

Pursuant to California Government Code section 54953(e), the Oakland Police & Fire Retirement System Board and Committee Members, as well as City staff, will participate via phone/video conference, and no physical teleconference locations are required.

Please see the agenda to participate in the meeting. For additional information, contact the Retirement Unit by calling (510) 238-7295.



**Retirement Unit**  
**150 Frank H. Ogawa Plaza**  
**Oakland, California 94612**  
**AGENDA**

**INVESTMENT COMMITTEE MEMBERS**

**Jaime T. Godfrey**  
Chairperson

**R. Steve Wilkinson**  
Member

**Robert W. Nichelini**  
Member

*\*In the event a quorum of the Board participates in the Committee meeting, the meeting is noticed as a Special Meeting of the Board; however, no final Board action can be taken. In the event that the Investment Committee does not reach quorum, this meeting is noticed as an informational meeting between staff and the Chair of the Investment Committee.*

**SPECIAL MEETING of the INVESTMENT AND FINANCIAL MATTERS COMMITTEE  
of the OAKLAND POLICE AND FIRE RETIREMENT SYSTEM (“PFRS”)**

**WEDNESDAY, NOVEMBER 17, 2021**  
**10:00 AM**  
**TELE-CONFERENCE BOARD MEETING**  
**VIA ZOOM WEBINAR**

**OBSERVE**

- To observe the meeting by video conference, please click on this link: <https://us02web.zoom.us/j/82880493983> at the noticed meeting time.
- To listen to the meeting by phone, please call the numbers below at the noticed meeting time: Dial (for higher quality, dial a number based on your current location):
- iPhone one-tap: US: +16699006833, 82880493983# or +13462487799, 82880493983#
- US: +1 669 900 6833 or +1 346 248 7799 or +1 253 215 8782 or +1 301 715 8592 or +1 312 626 6799 or +1 929 205 6099
- International numbers available: <https://us02web.zoom.us/j/82880493983>
- Webinar ID: 828 8049 3983.  
If asked for a participant ID or code, press #.

**PUBLIC COMMENTS**

There are three ways to submit public comments.

- To send your comment directly to staff BEFORE the meeting starts, please email to [mvisaya@oaklandca.gov](mailto:mvisaya@oaklandca.gov) with “PFRS Board Meeting” in the subject line for the corresponding meeting. Please note that eComment submission **closes two (2) hours before posted meeting time.**

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM  
SPECIAL INVESTMENT COMMITTEE MEETING  
NOVEMBER 17, 2021**

- To comment by Zoom video conference, click the “Raise Your Hand” button to request to speak when Public Comment is being taken on an eligible agenda item at the beginning of the meeting. You will be permitted to speak during your turn, allowed to comment, and after the allotted time, re-muted. Instructions on how to “Raise Your Hand” is available at: <https://support.zoom.us/hc/en-us/articles/205566129> - Raise-Hand-In-Webinar.
- To comment by phone, please call on one of the above listed phone numbers. You will be prompted to “Raise Your Hand” by pressing “\*9” to speak when Public Comment is taken. You will be permitted to speak during your turn, allowed to comment, and after the allotted time, re-muted. Please unmute yourself by pressing \*6.

If you have any questions, please email Maxine Visaya, Administrative Assistant II at [mvisaya@oaklandca.gov](mailto:mvisaya@oaklandca.gov)

**- - - ORDER OF BUSINESS - - -**

- 1. Subject: Police and Fire Retirement System (“PFRS”) Investment Committee Meeting Minutes**  
**From:** Staff of the PFRS Board  

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**Recommendation:** **APPROVE** October 27, 2021 Investment Committee Meeting Minutes
- 2. Subject: Investment Manager Performance Update – Parametric Portfolio Associates, LLC**  
**From:** Parametric Portfolio Associates, LLC  

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**Recommendation:** **ACCEPT** informational report regarding managerial assessment, diversity and inclusion policy and practices, and investment performance of Parametric Portfolio Associates, LLC, a Covered Calls Investment Manager
- 3. Subject: Investment Manager Performance Review – Parametric Portfolio Associates, LLC**  
**From:** Meketa Investment Group  

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**Recommendation:** **ACCEPT** and **RECOMMEND BOARD APPROVAL** of Meketa Investment Group’s review and evaluation regarding managerial assessment, diversity and inclusion policy and practices, and investment performance, watch status update, and recommendation to continue or remove watch status of Parametric Portfolio Associates, LLC, a PFRS Covered Calls Investment Manager

OAKLAND POLICE AND FIRE RETIREMENT SYSTEM  
SPECIAL INVESTMENT COMMITTEE MEETING  
NOVEMBER 17, 2021

4. **Subject:** Resolution 8032 – Resolution authorizing one-year extension of professional services agreement with Parametric Portfolio Associates, LLC for the provision of Covered Calls Asset Class Investment Manager Services  
**From:** Staff of the PFRS Board
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- Recommendation:** REVIEW and RECOMMEND BOARD APPROVAL of Resolution 8032 – Resolution authorizing one-year extension of professional services agreement with Parametric Portfolio Associates, LLC for the provision of Covered Calls Asset Class Investment Manager Services
5. **Subject:** Investment Market Overview as of October 31, 2021  
**From:** Meketa Investment Group
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- Recommendation:** ACCEPT informational report regarding the Global Investment Markets as of October 31, 2021
6. **Subject:** Preliminary Investment Fund Performance Update as of October 31, 2021  
**From:** Meketa Investment Group
- 
- Recommendation:** ACCEPT informational report regarding the Preliminary Investment Fund Performance Update as of October 31, 2021
7. **Subject:** Investment Fund Quarterly Performance Update as of September 30, 2021  
**From:** Meketa Investment Group
- 
- Recommendation:** ACCEPT the Investment Fund Quarterly Performance Update as of September 30, 2021
8. **Subject:** Asset Allocation Review and Update of the PFRS Fund  
**From:** Meketa Investment Group
- 
- Recommendation:** ACCEPT and DISCUSS the informational report regarding the asset allocation review of the PFRS Fund and RECOMMEND BOARD APPROVAL of Committee’s recommended course of action regarding PFRS Investment Portfolio Target Allocation

**OAKLAND POLICE AND FIRE RETIREMENT SYSTEM  
SPECIAL INVESTMENT COMMITTEE MEETING  
NOVEMBER 17, 2021**

**9. Subject: Investment Manager Performance Review Follow-Up – Northern Trust Investments, Inc.**

**From:** Northern Trust Investments, Inc.

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**Recommendation:** **ACCEPT** informational report regarding performance evaluation net of fees and the formal Diversity, Equity and Inclusion policy of Northern Trust Investments, Inc., a PFRS Domestic Equity Large-Cap Core Investment Manager

**10. Subject: Custodial Services Update Follow-Up – Northern Trust Company**

**From:** Northern Trust Company

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**Recommendation:** **ACCEPT** informational report regarding cybersecurity and global technology and the Diversity, Equity and Inclusion policy and protocols of Northern Trust Company, PFRS custodial services provider

**11. Schedule of Pending Investment Committee Meeting Agenda Items**

**12. Open Forum**

**13. Future Scheduling**

**14. Adjournment**

**AN INVESTMENT AND FINANCIAL MATTERS COMMITTEE REGULAR MEETING** of the Oakland Police and Fire Retirement System (“PFRS”) was held Wednesday, October 27, 2021 via Zoom Webinar.

Committee Members:	▪ Jaime T. Godfrey	Chairperson
	▪ R. Steven Wilkinson	Member
	▪ Robert W. Nichelini	Member
Additional Attendees:	▪ David F. Jones	PFRS Secretary & Plan Administrator (Excused)
	▪ Jennifer Logue	PFRS Legal Counsel
	▪ Téir Jenkins	PFRS Staff Member
	▪ Maxine Visaya	PFRS Staff Member
	▪ David Sancewich	Meketa Investment Group
	▪ Paola Nealon	Meketa Investment Group
	▪ Jason Leong Campbell	Meketa Investment Group
	▪ John Dewey	Strategic Global Advisors, LLC (SGA)
	▪ Cherie Badri	Strategic Global Advisors, LLC (SGA)
	▪ Mark Wimer	Strategic Global Advisors, LLC (SGA)
	▪ Sam Ramirez, Jr.	Ramirez Asset Management, Inc.
	▪ Louis Sarno	Ramirez Asset Management, Inc.
	▪ Helen Yee	Ramirez Asset Management, Inc.
	▪ James Haddon	Ramirez Asset Management, Inc.

The meeting was called to order at 10:01 a.m. PST

1. **Approval of Investment Committee Meeting Minutes** Member Wilkinson made a motion to approve the September 29, 2021 Investment Committee Meeting Minutes, as written, second by Member Nichelini. The motion passed.

[GODFREY – Y/ NICHELINI – Y/ WILKINSON – Y]  
(AYES: 3 / NOES: 0 / ABSTAIN: 0)

2. **Investment Manager Performance Update – Strategic Global Advisors, LLC** – John Dewey, Cherie Badri, & Mark Wimer of Strategic Global Advisors, LLC (SGA), a PFRS Active International Equity Investment Manager, presented an informational report regarding an organizational overview, the firm’s Inclusion & Diversity policy and practices, and the investment process, portfolio performance and attributions. Chairperson Godfrey noted SGA’s commitment and work surrounding Inclusion & Diversity is very encouraging.

**MOTION:** Member Nichelini made a motion to accept the informational report presented by SGA and forward to the Full Board, second by Member Wilkinson. Motion passed.

[GODFREY – Y/ NICHELINI – Y/ WILKINSON – Y]  
(AYES: 3 / NOES: 0 / ABSTAIN: 0)

3. **Investment Manager Performance Review – Strategic Global Advisors, LLC** – D. Sancewich of Meketa Investment Group provided an overview memo regarding SGA, a PFRS Active International Equity Investment Manager. D. Sancewich advised Meketa continues to have confidence and does not have any concerns regarding SGA at this time.

**MOTION:** Member Nichelini made a motion to accept the review and evaluation by Meketa Investment Group regarding SGA, a PFRS Active International Equity Investment Manager and forward to the Full Board for approval, second by Member Wilkinson. The motion passed.

[GODFREY – Y/ NICHELINI – Y/ WILKINSON – Y]  
(AYES: 3 / NOES: 0 / ABSENT: 0)

4. **Investment Manager Performance Update – Ramirez Asset Management, Inc.** – Sam Ramirez, Jr., Louis Sarno, Helen Yee, & James Haddon of Ramirez Asset Management, Inc., a PFRS Core Fixed Income Investment Manager, presented an informational report regarding an organizational update, Diversity, Equity, and Inclusion policy and practices, and the firm's investment process, performance, and attributions.

Committee Members made inquiries to encourage further discussion of strategy regarding the threat of rising interest rates and if there are concerns with portfolio positioning regarding any increases in the inflation cycle.

**MOTION:** Member Wilkinson made a motion to accept the informational report presented by Ramirez Asset Management, Inc. and forward to the Full Board, second by Member Nichelini. Motion passed.

[GODFREY – Y/ NICHELINI – Y/ WILKINSON – Y]  
(AYES: 3 / NOES: 0 / ABSENT: 0)

5. **Investment Manager Performance Review – Ramirez Asset Management, Inc.** – D. Sancewich of Meketa Investment Group provided an overview memo regarding Ramirez Asset Management, Inc., a PFRS Core Fixed Income Investment Manager. D. Sancewich advised Meketa does not have any concerns regarding Ramirez Asset Management, Inc. from an organizational or process standpoint and drew attention to fairly strong performance relative to the Bloomberg Barclays Aggregate. PFRS Staff Member Jenkins noted a Resolution to extend the contract is forthcoming at the Full Board Meeting and Chairperson Godfrey requested such information be part of the Investment Committee Agenda prior to Full Board approval.

**MOTION:** Member Nichelini made a motion to accept the review and evaluation by Meketa Investment Group regarding Ramirez Asset Management, Inc. and forward to the Full Board for approval, second by Member Wilkinson. The motion passed.

[GODFREY – Y/ NICHELINI – Y/ WILKINSON – Y]  
(AYES: 3 / NOES: 0 / ABSENT: 0)

6. **Investment Market Overview as of September 30, 2021** – P. Nealon of Meketa Investment Group presented an informational report regarding the Investment Market Overview as of September 30, 2021 and highlighted market returns and current factors impacting outcomes.

**MOTION:** Member Nichelini made a motion to accept the informational report presented by Meketa Investment Group regarding the Investment Market Overview as of September 30, 2021 and forward to the Full Board, second by Member Wilkinson. Motion passed.

[GODFREY – Y/ NICHELINI – Y/ WILKINSON – Y]  
(AYES: 3/ NOES: 0/ ABSTAIN: 0)

7. **Preliminary Investment Performance Update as of September 30, 2021** – P. Nealon of Meketa Investment Group presented an informational report regarding the Preliminary Investment Fund Performance Update as of September 30, 2021 and highlighted Asset Allocation vs. Targets and Policy and the Asset Class Performance Summary.

Member Wilkinson made inquiries to further discussion regarding expectations and performance of the Crisis Risk Offset Asset Class.

**MOTION:** Member Wilkinson made a motion to accept the informational report presented by Meketa Investment Group regarding the Preliminary Investment Fund Performance Update as of September 30, 2021 and forward to the Full Board, second by Chairperson Godfrey. Motion passed.

[GODFREY – Y/ NICHELINI – Y/ WILKINSON – Y]  
(AYES: 3/ NOES: 0/ ABSTAIN: 0)

8. **Thermal Coal Companies Prohibited from the PFRS Investment Portfolio – 2021 Update** – David Sancewich of Meketa Investment Group presented an informational report regarding a 2021 update of thermal coal companies prohibited from the PFRS Investment Portfolio. If approved by the Board, Meketa will implement in the Investment Policy and share out to Investment Portfolio Managers.

**MOTION:** Member Nichelini made a motion to accept the informational report provided by Meketa Investment Group's regarding a 2021 update of thermal coal companies prohibited from the PFRS Investment Portfolio and forward to the Full Board for approval, second by Member Wilkinson. Motion passed.

[GODFREY – Y/ NICHELINI – Y/ WILKINSON – Y]  
(AYES: 3/ NOES: 0/ ABSTAIN: 0)

9. **Asset Allocation Review and Update of the PFRS Fund** – D. Sancewich provided an informational report and led a continued discussion regarding the Asset Allocation Review and Update of the PFRS Fund which highlighted a comparison between the current long-term policy, the current interim policy, and a long-term policy with an inflation component.

D. Sancewich presented three options to consider with regard to changing the PFRS asset allocation with a recommendation to create an inflation sensitive class comprised of short-duration TIPS to further de-risk the portfolio and requested direction from the Board. Member Wilkinson requested additional information regarding the percentage of TIPS currently allocated in the PFRS Bond Portfolio. Chairperson Godfrey tabled the discussion until the November 2021 Committee Meeting pending additional information provided by Meketa Investment Group.

**MOTION:** Member Nichelini made a motion to move this item to the November 2021 Committee Meeting, second by Member Wilkinson. Motion passed.

[GODFREY – Y/ NICHELINI – Y/ WILKINSON – Y]  
(AYES: 3/ NOES: 0/ ABSTAIN: 0)

10. **Investment Manager Performance Review Follow-Up – Northern Trust Investments, Inc. –** PFRS Member Jenkins noted the information provided by Northern Trust Investments was a response to the Committee’s request for additional information. Members of the Committee requested additional time for an in-depth review of the information to determine if it satisfies the request or if further information will be necessary.

**MOTION:** Member Nichelini made a motion to move this item to the November 2021 Committee Meeting, second by Member Wilkinson. Motion passed.

[GODFREY – Y/ NICHELINI – Y/ WILKINSON – Y]  
(AYES: 3/ NOES: 0/ ABSTAIN: 0)

11. **Schedule of Pending Investment Committee Meeting Agenda Items –** David Sancewich of Meketa Investment Group presented the 2021 Ongoing Strategic Investment Agenda for discussion. No changes, additions, or questions were presented in respect to the proposed strategic agenda.

12. **Open Forum –** No Report

13. **Future Scheduling –** The next Investment Committee Meeting is tentatively scheduled for November 17, 2021, unless the Full Board wishes to make a change.

14. **Adjournment –** Member Nichelini made a motion to adjourn, second by Member Wilkinson. Motion passed.

[GODFREY – Y / NICHELINI – Y / WILKINSON – ABSENT]  
(AYES: 3 / NOES: 0 / ABSTAIN: 0)

The meeting adjourned at 11:39 a.m. PST



# Oakland Police & Fire Retirement System Covered Call Portfolio Review

**November 17, 2021**

**Dan Ryan**

*Senior Director – Client Relationship Management*

Parametric Portfolio Associates® LLC

(206) 381-7036

DRyan@paraport.com

**James Roccas**

*Managing Director, Investment Strategy*

Parametric Portfolio Associates® LLC

(203) 227-1700

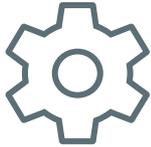
JRoccas@paraport.com

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# Firm Overview

# Our Difference



Rigorous, disciplined,  
and rules-based approach



Transparent, cost-effective  
implementation expertise



Customizable, flexible  
solutions

**\$404B+**

assets under management<sup>1</sup>,  
with \$195B across  
institutional

**30+**

years of experience across  
equity, fixed income and  
derivative strategies

**150+**

investment professionals,  
including 108 CFA charterholders  
and 9 PhDs

**500+**

institutional client  
relationships

All numbers are approximate as of 9/30/2021.

<sup>1</sup>AUM includes both discretionary and non-discretionary assets of Parametric Portfolio Associates® LLC (the Firm).

Please refer to the disclosures for additional information regarding the Firm.

# A Focus on DEI and Responsible Investing

Parametric's commitment to corporate citizenship and Diversity, Equity & Inclusion is built into our culture and the many ways we invest for our clients

- > Our Diversity, Equity & Inclusion infrastructure is progressive and top of mind – building an internal culture representative of those we serve
- > Our corporate partnerships and [community impact](#) initiatives are purposeful – helping to educate the population on ways to invest responsibly
- > We offer our clients customizable ways to pursue their portfolio objectives through responsible investing strategies that incorporate integration options supportive of DEI initiatives.

## ESG Integration



# Diversity, Equity, and Inclusion at Parametric

## Mission

**We aspire to be an industry leader** in our representation of a truly diverse and inclusive workforce to reflect the communities in which we live and work.

## Principles



### Accountability

Senior leadership teams take actions to improve diversity, equity, and inclusion.



### Advancement

We support all employees along their career journeys.



### Representation

We boost representation through targeted recruitment, development, and retention.



### Culture

We aim to foster an atmosphere of inclusion and belonging.

# Institutional Multi-Asset Capabilities

Parametric provides customizable offerings across **alternative, equity, and fixed income** that can help solve implementation challenges, portfolio risks, and asset allocation needs



## Custom Solutions

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- Overlay solutions
- Liability-driven investing
- Equity & fixed income indexing
- Centralized portfolio management
- Cross-asset portfolio solutions



## Systematic Strategies

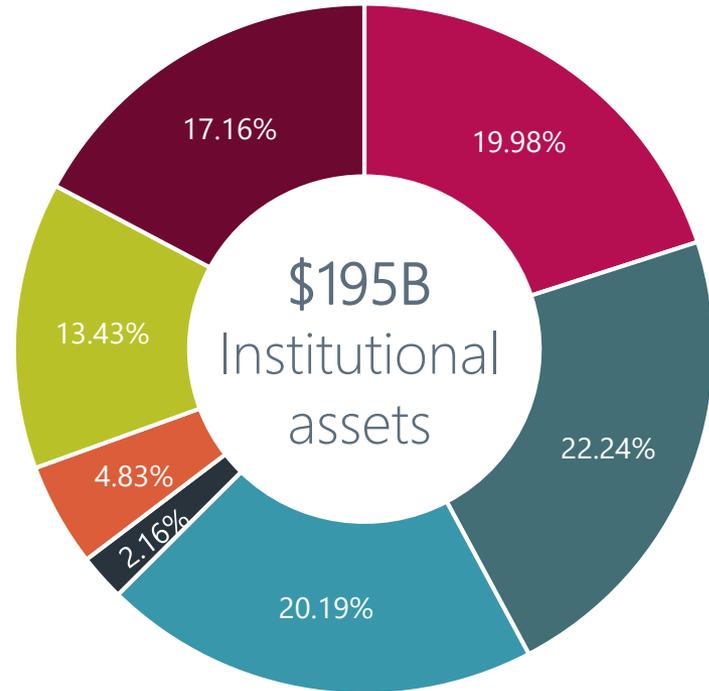
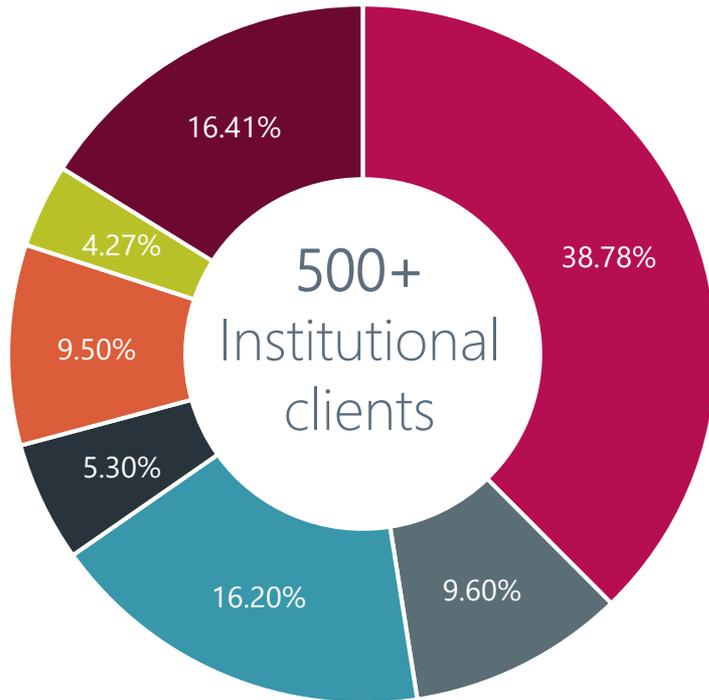
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- Developed international
- Emerging markets
- Volatility risk premium
- Commodities

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*Responsible investing, factors, and other themes can be applied across strategies and solutions*

# Diversified Institutional Client Base



Endowment/ Foundation
  Public
  Sub-Advisory
  Corporate
  Other<sup>1</sup>
 Healthcare
  Taft-Hartley

All numbers are approximate as of 9/30/2021 and include both discretionary and non-discretionary assets of the Firm.

<sup>1</sup>Other includes: Charity, Commingled, Individual, LP, Wrap, Superannuation, Insurance, Internal Account, Mutual Fund

# Representative Client List as of September 30, 2021

## > **Public**

East Bay Municipal Utility District  
Fairfax County Retirement Systems  
Houston Police Officers' Pension System  
Manhattan & Bronx Surface Transit Operating Authority Pension Plan  
Marin County Employees' Retirement Association  
Massachusetts Pension Reserves Investment Management Board  
New Mexico Public Employees' Retirement Association  
Oakland Police and Fire Retirement System  
Orange County Employees Retirement System  
San Mateo County Employees' Retirement Association  
Teachers Retirement System of Louisiana  
Utah School & Institutional Trust Funds Office  
Wisconsin Investment Board

## > **Endowments**

Carnegie Institution of Washington  
Florida State University  
Indiana University Foundation  
Pepperdine University  
Texas Christian University  
University of Michigan  
University of Minnesota

## > **Faith Based**

Catholic Diocese of Fort Worth  
Covenant Ministries of Benevolence  
Ministers & Missionaries' Benefit Board of American Baptist Churches  
Pension Fund of the Christian Church  
YMCA Retirement Fund

## > **Healthcare**

Advocate Aurora Health, Inc.  
North Memorial Health Care  
Trinity Health

## > **Taft-Hartley**

Board of Trustees ABC-NABET Retirement Trust Fund  
Boilermaker-Blacksmith National Pension Trust  
Carpenters, Regional Council, Greater Pennsylvania  
Central Laborers' Pension Fund  
Chicago Laborers' Pension & Welfare Funds  
International Union of Painters and Allied Trades  
SEIU Benefit Funds  
Teamsters, Western Pennsylvania

## > **Foundations**

The John D. & Catherine T. MacArthur Foundation  
The McKnight Foundation  
Strada Education Network, Inc.  
Wisconsin Alumni Research Foundation

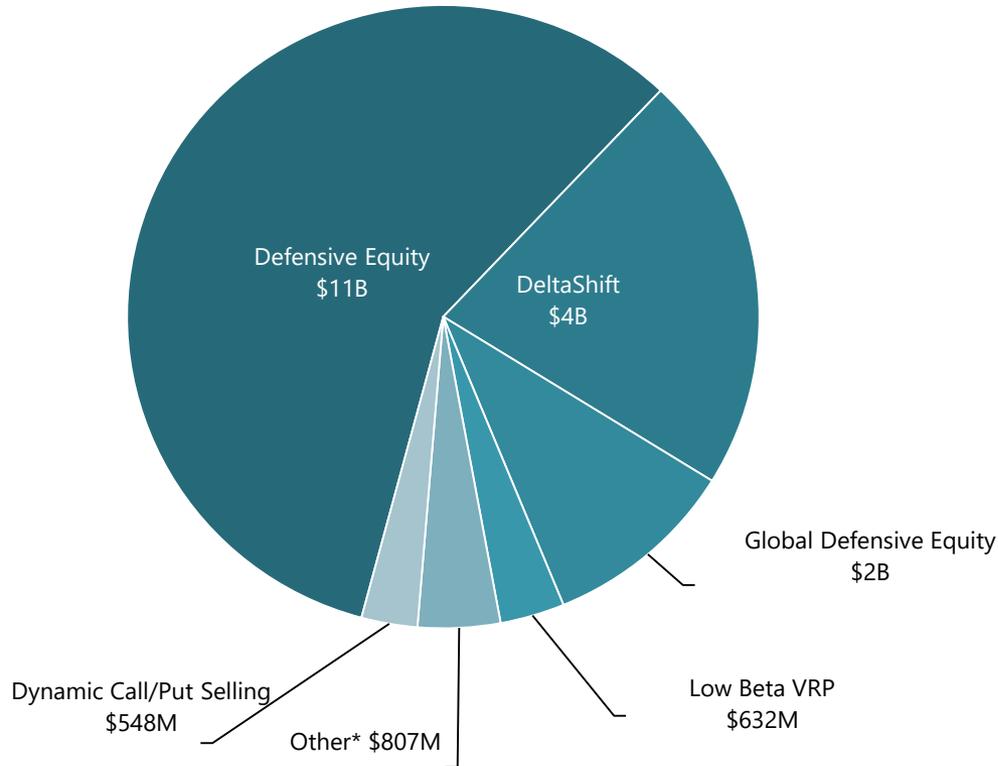
## > **Corporate**

The Boeing Company  
Eversource Energy  
3M Company  
Target Corporation  
Raytheon Technologies Corporation

It is not known whether the listed clients approve or disapprove of the adviser. The partial list of clients included herein were selected as being representative of the different types of institutional clients and businesses serviced by Parametric. Performance-based data was not a determining factor in their selection.

# Parametric Volatility Risk Premium Strategies

## Assets by Strategy



Volatility Risk Premium Strategies Total Assets of \$ 19.1 Billion  
Consists of Funded and Overlay Assets

\*"Other" includes strategies Absolute Return VRP, BXM Replications, Elevated Beta VRP, Fixed Budget Put Buying, Multi-Asset Volatility Risk Premium, Options - Dynamic Hedged Equity, and Risk Managed Put Selling.

All numbers are approximate as of 9/30/21 and include both discretionary and non-discretionary assets of the Firm.

