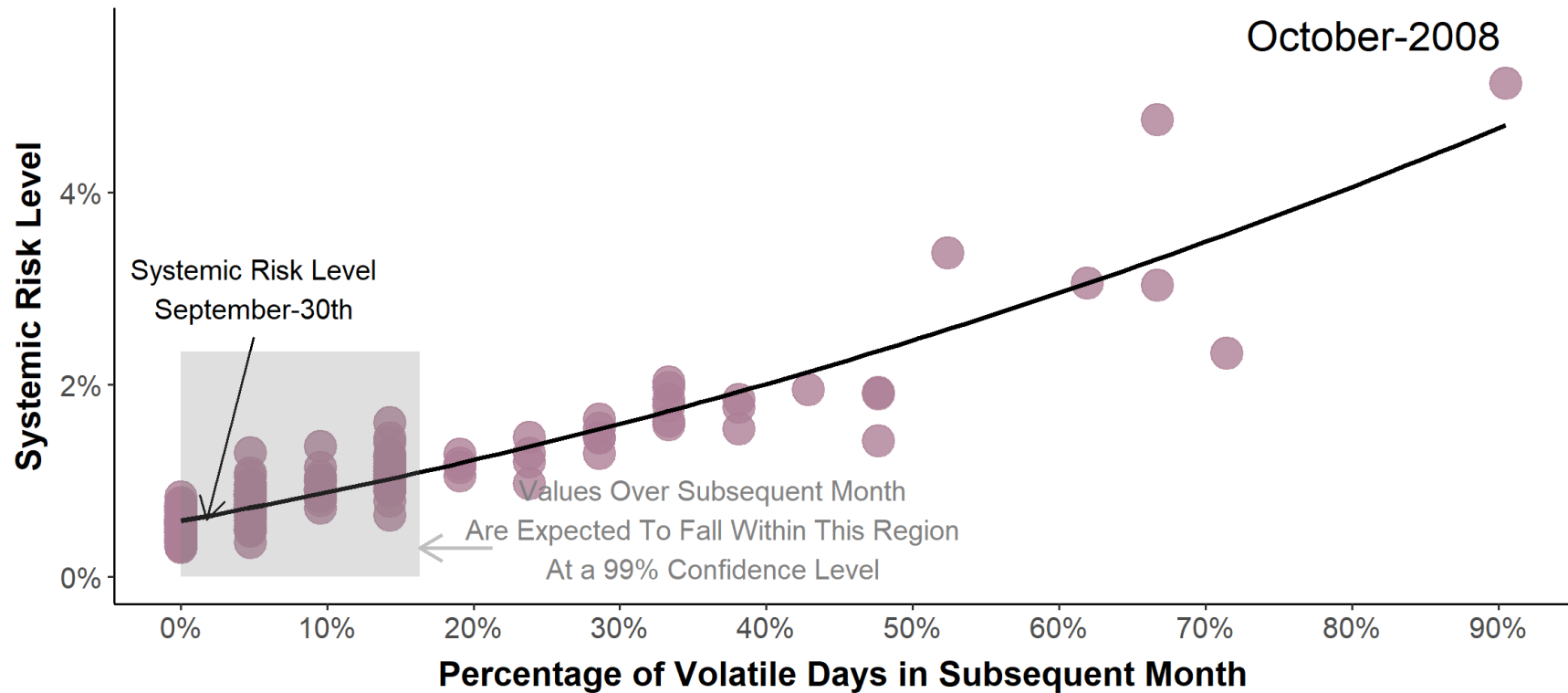
- Systemic Risk is a measure of 'System-wide' risk, which indicates herding type behavior. This measure declined materially during September.

Yield Curve Slope (Ten Minus Two)[1]
(As of September 30, 2019)
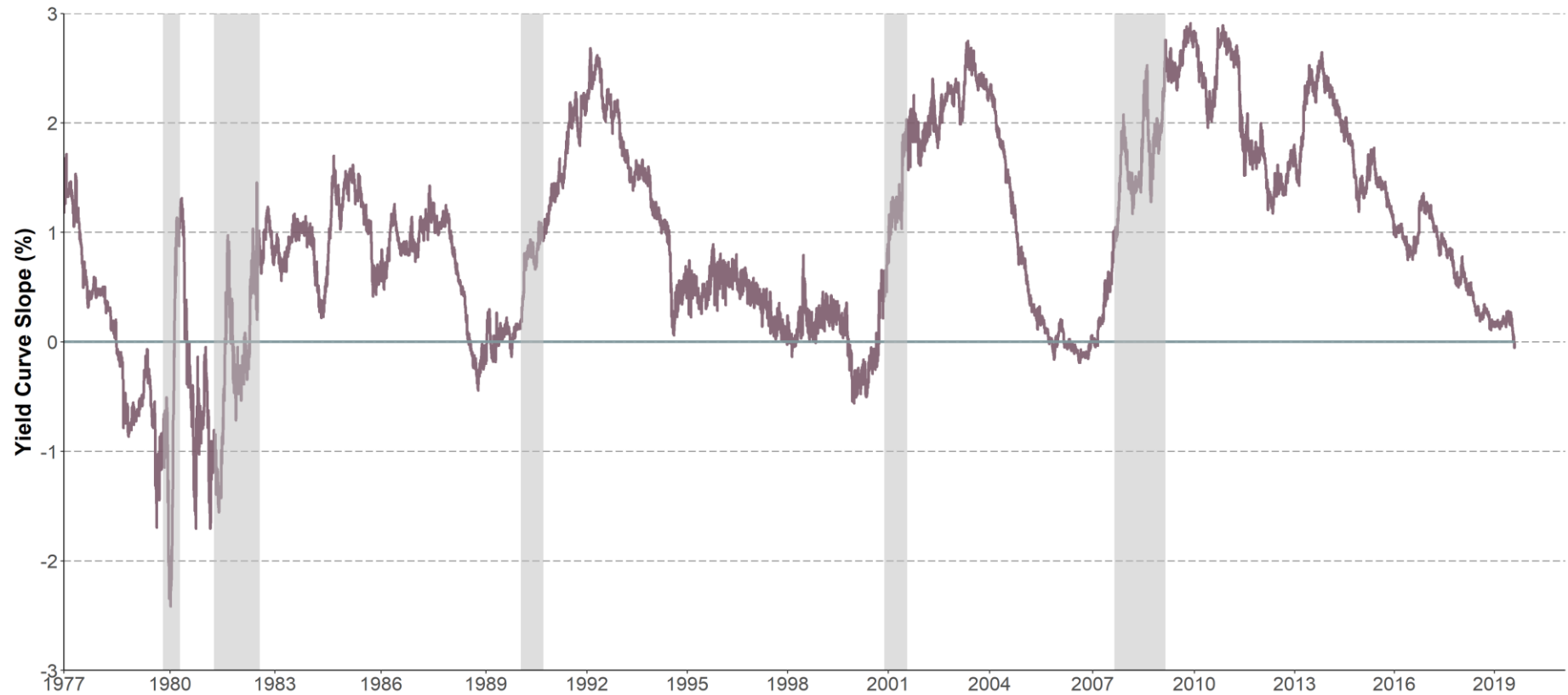
- This chart details the historical difference in yields between ten-year and two-year US Treasury bonds/notes. A higher (lower) figure indicates a steeper (flatter) yield curve slope.

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[1] Yield Curve Slope (Ten Minus Two) – Source: Bloomberg, and Meketa Investment Group. Yield curve slope is calculated as the difference between the 10-Year US Treasury Yield and 2-Year US Treasury Yield.

Ten-Year Breakeven Inflation[1]
(As of September 30, 2019)

- This chart details the difference between nominal and inflation-adjusted US Treasury bonds. A higher (lower) figure indicates higher (lower) inflation expectations.

Prepared by Meketa Investment Group

Total Return Given Changes in Interest Rates (bps)[1]
(As of September 30, 2019)

Barclays U.S. Short Treasury (Cash) —— Barclays U.S. Treasury 1-3 Yr. —— Barclays U.S. Treasury Intermediate
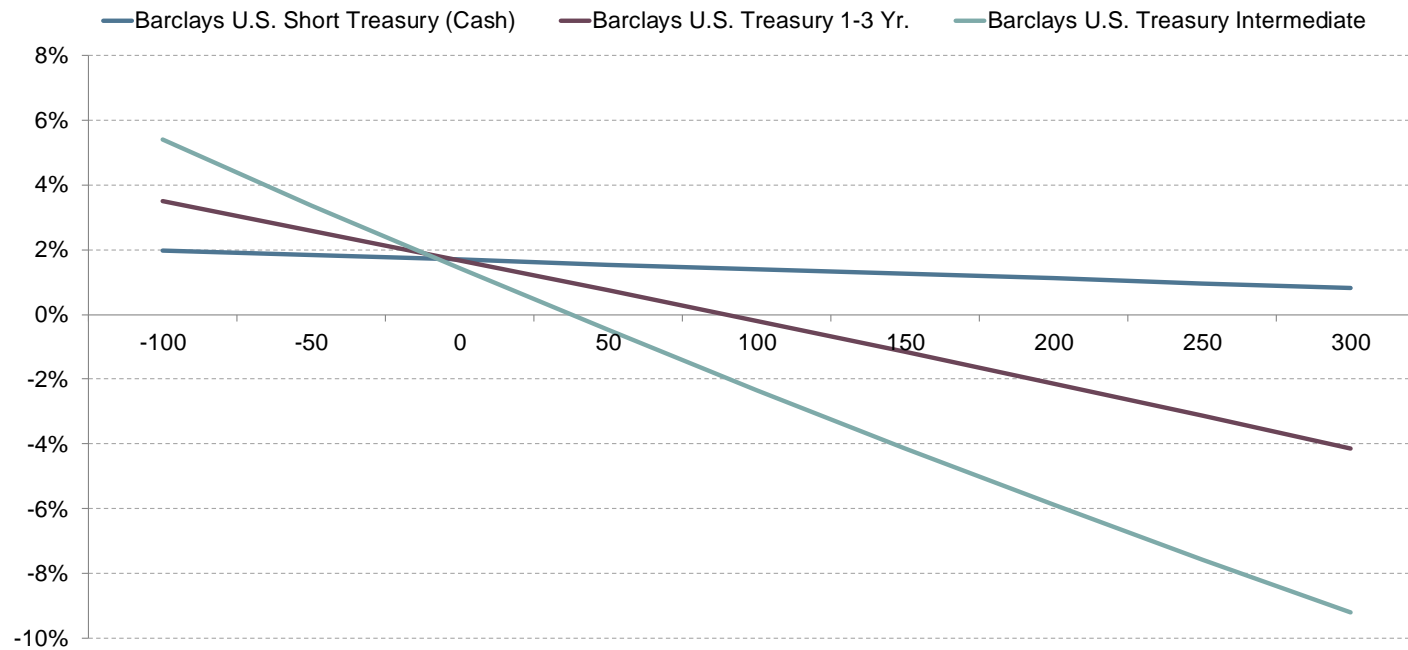
	Total Return for Given Changes in Interest Rates (bps)									Statistics	
	-100	-50	0	50	100	150	200	250	300	Duration	YTW
Barclays US Short Treasury (Cash)	2.0%	1.8%	1.7%	1.5%	1.4%	1.3%	1.1%	1.0%	0.8%	0.29	1.69%
Barclays US Treasury 1-3 Yr.	3.5%	2.6%	1.7%	0.8%	-0.2%	-1.2%	-2.1%	-3.1%	-4.1%	1.84	1.68%
Barclays US Treasury Intermediate	5.4%	3.4%	1.4%	-0.5%	-2.3%	-4.1%	-5.9%	-7.6%	-9.2%	3.87	1.42%
Barclays US Treasury Long	22.5%	11.7%	2.0%	-6.7%	-14.3%	-20.8%	-26.3%	-30.7%	-34.0%	18.4	1.98%

[1] Data represents the expected total return from a given change in interest rates (shown in basis points) over a 12-month period assuming a parallel shift in rates. Data is as of September 30, 2019 via Barclays, Bloomberg, and Meketa Investment Group.

Long-Term Outlook – 20-Year Annualized Expected Returns[1]
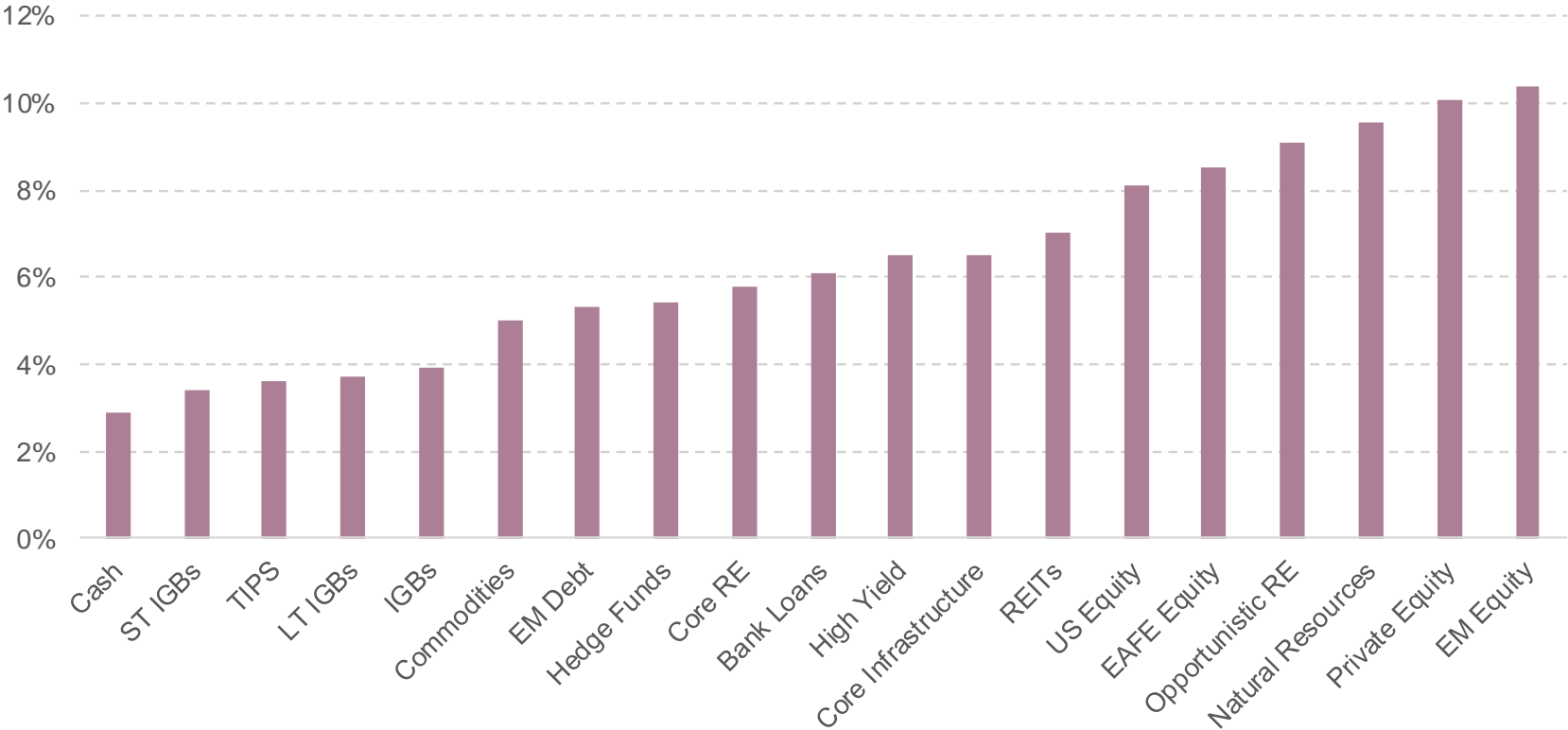
- This chart details Meketa's long-term forward-looking expectations for total returns across asset classes.

Appendix

Data Sources and Explanations[1]

- US Equity Cyclically Adjusted P/E on S&P 500 Index – Source: Robert Shiller and Yale University.

- Small Cap P/E (Russell 2000 Index) vs. Large Cap P/E (Russell 1000 Index) - Source: Russell Investments. Earnings figures represent 12-month "as reported" earnings.

- Growth P/E (Russell 3000 Growth Index) vs. Value (Russell 3000 Value Index) P/E - Source: Bloomberg, MSCI, and Meketa Investment Group. Earnings figures represent 12-month "as reported" earnings.

- Developed International Equity (MSCI EAFE ex Japan Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years.

- Emerging Market Equity (MSCI Emerging Markets Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years

- Private Equity Multiples – Source: S&P LCD Average EBITDA Multiples Paid in All LBOs

- Core Real Estate Spread vs. Ten-Year Treasury – Source: Real Capital Analytics, US Treasury, Bloomberg, and Meketa Investment Group. Core Real Estate is proxied by weighted sector transaction based indices from Real Capital Analytics and Meketa Investment Group.

- REITs Dividend Yield Spread vs. Ten-Year Treasury – Source: NAREIT, US Treasury. REITs are proxied by the yield for the NAREIT Equity index.

- Credit Spreads – Source: Barclays Capital. High Yield is proxied by the Barclays High Yield index and Investment Grade Corporates are proxied by the Barclays US Corporate Investment Grade index.

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[1] All Data as of September 30, 2019 unless otherwise noted.

Appendix

Data Sources and Explanations[1]

- EM Debt Spreads – Source: Bloomberg, and Meketa Investment Group. Option Adjusted Spread (OAS) for the Bloomberg Barclays EM USD Aggregate Index.

- Equity Volatility – Source: Bloomberg, and Meketa Investment Group. Equity Volatility proxied by VIX Index, a Measure of implied option volatility for US equity markets.

- Fixed Income Volatility – Source: Bloomberg, and Meketa Investment Group. Equity Volatility proxied by MOVE Index, a Measure of implied option volatility for US Treasury markets.

- Systemic Risk and Volatile Market Days – Source: Meketa Investment Group. Volatile days are defined as the top 10 percent of realized turbulence, which is a multivariate distance between asset returns.

  - Systemic Risk, which measures risk across markets, is important because the more contagion of risk that exists between assets, the more likely it is that markets will experience volatile periods.

- Yield Curve Slope (Ten Minus Two) – Source: Bloomberg, and Meketa Investment Group. Yield curve slope is calculated as the difference between the 10-Year US Treasury Yield and 2-Year US Treasury Yield.

- Ten-Year Breakeven Inflation – Source: US Treasury and Federal Reserve. Inflation is measured by the Consumer Price Index (CPI-U NSA).

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[1] All Data as of September 30, 2019 unless otherwise noted.

Meketa Market Sentiment Indicator

Explanation, Construction and Q&A

Meketa has created the MIG Market Sentiment Indicator (MIG-MSI) to <u>complement</u> our valuation-focused Risk Metrics. This measure of sentiment is meant to capture significant and persistent shifts in long-lived market trends of economic growth risk, either towards a <u>risk-seeking trend</u> or a <u>risk-aversion trend</u>.

This appendix explores:

- What is the Meketa Market Sentiment Indicator?
- How do I read the indicator graph?
- How is the Meketa Market Sentiment Indicator constructed?
- What do changes in the indicator mean?

Meketa has created a market sentiment indicator for monthly publication (the MIG-MSI – see below) to complement Meketa's Risk Metrics.

- Meketa's Risk Metrics, which rely significantly on standard market measures of relative valuation, often provide valid early signals of increasing long-term risk levels in the global investment markets. However, as is the case with numerous valuation measures, the Risk Metrics may convey such risk concerns long before a market corrections take place. The MIG-MSI helps to address this early-warning bias by measuring whether the markets are beginning to acknowledge key Risk Metrics trends, and / or indicating non-valuation based concerns. Once the MIG-MSI indicates that the market sentiment has shifted, it is our belief that investors should consider significant action, particularly if confirmed by the Risk Metrics. Importantly, Meketa believes the Risk Metrics and MIG-MSI should always be used in conjunction with one another and never in isolation. The questions and answers below highlight and discuss the basic underpinnings of the Meketa MIG-MSI:

What is the Meketa Market Sentiment Indicator (MIG-MSI)?

