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MEMORANDUM

TO: HONORABLE MAYOR &
CITY COUNCIL

FROM: Adam Benson
Director of Finance

SUBJECT: Oakland Police and Fire Retirement
System's Investment Portfolio

DATE: August 3, 2020

INFORMATION

As a continued best practice and in accordance with the City of Oakland Charter, the Finance Department will publish a quarterly informational report on the performance of Oakland Police and Fire Retirement System's ("PFRS") investment portfolio to the City Council.

The Oakland Police and Fire Retirement System is a closed defined benefit plan established by the City of Oakland's (the "City") Charter. PFRS is governed by a board of seven trustees (the "PFRS Board"). PFRS covers the City's sworn police and fire employees hired prior to July 1, 1976. PFRS was closed to new members on June 30, 1976. As of March 31, 2020, PFRS had 772 retired members and no active members.

For the quarter ended March 31, 2020, the PFRS Investment Portfolio had a balance of \$341.5 million and generated a quarterly return of -15.6 percent, gross of fees, underperforming its policy benchmark by -3.4 percent. The portfolio also underperformed its benchmark by -3.5 percent over the one-year period, -0.5 percent over the three-year period, and -0.5 percent over the five-year period. This is discussed in more detail in the attached Investment Quarterly report.

As of the most recent PFRS actuarial valuation dated July 1, 2019, the PFRS Funded Ratio (market value of assets divided by present value of future benefits) is 61.8 percent. The City is currently making annual required contributions to PFRS. The required contribution for fiscal year 2020/2021 is \$43.65 million. The City funds these contributions from a voter approved ad valorem tax on all property within the City of Oakland. This tax is specifically dedicated to fund PFRS pension obligations.

The attached Quarterly Investment Performance report (*Attachment A*) provided by the PFRS Investment Consultant, Meketa Investment Group (MIG) summarizes the performance of the PFRS investment portfolio for the quarter ended December 31, 2019.

HONORABLE MAYOR AND MEMBERS OF CITY COUNCIL

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For questions regarding this report, please contact Teir Jenkins, Investment Officer, at (510) 238-6481.

Respectfully submitted,



ADAM BENSON
Director of Finance

Attachment A: Oakland Police and Fire System Quarterly Investment Performance Report as of March 31, 2020

Oakland Police and Fire Retirement System

Q1 2020

Quarterly Report

1. Total Portfolio Summary
2. World Markets First Quarter of 2020
3. Capital Markets Outlook & Risk Metrics
 - Meketa Market Sentiment Indicator
4. Total Portfolio Review
5. Manager Monitoring / Probation List
6. Individual Manager Performance
7. Disclaimer, Glossary, and Notes

Total Portfolio Summary

Total Portfolio Summary

As of March 31, 2020, the City of Oakland Police and Fire Retirement System (OPFRS) portfolio had an aggregate value of \$341.5 million. This represents a (\$63.4) million decrease in investment value and (\$3.3) million in benefit payments over the quarter. During the previous one-year period, the OPFRS Total Portfolio decreased in value by (\$24.6) million and withdrew (\$14.6) million for benefit payments.

Asset Allocation Trends

The asset allocation targets (see table on page 52) reflect those as of March 31, 2020. 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 overweight Fixed Income, Covered Calls and Cash, while underweight Domestic Equity, International Equity and Crisis Risk Offset.

Recent Investment Performance

During the most recent quarter, the OPFRS Total Portfolio generated an absolute return of (15.6%), gross of fees, underperforming its policy benchmark by (340) basis points. The portfolio underperformed its benchmark by (3.5%) and (0.5%) over the 1- and 3-year periods, respectively, and underperformed by (50) basis points over the 5-year period.

The Total Portfolio underperformed the Median fund's return over the most recent quarter. The Total Portfolio underperformed the Median fund over the 1-year period by (1.8%), but outperformed over the 3- and 5-year periods 0.1% and 0.3% 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 | -15.6 | -9.8 | -6.8 | 3.1 | 4.1 |
| Policy Benchmark ² | -12.2 | -6.6 | -3.3 | 3.6 | 4.6 |
| Excess Return | -3.4 | -3.2 | -3.5 | -0.5 | -0.5 |
| Reference: Median Fund ³ | -13.3 | -7.9 | -5.0 | 3.0 | 3.8 |
| Reference: Total Net of Fees ⁴ | -15.7 | -9.9 | -7.1 | 2.8 | 1.5 |

¹ Gross of Fees. Performance since 2005 includes securities lending.

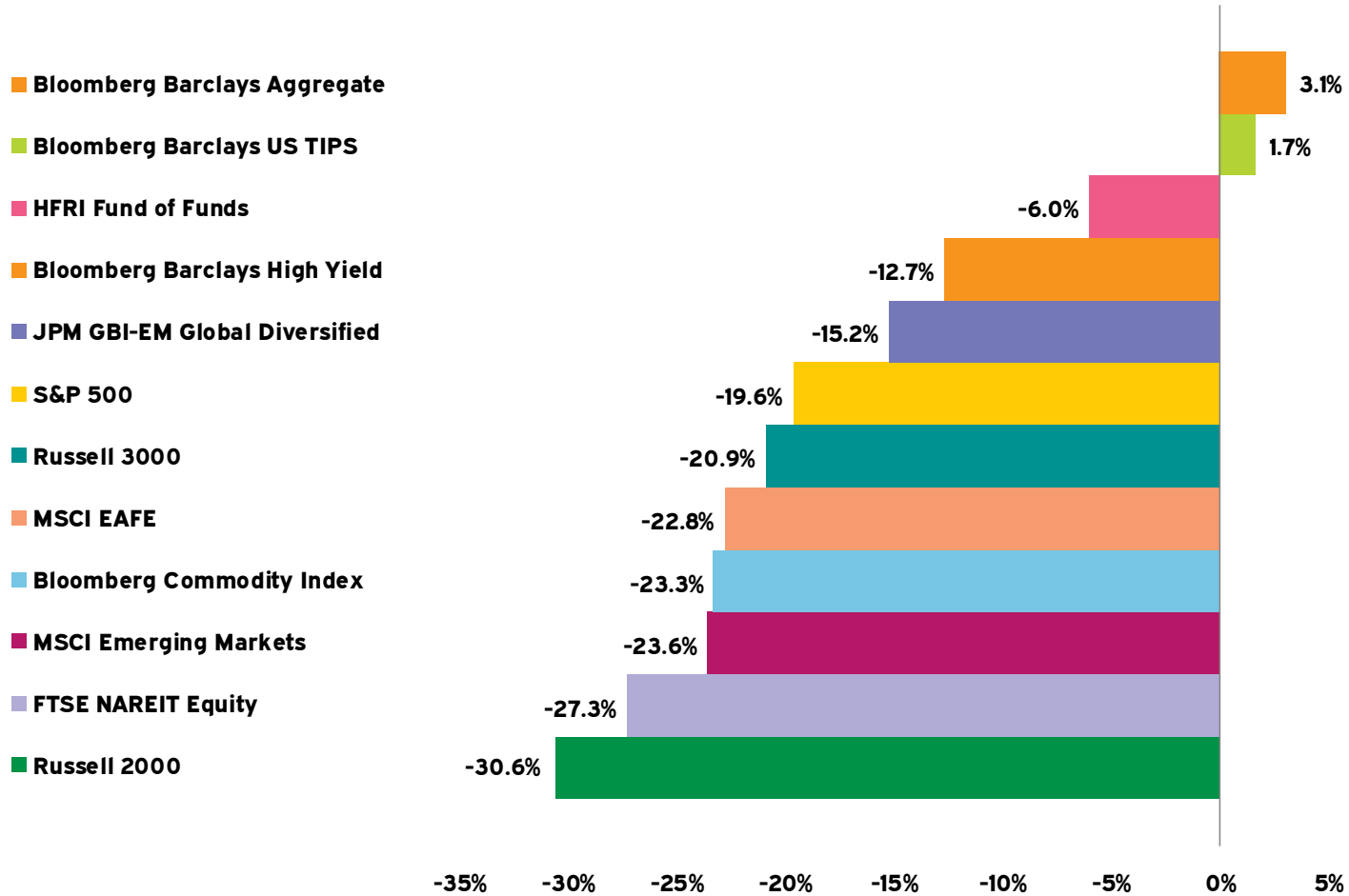
² Evolving Policy Benchmark consists of 40% Russell 3000, 12% MSCI ACWI ex U.S., 33% Bbg BC Universal, 5% CBOE BXM, 6.7% SG Multi Asset Risk Premia, 3.3% Bbg BC Long Treasury

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 First Quarter of 2020

The World Markets¹ First Quarter of 2020



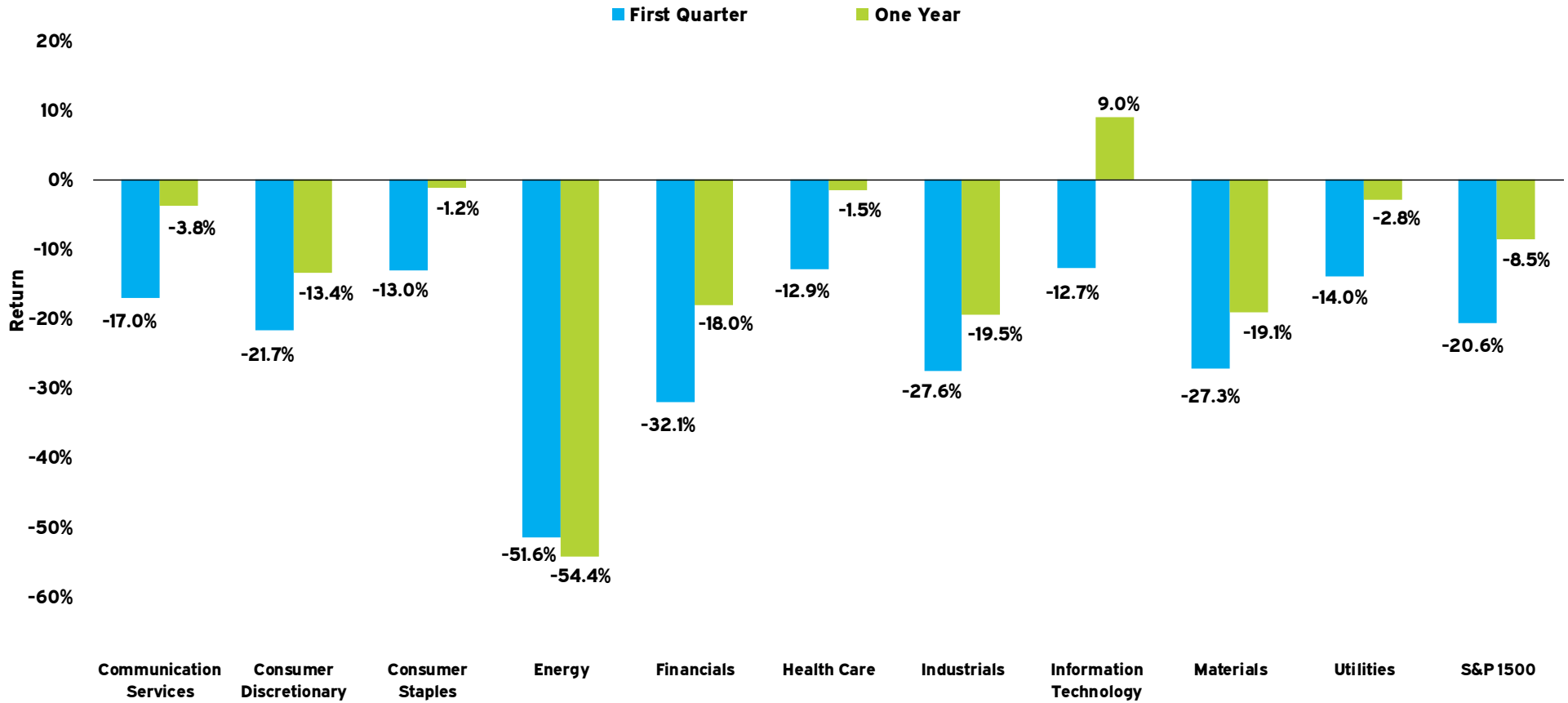
¹ Source: InvestorForce.

Index Returns¹

| | 1Q20 (%) | 1 YR (%) | 3 YR (%) | 5 YR (%) | 10 YR (%) |
|--|-------------|-------------|-------------|-------------|--------------|
| Domestic Equity | | | | | |
| S&P 500 | -19.6 | -7.0 | 5.1 | 6.7 | 10.5 |
| Russell 3000 | -20.9 | -9.1 | 4.0 | 5.8 | 10.1 |
| Russell 1000 | -20.2 | -8.0 | 4.6 | 6.2 | 10.4 |
| Russell 1000 Growth | -14.1 | 0.9 | 11.3 | 10.4 | 13.0 |
| Russell 1000 Value | -26.7 | -17.2 | -2.2 | 1.9 | 7.7 |
| Russell MidCap | -27.1 | -18.3 | -0.8 | 1.8 | 8.8 |
| Russell MidCap Growth | -20.0 | -9.4 | 6.5 | 5.6 | 10.9 |
| Russell MidCap Value | -31.7 | -24.1 | -6.0 | -0.8 | 7.2 |
| Russell 2000 | -30.6 | -24.0 | -4.6 | -0.2 | 6.9 |
| Russell 2000 Growth | -25.8 | -18.6 | 0.1 | 1.7 | 8.9 |
| Russell 2000 Value | -35.7 | -29.6 | -9.5 | -2.4 | 4.8 |
| Foreign Equity | | | | | |
| MSCI ACWI (ex. US) | -23.4 | -15.6 | -2.0 | -0.6 | 2.1 |
| MSCI EAFE | -22.8 | -14.4 | -1.8 | -0.6 | 2.7 |
| MSCI EAFE (Local Currency) | -20.5 | -12.6 | -1.8 | -0.1 | 4.4 |
| MSCI EAFE Small Cap | -27.5 | -18.1 | -2.9 | 1.0 | 4.8 |
| MSCI Emerging Markets | -23.6 | -17.7 | -1.6 | -0.4 | 0.7 |
| MSCI Emerging Markets (Local Currency) | -19.1 | -13.0 | 1.3 | 2.0 | 3.8 |
| Fixed Income | | | | | |
| Bloomberg Barclays Universal | 1.3 | 7.2 | 4.4 | 3.4 | 4.0 |
| Bloomberg Barclays Aggregate | 3.1 | 8.9 | 4.8 | 3.4 | 3.9 |
| Bloomberg Barclays US TIPS | 1.7 | 6.9 | 3.5 | 2.7 | 3.5 |
| Bloomberg Barclays High Yield | -12.7 | -6.9 | 0.8 | 2.8 | 5.6 |
| JPM GBI-EM Global Diversified | -15.2 | -6.5 | -0.8 | 0.3 | 0.4 |
| Other | | | | | |
| FTSE NAREIT Equity | -27.3 | -21.3 | -3.1 | -0.3 | 7.4 |
| Bloomberg Commodity Index | -23.3 | -22.3 | -8.6 | -7.8 | -6.7 |
| HFRI Fund of Funds | -6.0 | -2.6 | 1.0 | 0.6 | 2.1 |

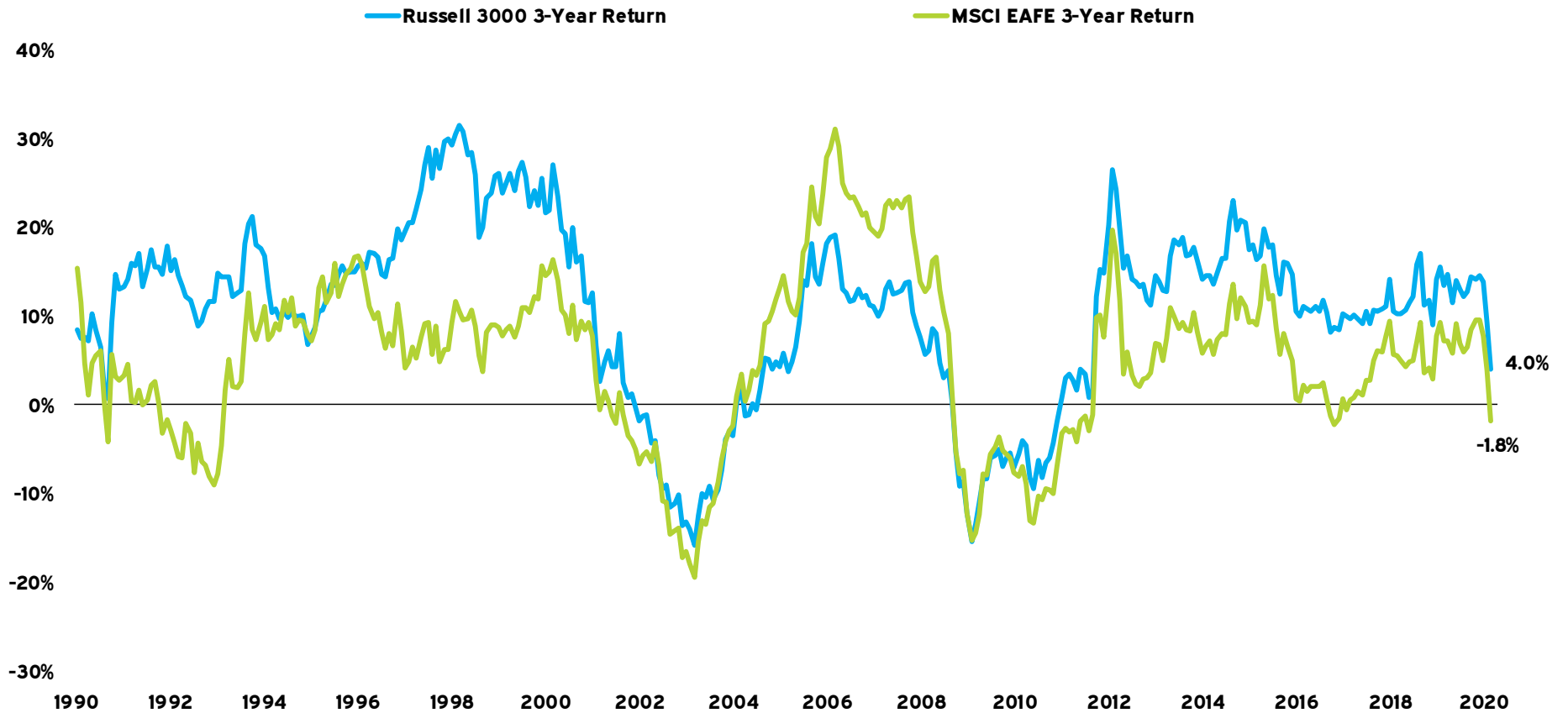
¹ Source: InvestorForce.

S&P Sector Returns¹



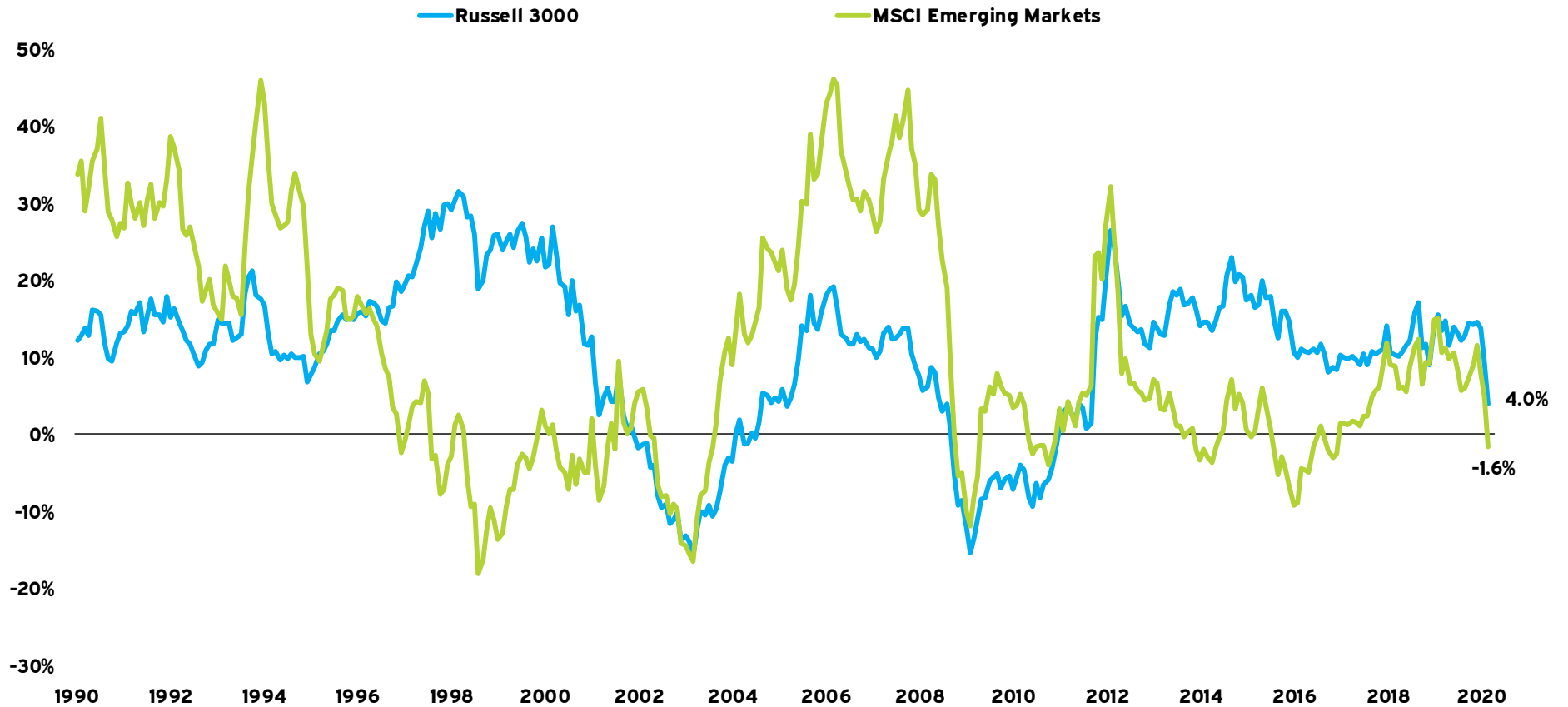
¹ Source: InvestorForce. Represents S&P 1500 (All Cap) data.

US and Developed Market Foreign Equity Rolling Three-Year Returns¹



¹ Source: InvestorForce.

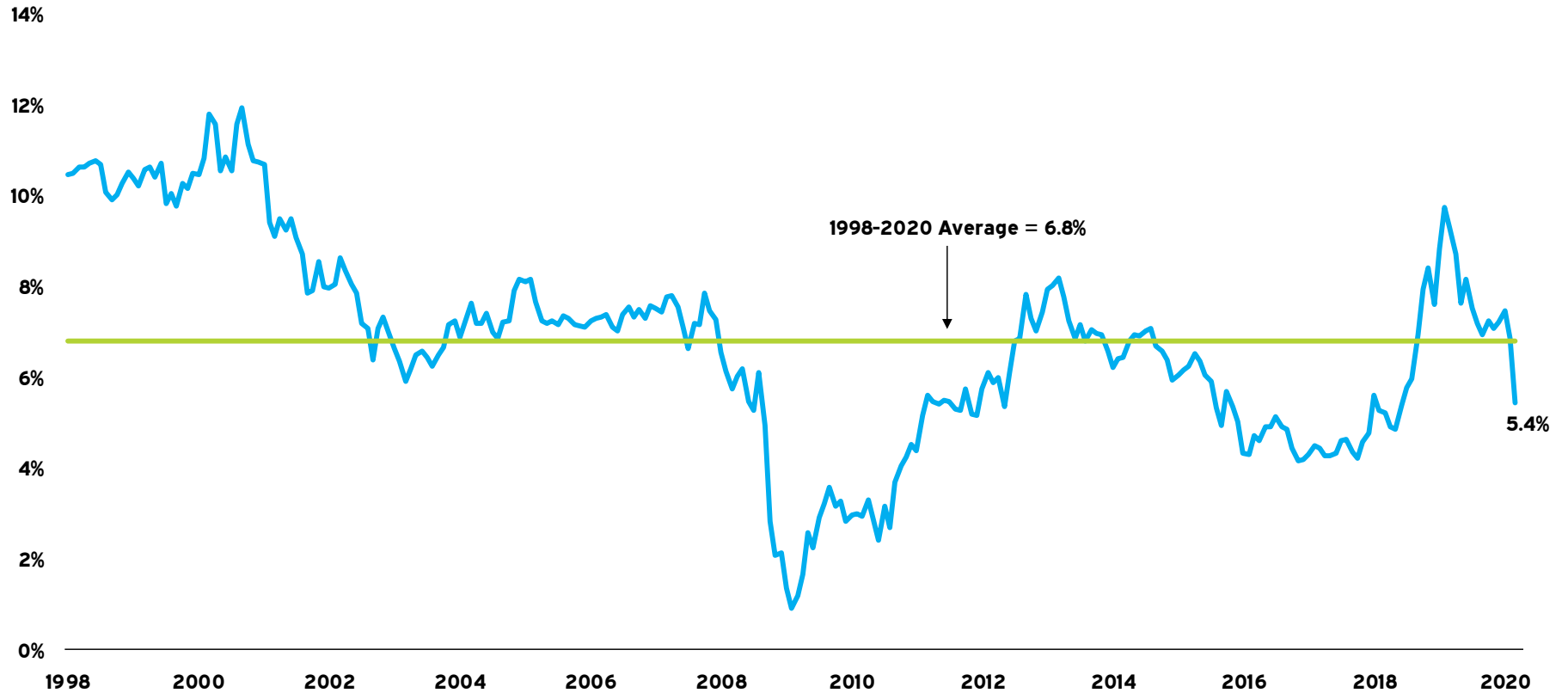
US and Emerging Market Equity Rolling Three-Year Returns¹



¹ Source: InvestorForce.

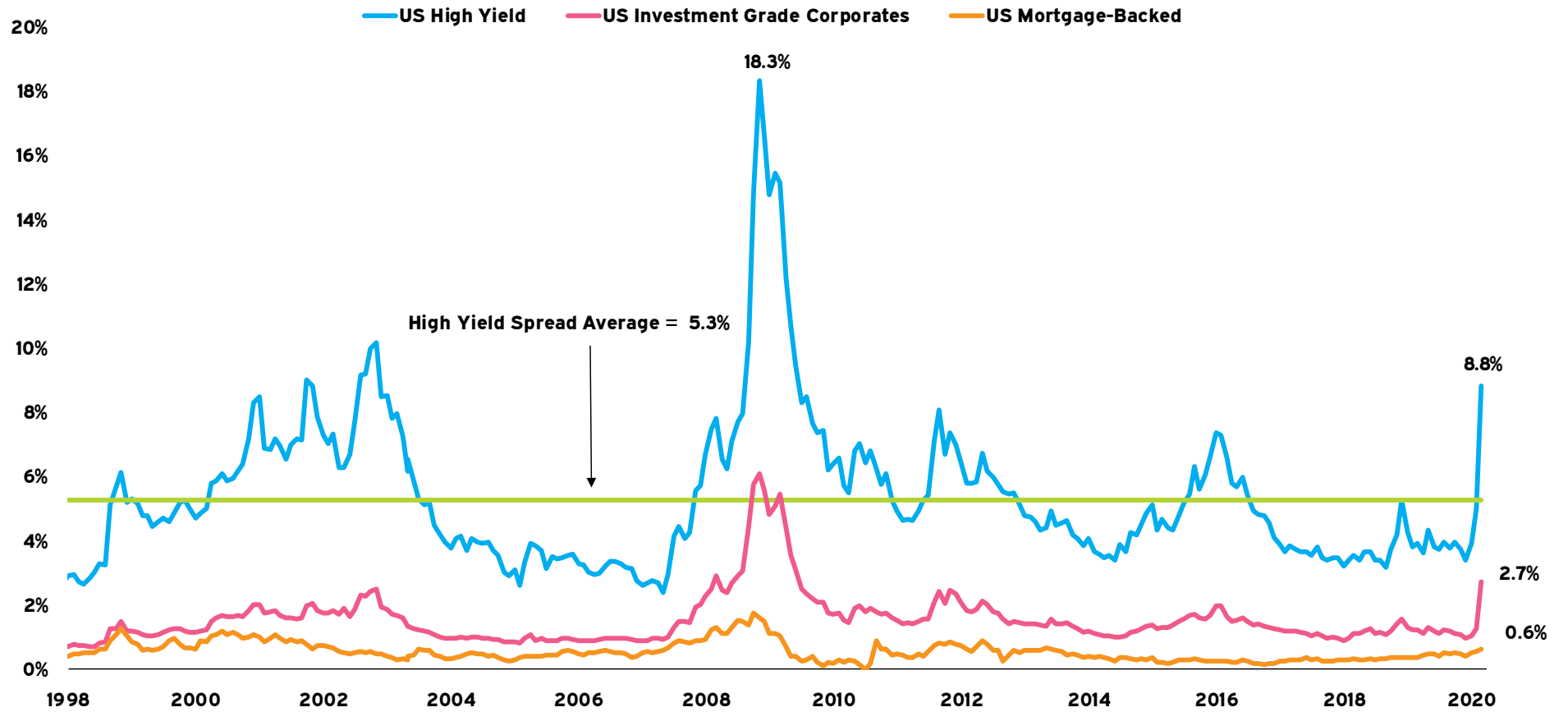
Rolling Ten-Year Returns: 65% Stocks and 35% Bonds¹

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



¹ Source: InvestorForce.