# Covered Call Investment Process

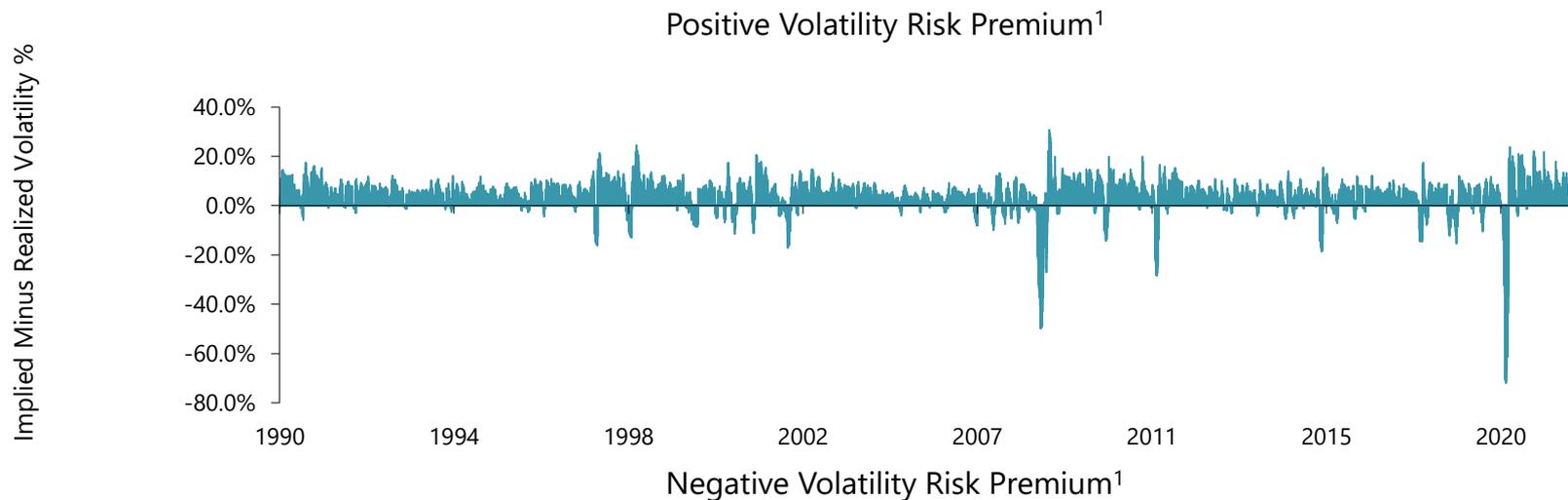
# Investment Objectives

Parametric manages two covered call portfolios for Oakland Police and Fire: one utilizing the CBOE BXM BuyWrite Enhanced Replication strategy (“Enhanced BXM”) and one utilizing the Portfolio DeltaShift strategy (“DeltaShift”).

- **The Enhanced BXM objective** is to replicate the CBOE BXM Index with greater diversification than the published index.
- **The DeltaShift objective** is to monetize the existing volatility of the underlying large-cap portfolio and maintain partial upside equity participation that is often forgone in traditional call writing programs.
  - When equity markets are down, flat or moderately positive, DeltaShift seeks to add cash flow to the portfolio.
  - When equity markets are strong, DeltaShift may underperform the equity market.
  - DeltaShift is expected to deliver a positive return over market cycles, net of fees, as a result of the embedded volatility imbalance observed in the options market.

# Empirical Data Supports Our Investment Thesis

S&P 500<sup>®</sup> Index options have traded with a positive volatility risk premium over 85% of the time since 1990.



Embedded risk premium creates opportunity to enhance return through option selling.

<sup>1</sup>1990 to present represents longest period from which reliable data is available and accessible for S&P 500 Volatility Index. S&P 500<sup>®</sup> Index options relative valuation measured by taking daily observations of Implied Volatility (as measured by VIX Index) and subtracting the subsequent Realized Volatility of the S&P 500<sup>®</sup> over the subsequent 1 month (assuming 21 trading days). Options have historically traded about above subsequent realized volatility. Said another way, the option market tends to overestimate future volatility, which translates directly into higher prices for both puts and calls. VIX is the Chicago Board Options Exchange volatility index. VIX is calculated constantly throughout each trading day by observing the implied volatility derived from actual market prices of a wide array of put and call options with an average maturity of 30 days to expiration. For informational purposes only. It is not possible to invest directly in an index. All investments are subject to loss. Source: Parametric, Bloomberg; Date: 10/11/21.

# Investment Objectives

## DeltaShift and Enhanced BXM Investment Thesis

**Equity index options have historically traded above “theoretical fair value”, and we expect this to continue.**

- Option prices contain a “Volatility Risk Premium” (VRP) paid by option buyers to option sellers.
- The VRP is meaningful and likely to persist, it is a diversifying premium that most portfolios currently do not hold.
- A covered call portfolio can capture the VRP by selling covered options without introducing leverage.

Disciplined ▶ Liquid ▶ Transparent ▶ No Leverage

Investing in an options strategy involves risk. There is no guarantee that the investment objectives can be achieved. Please refer to the Appendix for additional information and disclosure.

# Portfolio Construction & Overview

DeltaShift seeks to provide incremental return over an equity index or other base portfolio by systematically selling index call options that generally expire in 1 to 3 months. The additional return is received in exchange for potentially limiting upside participation in strong equity markets.

## Standard portfolio construction & characteristics

- Own a S&P 500<sup>®</sup> equity index portfolio.
- Systematic, rules-based call writing using exchange-traded, S&P 500<sup>®</sup> index call options .
  - Option selection diversified across maturities and strike prices to mitigate risk .
  - Favorable risk/reward trade-off.
  - Early profit capture and risk reduction based on loss minimization implementation rules.
- Expected to outperform the S&P 500<sup>®</sup> Index in down, sideways and moderately up markets, and expected to underperform in strong equity markets.

Investing in an options strategy involves risk. Investment management techniques require liquidity in the specific option. Please refer to the Appendix for additional information and disclosure.

# DeltaShift Option Selection

When selling call options, we index the strike price to market volatility.

- Higher strike price in higher volatility environments; lower strike price in lower volatility environments.
- Dynamic strike prices adapt to market conditions.
- At point of sale, call options expected to finish in the money approximately 1 in 4 times.

In addition, DeltaShift incorporates the following factors in the option selection process:

- Liquidity – select options which helps to minimize market impact and transactions costs; exchange traded only — liquid, transparent and low cost.
- Volatility – systematically select options which exhibit attractive risk vs. reward opportunities.
- Maturity – select short-term options (1 – 3 months) to optimize time decay and minimize event risk; generally short-dated options have higher implied volatility than longer dated options.
- Diversification – select options with several different strikes and maturities; reduces time/price specific risk.

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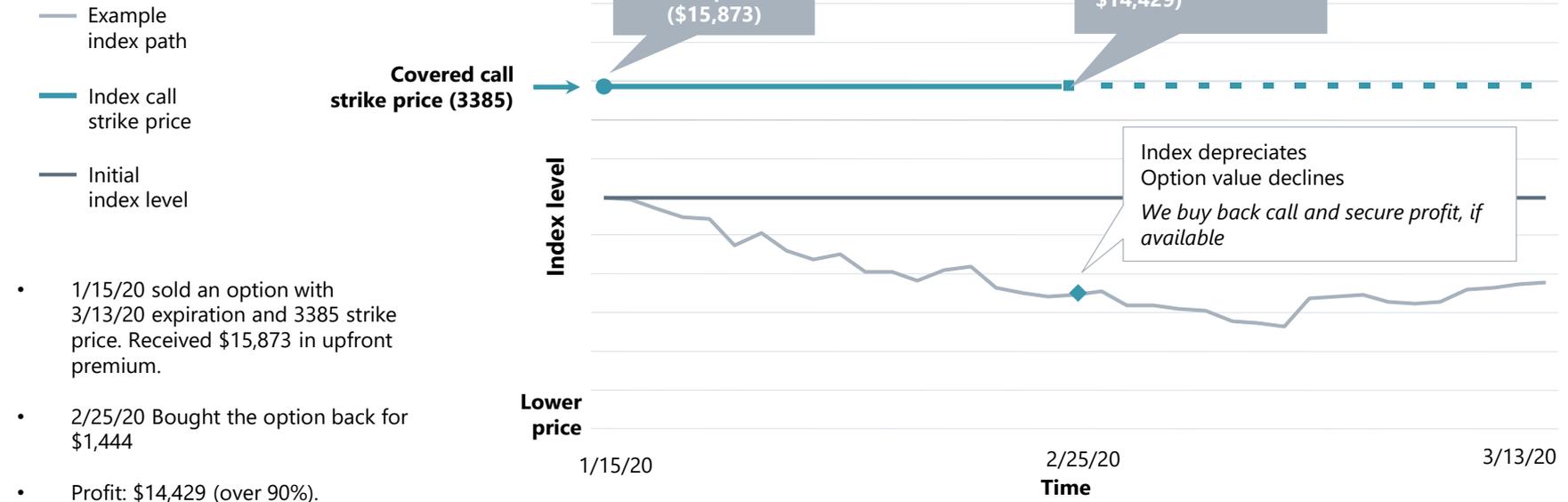
Investing in an options strategy involves risk. There is no guarantee that the investment objectives can be achieved. Investment management techniques require liquidity in the specific option. Please refer to the Appendix for additional information and disclosure.

# DeltaShift Rules-Based Management

Portfolio management example: early profit capture

If the index option loses a significant amount of value due to index movement, change in volatility or excessive time decay, we seek to take profits and minimize risk.

## Illustrative index price path index depreciates



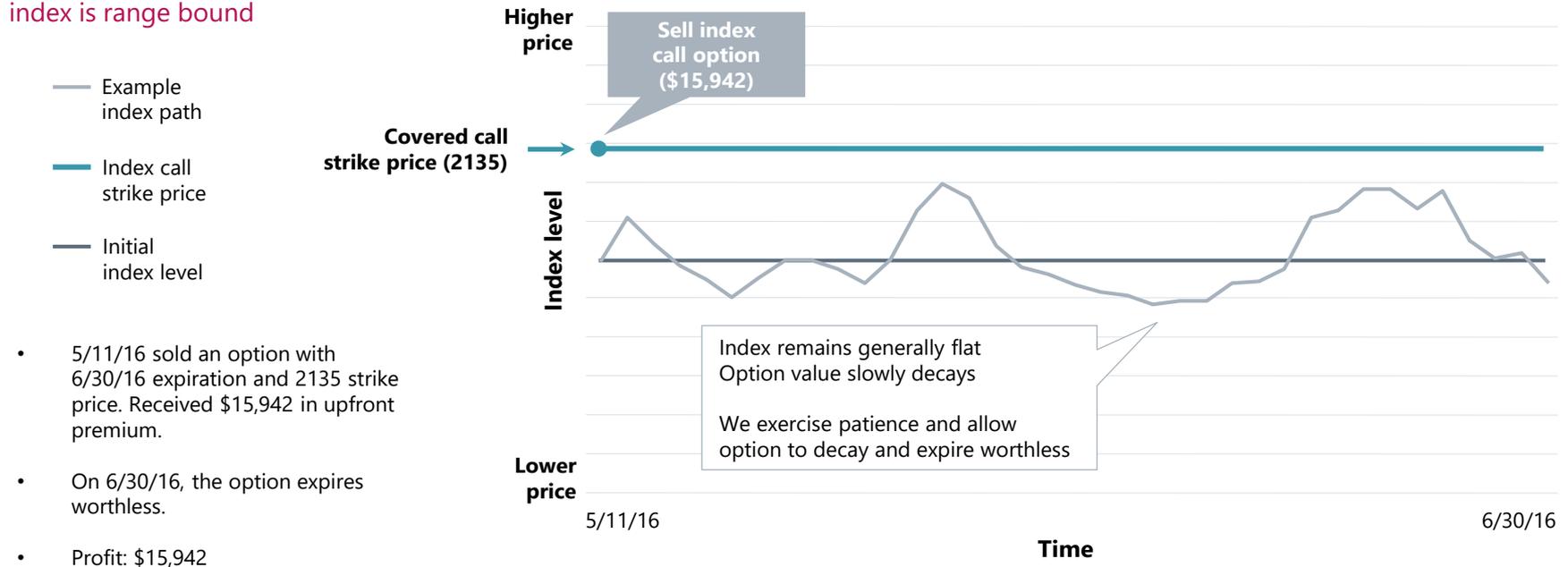
Source: Parametric. The above example is for demonstration and illustrative purposes only. Actual returns will vary from the illustrative example presented. There is no guarantee that the strategy will be successful. All investments are subject to potential loss of principal. Please refer to the Appendix for additional important information and disclosure.

# DeltaShift Rules-Based Management

Portfolio management example: allow option to expire worthless

If the index remains within “expected” range, the option’s value “decays” each day. This is known as time decay. If the index remains below the option strike we will let the option expire worthless.

Illustrative index price path  
index is range bound



Source: Parametric. The above example is for demonstration and illustrative purposes only. Actual returns will vary from the illustrative example presented. There is no guarantee that the strategy will be successful. All investments are subject to potential loss of principal. Please refer to the Appendix for additional important information and disclosure.

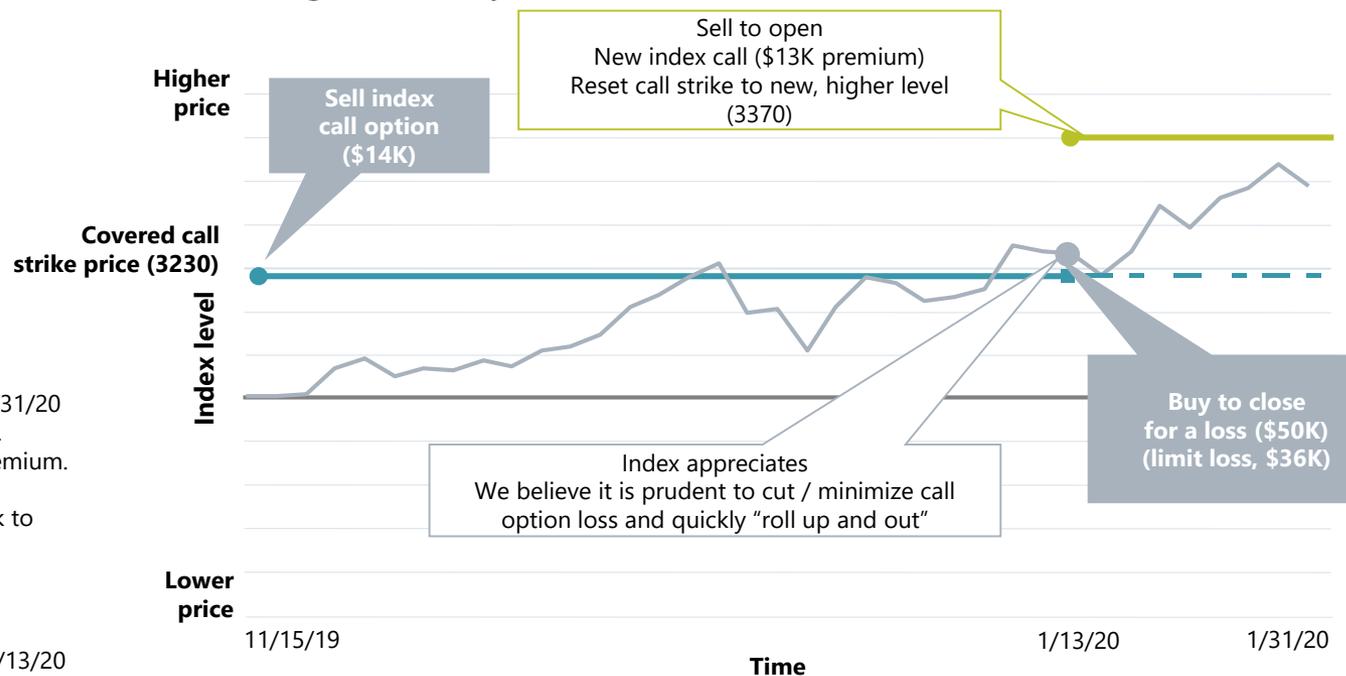
# DeltaShift Rules-Based Management

Portfolio management example: risk management / loss mitigation

If underlying index appreciates from the initial index level and the risk vs. reward exposure becomes unfavorable, due to the convexity in options pricing, we seek to mitigate the risk by repurchasing the sold call option (generally for a loss) and sell a new, higher strike option by rolling option "up and out" (up to a higher strike price and out to a longer maturity).

Illustrative index price path:  
index appreciates

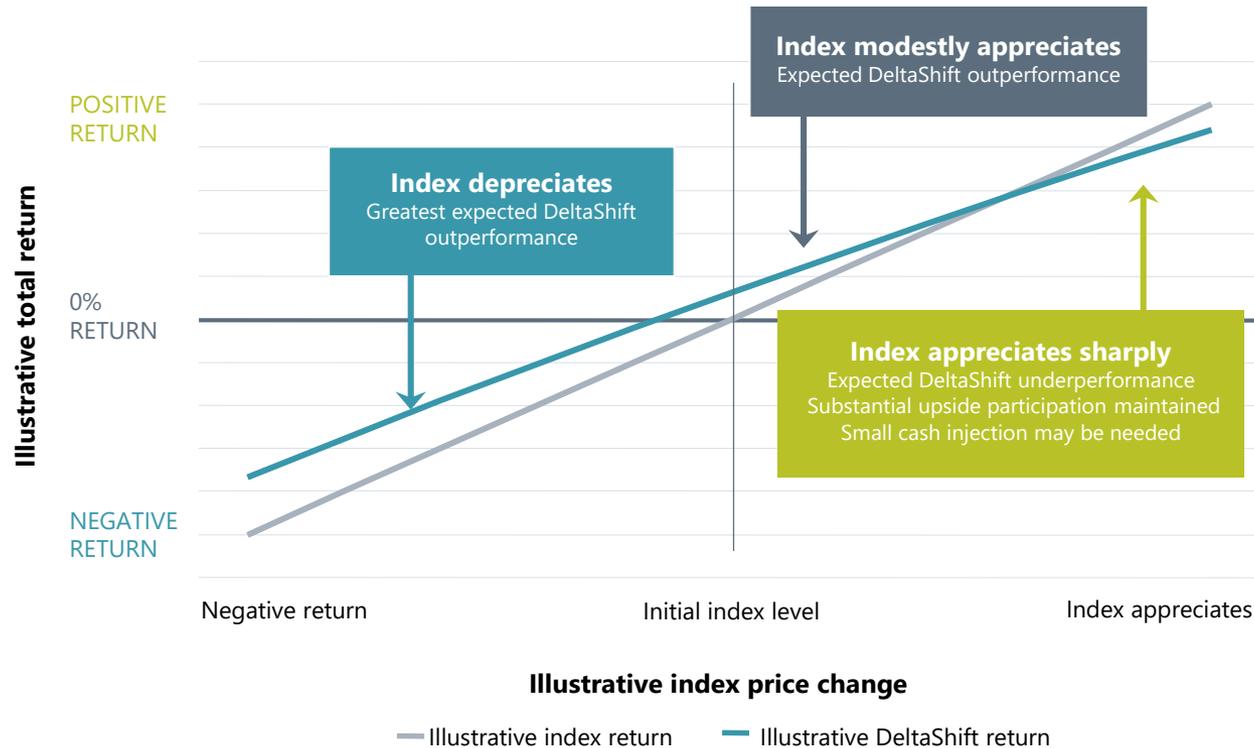
- Example index path
- Initial index level
- Index call strike price
- New index call strike price
- 11/15/19 sold an option with 1/31/20 expiration and 3230 strike price. Received \$14,070 in upfront premium.
- 1/13/20 bought the option back to mitigate risk for \$50,010.
- Loss: \$36K
- 1/13/20 sold new option with 3/13/20 expiration and 3370 strike price. Received \$13,190 in upfront premium and bought back on 2/27/20 for \$832. Led to a \$12,357 profit.



Source: Parametric. The above example is for demonstration and illustrative purposes only. Actual returns will vary from the illustrative example presented. There is no guarantee that the strategy will be successful. All investments are subject to potential loss of principal. Please refer to the Appendix for additional important information and disclosure.

# DeltaShift Rules-Based Management

## Illustrative DeltaShift results



### Portfolio management example: risk management / loss mitigation

- Traditional call writing is a trade-off between receiving an upfront payment in exchange for giving away upside (being capped at a target level).
- Unlike traditional covered call writing, a key goal of DeltaShift is to maintain substantial (but not all) upside participation during times of sharp appreciation.

**During these times we expect the total portfolio value to continue to appreciate (not be capped), but it may underperform the index itself**

Source: Parametric. The above example is for demonstration and illustrative purposes only. Actual returns will vary from the illustrative example presented. There is no guarantee that the strategy will be successful. All investments are subject to potential loss of principal. Please refer to the Appendix for additional important information and disclosure.

# DeltaShift Summary

## Expected benefits

- Incremental return in down, sideways and moderately up markets.
- Cash flow enhancement and management for future funding obligations.
  - Generally positive cash flow from call selling during declining equity markets can reduce need to sell into weakness.
- Enhanced performance and attractive risk-adjusted returns.
- Flexibility to include or exclude management of equity portfolio.

Disciplined ▶ Liquid ▶ Transparent ▶ No Leverage

Investing in an options strategy involves risk. There is no guarantee that the investment objectives can be achieved. Please refer to the Appendix for additional information and disclosure.

# Oakland Police & Fire Portfolio Review

# Portfolio and Benchmark Returns - September 30, 2021

## Oakland Police and Fire Retirement System

\$37.6 Million – **Total AUM**

\$21.1 Million - DeltaShift

\$16.5 Million – Enhanced BXM Replication

### Inception Date

March 11, 2014

	Returns				
	Oakland Police & Fire Total Account	DeltaShift	Enhanced BXM Replication	BXM – CBOE S&P 500® Buy-Write Index	S&P 500® Index
QTD	0.72%	0.90%	0.47%	1.35%	0.58%
YTD	13.88%	16.14%	11.05%	12.61%	15.92%
1 Year	25.46%	30.11%	19.82%	21.10%	30.00%
3 Year	11.14%	14.30%	7.34%	4.15%	16.00%
5 Year	11.70%	14.38%	8.62%	6.95%	16.90%
Since Inception	9.93%	12.34%	7.64%	6.23%	13.89%

Source: Parametric; Bloomberg; CBOE®

Performance is as of 9/30/2021 and is net of investment advisory fees. Past performance is not indicative of future results. All investments are subject to loss. It is not possible to invest directly in an index. They are unmanaged and do not reflect the deduction of fees and other expenses. Please refer to the Appendix for additional information and disclosure.



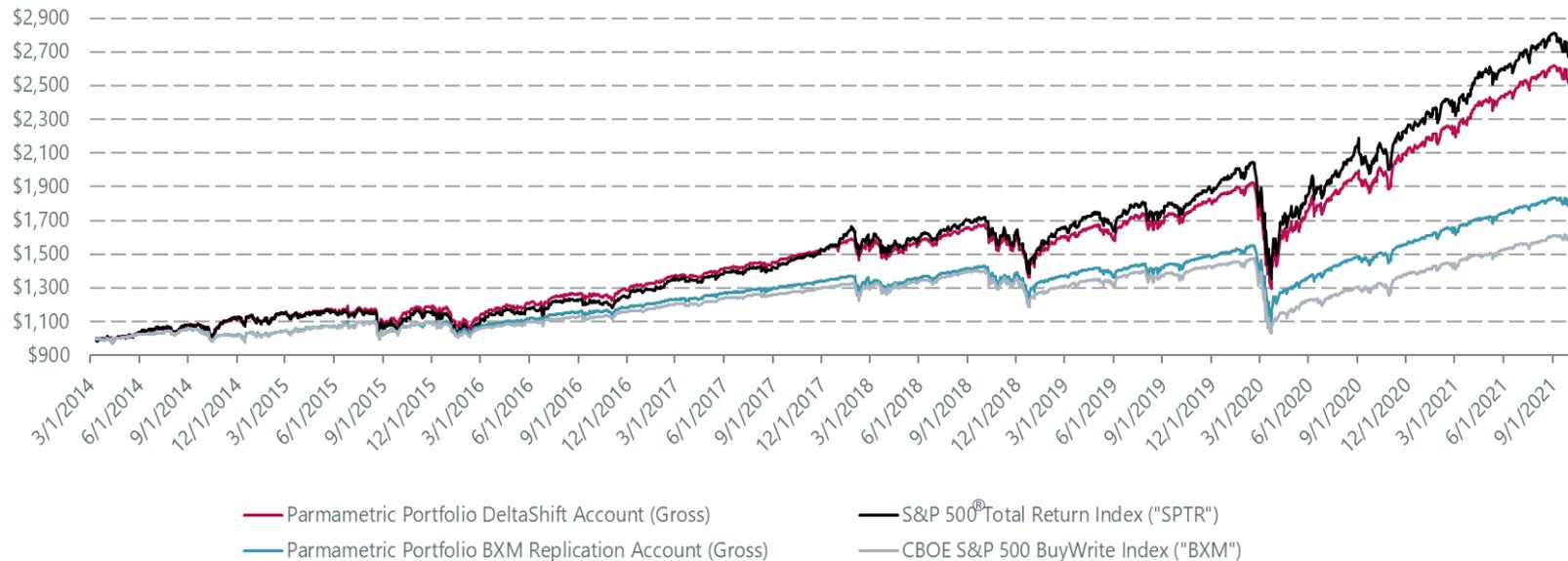
For One-on-One Use with Oakland Police and Fire Retirement System Only. Not for Use with the Public.

Third Quarter 2021

DeltaShift

# Oakland Police & Fire Retirement System Portfolio Performance

Parametric Portfolio DeltaShift Account (Gross) vs.  
 Parametric Portfolio BXM Replication Account (Gross)  
 vs. S&P 500® Index Total Return vs CBOE BXM Index  
*Mar 13, 2014 - Sep 30, 2021*



Source: Parametric; Bloomberg; CBOE®

\*Performance is as of 9/30/21 and is shown gross of advisory fees. The deduction of an advisory fee would reduce an investor's return.

Past performance is not indicative of future results. All investments are subject to loss. It is not possible to invest directly in an index. They are unmanaged and do not reflect the deduction of fees and other expenses. Please refer to the Appendix for additional information and disclosure.

# Oakland Police & Fire Retirement System Portfolio Performance

## Parametric DeltaShift (Gross) vs. Parametric BXM (Gross) vs. S&P 500® Index Total Return vs CBOE BXM Index

	Parametric Portfolio DeltaShift Account (Gross)		Parametric Portfolio BXM Replication Account (Gross)		CBOE S&P 500 BuyWrite Index ("BXM")		S&P 500 Total Return Index ("SPTR")	
	Return	Volatility	Return	Volatility	Return	Volatility	Return	Volatility
Mar 11, 2014 - Dec 31, 2014	11.69%	9.96%	3.04%	8.80%	2.84%	8.80%	12.05%	11.13%
Jan 1, 2015 - Dec 31, 2015	3.27%	15.12%	6.33%	12.17%	5.24%	11.75%	1.38%	15.49%
Jan 1, 2016 - Dec 31, 2016	11.78%	11.78%	8.57%	8.86%	7.07%	8.51%	11.96%	13.10%
Jan 1, 2017 - Dec 31, 2017	17.97%	5.28%	13.54%	3.95%	13.00%	3.69%	21.83%	6.68%
Jan 1, 2018 - Dec 31, 2018	(5.78%)	15.80%	(3.82%)	13.38%	(4.77%)	13.45%	(4.38%)	16.73%
Jan 1, 2019 - Dec 31, 2019	27.93%	10.96%	16.08%	8.29%	15.68%	8.65%	31.49%	12.26%
Jan 1, 2020 - Dec 31, 2020	16.38%	32.24%	6.03%	26.17%	(2.75%)	26.54%	18.40%	33.84%
Jan 1, 2021 - Sep 30, 2021	16.31%	10.45%	11.52%	7.97%	12.61%	7.88%	15.92%	12.60%
<b>Annualized Since Inception</b>	<b>12.79%</b>	<b>16.20%</b>	<b>7.96%</b>	<b>13.10%</b>	<b>6.24%</b>	<b>13.14%</b>	<b>13.91%</b>	<b>17.33%</b>

- DeltaShift outperformed both BXM and PPA Enhanced BXM through 9/30/2021 and since inception.
- PPA Enhanced BXM outperformed BXM in most illustrated time frames plus since inception.