- The MIG-MSI is a measure meant to gauge the market's sentiment regarding economic growth risk. Growth risk cuts across most financial assets, and is the largest risk exposure that most portfolios bear. The MIG-MSI takes into account the momentum (trend over time, positive or negative) of the economic growth risk exposure of publicly traded stocks and bonds, as a signal of the future direction of growth risk returns; either positive (risk seeking market sentiment), or negative (risk averse market sentiment).

How do I read the Meketa Market Sentiment Indicator graph?

- Simply put, the MIG-MSI is a color-coded indicator that signals the market's sentiment regarding economic growth risk. It is read left to right chronologically. A green indicator on the MIG-MSI indicates that the market's sentiment towards growth risk is positive. A gray indicator indicates that the market's sentiment towards growth risk is neutral or inconclusive. A red indicator indicates that the market's sentiment towards growth risk is negative. The black line on the graph is the level of the MIG-MSI. The degree of the signal above or below the neutral reading is an indication the signal's current strength.

- Momentum as we are defining it is the use of the past behavior of a series as a predictor of its future behavior.
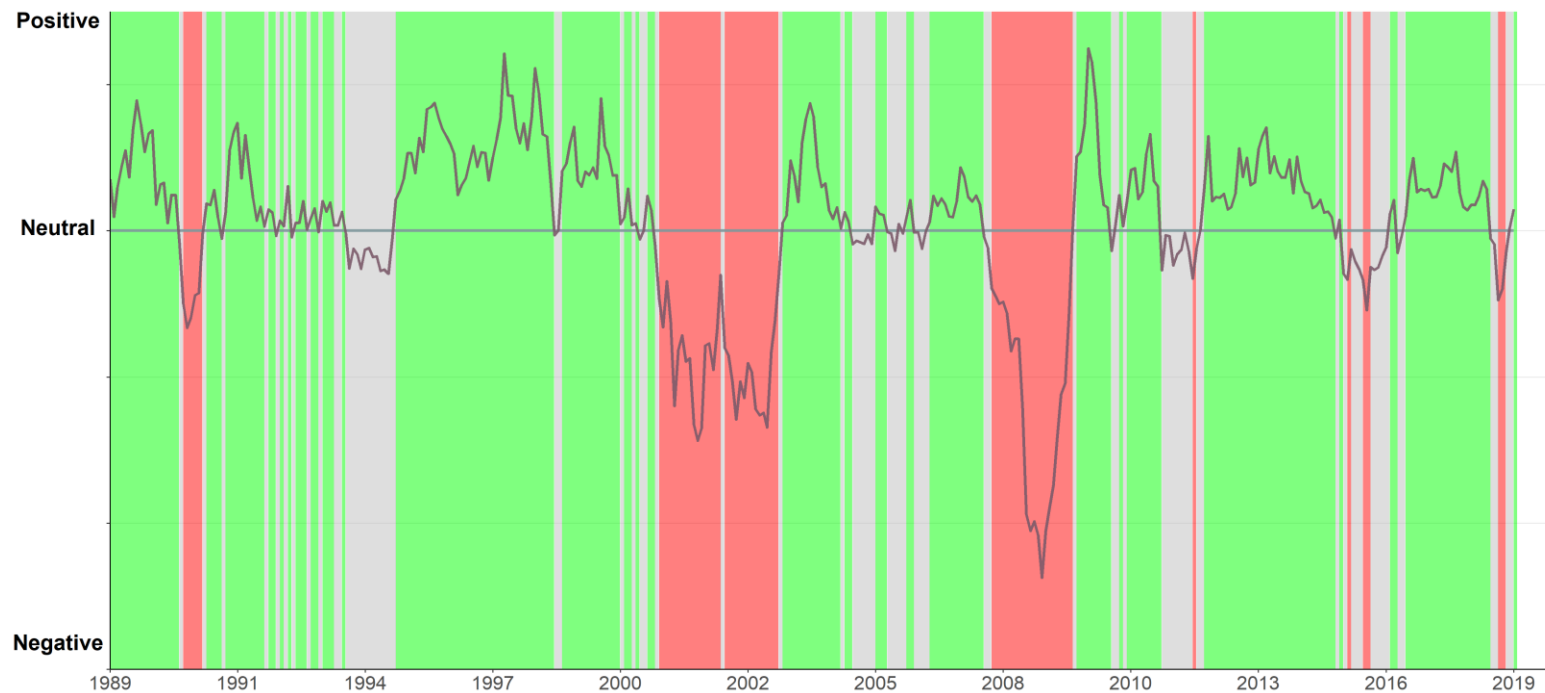
How is the Meketa Market Sentiment Indicator (MIG-MSI) Constructed?

- The MIG-MSI is constructed from two sub-elements representing investor sentiment in stocks and bonds:

  – Stock return momentum: Return momentum for the S&P 500 Equity Index (trailing 12-months)

  – Bond yield spread momentum: Momentum of bond yield spreads (excess of the measured bond yield over the identical duration US Treasury bond yield) for corporate bonds (trailing 12-months) for both investment grade bonds (75% weight) and high yield bonds (25% weight).

  – Both measures are converted to Z-scores and then combined to get an "apples to apples" comparison without the need of re-scaling.

- The black line reading on the graph is calculated as the average of the stock return momentum measure and the bonds spread momentum measure.[1] The color reading on the graph is determined as follows:

  – If both stock return momentum and bond spread momentum are positive = GREEN (positive)

  – If one of the momentum indicators is positive, and the other negative = GRAY (inconclusive)

  – If both stock return momentum and bond spread momentum are negative = RED (negative)

---

[1] Momentum as we are defining it is the use of the past behavior of a series as a predictor of its future behavior.
" Time Series Momentum" Moskowitz, Ooi, Pedersen, August 2010. *http://pages.stern.nyu.edu/~lpederse/papers/TimeSeriesMomentum.pdf*

What does the Meketa Market Sentiment Indicator (MIG-MSI) mean? Why might it be useful?

- There is strong evidence that time series momentum is significant and persistent. In particular, across an extensive array of asset classes, the sign of the trailing 12-month return (positive or negative) is indicative of future returns (positive or negative) over the next 12-month period. The MIG-MSI is constructed to measure this momentum in stocks and corporate bond spreads. A reading of green or red is agreement of both the equity and bond measures, indicating that it is likely that this trend (positive or negative) will continue over the next 12 months. When the measures disagree, the indicator turns gray. A gray reading does not necessarily mean a new trend is occurring, as the indicator may move back to green, or into the red from there. The level of the reading (black line) and the number of months at the red or green reading, gives the user additional information on which to form an opinion, and potentially take action.

Total Portfolio Performance & Market Value As of September 30, 2019

Investment Performance

Legend:
- Total Plan (Gross)
- OPFRS Policy Benchmark
- All Public Plans < $1B-Total Fund

Values by period:
- 1 Quarter: 1.6, 1.4, 0.8
- 1 Year: 3.8, 2.4, 4.3
- 3 Years: 9.8, 8.8, 7.9
- 5 Years: 7.6, 7.2, 6.3
- 7 Years: 8.4, 7.8, 7.6
- 10 Years: 8.9, 8.2, 8.0
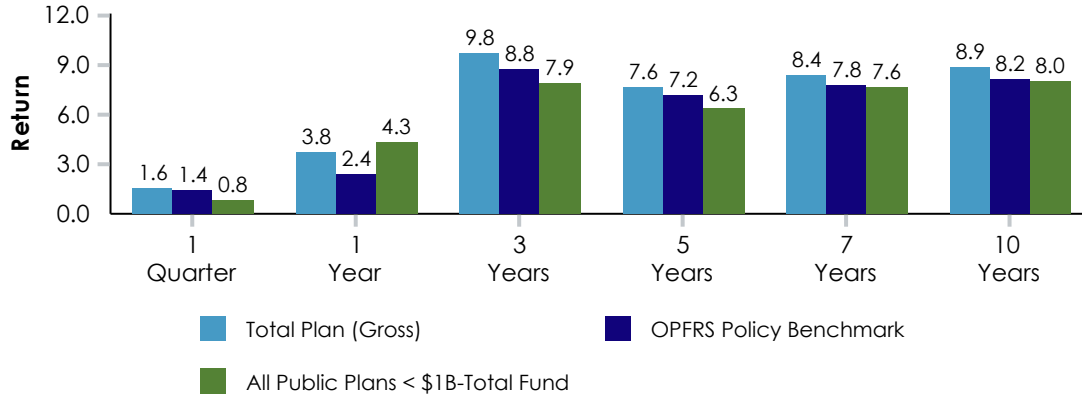
Portfolio Valuation (000's)

	1 Quarter	1 Year
OPFRS Total Plan		
Beginning Market Value	388,740	391,498
Net Contributions	-3,691	-13,862
Gain/Loss	6,195	13,608
Ending Market Value	**391,244**	**391,244**

Quarterly Risk/Return
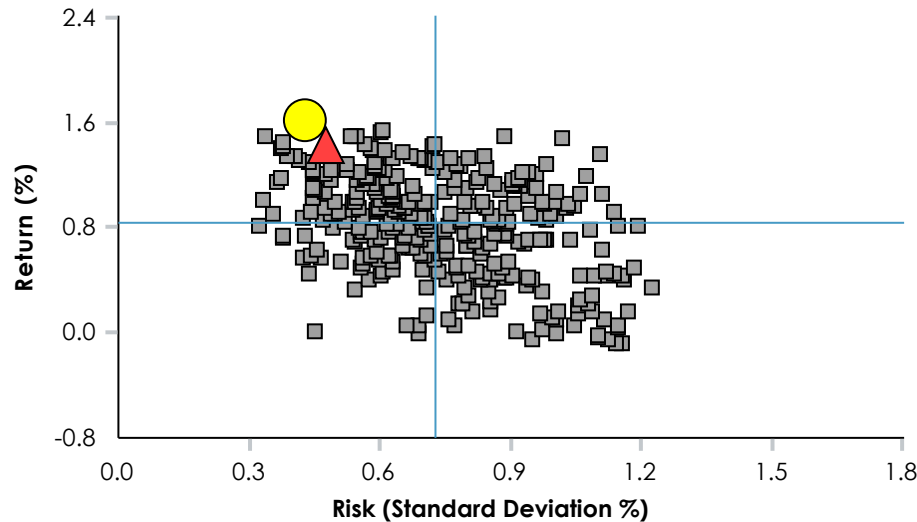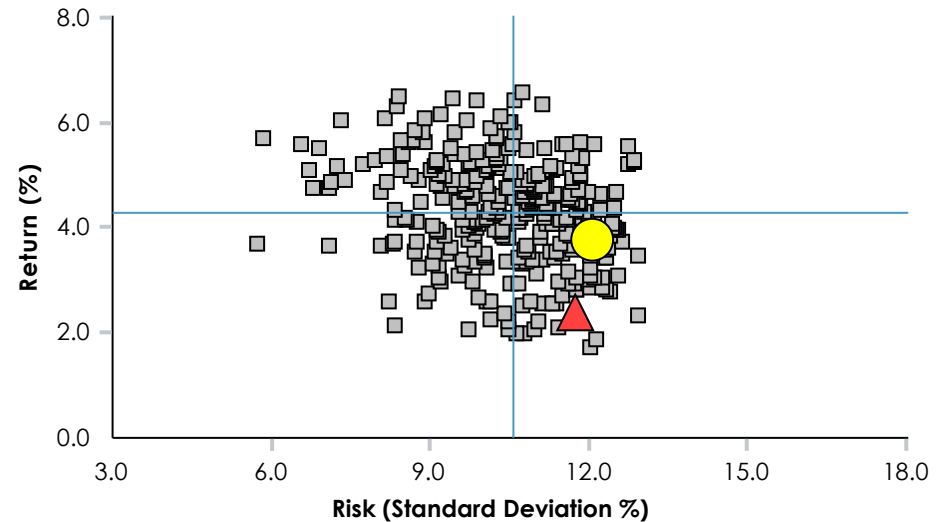
	Return	Standard Deviation
⬤ OPFRS Total Plan	1.6	0.4
▲ OPFRS Policy Benchmark	1.4	0.5
— Median	0.8	0.7

1-Year Risk/Return

	Return	Standard Deviation
⬤ OPFRS Total Plan	3.8	12.1
▲ OPFRS Policy Benchmark	2.4	11.7
— Median	4.3	10.6

Evolving Policy Benchmark consists of 40% Russell 3000, 12% MSCI ACWI ex U.S., 33% Bbg BC Universal, 5% CBOE BXM , 6.7% SG Multi Asset Risk Premia, 3.3% Bbg BC Long Treasury

Asset Class Performance As of September 30, 2019

Investment Performance

Asset Class Performance (gross of fees)

	1 Quarter	1 Year	3 Years	5 Years	7 Years	10 Years
OPFRS Total Plan	1.6	3.8	9.8	7.6	8.4	8.9
OPFRS Policy Benchmark*	*1.4*	*2.4*	*8.8*	*7.2*	*7.8*	*8.2*
Excess Return	0.2	1.4	1.0	0.4	0.6	0.7
Domestic Equity	0.7	1.4	12.8	10.4	13.0	13.3
Russell 3000 (Blend)**	*1.2*	*2.9*	*12.8*	*10.4*	*13.0*	*13.1*
Excess Return	-0.5	-1.5	0.0	0.0	0.0	0.2
International Equity	-0.8	0.9	8.1	5.3	6.9	5.8
*MSCI ACWI Ex US (Blend)^*	*-1.7*	*-0.7*	*6.8*	*3.4*	*5.5*	*4.9*
Excess Return	0.9	1.6	1.3	1.9	1.4	0.9
Fixed Income	2.1	10.0	3.9	4.1	3.3	4.4
*Bloomberg Barclays Universal (Blend)^^*	*2.1*	*10.1*	*3.2*	*3.6*	*3.1*	*4.1*
Excess Return	0.0	-0.1	0.7	0.5	0.2	0.3
Crisis Risk Offset	6.8	0.3	-	-	-	-
SG Multi Alternative Risk Premia	*2.0*	*3.1*	*-*	*-*	*-*	*-*
Excess Return	4.8	-2.8	-	-	-	-
Covered Calls	2.0	2.8	9.4	8.1	-	-
CBOE BXM	*0.6*	*-1.1*	*7.0*	*5.9*	*-*	*-*
Excess Return	1.4	3.9	2.4	2.2	-	-
Cash	0.7	2.6	1.7	1.1	0.8	-
FTSE 3 Month T-Bill	*0.6*	*2.4*	*1.5*	*1.0*	*0.7*	*-*
Excess Return	0.1	0.2	0.2	0.1	0.1	-

Evolving Policy Benchmark consists of 40% Russell 3000, 12% MSCI ACWI ex U.S., 33% Bbg BC Universal, 5% CBOE BXM , 6.7% SG Multi Asset Risk Premia, 3.3% Bbg BC Long Treasury
** Domestic Equity Benchmark consists of S&P 500 thru 3/31/98, 10% R1000, 20% R1000V, 5% RMC from 4/1/98 - 12/31/04, and Russell 3000 from 1/1/05 to present
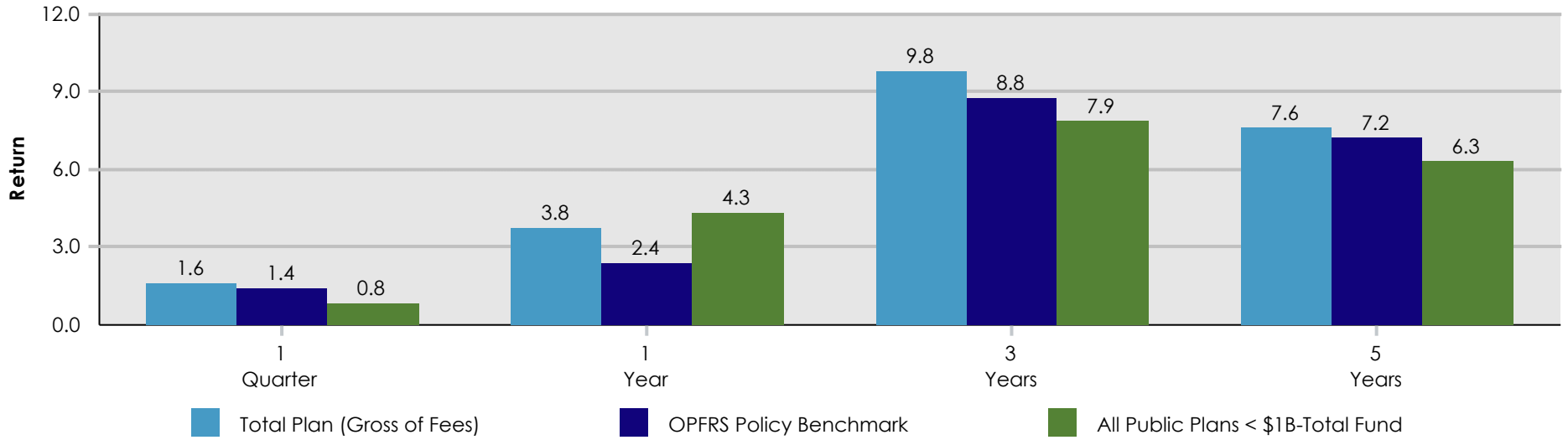^ International Equity Benchmark consists of MSCI EAFE thru 12/31/04, and MSCI ACWI x US thereafter.
^^ Fixed Income Benchmark consists of Bbg BC Aggregate prior to 4/1/06, and Bbg BC Universal thereafter.
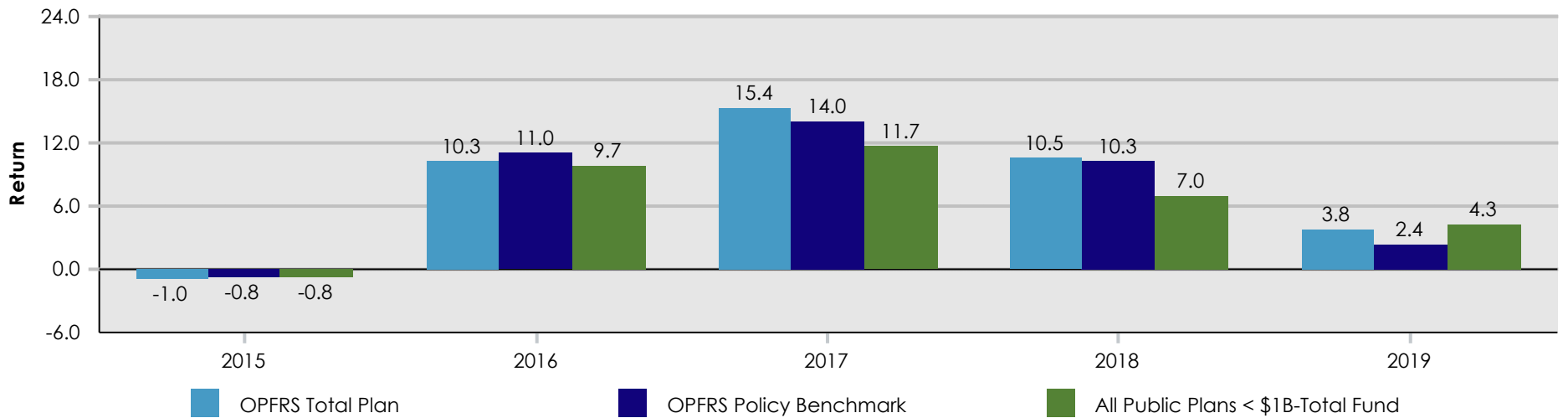
OPFRS Portfolio Relative Performance Results

As of September 30, 2019

Trailing Period Perfomance (annualized)

Legend:
- Total Plan (Gross of Fees)
- OPFRS Policy Benchmark
- All Public Plans < $1B-Total Fund

	1 Quarter	1 Year	3 Years	5 Years
Total Plan (Gross of Fees)	1.6	3.8	9.8	7.6
OPFRS Policy Benchmark	1.4	2.4	8.8	7.2
All Public Plans < $1B-Total Fund	0.8	4.3	7.9	6.3