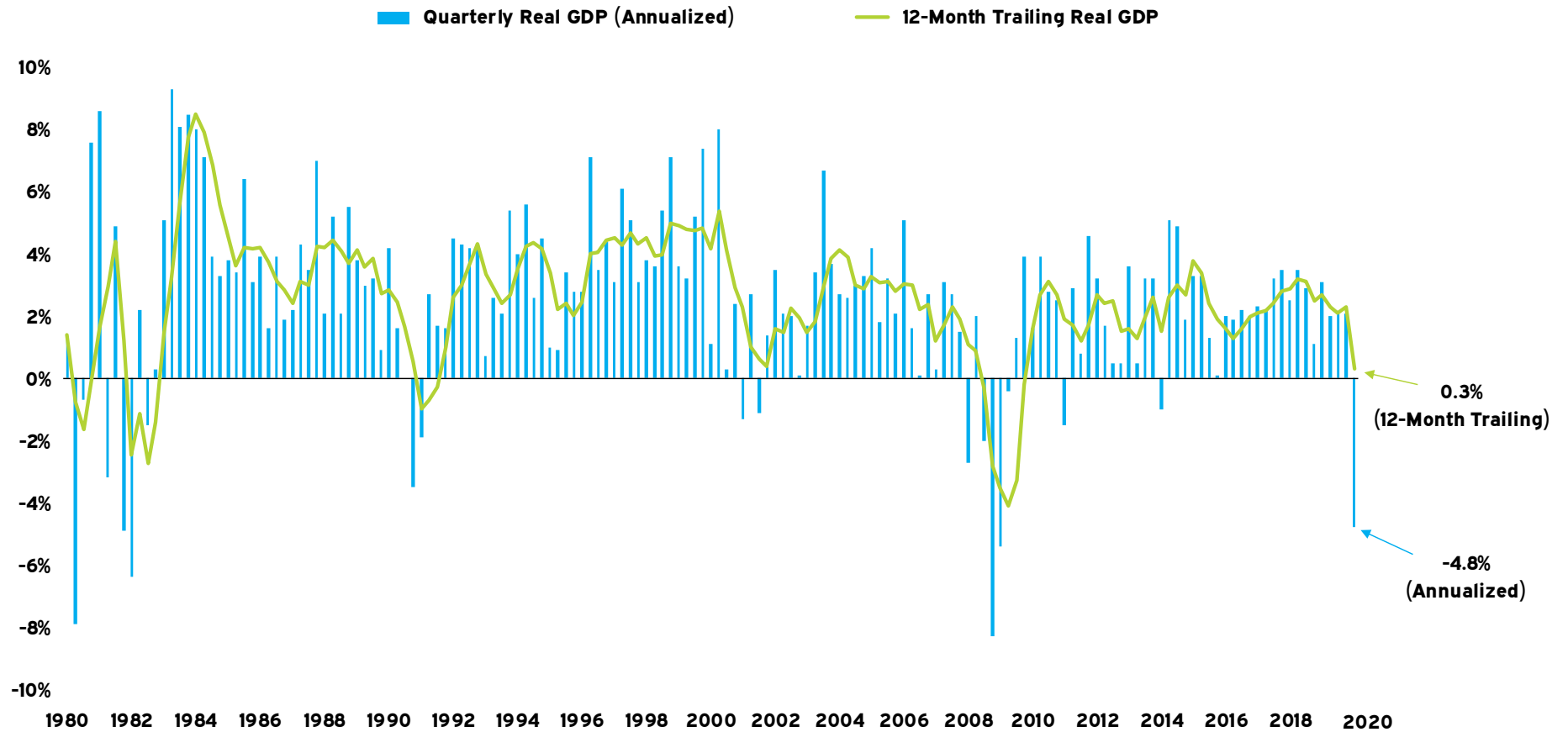
Credit Spreads vs. US Treasury Bonds^{1,2}



¹ Source: Barclays Live. Data represents the OAS.

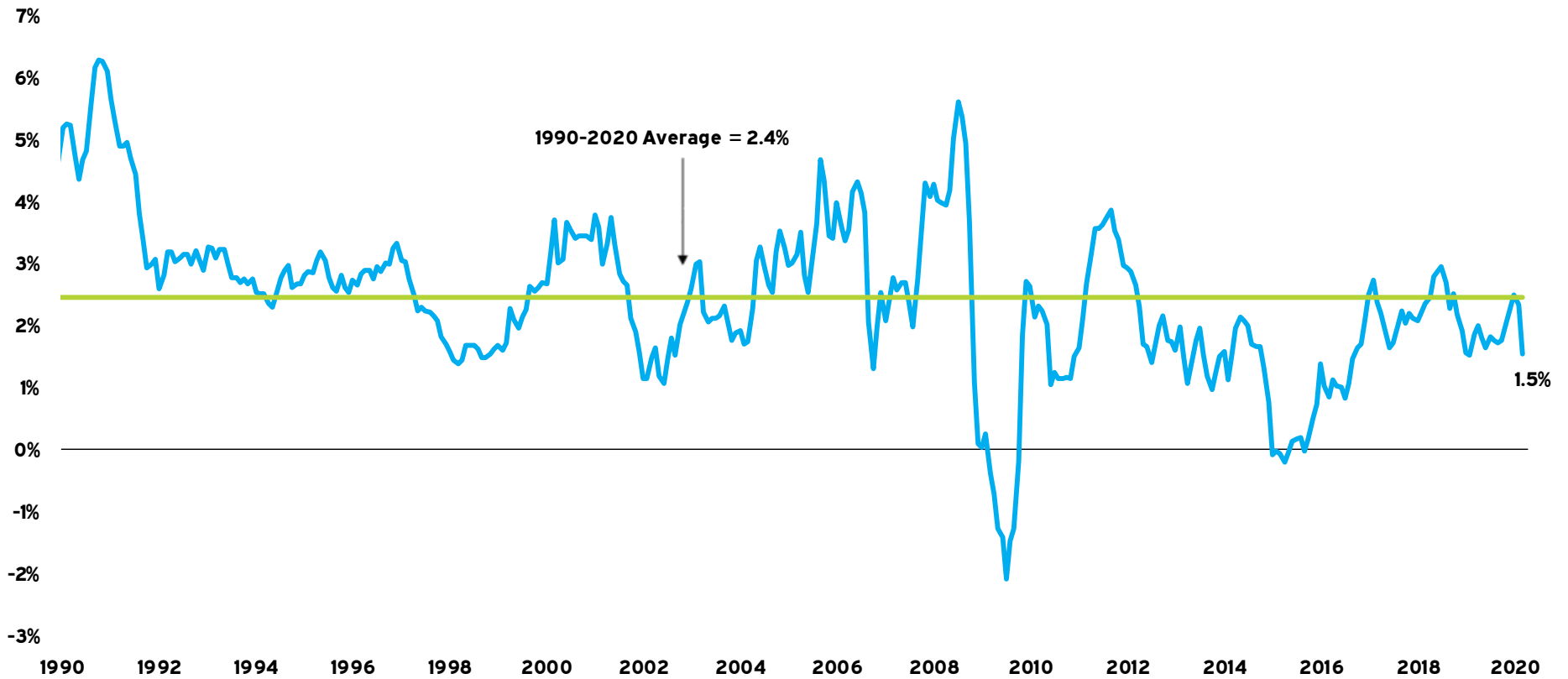
² The median high yield spread was 4.8% from 1997-2020.

US Real Gross Domestic Product (GDP) Growth¹



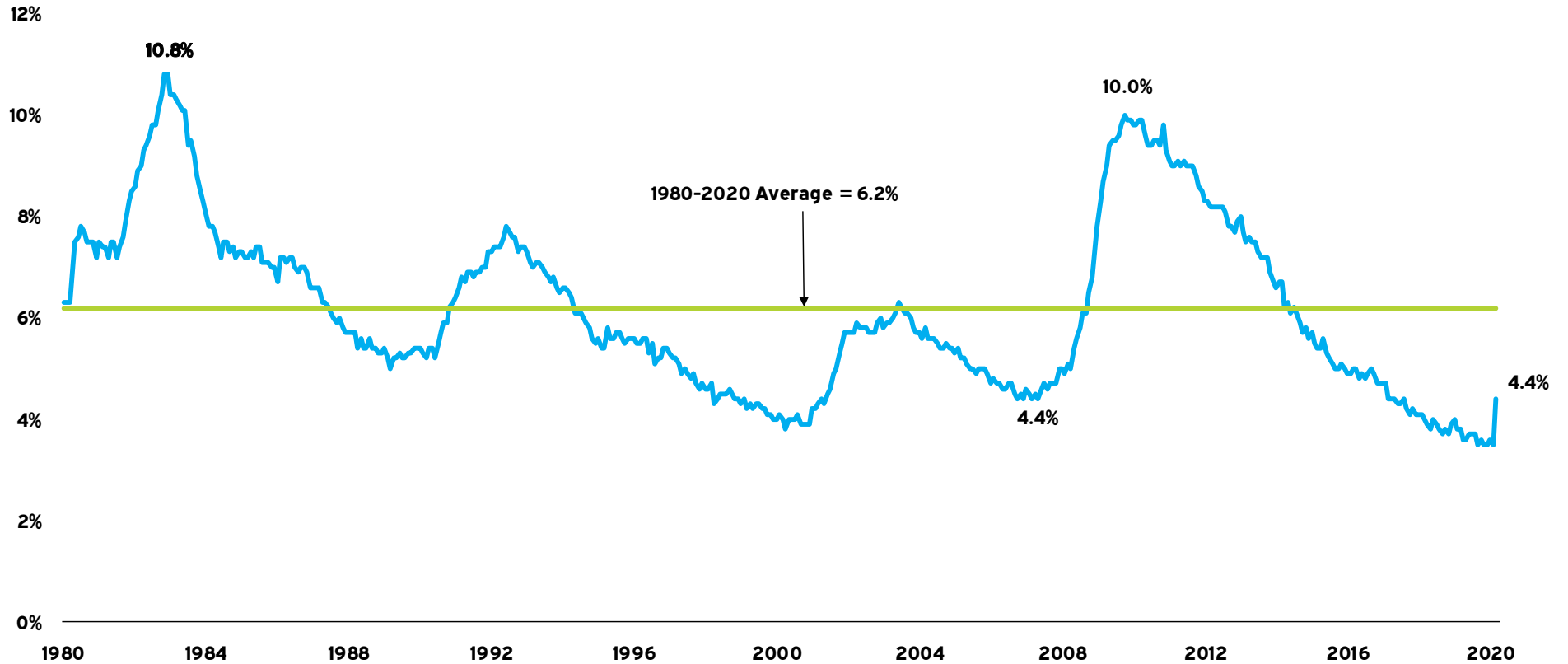
¹ Source: Bureau of Economic Analysis. Data is as of Q1 2020 and represents the first estimate.

US Inflation (CPI)
Trailing Twelve Months¹



¹ Source: Bureau of Labor Statistics. Data is non-seasonally adjusted CPI, which may be volatile in the short-term. Data is as of March 31, 2020.

US Unemployment¹



¹ Source: Bureau of Labor Statistics. Data is as of March 31, 2020.

Capital Markets Outlook & Risk Metrics

As of April 30, 2020

Capital Markets Outlook

Takeaways

- After Q1 turned out to be a historically challenging quarter, the month of April proved to be one of history's strongest months on record for a variety of risk-based assets. Moreover, safe-haven assets such as US Treasury bonds also produced positive returns during the month.
- From a performance perspective, US equity indices were generally up in the 10-15% range, developed international equity markets (in aggregate) produced returns in the 6-8% range, and emerging markets equity generated returns near 10%.
- Growth continued to outperform value. However, in a reversal from Q1, small cap stocks outperformed large cap stocks. An interesting outcome from these market movements is that large cap growth stocks, in aggregate, are only down -2% to -4% YTD as a variety of technology companies have proved resilient.
- US interest rates were stable throughout the month of April as the Federal Reserve continued to remain extremely accommodative. This level of accommodation is also seen in global fiscal policies as authorities continue to rollout historic efforts to combat the economic fallout from the pandemic.
- While valuations for most risk-based asset classes appear attractive at first glance, it is important to note that the full impact on corporate earnings and solvencies remains unknown. The actual path that the global economy will take moving forward is uncertain.

Capital Markets Outlook

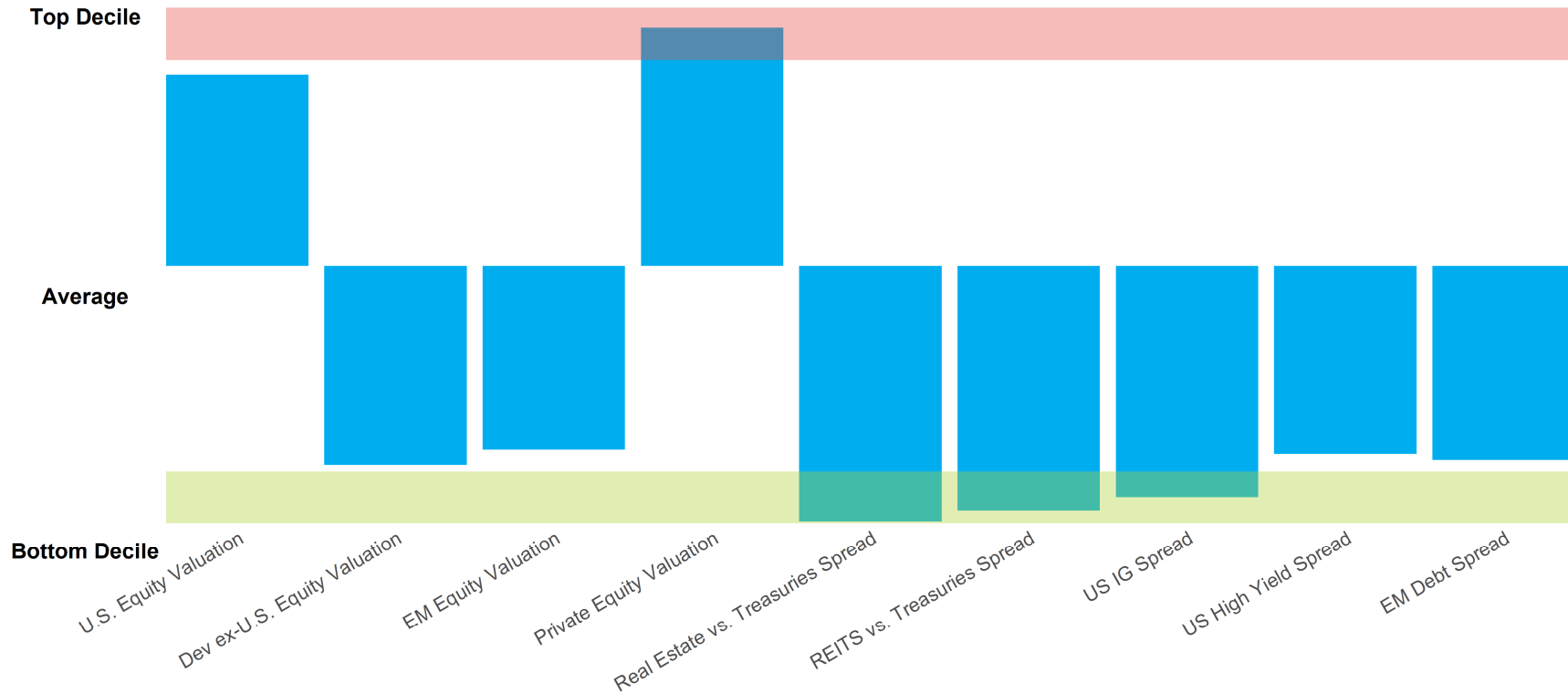
Takeaways

- Implied equity market volatility¹ began April at around 55 but declined over the course of the month to end the period at around 34. To put that level in context, the market is currently implying that, over the next month, equities will be about two times as volatile as the long-term average.
- The Market Sentiment Indicator² flipped to **grey** (i.e., neutral) at month-end.

¹ As measured by VIX Index.

² See Appendix for the rationale for selection and calculation methodology used for the risk metrics.

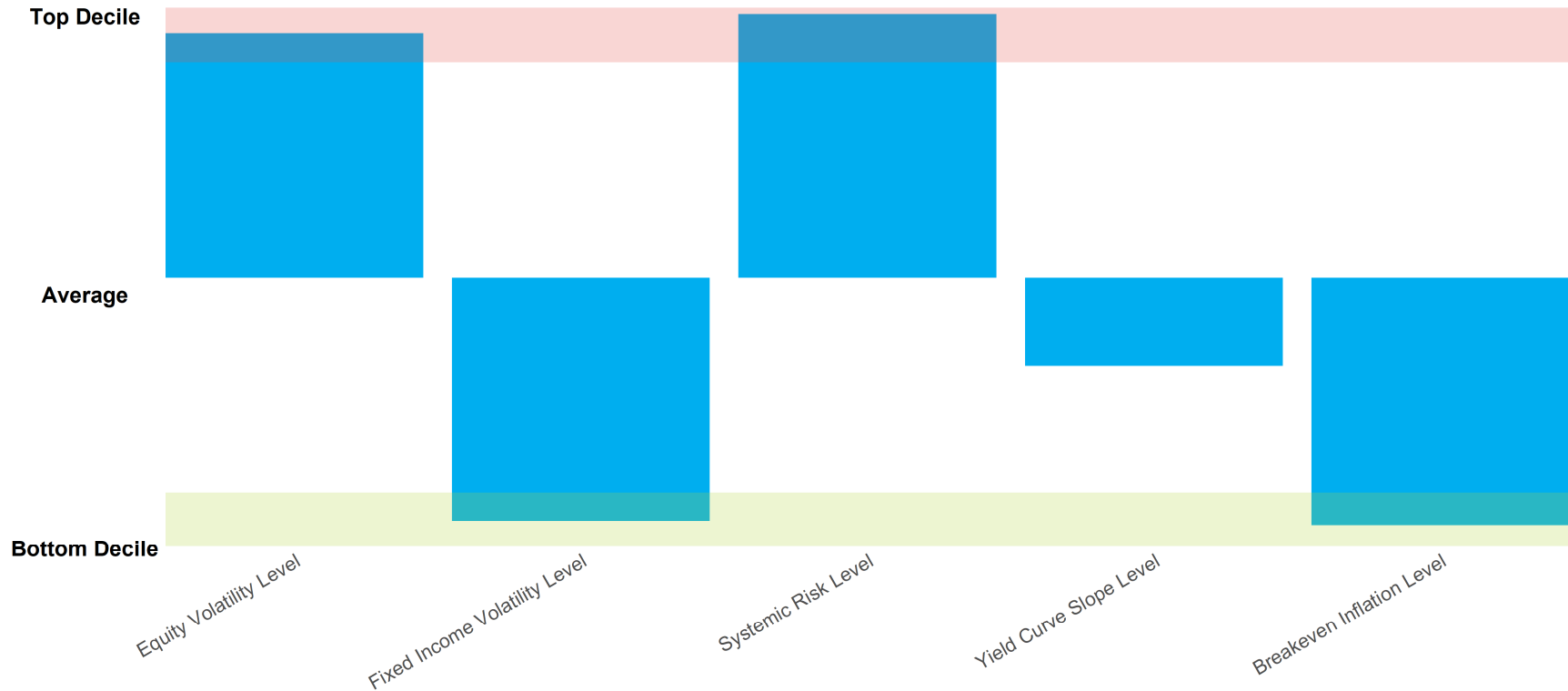
Risk Overview/Dashboard (1) (As of April 30, 2020)¹



- Dashboard (1) summarizes the current state of the different valuation metrics per asset class relative to their own history.

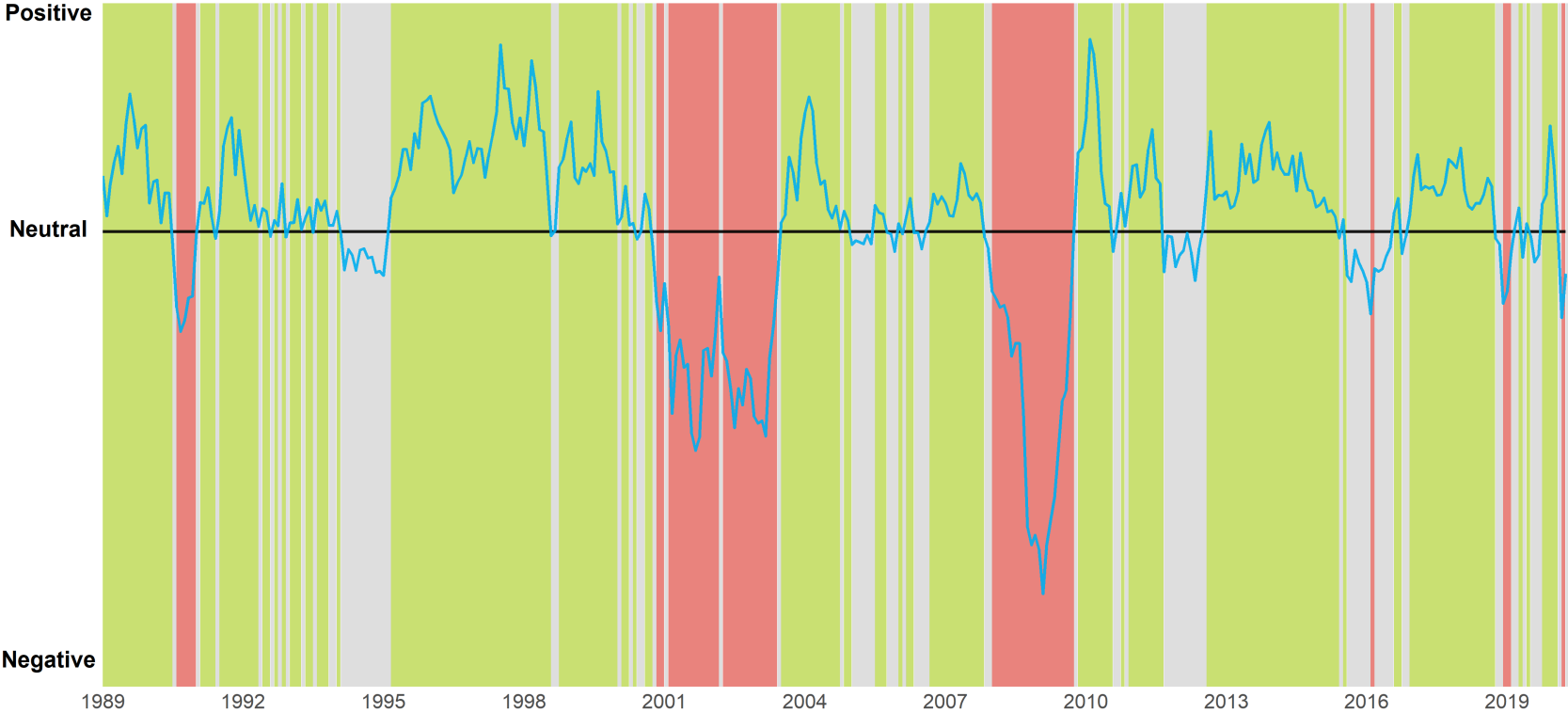
¹ With the exception of Private Equity Valuation, that is YTD as of December 31, 2019.

Risk Overview/Dashboard (2)
(As of April 30, 2020)

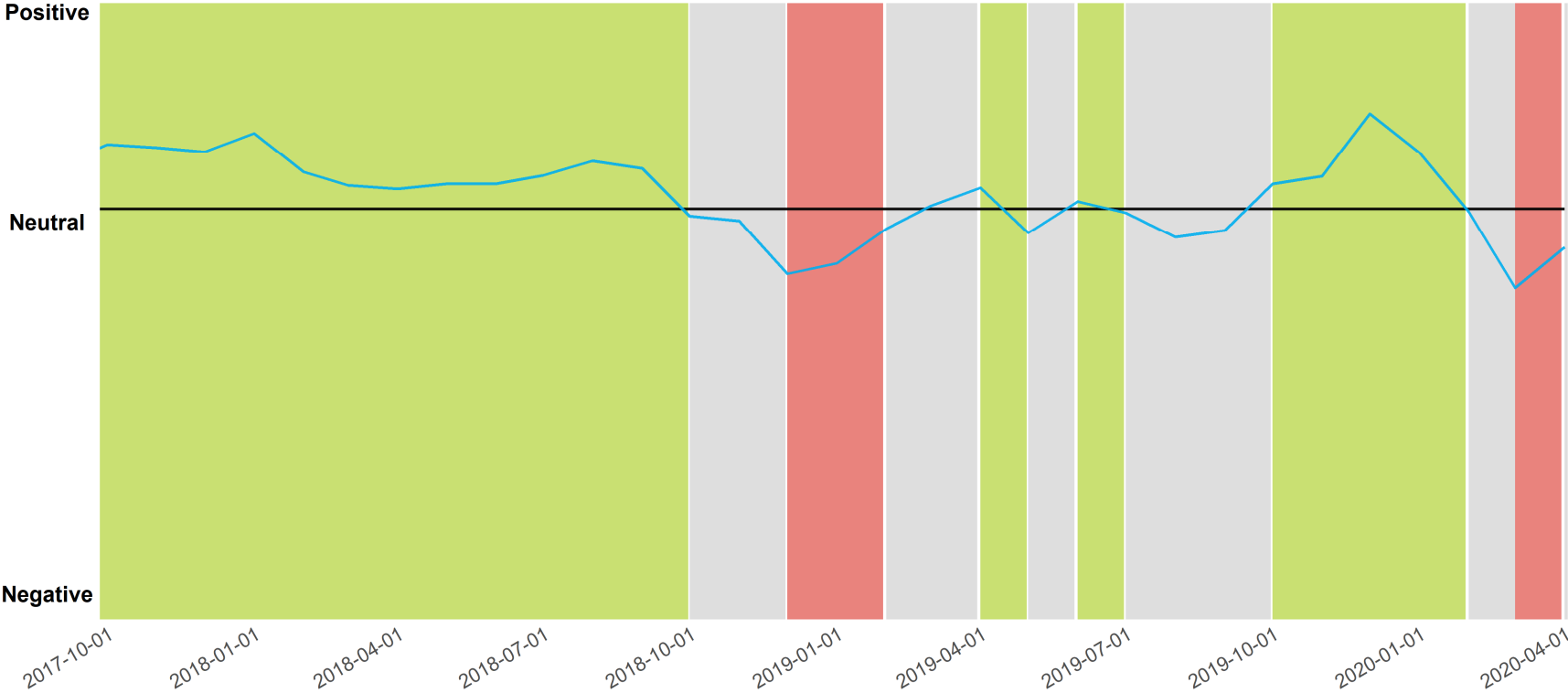


- Dashboard (2) shows how the current level of each indicator compares to its respective history.