Source: Parametric; Bloomberg; CBOE®

Performance is as of 9/30/21 and is shown gross of advisory fees. The deduction of an advisory fee would reduce an investor's return.

Past performance is not indicative of future results. All investments are subject to loss. It is not possible to invest directly in an index. They are unmanaged and do not reflect the deduction of fees and other expenses. Please refer to the Appendix for additional information and disclosure.

## Performance Commentary: A review of the Past Year

- From 9/30/20 to 9/30/21, the S&P 500® has experienced a steady upward climb (up 30.00%), with a few notable pullbacks.
- The VIX® Index has remained elevated relative to pre-COVID, but has trended downward in the last year.
- The Oakland Police & Fire total account has outperformed the BXM Index (+25.46% vs. +21.10%).
- We might expect this result in a strong up market as the BXM Index sells at-the-money options.
- The relatively steady (not spiky) move upward of the S&P 500® Index allowed the DeltaShift program to keep pace with the S&P 500® Index. With the S&P 500® up 30% in a year, we would expect the DeltaShift options to detract from the upside of the underlying equity portfolio.
- Elevated VIX® (a measure of implied volatility) allows DeltaShift options to leave more room for upside moves and collect more upfront premium.
- Enhanced BXM Replication (4 rolling one-month call option tranches vs. one monthly tranche for BXM) trailed the BXM Index in the last year, but has outperformed since inception.
- The DeltaShift program has outperformed the BXM Index since inception (+12.34% per annum vs. +6.23%).

# Appendix

# Parametric Diversity Survey (9/30/2021)

<b>Firm Name</b>	Parametric Portfolio Associates LLC
<b>Product Name</b>	DeltaShift / Enhanced BXM Replication

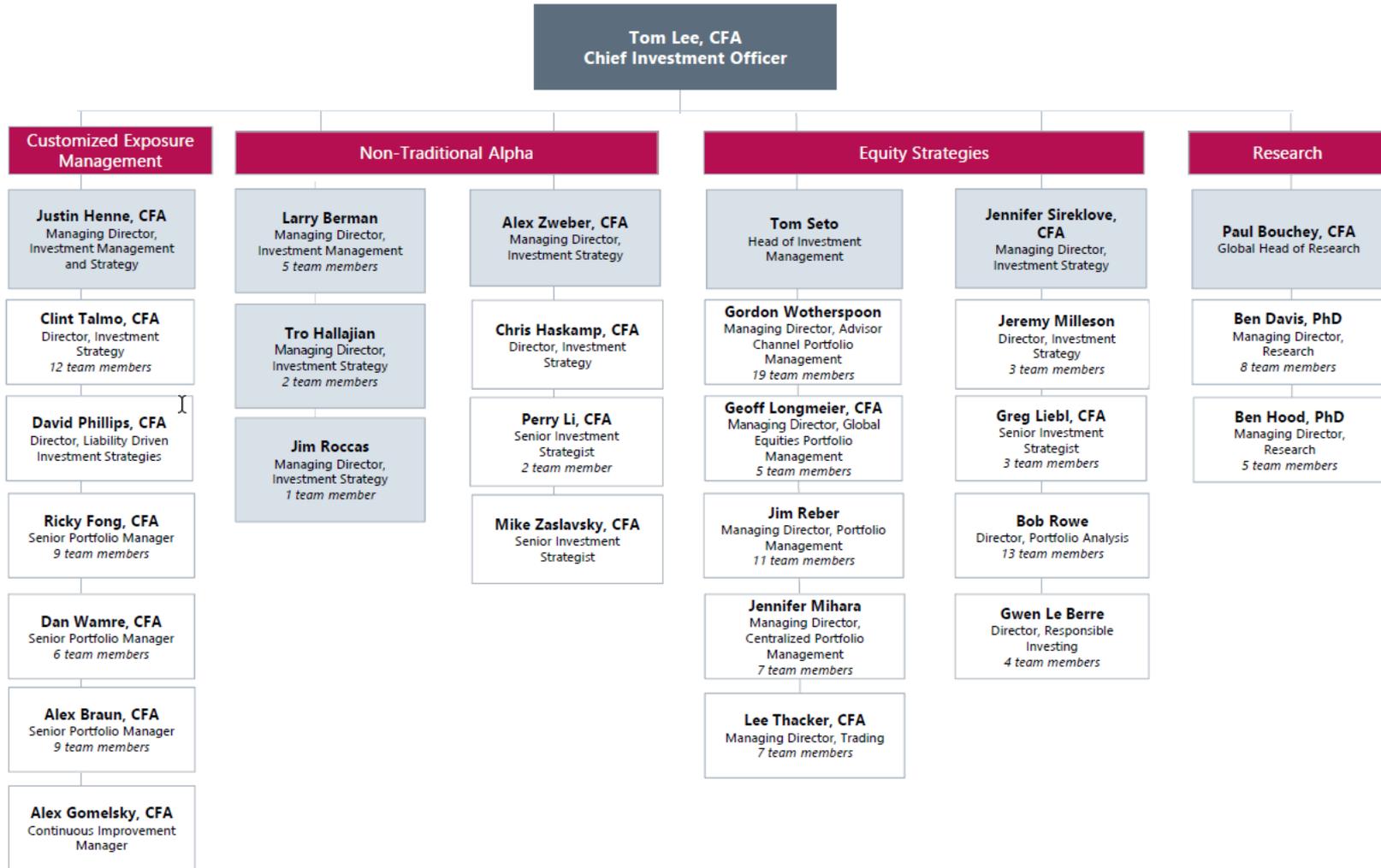
<b>Total Number of Employees</b>	640
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<b>Race and Ethnicity*</b>	<b>Percentage (%) of Board of Directors / Managing Members</b>	<b>Percentage(%) of Firm (Entire Staff)</b>	<b>Percentage (%) of Firm (Investment Professionals)</b>
African American/Black	Not applicable.	2.97%	1.32%
Asian/Hawaiian/Pacific Islander	Parametric is a part of Morgan Stanley Investment Management, the asset management division of Morgan Stanley	17.66%	17.22%
Latino/Hispanic		2.50%	0.66%
White		70.94%	74.17%
American Indian/Alaska Native		0.31%	0.66%
Other		5.63%	5.96%
		Not applicable.	65.16%
<b>Gender</b>			
Male	Not applicable.	65.16%	78.81%
Female	Parametric is a part of Morgan Stanley Investment Management, the asset management division of Morgan Stanley	34.84%	21.19%
Non-Identified/Other			

\* Racial/ethnic categories appear as defined by EEOC guidance.

Gender and Ethnicity metrics reflect a point in time and may not reflect voluntary employee changes to their gender or race/ethnicity.

# Investment Team



As of 7/10/2021. Shaded box denotes direct report to Tom Lee.

# Potential Risks

Strategies utilizing options have certain risks. One or more combinations of the following risks may be incurred:

<b>Risk</b>	<b>Description</b>
Trade Restrictions Risk	Like other strategies that utilize exchange-traded instruments, a trading halt or other suspension of trading, whether or not temporary in nature, may limit Parametric's ability to implement portfolio modifications.
Liquidity Risk	During periods of heightened volatility, there may be a reduction in liquidity that impacts option pricing or bid/offer spreads. Such occurrences could impact Investment Manager's ability to establish new or liquidate existing positions and subject portfolio to losses.
Option Collateral Risk	Changes in option collateral requirements could require positions to be modified or removed, which may produce results meaningfully different from objectives.
Opportunity Risk	Selling call options could limit investment gains if underlying index advances beyond call strike price.

Please refer to the general disclosures in the Appendices.

# Large Capitalization U.S. Equity Portfolio DeltaShift (Unfunded, Brokerage) Composite

## GIPS Composite Report

Reported in: USD

	Total Gross Return AWR	Total Net Return AWR	Primary Benchmark	3Yr Ex Post Std Dev Composite Gross	3Yr Ex Post Std Dev Primary Benchmark	Internal Equal Wtd. Dispersion	Number Of Portfolios	Year-End Composite Overlay Exposure (MM)	Total Firm Assets (MM)	Total Firm Overlay Exposure (MM)	Total Firm Economic Exposure (MM)*
2011	1.14%	0.54%	2.12%	2.27%	8.70%	0.64%	48	1,595	19,548		
2012	-0.84%	-1.43%	-9.92%	1.96%	7.27%	0.33%	37	1,751	63,431		
2013	-4.33%	-4.91%	-14.96%	1.82%	5.97%	0.44%	25	826	80,896		
2014	0.34%	-0.26%	-0.86%	1.69%	5.29%	0.19%	30	829	94,545		
2015	1.84%	1.24%	3.07%	1.85%	5.89%	0.20%	117	2,498	99,248		
2016	-0.31%	-0.91%	-5.05%	1.68%	5.98%	0.28%	194	2,457	111,470		
2017	-3.16%	-3.74%	-7.46%	1.82%	5.74%	0.39%	258	3,010	137,760		
2018	-1.90%	-2.49%	-1.10%	2.62%	5.55%	0.39%	188	2,310	122,628		
2019	-2.98%	-3.56%	-12.61%	2.74%	5.62%	0.41%	140	2,512	277,776		
2020	-1.99%	-2.57%	-20.24%	3.11%	7.96%	0.93%	56	403	241,115	106,570	347,685

\* Total Firm Economic Exposure is the sum of the total firm assets and the overlay exposure.

Primary Benchmark: Custom CBOE S&P 500 BuyWrite Index Option Attribution Index

Composite Creation Date: December 1, 2013; Inception Date: August 1, 2007

- Parametric Portfolio Associates® LLC claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. Parametric Portfolio Associates® LLC has been independently verified for the periods January 1, 2000 to December 31, 2020. The verification report(s) is/are available upon request. A firm that claims compliance with the GIPS standards must establish policies and procedures for complying with all the applicable requirements of the GIPS standards. Verification provides assurance on whether the firm's policies and procedures related to composite and pooled fund maintenance, as well as the calculation, presentation, and distribution of performance, have been designed in compliance with the GIPS standards and have been implemented on a firm-wide basis. Verification does not provide assurance on the accuracy of any specific performance report.
- Parametric Portfolio Associates® LLC is an independent investment advisor registered under the Investment Advisers Act of 1940. Parametric Portfolio Associates® LLC provides rules-based investment management services to institutional investors, individual clients and commingled investment vehicles, including Systematic Alpha and Income Strategies, Custom Core, Centralized Portfolio Management ("CPM"), Policy Implementation Overlay Service ("PIOS"), Customized Exposure Management ("CEM"), Volatility Risk Premium ("VRP"), Tax-Advantaged Bond Strategies (TABS), and Taxable Bond Strategies. The Firm has complied with the GIPS standards retroactive to January 1, 2000.  
  
Prior to July 1, 2019, the firm included only the Parametric Investment & Overlay Strategies. On July 1, 2019, the firm was redefined to include the Parametric Custom Tax-Managed & Centralized Portfolio Management Strategies. On January 1, 2020, the firm was redefined to include the Tax-Advantaged Bond Strategies (TABS), and Taxable Bond Strategies previously managed by Eaton Vance Management, an investment affiliate of Parametric's parent company, Eaton Vance Corporation. For the purpose of complying with the GIPS standards, the Firm is defined and held out to the public as Parametric Portfolio Associates® LLC.  
  
On March 1, 2021, Eaton Vance Management and its affiliates (which includes Parametric Portfolio Associates® LLC) became a wholly-owned, independently managed subsidiary of Morgan Stanley. The firm continues to operate as Parametric Portfolio Associates® LLC.
- Portfolio daily returns represent the change of the daily options' gains and losses divided by the daily contractual program notional value. Total gross monthly returns reflect the sum of the daily returns during the applicable calendar month. Collateral and collateral income are not reflected in the composite returns. Performance results are expressed in U.S. dollars. Past performance is not an indication of future performance.
- Internal dispersion is calculated retroactively based on the sample using the equal-weighted standard deviation of the annual gross returns of those portfolios that were included in the composite for the entire year. When the composite consists of five or fewer portfolios for the full year, no dispersion measure is presented. The three-year annualized standard deviation measures the variability of the composite gross returns and the benchmark returns over the preceding 36-month period.
- Policies for valuing investments, calculating performance, and preparing GIPS Reports are available upon request.
- A list including composite descriptions and pooled funds descriptions for limited distribution pooled funds is available upon request.
- GIPS® is a registered trademark of CFA Institute. CFA Institute does not endorse or promote this organization, nor does it warrant the accuracy or quality of the content contained herein.

- 8 Large Capitalization U.S. Equity Portfolio DeltaShift (Unfunded, Brokerage) Composite includes all fully discretionary unfunded brokerage portfolios that utilize a call option selling strategy on the S&P 500 Index (or other underlyings that are designed to economically track the returns of the S&P 500 Index). The DeltaShift option strategy, when combined with the daily returns of the S&P 500 Index, seeks to increase the total return and reduce the volatility relative to the returns of the S&P 500 Index. Key risks for strategies utilizing option have one or more combinations of the following risks that may be incurred: market risk, trade restrictions risk, liquidity risk, early termination risk, option collateral risk and opportunity risk.
- 9 Composite net of fees performance results are calculated utilizing a model fee and reflect the deduction of 0.60%. The fees for the investment management services described herein are described in the fee schedule.
- 10 The management fee schedule for this strategy is: Segregated Account 0.60% on the first \$20 million; 0.50% on the next \$20M; 0.40% thereafter.
- 11 The composite's benchmark is the Custom CBOE S&P 500 BuyWrite Index Option Attribution Index. The Custom Index represents the difference between the CBOE S&P 500 BuyWrite Index ("BXM") and the S&P 500 Total Return Index ("SPTR") and the returns are calculated daily. The calculation attempts to isolate the options only performance attribution of the BXM Index. Monthly returns reflect the sum of the daily returns during the applicable calendar month. The Custom Index is unmanaged and does not incur management fees, transaction costs or other expenses associated with separately managed accounts in this style. It is not possible to directly invest in an index. S&P Indices are a product of S&P Dow Jones Indices LLC, a division of S&P Global, or its affiliates ("S&P") and have been licensed for use. Standard & Poor's® and S&P® are registered trademarks of S&P. Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC ("Dow Jones"); S&P, Dow Jones and their respective affiliates do not sponsor, endorse, sell or promote the Fund and do not have any liability for any errors, omissions, or interruptions of the S&P Indices.
- 12 Derivative securities are used in the accounts which comprise this composite. Accounts invest in options which are material to this composite.
- 13 The firm's strategies contain derivatives such as futures, options, swaps, and other investment strategies that may involve certain advantages and risks. Futures require the posting of initial and variation margin. Therefore, a portion of risk capital must be preserved for this purpose rather than being allocated to a manager. Swaps require periodic payments, which may be less liquid than futures, and certain swaps may have counterparty/credit risk. Some investment strategies may require a collateral investment equal to the desired amount of exposure.

# Biographies

## Thomas Lee, CFA

Chief Investment Officer

Tom is a member of Parametric's Executive Committee and leads Parametric's Research, Strategy, Portfolio Management, and Trading teams, coordinating resources, aligning priorities, and establishing processes for achieving clients' investment objectives. Tom has coauthored articles on topics ranging from liability-driven investing to the volatility risk premium. He is a voting member of all the firm's investment committees. Prior to joining Parametric in 1994 (originally as an employee of the Clifton Group, which was acquired by Parametric in 2012), Tom spent two years working for the Board of Governors of the Federal Reserve in Washington, DC. He earned a BS in economics and an MBA in finance from the University of Minnesota. A CFA charterholder, Tom is a member of the CFA Society of Minnesota.

## Larry Berman

Managing Director, Investment Management

Larry oversees the portfolio management and trading of the Parametric Liquid Alternatives Investment Strategies including SARP, commodities, VRP, and related options strategies. He is a member of the Parametric Enterprise Investment Management Committee and a voting member of the Liquid Alternatives Investment Committee. Prior to joining Parametric in 2006 (originally as an employee of Managed Risk Advisors, which was acquired by Parametric in 2007), Larry was a principal at Wolverine Trading, one of the largest options market-makers in the world. At Wolverine, he was the head trader in charge of all trading in the New York office on the American Stock Exchange and the COMEX, and he was responsible for over 90 equity/index options as well as market-making in ETFs and structured products. He earned a BS in business administration from Boston University.

## Jim Roccas

Managing Director, Investment Strategy

Jim works with clients who are interested in accessing Parametric's Volatility Risk Premium (VRP) suite of options-based solutions. Jim has over 25 years of experience working with clients to implement solutions for increasing return and reducing risk using options and other derivative product strategies. Prior to joining Parametric in 2008, Jim was a Director at Merrill Lynch where he structured and originated solutions for high-net-worth and institutional investors for protecting downside, enhancing returns and gaining customized market exposure. He earned a BA in Economics from Princeton University and an MBA in Finance from The Wharton School at the University of Pennsylvania.

## Tro Hallajian

Managing Director, Investment Strategy

Tro works with clients who are interested in accessing Parametric's volatility risk premium (VRP) suite of options-based solutions. Prior to joining Parametric in 2010, Tro was an associate trader at Credit Suisse in New York and Switzerland, trading options in domestic and international markets. In addition, Tro provided client service directly to high-net-worth individuals, foundations, and institutional investors engaged in various option overlay and absolute return volatility strategies. He earned a BS with honors in finance and a minor in communications from Marist College.

## Robert D'Amato

VP, Operations/Client Relationship

Robert supports day-to-day operations and marketing of our derivative strategies. Prior to joining Parametric in 2011, Robert worked with high-net-worth clients as part of a large UBS Financial Services Team in New Haven, Connecticut. Robert earned a BA in political science from the University of Connecticut and an MBA from Southern Connecticut State University.

## Gregory Bukoski

Portfolio Management Analyst

Greg is a portfolio management analyst on the investment strategy team working closely with relationship management, client services and trading. Prior to joining Parametric in 2020, Greg worked at AIG Global Capital Markets on the derivative team. He also worked at the Royal Bank of Scotland supporting the fixed income and derivative desks. Greg earned a BS in finance with a minor in accounting from Fairfield University.

# Biographies (Continued)

## **Ken Everding, Ph.D.**

Managing Director, Research

Mr. Everding is responsible for risk management and product development at the Westport Investment Center. Prior to joining Parametric in 2005\*, Ken was a Managing Director at Zurich Capital Markets and BNP Paribas following Zurich's acquisition. At Zurich, Ken's team was the pioneer in creating structured hedge fund products. He earned a Ph.D. in Theoretical Particle Physics from Yale University. The title of his Ph.D. thesis is "Aspects of Non-Perturbative Quantum Electrodynamics", excerpts of which have been published in leading academic journals. He also earned a B.S. with honors in Physics from Iowa State University.

*\*Reflects the year employee was hired by Managed Risk Advisors, which was acquired by Parametric Portfolio Associates® LLC on May 1, 2007.*

## **Brendan Lanahan**

Director

Brendan is responsible for trading our derivative strategies. Prior to joining Parametric in 2012, Brendan was a member of the New York and American Stock Exchanges. Here he was an Equity Market Maker in over 50 small to mid-cap oil/gas and materials companies. He also worked at Bloomberg specializing in their Electronic Trading Division. He earned a BS in management and marketing from Elmira College.

## **Arthur Harris**

Associate Portfolio Manager

Arthur is responsible for day-to-day management of Parametric's options-based Volatility Risk Premium Strategies, including Defensive Equity, Global Defensive Equity, Multi-Asset VRP and other proprietary strategies. Prior to joining Parametric in 2017, Arthur worked at Parametric as a Marketing/Reporting Intern. He earned a BS in business economics and finance from Iowa State University.

## **Mike Kelly**

Managing Director, Trading

Mike is responsible for day to day trading as well as monitoring and managing existing positions across our derivative strategies. Prior to joining Parametric in 2008, Mike was a Senior Vice President at Cambridge International Securities responsible for selling fixed income products to institutional investors. He earned a BA in history from Providence College.

# Disclosure

Parametric Portfolio Associates® LLC ("Parametric"), headquartered in Seattle, is registered as an investment advisor with the Securities and Exchange Commission under the Investment Advisers Act of 1940. Parametric is a leading global asset management firm, providing investment strategies and customized exposure management directly to institutional investors and indirectly to individual investors through financial intermediaries. Parametric offers a variety of rules-based investment strategies, including alpha-seeking equity, fixed-income, alternative and options strategies. Parametric also offers implementation services, including customized equity, traditional overlay and centralized portfolio management. Parametric is part of Morgan Stanley Investment Management, the asset management division of Morgan Stanley, and offers these capabilities through offices located in Seattle, Boston, Minneapolis, New York City, and Westport, Connecticut. This material may not be forwarded or reproduced, in whole or in part, without the written consent of Parametric. Parametric and its affiliates are not responsible for its use by other parties.

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Performance is presented gross of investment advisory fees. Advisory fees are deducted quarterly from an investor's portfolio and would impact performance adversely. As an example, assuming (a) \$1,000,000 investment, (b) portfolio return of 5% per year, and (c) 1.00% annual investment advisory fee, the cumulative fees paid would be \$10,209.57 in the first year, \$55,254.43 over five years, and \$122,351.51 over ten years. Actual fees charged vary by portfolio due to various conditions, including account size. Parametric's investment advisory fees are described further in Part 2A of Form ADV, which is available upon request.

# Disclosure (Continued)

Benchmark/index information provided is for illustrative purposes only. Indexes are unmanaged and cannot be invested in directly. Deviations from the benchmarks provided herein may include, but are not limited to, factors such as: the purchase of higher risk securities, over/under-weighting specific sectors and countries, limitations in market capitalization, company revenue sources, and/or client restrictions. Parametric's proprietary investment process considers factors such as additional guidelines, restrictions, weightings, allocations, market conditions and other investment characteristics. Thus returns may at times materially differ from the stated benchmark and/or other disciplines provided for comparison.

The S&P 500 represents the top 500 publicly traded companies in the U.S. The CBOE S&P 500<sup>®</sup> BuyWrite Index (BXM) is a benchmark index designed to track the performance of a hypothetical buy-write strategy on the S&P 500<sup>®</sup> Index. The BXM is a passive total return index based on (1) buying an S&P 500<sup>®</sup> stock index portfolio, and (2) "writing" (or selling) the near-term S&P 500<sup>®</sup> Index (SPXSM) "covered" call option, generally on the third Friday of each month. The SPX call written will have about one month remaining to expiration, with an exercise price just above the prevailing index level (i.e., slightly out of the money). The SPX call is held until expiration and cash settled, at which time a new one-month, near-the-money call is written.

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The effectiveness of the option strategy is dependent on a general imbalance of natural buyers over natural sellers of index options. This imbalance could decrease or be eliminated, which could have an adverse effect. A decision as to whether, when and how to use options involves the exercise of skill and judgment, and even a well-conceived and well-executed options program may be adversely affected by market behavior or unexpected events. Successful options strategies may require the anticipation of future movements in securities prices, interest rates and other economic factors. No assurances can be given that the judgments of Parametric in this respect will be correct.

Options are not suitable for all investors and carry additional risks. Investors must ensure that they have read and understood the current options risk disclosure document before entering into any options transactions. In addition, investors should consult with a tax, legal and/or financial advisor prior to contemplating any derivative transactions. The options risk disclosure document can be accessed at the following web address: <http://www.optionsclearing.com/about/publications/character-risks.jsp>.

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Parametric is headquartered at 800 5th Ave Suite 2800, Seattle, WA 98104. Parametric's Minneapolis office is located at 3600 Minnesota Drive, Suite 325, Minneapolis, MN 55435. For more information regarding Parametric and its investment strategies, or to request a copy of Parametric's Form ADV, please contact us at 206.694.5500 (Seattle) or 612.870.8800 (Minneapolis), or visit our website, [www.parametricportfolio.com](http://www.parametricportfolio.com).

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## MEMORANDUM

**TO:** Oakland Police and Fire Retirement System (OPFRS)  
**FROM:** David Sancewich, Paola Nealon, Jason Leong Campbell – Meketa Inv. Group  
**DATE:** November 17, 2021  
**RE:** Parametric (Covered Calls) – Contract Renewal

---

Manager	Parametric
<b>Inception Date:</b>	4/2014
<b>OPFRS AUM (9/30/2021):</b>	\$37.6 million (8.6%)
<b>Product Name:</b>	Parametric BXM/DeltaShift
<b>Management Fee:</b>	32 bps
<b>Investment Strategy:</b>	Covered Calls DeltaShift (Active) & Replication (Passive)
<b>Benchmark:</b>	CBOE BXM

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*Meketa recommends that OPFRS renew its contract with Parametric before the current contract date of expiration.* OPFRS contracts reserve the right for the Board to terminate the agreement, with or without cause, at any time upon 30 calendar days' prior written notice. In making this recommendation, Meketa considered investment performance and recent organizational / personnel issues. Since the last contract renewal, Parametric has exhibited acceptable performance and organizational stability regarding its Covered Calls portfolios, therefore Meketa believes that there are no issues that should prevent a contract extension for this manager.

### Organizational Issues

Parametric	Level of Concern^	Areas of Potential Impact			
		Investment process (client portfolio)	Investment Team	Performance Track Record	Team/ Firm Culture
<b>Product</b>					
Key people changes	None				
Changes to team structure/individuals' roles	None				
Product client gain/losses	None				
Changes to the investment process	None				
Personnel turnover	None				
<b>Organization</b>					
Ownership changes	None				
Key people changes	None				
Firm wide client gain/losses	None				
<b>Recommended Action</b>	<b>None - X</b>	<b>Watch Status</b>		<b>Termination</b>	

### Investment Philosophy & Process, per manager

Parametric's approach to covered calls investing is based on the persistent premium of implied volatility to realized volatility in the options market. Parametric believes that there is a supply versus demand imbalance for equity options, and thus the implied volatility generally exceeds the realized volatility. The covered calls program is designed to generate returns for a long equity investor by providing additional income and cash flow while reducing volatility.

The options portion, managed by Parametric, is constructed around a diversified portfolio of short dated options (generally 1-3 month options). Option selection incorporates liquidity, volatility, maturity, and time-decay. Strike prices are selected using a dynamic, volatility-based framework designed to adapt to changing market conditions. By selecting options that have a targeted initial delta, options strikes move further out-of-the-money when implied volatility levels rise, and vice-versa Parametric attempts to create a ladder portfolio of options with multiple strike prices and maturities in order to diversify the time and price specific risk of selling call options. Parametric generally sells 25%-35% "delta" options, which, by definition, are out-of-the-money options. Using a fixed "delta" allows Parametric to effectively index the strikes to volatility. When the opportunity arises, the strategy allows for Parametric to capture and realize profits prior to written option maturity, and aggressively close out losing positions in order to mitigate potential outlier losses that are inherent to a "sell and hold" option program (i.e. BXM replication).