12-month Performance- As of September 30, 2019

Legend:
- OPFRS Total Plan
- OPFRS Policy Benchmark
- All Public Plans < $1B-Total Fund

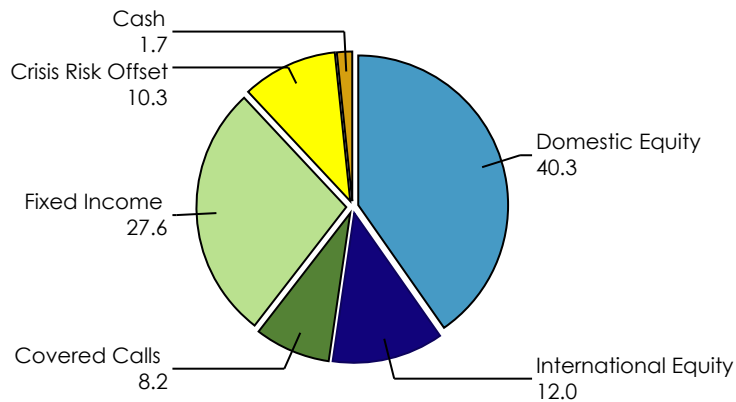|	2015	2016	2017	2018	2019
OPFRS Total Plan	-1.0	10.3	15.4	10.5	3.8
OPFRS Policy Benchmark	-0.8	11.0	14.0	10.3	2.4
All Public Plans < $1B-Total Fund	-0.8	9.7	11.7	7.0	4.3

Actual vs. Target Allocation
As of September 30, 2019

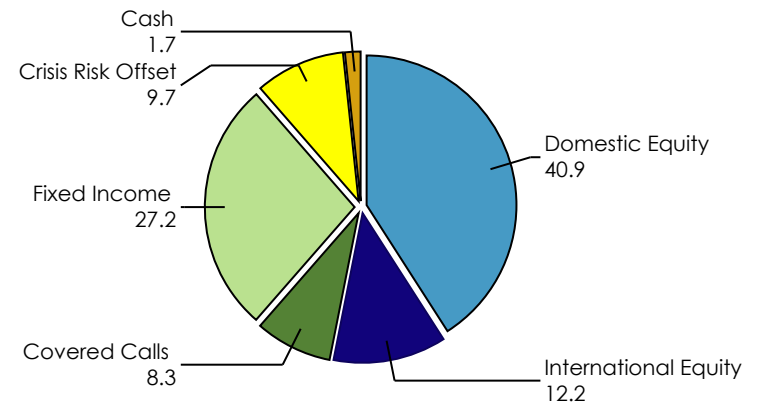|	Asset Allocation ($000)	Asset Allocation (%)	Target Allocation* (%)	Variance (%)
OPFRS Total Plan	391,244	100.0	100.0	0.0
Domestic Equity	157,679	40.3	40.0	0.3
International Equity	46,964	12.0	12.0	0.0
Total Fixed Income	107,891	27.6	33.0	-5.4
Covered Calls	31,961	8.2	5.0	3.2
Crisis Risk Offset	40,259	10.3	10.0	0.3
Cash	6,489	1.7	0.0	1.7

*Target weightings reflect the Plan's evolving asset allocation (effective 5/31/2017).

Actual Asset Allocation Comparison

September 30, 2019 : $391,243,865

Cash 1.7
Crisis Risk Offset 10.3
Fixed Income 27.6
Covered Calls 8.2
Domestic Equity 40.3
International Equity 12.0

June 30, 2019 : $388,739,954

Cash 1.7
Crisis Risk Offset 9.7
Fixed Income 27.2
Covered Calls 8.3
Domestic Equity 40.9
International Equity 12.2

Manager Performance - Gross of Fees
As of September 30, 2019

Domestic Equity

Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception*	Inception Date
Large Cap Core							
Northern Trust Russell 1000 Index	87,947	1.4	3.9	13.2	10.6	13.6	06/2010
Russell 1000 Index		*1.4*	*3.9*	*13.2*	*10.6*	*13.6*	
Excess Return		0.0	0.0	0.0	0.0	0.0	
Mid Cap Core							
EARNEST Partners - Active	31,399	1.3 (14)	7.1 (9)	15.5 (12)	12.7 (12)	9.8 (18)	04/2006
Russell Midcap Index		*0.5*	*3.2*	*10.7*	*9.1*	*8.5*	
Excess Return		0.8	3.9	4.8	3.6	1.3	
Small Cap Value							
Vanguard Russell 2000 Value	9,463	---	---	---	---	-0.4 (32)	08/2019
Russell 2000 Value Index		*---*	*---*	*---*	*---*	*-0.7*	
Excess Return		---	---	---	---	0.3	
Small Cap Growth							
Rice Hall James - Active	10,964	-4.6 (58)	-15.7 (95)	---	---	6.1 (82)	07/2017
Russell 2000 Growth Index		*-4.2*	*-9.6*	*---*	*---*	*6.9*	
Excess Return		-0.4	-6.1	---	---	-0.8	
Defensive Equity							
SPI - Active	17,906	0.4 (87)	---	---	---	0.4 (87)	07/2019
S&P 500 Index		*1.7*	*---*	*---*	*---*	*1.7*	
Excess Return		-1.3	---	---	---	-1.3	

Over the latest three-month period ending September 30, 2019, one of OPFRS's three active Domestic Equity managers outperformed its respective benchmark.

OPFRS's passive Domestic Equity mandate performed in-line with its respective benchmark.

Northern Trust, the Plan's passive large cap core transition account, continues to perform in-line with its benchmark over all time periods measured. This performance is within expectations for a passive mandate.

Manager Performance - Gross of Fees
As of September 30, 2019

Domestic Equity

EARNEST Partners, the Plan's active mid cap core manager, outperformed its Russell Midcap benchmark by 0.8%, placing it in the 14th percentile of its peer group. The portfolio has also outperformed its benchmark over the 1-year period by 3.9% and continues to outperform over the 3- and 5-year periods by 4.8% and 3.6% respectively. The portfolio also ranks in the top quartile of its peer group over all time periods measured.

Vanguard Russell 2000 Value, the Plan's new passive small cap value manager, replaced NWQ in August and does not have a full quarter performance return.

Rice Hall James, the Plan's active small cap growth manager, underperformed its Russell 2000 Growth benchmark over the most recent quarter by (0.4%), placing the portfolio in the 58th percentile of its peer group. The portfolio has underperformed its benchmark over the 1-year period by (6.1%).

SPI, the Plan's new active Defensive Equity manager, underperformed the S&P 500 benchmark by (1.3%) over the recent quarter, placing the portfolio in the 87th percentile of its peer group.

Manager Performance - Gross of Fees
As of September 30, 2019

International Equity

Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
Active International							
Fisher Investments	16,550	-2.0 (74)	0.2 (24)	7.7 (28)	5.0 (25)	4.4 (74)	04/2011
MSCI AC World ex USA		*-1.7*	*-0.7*	*6.8*	*3.4*	*3.6*	
Excess Return		-0.3	0.9	0.9	1.6	0.8	
Hansberger	16,564	-1.3 (49)	1.3 (44)	9.1 (36)	6.7 (29)	4.6 (73)	02/2006
MSCI AC World ex USA		*-1.7*	*-0.7*	*6.8*	*3.4*	*3.9*	
Excess Return		0.4	2.0	2.3	3.3	0.7	
Passive International							
SSgA	---	---	---	---	---	---	08/2002
MSCI EAFE Index		*-1.0*	*-0.8*	*7.0*	*3.8*	*7.0*	
Excess Return		---	---	---	---	---	

Over the latest three-month period ending September 30, 2019, one of OPFRS's two active International Equity managers outperformed their respective benchmark.

The **SSgA** account has performed roughly in-line with its benchmark over all time periods measured. This performance is within expectations for a passive mandate. It should also be noted the SSgA was terminated as the Developed International portfolio manager during OPFRS's July meeting.

Hansberger, one of OPFRS' active international equity managers, outperformed the MSCI ACWI x US Index during the quarter by 0.4%, placing the fund in the 49th percentile of its peer group. Over the 12-month period, Hansberger outperformed its benchmark by 2.0% with an absolute return of 1.3%. Hansberger continues to outperform over the 3- and 5-year periods with excess returns of 2.3% and 3.3%, respectively.

Fisher, one of OPFRS' active international equity managers, underperformed the MSCI ACWI x US Index by (0.3%) during the quarter, ranking the fund in the 74th percentile of its peer group. Over the most recent 1- and 3-year periods, Fisher has outperformed its benchmark by 0.9% and 0.9%, respectively, and continues to outperform by 1.6% over the five year period.

Manager Performance - Gross of Fees
As of September 30, 2019

Fixed Income

Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
Core Fixed Income							
Ramirez	75,168	2.5 (15)	10.9 (26)	---	---	5.3 (10)	01/2017
Blmbg. Barc. U.S. Aggregate Index		*2.3*	*10.3*	*---*	*---*	*4.3*	
Excess Return		0.2	0.6	---	---	1.0	
Core-Plus Fixed Income							
Reams	24,922	2.4 (36)	11.1 (17)	3.4 (77)	3.8 (60)	5.7 (59)	02/1998
Bbg Barclays Universal (Hybrid)		*2.1*	*10.1*	*3.2*	*3.6*	*5.1*	
Excess Return		0.3	1.0	0.2	0.2	0.6	
High Yield / Bank Loans							
DDJ Capital	7,801	-2.0 (99)	-1.1 (98)	6.0 (51)	---	5.4 (67)	02/2015
ICE BofAML High Yield Master II		*1.2*	*6.3*	*6.1*	*---*	*5.8*	
Excess Return		-3.2	-7.4	-0.1	---	-0.4	

Over the latest three-month period, ending September 30, 2019, two of OPFRS's three active Fixed Income managers outperformed their respective benchmarks.

Ramirez, the Plan's core fixed income manager, returned 2.5% compared to the benchmark return of 2.3% during the quarter, ranking the portfolio in the 15th percentile of its peer group. Over the 1-year period, Ramirez has outperformed its benchmark by 0.6% and ranked in the 26th percentile of its peer group.

Reams, the Plan's core plus fixed income manager, outperformed its benchmark by 0.3% during the quarter and ranked in the 36th percentile of its peer group. Over the most recent 12-month period, Reams outperformed its benchmark by 1.0%, earning a 17th percentile ranking. Reams also outperformed its benchmark over the 3- and 5-year periods by 0.2% respectively.

DDJ, the Plan's High Yield & Bank Loan manager, returned -2.0% during the most recent quarter, underperforming the benchmark by (3.2%). A string of underperforming quarters has left DDJ trailing its benchmark by (7.4%) over the most recent 12-month period and (0.1%) over the 3-year period.

Manager Performance - Gross of Fees
As of September 30, 2019

Covered Calls

| Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
Covered Calls Composite							
Covered Calls	31,961	2.0	2.8	9.4	8.1	8.1	04/2014
CBOE BXM		*0.6*	*-1.1*	*7.0*	*5.9*	*6.1*	
Excess Return		1.4	3.9	2.4	2.2	2.0	
CC - Passive Allocation							
Parametric BXM	15,423	1.6	1.5	7.6	6.8	6.9	04/2014
CBOE BXM		*0.6*	*-1.1*	*7.0*	*5.9*	*6.1*	
Excess Return		1.0	2.6	0.6	0.9	0.8	
CC - Active Allocation							
Parametric DeltaShift	16,538	2.3	4.0	11.2	9.6	9.9	04/2014
CBOE BXM		*0.6*	*-1.1*	*7.0*	*5.9*	*6.1*	
Excess Return		1.7	5.1	4.2	3.7	3.8	

During the latest three-month period ending September 30, 2019, OPFRS' aggregate Covered Calls portfolio outperformed its benchmark by 1.4%.

Parametric BXM Portfolio, the Plan's passive covered calls allocation outperformed its CBOE BXM index by 1.0% over the most recent quarter. Over the most recent 1-year period the portfolio has outperformed by 2.6% and has outperformed over both the 3- and 5-year periods by 0.6% and 0.9% respectively.

Parametric Delta Shift Portfolio, the Plan's active covered calls allocation has outperformed the CBOE BXM benchmark by 1.7% over the most recent quarter and has outperformed by 5.1% over the 1-year period. The portfolio outperformed over the 3-year period by 4.2% and has earned an annualized 9.6% over the most recent 5-year period, outperforming its benchmark by 3.7%.

Manager Performance - Gross of Fees
As of September 30, 2019

Crisis Risk Offset

Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years	Since Inception	Inception Date
Crisis Risk Offset Composite							
Crisis Risk Offset	40,259	6.8	0.3	---	---	3.3	09/2018
CRO Composite Benchmark		*2.0*	*3.1*	*---*	*---*	*3.1*	
Excess Return		4.8	-2.8	---	---	0.2	
CRO - Risk Premia / Trend Following							
Parametric S.A.R.P.	25,751	6.1	0.5	---	---	3.4	09/2018
SG Multi Alternative Risk Premia		*2.0*	*3.1*	*---*	*---*	*3.1*	
Excess Return		4.1	-2.6	---	---	0.3	
CRO - Long Duration							
Vanguard Long-Term Treasury ETF	14,509	8.1	---	---	---	8.1	07/2019
Bloomberg Barclays U.S. Gov Float Adjusted: Long		*7.8*	*---*	*---*	*---*	*7.8*	
Excess Return		0.3	---	---	---	0.3	

During the latest three-month period ending September 30, 2019, OPFRS's partially funded aggregate Crisis Risk Offset portfolio outperformed its benchmark by 4.8%.

Parametric Systematic Alternative Risk Premia, the Plan's Risk Premia / Trend Following manager outperformed its benchmark by 4.1% during the quarter. Due to a poor first few months after funding, the portfolio continues to trail its benchmark by (2.6%) since its funding in September 2018.

Temporary Long Duration ETF, the Plan's Long Duration allocation was funded in early June through the use of the Vanguard Long-Term Treasury ETF until a permanent manager can be selected. The portfolio outperformed it's benchmark by 0.3% over the most recent quarter.

OPFRS Total Portfolio 5-Year Performance
As of September 30, 2019

Growth of $1 (5-year)
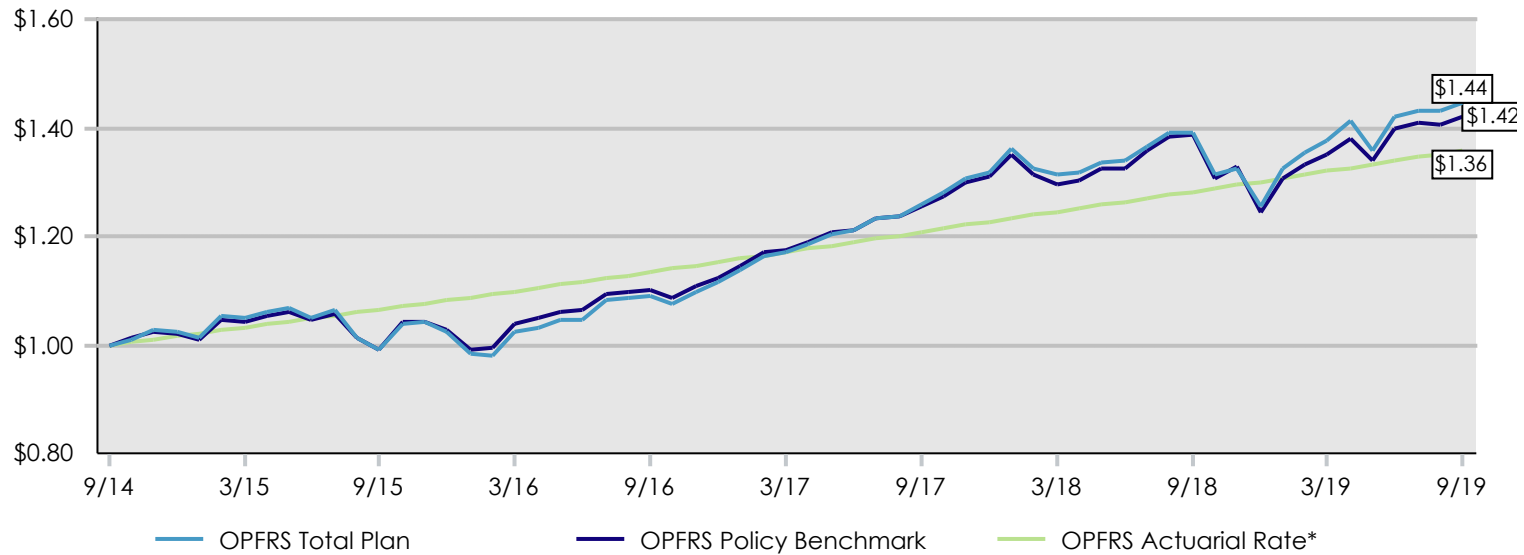
* The actuarial expected rate of return was 8% through 6/30/2009, 7.5% through 6/30/2010, 7% through 6/30/2011, 6.75% through 6/30/2014, 6.5% through 12/31/2017 and 6.0% currently