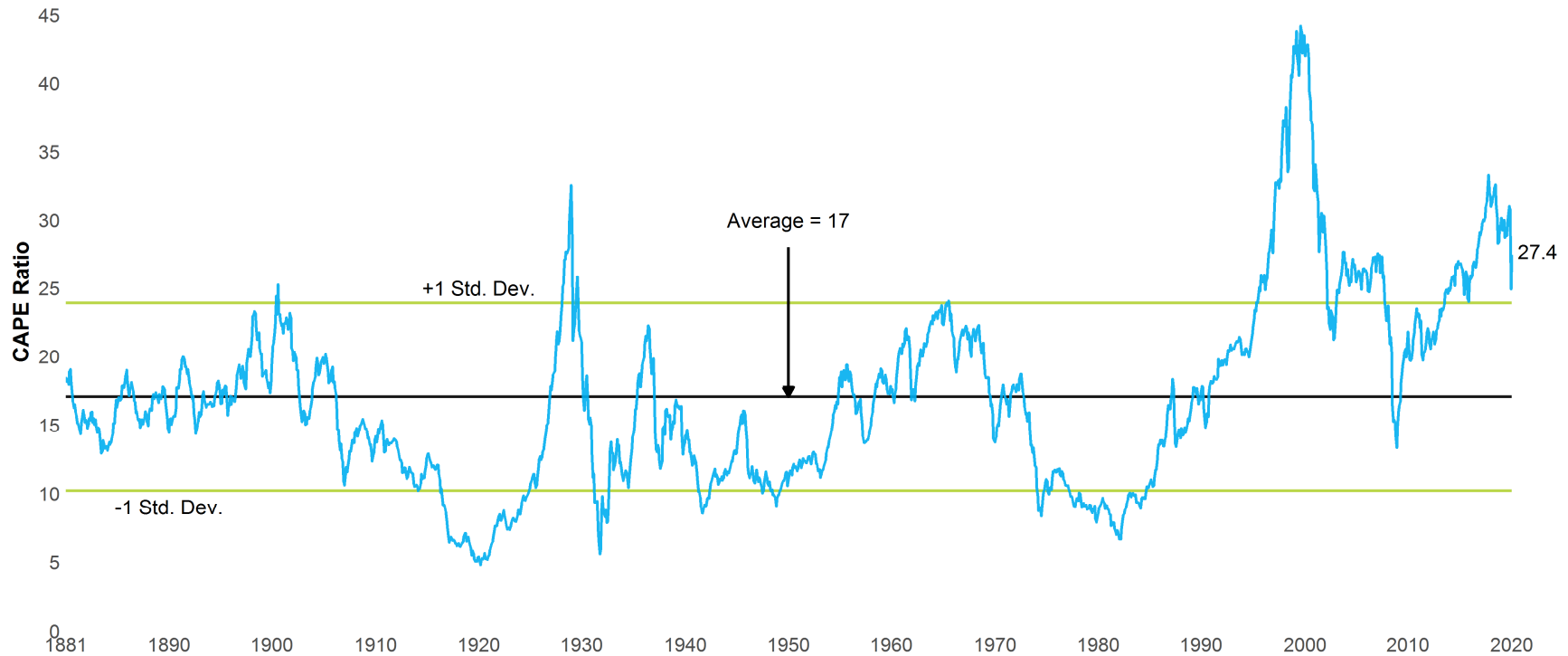
Market Sentiment Indicator (All History)
(As of April 30, 2020)



Market Sentiment Indicator (Last Three Years)
(As of April 30, 2020)



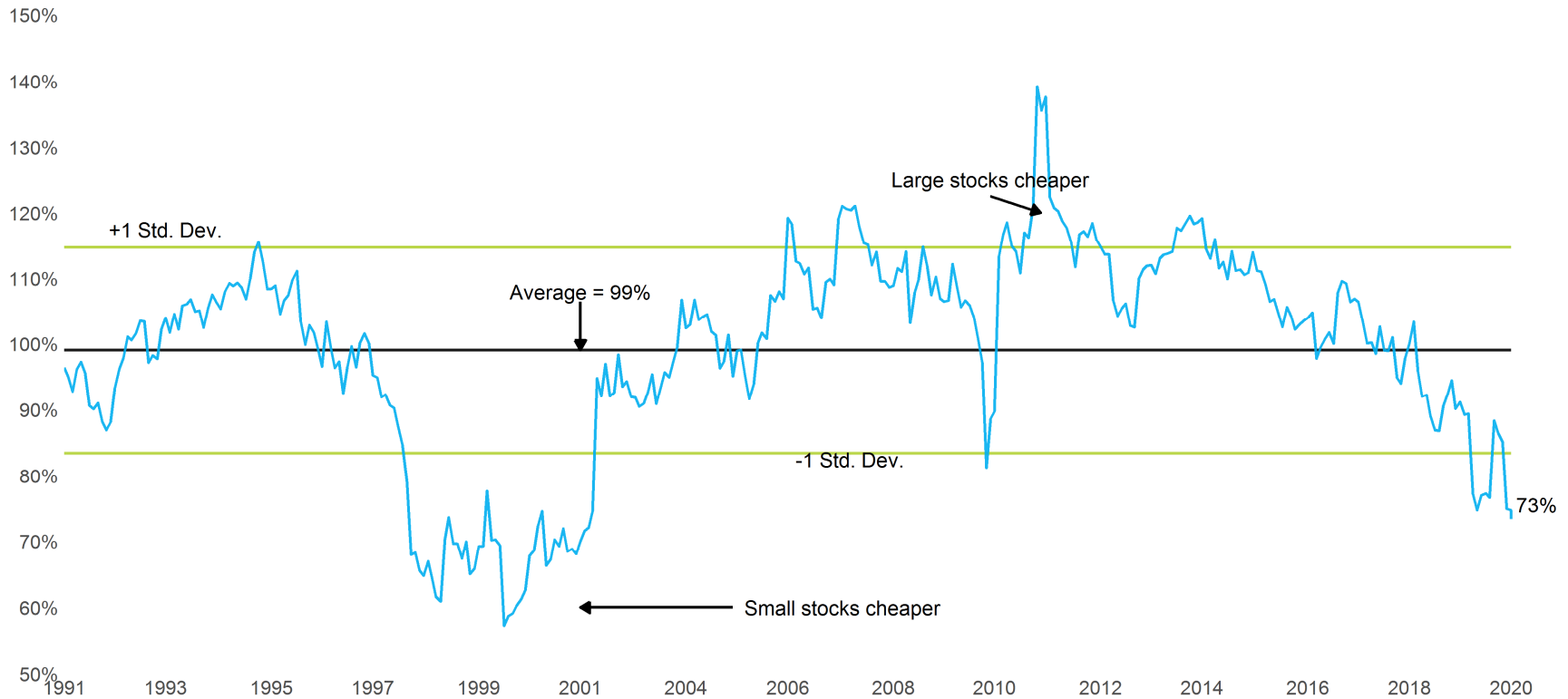
US Equity Cyclically Adjusted P/E¹
(As of April 30, 2020)



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

¹ US Equity Cyclically Adjusted P/E on S&P 500 Index. - Source: Robert Shiller, Yale University, and Meketa Investment Group.

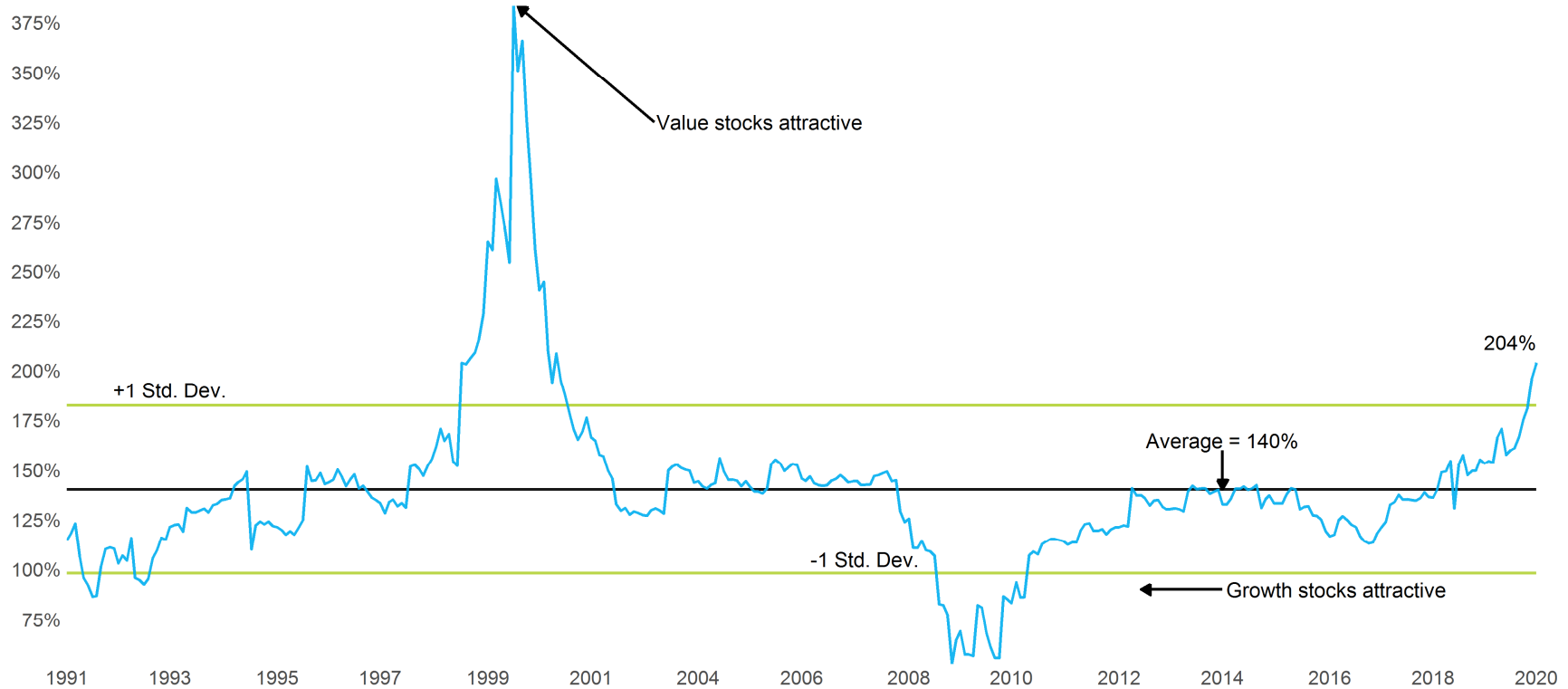
Small Cap P/E vs. Large Cap P/E¹ (As of April 30, 2020)



- 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.

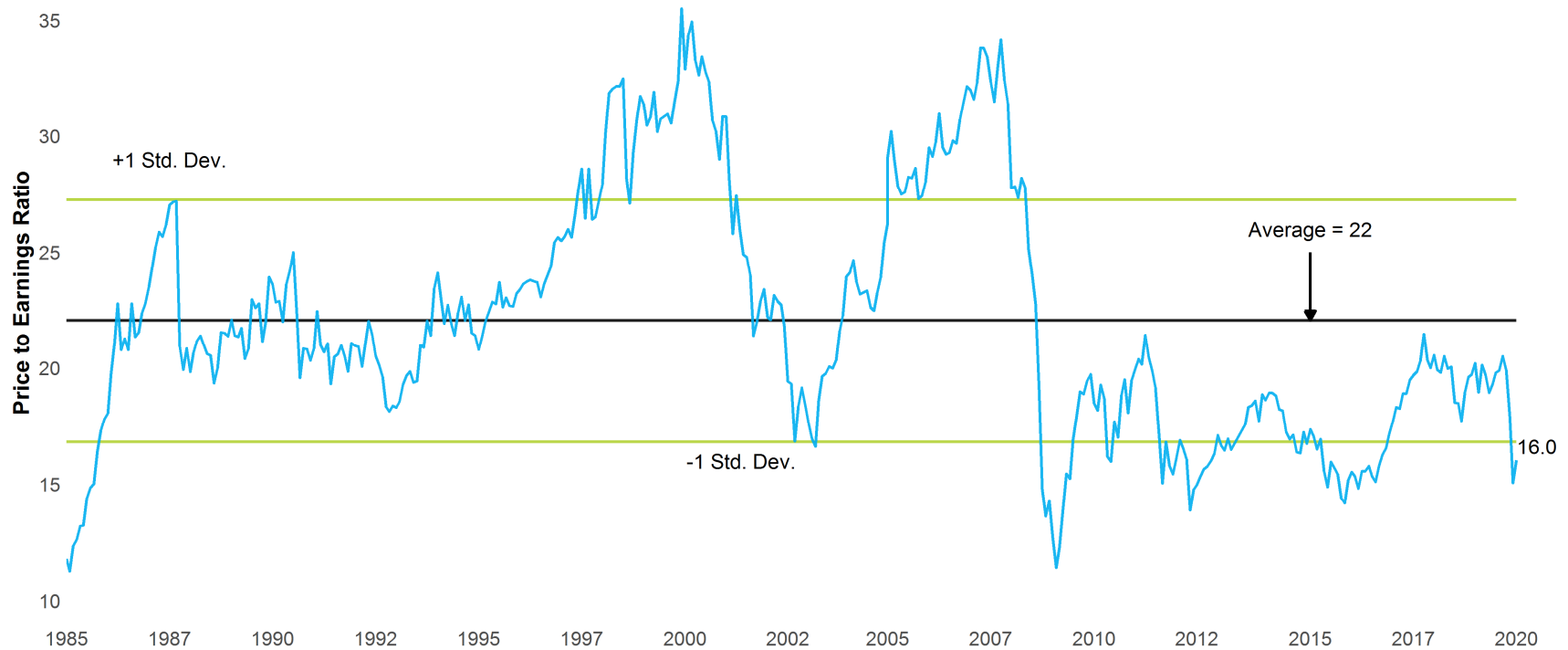
Growth P/E vs. Value P/E¹
(As of April 30, 2020)



- 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.

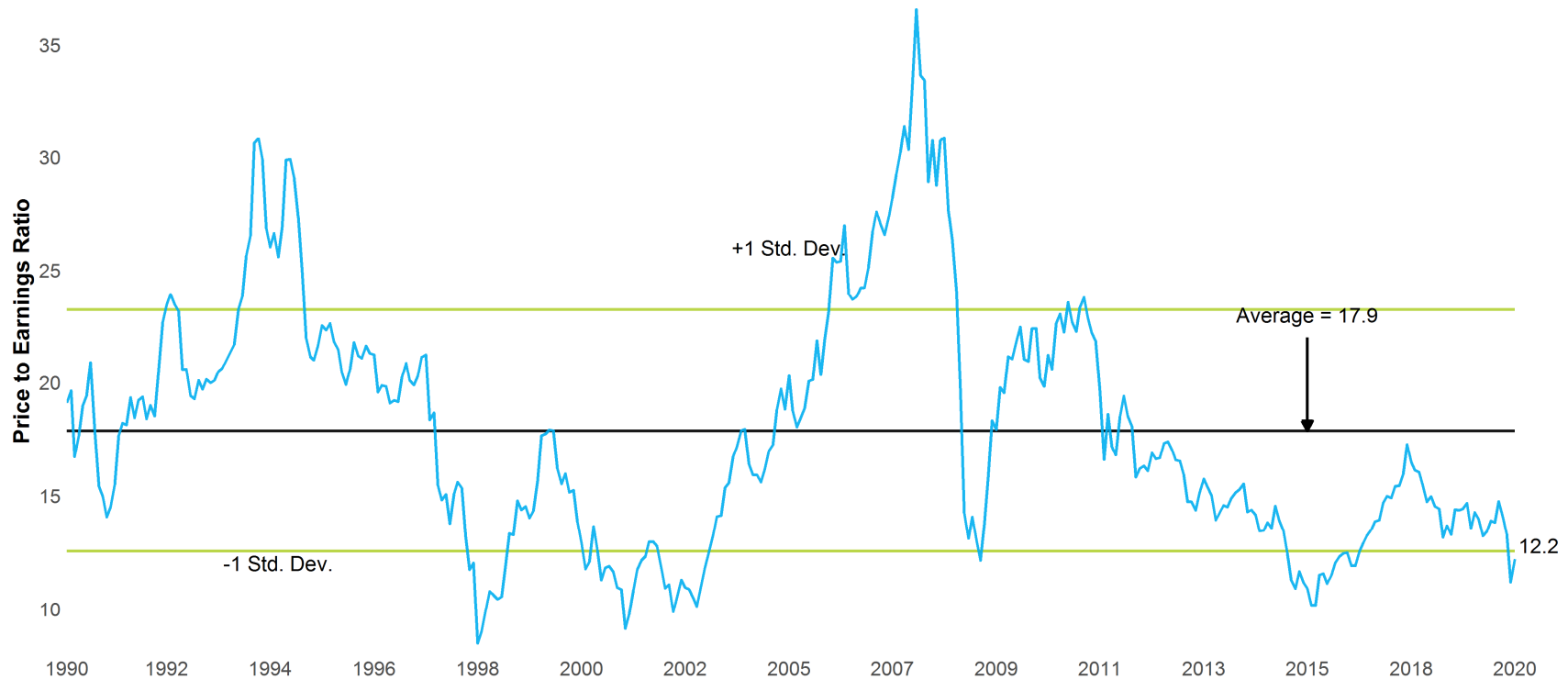
Developed International Equity Cyclically Adjusted P/E¹
(As of April 30, 2020)



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

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.

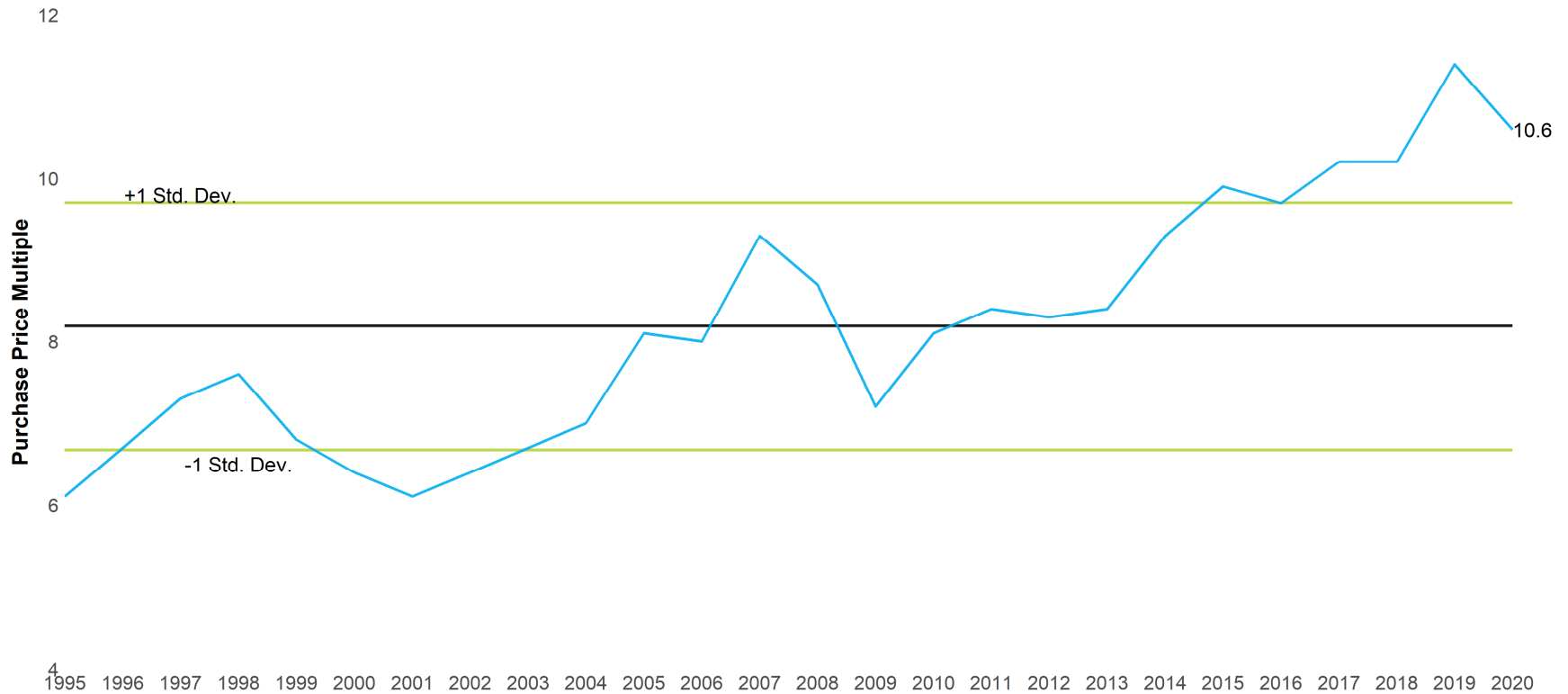
Emerging Market Equity Cyclically Adjusted P/E¹
(As of April 30, 2020)



- 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.

Private Equity Multiples¹ (As of February 29, 2020)²

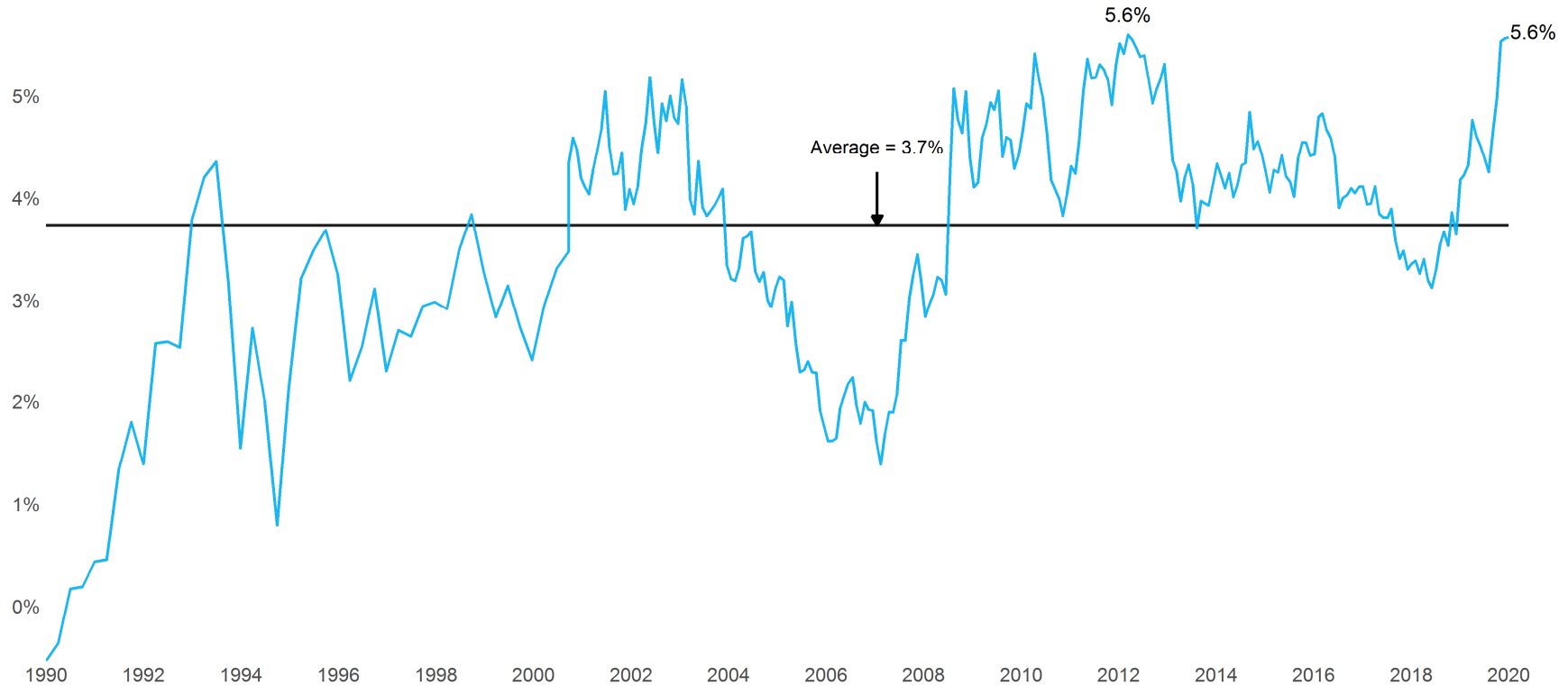


- This chart details one valuation metric for the private equity market. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

¹ Private Equity Multiples – Source: S&P LCD Average EBITDA Multiples Paid in All LBOs.

² Annual figures, except for 2020 (YTD).

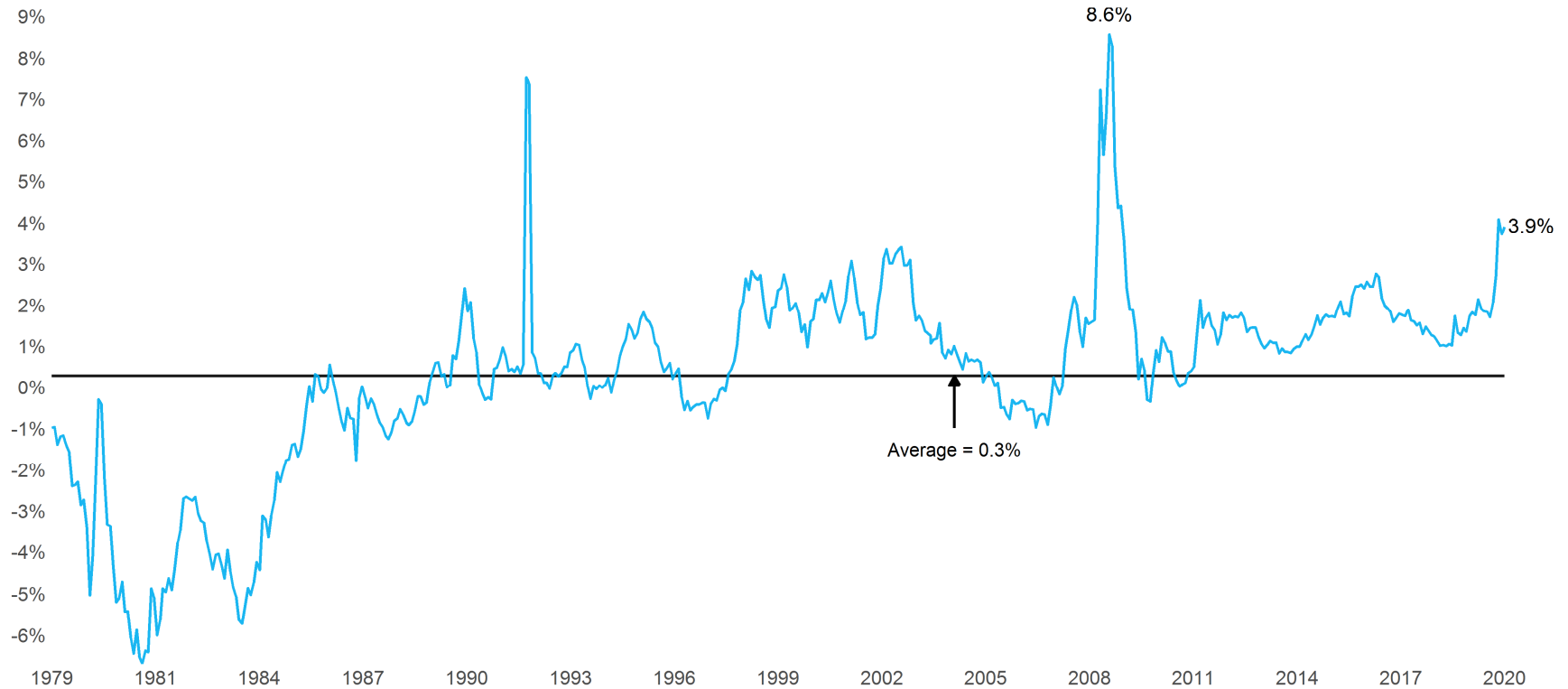
Core Real Estate Spread vs. Ten-Year Treasury¹
(As of April 30, 2020)



- This chart details one valuation metric for the private core real estate market. A higher (lower) figure indicates cheaper (more expensive) valuation.