OAKLAND POLICE AND FIRE RETIREMENT BOARD  
CITY OF OAKLAND, CALIFORNIA

*Approved to Form  
and Legality*



RESOLUTION No. 8032

ON MOTION OF MEMBER \_\_\_\_\_ SECONDED BY MEMBER \_\_\_\_\_

**RESOLUTION AUTHORIZING ONE-YEAR EXTENSION OF PROFESSIONAL SERVICES AGREEMENT WITH PARAMETRIC PORTFOLIO ASSOCIATES, LLC FOR THE PROVISION OF COVERED CALLS ASSET CLASS INVESTMENT MANAGER SERVICES**

**WHEREAS**, Oakland City Charter section 2601(e) states that the Board of the Oakland Police and Fire Retirement System (“PFRS Board”) shall possess power to make all necessary rules and regulation for its guidance and shall have exclusive control of the administration and investment of the funds established for the maintenance and operation of the system; and

**WHEREAS**, on June 19, 2013, the PFRS Board passed a motion to enter into an agreement (“The Agreement”) with Parametric Portfolio Associates, LLC (“Investment Counsel”), to provide advice and counsel regarding investments of the assets of the Police and Fire Retirement Fund (“Fund”); and

**WHEREAS**, Section XX of the Agreement allows for modification of the Agreement by written agreement of all parties; and

**WHEREAS**, Section IV(B) of the Agreement gave the PFRS Board the option to extend the initial term of the Agreement for three additional one-year terms by giving Investment Counsel written notice of its intent to exercise its option not less than sixty days prior to the expiration of the term or extended term of the agreement; and

**WHEREAS**, on November 28, 2018, the PFRS Board passed Resolution No. 7033 authorizing amendment of Section IV(B) of the Agreement to provide the Board with unlimited one-year extension options, and

**WHEREAS**, on October 30, 2019, the PFRS Board passed Resolution No. 7074 authorizing an extension of the Agreement with Investment Counsel for an additional one-year term commencing December 23, 2019 and ending December 23, 2020; and

**WHEREAS**, on December 10, 2020, the PFRS Board passed Resolution No. 8006 authorizing an extension of the Agreement with Investment Counsel

OAKLAND POLICE AND FIRE RETIREMENT BOARD  
CITY OF OAKLAND, CALIFORNIA

RESOLUTION No. 8032

for an additional one-year term commencing December 23, 2020 and ending December 23, 2021; and

**WHEREAS**, the PFRS Board now wishes to extend the current Agreement with Investment Counsel for an additional one-year term commencing December 23, 2021 and ending December 23, 2022; now, therefore, be it

**RESOLVED:** That the Board hereby authorizes a one-year extension of the professional service agreement between the City of Oakland Police and Fire Retirement System and Parametric Portfolio Associates, LLC for the provision of Covered Calls Asset Class Investment Manager Services commencing December 23, 2021 and ending December 23, 2022.

IN BOARD MEETING, VIA ZOOM TELE-CONFERENCE NOVEMBER 17, 2021

PASSED BY THE FOLLOWING VOTE:

AYES:

NOES:

ABSTAIN:

ABSENT:

ATTEST: \_\_\_\_\_  
PRESIDENT

ATTEST: \_\_\_\_\_  
SECRETARY

**Capital Markets Outlook & Risk Metrics**  
As of October 31, 2021

## Capital Markets Outlook

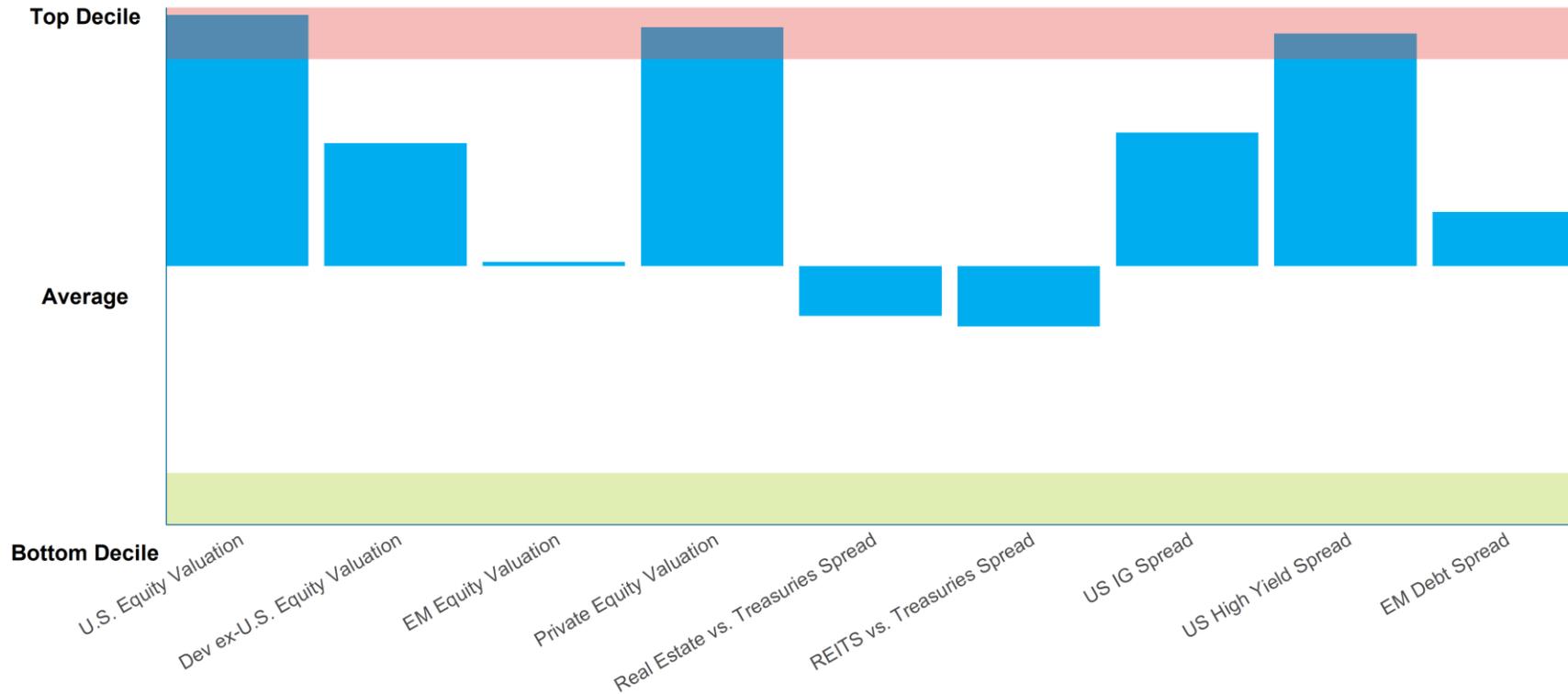
### Markets

- After a difficult September, global equity markets posted positive returns in October even as global supply chain disruptions and robust consumer demand drove inflation higher. Significant financial entities (e.g., IMF) are analyzing the potential for mounting inflationary forces to disrupt the outlook for the global recovery.
- Global equity markets posted returns generally between 1% and 9% in the month of October, with US equities outperforming non-US equities.
- Reversing September's outperformance, US value stocks lagged growth stocks across all market capitalizations in October. For example, the Russell 1000 Growth index returned 8.7% in the month, versus the Russell 1000 Value index's return of 5.1%.
- China's equity markets recovered in October and returned 3.2%, outperforming the MSCI Emerging Markets index which returned 1.0%.
- Bond markets saw mixed returns as rising inflation expectations dampened returns. The Bloomberg US Aggregate index returning 0.0%, while TIPS generated positive returns with the Bloomberg TIPS index return 1.1%.
- The Bloomberg US Long Government Bond index returned 1.8% as the market adjusted long-term inflation risks lower.

### Capital Markets Outlook

- Global and US REITS posted strong positive returns in the month of October with the MSCI US REITS index returning 7.7%, and the FTSE NAREIT Equity Index returning 7.6%.
- Natural resource equities outperformed the broad commodity index with the S&P Global Natural Resource index returning 4.8%, while the Bloomberg Commodity index returned 2.6% for the month.
- US headline inflation for September reached 5.4% year-on-year, largely driven by higher energy costs, which rose 24.8% year-on-year, while core inflation (CPI ex. food and energy) rose 4% year-on-year.
- Energy prices continued to rise in October. In China, flooding and high natural gas prices have prompted energy rationing schemes and higher energy costs for manufacturers. In Europe, natural gas prices have driven power costs higher and pushed inflation to multi-decade highs.
- In October, the US Senate agreed to fund a temporary extension of the debt ceiling for \$480 billion.
- In China, the potential default of mega-real estate company, Evergrande, put a strain on markets. Investors worry whether a potential default will be limited to just Evergrande's creditors or if its troubles are a symptom of a broader real estate and economic downturn in China.
- Vaccine efficacy remains uncertain as some countries enact targeted booster programs, while Delta variant cases appear to be falling in the US and Europe. Meanwhile, China has reinstated some targeted local lockdowns in response to COVID outbreaks.

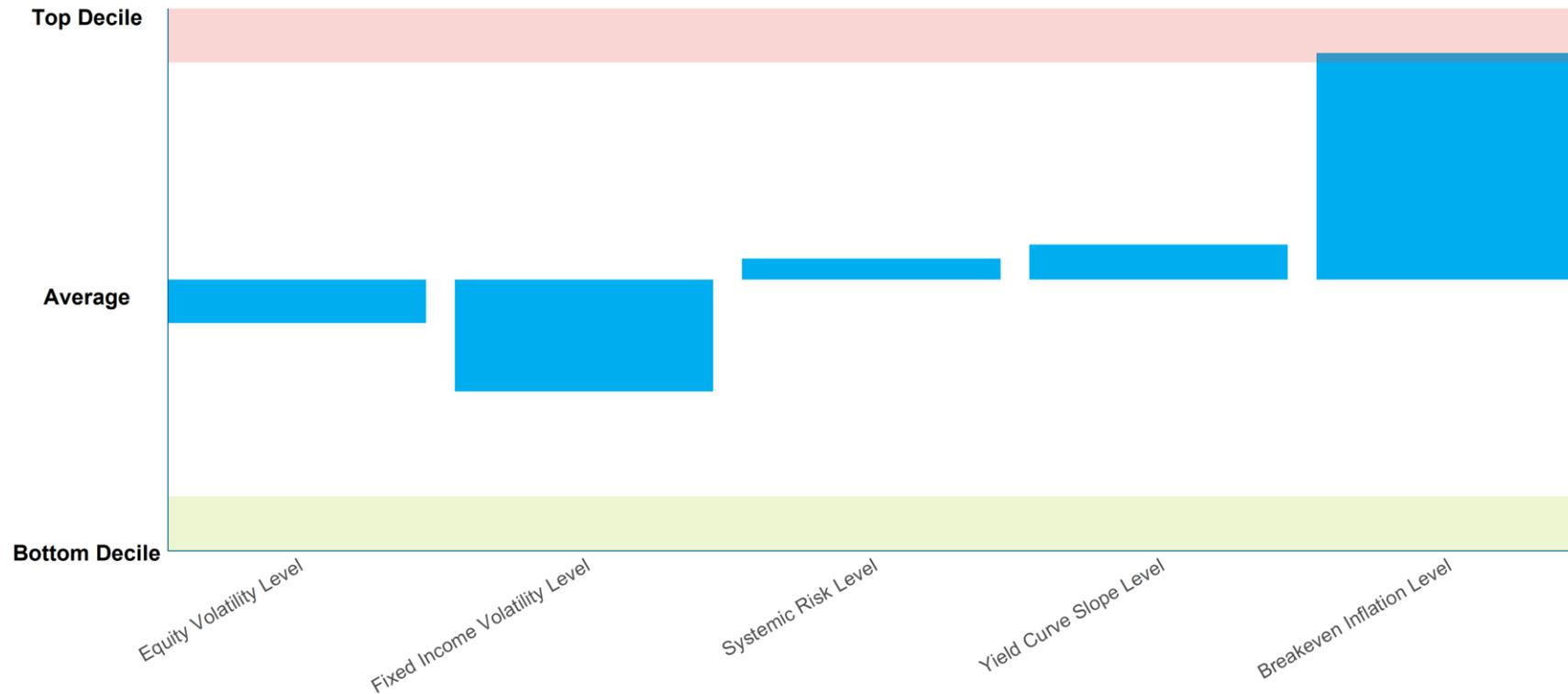
### Risk Overview/Dashboard (1) (As of October 31, 2021)<sup>1</sup>



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

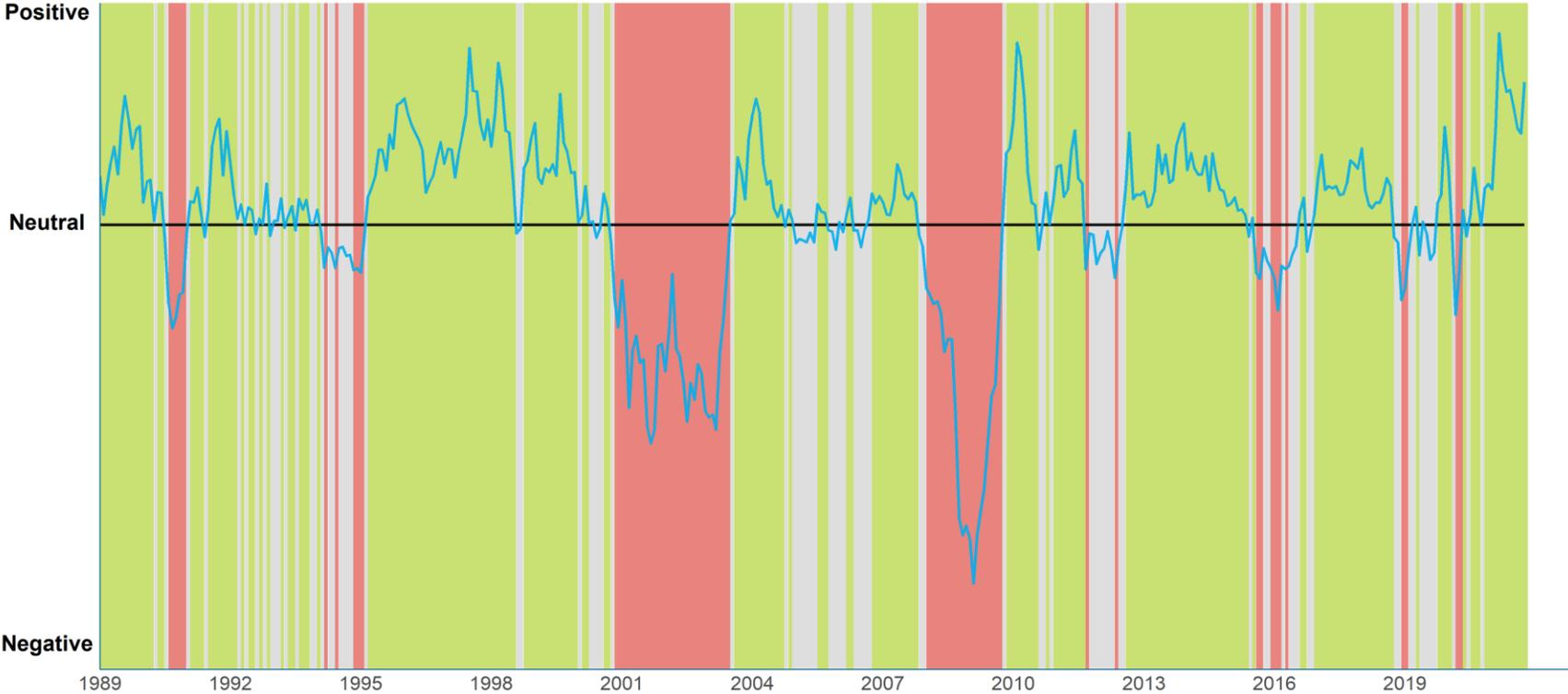
<sup>1</sup> With the exception of Private Equity Valuation, that is YTD as of December 31, 2020.

### Risk Overview/Dashboard (2) (As of October 31, 2021)



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

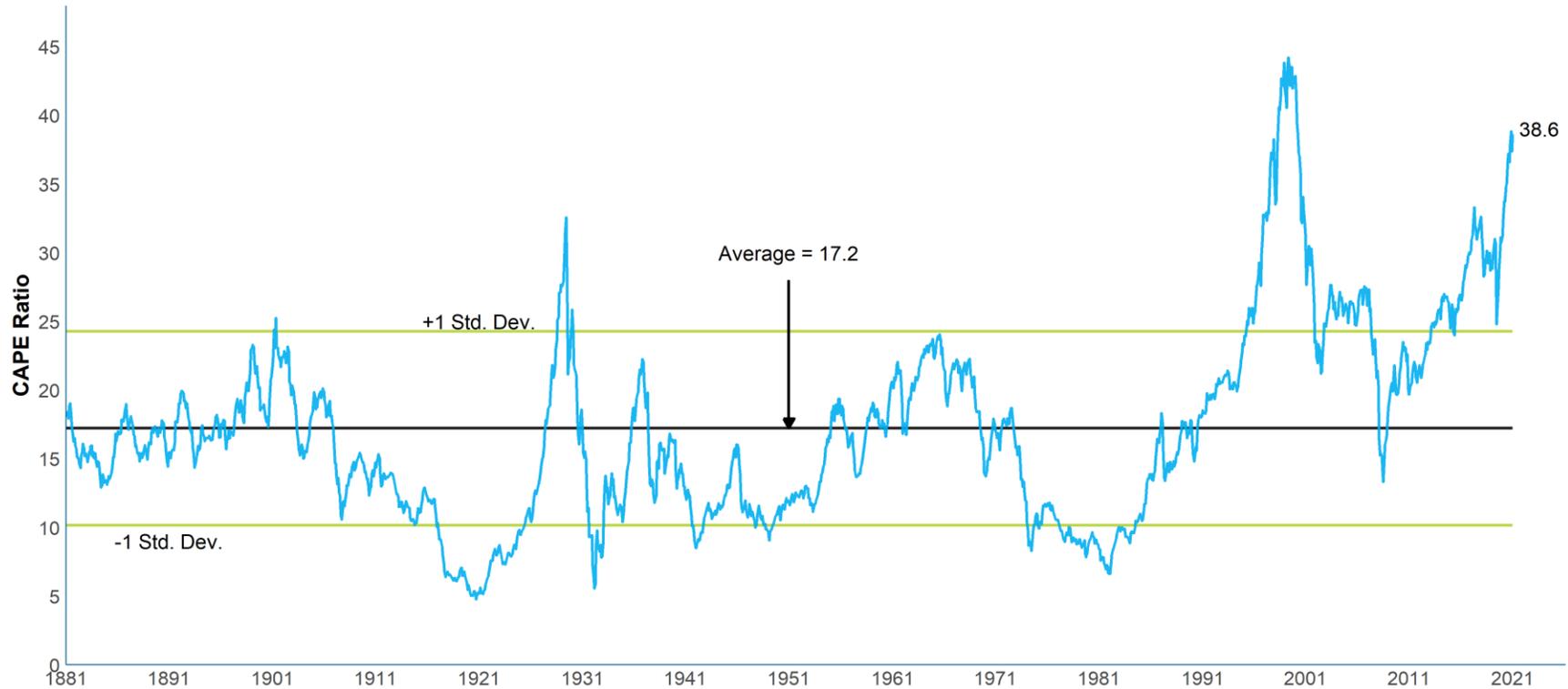
**Market Sentiment Indicator (All History)**  
(As of October 31, 2021)



Market Sentiment Indicator (Last Three Years)  
(As of October 31, 2021)



**US Equity Cyclically Adjusted P/E<sup>1</sup>**  
(As of October 31, 2021)



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

<sup>1</sup> 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/E<sup>1</sup> (As of October 31, 2021)



- 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.

<sup>1</sup> 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<sup>1</sup> (As of October 31, 2021)



- 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.

<sup>1</sup> 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.

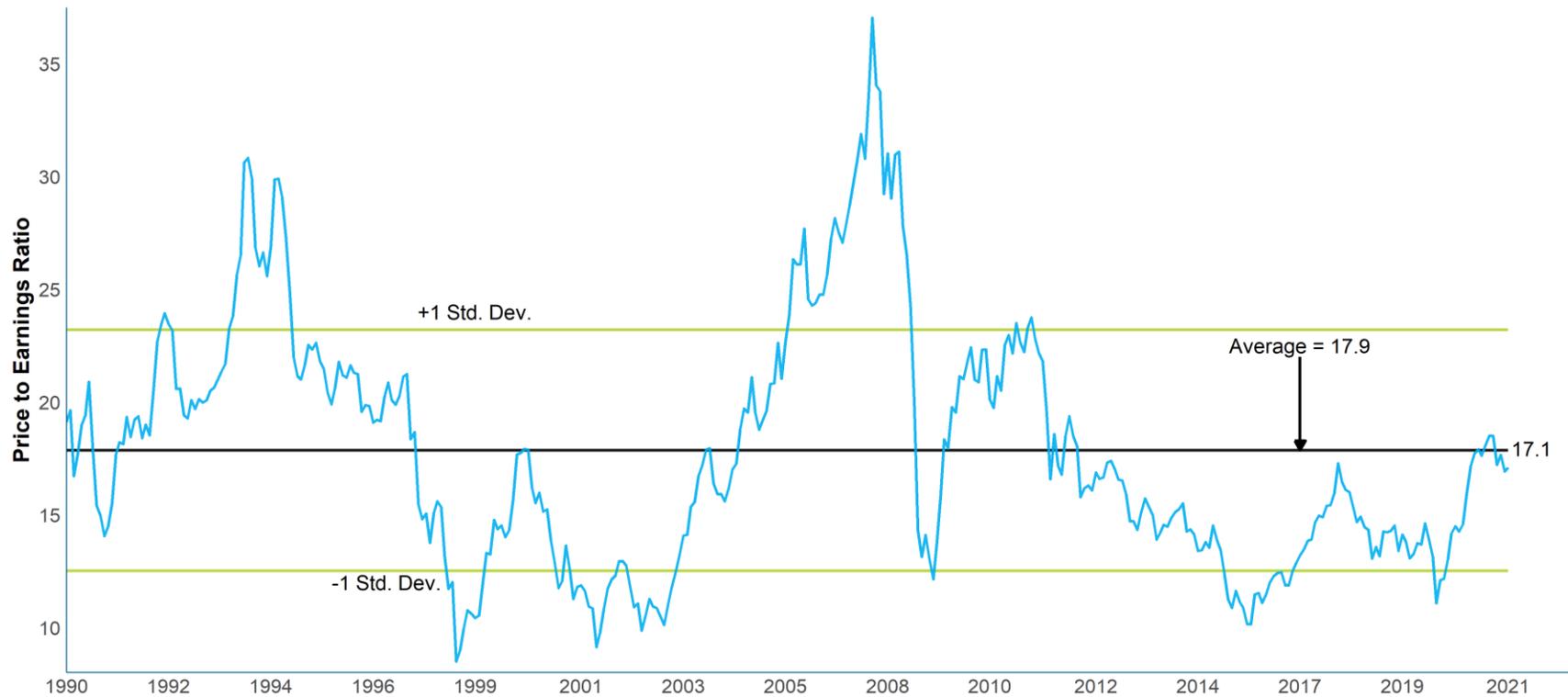
### Developed International Equity Cyclically Adjusted P/E<sup>1</sup> (As of October 31, 2021)



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

<sup>1</sup> Developed International Equity (MSCI EAFE Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly “as reported” earnings over the previous ten years.

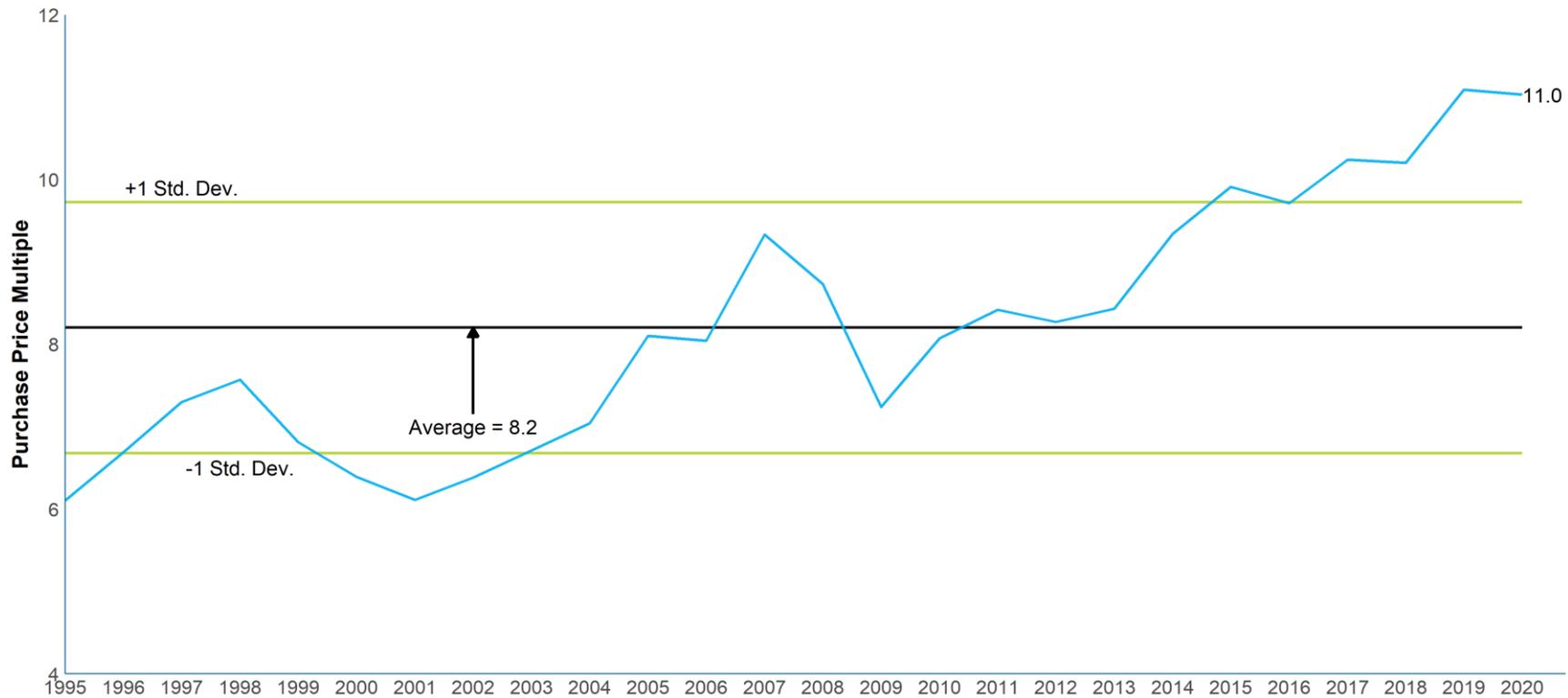
Emerging Market Equity Cyclically Adjusted P/E<sup>1</sup>  
(As of October 31, 2021)



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

<sup>1</sup> 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<sup>1</sup> (As of February 28, 2021)<sup>2</sup>

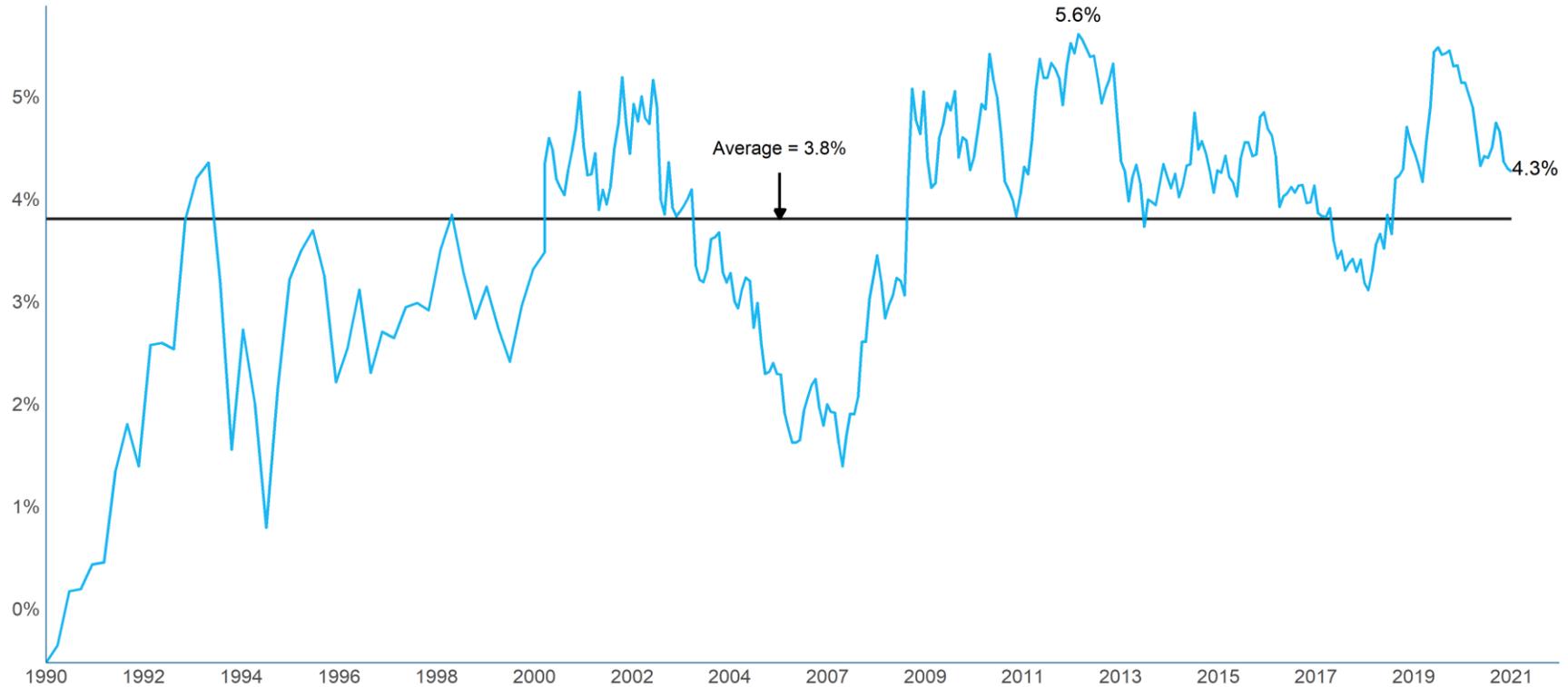


- This chart details one valuation metric for the private equity market. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