Risk/Return Performance (5-year)
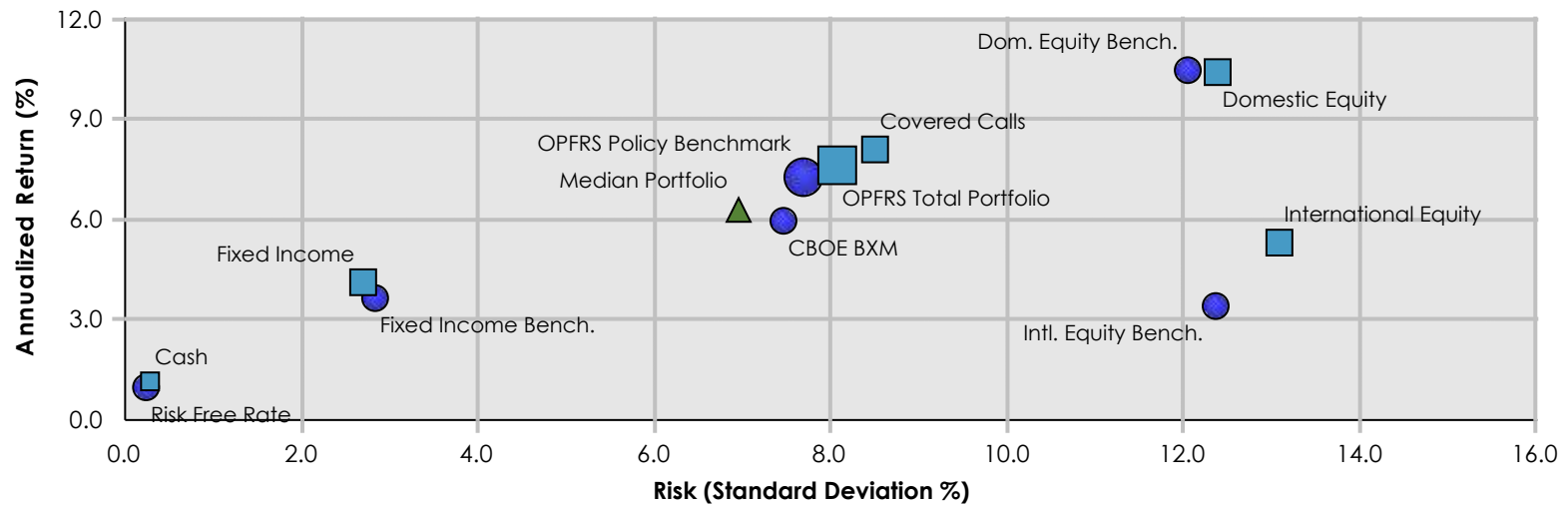
Plan Sponsor Peer Group Analysis
As of September 30, 2019
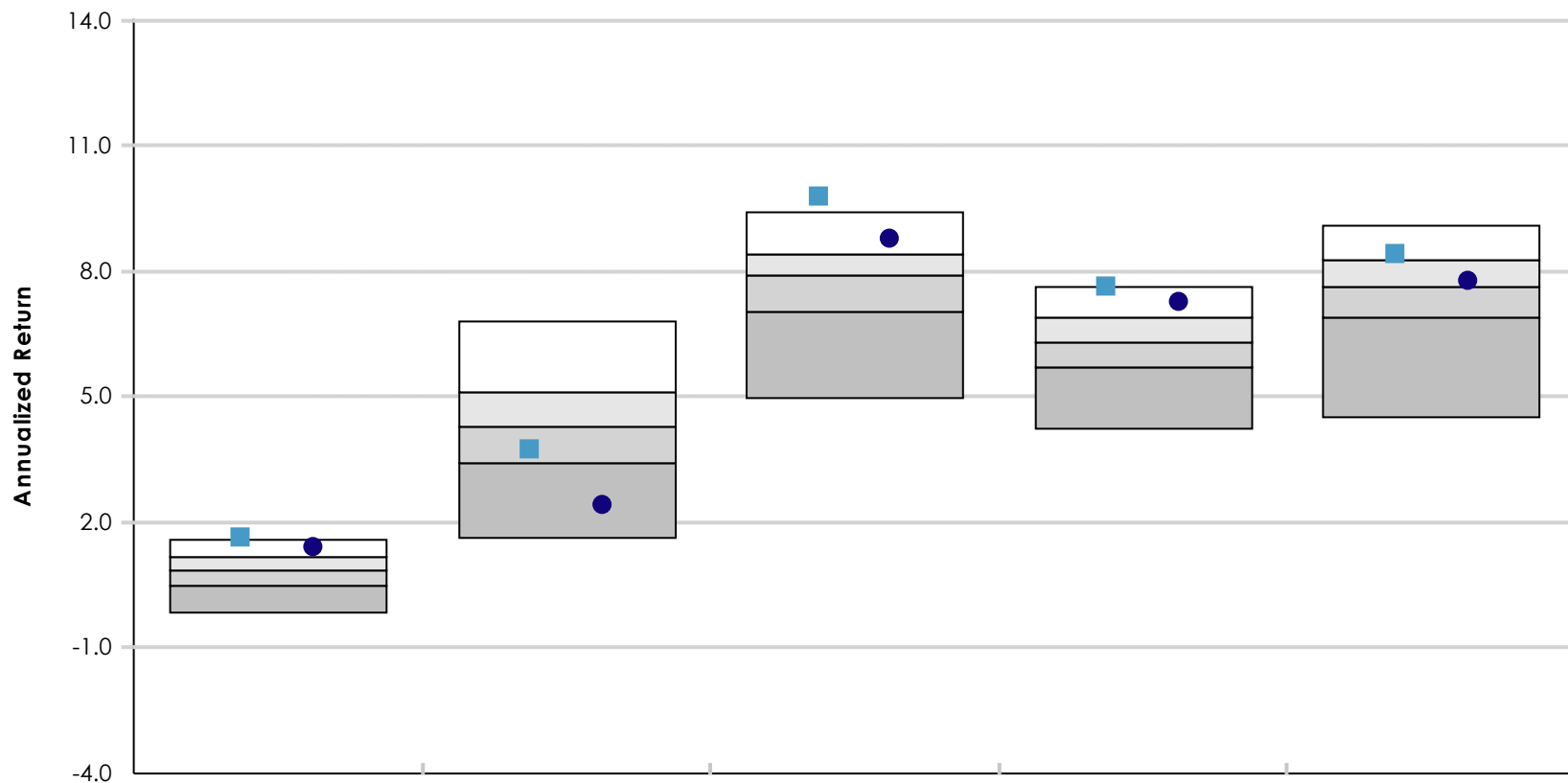
	1 Quarter	1 Year	3 Years	5 Years	7 Years
■ **OPFRS Total Plan**	**1.6 (5)**	**3.8 (66)**	**9.8 (3)**	**7.6 (5)**	**8.4 (21)**
● *OPFRS Policy Benchmark*	*1.4 (9)*	*2.4 (90)*	*8.8 (14)*	*7.2 (12)*	*7.8 (45)*
5th Percentile	1.6	6.8	9.4	7.6	9.1
1st Quartile	1.2	5.1	8.4	6.9	8.3
Median	0.8	4.3	7.9	6.3	7.6
3rd Quartile	0.5	3.4	7.0	5.7	6.9
95th Percentile	-0.1	1.7	5.0	4.3	4.5
Population	402	392	373	363	341

Parentheses contain percentile rankings.
Calculation based on monthly periodicity.

Plan Sponsor TF Asset Allocation
As of September 30, 2019
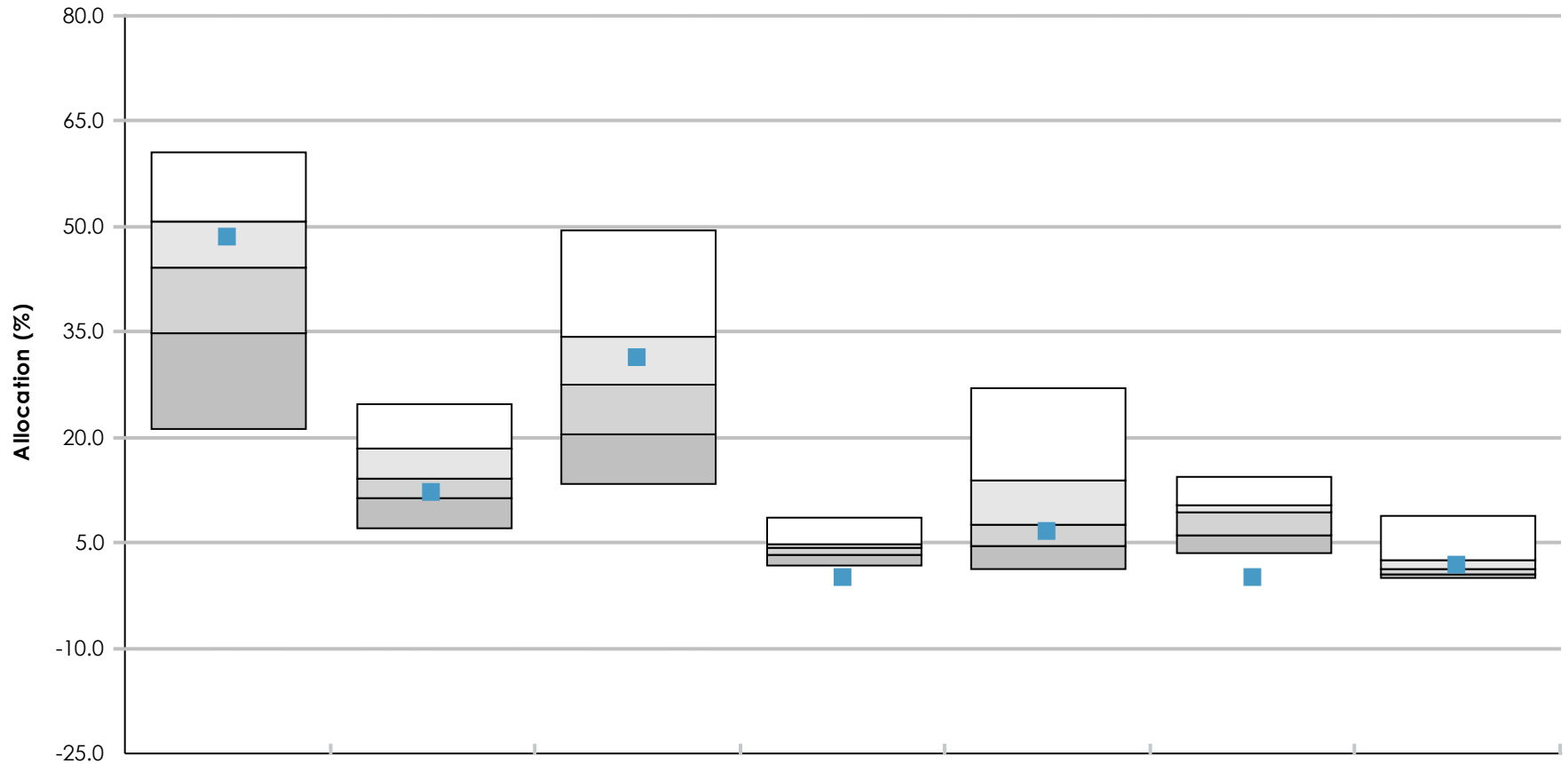
	US Equity	Intl. Equity	US Fixed Income	Intl. Fixed Income	Alternative Inv.	Real Estate	Cash
■ **OPFRS Total Plan**	**48.5 (35)**	**12.0 (71)**	**31.3 (35)**	**0.0**	**6.6 (57)**	**0.0**	**1.7 (39)**
5th Percentile	60.5	24.7	49.5	8.6	26.9	14.5	8.9
1st Quartile	50.6	18.4	34.3	4.9	14.0	10.4	2.5
Median	44.0	14.2	27.5	4.2	7.7	9.3	1.3
3rd Quartile	34.7	11.4	20.5	3.3	4.6	6.0	0.6
95th Percentile	21.1	7.1	13.5	1.7	1.3	3.5	0.1
Population	574	525	525	167	126	304	399

Parentheses contain percentile rankings.
Calculation based on monthly periodicity.

57

Monitoring/Probation Status

As of September 30, 2019
Return vs. Benchmark since Corrective Action

Portfolio	Status	Concern	Months Since Corrective Action	Performance^ Since Corrective Action (Gross)	Peer Group Percentile Ranking	Date of Corrective Action*
Hansberger	On Watch	Organizational	19	1.0	62	11/30/2017
MSCI ACWI ex-USA	---	---	---	0.3		
NWQ	Terminated	Organizational	17	-5.4	84	1/31/2018
Russell 2000 Value	---	---	---	-1.7		
DDJ Capital	On Watch	Performance	1	0.1	100	5/29/2019
Ice BofAML US High Yield				---	2.5	
Rice Hall James	On Watch	Performance	1	6.6	74	5/29/2019
Russell 2000 Growth	---	---	---	7.7		

^. Annualized performance if over one year.
* Approximate date based on when Board voted to either monitor a manager at a heightened level or place it on probation.

Investment Performance Criteria
For Manager Monitoring/Probation Status

Asset Class	Short-term (rolling 12 mth periods)	Medium-term (rolling 36 mth periods)	Long-term (60 + months)
Active Domestic Equity	Fd return < bench return – 3.5%	Fd annlzd return < bench annlzd return – 1.75% for 6 consecutive months	VRR < 0.97 for 6 consecutive months
Active International Equity	Fd return < bench return – 4.5%	Fd annlzd return < bench annlzd return – 2.0% for 6 consecutive months	VRR < 0.97 for 6 consecutive months
Passive International Equity	Tracking Error > 0.50%	Tracking Error > 0.45% for 6 consecutive months	Fd annlzd return < bench annlzd return – 0.40% for 6 consecutive months
Fixed Income	Fd return < bench return – 1.5%	Fd annlzd return < bench annlzd return – 1.0% for 6 consecutive months	VRR < 0.98 for 6 consecutive months

VRR – Value Relative Ratio – is calculated as: manager cumulative return / benchmark cumulative return.

Northern Trust Russell 1000 - gross of fees

As of September 30, 2019

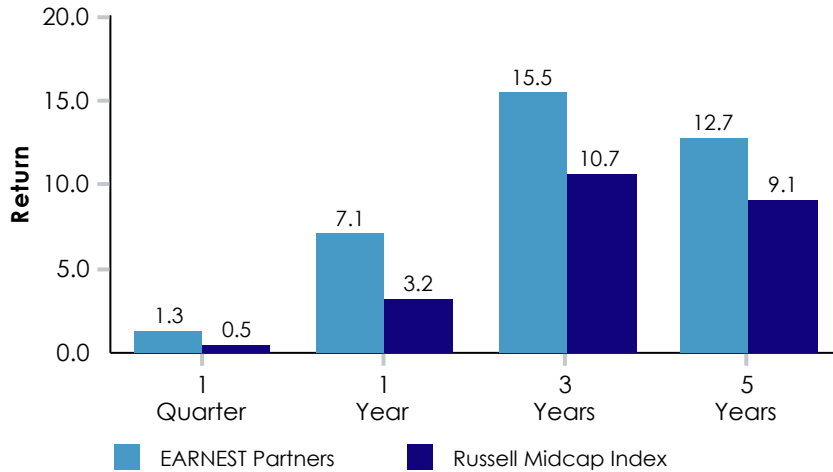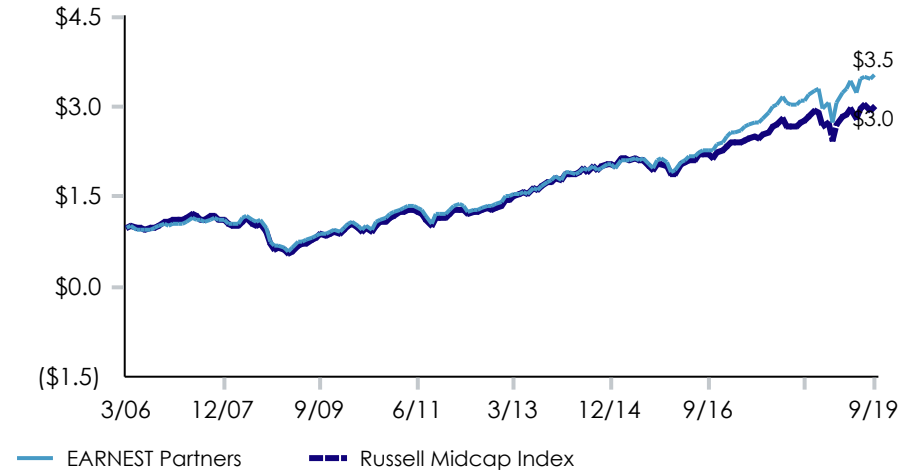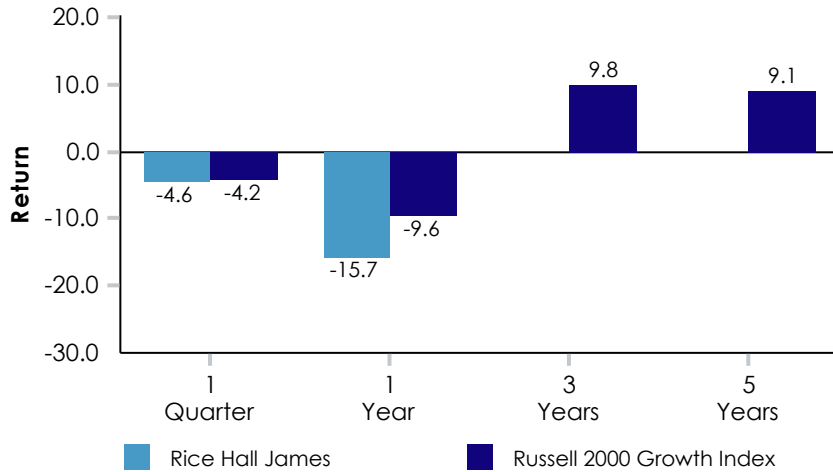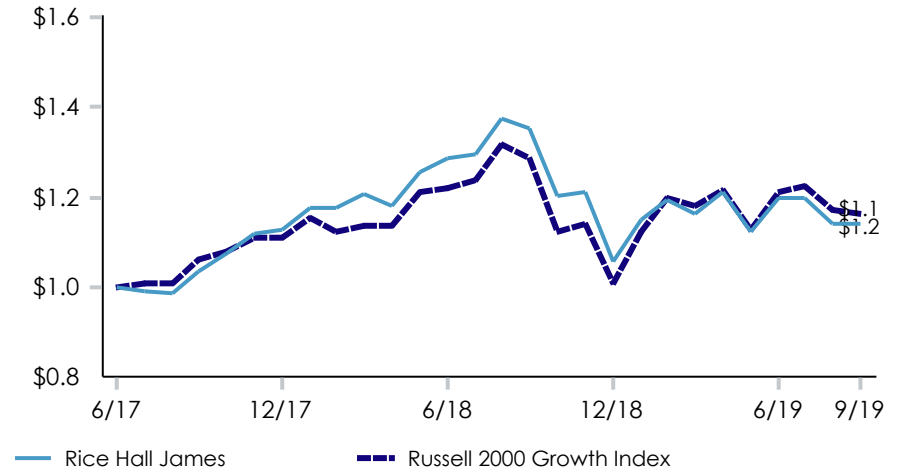|	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Northern Trust Russell 1000	0.78	0.97	0.32	1.01	1.30	0.99	99.59	95.58	05/01/2010
Russell 1000 Index	0.00	1.00	-	0.95	0.00	1.00	100.00	100.00	05/01/2010

Trailing Period Performance
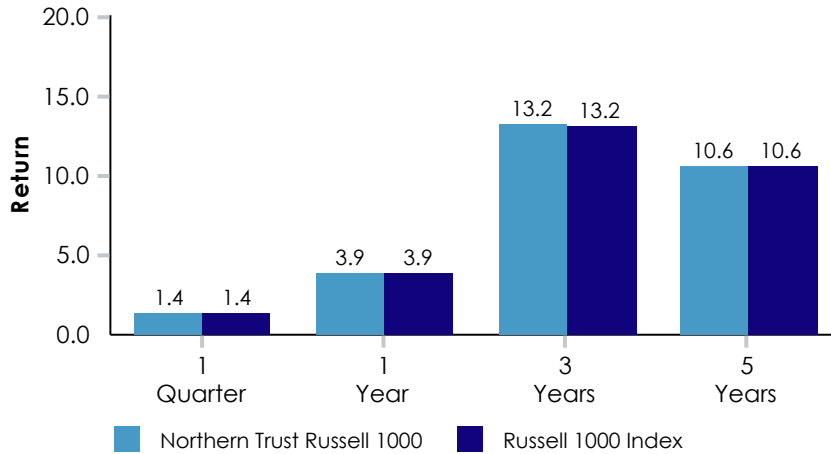
Growth of $1 - Since Inception