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.

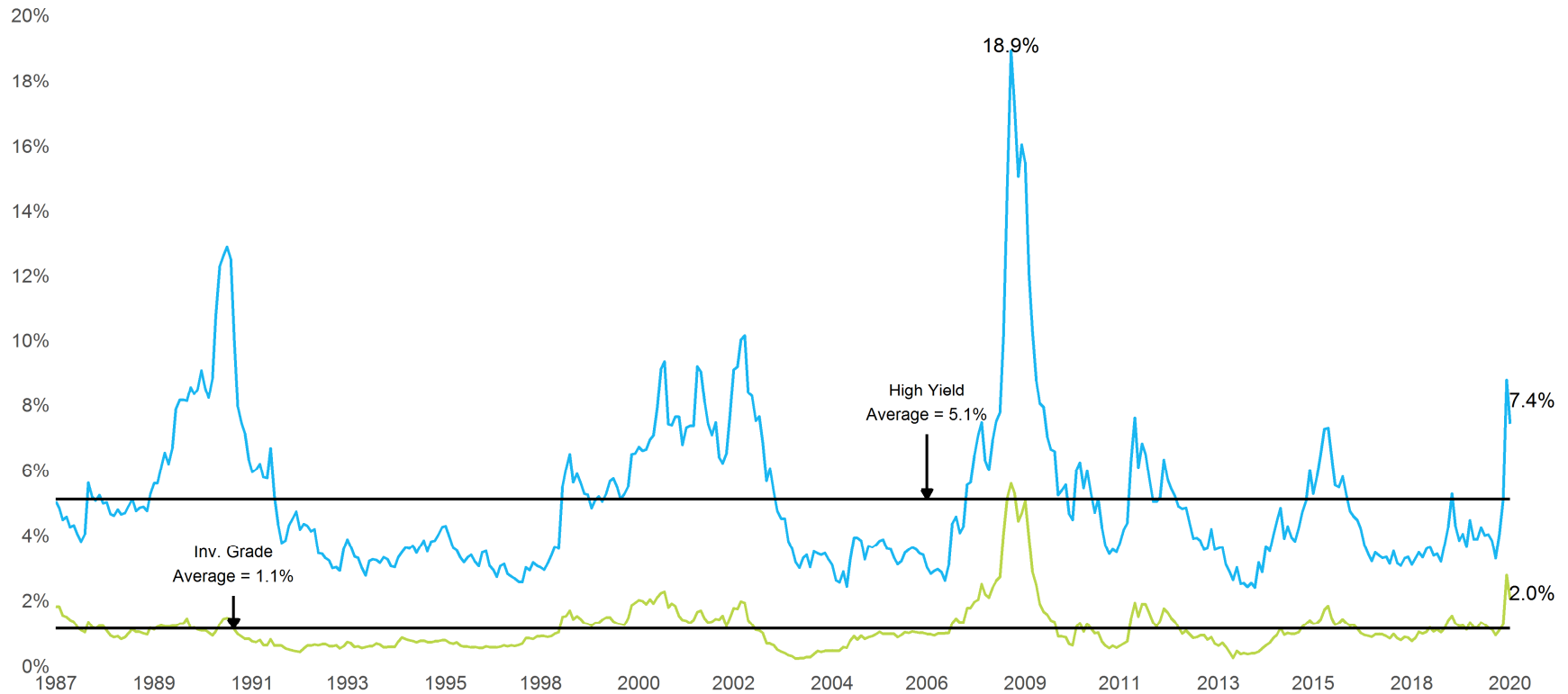
REITs Dividend Yield Spread vs. Ten-Year Treasury¹
(As of April 30, 2020)



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

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

Credit Spreads¹ (As of April 30, 2020)



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

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. Spread is calculated as the difference between the Yield to Worst of the respective index and the 10-Year US Treasury yield.

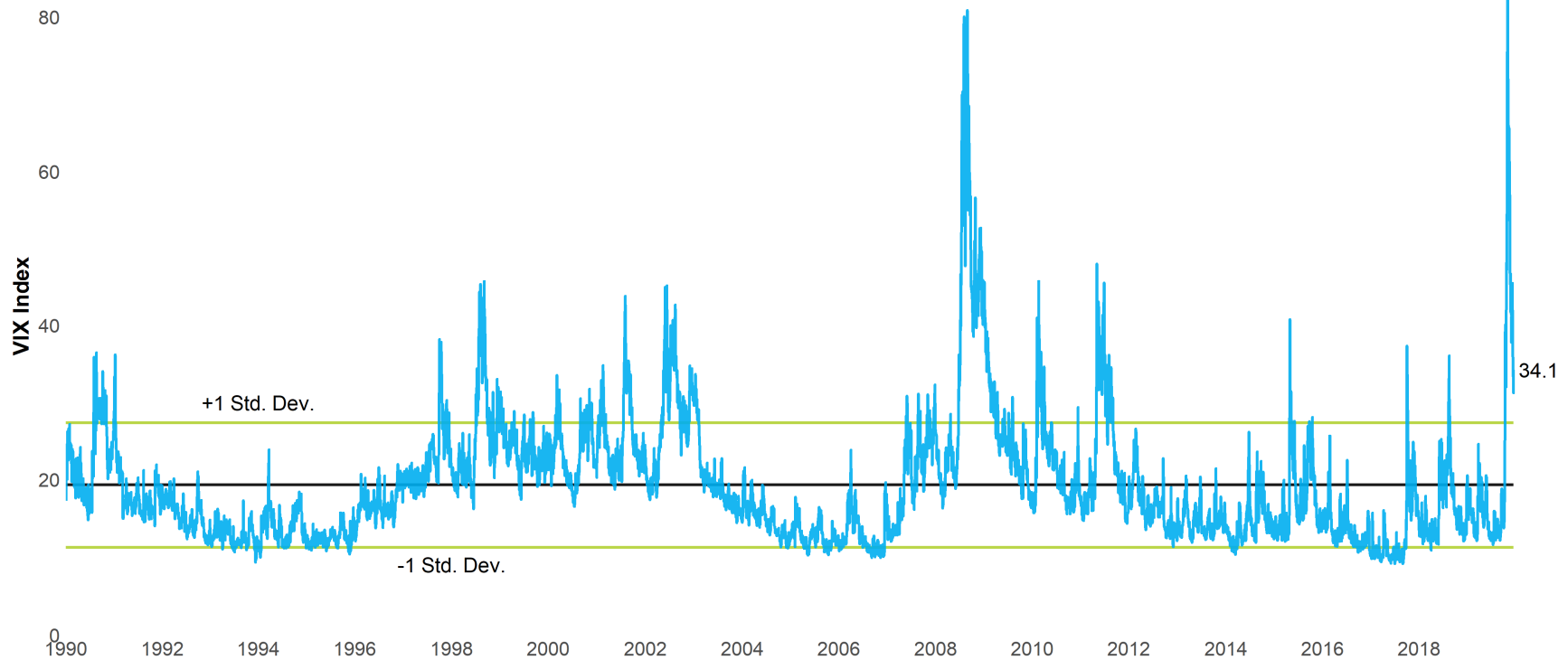
Emerging Market Debt Spreads¹
(As of April 30, 2020)



- 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.

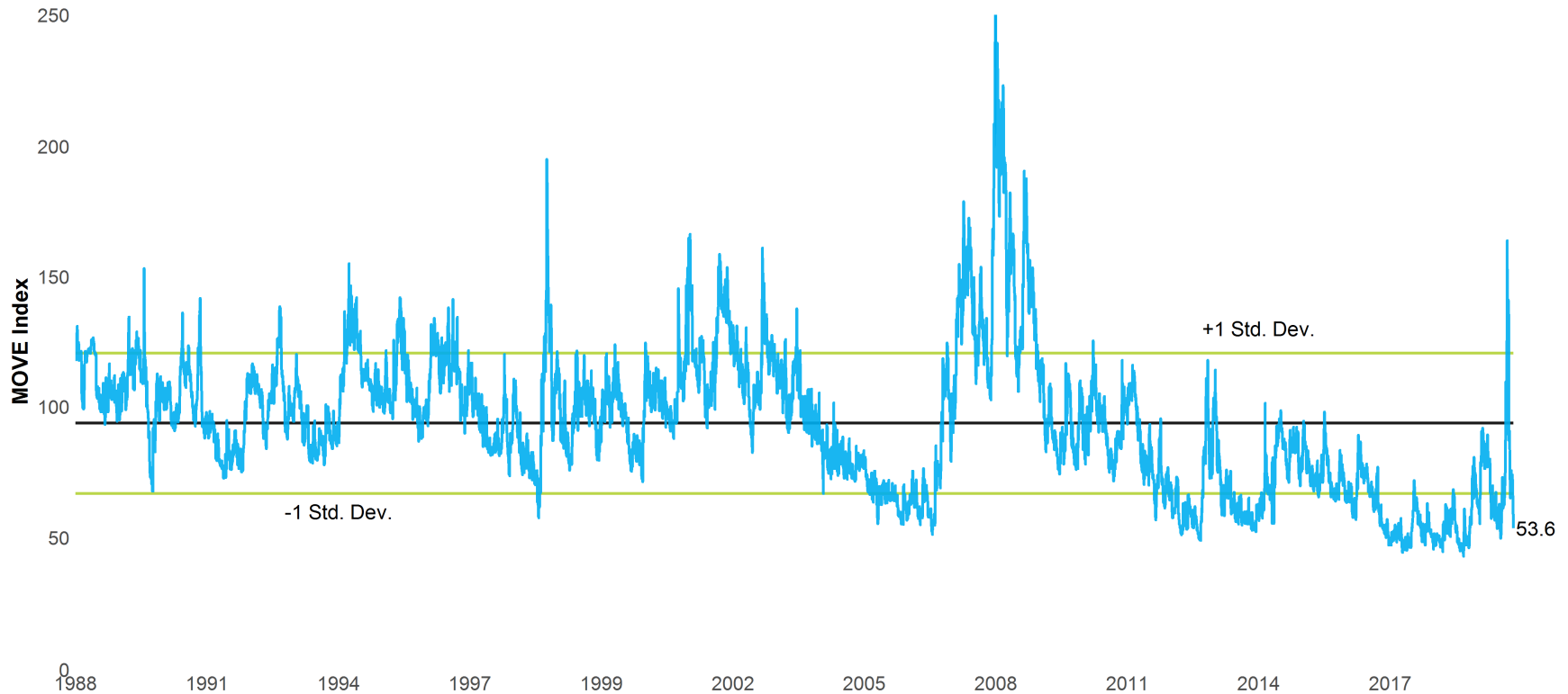
Equity Volatility¹
(As of April 30, 2020)



- 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.

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.

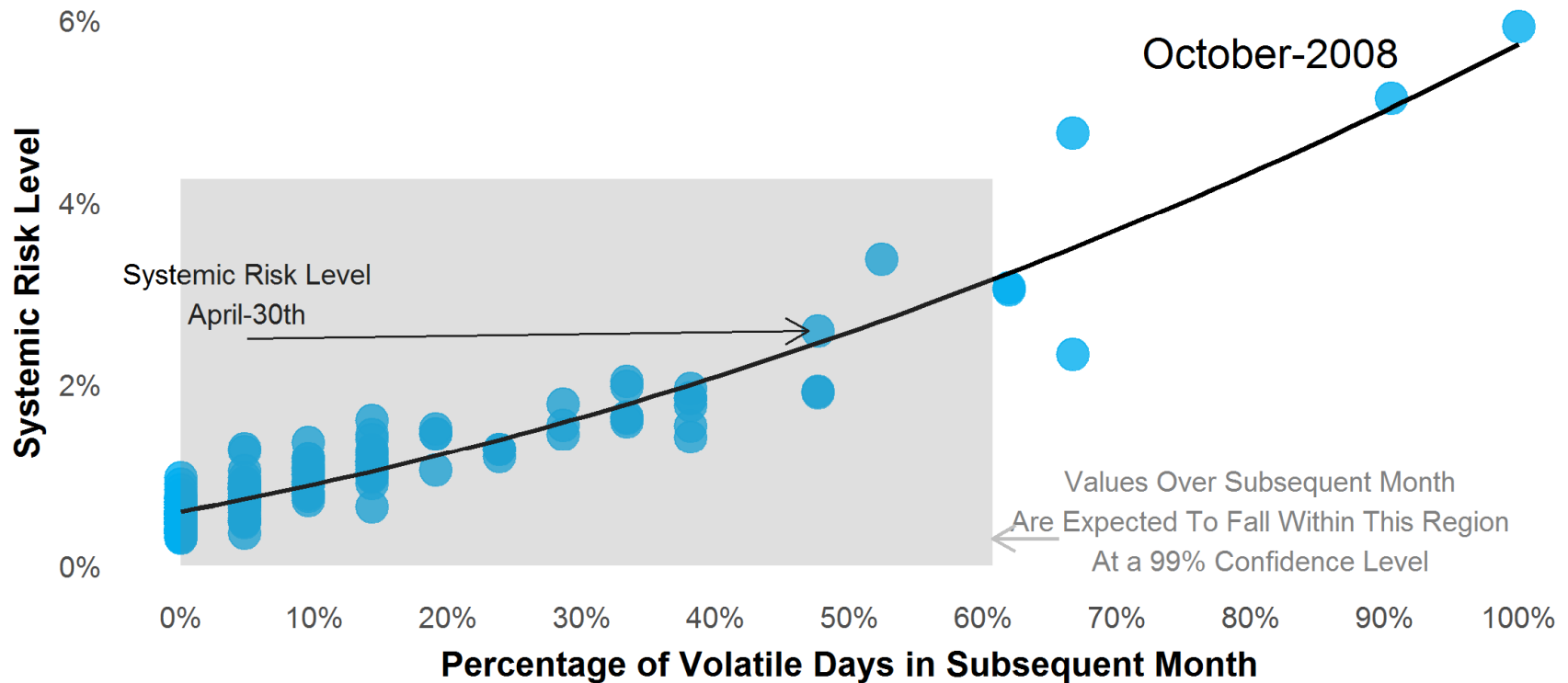
Fixed Income Volatility¹
(As of April 30, 2020)



- 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.

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.

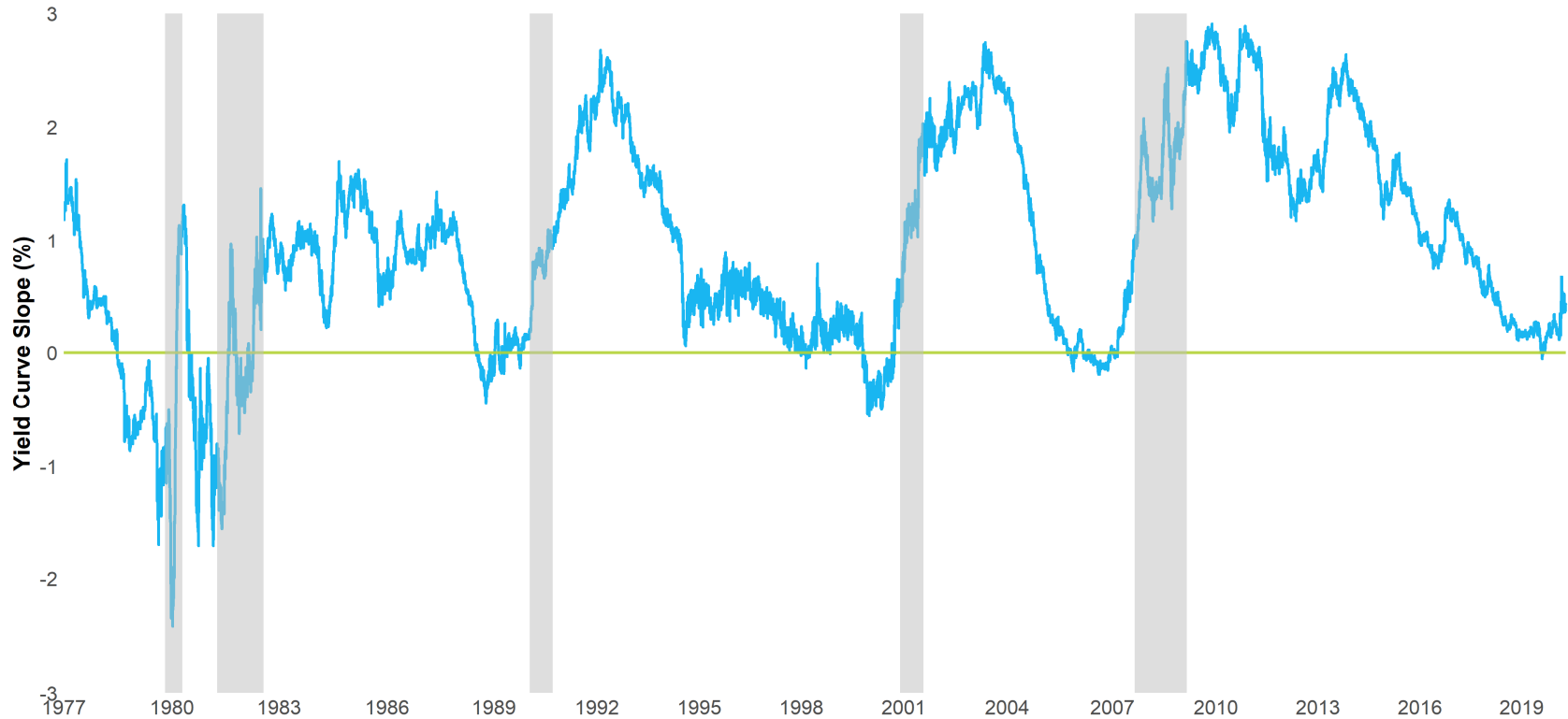
Systemic Risk and Volatile Market Days¹
(As of April 30, 2020)



- Systemic Risk is a measure of 'System-wide' risk, which indicates herding type behavior.

¹ Source: Meketa Investment Group. Volatile days are defined as the top 10 percent of realized turbulence, which is a multivariate distance between asset returns.

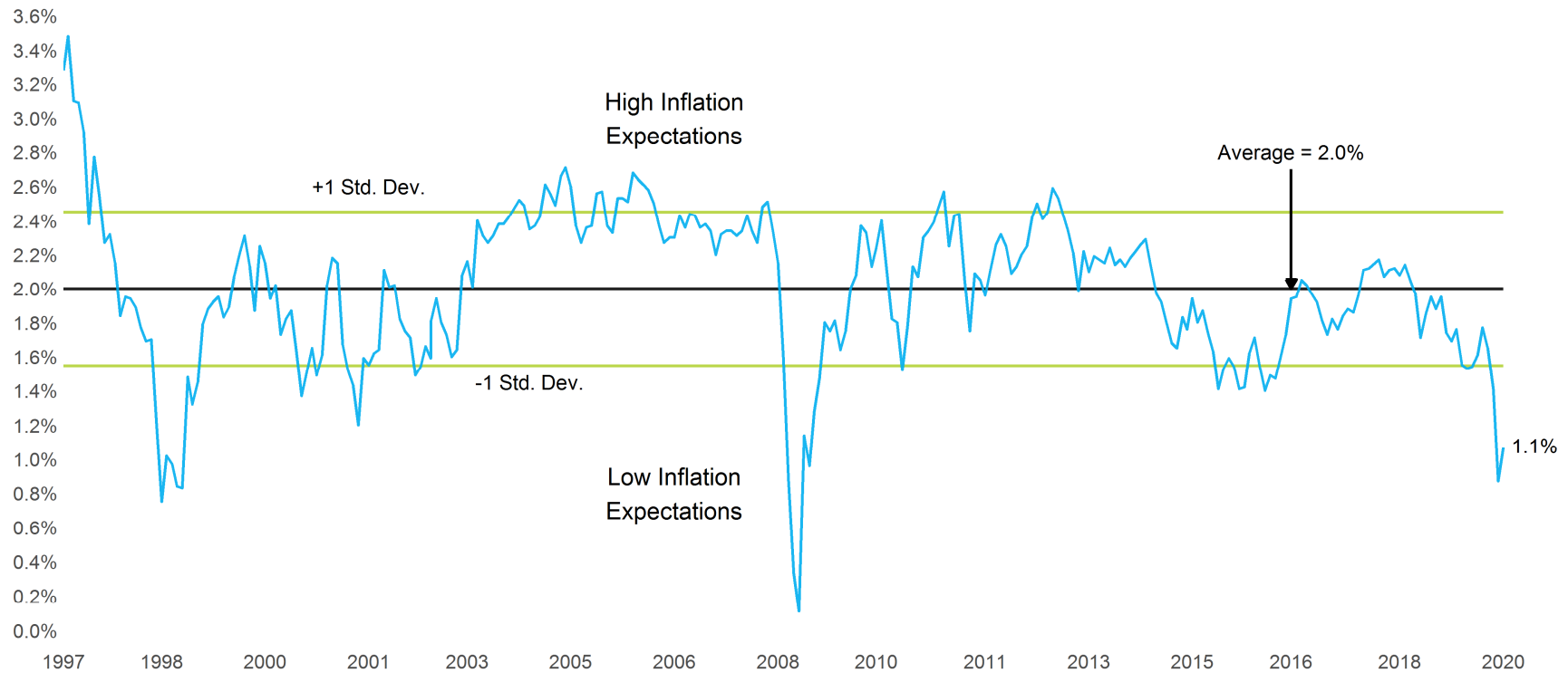
Yield Curve Slope (Ten Minus Two)¹
(As of April 30, 2020)



- 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.

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.

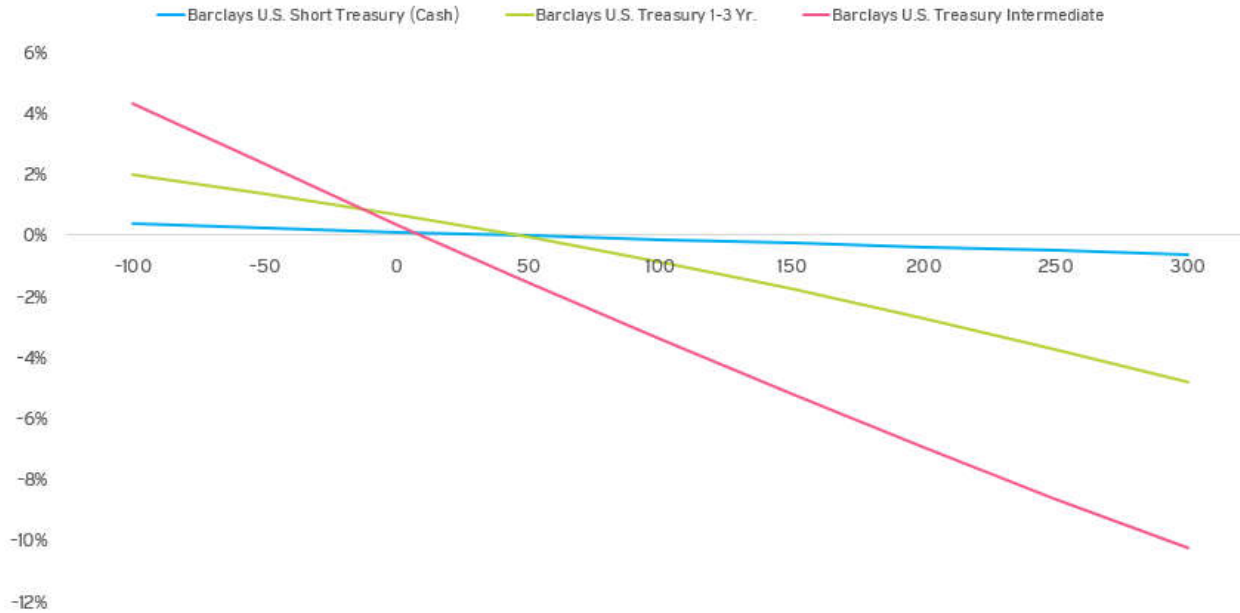
Ten-Year Breakeven Inflation¹
(As of April 30, 2020)



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

¹ Ten-Year Breakeven Inflation – Source: US Treasury and Federal Reserve. Inflation is measured by the Consumer Price Index (CPI-U NSA).

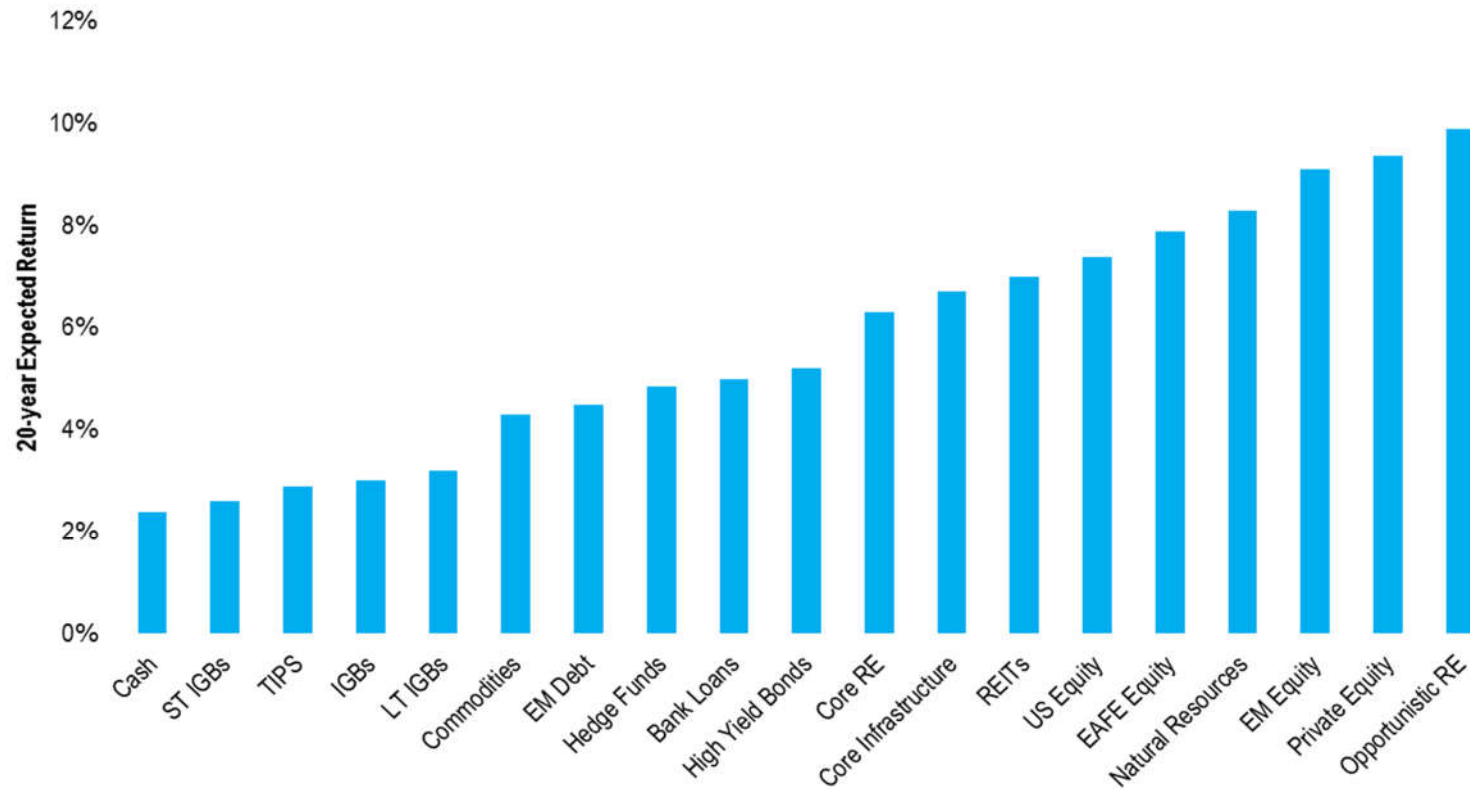
Total Return Given Changes in Interest Rates (bps)¹
(As of April 30, 2020)



| | 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) | 0.4% | 0.2% | 0.1% | 0.0% | -0.1% | -0.3% | -0.4% | -0.5% | -0.6% | 0.25 | 0.10% |
| Barclays US Treasury 1-3 Yr. | 2.0% | 1.4% | 0.7% | -0.1% | -0.9% | -1.8% | -2.7% | -3.7% | -4.8% | 1.42 | 0.68% |
| Barclays US Treasury Intermediate | 4.3% | 2.3% | 0.3% | -1.6% | -3.4% | -5.2% | -7.0% | -8.7% | -10.3% | 3.87 | 0.33% |
| Barclays US Treasury Long | 22.8% | 11.4% | 1.2% | -7.9% | -15.8% | -22.6% | -28.2% | -32.7% | -36.0% | 19.3 | 1.21% |

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. Source: Bloomberg, and Meketa Investment Group.