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

<sup>2</sup> Annual Data, as of December 31, 2020

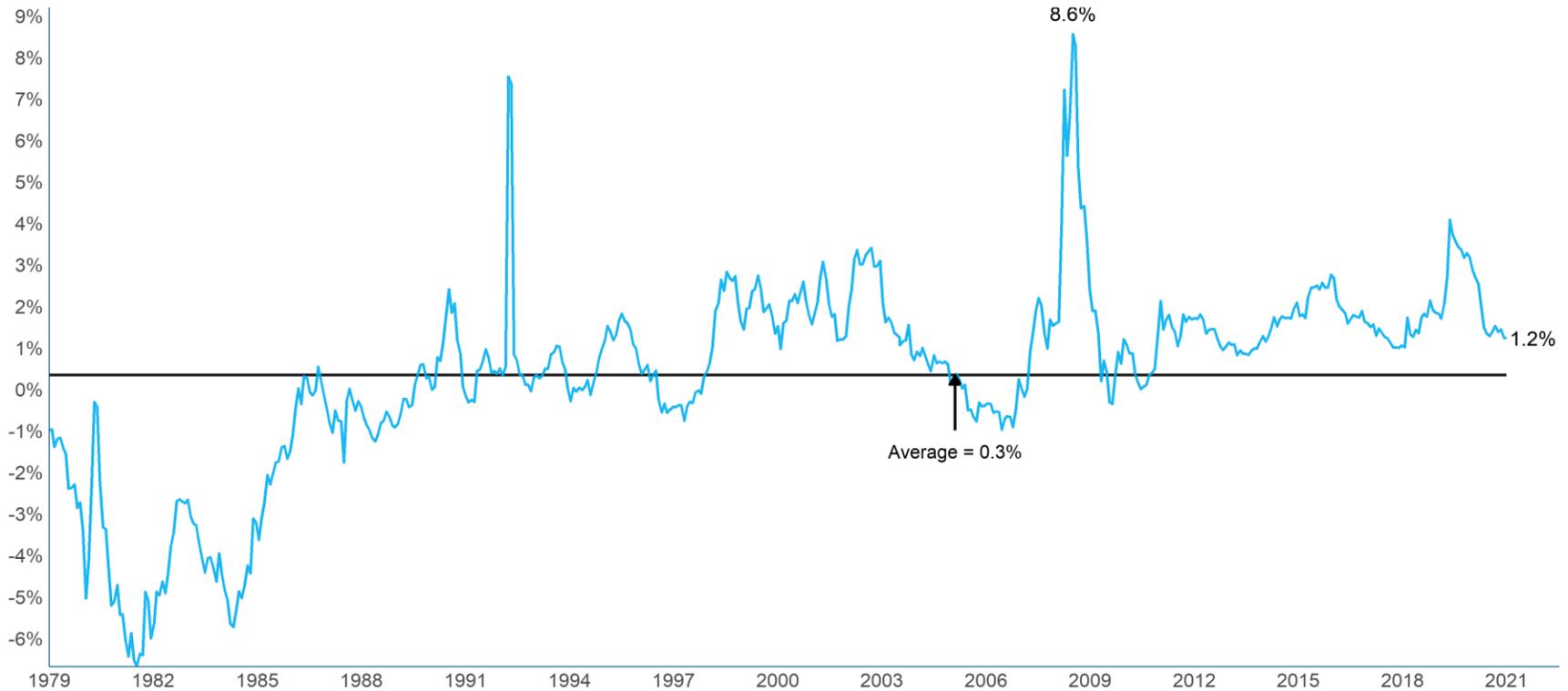
**Core Real Estate Spread vs. Ten-Year Treasury<sup>1</sup>**  
 (As of October 31, 2021)



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

<sup>1</sup> 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.

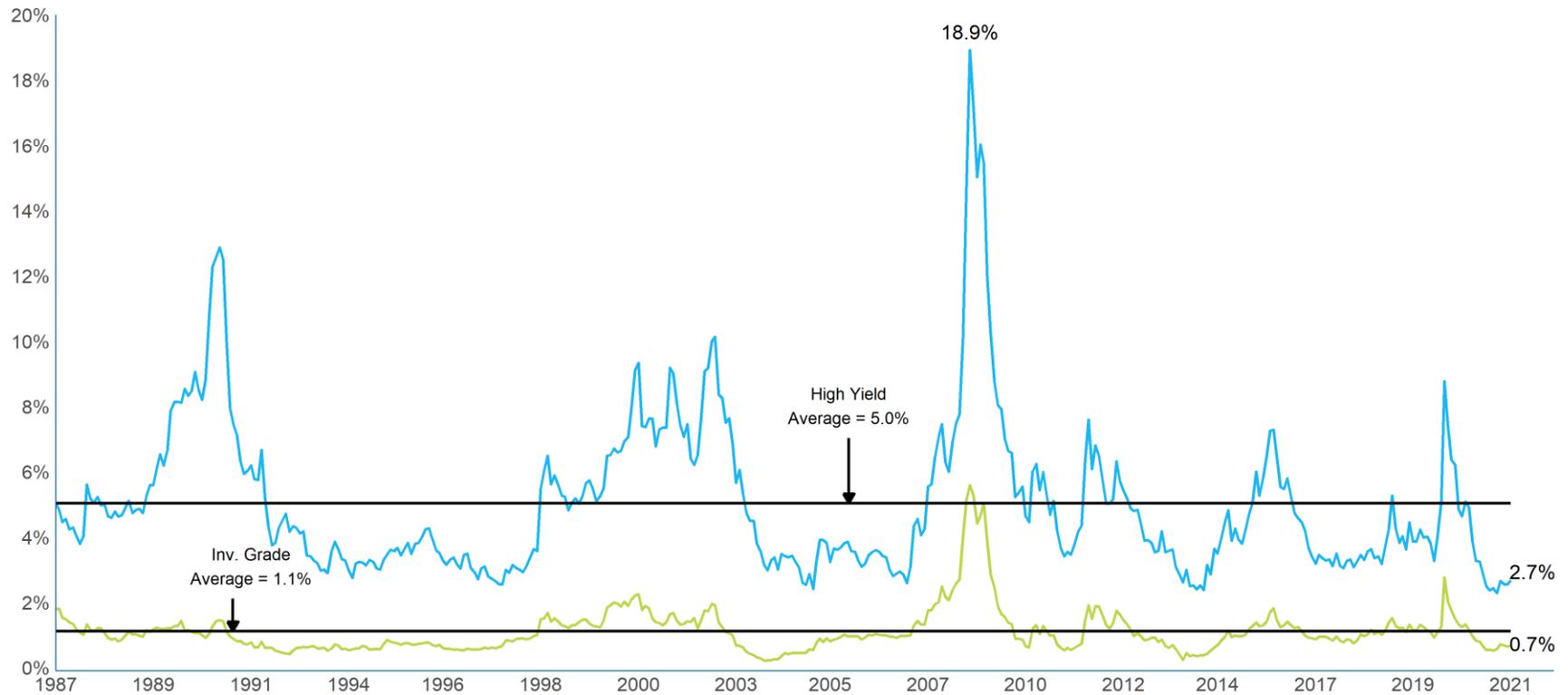
**REITs Dividend Yield Spread vs. Ten-Year Treasury<sup>1</sup>**  
 (As of October 31, 2021)



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

<sup>1</sup> 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<sup>1</sup>**  
(As of October 31, 2021)



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

<sup>1</sup> 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.

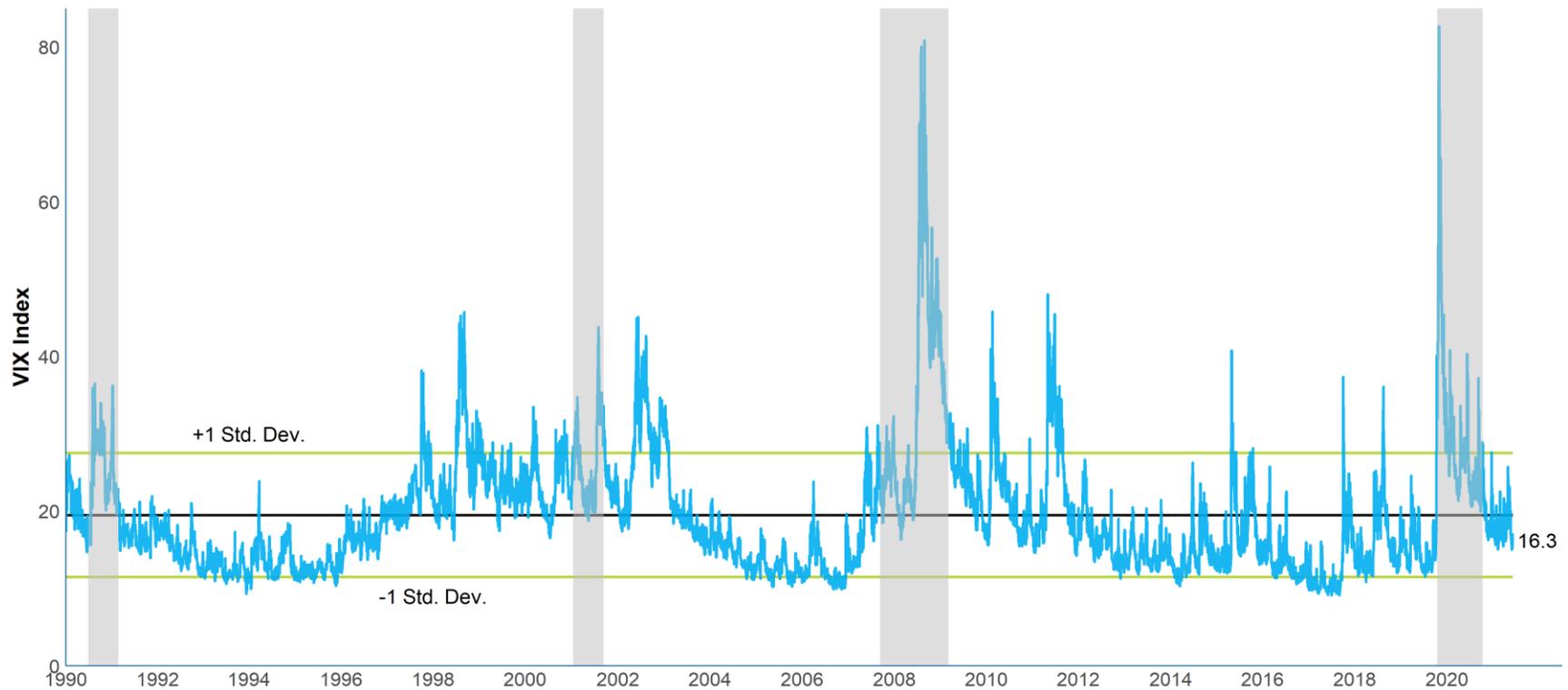
### Emerging Market Debt Spreads<sup>1</sup> (As of October 31, 2021)



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

<sup>1</sup> EM Spreads – Source: Bloomberg. Option Adjusted Spread (OAS) for the Bloomberg Barclays EM USD Aggregate Index.

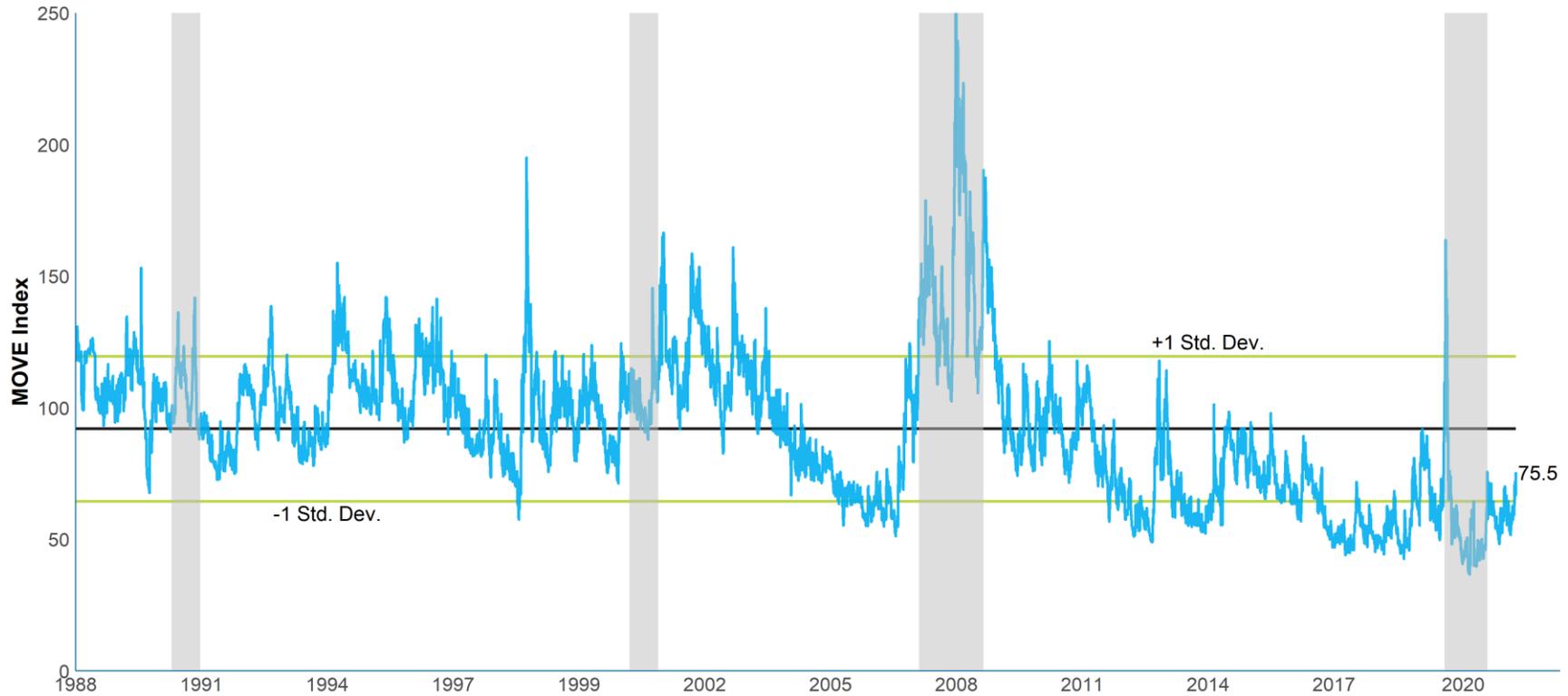
### Equity Volatility<sup>1</sup> (As of October 31, 2021)



- 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.

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

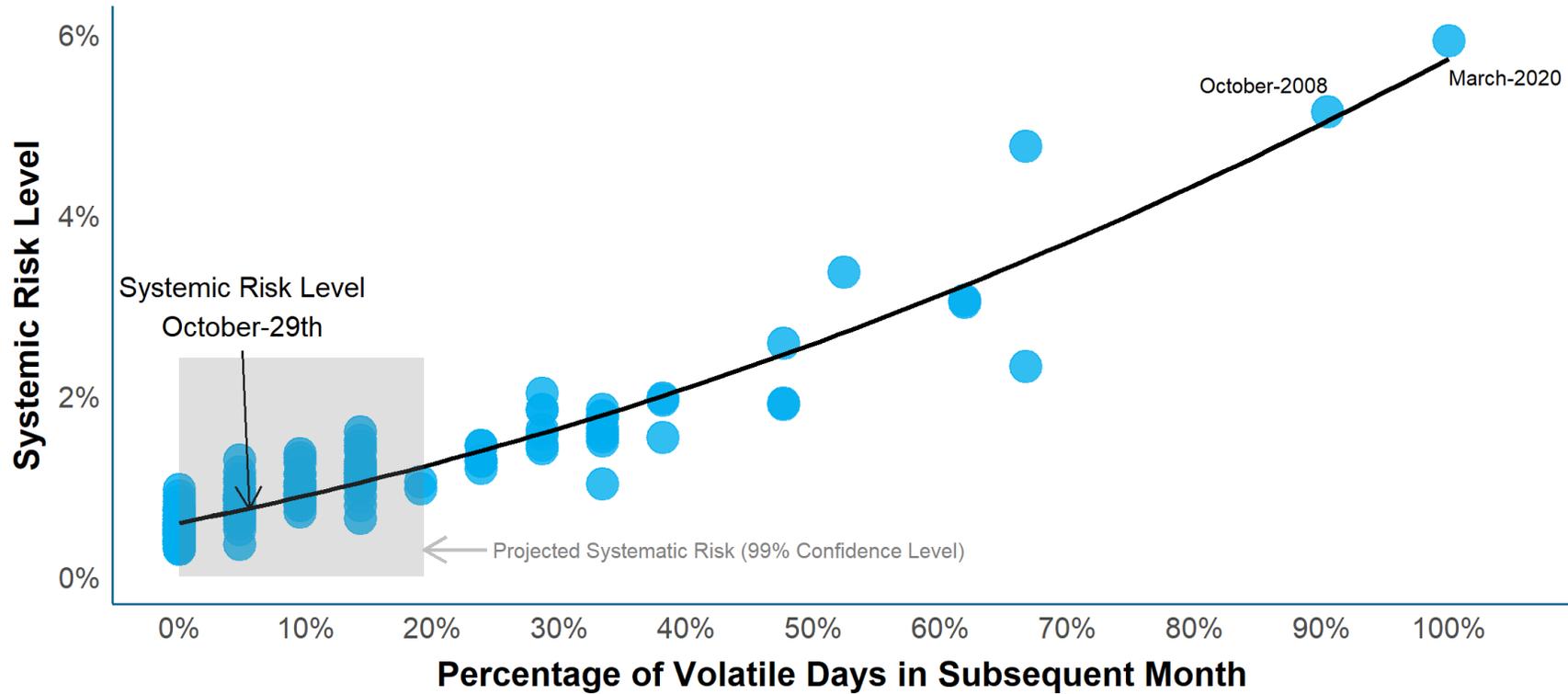
**Fixed Income Volatility<sup>1</sup>**  
(As of October 31, 2021)



- 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.

<sup>1</sup> 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.

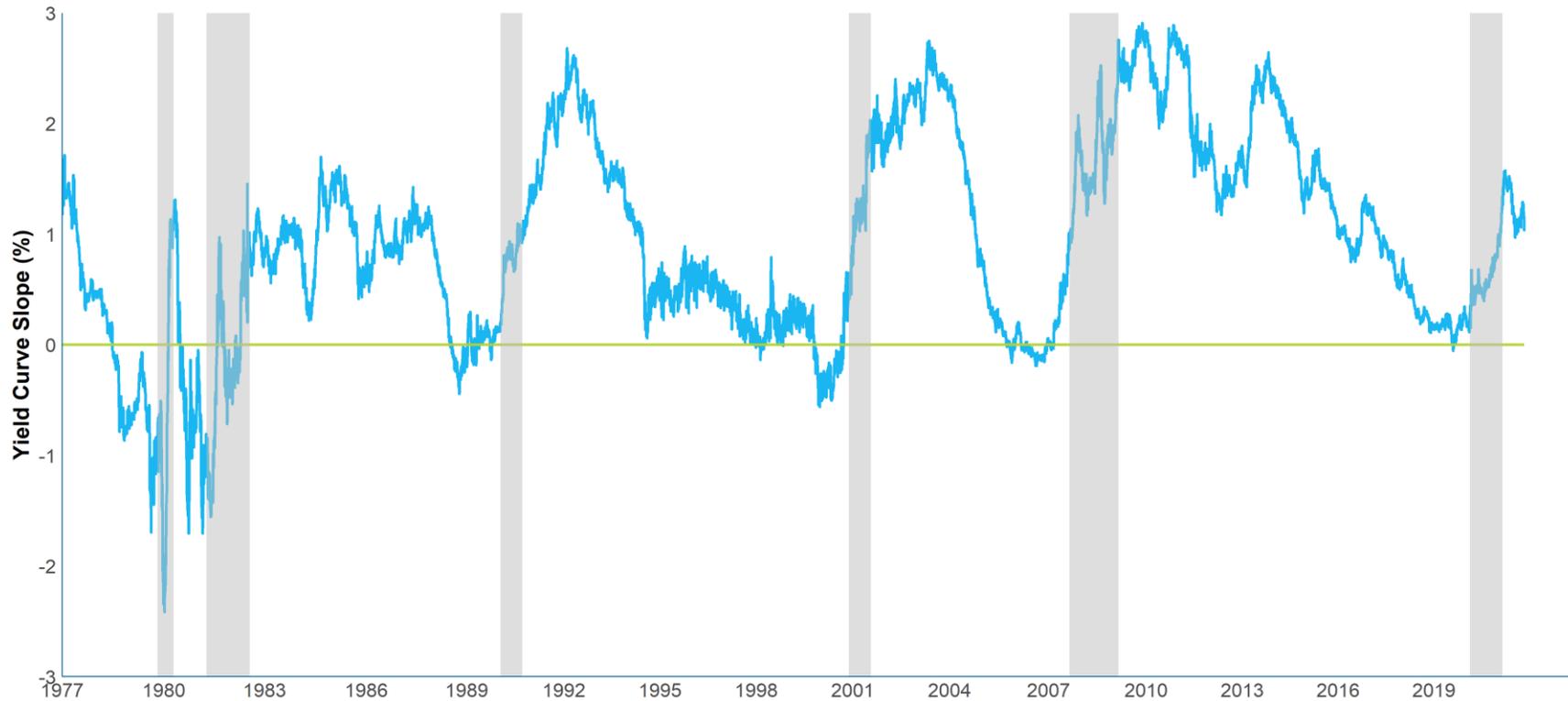
**Systemic Risk and Volatile Market Days<sup>1</sup>**  
(As of October 31, 2021)



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

<sup>1</sup> 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)<sup>1</sup>  
(As of October 31, 2021)



- 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.

<sup>1</sup> 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.

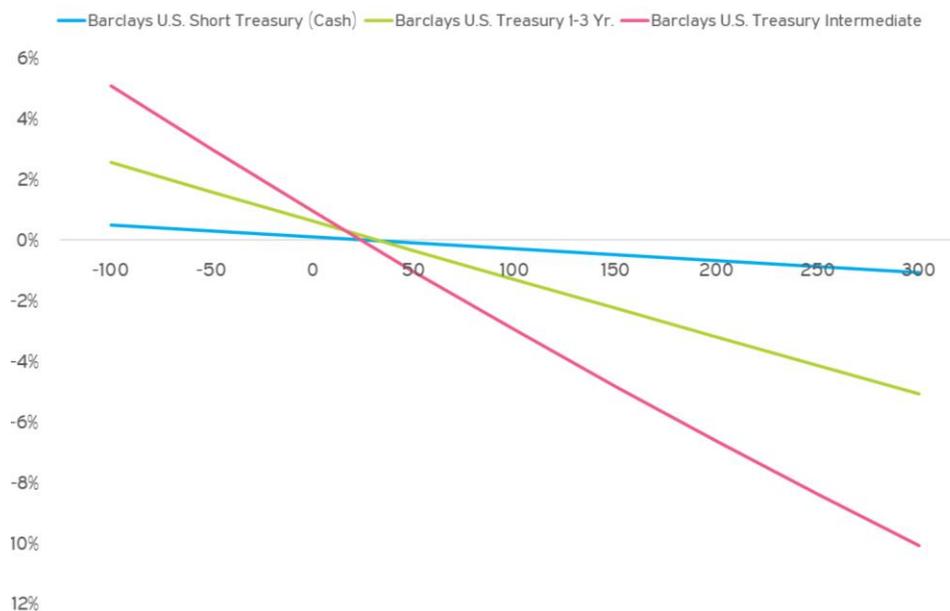
**Ten-Year Breakeven Inflation<sup>1</sup>**  
(As of October 31, 2021)



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

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

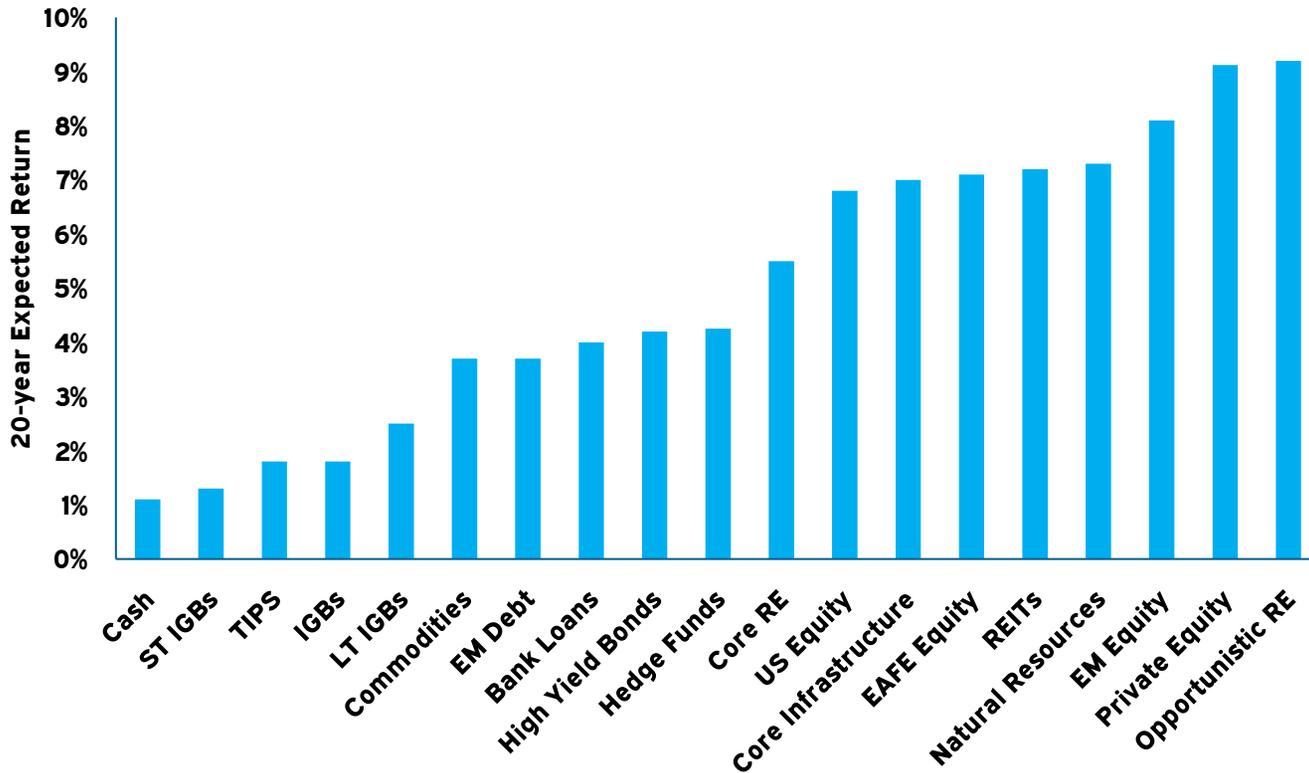
### Total Return Given Changes in Interest Rates (bps)<sup>1</sup> (As of October 31, 2021)



	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)	0.5%	0.3%	0.1%	-0.1%	-0.3%	-0.5%	-0.7%	-0.9%	-1.1%	0.39	0.08%
Barclays US Treasury 1-3 Yr.	2.5%	1.6%	0.6%	-0.4%	-1.3%	-2.3%	-3.2%	-4.2%	-5.1%	1.93	0.60%
Barclays US Treasury Intermediate	5.1%	3.0%	0.9%	-1.1%	-3.0%	-4.8%	-6.7%	-8.4%	-10.1%	4.03	0.93%
Barclays US Treasury Long	22.7%	11.8%	1.9%	-6.8%	-14.5%	-21.1%	-26.7%	-31.2%	-34.6%	18.59	1.94%

<sup>1</sup> 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 Returns<sup>1</sup>



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

<sup>1</sup> Source: Meketa Investment Group’s 2021 Annual Asset Study.