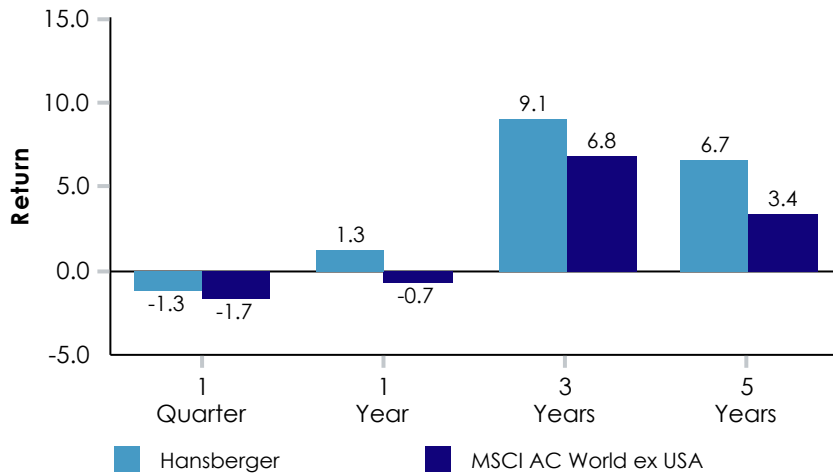## Calendar Year Performance

Risk/Return - Since Inception

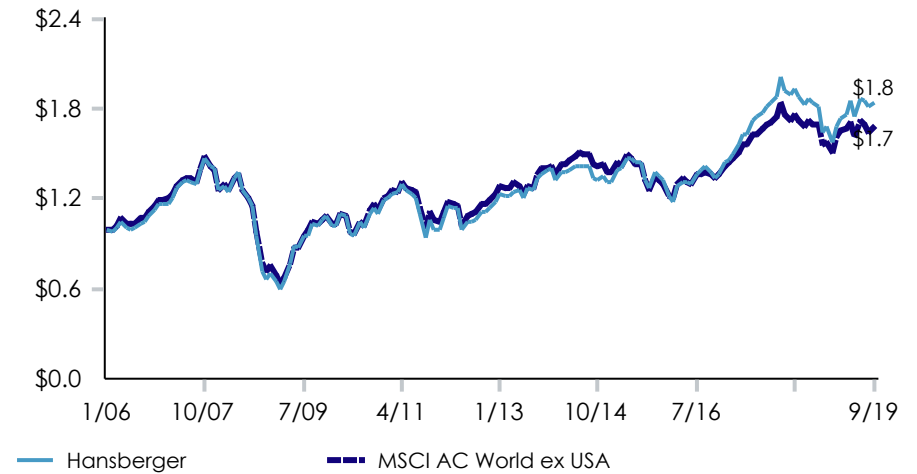|	Return	Standard Deviation
Northern Trust Russell 1000	13.0	12.4
Russell 1000 Index	12.5	12.7
Median	12.5	12.9
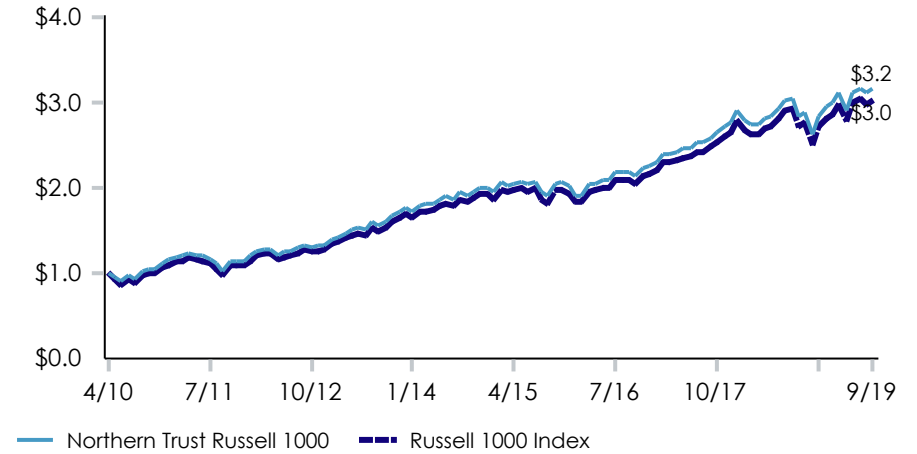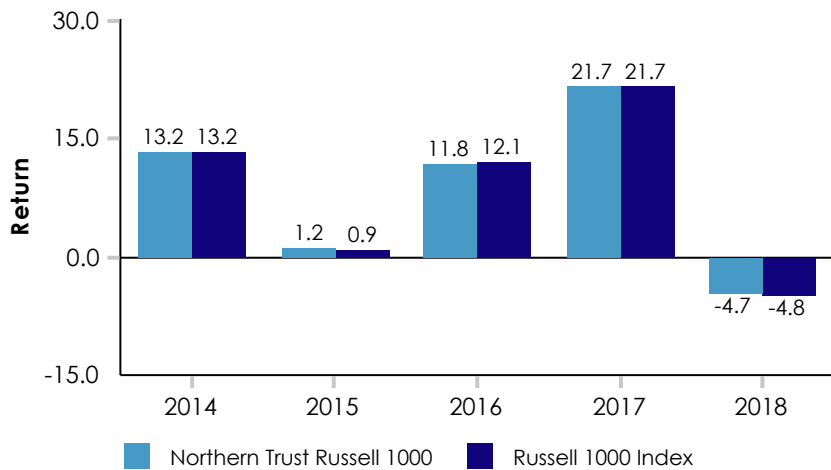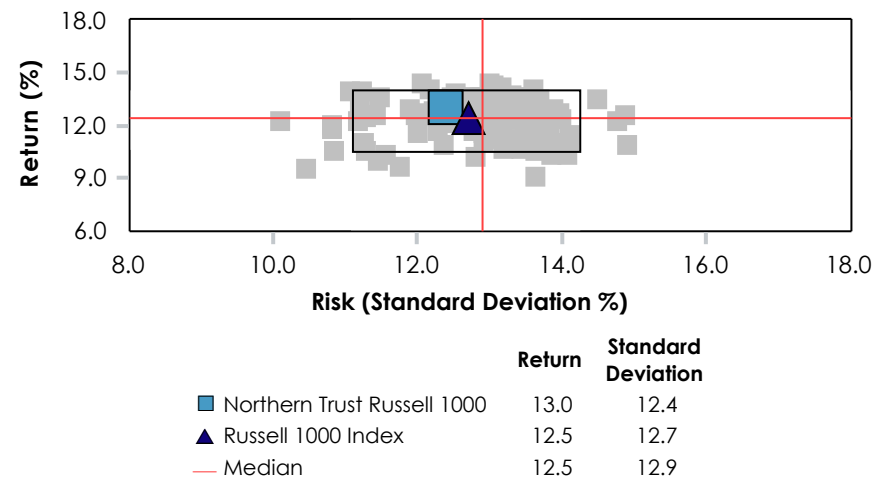
EARNEST Partners - gross of fees

As of September 30, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
EARNEST Partners	1.26	1.00	0.39	0.57	3.29	0.96	101.44	94.74	04/01/2006
Russell Midcap Index	0.00	1.00	-	0.51	0.00	1.00	100.00	100.00	04/01/2006

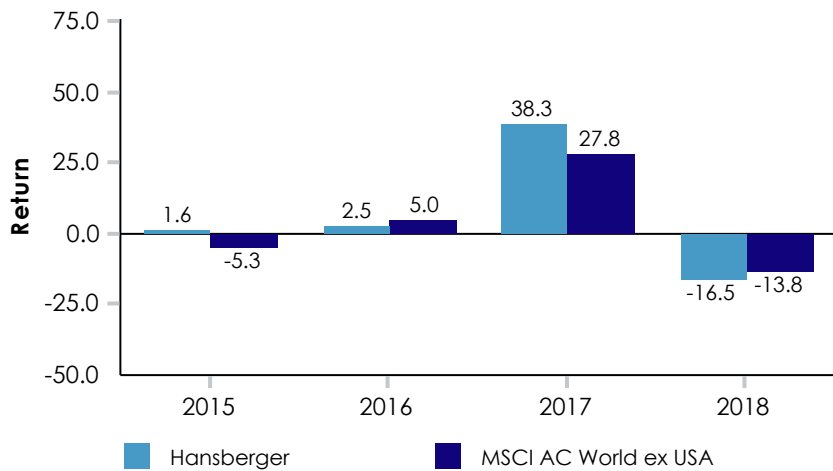## Trailing Period Performance

Growth of $1 - Since Inception

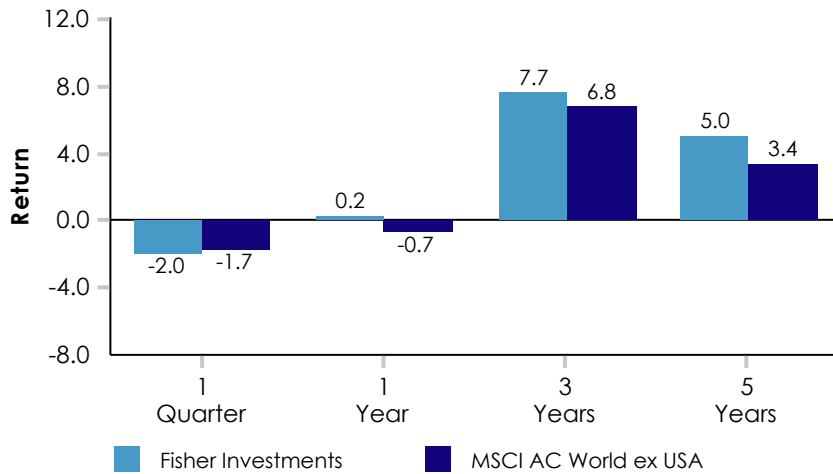## Calendar Year Performance

Risk/Return - Since Inception

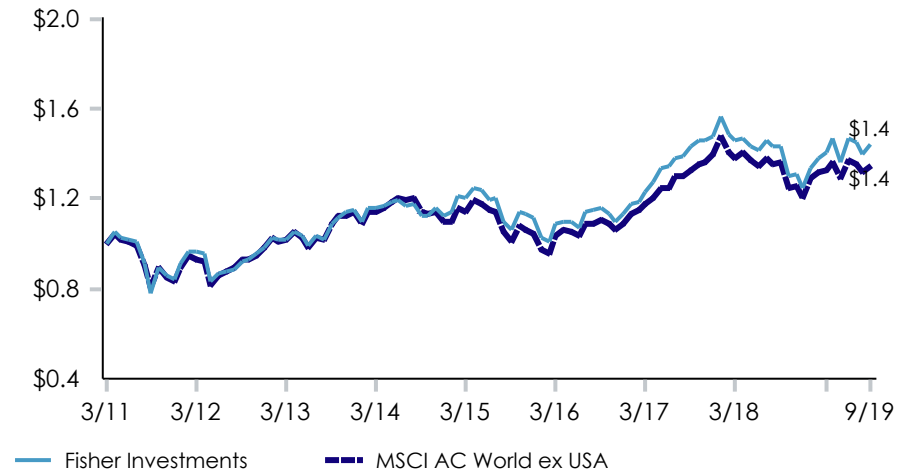|	Return	Standard Deviation
■ EARNEST Partners	9.8	17.0
▲ Russell Midcap Index	8.5	16.6
— Median	8.5	17.0
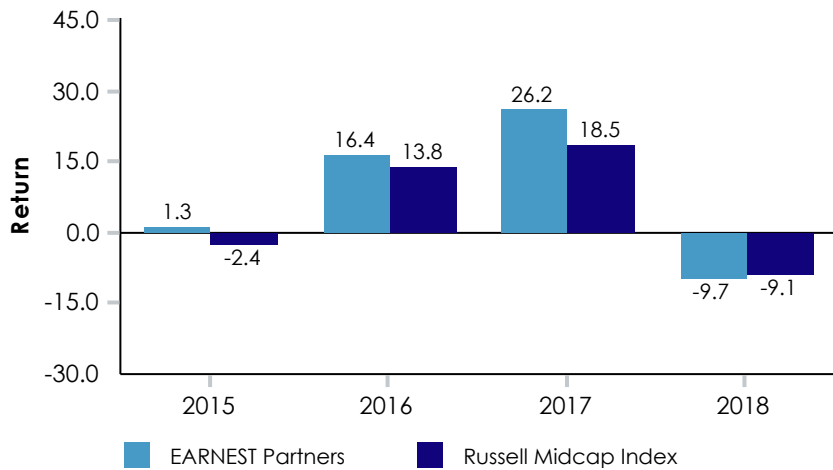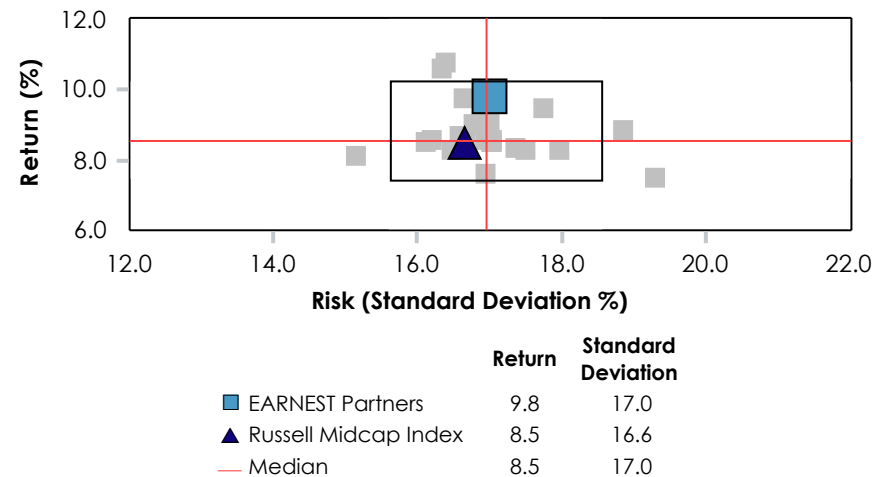
Rice Hall James - gross of fees

As of September 30, 2019

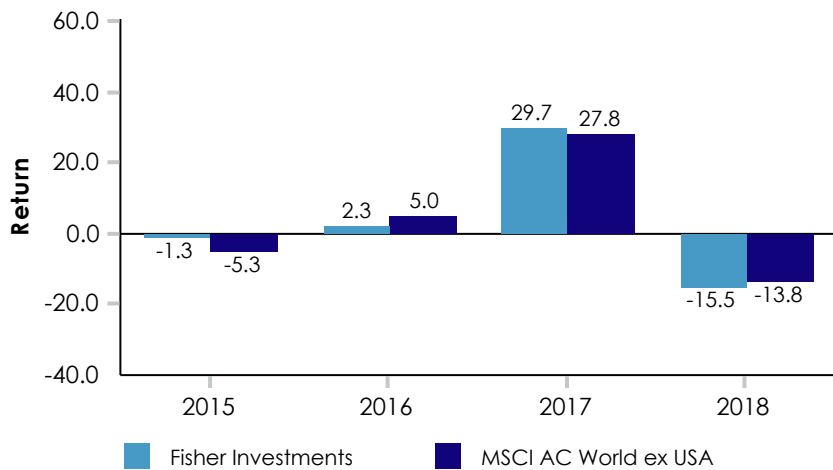|	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Rice Hall James	-0.26	0.92	-0.19	0.32	4.87	0.93	91.88	93.20	07/01/2017
Russell 2000 Growth Index	0.00	1.00	-	0.36	0.00	1.00	100.00	100.00	07/01/2017

Trailing Period Performance

Growth of $1 - Since Inception

Calendar Year Performance

Risk/Return - Since Inception

	Return	Standard Deviation
Rice Hall James	6.1	17.5
Russell 2000 Growth Index	6.9	18.4
Median	11.2	18.8
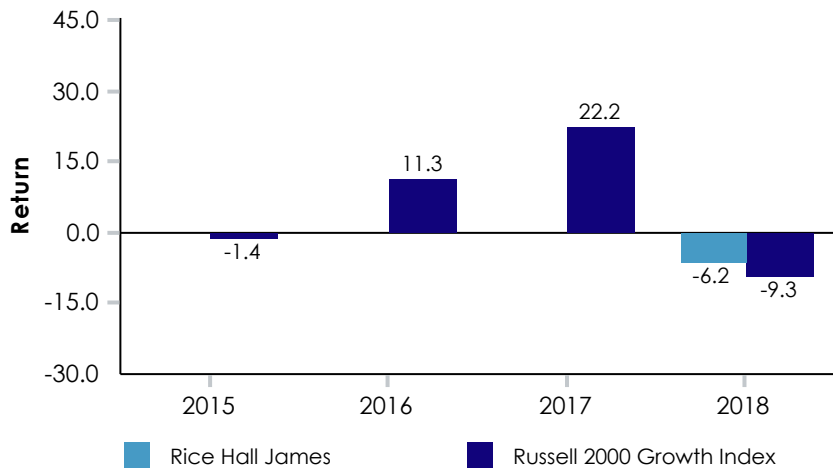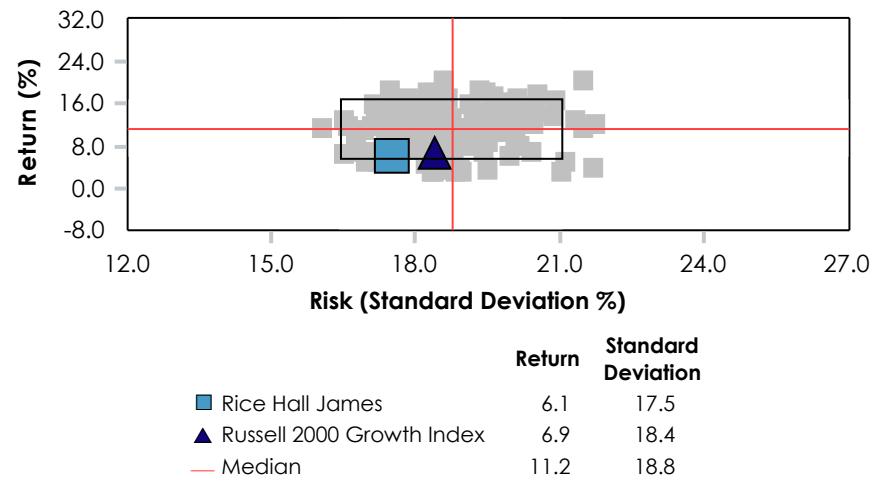
Hansberger - gross of fees

As of September 30, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Hansberger	0.53	1.09	0.25	0.27	3.99	0.96	108.00	105.05	02/01/2006
MSCI AC World ex USA	0.00	1.00	-	0.24	0.00	1.00	100.00	100.00	02/01/2006

Trailing Period Performance

Growth of $1 - Since Inception

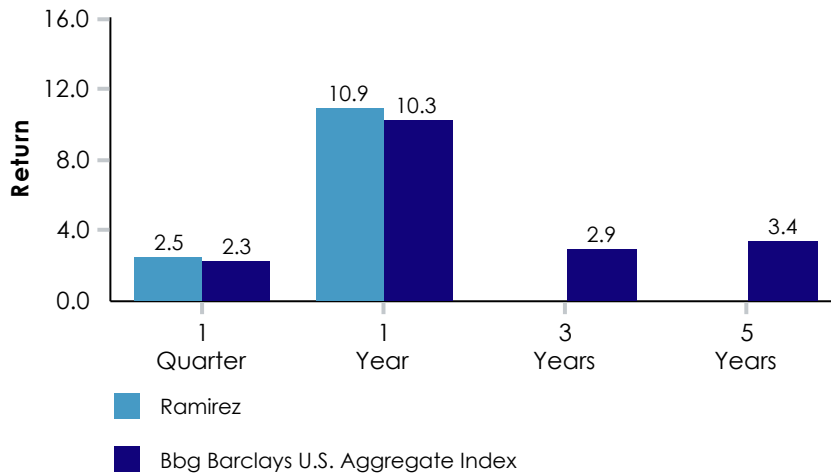## Calendar Year Performance

Risk/Return - Since Inception

	Return	Standard Deviation
Hansberger	4.6	19.2
MSCI AC World ex USA	3.9	17.3
Median	4.3	17.1
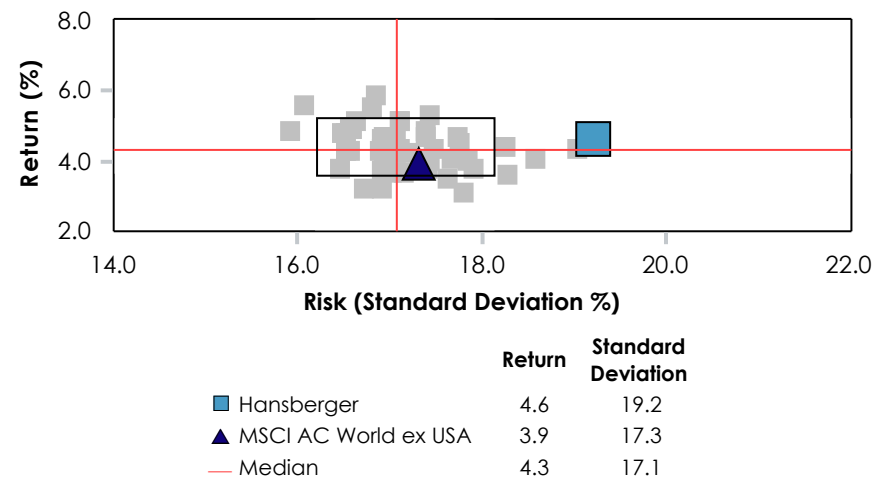
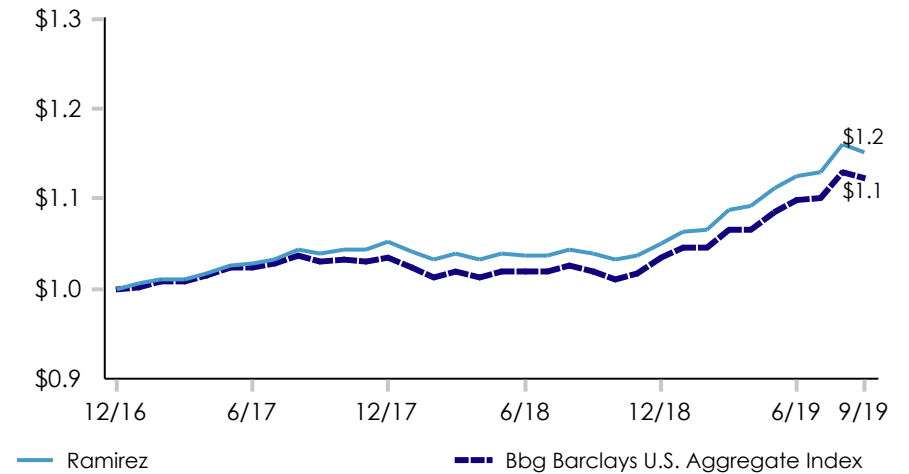# Fisher Investments - gross of fees