Long-Term Outlook – 20-Year Annualized Expected Returns¹



- This chart details Meketa’s long-term forward-looking expectations for total returns across asset classes.

¹ Source: Meketa Investment Group’s 2020 Annual Asset Study.

Appendix

Data Sources and Explanations¹

- 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.

¹ All Data as of March 31, 2020 unless otherwise noted.

Appendix

Data Sources and Explanations¹

- 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.
 - Spread is calculated as the difference between the Yield to Worst of the respective index and the 10-Year Treasury Yield.
- 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.

¹ All Data as of April 30, 2020 unless otherwise noted.

Appendix

Data Sources and Explanations¹

- 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).

¹ All Data as of April 30, 2020 unless otherwise noted.

Meketa Market Sentiment Indicator Explanation, Construction and Q&A

Meketa has created the MIG Market Sentiment Indicator (MIG-MSI) to complement 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 risk-seeking trend or a risk-aversion trend.

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.

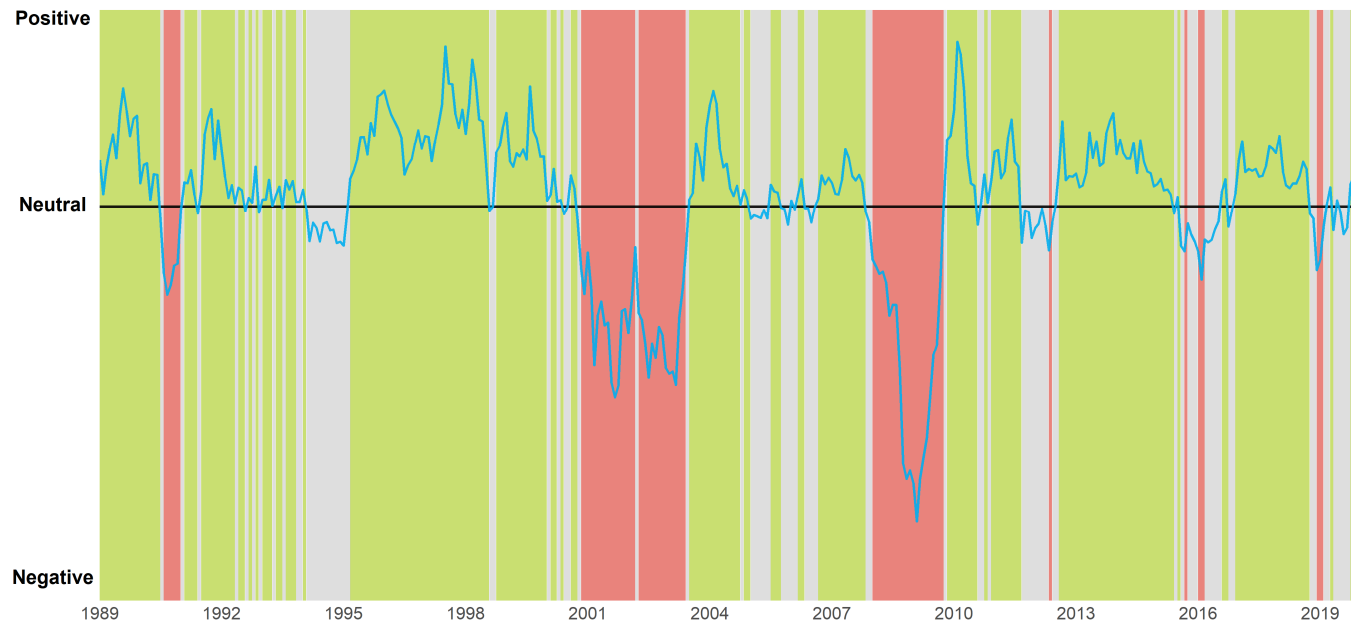
- Meketa’s Risk Metrics, which rely significantly on standard market measures of relative valuation, often provide valid early signals of increasing long-term risk levels in the global investment markets. However, as is the case with numerous valuation measures, the Risk Metrics may convey such risk 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.

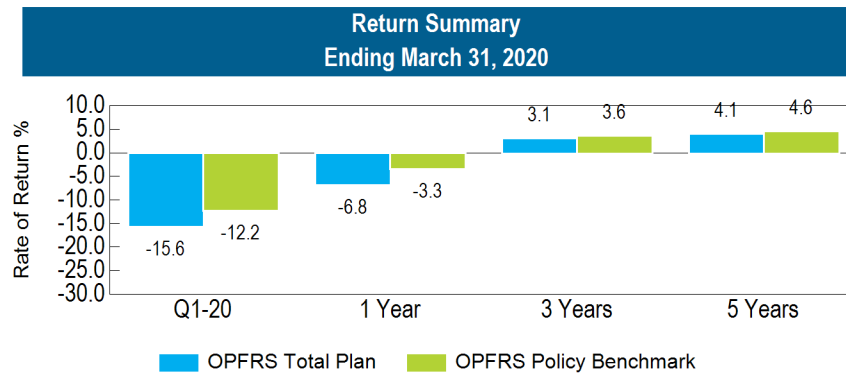
“Time Series Momentum” Moskowitz, Ooi, Pedersen, August 2010. <http://pages.stern.nyu.edu/~lpederse/papers/TimeSeriesMomentum.pdf>

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.

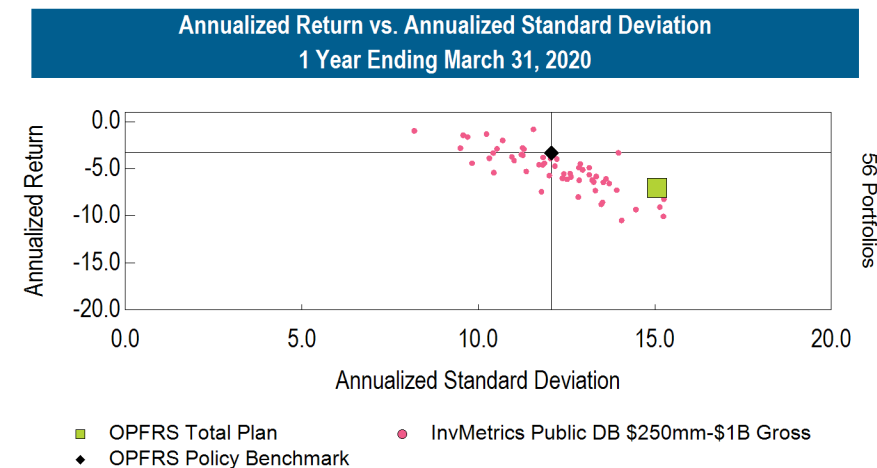
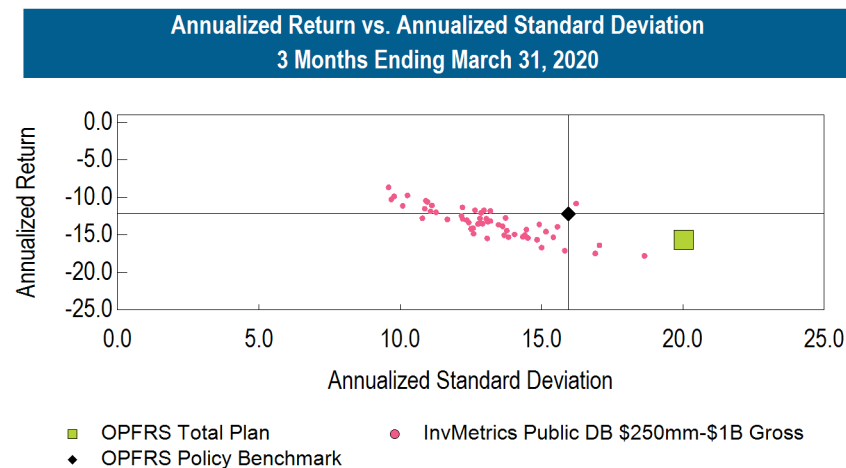
Total Portfolio Review

OPFRS Total Plan | As of March 31, 2020



Summary of Cash Flows

| | Quarter-To-Date | One Year |
|------------------------|-----------------|---------------|
| Beginning Market Value | \$408,226,525 | \$380,733,118 |
| Net Cash Flow | -\$3,267,185 | -\$14,563,690 |
| Capital Appreciation | -\$63,428,831 | -\$24,638,919 |
| Ending Market Value | \$341,530,510 | \$341,530,510 |



| | Anlzd Return | Standard Deviation |
|---|--------------|--------------------|
| OPFRS Total Plan | -11.30% | 5.36% |
| OPFRS Policy Benchmark | -7.91% | 4.30% |
| InvMetrics Public DB \$250mm-\$1B Gross | -8.50% | 4.20% |
| Median | | |

| | Anlzd Return | Standard Deviation |
|---|--------------|--------------------|
| OPFRS Total Plan | -7.06% | 4.35% |
| OPFRS Policy Benchmark | -3.32% | 3.49% |
| InvMetrics Public DB \$250mm-\$1B Gross | -5.01% | 3.55% |
| Median | | |

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 (gross of fees) | As of March 31, 2020

| | 3 Mo (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) | 7 Yrs (%) | 10 Yrs (%) |
|---|--------------|--------------|--------------|--------------|--------------|---------------|
| OPFRS Total Plan | -15.6 | -6.8 | 3.1 | 4.1 | 5.8 | 6.6 |
| <i>OPFRS Policy Benchmark</i> ¹ | <u>-12.2</u> | <u>-3.3</u> | <u>3.6</u> | <u>4.6</u> | <u>5.9</u> | <u>6.4</u> |
| Excess Return | -3.4 | -3.5 | -0.5 | -0.5 | -0.1 | 0.2 |
| Domestic Equity | -22.2 | -11.5 | 3.1 | 5.1 | 8.6 | 10.1 |
| <i>Russell 3000 (Blend)</i> ² | <u>-20.9</u> | <u>-9.1</u> | <u>4.0</u> | <u>5.8</u> | <u>9.0</u> | <u>10.1</u> |
| Excess Return | -1.3 | -2.4 | -0.9 | -0.7 | -0.4 | 0.0 |
| International Equity | -22.4 | -11.4 | 0.4 | 1.1 | 3.0 | 3.4 |
| <i>MSCI ACWI ex US (Blend)</i> ³ | <u>-23.3</u> | <u>-15.1</u> | <u>-1.5</u> | <u>-0.2</u> | <u>1.5</u> | <u>2.5</u> |
| Excess Return | 0.9 | 3.7 | 1.9 | 1.3 | 1.5 | 0.9 |
| Fixed Income | -1.3 | 4.1 | 4.0 | 3.2 | 3.0 | 4.0 |
| <i>Bmbg BC Universal (Blend)</i> ⁴ | <u>1.3</u> | <u>7.2</u> | <u>4.4</u> | <u>3.4</u> | <u>3.2</u> | <u>4.0</u> |
| Excess Return | -2.6 | -3.1 | -0.4 | -0.2 | -0.2 | 0.0 |
| Covered Calls | -18.6 | -9.0 | 1.7 | 4.5 | -- | -- |
| <i>CBOE S&P 500 BuyWrite USD</i> | <u>-22.2</u> | <u>-15.1</u> | <u>-2.1</u> | <u>1.6</u> | -- | -- |
| Excess Return | 3.6 | 6.1 | 3.8 | 2.9 | | |
| Crisis Risk Offset | -18.1 | -13.0 | -- | -- | -- | -- |
| <i>SG Multi Alternative Risk Premia Index</i> | <u>-8.7</u> | <u>-8.2</u> | -- | -- | -- | -- |
| Excess Return | -9.4 | -4.8 | | | | |
| Cash | 1.0 | 3.1 | 2.1 | 1.4 | 1.0 | -- |
| <i>FTSE T-Bill 3 Months TR</i> | <u>0.4</u> | <u>2.0</u> | <u>1.7</u> | <u>1.1</u> | <u>0.8</u> | -- |
| Excess Return | 0.6 | 1.1 | 0.4 | 0.3 | 0.2 | |

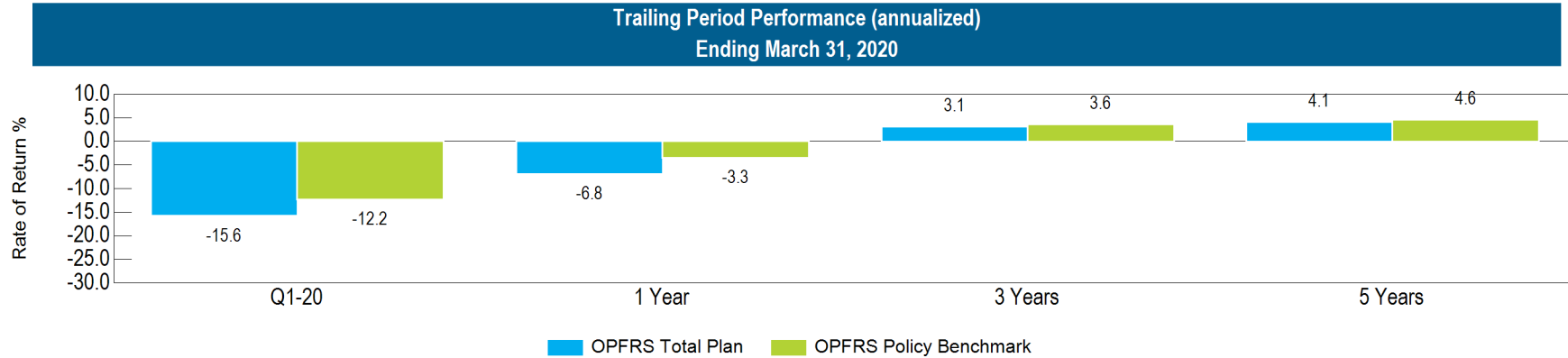
1. Evolving Policy Benchmark consists of 40% Russell 3000, 12% MSCI ACWI ex U.S., 33% Bbg BC Universal, 5% CBOE BXM , 6.7% SG Multi Asset Risk Premia, 3.3% Bbg BC Long Treasury.

2. 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.

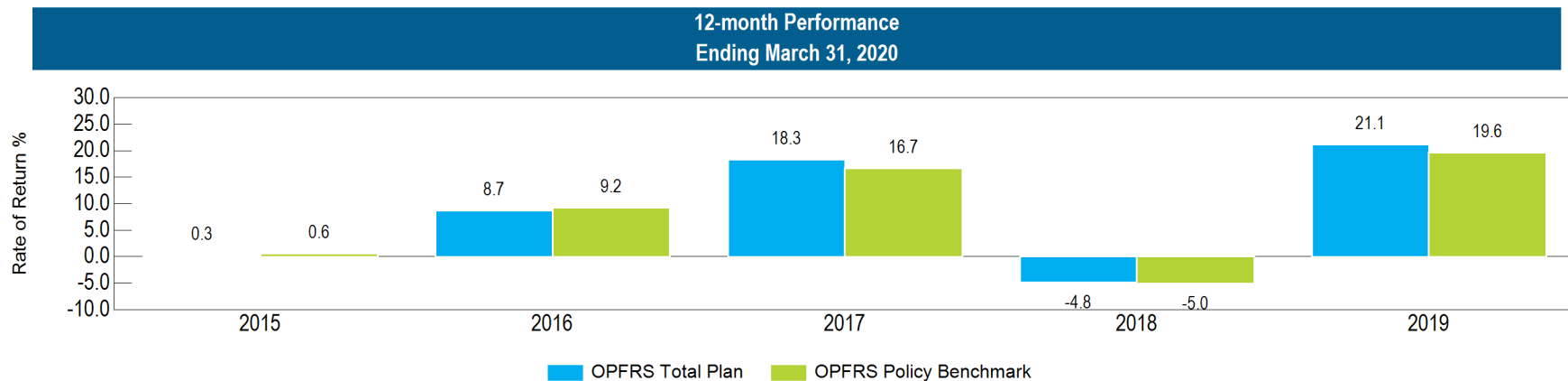
3. International Equity Benchmark consists of MSCI EAFE thru 12/31/04, and MSCI ACWI x US thereafter.

4. Fixed Income Benchmark consists of Bbg BC Aggregate prior to 4/1/06, and Bbg BC Universal thereafter.

Portfolio Relative Performance Results | As of March 31, 2020









| | 3 Mo (%) | 1 Yr (%) | 3 Yrs (%) | 5 Yrs (%) | 2015 (%) | 2016 (%) | 2017 (%) | 2018 (%) | 2019 (%) |
|---|--------------|-------------|------------|------------|--------------|------------|-------------|-------------|-------------|
| OPFRS Total Plan | -15.7 | -7.1 | 2.8 | 1.5 | -15.2 | 8.3 | 18.0 | -5.1 | 20.8 |
| <i>OPFRS Policy Benchmark</i> | <i>-12.2</i> | <i>-3.3</i> | <i>3.6</i> | <i>4.6</i> | <i>0.6</i> | <i>9.2</i> | <i>16.7</i> | <i>-5.0</i> | <i>19.6</i> |
| <i>InvMetrics Public DB \$250mm-\$1B Gross Median</i> | <i>-13.3</i> | <i>-5.0</i> | <i>3.0</i> | <i>3.8</i> | <i>0.0</i> | <i>7.8</i> | <i>15.8</i> | <i>-4.1</i> | <i>18.6</i> |



Portfolio Relative Performance Results | As of March 31, 2020

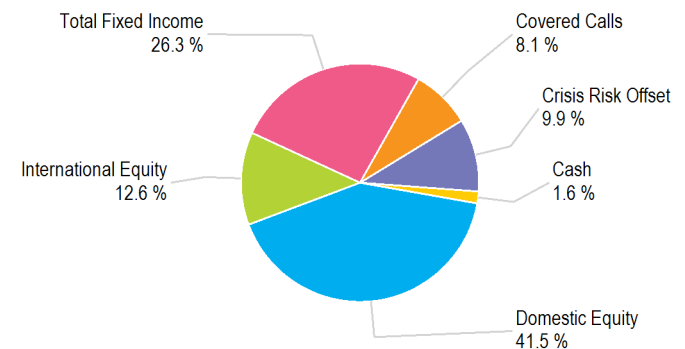
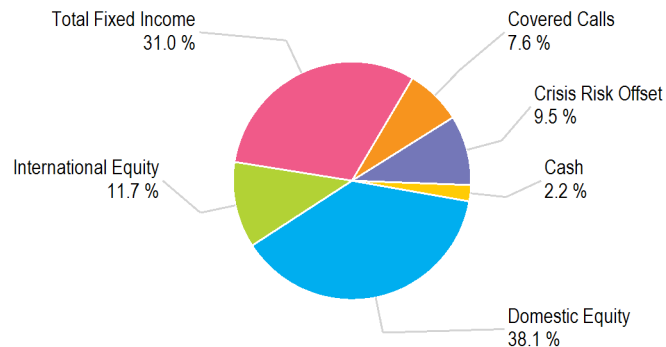
Asset Allocation vs. Target ¹ As Of March 31, 2020

| | Current | % | Policy | Difference* |
|---|----------------------|---------------|---------------|-------------|
|  Domestic Equity | \$130,193,710 | 38.1% | 40.0% | -1.9% |
|  International Equity | \$39,823,657 | 11.7% | 12.0% | -0.3% |
|  Total Fixed Income | \$105,804,029 | 31.0% | 33.0% | -2.0% |
|  Covered Calls | \$25,955,463 | 7.6% | 5.0% | 2.6% |
|  Crisis Risk Offset | \$32,299,476 | 9.5% | 10.0% | -0.5% |
|  Cash | \$7,454,175 | 2.2% | 0.0% | 2.2% |
| Total | \$341,530,510 | 100.0% | 100.0% | |

*Difference between Policy and Current Allocation

March 31, 2020 : \$341,530,510

December 31, 2019 : \$408,226,525.37



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

Manager Performance - Gross of Fees | As of March 31, 2020

| | Market Value | 3 Mo Rank | 1 Yr Rank | 3 Yrs Rank | 5 Yrs Rank | S.I. | S.I. Date |
|-----------------------------|--------------------|-----------------|-----------------|----------------|---------------|--------------|---------------|
| Domestic Equity | 130,193,710 | | | | | | |
| Northern Trust Russell 1000 | 74,854,604 | -20.2 56 | -8.0 50 | 4.6 43 | 6.2 42 | 11.3 | Jun-10 |
| <i>Russell 1000</i> | | <i>-20.2 56</i> | <i>-8.0 50</i> | <i>4.6 43</i> | <i>6.2 42</i> | <i>11.3</i> | <i>Jun-10</i> |
| Excess Return | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| EARNEST Partners | 25,814,131 | -23.6 27 | -12.0 27 | 3.9 21 | 6.5 7 | 7.9 | Apr-06 |
| <i>Russell MidCap</i> | | <i>-27.1 54</i> | <i>-18.3 55</i> | <i>-0.8 51</i> | <i>1.8 54</i> | <i>6.3</i> | <i>Apr-06</i> |
| Excess Return | | 3.5 | 6.3 | 4.7 | 4.7 | 1.6 | |
| Vanguard Russell 2000 Value | 5,513,548 | -35.3 54 | -- -- | -- -- | -- -- | -30.1 | Aug-19 |
| <i>Russell 2000 Value</i> | | <i>-35.7 58</i> | <i>-- --</i> | <i>-- --</i> | <i>-- --</i> | <i>-30.7</i> | <i>Aug-19</i> |
| Excess Return | | 0.4 | | | | 0.6 | |
| Rice Hall James | 8,539,043 | -29.0 85 | -23.5 85 | -- -- | -- -- | -4.2 | Jul-17 |
| <i>Russell 2000 Growth</i> | | <i>-25.8 69</i> | <i>-18.6 66</i> | <i>-- --</i> | <i>-- --</i> | <i>-1.4</i> | <i>Jul-17</i> |
| Excess Return | | -3.2 | -4.9 | | | -2.8 | |
| iShares Edge MSCI Min Vol | 15,472,384 | -- -- | -- -- | -- -- | -- -- | -- | |

Over the three months ending March 31, 2020, only one active managers in the Domestic Equity portfolio outperformed their respective benchmark. Passive managers performed in line with, or modestly outperformed their respective benchmarks.

Northern Trust Russell 1000, 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 exceptions for a passive mandate.

Vanguard Russell 2000 Value, the Plan's passive small cap manager, outperformed its benchmark by 0.4% over the most recent quarter, and by 0.6% since inception (August 2019).

Earnest Partners, the Plan's active mid cap core manager, outperformed its Russell Midcap benchmark by 3.5% placing it in the 28th percentile of its peer group. The portfolio has also outperformed its benchmark over all periods with excess returns of 6.3%, 4.7% and 4.7% over the 1-year, 3-year and 5-year periods respectively.

Rice Hall James, the Plan's active small cap value manager, underperformed its benchmark over the recent quarter by (3.2%), placing the portfolio in the 85th percentile of its peer group. The portfolio has underperformed its benchmark over the 1-year period by (4.9%).

SPI Active, the Plan's active Defensive Equity manager, was terminated in March and temporarily replaced by the iShares Edge MSCI Min Vol ETF.

Manager Performance - Gross of Fees | As of March 31, 2020

| | Market Value | 3 Mo | 1 Yr | 3 Yrs | 5 Yrs | S.I. | S.I. Date |
|---|-------------------|--------------|------|-------|-------|--------------|---------------|
| International Equity¹ | 39,823,657 | | | | | | |
| Vanguard Developed Markets | 11,450,040 | -23.6 | -- | -- | -- | -14.7 | Sep-19 |
| <i>MSCI ACWI ex USA Gross</i> | | <i>-23.3</i> | -- | -- | -- | <i>-14.2</i> | <i>Sep-19</i> |
| Excess Return | | -0.3 | | | | -0.5 | |
| iShares MSCI ACW exUS ETF | 27,996,931 | -21.3 | -- | -- | -- | -20.8 | Dec-19 |
| <i>MSCI ACWI ex USA Gross</i> | | <i>-23.3</i> | -- | -- | -- | <i>-19.9</i> | <i>Dec-19</i> |
| Excess Return | | 2.0 | | | | -0.9 | |

As of March 31, 2020, the Plan's international equity portfolio was entirely composed of passive managers. Over the quarter, managers produced mixed results versus their respective benchmarks.

Vanguard Developed Markets, the Plan's passive international developed markets (ex US), trailed its benchmark by (0.3%) over the most recent quarter. This tracking error is within the expected range. iShares MSCI ACWI ex US ETF, the Plan's temporary passive international equity manager, outperformed its benchmark by 2.0% over the most recent quarter.

1. Total International Equity market value includes cash held in closed accounts Fisher and Hansberger.

Manager Performance - Gross of Fees | As of March 31, 2020

| | Market Value | 3 Mo | Rank | 1 Yr | Rank | 3 Yrs | Rank | 5 Yrs | Rank | S.I. | S.I. Date |
|--|--------------------|--------------|-----------|-------------|-----------|------------|-----------|------------|-----------|------------|---------------|
| Total Fixed Income | 105,804,029 | | | | | | | | | | |
| Ramirez | 72,611,274 | -2.2 | 96 | 3.7 | 94 | 3.8 | 85 | -- | -- | 3.8 | Jan-17 |
| <i>BBgBarc US Aggregate TR</i> | | <u>3.1</u> | <u>15</u> | <u>8.9</u> | <u>13</u> | <u>4.8</u> | <u>15</u> | -- | -- | <u>4.7</u> | <u>Jan-17</u> |
| Excess Return | | -5.3 | | -5.2 | | -1.0 | | | | -0.9 | |
| Reams | 26,446,804 | 6.2 | 1 | 11.7 | 1 | 6.2 | 2 | 4.4 | 5 | 5.8 | Feb-98 |
| <i>Blmbg BC Universal (Blend)</i> | | <u>1.3</u> | <u>22</u> | <u>7.2</u> | <u>26</u> | <u>4.4</u> | <u>42</u> | <u>3.4</u> | <u>61</u> | <u>5.0</u> | <u>Feb-98</u> |
| Excess Return | | 4.9 | | 4.5 | | 1.8 | | 1.0 | | 0.8 | |
| DDJ Capital | 6,745,908 | -15.9 | 92 | -14.9 | 99 | -1.3 | 99 | 1.6 | 96 | 1.9 | Feb-15 |
| <i>ICE BofAML High Yield Master TR</i> | | <u>-13.1</u> | <u>67</u> | <u>-7.4</u> | <u>73</u> | <u>0.6</u> | <u>74</u> | <u>2.7</u> | <u>59</u> | <u>3.0</u> | <u>Feb-15</u> |
| Excess Return | | -2.8 | | -7.5 | | -1.9 | | -1.1 | | -1.1 | |

Over the three months ending March 31, 2020, one of three active managers in the Plan's Fixed Income portfolio outperformed their respective benchmark.