## Appendix

### Data Sources and Explanations<sup>1</sup>

- 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) 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.

<sup>1</sup> All Data as of October 31, 2021 unless otherwise noted.

## Appendix

### Data Sources and Explanations<sup>1</sup>

- 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.
- 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.

<sup>1</sup> All Data as of October 31, 2021 unless otherwise noted.

## Appendix

### Data Sources and Explanations<sup>1</sup>

- 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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<sup>1</sup> All Data as of October 31, 2021 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.

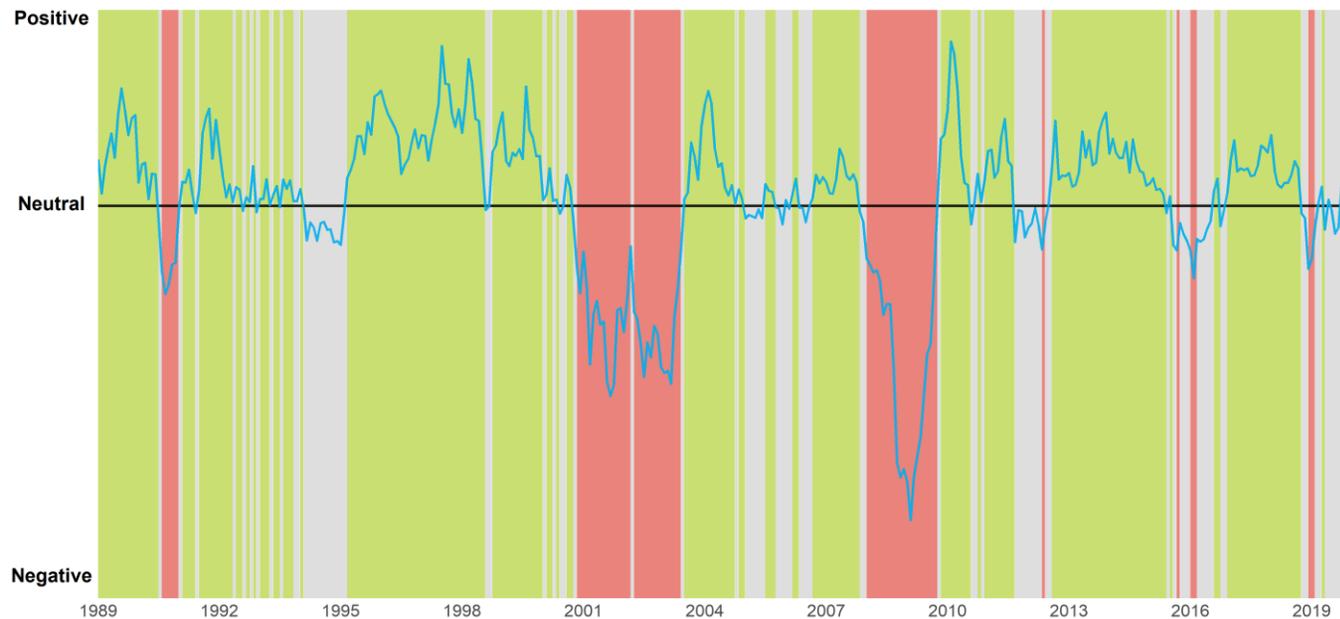
- Meketa's Risk Metrics, which rely significantly on standard market measures of relative valuation, often provide valid early signals of increasing long-term risk levels in the global investment markets. However, as is the case with numerous valuation measures, the Risk Metrics may convey such risk concerns long before a market correction takes 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<sup>1</sup>. 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).

<sup>1</sup> 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.

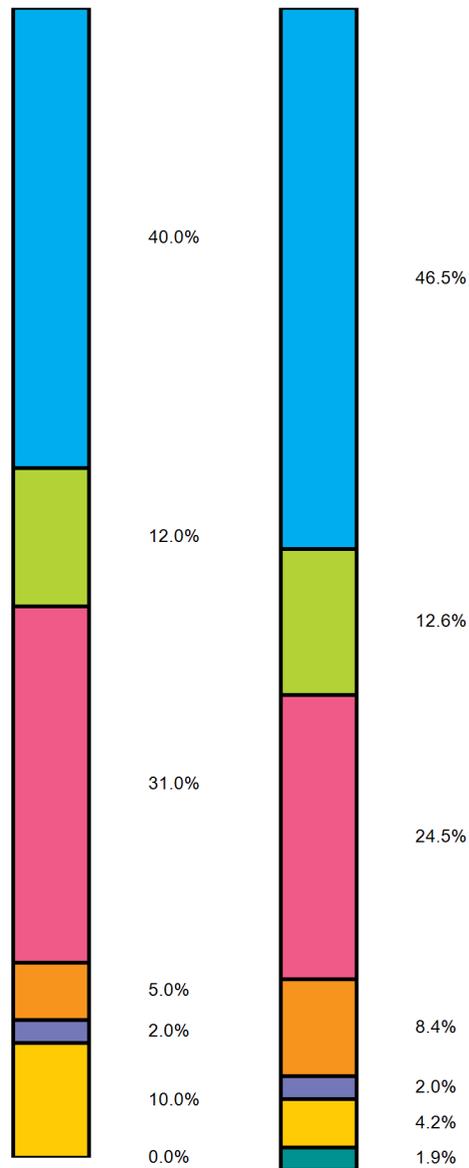
## Disclaimer Information

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# Oakland Police and Fire Retirement System

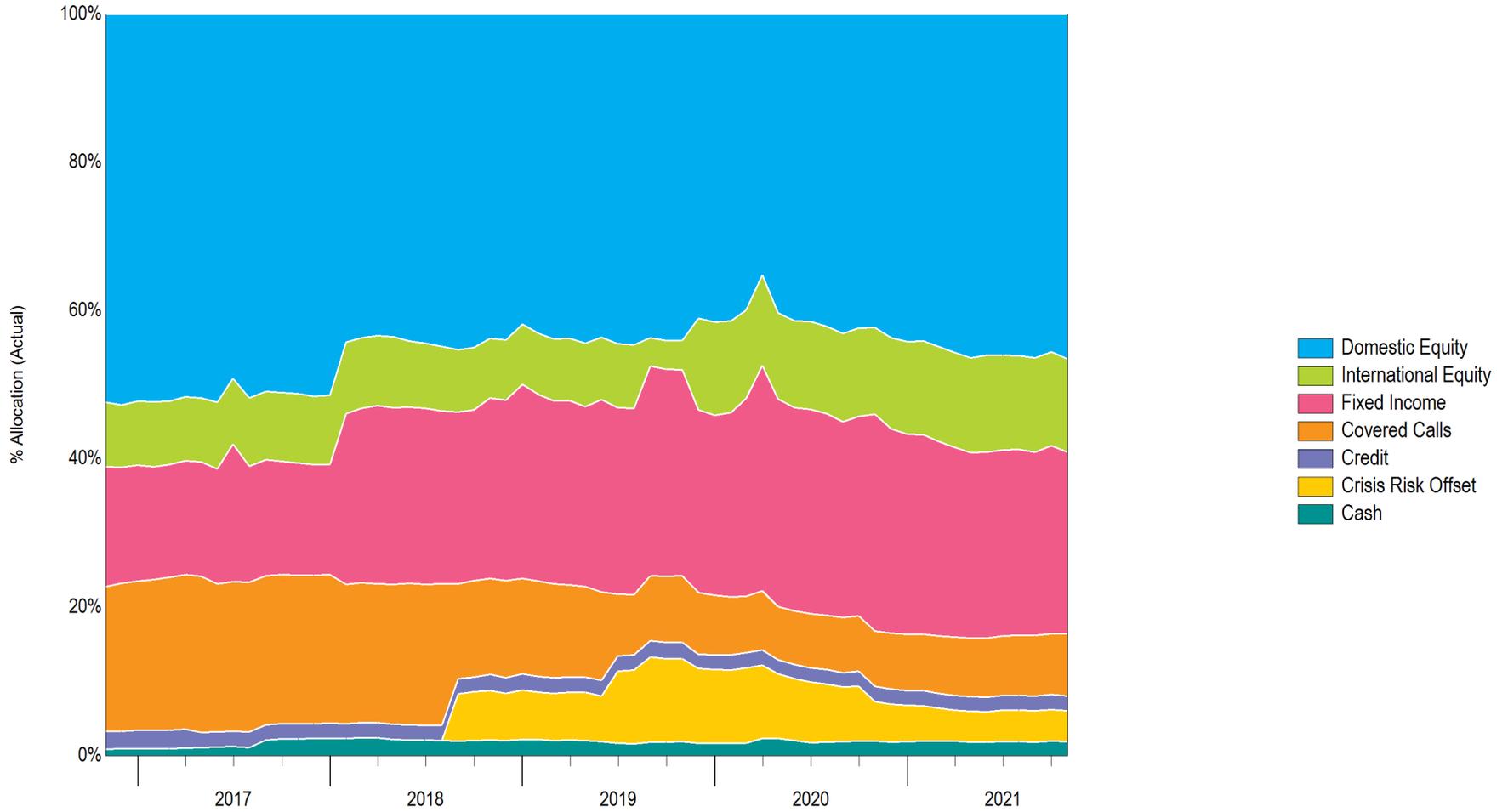
October 2021 Flash Report

OPFRS Total Plan As of October 31, 2021



Allocation vs. Targets and Policy						
	Current Balance	Current Allocation	Policy	Difference	Within IPS Range?	
Domestic Equity	\$221,222,023	46.5%	40.0%	6.5%	Yes	
International Equity	\$59,844,724	12.6%	12.0%	0.6%	Yes	
Fixed Income	\$116,421,437	24.5%	31.0%	-6.5%	No	
Covered Calls	\$39,728,652	8.4%	5.0%	3.4%	Yes	
Credit	\$9,315,568	2.0%	2.0%	0.0%	Yes	
Crisis Risk Offset	\$19,848,054	4.2%	10.0%	-5.8%	No	
Cash	\$9,047,775	1.9%	0.0%	1.9%	Yes	
<b>Total</b>	<b>\$475,428,233</b>	<b>100.0%</b>	<b>100.0%</b>			

Asset Allocation History  
5 Years Ending October 31, 2021



Asset Class Performance Summary											
	Market Value (\$)	% of Portfolio	1 Mo (%)	Fiscal YTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	S.I. (%)	S.I. Date
<b>OPFRS Total Plan</b>	<b>475,428,233</b>	<b>100.0</b>	<b>3.7</b>	<b>3.4</b>	<b>11.7</b>	<b>24.0</b>	<b>12.4</b>	<b>11.6</b>	<b>9.5</b>	<b>7.2</b>	<b>Dec-88</b>
<i>OPFRS Policy Benchmark</i>			<i>3.2</i>	<i>2.9</i>	<i>10.4</i>	<i>21.7</i>	<i>12.1</i>	<i>11.1</i>	<i>9.1</i>	<i>8.5</i>	<i>Dec-88</i>
<b>Domestic Equity</b>	<b>221,222,023</b>	<b>46.5</b>	<b>6.2</b>	<b>5.8</b>	<b>20.9</b>	<b>41.6</b>	<b>19.7</b>	<b>17.9</b>	<b>15.5</b>	<b>9.7</b>	<b>Jun-97</b>
<i>Russell 3000 (Blend)</i>			<i>6.8</i>	<i>6.7</i>	<i>22.8</i>	<i>43.9</i>	<i>21.6</i>	<i>18.9</i>	<i>16.1</i>	<i>10.0</i>	<i>Jun-97</i>
<b>International Equity</b>	<b>59,844,724</b>	<b>12.6</b>	<b>2.5</b>	<b>0.9</b>	<b>10.1</b>	<b>30.5</b>	<b>12.7</b>	<b>10.8</b>	<b>7.9</b>	<b>5.9</b>	<b>Jan-98</b>
<i>MSCI ACWI ex US (Blend)</i>			<i>2.4</i>	<i>-0.5</i>	<i>8.9</i>	<i>30.2</i>	<i>12.5</i>	<i>10.3</i>	<i>7.2</i>	<i>6.1</i>	<i>Jan-98</i>
<b>Fixed Income</b>	<b>116,421,437</b>	<b>24.5</b>	<b>-0.1</b>	<b>0.1</b>	<b>-0.5</b>	<b>1.4</b>	<b>6.0</b>	<b>4.0</b>	<b>3.7</b>	<b>5.4</b>	<b>Dec-93</b>
<i>Blmbg BC Universal (Blend)</i>			<i>-0.1</i>	<i>0.0</i>	<i>-1.2</i>	<i>0.5</i>	<i>5.8</i>	<i>3.4</i>	<i>3.4</i>	<i>5.2</i>	<i>Dec-93</i>
<b>Credit</b>	<b>9,315,568</b>	<b>2.0</b>	<b>-0.2</b>	<b>1.7</b>	<b>8.8</b>	<b>15.1</b>	<b>6.2</b>	<b>7.3</b>	<b>--</b>	<b>6.6</b>	<b>Feb-15</b>
<i>Bloomberg US High Yield TR</i>			<i>-0.2</i>	<i>0.7</i>	<i>4.4</i>	<i>10.5</i>	<i>7.4</i>	<i>6.4</i>	<i>6.8</i>	<i>6.1</i>	<i>Feb-15</i>
<b>Covered Calls</b>	<b>39,728,652</b>	<b>8.4</b>	<b>5.6</b>	<b>6.4</b>	<b>20.5</b>	<b>35.8</b>	<b>15.9</b>	<b>13.5</b>	<b>--</b>	<b>10.9</b>	<b>Apr-14</b>
<i>CBOE S&amp;P 500 BuyWrite USD</i>			<i>4.7</i>	<i>6.0</i>	<i>17.7</i>	<i>31.4</i>	<i>8.0</i>	<i>8.0</i>	<i>8.0</i>	<i>7.0</i>	<i>Apr-14</i>
<b>Crisis Risk Offset</b>	<b>19,848,054</b>	<b>4.2</b>	<b>1.7</b>	<b>1.8</b>	<b>-6.9</b>	<b>-5.9</b>	<b>-8.7</b>	<b>--</b>	<b>--</b>	<b>-8.4</b>	<b>Aug-18</b>
<i>SG Multi Alternative Risk Premia Index</i>			<i>-1.6</i>	<i>-1.4</i>	<i>4.4</i>	<i>4.4</i>	<i>-2.8</i>	<i>--</i>	<i>--</i>	<i>-3.0</i>	<i>Aug-18</i>
<b>Cash</b>	<b>9,047,775</b>	<b>1.9</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>1.3</b>	<b>1.3</b>	<b>0.7</b>	<b>0.7</b>	<b>Mar-11</b>
<i>FTSE T-Bill 3 Months TR</i>			<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.1</i>	<i>1.1</i>	<i>1.1</i>	<i>0.6</i>	<i>0.6</i>	<i>Mar-11</i>

Cash balances held in ETF accounts at the Custodian are reflected in the Cash account market value.

Trailing Net Performance												
	Market Value (\$)	% of Portfolio	% of Sector	1 Mo (%)	Fiscal YTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	S.I. (%)	S.I. Date
<b>OPFRS Total Plan</b>	<b>475,428,233</b>	<b>100.0</b>	<b>--</b>	<b>3.7</b>	<b>3.4</b>	<b>11.7</b>	<b>24.0</b>	<b>12.4</b>	<b>11.6</b>	<b>9.5</b>	<b>7.2</b>	<b>Dec-88</b>
<i>OPFRS Policy Benchmark</i>				<i>3.2</i>	<i>2.9</i>	<i>10.4</i>	<i>21.7</i>	<i>12.1</i>	<i>11.1</i>	<i>9.1</i>	<i>8.5</i>	<i>Dec-88</i>
<b>Domestic Equity</b>	<b>221,222,023</b>	<b>46.5</b>	<b>46.5</b>	<b>6.2</b>	<b>5.8</b>	<b>20.9</b>	<b>41.6</b>	<b>19.7</b>	<b>17.9</b>	<b>15.5</b>	<b>9.7</b>	<b>Jun-97</b>
<i>Russell 3000 (Blend)</i>				<i>6.8</i>	<i>6.7</i>	<i>22.8</i>	<i>43.9</i>	<i>21.6</i>	<i>18.9</i>	<i>16.1</i>	<i>10.0</i>	<i>Jun-97</i>
Northern Trust Russell 1000	121,527,551	25.6	54.9	6.9	7.2	23.2	43.5	22.0	19.1	16.3	15.8	Jun-10
<i>Russell 1000</i>				<i>6.9</i>	<i>7.2</i>	<i>23.2</i>	<i>43.5</i>	<i>22.0</i>	<i>19.2</i>	<i>16.3</i>	<i>15.8</i>	<i>Jun-10</i>
EARNEST Partners	48,815,539	10.3	22.1	5.5	4.4	19.2	40.6	22.5	19.4	16.2	11.5	Apr-06
<i>Russell MidCap</i>				<i>5.9</i>	<i>5.0</i>	<i>22.0</i>	<i>45.4</i>	<i>19.9</i>	<i>16.5</i>	<i>14.8</i>	<i>10.3</i>	<i>Apr-06</i>
iShares Edge MSCI Min Vol ETF	22,070,652	4.6	10.0	5.5	5.8	15.5	27.7	--	--	--	27.7	Apr-20
<i>MSCI USA Minimum Volatility GR USD</i>				<i>5.5</i>	<i>5.7</i>	<i>15.6</i>	<i>28.0</i>	<i>14.7</i>	<i>14.3</i>	<i>14.1</i>	<i>27.8</i>	<i>Apr-20</i>
Rice Hall James	17,420,639	3.7	7.9	4.5	2.0	16.1	41.2	14.7	--	--	14.7	Jul-17
<i>Russell 2000 Growth</i>				<i>4.7</i>	<i>-1.2</i>	<i>7.6</i>	<i>38.5</i>	<i>18.6</i>	<i>17.9</i>	<i>14.6</i>	<i>15.6</i>	<i>Jul-17</i>
Brown Fundamental Small Cap Value	11,387,642	2.4	5.1	5.6	3.0	--	--	--	--	--	6.5	Apr-21
<i>Russell 2000 Value</i>				<i>3.8</i>	<i>0.7</i>	<i>27.6</i>	<i>64.3</i>	<i>13.4</i>	<i>12.6</i>	<i>12.1</i>	<i>5.3</i>	<i>Apr-21</i>
<b>International Equity</b>	<b>59,844,724</b>	<b>12.6</b>	<b>12.6</b>	<b>2.5</b>	<b>0.9</b>	<b>10.1</b>	<b>30.5</b>	<b>12.7</b>	<b>10.8</b>	<b>7.9</b>	<b>5.9</b>	<b>Jan-98</b>
<i>MSCI ACWI ex US (Blend)</i>				<i>2.4</i>	<i>-0.5</i>	<i>8.9</i>	<i>30.2</i>	<i>12.5</i>	<i>10.3</i>	<i>7.2</i>	<i>6.1</i>	<i>Jan-98</i>
SGA ACWI ex-U.S. Equity	41,964,831	8.8	70.1	2.1	1.2	9.7	29.6	--	--	--	9.4	Dec-19
<i>MSCI ACWI ex USA Gross</i>				<i>2.4</i>	<i>-0.5</i>	<i>8.9</i>	<i>30.2</i>	<i>12.5</i>	<i>10.3</i>	<i>7.2</i>	<i>12.9</i>	<i>Dec-19</i>
Vanguard Developed Markets ETF	17,453,164	3.7	29.2	3.2	1.2	10.4	32.2	--	--	--	14.3	Sep-19
<i>FTSE Developed All Cap Ex US TR USD</i>				<i>2.6</i>	<i>1.5</i>	<i>11.8</i>	<i>36.0</i>	<i>12.8</i>	<i>10.4</i>	<i>6.1</i>	<i>16.0</i>	<i>Sep-19</i>

Throughout the report performance for new funds will be shown after one full month of investment.

International equity performance inclusive of residual cash in Hansberger transition.

OPFRS Total Plan As of October 31, 2021

	Market Value (\$)	% of Portfolio	% of Sector	1 Mo (%)	Fiscal YTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	S.I. (%)	S.I. Date
<b>Fixed Income</b>	<b>116,421,437</b>	<b>24.5</b>	<b>24.5</b>	<b>-0.1</b>	<b>0.1</b>	<b>-0.5</b>	<b>1.4</b>	<b>6.0</b>	<b>4.0</b>	<b>3.7</b>	<b>5.4</b>	<b>Dec-93</b>
<i>Blmbg BC Universal (Blend)</i>				<i>-0.1</i>	<i>0.0</i>	<i>-1.2</i>	<i>0.5</i>	<i>5.8</i>	<i>3.4</i>	<i>3.4</i>	<i>5.2</i>	<i>Dec-93</i>
Ramirez	79,361,874	16.7	68.2	-0.1	0.2	0.1	2.1	6.1	--	--	4.4	Jan-17
<i>Bloomberg US Aggregate TR</i>				<i>0.0</i>	<i>0.0</i>	<i>-1.6</i>	<i>-0.5</i>	<i>5.6</i>	<i>3.1</i>	<i>3.0</i>	<i>3.7</i>	<i>Jan-17</i>
Reams	29,415,689	6.2	25.3	-0.1	-0.1	-1.7	0.2	9.6	5.6	4.8	5.9	Feb-98
<i>Blmbg BC Universal (Blend)</i>				<i>-0.1</i>	<i>0.0</i>	<i>-1.2</i>	<i>0.5</i>	<i>5.8</i>	<i>3.4</i>	<i>3.4</i>	<i>4.9</i>	<i>Feb-98</i>
Wellington Core Bond	7,643,830	1.6	6.6	0.0	0.1	--	--	--	--	--	2.0	Apr-21
<i>Bloomberg US Aggregate TR</i>				<i>0.0</i>	<i>0.0</i>	<i>-1.6</i>	<i>-0.5</i>	<i>5.6</i>	<i>3.1</i>	<i>3.0</i>	<i>1.9</i>	<i>Apr-21</i>
<b>Credit</b>	<b>9,315,568</b>	<b>2.0</b>	<b>2.0</b>	<b>-0.2</b>	<b>1.7</b>	<b>8.8</b>	<b>15.1</b>	<b>6.2</b>	<b>7.3</b>	<b>--</b>	<b>6.6</b>	<b>Feb-15</b>
<i>Bloomberg US High Yield TR</i>				<i>-0.2</i>	<i>0.7</i>	<i>4.4</i>	<i>10.5</i>	<i>7.4</i>	<i>6.4</i>	<i>6.8</i>	<i>6.1</i>	<i>Feb-15</i>
DDJ Capital	9,315,568	2.0	100.0	-0.2	1.7	8.8	15.1	6.2	7.3	--	6.6	Feb-15
<i>ICE BofA High Yield Master TR</i>				<i>-0.2</i>	<i>0.7</i>	<i>4.5</i>	<i>10.7</i>	<i>7.2</i>	<i>6.3</i>	<i>6.7</i>	<i>6.0</i>	<i>Feb-15</i>
<b>Covered Calls</b>	<b>39,728,652</b>	<b>8.4</b>	<b>8.4</b>	<b>5.6</b>	<b>6.4</b>	<b>20.5</b>	<b>35.8</b>	<b>15.9</b>	<b>13.5</b>	<b>--</b>	<b>10.9</b>	<b>Apr-14</b>
<i>CBOE S&amp;P 500 BuyWrite USD</i>				<i>4.7</i>	<i>6.0</i>	<i>17.7</i>	<i>31.4</i>	<i>8.0</i>	<i>8.0</i>	<i>8.0</i>	<i>7.0</i>	<i>Apr-14</i>
Parametric DeltaShift	22,550,173	4.7	56.8	6.7	7.7	24.1	42.5	20.0	16.7	--	13.5	Apr-14
<i>CBOE S&amp;P 500 BuyWrite USD</i>				<i>4.7</i>	<i>6.0</i>	<i>17.7</i>	<i>31.4</i>	<i>8.0</i>	<i>8.0</i>	<i>8.0</i>	<i>7.0</i>	<i>Apr-14</i>
Parametric BXM	17,178,479	3.6	43.2	4.1	4.8	16.1	27.9	11.4	10.0	--	8.5	Apr-14
<i>CBOE S&amp;P 500 BuyWrite USD</i>				<i>4.7</i>	<i>6.0</i>	<i>17.7</i>	<i>31.4</i>	<i>8.0</i>	<i>8.0</i>	<i>8.0</i>	<i>7.0</i>	<i>Apr-14</i>
<b>Crisis Risk Offset</b>	<b>19,848,054</b>	<b>4.2</b>	<b>4.2</b>	<b>1.7</b>	<b>1.8</b>	<b>-6.9</b>	<b>-5.9</b>	<b>-8.7</b>	<b>--</b>	<b>--</b>	<b>-8.4</b>	<b>Aug-18</b>
<i>SG Multi Alternative Risk Premia Index</i>				<i>-1.6</i>	<i>-1.4</i>	<i>4.4</i>	<i>4.4</i>	<i>-2.8</i>	<i>--</i>	<i>--</i>	<i>-3.0</i>	<i>Aug-18</i>
Vanguard Long-Term Treasury ETF	19,848,054	4.2	100.0	1.7	1.8	-6.9	-5.9	--	--	--	5.6	Jul-19
<i>Bloomberg US Govt Long TR</i>				<i>1.8</i>	<i>2.3</i>	<i>-5.7</i>	<i>-5.7</i>	<i>11.0</i>	<i>4.6</i>	<i>5.0</i>	<i>6.0</i>	<i>Jul-19</i>
<b>Cash</b>	<b>9,047,775</b>	<b>1.9</b>	<b>1.9</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>1.3</b>	<b>1.3</b>	<b>0.7</b>	<b>0.7</b>	<b>Mar-11</b>
<i>FTSE T-Bill 3 Months TR</i>				<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.1</i>	<i>1.1</i>	<i>1.1</i>	<i>0.6</i>	<i>0.6</i>	<i>Mar-11</i>
Cash - Treasury	6,463,500	1.4	71.4									
Cash	2,584,275	0.5	28.6	0.0	0.0	0.1	0.2	1.5	1.5	0.8	0.7	Mar-11
<i>FTSE T-Bill 3 Months TR</i>				<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.1</i>	<i>1.1</i>	<i>1.1</i>	<i>0.6</i>	<i>0.6</i>	<i>Mar-11</i>

Values for DDJ Capital are based on benchmark estimate for the month of October.

Cash balances held in ETF accounts at the Custodian are reflected in the Cash account market value.