As of September 30, 2019

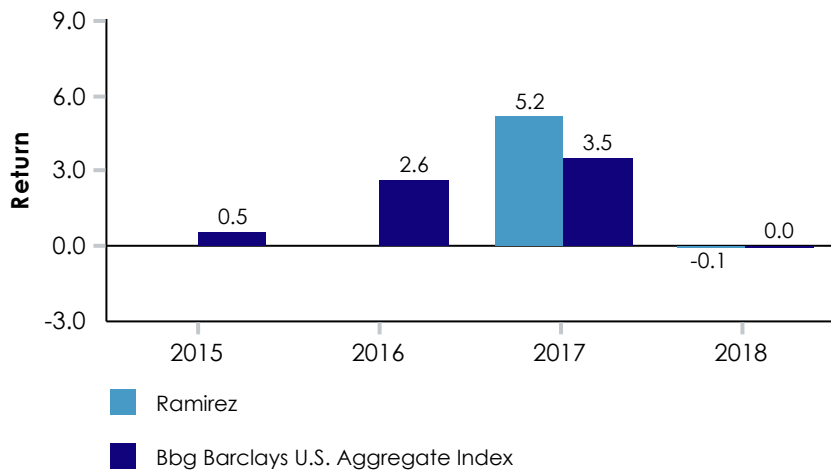|	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Fisher Investments	0.59	1.10	0.29	0.32	3.56	0.96	108.64	104.75	04/01/2011
MSCI AC World ex USA	0.00	1.00	-	0.28	0.00	1.00	100.00	100.00	04/01/2011

Trailing Period Performance

Growth of $1 - Since Inception

Calendar Year Performance

Risk/Return - Since Inception

	Return	Standard Deviation
■ Fisher Investments	4.4	15.6
▲ MSCI AC World ex USA	3.6	13.8
— Median	5.1	13.8

Oakland Police and Fire Retirement System
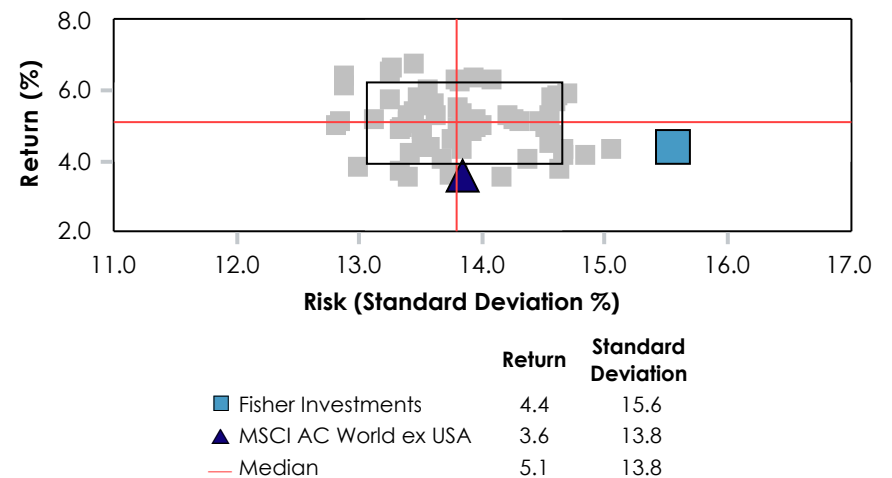
Ramirez - gross of fees

As of September 30, 2019

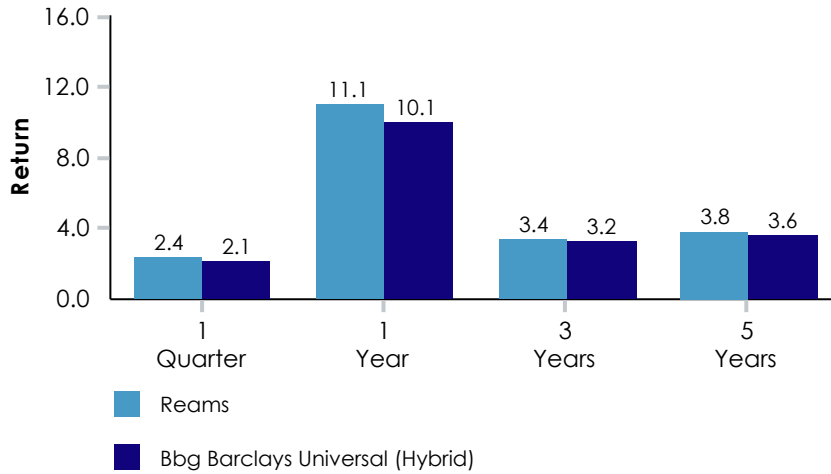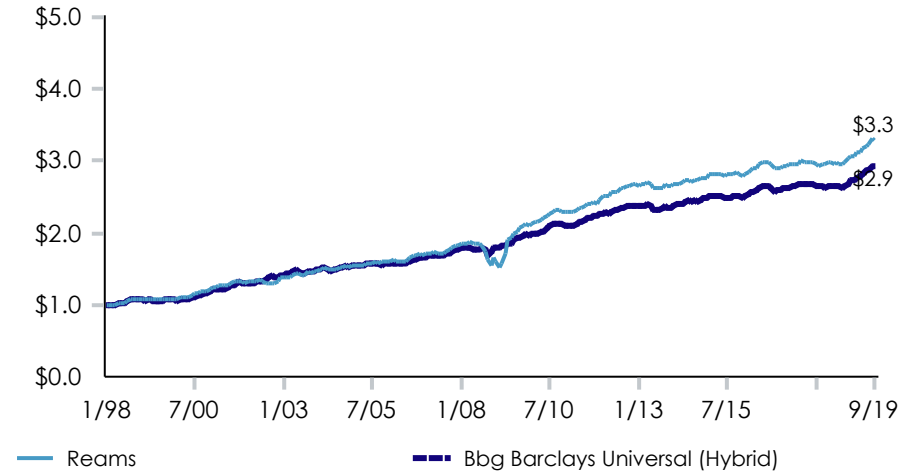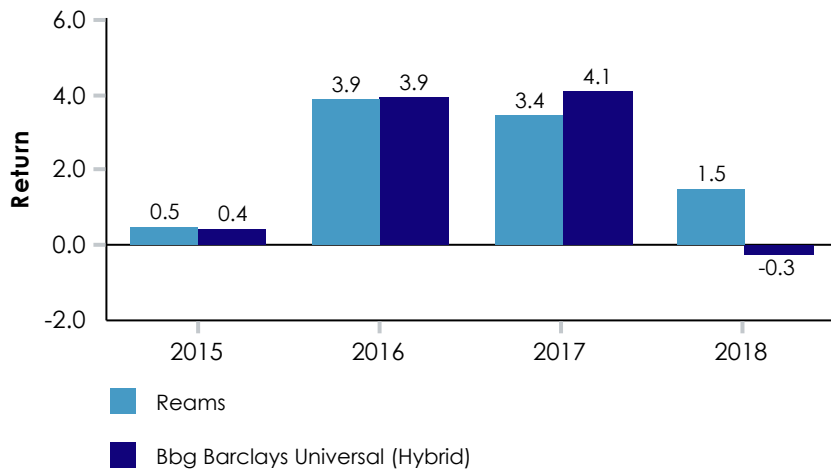|	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Ramirez	1.15	0.95	1.53	1.27	0.61	0.96	107.34	77.76	01/01/2017
Bbg Barclays U.S. Aggregate Index	0.00	1.00	-	0.91	0.00	1.00	100.00	100.00	01/01/2017

Trailing Period Performance

Growth of $1 - Since Inception

Calendar Year Performance

Risk/Return - Since Inception

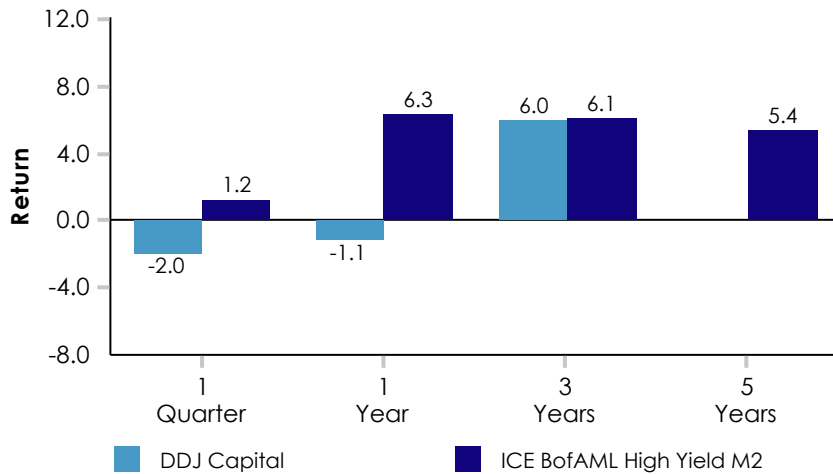|	Return	Standard Deviation
▢ Ramirez	5.3	2.9
▲ Bbg Barclays U.S. Aggregate Index	4.3	3.0
— Median	4.7	2.9
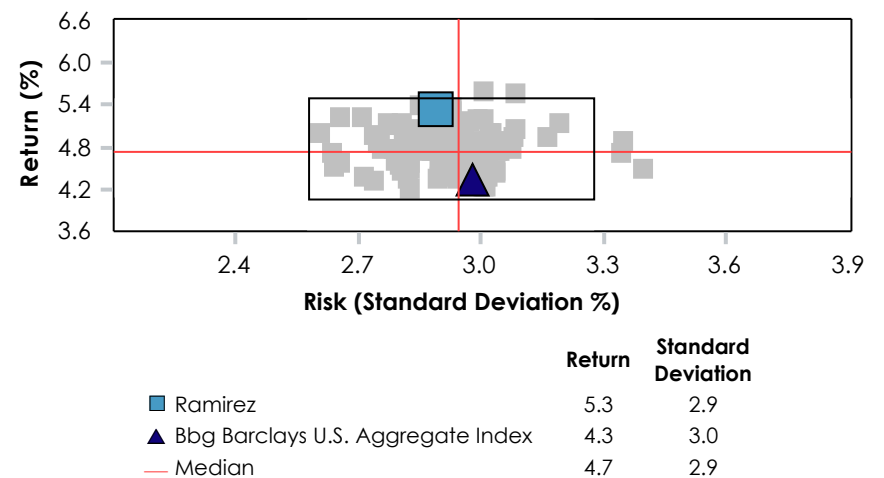
Reams - gross of fees

As of September 30, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Reams	0.32	1.06	0.16	0.70	3.93	0.45	109.68	103.42	02/01/1998
Bbg Barclays Universal (Hybrid)	0.00	1.00	-	0.91	0.00	1.00	100.00	100.00	02/01/1998

Trailing Period Performance

Growth of $1 - Since Inception

Calendar Year Performance

Risk/Return - Since Inception
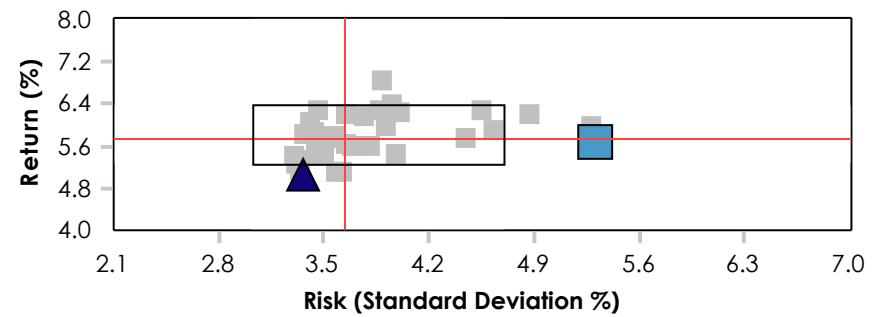
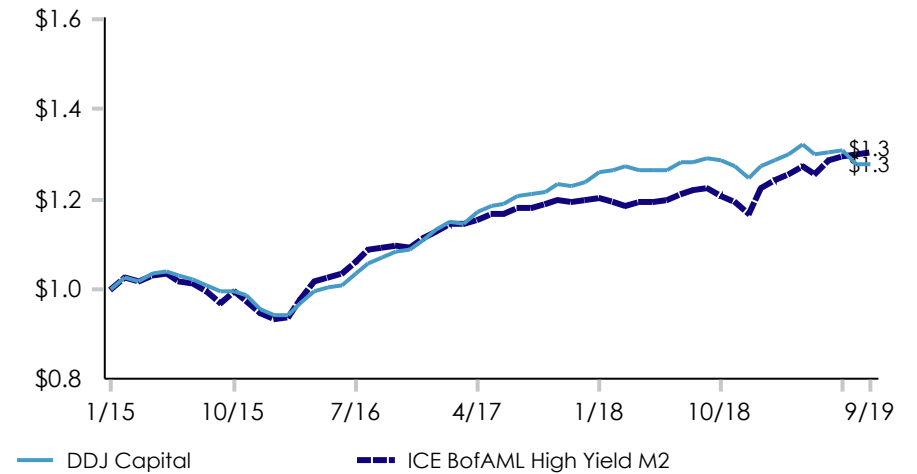|	Return	Standard Deviation
Reams	5.7	5.3
Bbg Barclays Universal (Hybrid)	5.1	3.4
Median	5.7	3.6

DDJ Capital - gross of fees

As of September 30, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
DDJ Capital	1.40	0.68	-0.15	0.93	3.28	0.64	81.40	68.77	02/01/2015
ICE BofAML High Yield M2	0.00	1.00	-	0.89	0.00	1.00	100.00	100.00	02/01/2015

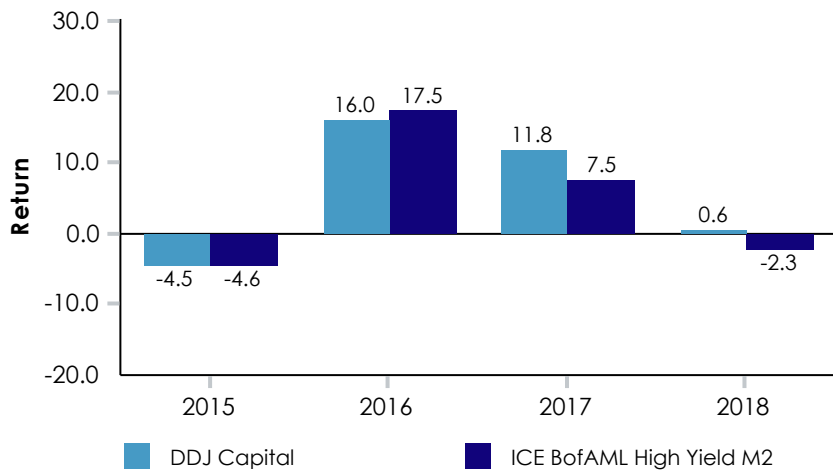### Trailing Period Performance

Growth of $1 - Since Inception

Calendar Year Performance
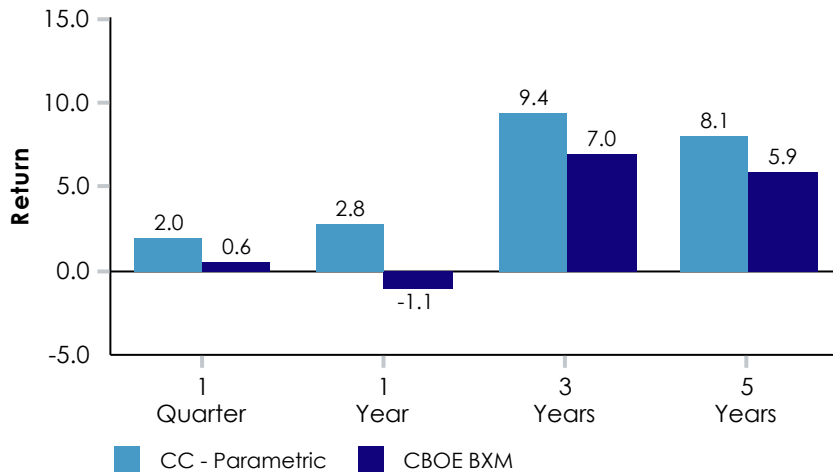

Risk/Return - Since Inception

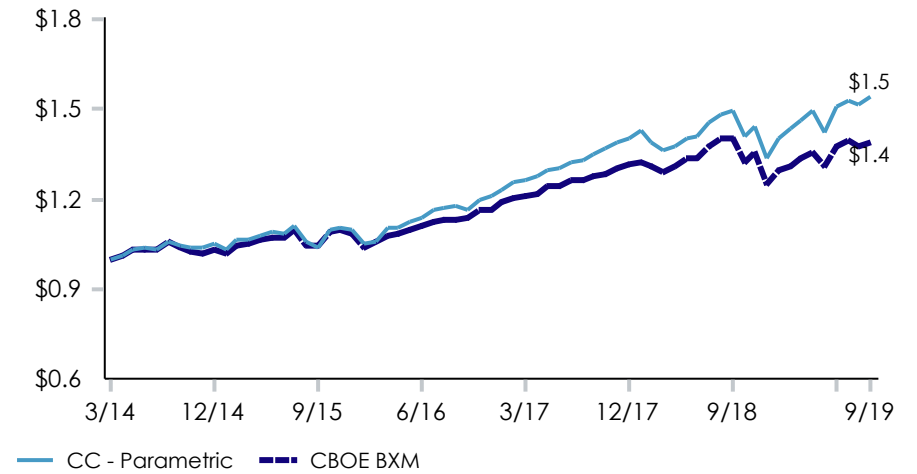|	Return	Standard Deviation
DDJ Capital	5.4	4.6
ICE BofAML High Yield M2	5.8	5.4
Median	5.6	4.8
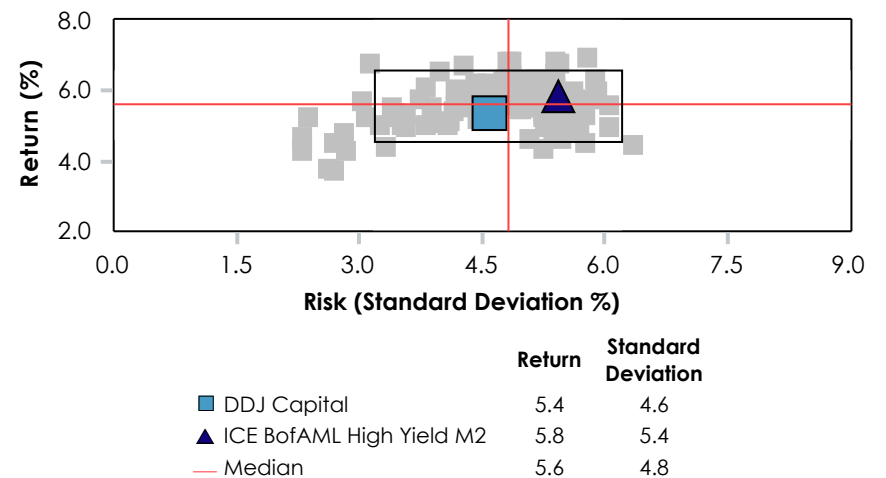
CC - Parametric - gross of fees