Ramirez, the Plan's core fixed income manager, returned -2.2% compared to the benchmark return of 3.1% during the quarter, ranking the portfolio in the 96th percentile of its peergroup. Ramirez has underperformed its benchmark by (5.2%) and (1.0%) over the 1-year and 3-year periods respectively, ranking in 93rd and 85th percentiles versus peers.

Reams, the Plan's core plus fixed income manager returned 6.2%, beating its benchmark by 4.9% during the quarter and ranked in the 1st percentile of its peer group. Over the mostrecent 12-month period,Reams outperformed its benchmark by 4.5%, earning a 1st percentile ranking. Reams did outperform its benchmark over the 3- and 5-year periods by 1.8%and 1.0% respectively.

DDJ, the Plan's High Yield & Bank Loan manager, returned -15.9% during the most recent quarter, underperforming the benchmark by (2.8%). DDJ now trails the benchmark in all periods with underperformanceof (7.5%), (1.9%) and (1.1%) over the 1, 3 and 5-year periods respectively.

Manager Performance - Gross of Fees | As of March 31, 2020

| | Market Value | 3 Mo | 1 Yr | 3 Yrs | 5 Yrs | S.I. | S.I. Date |
|--------------------------------------|-------------------|--------------|--------------|-------------|------------|------------|---------------|
| Covered Calls | 25,955,463 | -18.6 | -9.0 | 1.7 | 4.5 | 4.8 | Apr-14 |
| <i>CBOE S&P 500 BuyWrite USD</i> | | <i>-22.2</i> | <i>-15.1</i> | <i>-2.1</i> | <i>1.6</i> | <i>2.1</i> | <i>Apr-14</i> |
| Excess Return | | 3.6 | 6.1 | 3.8 | 2.9 | 2.7 | |
| Parametric BXM | 12,476,733 | -17.5 | -10.5 | 0.3 | 3.5 | 3.7 | Apr-14 |
| <i>CBOE S&P 500 BuyWrite USD</i> | | <i>-22.2</i> | <i>-15.1</i> | <i>-2.1</i> | <i>1.6</i> | <i>2.1</i> | <i>Apr-14</i> |
| Excess Return | | 4.7 | 4.6 | 2.4 | 1.9 | 1.6 | |
| Parametric DeltaShift | 13,478,731 | -19.6 | -7.6 | 3.0 | 5.2 | 6.5 | Apr-14 |
| <i>CBOE S&P 500 BuyWrite USD</i> | | <i>-22.2</i> | <i>-15.1</i> | <i>-2.1</i> | <i>1.6</i> | <i>2.1</i> | <i>Apr-14</i> |
| Excess Return | | 2.6 | 7.5 | 5.1 | 3.6 | 4.4 | |

Over the three months ending March 31, 2020, the Covered Calls portfolio outperformed its benchmark by 3.6%.

Parametric BXM, the Plan's passive covered calls allocation outperformed its CBOE BXM index by 4.7% over the most recent quarter. The portfolio has outperformed over the most recent 1-year, 3- and 5-year periods by 4.6%, 2.4% and 1.9% respectively.

Parametric DeltaShift, the Plan's active covered calls allocation outperformed its CBOE BXM index by 2.6% over the most recent quarter. The portfolio has outperformed over the most recent 1-year, 3- and 5-year periods by 7.5%, 5.1% and 3.6% respectively.

Manager Performance - Gross of Fees | As of March 31, 2020

| | Market Value | 3 Mo | 1 Yr | 3 Yrs | 5 Yrs | S.I. | S.I. Date |
|---|-------------------|--------------|--------------|-------|-------|-------------|---------------|
| Crisis Risk Offset | 32,299,476 | -18.1 | -13.0 | -- | -- | -9.3 | Sep-18 |
| <i>SG Multi Alternative Risk Premia Index</i> | | <i>-8.7</i> | <i>-8.2</i> | -- | -- | <i>-4.1</i> | <i>Sep-18</i> |
| Excess Return | | -9.4 | -4.8 | | | -5.2 | |
| Parametric Systematic Alternative Risk Premia | 16,485,876 | -38.2 | -32.4 | -- | -- | -21.6 | Aug-18 |
| <i>SG Multi Alternative Risk Premia Index</i> | | <i>-8.7</i> | <i>-8.2</i> | -- | -- | <i>-4.3</i> | <i>Aug-18</i> |
| Excess Return | | -29.5 | -24.2 | | | -17.3 | |
| Vanguard Long-Term Treasury ETF | 15,813,600 | 21.3 | -- | -- | -- | 25.5 | Jul-19 |
| <i>BBgBarc US Govt Long TR</i> | | <i>20.6</i> | -- | -- | -- | <i>24.8</i> | <i>Jul-19</i> |
| Excess Return | | 0.7 | | | | 0.7 | |

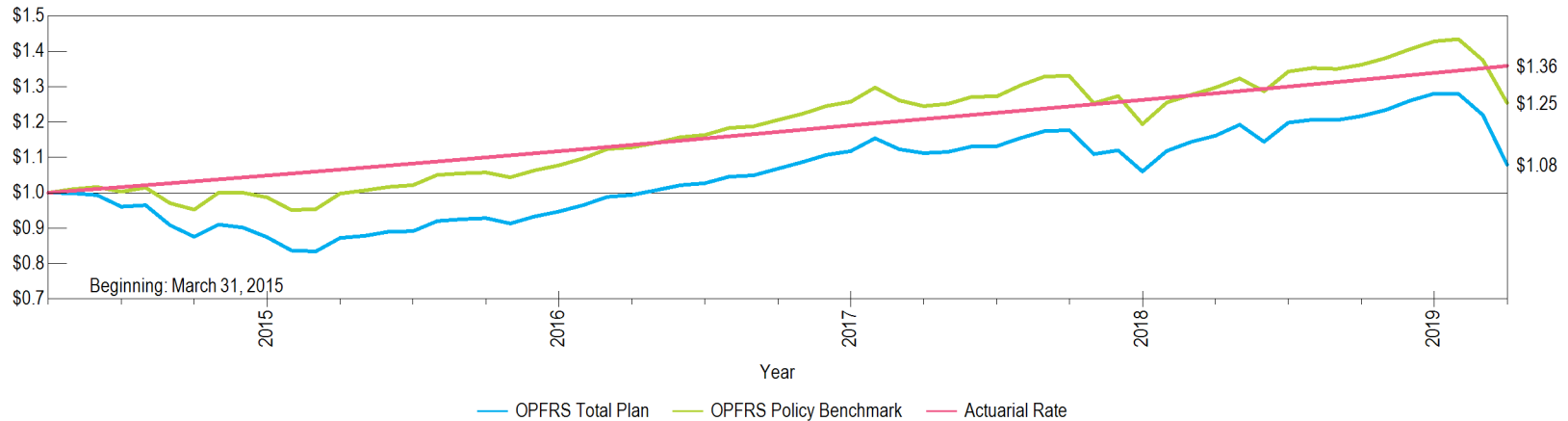
Over the three months ending March 31, 2020, the Crisis Risk Offset portfolio underperformed its benchmark by (9.4%).

Parametric Systematic Alternative Risk Premia, the Plan's Risk Premia / Trend Following manager returned -38.2%, significantly underperforming its benchmark by (29.5%) during the quarter. This resulted in underperformance at the 1-year mark of (24.2%) and (17.3%) since inception.

Vanguard Long Duration ETF, the Plan's Long Duration allocation returned 21.3%, beating its benchmark by 0.7% over the quarter. The Vanguard Long-Term Treasury ETF is a placeholder in the Long Duration allocation until a permanent manager is selected.

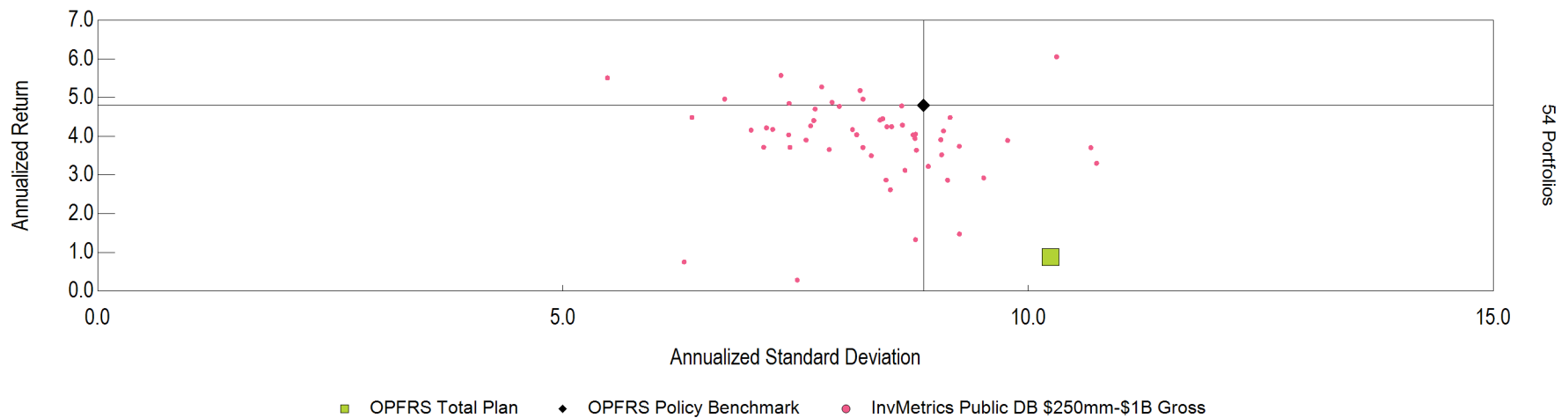
Total Portfolio 5-Year Performance | As of March 31, 2020

Growth of a Dollar

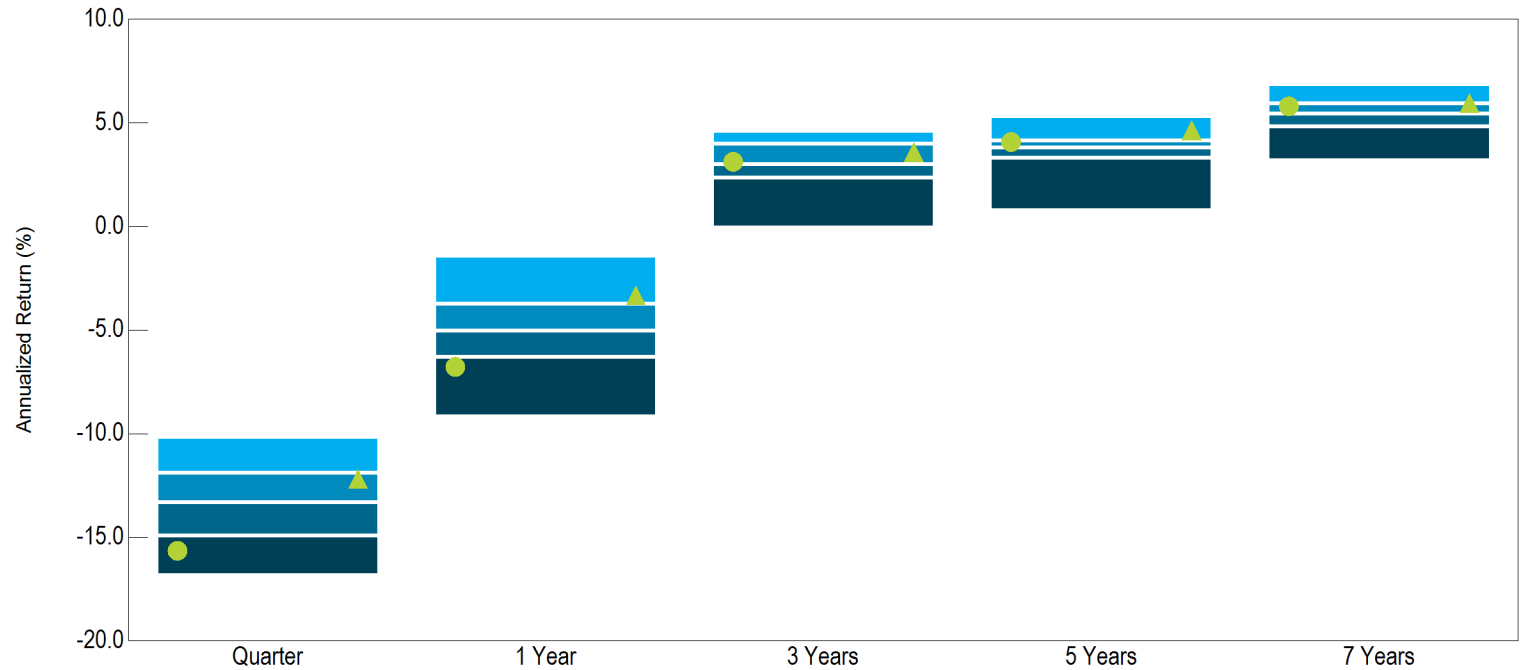


The actuarial expected rate of return was 8% through 6/30/2009, 7.5% through 6/30/2010, 7% through 6/30/2011, 6.75% through 6/30/2014, 6.5% through 2/31/2017 and 6.0% currently.

Annualized Return vs. Annualized Standard Deviation 5 Years 3 Months Ending March 31, 2020



InvMetrics Public DB \$250mm-\$1B Gross Return Comparison

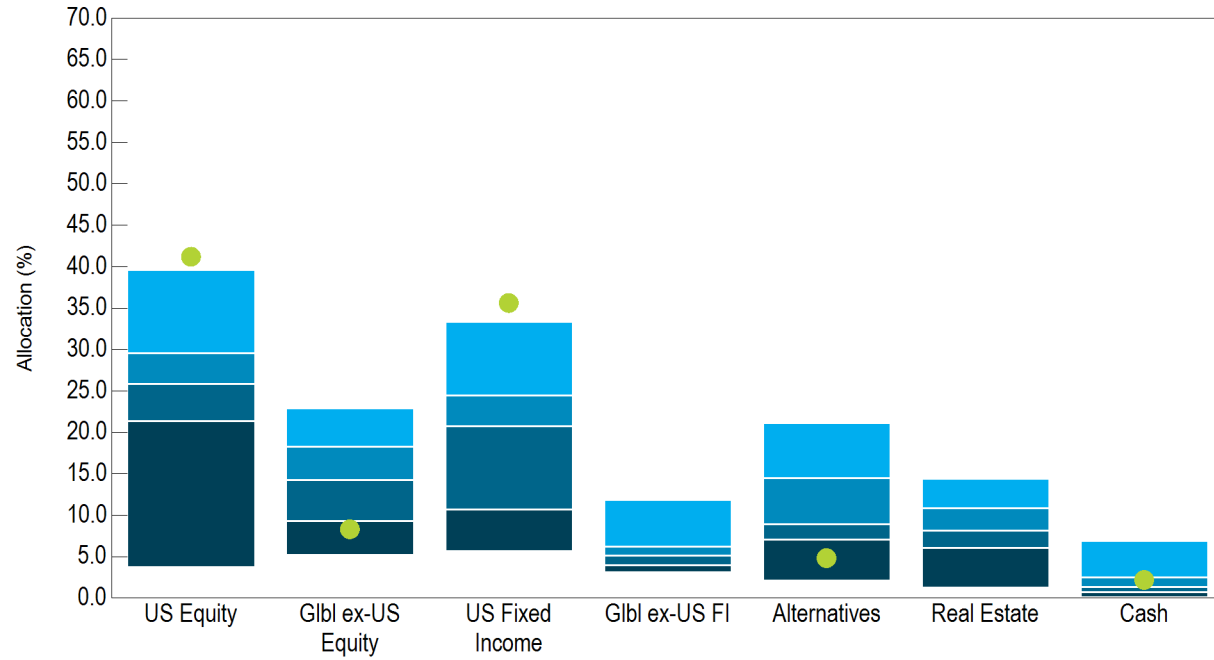


| | Return (Rank) | | | | |
|--------------------------|---------------|-----------|----------|----------|----------|
| | Quarter | 1 Year | 3 Years | 5 Years | 7 Years |
| 5th Percentile | -10.2 | -1.4 | 4.6 | 5.3 | 6.8 |
| 25th Percentile | -11.9 | -3.7 | 4.0 | 4.2 | 5.9 |
| Median | -13.3 | -5.0 | 3.0 | 3.8 | 5.5 |
| 75th Percentile | -14.9 | -6.3 | 2.4 | 3.3 | 4.8 |
| 95th Percentile | -16.8 | -9.1 | 0.0 | 0.8 | 3.2 |
| # of Portfolios | 56 | 56 | 54 | 54 | 52 |
| ● OPFRS Total Plan | -15.6 (91) | -6.8 (81) | 3.1 (49) | 4.1 (29) | 5.8 (29) |
| ▲ OPFRS Policy Benchmark | -12.2 (30) | -3.3 (19) | 3.6 (35) | 4.6 (15) | 5.9 (26) |

Calculation based on monthly periodicity.

Plan Sponsor Total Fund Asset Allocation | As of March 31, 2020

Total Plan Allocation vs. InvMetrics Public DB \$250mm-\$1B Gross



| | Allocation (Rank) | | | | | | |
|---------------------------|-------------------|------------------|-----------------|--------------|--------------|-------------|----------|
| | US Equity | Gbl ex-US Equity | US Fixed Income | Gbl ex-US FI | Alternatives | Real Estate | Cash |
| 5th Percentile | 39.6 | 22.9 | 33.3 | 11.8 | 21.2 | 14.4 | 6.9 |
| 25th Percentile | 29.6 | 18.3 | 24.5 | 6.3 | 14.5 | 10.9 | 2.6 |
| Median | 26.0 | 14.3 | 20.8 | 5.2 | 9.0 | 8.2 | 1.4 |
| 75th Percentile | 21.4 | 9.4 | 10.8 | 4.1 | 7.1 | 6.2 | 0.8 |
| 95th Percentile | 3.8 | 5.3 | 5.7 | 3.2 | 2.2 | 1.3 | 0.1 |
| # of Portfolios | 35 | 37 | 31 | 11 | 47 | 33 | 47 |
| ● OPFRS Total Plan | 41.2 (4) | 8.3 (82) | 35.6 (1) | -- | 4.8 (89) | -- | 2.2 (29) |

Calculation based on monthly periodicity.

Manager Monitoring / Probation List

Monitoring/Probation Status

Return vs. Benchmark since Corrective Action As of March 31, 2020

| Portfolio | Status | Concern | Months Since Corrective Action | Performance [^] Since Corrective Action (Gross) | Peer Group Percentile Ranking | Date of Corrective Action* |
|--------------------------|----------|-------------|--------------------------------|--|-------------------------------|----------------------------|
| DDJ Capital | On Watch | Performance | 7 | -15.1 | 92 | 5/29/2019 |
| Ice BofAML US High Yield | | | --- | -7.5 | | |
| Rice Hall James | On Watch | Performance | 7 | -20.7 | 85 | 5/29/2019 |
| Russell 2000 Growth | --- | --- | --- | -14.7 | | |

[^] 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

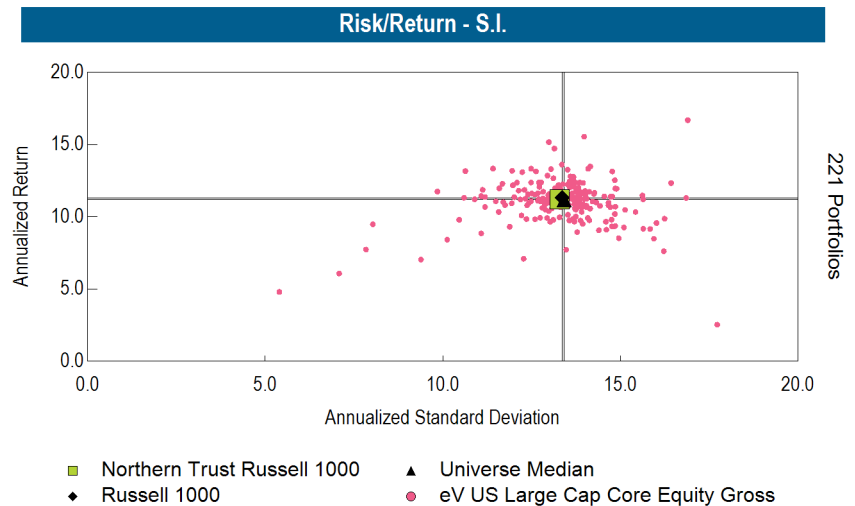
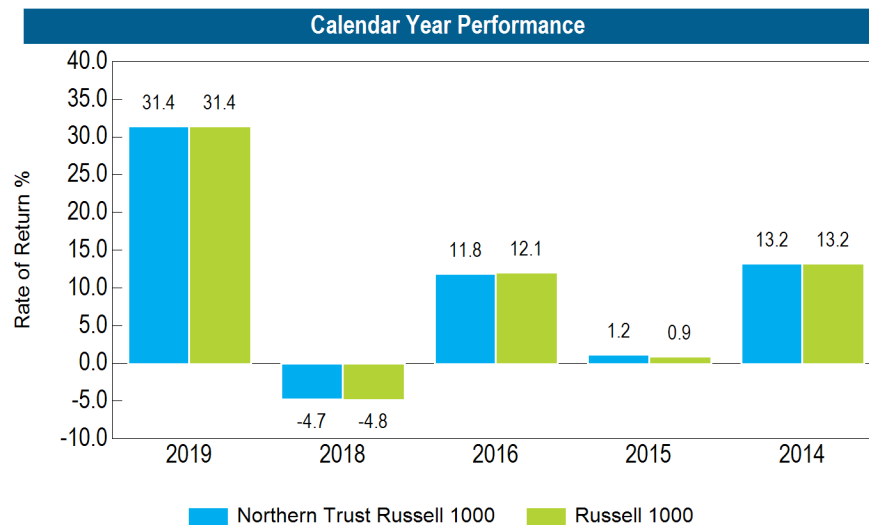
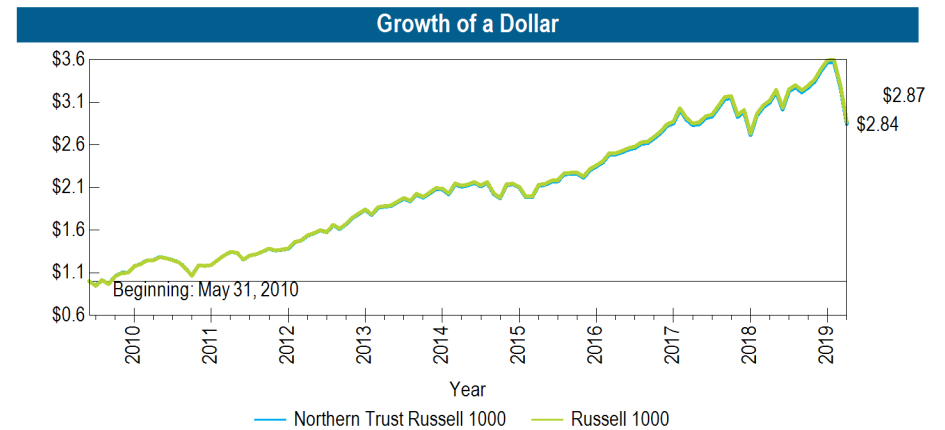
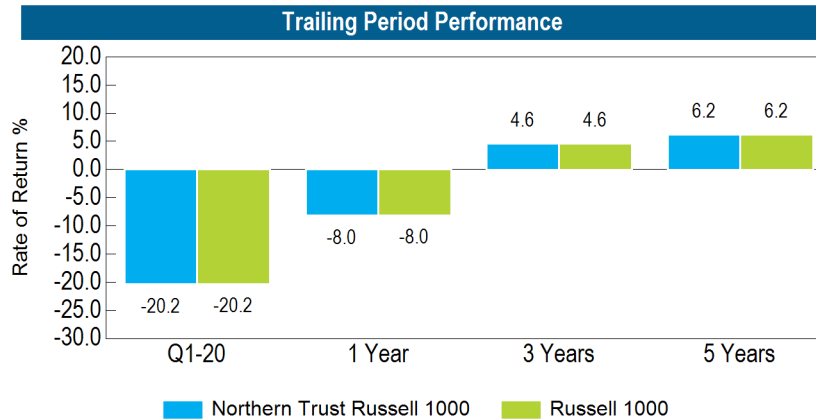
| Asset Class | Short-term (Rolling 12 mth periods) | Medium-term (Rolling 36 mth periods) | Long-term (60 + mths) |
|------------------------------|--|---|---|
| Active Domestic Equity | Fd return < bench return - 3.5% | Fd annlzd return < bench annlzd return - 1.75% for 6 consecutive months | VRR** < 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.