## OPFRS Total Plan As of October 31, 2021

Cash Flow Summary				
Month to Date				
	Beginning Market Value	Net Cash Flow	Net Investment Change	Ending Market Value
Brown Fundamental Small Cap Value	\$10,796,232	\$0	\$591,410	\$11,387,642
Cash	\$2,512,290	\$41,978	\$30,007	\$2,584,275
Cash - Treasury	\$6,516,000	-\$52,500	\$0	\$6,463,500
DDJ Capital	\$9,338,573	\$0	-\$23,005	\$9,315,568
EARNEST Partners	\$46,275,569	\$0	\$2,539,969	\$48,815,539
Hansberger Transition	\$389,417	\$0	\$37,313	\$426,729
iShares Edge MSCI Min Vol ETF	\$20,918,027	\$0	\$1,152,626	\$22,070,652
Northern Trust Russell 1000	\$114,653,648	-\$1,000,000	\$7,873,902	\$121,527,551
Parametric BXM	\$16,497,886	\$0	\$680,593	\$17,178,479
Parametric DeltaShift	\$21,129,454	\$0	\$1,420,719	\$22,550,173
Ramirez	\$79,415,899	\$0	-\$54,025	\$79,361,874
Reams	\$29,446,483	\$0	-\$30,794	\$29,415,689
Reams Low Duration	\$44	\$0	\$0	\$44
Rice Hall James	\$16,670,108	\$0	\$750,531	\$17,420,639
Securities Lending Northern Trust	\$0	-\$41,978	\$41,978	\$0
SGA ACWI ex-U.S. Equity	\$41,089,986	\$0	\$874,845	\$41,964,831
Vanguard Developed Markets ETF	\$16,907,334	\$0	\$545,830	\$17,453,164
Vanguard Long-Term Treasury ETF	\$19,509,949	\$0	\$338,104	\$19,848,054
Wellington Core Bond	\$7,645,679	\$0	-\$1,849	\$7,643,830
<b>Total</b>	<b>\$459,712,578</b>	<b>-\$1,052,500</b>	<b>\$16,768,154</b>	<b>\$475,428,233</b>

**Benchmark History**  
As of October 31, 2021

Total Plan x Securities Lending x Reams LD Exception Comp

1/1/2019	Present	40% Russell 3000 / 12% MSCI ACWI ex USA Gross / 33% Bloomberg US Universal TR / 5% CBOE BXM / 6.7% SG Multi Alternative Risk Premia Index / 3.3% Bloomberg US Treasury Long TR
5/1/2016	12/31/2018	48% Russell 3000 / 12% MSCI ACWI ex USA Gross / 20% Bloomberg US Universal TR / 20% CBOE BXM
10/1/2015	4/30/2016	43% Russell 3000 / 12% MSCI ACWI ex USA Gross / 20% Bloomberg US Universal TR / 15% CBOE BXM / 10% CPI - All Urban Consumers (unadjusted) +3%
1/1/2014	9/30/2015	48% Russell 3000 / 12% MSCI ACWI ex USA Gross / 20% Bloomberg US Universal TR / 10% CBOE BXM / 10% CPI - All Urban Consumers (unadjusted) +3%
3/1/2013	12/31/2013	40% Russell 3000 / 10% MSCI ACWI ex USA Gross / 17% Bloomberg US Universal TR / 33% ICE BofA 3M US Treasury TR USD
8/1/2012	2/28/2013	20% Russell 3000 / 7% MSCI ACWI ex USA Gross / 18% Bloomberg US Universal TR / 55% ICE BofA 3M US Treasury TR USD
10/1/2007	7/31/2012	53% Russell 3000 / 17% MSCI ACWI ex USA Gross / 30% Bloomberg US Universal TR
4/1/2006	9/30/2007	35% Russell 3000 / 15% MSCI ACWI ex USA Gross / 50% Bloomberg US Universal TR
1/1/2005	3/31/2006	35% Russell 3000 / 15% MSCI ACWI ex USA Gross / 50% Bloomberg US Aggregate TR
4/1/1998	12/31/2004	50% Bloomberg US Aggregate TR / 10% Russell 1000 / 20% Russell 1000 Value / 5% Russell MidCap / 15% MSCI EAFE
9/1/1988	3/31/1998	40% S&P 500 / 55% Bloomberg US Aggregate TR / 5% FTSE T-Bill 3 Months TR

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# Oakland Police and Fire Retirement System

3Q 2021 Performance Report

## Agenda

1. Total Portfolio Summary
2. Economic and Market Update
3. Asset Class and Manager Commentary
4. 3Q 2021 Performance as of September 30, 2021
5. Manager Monitoring / Probation List
6. Disclaimer, Glossary, and Notes

## **Total Portfolio Summary**

### Total Portfolio Summary

- As of September 30, 2021, the City of Oakland Police and Fire Retirement System (OPFRS) portfolio had an aggregate value of \$459.7 million. This represents a (\$0.5) million decrease in investment value and (\$3.4) million in benefit payments funded from investments over the quarter. Over the one-year period, the OPFRS Total Portfolio value is higher by \$59.6 million, after withdrawals totaling (\$13.0) million for benefit payments.

### Asset Allocation Trends

- The asset allocation targets throughout this report reflect those as of September 30, 2021. Target weightings reflect the interim phase (CRO = 10%) of the Plan's previously approved asset allocation (effective 5/31/2017).
- Relative to policy targets, the portfolio ended the latest quarter overweight Equities, Covered Calls and Cash, while underweight Crisis Risk Offset and Fixed Income. The Crisis Risk Offset asset class was below its acceptable ranges from the policy target.

### Recent Investment Performance

- During the most recent quarter, the OPFRS portfolio generated an absolute return of (0.2%), gross of fees, outperforming its policy benchmark by 0.1%. The portfolio also outperformed its benchmark over the 1-, 3-, and 5-year periods, by 1.7%, 0.1%, and 0.4% respectively.

### Total Portfolio Summary

- The OPFRS portfolio trailed the Median fund's return over the quarter by (0.1%), and by (3.2%), (1.7%), and (0.1%) respectively over 1-, 3-, and 5-year trailing periods. Performance differences with respect to the Median Fund are attributed largely to differences in asset allocation.

	Quarter	CYTD	1 Year	3 Year	5 Year
Total Portfolio <sup>1</sup>	-0.2%	7.8%	17.8%	8.9%	10.5%
Policy Benchmark <sup>2</sup>	-0.3%	7.0%	16.1%	8.8%	10.1%
<b>Excess Return</b>	<b>0.1%</b>	<b>0.8%</b>	<b>1.7%</b>	<b>0.1%</b>	<b>0.4%</b>
Reference: Median Fund <sup>3</sup>	-0.1%	9.0%	21.0%	10.6%	10.6%
Reference: Total Net of Fees <sup>4</sup>	-0.3%	7.5%	17.5%	8.6%	10.2%

- Over the quarter, positive absolute return was driven by the Credit segment 1.9% amidst the volatile equity markets. This asset class outperformed its benchmark, Bloomberg US High Yield, by 1.0% as well.
- Even though International Equity asset class posted negative absolute return of (1.5%), it outperformed its benchmark, MSCI ACWI ex US by 1.4%. This outperformance was driven primarily by the sole active manager within this asset class SGA ACWI ex-US Equity.

<sup>1</sup> Gross of Fees. Performance since 2005 includes securities lending.

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

<sup>3</sup> Investment Metrics < \$1 Billion Public Plan Universe.

<sup>4</sup> Longer-term (>1 year) Net of fee returns include estimates based on OPFRS manager fee schedule (approximately 34 bps).

# **Economic and Market Update**

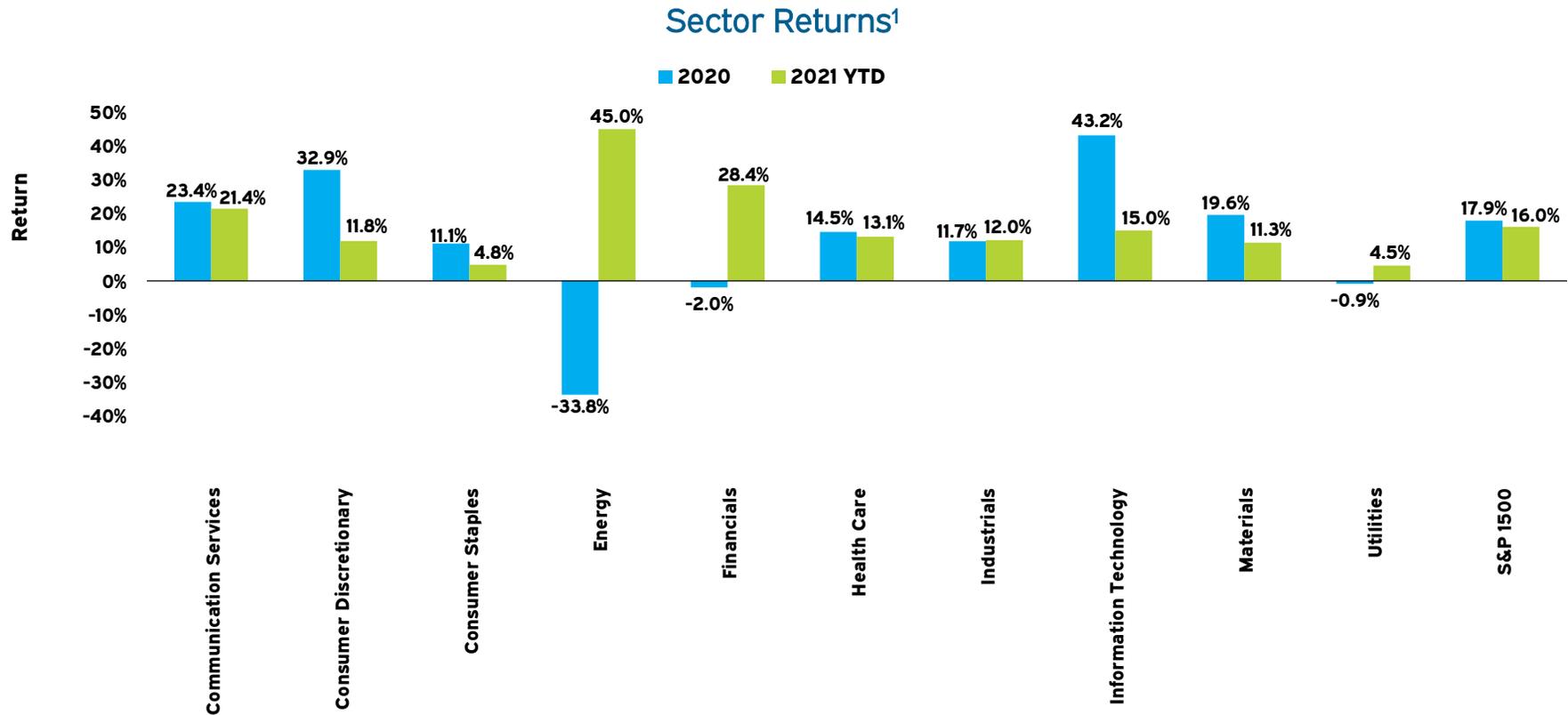
Data as of September 30, 2021

### Market Returns<sup>1</sup>

Indices	September	QTD	YTD	1 Year	3 Year	5 Year	10 Year
S&P 500	-4.7%	0.6%	15.9%	30.0%	16.0%	16.9%	16.6%
MSCI EAFE	-2.9%	-0.5%	8.4%	25.7%	7.6%	8.8%	8.1%
MSCI Emerging Markets	-4.0%	-8.1%	-1.3%	18.2%	8.6%	9.2%	6.1%
MSCI China	-5.0%	-18.2%	-16.7%	-7.3%	6.0%	9.1%	8.7%
Bloomberg Barclays Aggregate	-0.9%	0.1%	-1.6%	-0.9%	5.4%	2.9%	3.0%
Bloomberg Barclays TIPS	-0.7%	1.8%	3.5%	5.2%	7.5%	4.3%	3.1%
Bloomberg Barclays High Yield	0.0%	0.9%	4.5%	11.3%	6.9%	6.5%	7.4%
10-year US Treasury	-1.8%	-0.1%	-4.2%	-6.1%	6.3%	1.9%	2.5%
30-year US Treasury	-3.3%	0.4%	-8.9%	-12.7%	9.8%	2.9%	4.1%

- Equity markets broadly declined in September posting one of their worst months since early 2020. Gridlock in Washington and continued supply chain issues weighed on US equities, while government intervention and growing concerns around the stability of real estate giant Evergrande, weighed on markets in China.
- In September, Treasuries also pulled back given persistent inflation and expectations for the Federal Reserve to start unwinding their quantitative easing program.

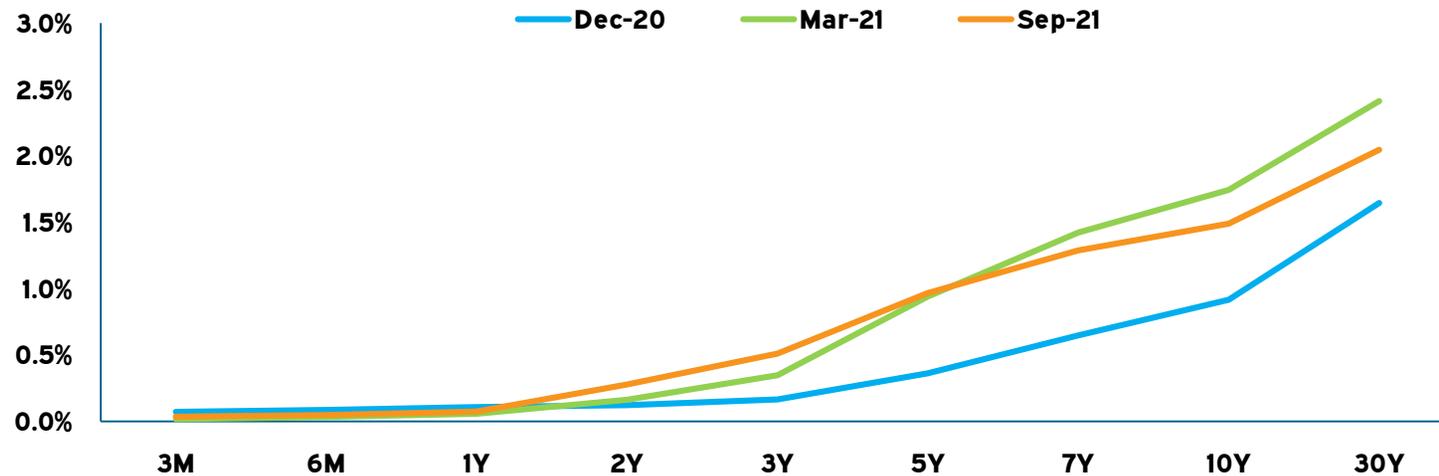
<sup>1</sup> Source: Investment Metrics and Bloomberg. Data is as of September 30, 2021.



- In a reversal of the trend from last year, cyclical sectors like energy and financials continue to lead the way on a year-to-date basis, followed by communication services.
- The energy sector recently extended its gains, helped by rising demand and supply constraints.

<sup>1</sup> Source: Bloomberg. Data is as of September 30, 2021.

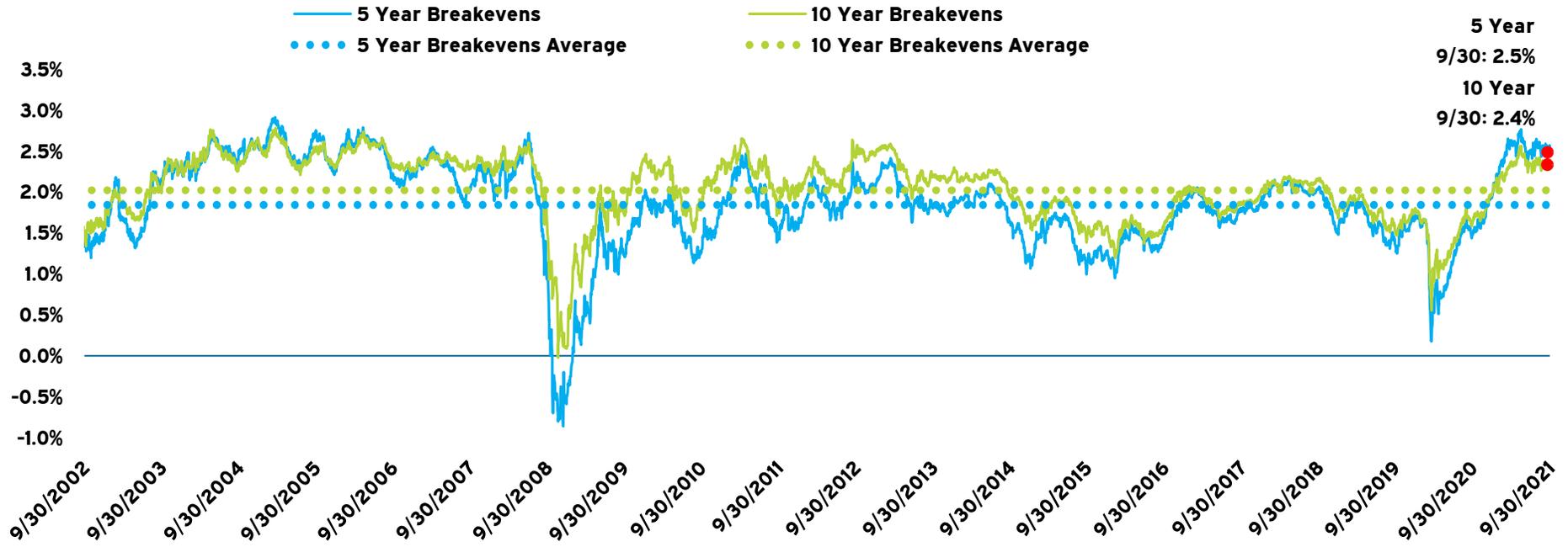
US Yield Curve<sup>1</sup>



- During the first half of 2021, the yield curve steepened, on higher growth and inflation expectations.
- While shorter-dated Treasury yields remained largely unchanged, rates in the 2-year to 5-year sector increased on the September FOMC signal that policy rates may need to be tightened more aggressively than previously anticipated. Longer-term rates rose slightly in September but remain below their recent peak in March 2021.
- The yield curve could continue its steepening if growth and inflation pressures build beyond current expectations. Alternatively, if the economy weakens, or if projected economic growth simply happens faster than expected, a flattening trend could continue.

<sup>1</sup> Source: Bloomberg. Data is as of September 30, 2021.

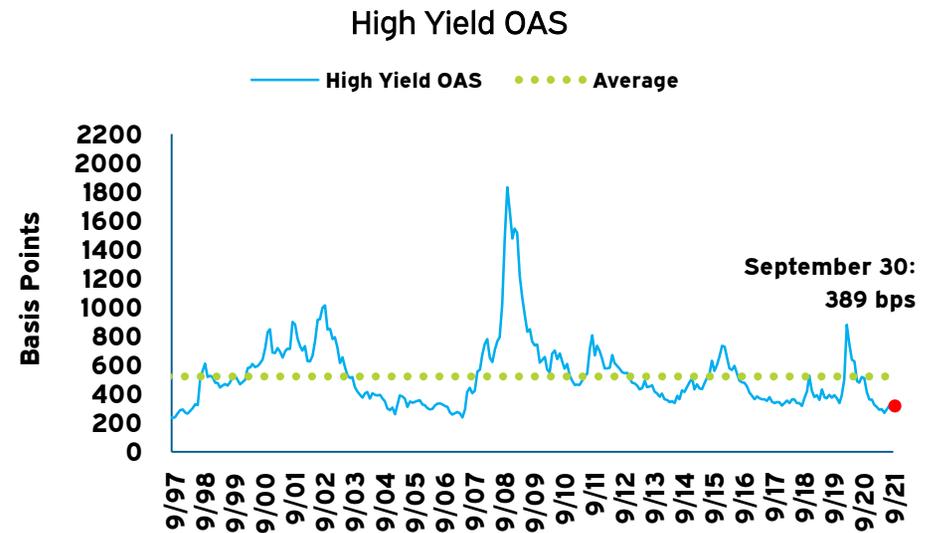
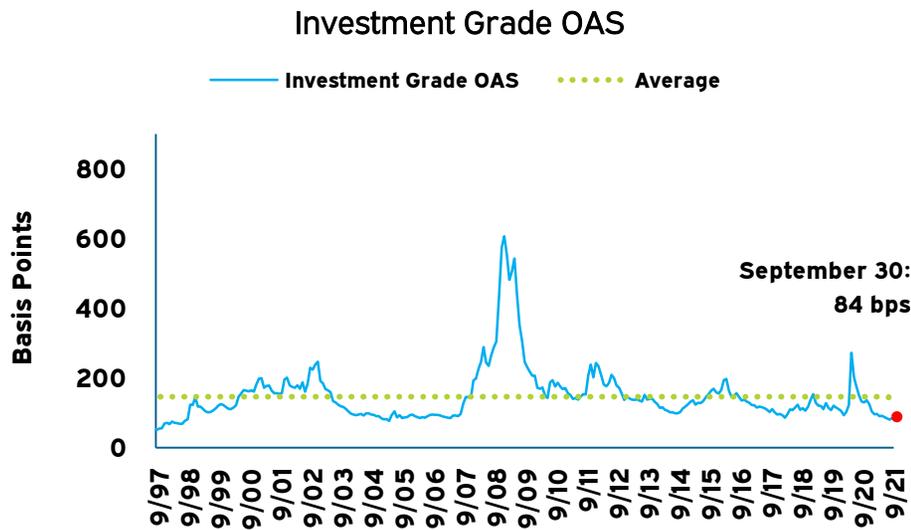
### Breakeven Inflation<sup>1</sup>



- Inflation expectations remain well above long-term averages, particularly in the short-term, with the economy reopening, supply chain issues persisting, and expected additional fiscal stimulus as key drivers.
- Looking ahead, the track of economic growth, the persistence of supply chain issues, and the unprecedented US fiscal response will be key issues. Additionally, changes to Fed policy focused on an average inflation target may play a role in the inflation market dynamics.

<sup>1</sup> Source: Bloomberg. Data is as of September 30, 2021.

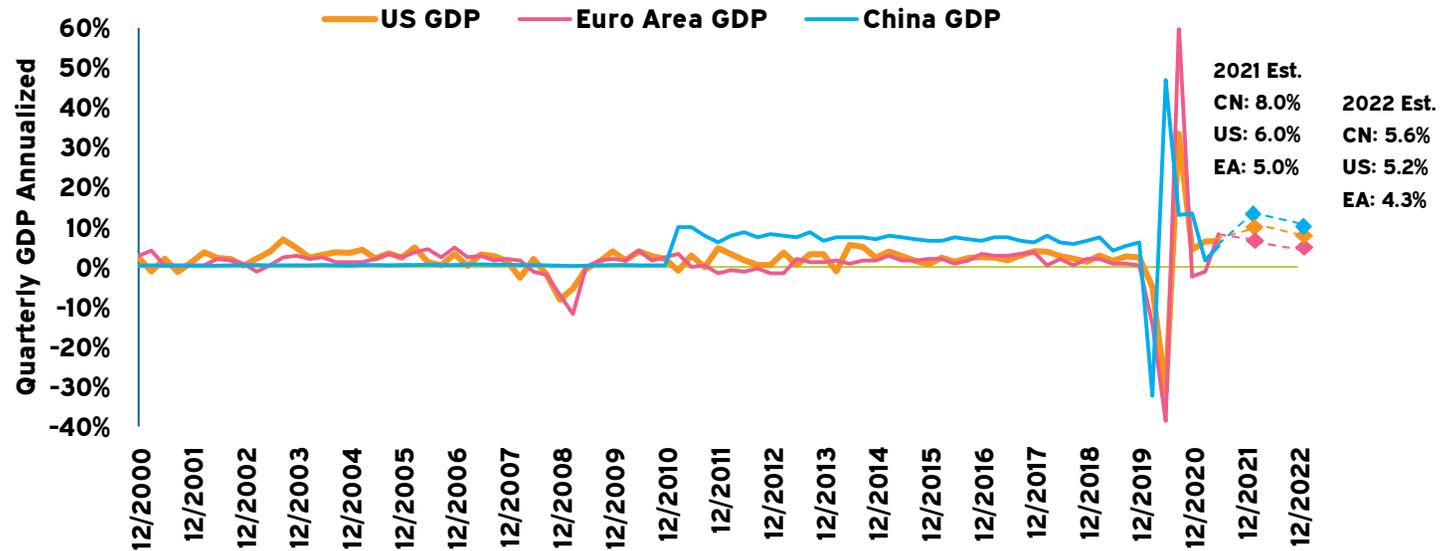
### Credit Spreads (High Yield & Investment Grade)<sup>1</sup>



- Credit spreads (the spread above a comparable maturity Treasury) for investment-grade and high yield corporate debt remain historically narrow despite continued economic uncertainty.
- Policy support and the search for yield in a low-rate environment have been key drivers in the decline in US credit spreads to below long-term averages, particularly for high yield issuers.

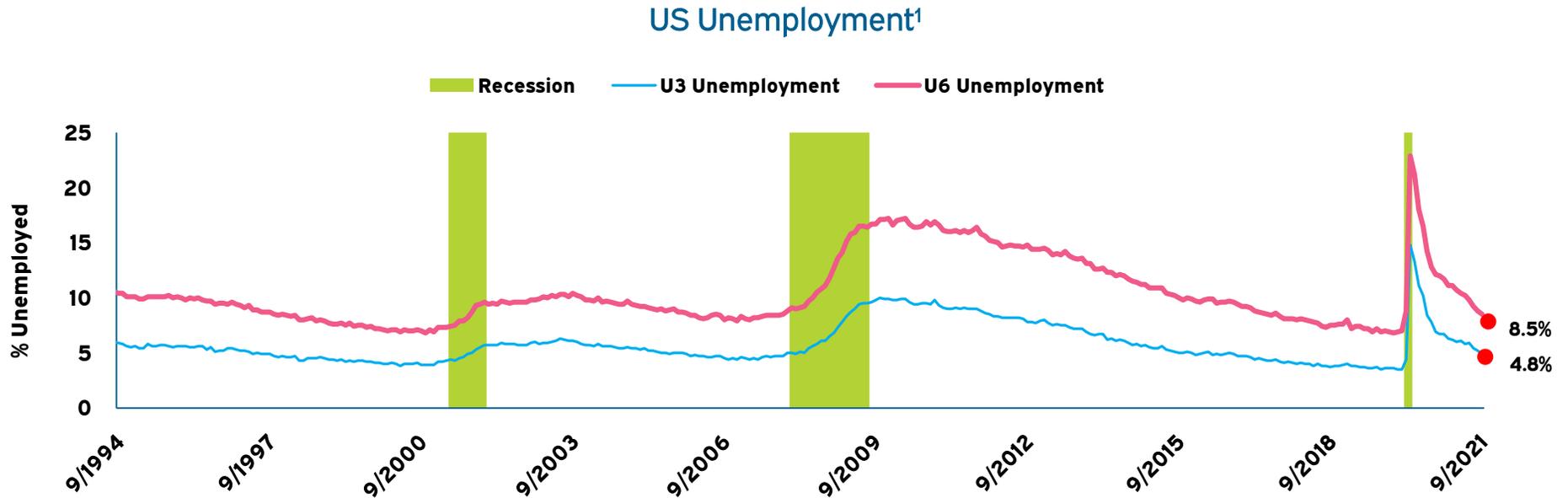
<sup>1</sup> Source: Barclays Live. Data represents OAS and is as of September 30, 2021.

**GDP Data Shows Projected Improvements in 2021<sup>1</sup>**



- In late 2020 and early 2021, major economies grew at rates far above potential. These very high rates of growth are not expected to continue, with projections continuing to decline given supply disruptions, reopening trends moderating, and some countries continuing to struggle with the virus.
- The US is expected to grow faster than the euro area this year and next, with some growth pulled forward due to the relative success in distributing the vaccine and a substantially larger fiscal stimulus response to the pandemic.
- China is projected to grow at 8.0% in 2021 and 5.6% in 2022 both above the expected US growth rate. Questions remain though about the highly levered property market and government regulations.

<sup>1</sup> Source: Bloomberg, and IMF; Euro Area and China figures annualized by Meketa. Projections via October 2021 IMF World Economic Outlook and represent annual numbers.



- The unemployment rate (U3) continued its decline in September falling from 5.2% to 4.8%. It still remains above pre-pandemic levels though, but far below the pandemic peak.
- The broader measure of unemployment (U6) that includes discouraged and underemployed workers also continued to decline, but remains much higher at 8.5%. Also, the labor force participation rate remains quite low and is 1.7% below the 61.6% level of February 2020.
- Pandemic related concerns, childcare issues, and a mismatch of skills and available jobs have contributed to the continued labor market issues. The track of the unemployment rate from here will be a key consideration in the Federal Reserve's pace of reducing its policy support.