As of September 30, 2019

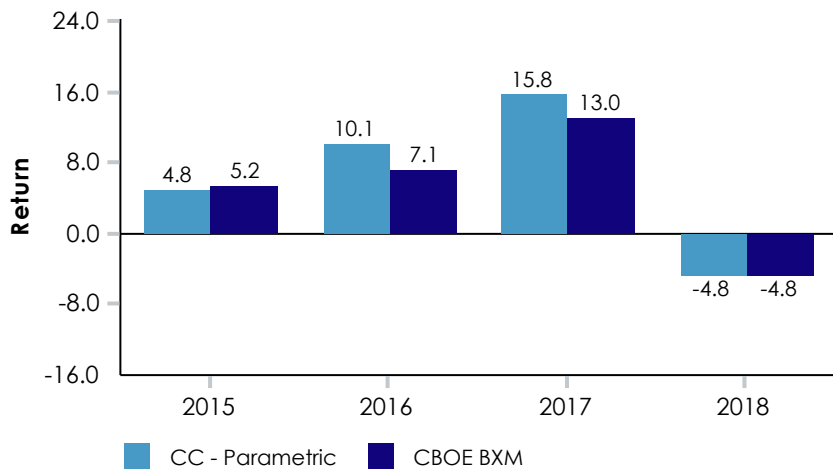|	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
CC - Parametric	1.41	1.09	0.85	0.89	2.32	0.93	120.18	109.08	04/01/2014
CBOE BXM	0.00	1.00	-	0.73	0.00	1.00	100.00	100.00	04/01/2014

Trailing Period Performance

Growth of $1 - Since Inception

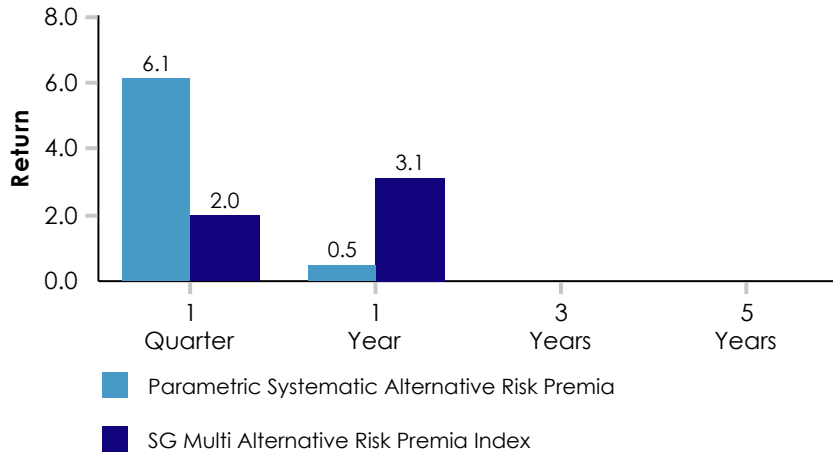## Calendar Year Performance

Risk/Return - Since Inception

	Return	Standard Deviation
■ CC - Parametric	8.1	8.3
▲ CBOE BXM	6.1	7.3
— Median	10.6	11.7
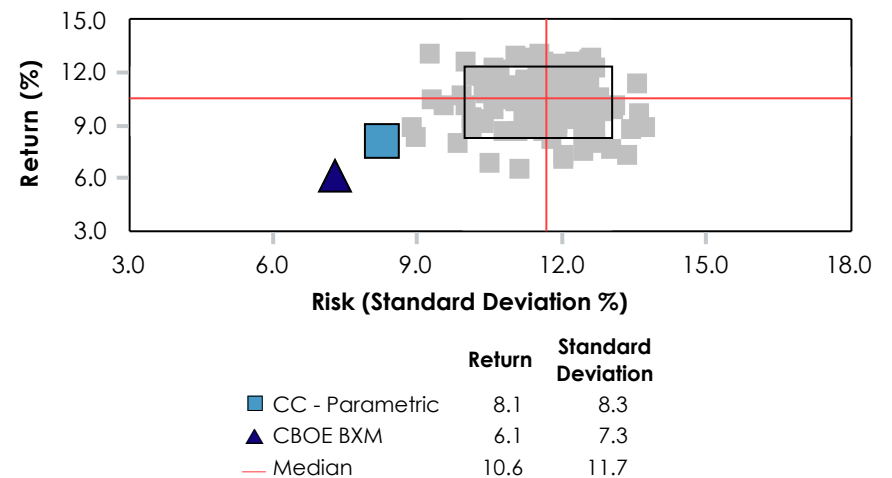
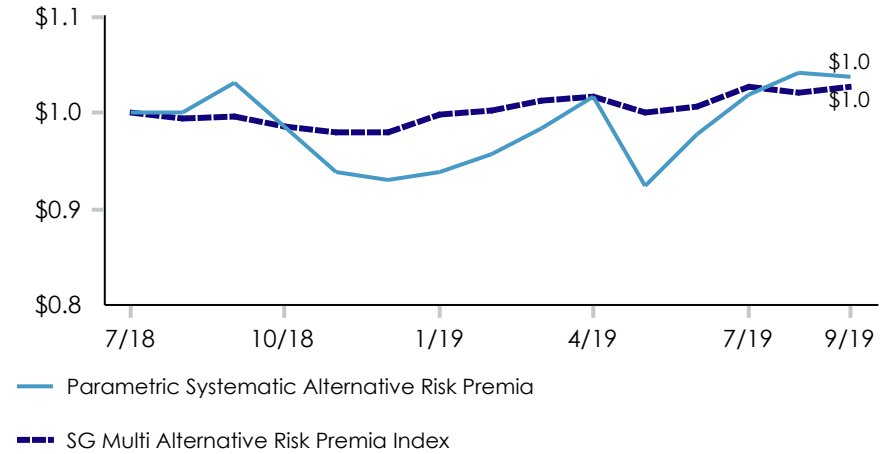# Parametric Systematic Alternative Risk Premia - gross of fees

As of September 30, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Parametric Systematic Alternative Risk Premia	-2.41	2.73	0.15	0.13	11.21	0.52	279.38	343.99	08/01/2018
SG Multi Alternative Risk Premia Index	0.00	1.00	-	0.03	0.00	1.00	100.00	100.00	08/01/2018

Trailing Period Performance

- ■ Parametric Systematic Alternative Risk Premia
- ■ SG Multi Alternative Risk Premia Index

Growth of $1 - Since Inception

- — Parametric Systematic Alternative Risk Premia
- ▬▬ SG Multi Alternative Risk Premia Index

Calendar Year Performance

No data found.

Risk/Return - Since Inception
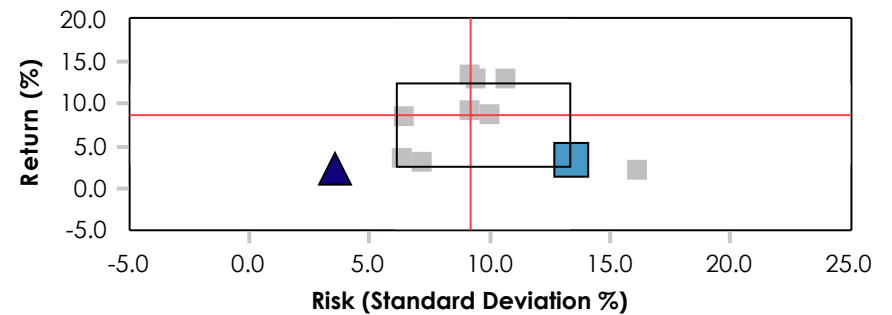
	Return	Standard Deviation
■ Parametric Systematic Alternative Risk Premia	3.2	13.5
▲ SG Multi Alternative Risk Premia Index	2.3	3.5
— Median	8.7	9.2

Domestic Equity Analysis
As of September 30, 2019

Style Map (5-Year)

Russell 1000 Value

Russell 1000 Growth

Russell 2000 Value

Russell 2000 Growth

Capitalization

Manager Style

- Style History
- Most Recent
- Average Style Exposure

Growth of $1 (5-Year)

$2.2

$2.0

$1.8

$1.6

$1.4

$1.2

$1.0

9/14 6/15 3/16 12/16 9/17 6/18 3/19 9/19

— Domestic Equity   — Russell 3000 (Hybrid)

Style Exposure

- Russell 2000 Growth
- Russell 2000 Value
- Russell Mid Cap Growth
- Russell Midcap Value
- Russell 1000 Growth
- Russell 1000 Value

0.0%   15.0%   30.0%   45.0%   60.0%

Style History (5-Year)

100

75

50

25

0

11/15 5/16 11/16 5/17 11/17 5/18 11/18 5/19 9/19

- Russell 1000 Value
- Russell 1000 Growth
- Russell Midcap Value
- Russell Mid Cap Growth
- Russell 2000 Value
- Russell 2000 Growth

International Equity Analysis
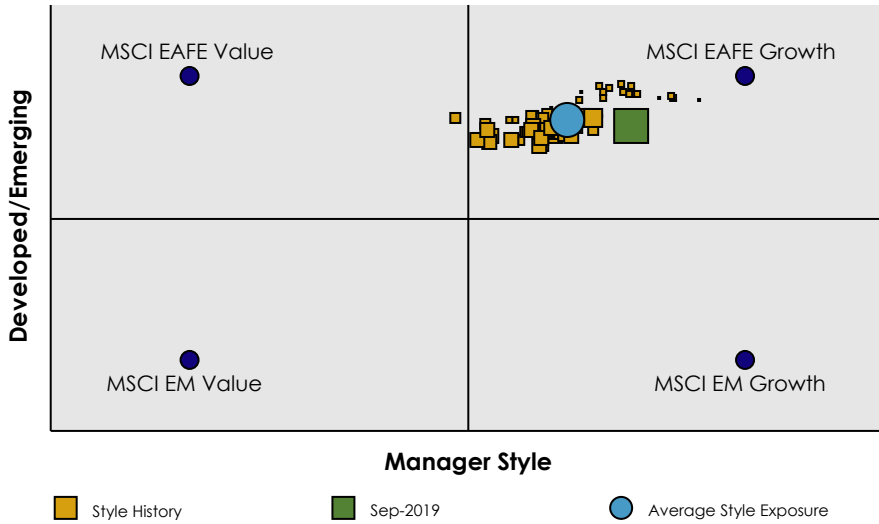## As of September 30, 2019

Style Map (5-Year)

MSCI EAFE Value

MSCI EAFE Growth

Developed/Emerging

MSCI EM Value

MSCI EM Growth

Manager Style

- Style History
- Sep-2019
- Average Style Exposure

Growth of $1 (5-Year)

$1.8

$1.5

$1.3

$1.2

$0.9

$0.6

9/14   6/15   3/16   12/16   9/17   6/18   3/19   9/19

— International Equity   — MSCI ACWI Ex US (Hybrid)

Style Exposure

MSCI EM Value

MSCI EM Growth

MSCI EAFE Value

MSCI EAFE Growth

0.0%   15.0%   30.0%   45.0%   60.0%   75.0%

Style History (5-Year)

100

75

50

25

0

11/15   5/16   11/16   5/17   11/17   5/18   11/18   5/19   9/19

- MSCI Japan
- MSCI Canada
- MSCI U.K.
- MSCI Australia
- MSCI Europe
- MSCI Pacific ex Japan
- MSCI EM
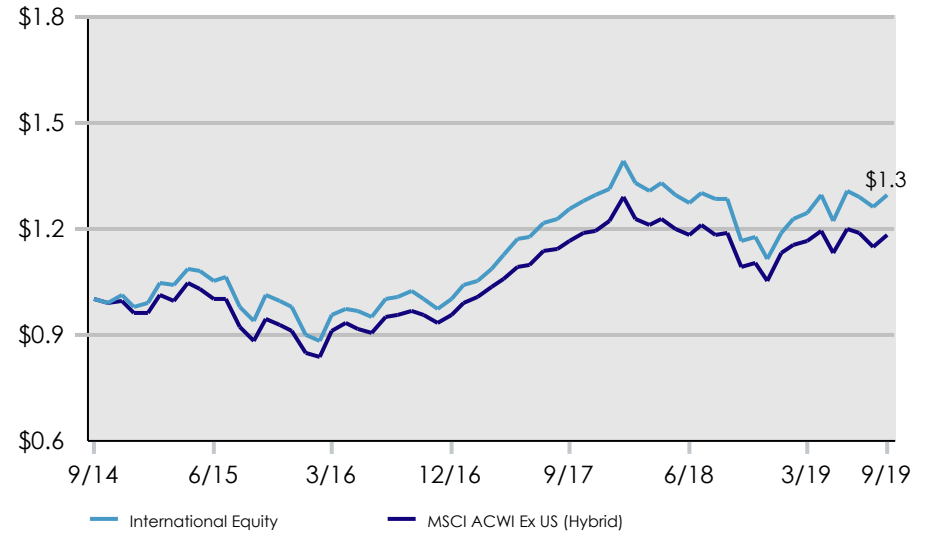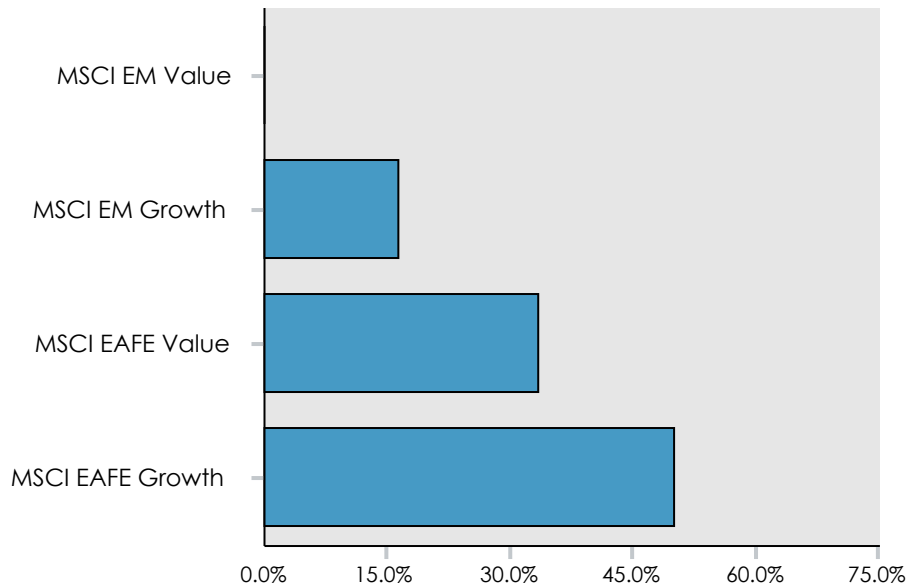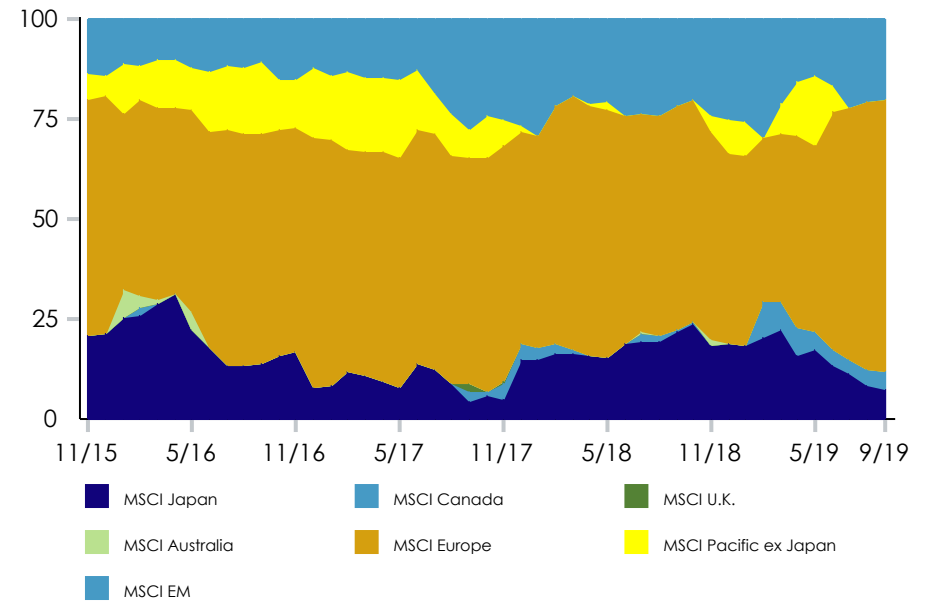
Fixed Income Analysis
As of September 30, 2019

Style Map (5-Year)

Quality / Maturity

- Short Treasuries
- Long Treasuries
- Short Credit
- Long Credit

■ Style History ■ Sep-2019 ● Average Style Exposure

Growth of $1 (5-Year)

$1.2

— Fixed Income — Bbg Barclays Universal (Hybrid)

Style Exposure

- Bbg BC U.S. Credit 5-10y
- Bbg BC U.S. Credit Short
- Bbg BC U.S. Treasury Short
- Bbg BC U.S. Treasury Long

0.0% 20.0% 40.0% 60.0% 80.0%

Style History (5-Year)