Individual Manager Performance

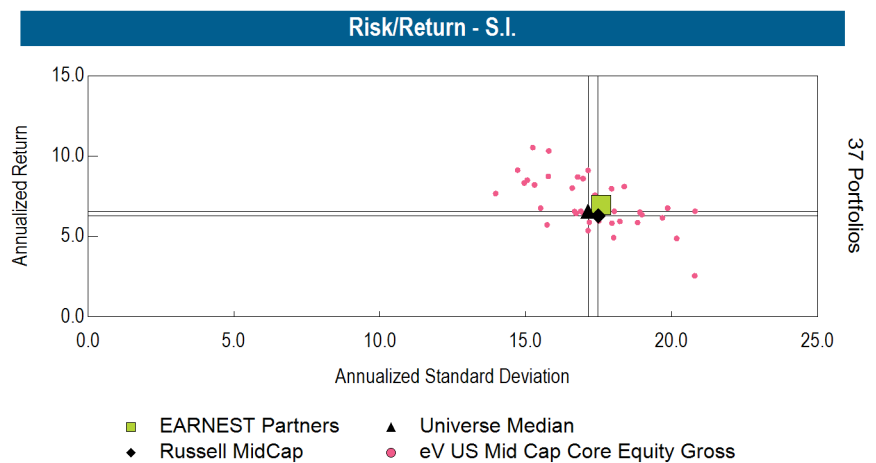
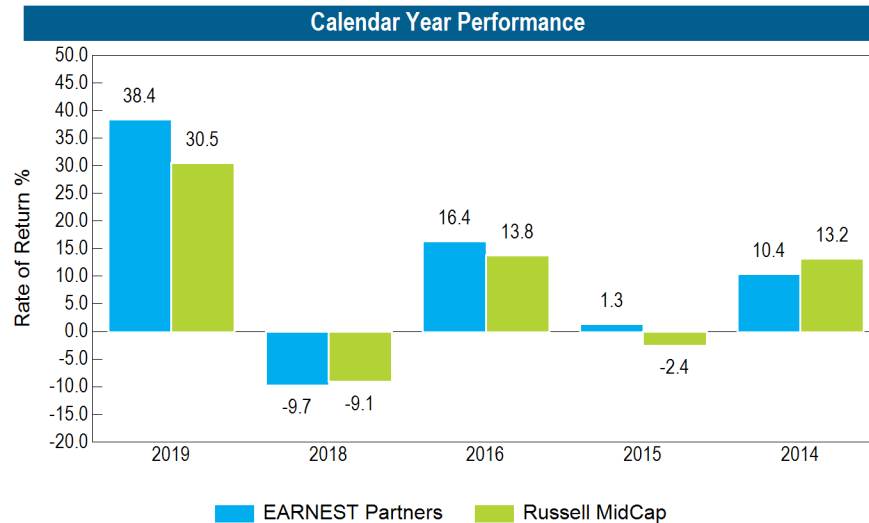
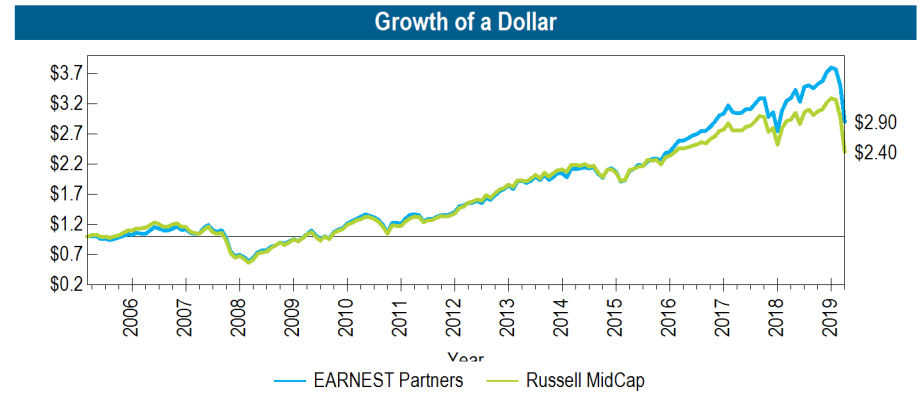
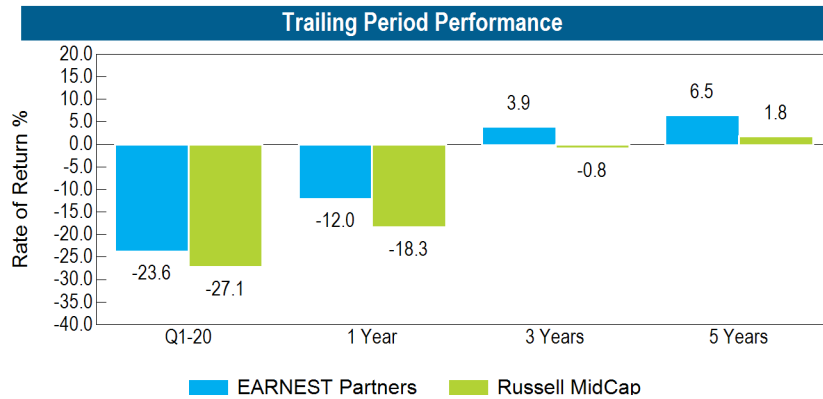
Northern Trust Russell 1000 | As of March 31, 2020

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Mkt Capture Ratio | Down Mkt Capture Ratio |
|-----------------------------|-------|------|-------------------|--------------|----------------|-----------|----------------------|------------------------|
| Northern Trust Russell 1000 | 0.00% | 1.00 | -0.63 | 0.80 | 0.14% | 1.00 | 98.43% | 99.74% |
| Russell 1000 | 0.00% | 1.00 | -- | 0.80 | 0.00% | 1.00 | 100.00% | 100.00% |



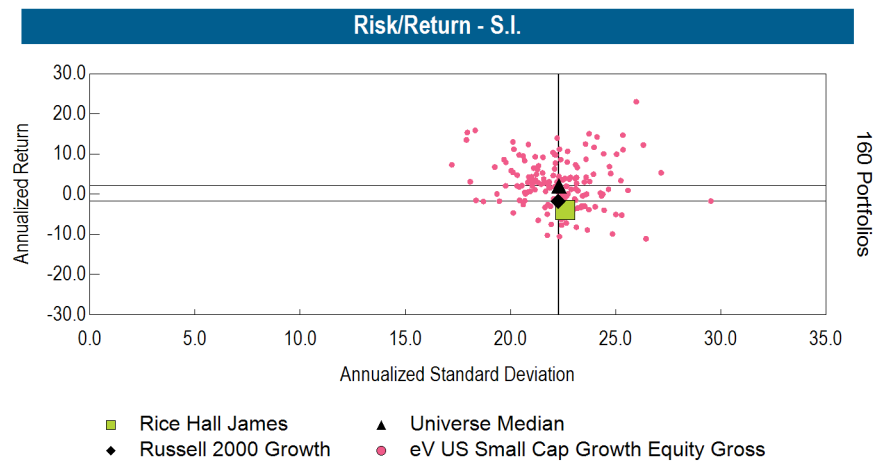
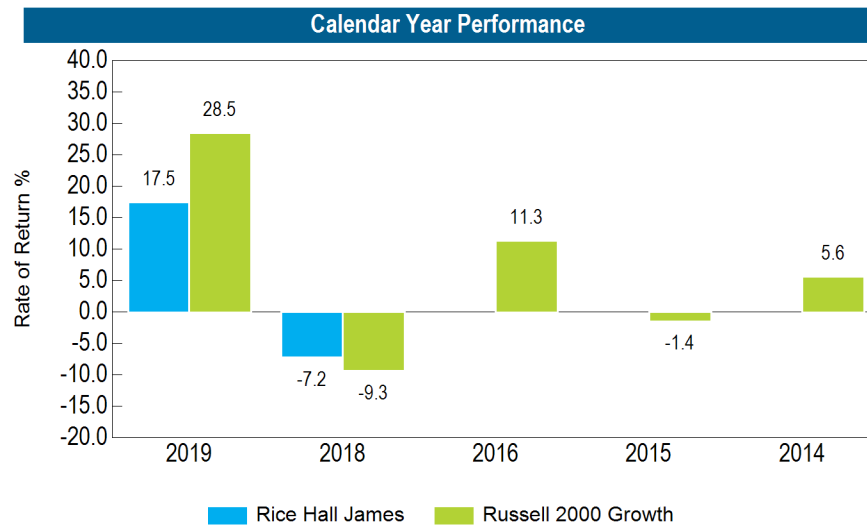
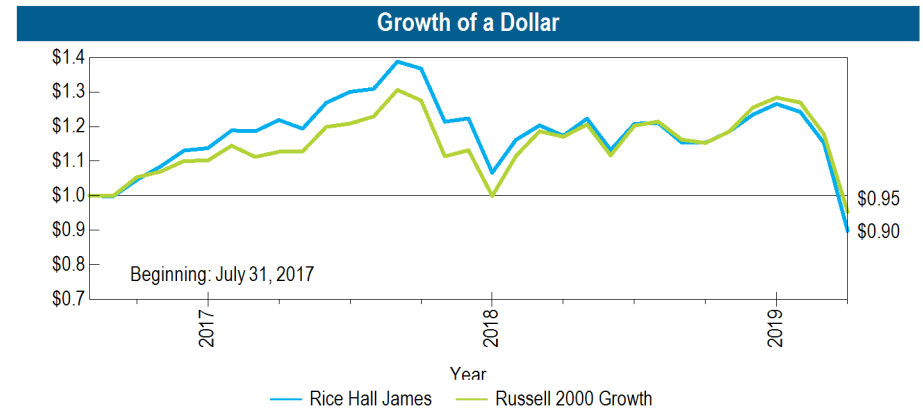
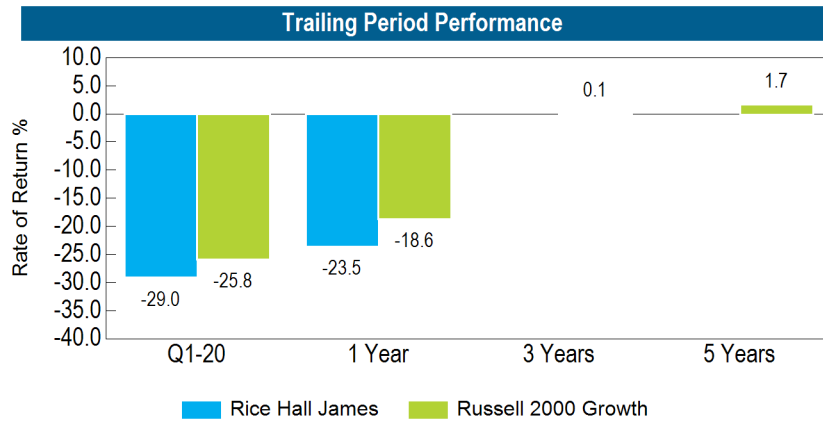
EARNEST Partners | As of March 31, 2020

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Mkt Capture Ratio | Down Mkt Capture Ratio |
|------------------|-------|------|-------------------|--------------|----------------|-----------|----------------------|------------------------|
| EARNEST Partners | 0.14% | 0.99 | 0.49 | 0.39 | 3.33% | 0.96 | 105.22% | 98.71% |
| Russell MidCap | 0.00% | 1.00 | -- | 0.29 | 0.00% | 1.00 | 100.00% | 100.00% |

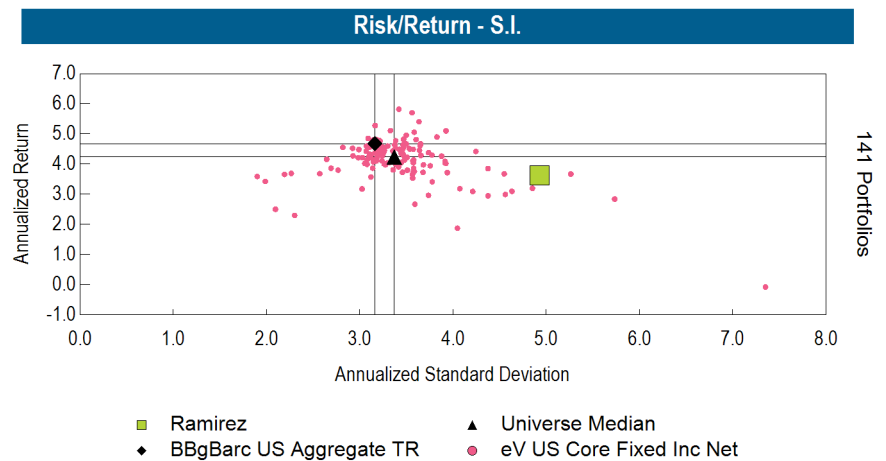
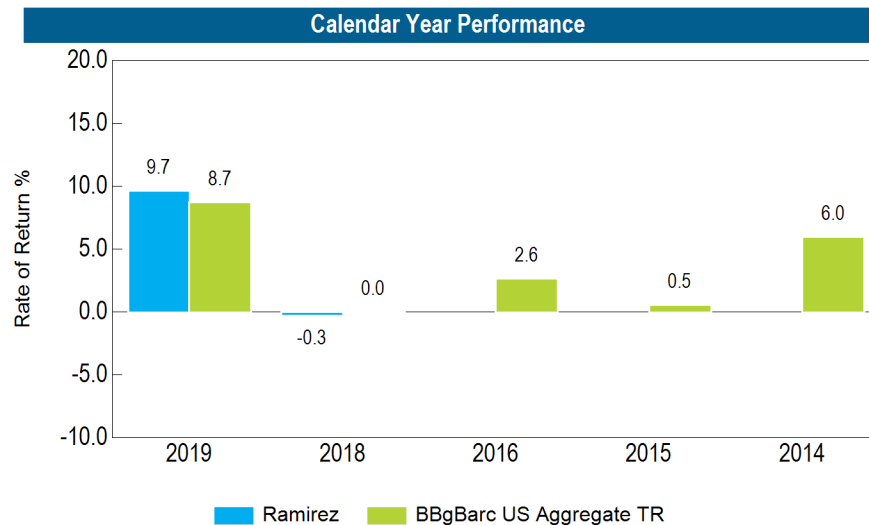
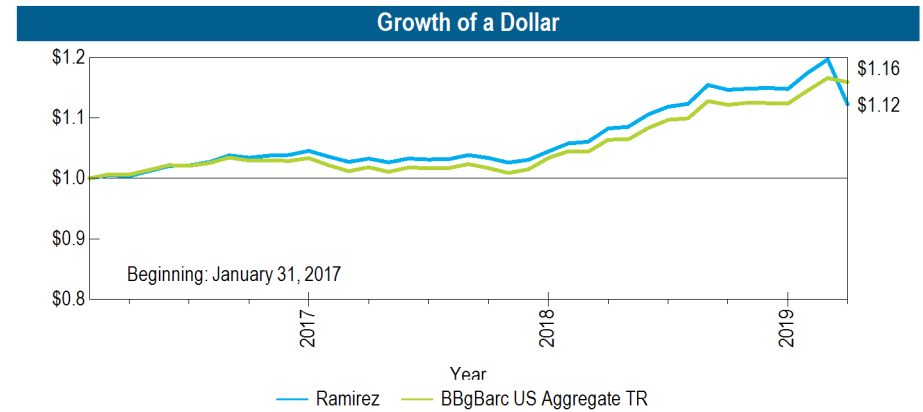
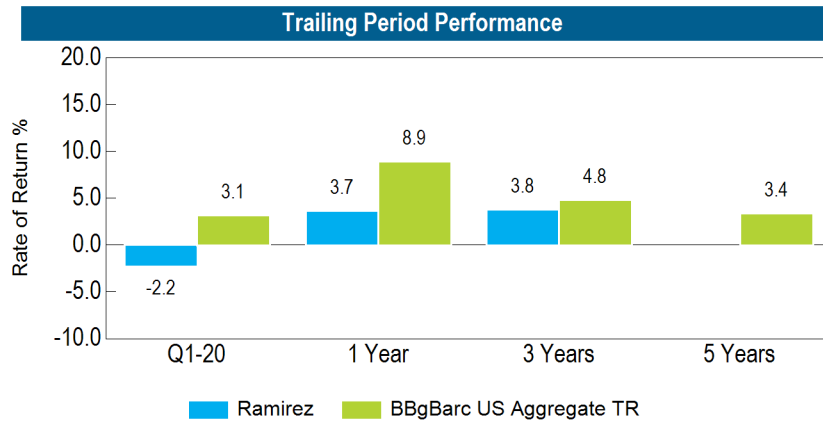


Rice Hall James | As of March 31, 2020

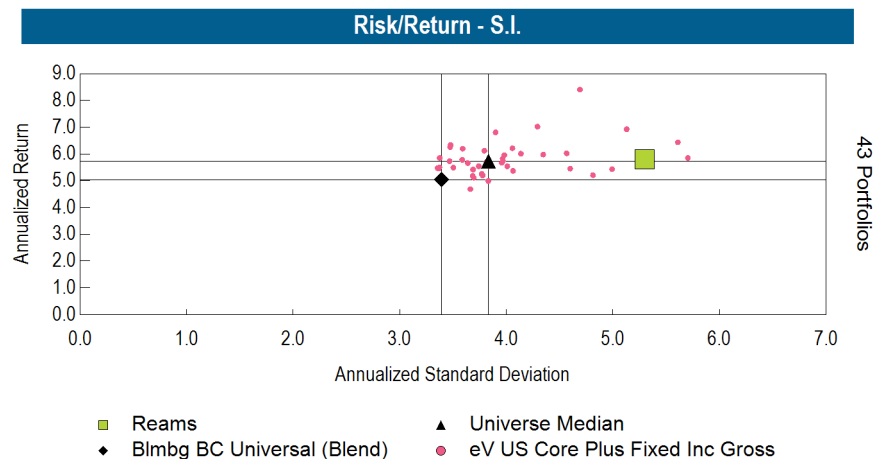
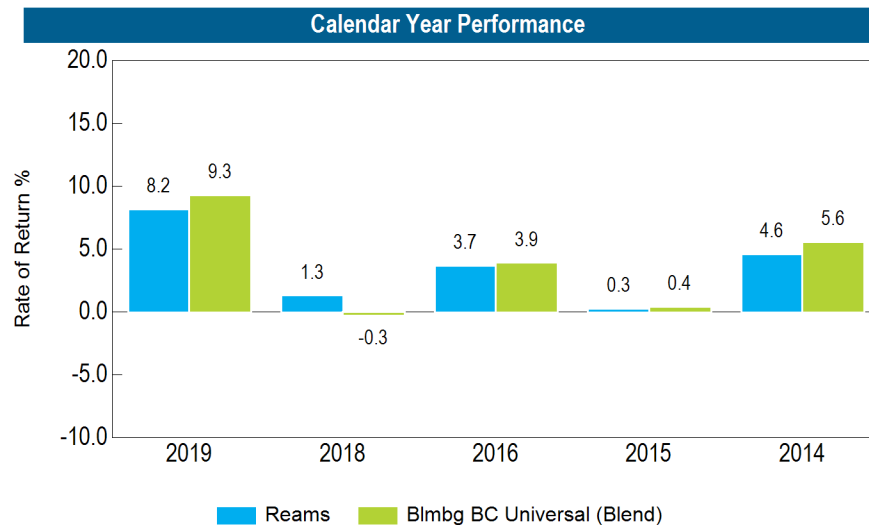
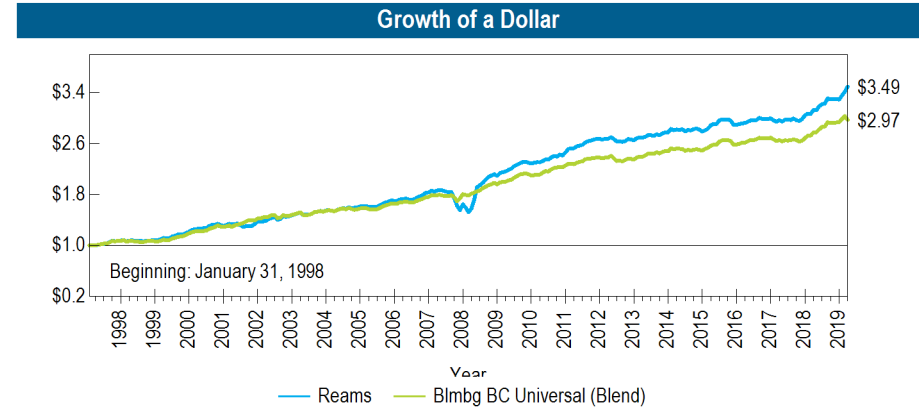
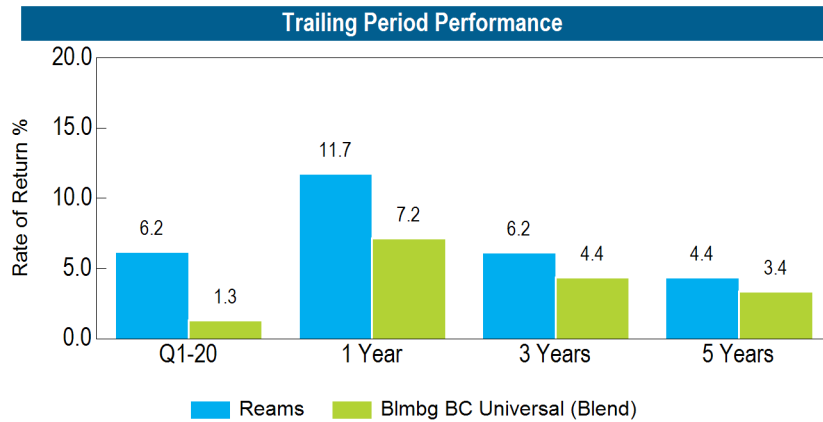
| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Mkt Capture Ratio | Down Mkt Capture Ratio |
|---------------------|--------|------|-------------------|--------------|----------------|-----------|----------------------|------------------------|
| Rice Hall James | -0.17% | 0.99 | -0.44 | -0.26 | 4.89% | 0.95 | 91.43% | 101.33% |
| Russell 2000 Growth | 0.00% | 1.00 | -- | -0.17 | 0.00% | 1.00 | 100.00% | 100.00% |



| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Mkt Capture Ratio | Down Mkt Capture Ratio |
|-------------------------|--------|------|-------------------|--------------|----------------|-----------|----------------------|------------------------|
| Ramirez | -0.14% | 1.17 | -0.33 | 0.42 | 3.26% | 0.56 | 106.60% | 165.41% |
| BBgBarc US Aggregate TR | 0.00% | 1.00 | -- | 0.99 | 0.00% | 1.00 | 100.00% | 100.00% |

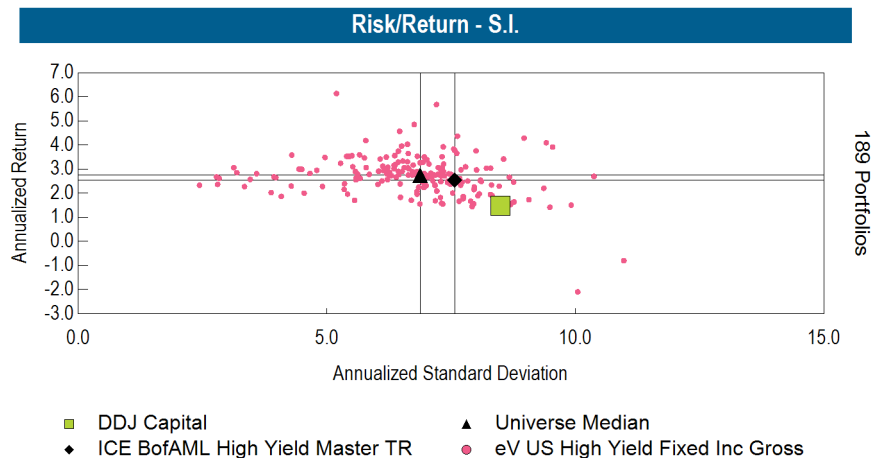
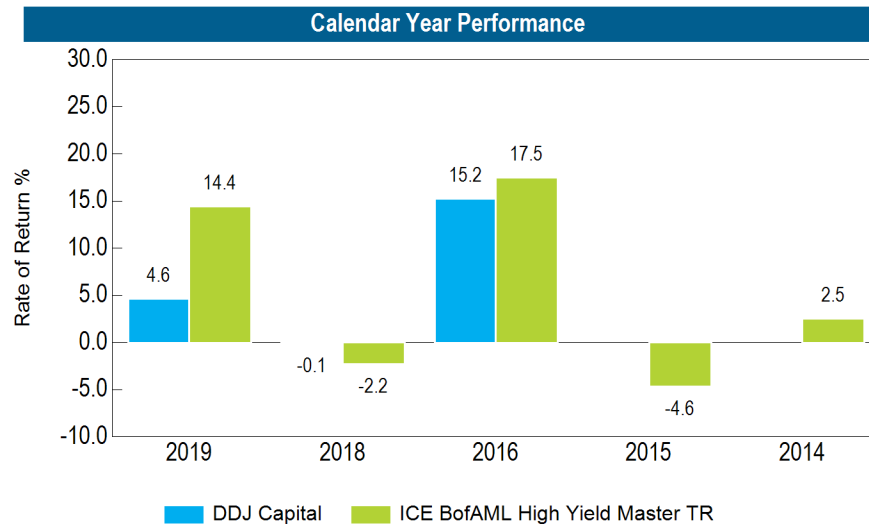
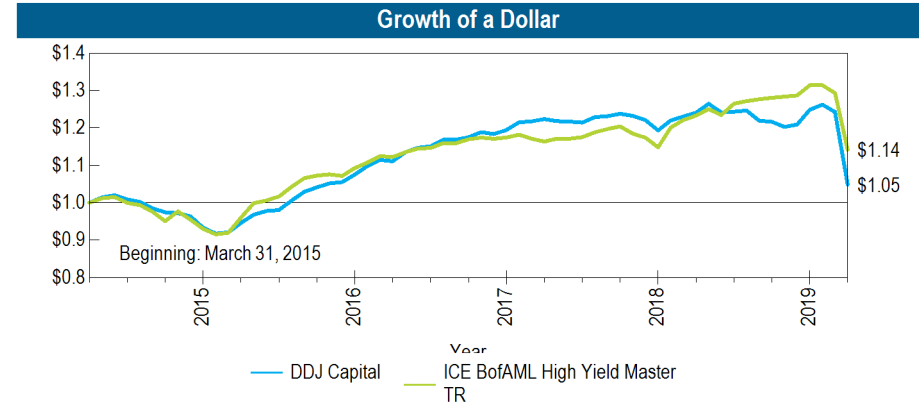
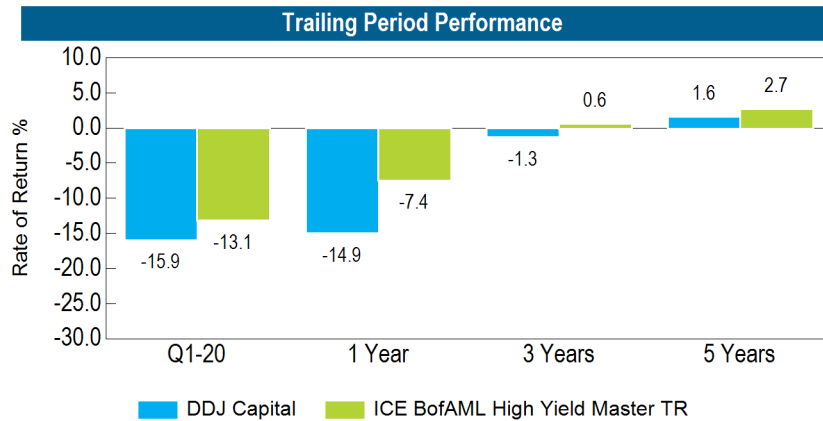


| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Mkt Capture Ratio | Down Mkt Capture Ratio |
|----------------------------|-------|------|-------------------|--------------|----------------|-----------|----------------------|------------------------|
| Reams | 0.06% | 1.02 | 0.19 | 0.74 | 4.00% | 0.43 | 119.11% | 97.58% |
| Blmbg BC Universal (Blend) | 0.00% | 1.00 | -- | 0.92 | 0.00% | 1.00 | 100.00% | 100.00% |