11/15 5/16 11/16 5/17 11/17 5/18 11/18 5/19 9/19

- ■ Bbg BC U.S. Govt. Long
- ■ Bbg BC U.S. Govt. Interm.
- ■ Bbg BC U.S. Govt. Short
- ■ Bbg BC U.S. Securitized
- ■ Bbg BC U.S. Corp. IG
- ■ BofAML US High Yield
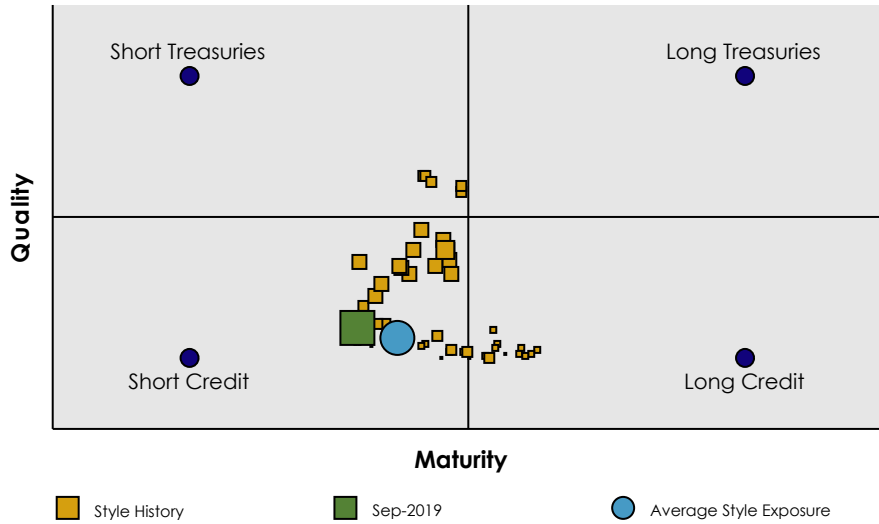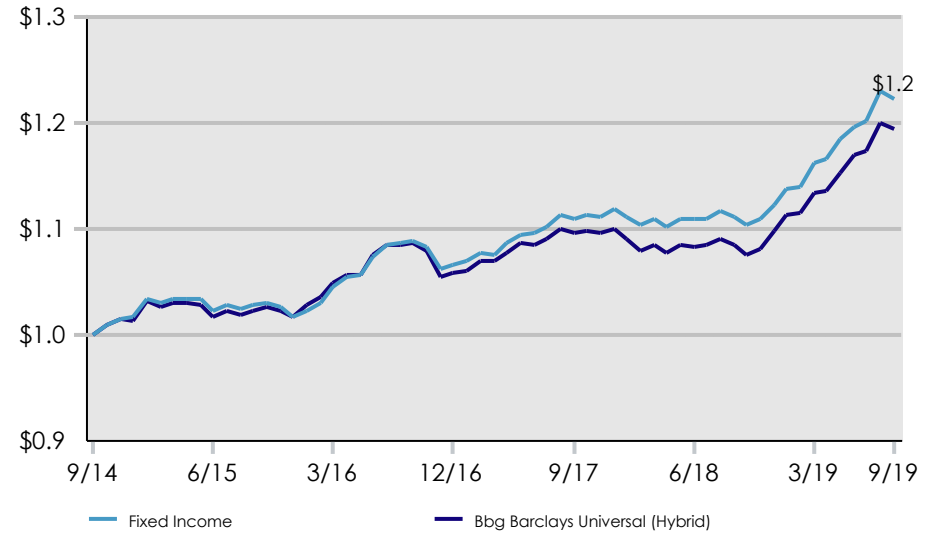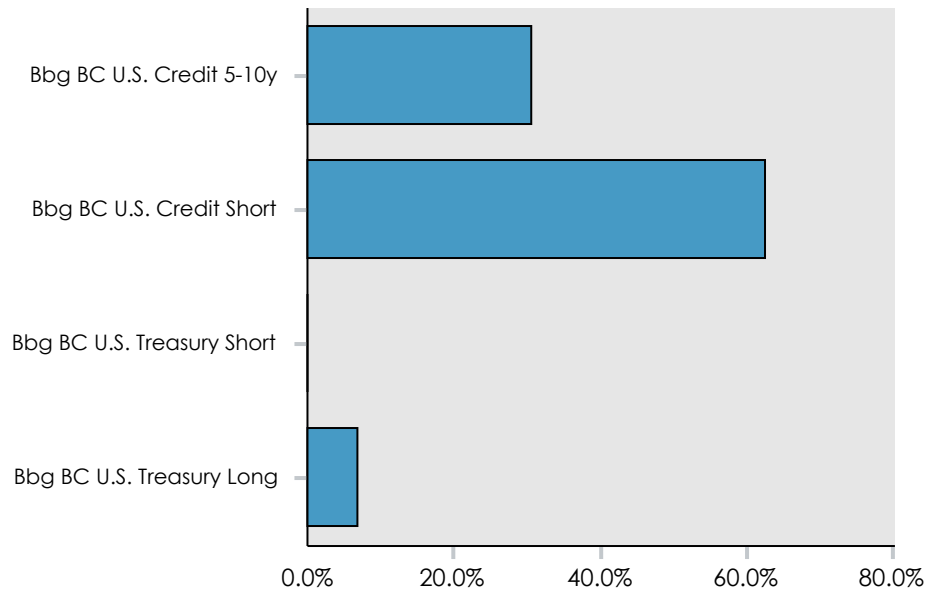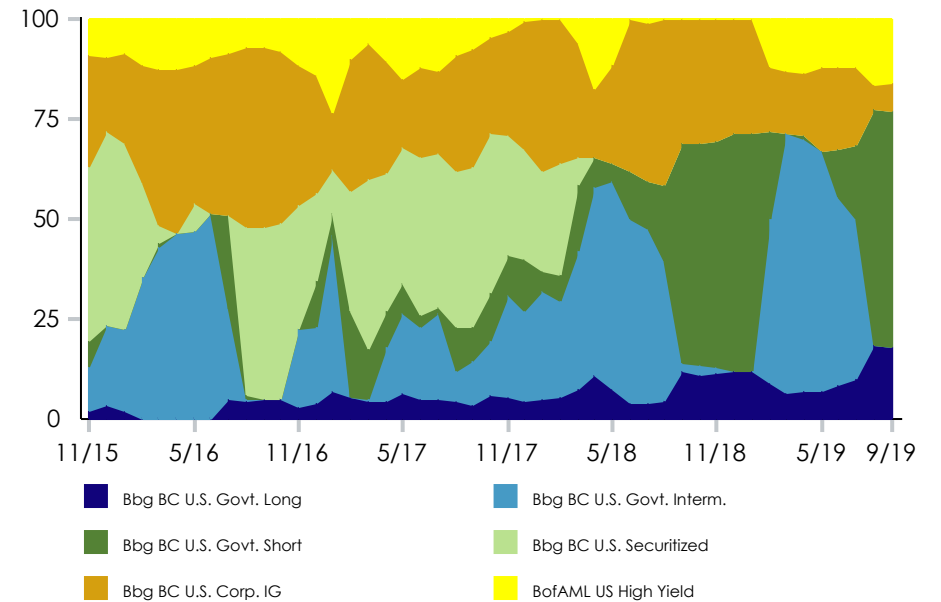
Glossary

Alpha

The premium an investment earns above a set standard. This is usually measured in terms of a common index (i.e., how the stock performs independent of the market). An Alpha is usually generated by regressing excess return on the S&P 500 excess return.

Annualized Performance

The annual rate of return that when compounded (t) times generates the same (t) period holding return as actually occurred from periods (1) to period (t).

Batting Average

Percentage of periods a portfolio outperforms a given index.

Beta

The measure of an asset's risk in relation to the Market (for example, the S&P 500) or to an alternative benchmark or factors. Roughly speaking, a security with a Beta of 1.5 will have moved, on average, 1.5 times the market return.

Bottom-up

A management style that de-emphasizes the significance of economic and market cycles, focusing instead on the analysis of individual stocks.

Dividend Discount Model

A method to value the common stock of a company that is based on the present value of the expected future dividends.

Growth Stock

Common stock of a company that has an opportunity to invest money and earn more than its opportunity cost of capital.

Information Ratio

The ratio of annualized expected residual return to residual risk. A central measurement for active management, value added is proportional to the square of the information ratio.

R - Squared

Square of the correlation coefficient. The proportion of the variability in one series that can be explained by the variability of one or more other series in a regression model. A measure of the quality of fit. 100% R-square means a perfect predictability.

Standard Deviation

The square root of the variance. A measure of dispersion of a set of data from its mean

Sharpe Ratio

A measure of a portfolio's excess return relative to the total variability of the portfolio.

Style Analysis

A returns-based analysis using a multi-factor attribution model. The model calculates a product's average exposure to particular investment styles over time (i.e., the products normal style benchmark).

Top-Down

Investment style that begins with an assessment of the overall economic environment and makes a general asset allocation decision regarding various sectors of the financial markets and various industries.

Tracking Error

The standard deviation of the difference between the returns of a portfolio and an appropriate benchmark.

Turnover

For mutual funds, a measure of trading activity during the previous year, expressed as a percentage of the average total assets of the fund. A turnover rate of 25% means that the value of trades represented (1/4) of the assets of the fund.

Value Stock

Stocks with low price/book ratios or price/earnings ratios. Historically, value stocks have enjoyed higher average returns than growth stocks (stocks with high price/book or price/earnings ratios) in a variety of countries.

Benchmark Definitions

Bloomberg Barclays Capital Universal: includes market coverage by the Aggregate Bond Index fixed rate debt issues, which are rated investment grade or higher by Moody's, S&P, or Fitch, in that order with all issues having at least one year to maturity and an outstanding par value of at least $100 million and includes exposures to high yield CMBS securities. All returns are market value weighted inclusive of accrued interest.

MSCI ACWI x US: MSCI ACWI (All Country World Index) Free excluding US (gross dividends): is a free-floating adjusted market capitalization index designed to measure equity performance in the global developed and emerging markets. As of April 2002, the index consisted of 49 developed and emerging market country indices.

MSCI EAFE (Europe, Australasia, Far East): is a free float-adjusted market capitalization index that is designed to measure developed market equity performance, excluding the US & Canada.

Russell 1000: measures the performance of the 1,000 largest securities in the Russell 3000 Index. Russell 1000 is highly correlated with the S&P 500 Index and capitalization-weighted.

Russell 1000 Growth: measures the performance of those Russell 1000 securities with a greater-than-average growth orientation. Securities in this index tend to exhibit higher price-to-book and price-earnings ratios, lower dividend yields and higher forecasted growth values than the Value universe.

Russell 1000 Value: measures the performance of those Russell 1000 securities with a less-than-average growth orientation. Securities in this index tend to exhibit lower price-to-book and price-earnings ratios, higher dividend yields and lower forecasted growth values than the Growth universe.

Russell Mid-Cap: measures the performance of the smallest 800 companies in the Russell 1000 Index, as ranked by total market capitalization.

Russell 2000: measures the performance of the 2,000 smallest securities in the Russell 3000 Index. Russell 2000 is market capitalization-weighted.

Russell 2000 Growth: measures the performance of those Russell 2000 securities with a greater-than-average growth orientation. Securities in this index tend to exhibit higher price-to-book and price-to-earnings ratios.

Russell 2000 Value: measures the performance of those Russell 2000 securities with a less-than-average growth orientation. Securities in this index tend to exhibit lower price-to-book and price-to-earnings ratios.

CBOE BXM: measures the performance of a hypothetical buy-write strategy on the S&P 500 Index.

ICE BofA ML U.S. High Yield Master II: Tracks the performance of US dollar denominated below investment grade rated corporate debt publically issued in the US domestic market. All securities in index must have a below investment grade rating and an investment grade rated country of risk (based on foreign currency long term sovereign debt ratings). Each securities have > 1 year remaining maturity, fixed coupon schedule, and a minimum amount outstanding of $100 million.

Societe Generale (SG) Multi-Alternative Risk Premia: Represents risk premia managers with programs diversified across multiple asset classes utilizing multiple risk premia factors. These managers trade multiple asset classes such as equities, fixed income, currencies, and in many cases commodities, and aim to capture a diversity of discrete risk premia, including most prevalently value, carry, and momentum. These multi-asset, multi-risk premia strategies are typically systematic. Single asset class and risk premia programs are excluded. The SG Multi Alternative Risk Premia Index is an equally weighed, non-investable index of funds

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RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

US Equity Markets:

Metric: P/E ratio = Price / "Normalized" earnings for the S&P 500 Index

To represent the price of US equity markets, we have chosen the S&P 500 index. This index has the longest published history of price, is well known, and also has reliable, long-term, published quarterly earnings. The price=P of the P/E ratio is the current price of the market index (the average daily price of the most recent full month for the S&P 500 index). Equity markets are very volatile. Prices fluctuate significantly during normal times and extremely during periods of market stress or euphoria. Therefore, developing a measure of earnings power (E) which is stable is vitally important, if the measure is to provide insight. While equity prices can and do double, or get cut in half, real earnings power does not change nearly as much. Therefore, we have selected a well known measure of real, stable earnings power developed by Yale Professor Robert Shiller known as the Shiller E-10. The calculation of E-10 is simply the average real annual earnings over the past 10 years. Over 10 years, the earnings shenanigans and boom and bust levels of earnings tend to even out (and often times get restated). Therefore, this earnings statistic gives a reasonably stable, slow-to-change estimate of average real earnings power for the index. Professor Shiller's data and calculation of the E-10 are available on his website at http://www.econ.yale.edu/~shiller/data.htm. We have used his data as the base for our calculations. Details of the theoretical justification behind the measure can be found in his book *Irrational Exuberance* [Princeton University Press 2000, Broadway Books 2001, 2nd ed., 2005].

Developed Equity Markets Excluding the US:

Metric: P/E ratio = Price / "Normalized" earnings for the MSCI EAFE Index

To represent the price of non-US developed equity markets, we have chosen the MSCI EAFE index. This index has the longest published history of price for non-US developed equities. The price=P of the P/E ratio is the current price of the market index (the average daily price of the most recent full month for the MSCI EAFE index). The price level of this index is available starting in December 1969. Again, for the reasons described above, we elected to use the Shiller E-10 as our measure of earnings (E). Since 12/1972, a monthly price earnings ratio is available from MSCI. Using this quoted ratio, we have backed out the implied trailing-twelve month earnings of the EAFE index for each month from 12/1972 to the present. These annualized earnings are then inflation adjusted using CPI-U to represent real earnings in US dollar terms for each time period. The Shiller E-10 for the EAFE index (10 year average real earnings) is calculated in the same manner as detailed above.

However, we do not believe that the pricing and earnings history of the EAFE markets are long enough to be a reliable representation of pricing history for developed market equities outside of the US. Therefore, in constructing the Long-Term Average Historical P/E for developed ex-US equities for comparison purposes, we have elected to use the US equity market as a developed market proxy, from 1881 to 1982. This lowers the Long-Term Average Historical P/E considerably. We believe this methodology provides a more realistic historical comparison for a market with a relatively short history.

Emerging Market Equity Markets

Metric: Ratio of Emerging Market P/E Ratio to Developed Market P/E Ratio

To represent the Emerging Markets P/E Ratio, we have chosen the MSCI Emerging Market Free Index, which has P/E data back to January 1995 on Bloomberg. To represent the Developed Markets PE Ratio, we have chosen the MSCI World Index, which also has data back to January 1995 on Bloomberg. Although there are issues with published, single time period P/E ratios, in which the denominator effect can cause large movements, we feel that the information contained in such movements will alert investors to market activity that they will want to interpret.

RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

US Private Equity Markets:

Metrics: S&P LCD Average EBITDA Multiples Paid in LBOs and US Quarterly Deal Volume

The Average Purchase Price to EBITDA multiples paid in LBOs is published quarterly by S&P in their LCD study. This is the total price paid (both equity and debt) over the trailing-twelve month EBITDA (earnings before interest, taxes, depreciation and amortization) as calculated by S&P LCD. This is the relevant, high-level pricing metric that private equity managers use in assessing deals. Data is published monthly.

US quarterly deal volume for private equity is the total deal volume in $ billions (both equity and debt) reported in the quarter by Thomson Reuters Buyouts. This metric gives a measure of the level of activity in the market. Data is published quarterly.

U.S Private Real Estate Markets:

Metrics: US Cap rates and Annual US Real Estate Deal Volume

Real estate cap rates are a measure of the price paid in the market to acquire properties versus their annualized income generation before financing costs (NOI=net operating income). The date is published by NCREIF. We chose to use current value cap rate. These are capitalization rates from properties that were revalued during the quarter. While this data does rely on estimates of value and therefore tends to be lagging, (estimated prices are slower to rise and slow to fall than transaction prices), the data series goes back to1979, providing a long data series for valuation comparison. Data is published quarterly.

Annual US real estate deal volume is the total deal transaction volume in $ billions (both equity and debt) reported by Real Capital Analytics during the trailing-twelve months. This metric gives the level of activity in the market. Data is published monthly.

Measure of Equity Market Fear / Uncertainty

Metric: VIX – Measure of implied option volatility for U.S. equity markets

The VIX is a key measure of near-term volatility conveyed by implied volatility of S&P 500 index option prices. VIX increases with uncertainty and fear. Stocks and the VIX are negatively correlated. Volatility tends to spike when equity markets fall.

Measure of Monetary Policy

Metric: Yield Curve Slope

We calculate the yield curve slope as the 10 year treasury yield minus the 1 year treasury yield. When the yield curve slope is zero or negative, this is a signal to pay attention. A negative yield curve slope signals lower rates in the future, caused by a contraction in economic activity. Recessions are typically preceded by an inverted (negatively sloped) yield curve. A very steep yield curve (2 or greater) indicates a large difference between shorter-term interest rates (the 1 year rate) and longer-term rates (the 10 year rate). This can signal expansion in economic activity in the future, or merely higher future interest rates.

RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

Definition of "extreme" metric readings

A metric reading is defined as "extreme" if the metric reading is in the top or bottom decile of its historical readings. These "extreme" reading should cause the reader to pay attention. These metrics have reverted toward their mean values in the past.

Credit Markets US Fixed Income:

Metric: Spreads

The absolute level of spreads over treasuries and spread trends (widening / narrowing) are good indicators of credit risk in the fixed income markets. Spreads incorporate estimates of future default, but can also be driven by technical dislocations in the fixed income markets. Abnormally narrow spreads (relative to historical levels) indicate higher levels of valuation risk, wide spreads indicate lower levels of valuation risk and / or elevated default fears. Investment grade bond spreads are represented by the Barclays Capital US Corporate Investment Grade Index Intermediate Component. The high yield corporate bond spreads are represented by the Barclays Capital US Corporate High Yield Index.

Measures of US Inflation Expectations

Metrics: Breakeven Inflation and Inflation Adjusted Commodity Prices

Inflation is a very important indicator impacting all assets and financial instruments. Breakeven inflation is calculated as the 10 year nominal treasury yield minus the 10 year real yield on US TIPS (treasury inflation protected securities). Abnormally low long-term inflation expectations are indicative of deflationary fears. A rapid rise in breakeven inflation indicates acceleration in inflationary expectations as market participants sell nominal treasuries and buy TIPs. If breakeven inflation continues to rise quarter over quarter, this is a signal of inflationary worries rising, which may cause Fed action and / or dollar decline.

Commodity price movement (above the rate of inflation) is an indication of anticipated inflation caused by real global economic activity putting pressure on resource prices. We calculate this metric by adjusted in the Dow Jones UBS Commodity Index (formerly Dow Jones AIG Commodity Index) by US CPI-U. While rising commodity prices will not necessarily translate to higher US inflation, higher US inflation will likely show up in higher commodity prices, particularly if world economic activity is robust.

These two measures of anticipated inflation can, and often are, conflicting.

Measures of US Treasury Bond Interest Rate Risk

Metrics: 10-Year Treasury Forward-Looking Real Yield and 10-Year Treasury Duration

The expected annualized real yield of the 10 year US Treasury Bond is a measure of valuation risk for US Treasuries. A low real yield means investors will accept a low rate of expected return for the certainly of receiving their nominal cash flows. MIG estimates the expected annualized real yield by subtracting an estimate of expected 10 year inflation (produced by the Survey of Professional Forecasters as collected by the Federal Reserve Bank of Philadelphia), from the 10 year Treasury constant maturity interest rate.

Duration for the 10-Year Treasury Bond is calculated based on the current yield and a price of 100. This is a measure of expected percentage movements in the price of the bond based on small movements in percentage yield. We make no attempt to account for convexity.

RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

What is the MIG Market Sentiment Indicator (PMSI)?

The PMSI is a measure meant to gauge the market's sentiment regarding economic growth risk. Growth risk cuts across most financial assets, and is the largest risk exposure that most portfolios bear. The PMSI takes into account the momentum (trend over time, positive or negative) of the economic growth risk exposure of publicly traded stocks and bonds, as a signal of the future direction of growth risk returns; either positive (risk seeking market sentiment), or negative (risk averse market sentiment).

How do I read the MIG Market Sentiment Indicator (PMSI) graph?

Simply put, the PMSI is a color coded indicator that signals the market's sentiment regarding economic growth risk. It is read left to right chronologically. A green indicator on the PMSI indicates that the market's sentiment towards growth risk is positive. A gray indicator indicates that the market's sentiment towards growth risk is neutral or inconclusive. A red indicator indicates that the market's sentiment towards growth risk is negative. The black line on the graph is the level of the PMSI. The degree of the signal above or below the neutral reading is an indication the signal's current strength.

How is the MIG Market Sentiment Indicator (PMSI) Constructed?

The PMSI is constructed from two sub-elements representing investor sentiment in stocks and bonds:

1.Stock return momentum: Return momentum for the S&P 500 Equity Index (trailing 12-months)

2.Bond yield spread momentum: Momentum of bond yield spreads (excess of the measured bond yield over the identical duration U.S. Treasury bond yield) for corporate bonds (trailing 12-months) for both investment grade bonds (75% weight) and high yield bonds (25% weight). The scale of this measure is adjusted to match that of the stock return momentum measure.

The black line reading on the graph is calculated as the average of the stock return momentum measure and the bonds spread momentum measure. The color reading on the graph is determined as follows:

1.If both stock return momentum and bond spread momentum are positive = GREEN (positive)

2.If one of the momentum indicators is positive, and the other negative = GRAY (inconclusive)

3.If both stock return momentum and bond spread momentum are negative = RED (negative)

What does the MIG Market Sentiment Indicator (PMSI) mean? Why might it be useful?

There is strong evidence that time series momentum is significant and persistent. In particular, across an extensive array of asset classes, the sign of the trailing 12-month return (positive or negative) is indicative of future returns (positive or negative) over the next 12 month period. The PMSI is constructed to measure this momentum in stocks and corporate bond spreads. A reading of green or red is agreement of both the equity and bond measures, indicating that it is likely that this trend (positive or negative) will continue over the next 12 months. When the measures disagree, the indicator turns gray. A gray reading does not necessarily mean a new trend is occurring, as the indicator may move back to green, or into the red from there. The level of the reading (black line) and the number of months at the red or green reading, gives the user additional information on which to form an opinion, and potentially take action.

Momentum is defined as the persistence of relative performance. There is a significant amount of academic evidence indicating that positive momentum (e.g., strong performing stocks over the recent past continue to post strong performance into the near future) exists over near-to-intermediate holding periods. See, for example, "Understanding Momentum," *Financial Analysts Journal*, Scowcroft, Sefton, March, 2005.