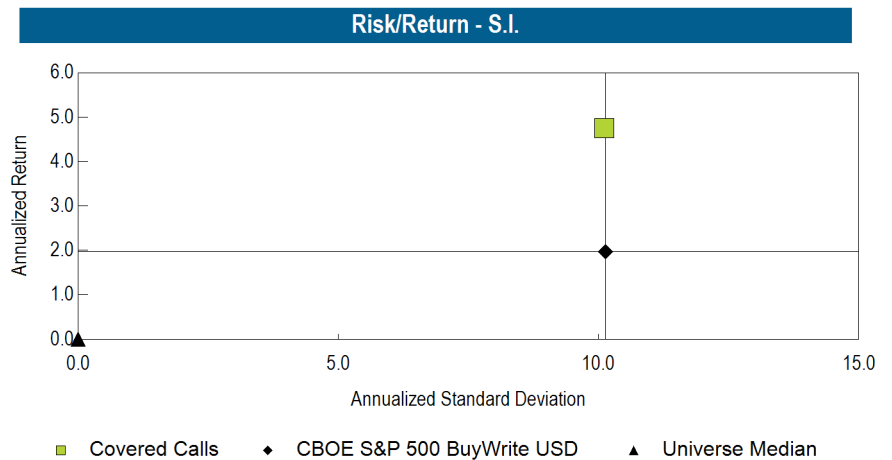
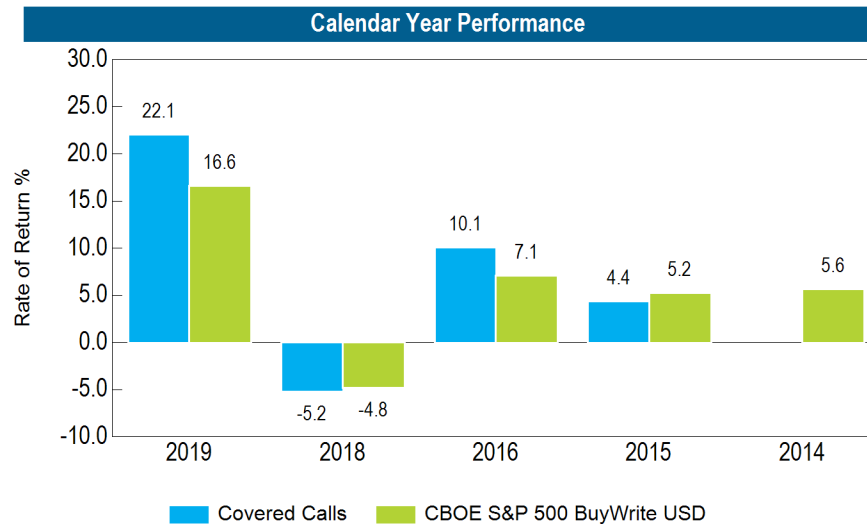
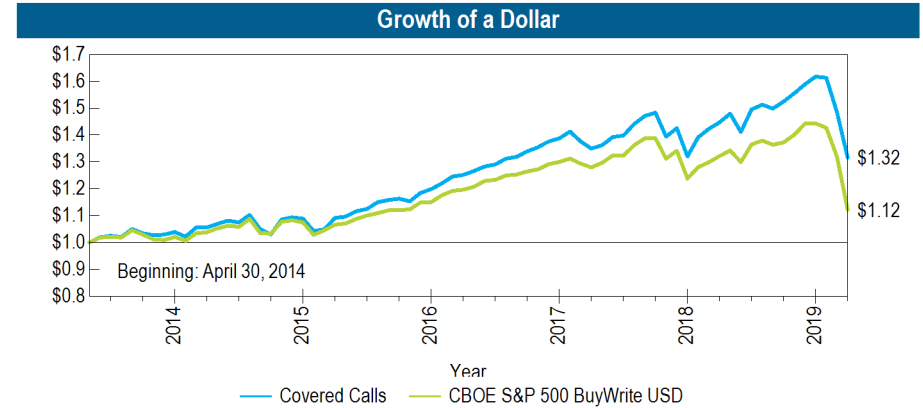
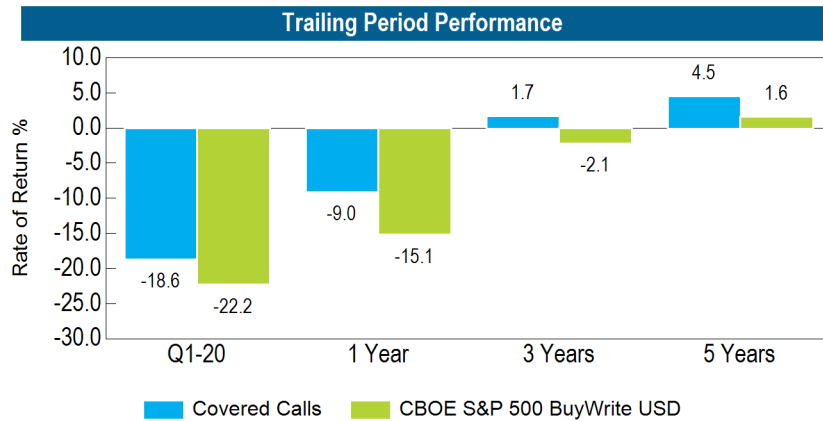
DDJ Capital | As of March 31, 2020

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Mkt Capture Ratio | Down Mkt Capture Ratio |
|---------------------------------|--------|------|-------------------|--------------|----------------|-----------|----------------------|------------------------|
| DDJ Capital | -0.08% | 1.01 | -0.28 | 0.04 | 3.72% | 0.81 | 80.78% | 94.25% |
| ICE BofAML High Yield Master TR | 0.00% | 1.00 | -- | 0.19 | 0.00% | 1.00 | 100.00% | 100.00% |



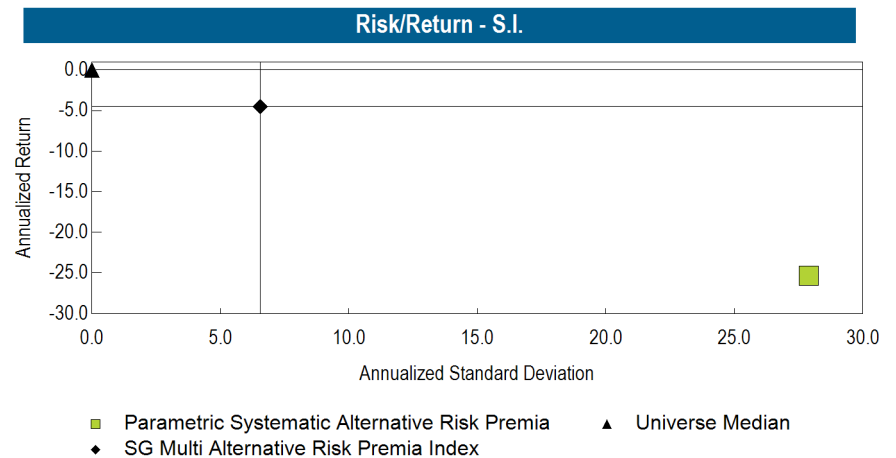
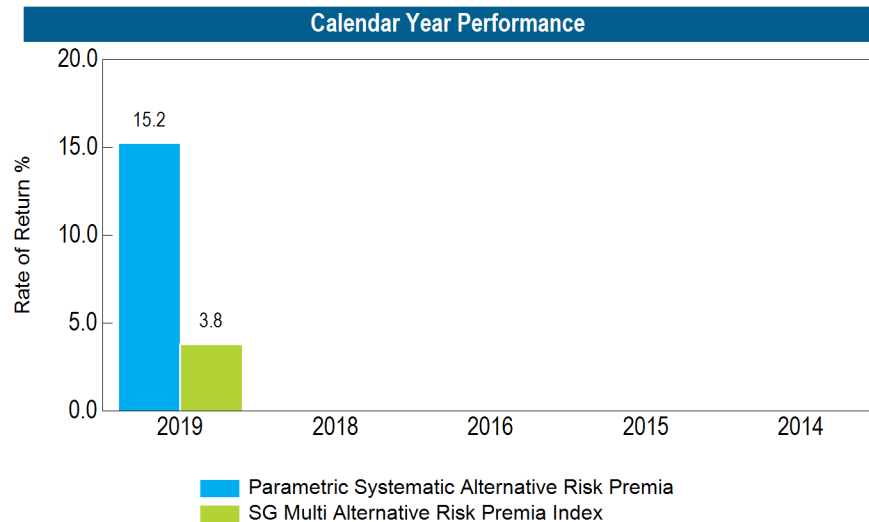
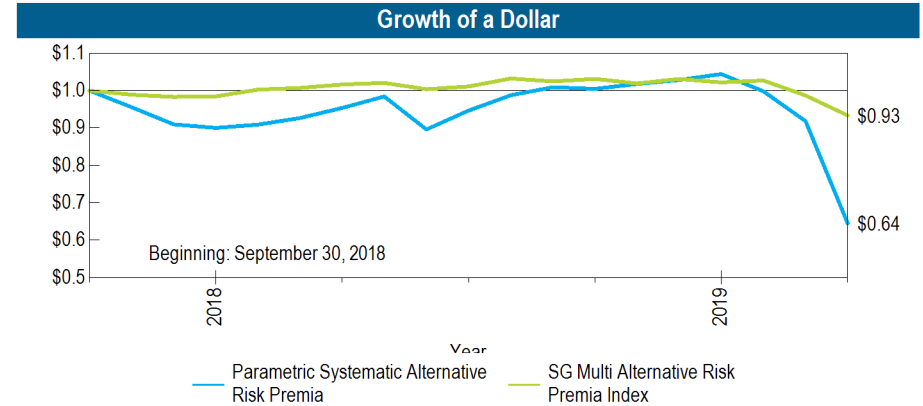
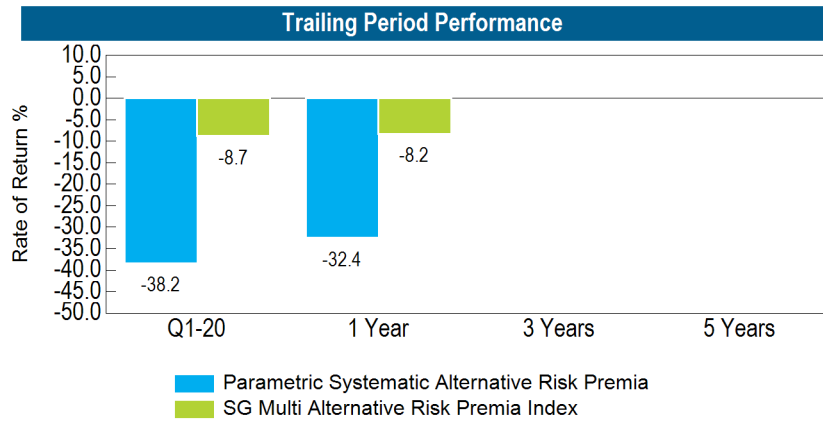
Covered Calls | As of March 31, 2020

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Mkt Capture Ratio | Down Mkt Capture Ratio |
|---------------------------|-------|------|-------------------|--------------|----------------|-----------|----------------------|------------------------|
| Covered Calls | 0.23% | 0.96 | 1.00 | 0.38 | 2.78% | 0.93 | 130.60% | 98.61% |
| CBOE S&P 500 BuyWrite USD | 0.00% | 1.00 | -- | 0.10 | 0.00% | 1.00 | 100.00% | 100.00% |



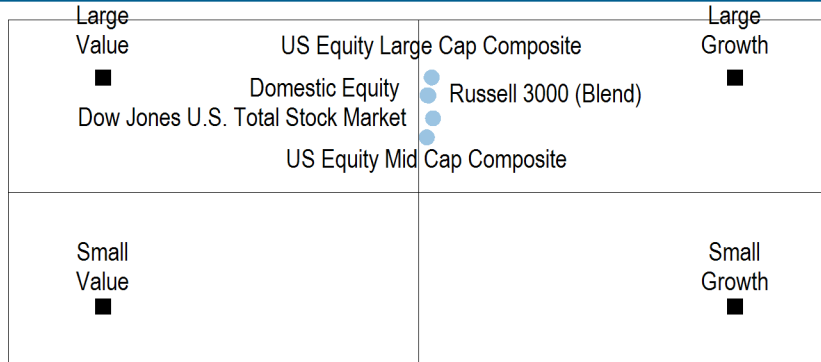
Parametric Systematic Alternative Risk Premia | As of March 31, 2020

| | Alpha | Beta | Information Ratio | Sharpe Ratio | Tracking Error | R-Squared | Up Mkt Capture Ratio | Down Mkt Capture Ratio |
|---|--------|------|-------------------|--------------|----------------|-----------|----------------------|------------------------|
| Parametric Systematic Alternative Risk Premia | -0.57% | 3.58 | -0.83 | -0.90 | 22.41% | 0.69 | 194.24% | 300.45% |
| SG Multi Alternative Risk Premia Index | 0.00% | 1.00 | -- | -0.97 | 0.00% | 1.00 | 100.00% | 100.00% |

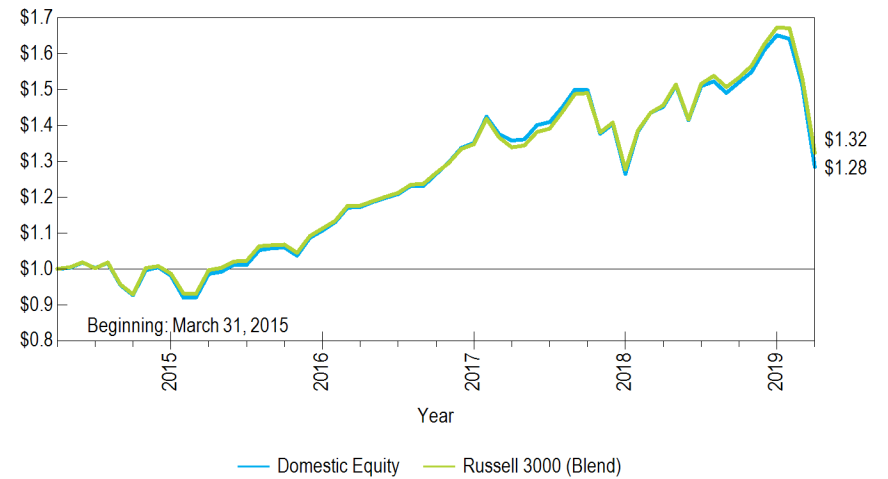


Domestic Equity | As of March 31, 2020

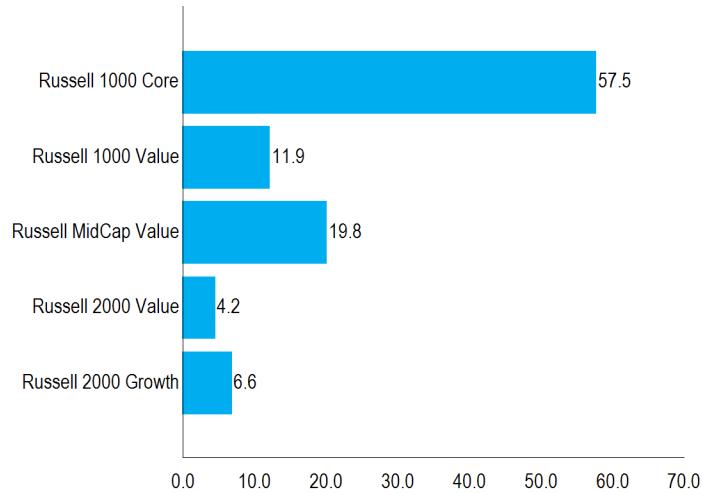
Style Map (5-Year)



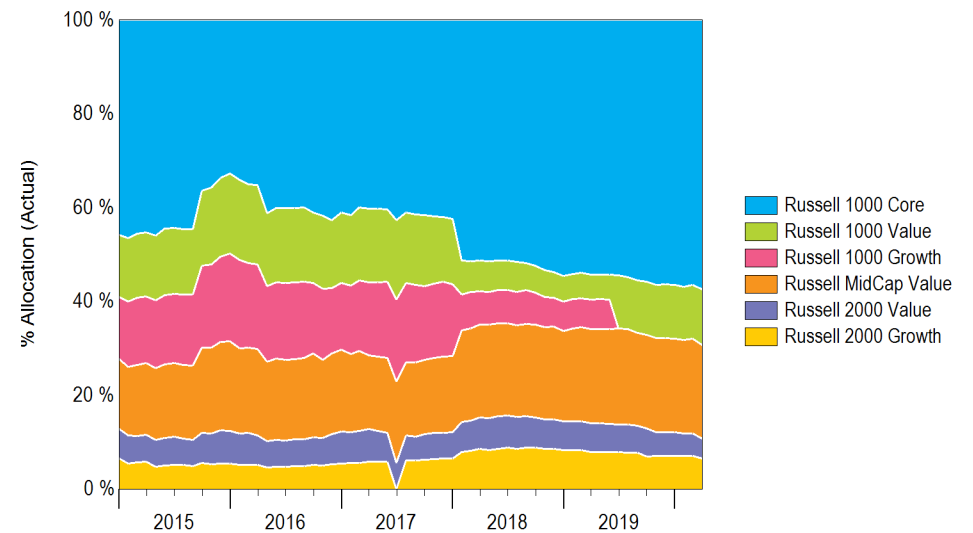
Growth of a Dollar



Style Exposure

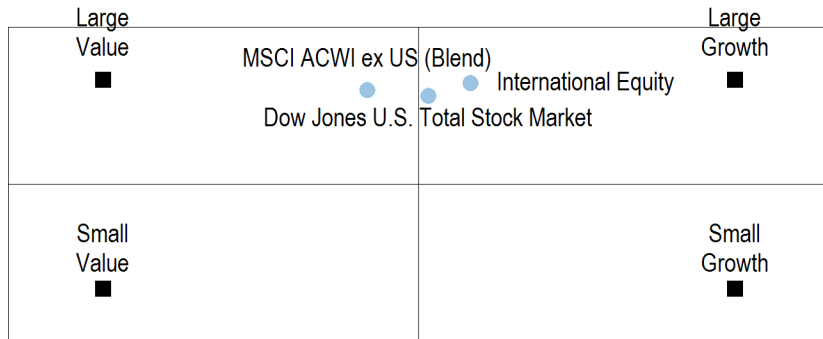


Style History (5-Year)

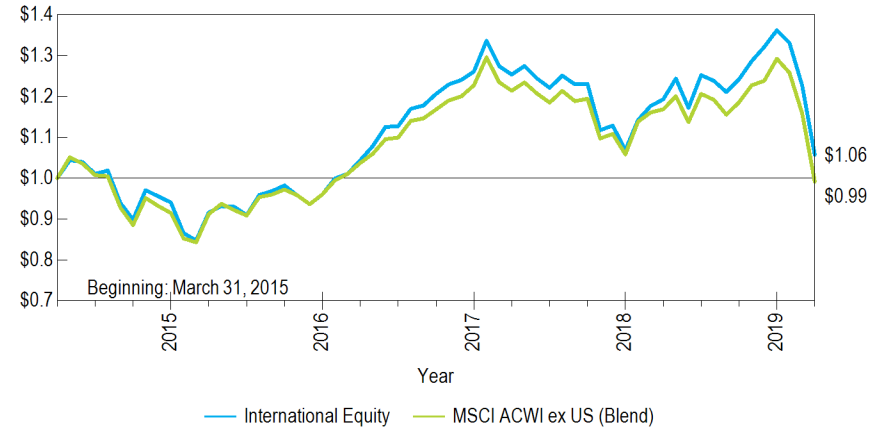


International Equity | As of March 31, 2020

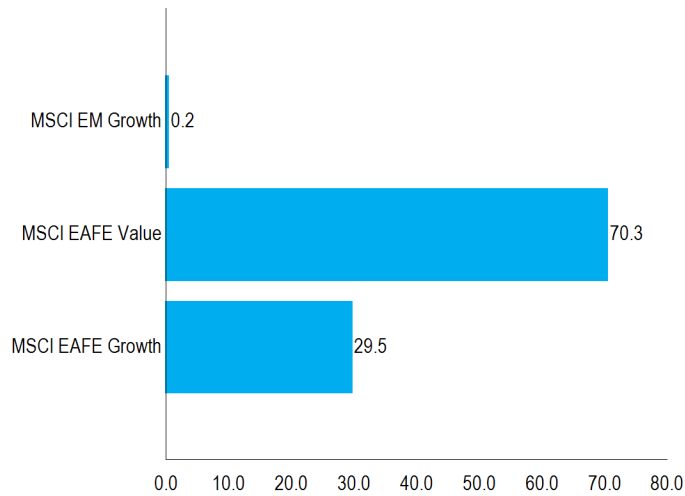
U.S. Effective Style Map
5 Years 3 Months Ending March 31, 2020



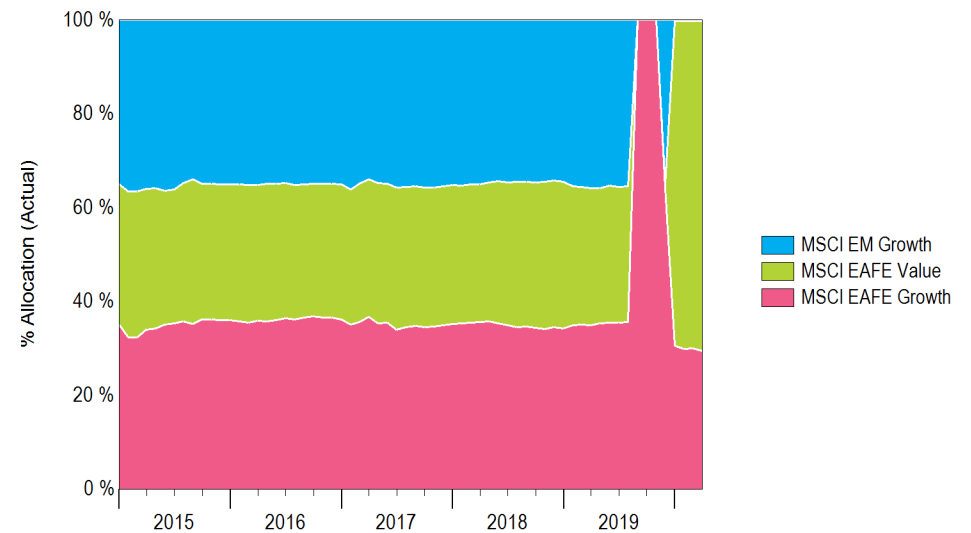
Growth of a Dollar
5 Years Ending March 31, 2020

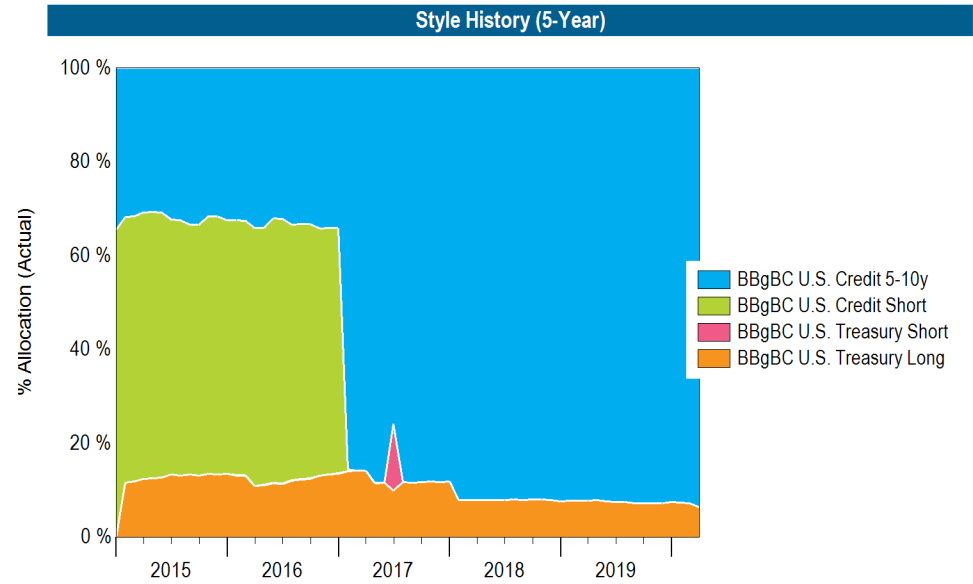
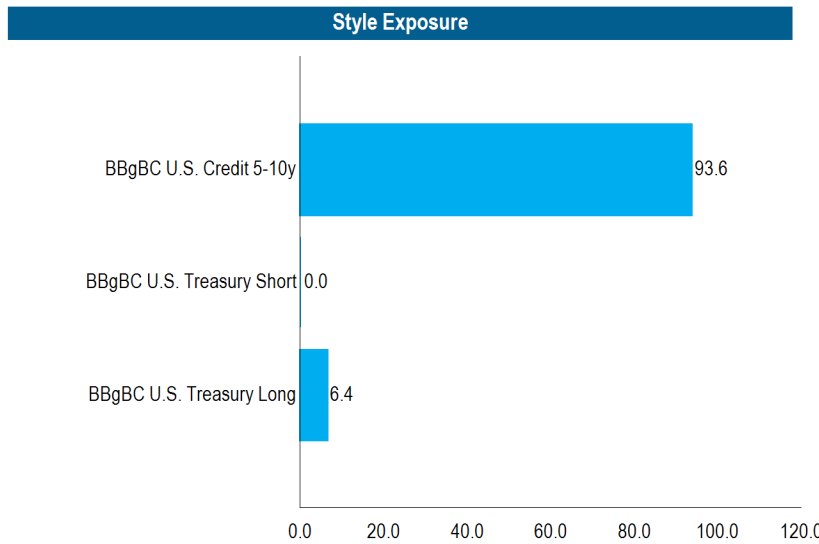
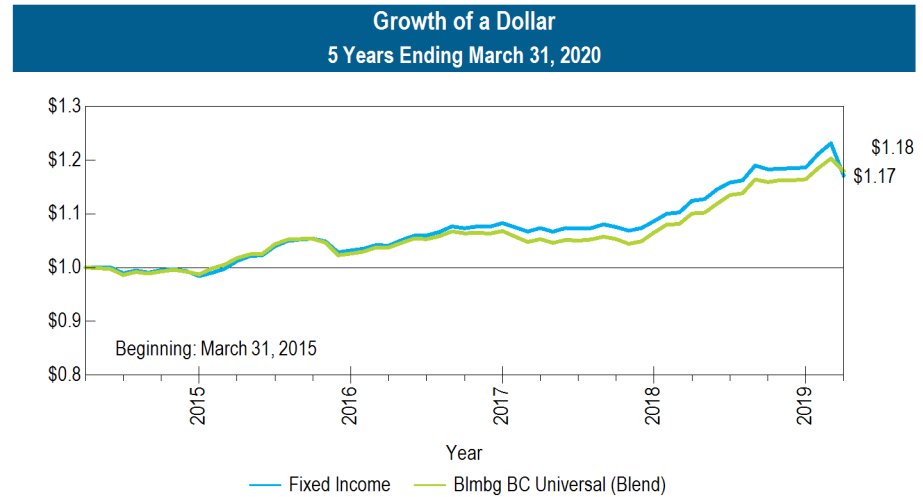
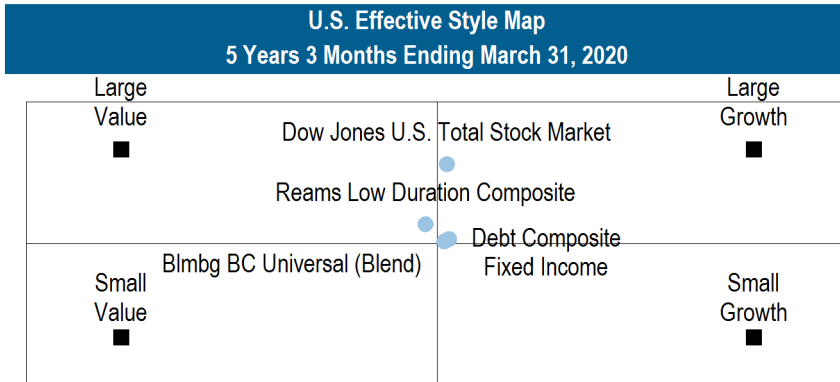


Style Exposure



Style History (5-Year)





Disclaimer, Glossary, and Notes

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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. $\text{Portfolio Return} - [\text{Risk Free Rate} + \text{Beta} * (\text{market return} - \text{Risk Free Rate})]$.

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.

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.

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.

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.

Tracking Error: A divergence between the price behavior of a position or a portfolio and the price behavior of a benchmark, as defined by the difference in standard deviation.

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%.

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

Yield to Worst: The lowest potential yield that can be received on a bond without the issuer actually defaulting. The yield to worst is calculated by making worst-case scenario assumptions on the issue by calculating the returns that would be received if provisions, including prepayment, call, or sinking fund, are used by the issuer.

NCREIF Property Index (NPI): Measures unleveraged investment performance of a very large pool of individual commercial real estate properties acquired in the private market by tax-exempt institutional investors for investment purposes only. The NPI index is capitalization-weighted for a quarterly time series composite total rate of return.

NCREIF Fund Index - Open End Diversified Core Equity (NFI-ODCE): Measures the investment performance of 28 open-end commingled funds pursuing a core investment strategy that reflects funds' leverage and cash positions. The NFI-ODCE index is equal-weighted and is reported gross and net of fees for a quarterly time series composite total rate of return.

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

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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.