<sup>1</sup> Source: Bloomberg. Data is as of September 30, 2021. Bars represent recessions as observed by the National Bureau of Economic Research.

## **Asset Class and Manager Commentary**

#### Domestic Equity

- Over the quarter ending September 30, 2021, Domestic Equity returned -0.4%, trailing the Russell 3000 benchmark by (0.3%). The passive managers/strategies (Northern Trust Russell 1000 and iShares Edge MSCI Minimum Volatility) performed in line with their respective benchmarks with acceptable tracking error. The Plan's mid cap manager, Earnest Partners, trailed its benchmark by (-0.1%) while the small cap managers outperformed their respective benchmarks despite the volatility that they encountered during the quarter.
- **Earnest Partners**, the Plan's active mid cap core manager, returned (1.0%), underperforming the Russell Midcap benchmark by (0.1%), and placing in the 65th percentile of its peer group for the quarter. Though the manager has underperformed its benchmark over the 1-year trailing period by (4.6%), it has outperformed over the longer 3- and 5-year trailing periods with excess returns of 2.2% and 3.4% respectively, putting it in the 1<sup>st</sup> quartile of its peer group. The manager may be monitored on watch status due to its underperformance over the 1-year trailing period.
- **Rice Hall James**, the Plan's active small cap growth manager, returned (2.4%), outperforming the Russell 2000 Growth benchmark by 3.3%, and placing in the 59<sup>th</sup> percentile for the quarter. The manager also outperformed its benchmark over the 1-year trailing period by 1.1% even though it has trailed its benchmark 3-year periods and since inception by (3.1%), and (0.8%) respectively. The manager is on watch status for performance concerns.
- **Brown Fundamental**, the Plan's recently funded active small cap value manager, returned (2.4%) over the quarter outperforming its Russell 2000 Value benchmark by 0.6%, placing it in the 67<sup>th</sup> percentile.

#### International Equity

- For the quarter, the International Equity portfolio returned (1.5%), outperforming the MSCI ACWI ex US benchmark by 1.4%. Within this portfolio, the Vanguard passive international developed markets portfolio returned (2.0%). While it deviates from tracking index's return of (1.0%), this is due to the fair-value pricing methodology that Vanguard uses.
- **SGA MSCI ACWI ex US ETF**, the Plan's active core international equity manager, returned (1.0%) outperforming its benchmark by 1.9% over the quarter ranking 29<sup>th</sup> percentile amongst its peers. However, SGA trailed its benchmark by (1.9%) over the 1-year period.

#### Fixed Income

- Over the quarter, the Fixed Income aggregate returned 0.2%, outperforming the Bloomberg Universal benchmark by 0.1%. All the managers in this portfolio posted flat or modest positive returns.
- **Ramirez** returned 0.2% over the quarter, outperforming the benchmark by 0.1% placing in the 14<sup>th</sup> percentile of its peer group. Ramirez also outperformed its benchmark over the 1- and 3-year trailing periods by 2.3% and 0.5% respectively, and by 0.7% since inception. Except for the 3-year trailing period, Ramirez's performance has ranked above median over all time periods.
- **Reams** remained flat for the quarter, trailing its benchmark by 0.1% and placing in the 88<sup>th</sup> percentile of its peer group. While it kept pace with its Bloomberg Universal benchmark in the 1-year trailing period, it outperformed its benchmark by 3.9%, 2.2%, and 1.0% over 3- and 5-year trailing period and since inception respectively. Even though Reams has fallen within the last decile over the 1-year trailing period, it has remained within the top decile over the longer 3- and 5-year trailing periods.

### Fixed Income (continued)

- **Wellington Core Bond**, the Plan's most recently funded core fixed income manager, returned 0.1% over the quarter keeping pace with its benchmark placing it in the 46<sup>th</sup> percentile.

#### Covered Calls

- Over the quarter, the Covered Calls portfolio returned 0.8% trailing its benchmark by (0.4%).
- **Parametric BXM**, the Plan's passive covered calls allocation returned 0.6%, trailing its benchmark, the CBOE BXM index, by (0.6%). Though the portfolio has trailed its benchmark over the most recent 1-year period, it has outperformed over the longer 3- and 5-year periods and since inception by 3.5%, 1.9%, and 1.6% respectively.
- **Parametric DeltaShift**, the Plan's active covered calls allocation returned 1.0%, trailing its benchmark, the CBOE BXM, index by (0.2%) over the quarter. The portfolio has outperformed the benchmark over all other the time periods measured. It outperformed by 9.4%, 10.4%, 7.8%, and 6.3% over 1-, 3-, 5-year trailing periods and since inception respectively.

#### Credit

- With **DDJ** as the Plan's sole High Yield & Bank Loan manager, the Credit portfolio returned 1.9% over the quarter, outperforming its benchmark, Bloomberg US High Yield, by 1.0%. It outperformed the benchmark over the 1-year and 5-year periods by 5.6% and 1.2% respectively but trailed the benchmark by (0.4%) over the 3-year trailing period. Since inception, DDJ has outperformed its benchmark by 0.6%. Except for the 3-year trailing period, DDJ has ranked amongst the top quartile in its peer group.

#### Crisis Risk Offset

- Over the quarter, the Crisis Risk Offset portfolio remained flat, modestly trailing its benchmark by (0.2%). **Vanguard Long Duration ETF**, the only funded component of the Crisis Risk Offset portfolio over the quarter, remained flat as concerns over inflation continued.
- Manager searches are underway to fund the Alternative Risk Premia and Systematic Trend Following components of the Crisis Risk Offset portfolio.

### OPFRS Total Plan | As of September 30, 2021

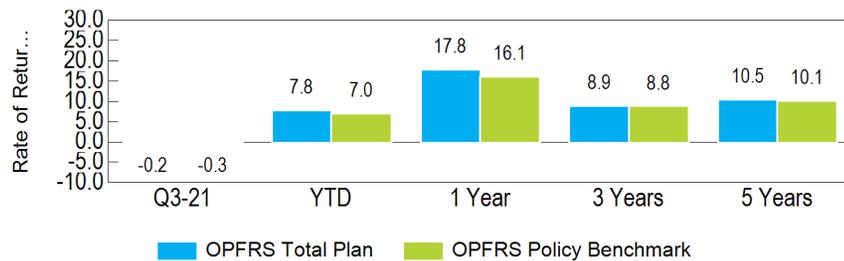
#### 9 Months Ending September 30, 2021

	Anlzd Return	Standard Deviation
OPFRS Total Plan	7.77%	1.66%
OPFRS Policy Benchmark	7.04%	1.56%
InvMetrics Public DB \$250mm-\$1B Gross Median	8.97%	1.50%

#### 1 Year Ending September 30, 2021

	Anlzd Return	Standard Deviation
OPFRS Total Plan	17.82%	2.67%
OPFRS Policy Benchmark	16.06%	2.51%
InvMetrics Public DB \$250mm-\$1B Gross Median	20.97%	2.55%

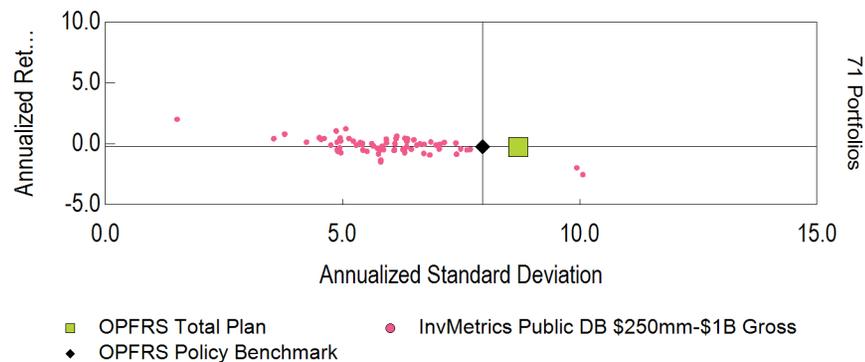
#### Return Summary Ending September 30, 2021



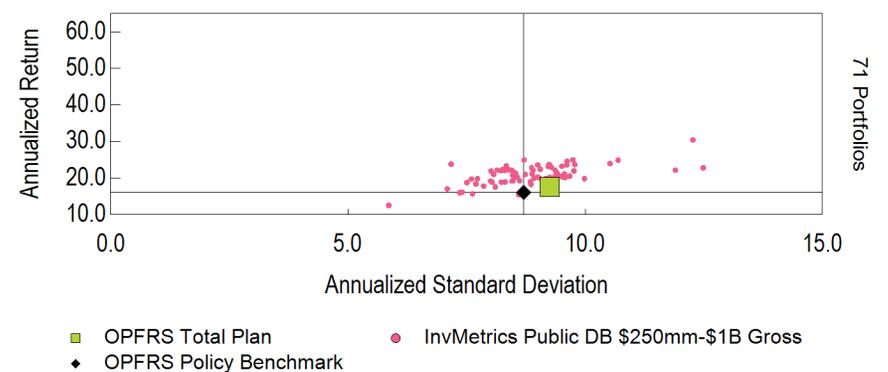
#### Summary of Cash Flows

	Quarter-To-Date	One Year
Beginning Market Value	\$463,640,323	\$400,067,242
Net Cash Flow	-\$3,400,566	-\$12,978,273
Capital Appreciation	-\$527,465	\$72,623,329
Ending Market Value	\$459,712,578	\$459,712,578

#### Annualized Return vs. Annualized Standard Deviation 3 Months Ending September 30, 2021



#### Annualized Return vs. Annualized Standard Deviation 1 Year Ending September 30, 2021

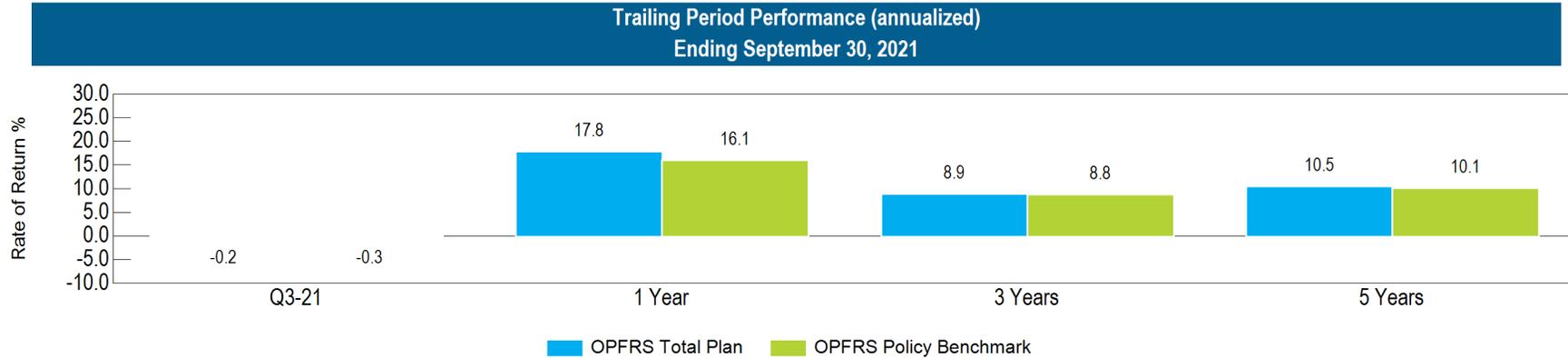


### Asset Class Performance (gross of fees) | As of September 30, 2021

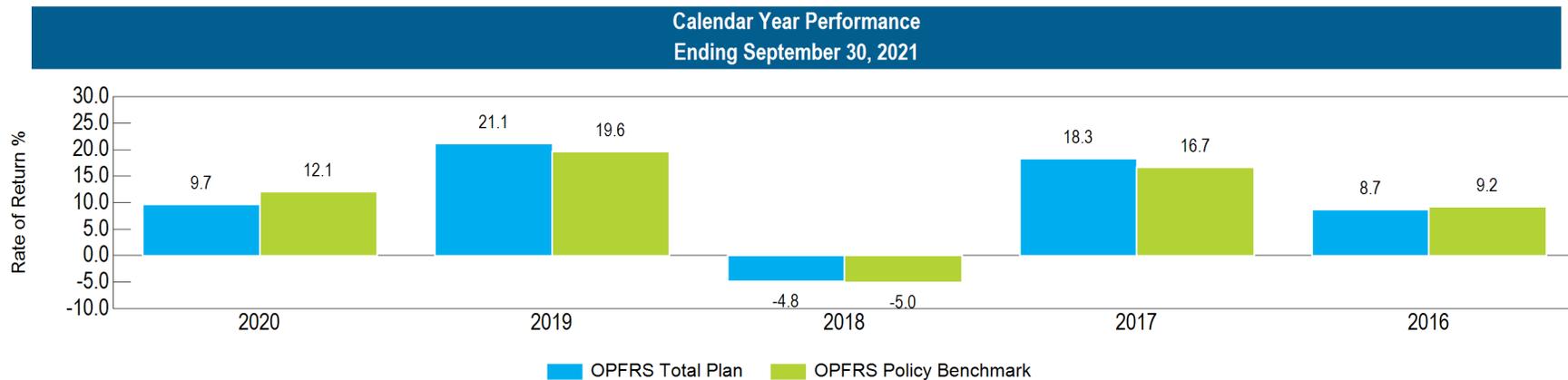
	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)
<b>OPFRS Total Plan</b>	<b>-0.2</b>	<b>7.8</b>	<b>17.8</b>	<b>8.9</b>	<b>10.5</b>	<b>8.7</b>	<b>10.0</b>
<i>OPFRS Policy Benchmark</i>	<i>-0.3</i>	<i>7.0</i>	<i>16.1</i>	<i>8.8</i>	<i>10.1</i>	<i>8.6</i>	<i>9.6</i>
Excess Return	0.1	0.8	1.7	0.1	0.4	0.1	0.4
<b>Domestic Equity</b>	<b>-0.4</b>	<b>13.9</b>	<b>31.2</b>	<b>14.1</b>	<b>16.0</b>	<b>13.3</b>	<b>16.1</b>
<i>Russell 3000 (Blend)</i>	<i>-0.1</i>	<i>15.0</i>	<i>31.9</i>	<i>16.0</i>	<i>16.9</i>	<i>13.9</i>	<i>16.6</i>
Excess Return	-0.3	-1.1	-0.7	-1.9	-0.9	-0.6	-0.5
<b>International Equity</b>	<b>-1.5</b>	<b>7.4</b>	<b>23.0</b>	<b>8.2</b>	<b>9.7</b>	<b>7.2</b>	<b>8.9</b>
<i>MSCI ACWI ex US (Blend)</i>	<i>-2.9</i>	<i>6.3</i>	<i>24.4</i>	<i>8.5</i>	<i>9.4</i>	<i>6.2</i>	<i>8.0</i>
Excess Return	1.4	1.1	-1.4	-0.3	0.3	1.0	0.9
<b>Fixed Income</b>	<b>0.2</b>	<b>-0.4</b>	<b>0.9</b>	<b>5.8</b>	<b>3.9</b>	<b>4.0</b>	<b>3.8</b>
<i>Blmbg BC Universal (Blend)</i>	<i>0.1</i>	<i>-1.1</i>	<i>0.2</i>	<i>5.6</i>	<i>3.3</i>	<i>3.6</i>	<i>3.5</i>
Excess Return	0.1	0.7	0.7	0.2	0.6	0.4	0.3
<b>Credit</b>	<b>1.9</b>	<b>9.0</b>	<b>17.1</b>	<b>6.2</b>	<b>7.6</b>	--	--
<i>Bloomberg US High Yield TR</i>	<i>0.9</i>	<i>4.5</i>	<i>11.3</i>	<i>6.9</i>	<i>6.5</i>	--	--
Excess Return	1.0	4.5	5.8	-0.7	1.1	--	--
<b>Covered Calls</b>	<b>0.8</b>	<b>14.2</b>	<b>25.9</b>	<b>11.5</b>	<b>12.1</b>	<b>10.3</b>	--
<i>CBOE S&amp;P 500 BuyWrite USD</i>	<i>1.2</i>	<i>12.5</i>	<i>21.0</i>	<i>4.4</i>	<i>7.1</i>	<i>6.3</i>	--
Excess Return	-0.4	1.7	4.9	7.1	5.0	4.0	--
<b>Crisis Risk Offset</b>	<b>0.0</b>	<b>-8.5</b>	<b>-10.3</b>	<b>-10.6</b>	--	--	--
<i>SG Multi Alternative Risk Premia Index</i>	<i>0.2</i>	<i>6.0</i>	<i>3.9</i>	<i>-2.6</i>	--	--	--
Excess Return	-0.2	-14.5	-14.2	-8.0	--	--	--
<b>Cash</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>1.4</b>	<b>1.4</b>	<b>1.0</b>	<b>0.7</b>
<i>FTSE T-Bill 3 Months TR</i>	<i>0.0</i>	<i>0.0</i>	<i>0.1</i>	<i>1.1</i>	<i>1.1</i>	<i>0.8</i>	<i>0.6</i>
Excess Return	0.0	0.0	0.0	0.3	0.3	0.2	0.1

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% Russell 1000, 20% Russell 1000 Value, 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.
5. Cash balances held in ETF accounts at the Custodian are reflected in the Cash account market value.

### Portfolio Relative Performance Results | As of September 30, 2021



	QTD (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)
<b>OPFRS Total Plan</b>	-0.2	7.8	17.8	8.9	10.5	8.7	18.3	-4.8	21.1	9.7
<i>OPFRS Policy Benchmark</i>	-0.3	7.0	16.1	8.8	10.1	9.2	16.7	-5.0	19.6	12.1
<i>InvMetrics Public DB \$250mm-\$1B Gross Median</i>	-0.1	9.0	21.0	10.6	10.6	7.8	15.8	-4.1	18.6	13.1

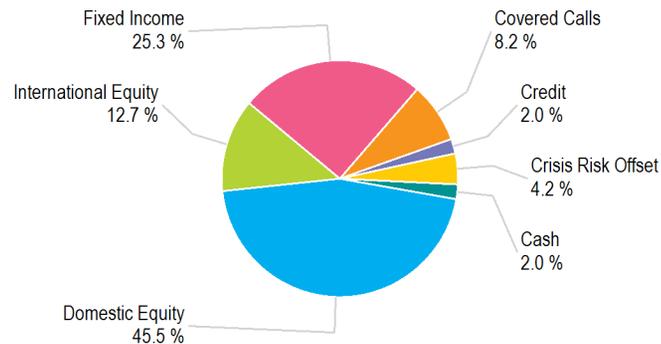


### Asset Allocation | As of September 30, 2021

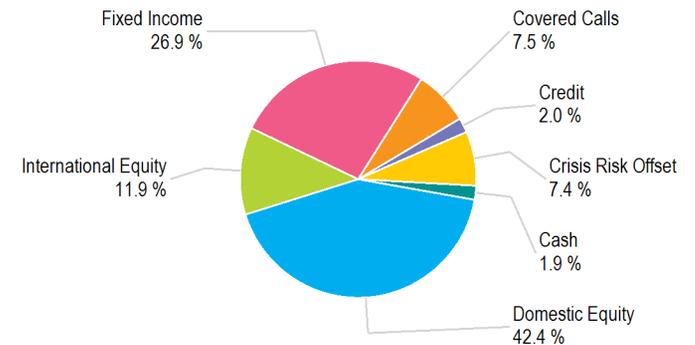
#### Asset Allocation vs. Target As Of September 30, 2021

	Current	%	Policy	Difference*
Domestic Equity	\$209,313,584	45.5%	40.0%	5.5%
International Equity	\$58,386,737	12.7%	12.0%	0.7%
Fixed Income	\$116,508,105	25.3%	31.0%	-5.7%
Covered Calls	\$37,627,340	8.2%	5.0%	3.2%
Credit	\$9,338,573	2.0%	2.0%	0.0%
Crisis Risk Offset	\$19,509,949	4.2%	10.0%	-5.8%
Cash	\$9,028,290	2.0%	0.0%	2.0%
<b>Total</b>	<b>\$459,712,578</b>	<b>100.0%</b>	<b>100.0%</b>	

September 30, 2021: \$459,712,578



September 30, 2020: \$400,067,242



Cash balances held in ETF accounts at the Custodian are reflected in the Cash account market value.

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

Manager Performance - Gross of Fees | As of September 30, 2021

	Market Value	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	S.I.	S.I. Date
<b>Domestic Equity</b>	<b>209,313,584</b>	<b>100.0</b>	<b>-0.4</b>	<b>13.9</b>	<b>31.2</b>	<b>14.1</b>	<b>16.0</b>	<b>9.5</b>	<b>Jun-97</b>
<i>Russell 3000 (Blend)</i>			<i>-0.1</i>	<i>15.0</i>	<i>31.9</i>	<i>16.0</i>	<i>16.9</i>	<i>9.7</i>	<i>Jun-97</i>
Excess Return			-0.3	-1.1	-0.7	-1.9	-0.9	-0.2	
Northern Trust Russell 1000	114,653,648	54.8	0.2	15.2	31.0	16.4	17.1	15.3	Jun-10
<i>Russell 1000</i>			<i>0.2</i>	<i>15.2</i>	<i>31.0</i>	<i>16.4</i>	<i>17.1</i>	<i>15.3</i>	<i>Jun-10</i>
Excess Return			0.0	0.0	0.0	0.0	0.0	0.0	
<i>eV US Large Cap Core Equity Gross Rank</i>			<i>52</i>	<i>54</i>	<i>42</i>	<i>34</i>	<i>34</i>	<i>36</i>	<i>Jun-10</i>
EARNEST Partners	46,275,569	22.1	-1.0	13.0	33.5	16.4	17.8	11.2	Apr-06
<i>Russell MidCap</i>			<i>-0.9</i>	<i>15.2</i>	<i>38.1</i>	<i>14.2</i>	<i>14.4</i>	<i>9.9</i>	<i>Apr-06</i>
Excess Return			-0.1	-2.2	-4.6	2.2	3.4	1.3	
<i>eV US Mid Cap Core Equity Gross Rank</i>			<i>65</i>	<i>65</i>	<i>65</i>	<i>23</i>	<i>14</i>	<i>32</i>	<i>Apr-06</i>
iShares Edge MSCI Min Vol ETF	20,918,027	10.0	0.2	9.4	17.1	--	--	24.9	Apr-20
<i>MSCI USA Minimum Volatility GR USD</i>			<i>0.3</i>	<i>9.6</i>	<i>17.2</i>	--	--	<i>25.1</i>	<i>Apr-20</i>
Excess Return			-0.1	-0.2	-0.1			-0.2	
<i>eV US Low Volatility Equity Gross Rank</i>			<i>36</i>	<i>81</i>	<i>77</i>	--	--	<i>81</i>	<i>Apr-20</i>
Rice Hall James	16,670,108	8.0	-2.4	11.1	34.4	8.6	--	13.9	Jul-17
<i>Russell 2000 Growth</i>			<i>-5.7</i>	<i>2.8</i>	<i>33.3</i>	<i>11.7</i>	--	<i>14.7</i>	<i>Jul-17</i>
Excess Return			3.3	8.3	1.1	-3.1		-0.8	
<i>eV US Small Cap Growth Equity Gross Rank</i>			<i>59</i>	<i>49</i>	<i>76</i>	<i>94</i>	--	<i>92</i>	<i>Jul-17</i>
Brown Fundamental Small Cap Value	10,796,232	5.2	-2.4	--	--	--	--	0.9	Apr-21
<i>Russell 2000 Value</i>			<i>-3.0</i>	--	--	--	--	<i>1.4</i>	<i>Apr-21</i>
Excess Return			0.6					-0.5	
<i>eV US Small Cap Value Equity Gross Rank</i>			<i>67</i>	--	--	--	--	<i>72</i>	<i>Apr-21</i>

### Manager Performance - Gross of Fees | As of September 30, 2021

	Market Value	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	S.I.	S.I. Date
<b>International Equity</b>	<b>58,386,737</b>	<b>100.0</b>	<b>-1.5</b>	<b>7.4</b>	<b>23.0</b>	<b>8.2</b>	<b>9.7</b>	<b>5.8</b>	<b>Jan-98</b>
<i>MSCI ACWI ex US (Blend)</i>			<i>-2.9</i>	<i>6.3</i>	<i>24.4</i>	<i>8.5</i>	<i>9.4</i>	<i>6.0</i>	<i>Jan-98</i>
Excess Return			1.4	1.1	-1.4	-0.3	0.3	-0.2	
SGA ACWI ex-U.S. Equity	41,089,986	70.4	-1.0	7.4	22.5	--	--	8.6	Dec-19
<i>MSCI ACWI ex USA Gross</i>			<i>-2.9</i>	<i>6.3</i>	<i>24.4</i>	--	--	<i>12.1</i>	<i>Dec-19</i>
Excess Return			1.9	1.1	-1.9			-3.5	
<i>eV ACWI ex-US All Cap Core Eq Gross Rank</i>			<i>29</i>	<i>64</i>	<i>81</i>	--	--	<i>96</i>	<i>Dec-19</i>
Vanguard Developed Markets ETF	16,907,334	29.0	-2.0	7.0	23.5	--	--	13.2	Sep-19
<i>FTSE Developed All Cap Ex US TR USD</i>			<i>-1.0</i>	<i>9.1</i>	<i>27.7</i>	--	--	<i>15.3</i>	<i>Sep-19</i>
Excess Return			-1.0	-2.1	-4.2			-2.1	
<i>eV ACWI ex-US All Cap Core Eq Gross Rank</i>			<i>54</i>	<i>68</i>	<i>74</i>	--	--	<i>88</i>	<i>Sep-19</i>

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

### Manager Performance - Gross of Fees | As of September 30, 2021

	Market Value	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	S.I.	S.I. Date
<b>Fixed Income</b>	<b>116,508,105</b>	<b>100.0</b>	<b>0.2</b>	<b>-0.4</b>	<b>0.9</b>	<b>5.8</b>	<b>3.9</b>	<b>5.4</b>	<b>Dec-93</b>
<i>Blmbg BC Universal (Blend)</i>			<i>0.1</i>	<i>-1.1</i>	<i>0.2</i>	<i>5.6</i>	<i>3.3</i>	<i>5.2</i>	<i>Dec-93</i>
Excess Return			0.1	0.7	0.7	0.2	0.6	0.2	
Ramirez	79,415,899	68.2	0.2	0.1	1.4	5.9	--	4.5	Jan-17
<i>Bloomberg US Aggregate TR</i>			<i>0.1</i>	<i>-1.6</i>	<i>-0.9</i>	<i>5.4</i>	--	<i>3.8</i>	<i>Jan-17</i>
Excess Return			0.1	1.7	2.3	0.5		0.7	
<i>eV US Core Fixed Inc Gross Rank</i>			<i>14</i>	<i>7</i>	<i>12</i>	<i>58</i>	--	<i>30</i>	<i>Jan-17</i>
Reams	29,446,483	25.3	0.0	-1.6	0.2	9.5	5.5	5.9	Feb-98
<i>Blmbg BC Universal (Blend)</i>			<i>0.1</i>	<i>-1.1</i>	<i>0.2</i>	<i>5.6</i>	<i>3.3</i>	<i>4.9</i>	<i>Feb-98</i>
Excess Return			-0.1	-0.5	0.0	3.9	2.2	1.0	
<i>eV US Core Plus Fixed Inc Gross Rank</i>			<i>88</i>	<i>97</i>	<i>94</i>	<i>2</i>	<i>4</i>	<i>39</i>	<i>Feb-98</i>
Wellington Core Bond	7,645,679	6.6	0.1	--	--	--	--	2.0	Apr-21
<i>Bloomberg US Aggregate TR</i>			<i>0.1</i>	--	--	--	--	<i>1.9</i>	<i>Apr-21</i>
Excess Return			0.0					0.1	
<i>eV US Core Fixed Inc Gross Rank</i>			<i>46</i>	--	--	--	--	<i>71</i>	<i>Apr-21</i>

### Manager Performance - Gross of Fees | As of September 30, 2021

	Market Value	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	S.I.	S.I. Date
<b>Covered Calls</b>	<b>37,627,340</b>	<b>100.0</b>	<b>0.8</b>	<b>14.2</b>	<b>25.9</b>	<b>11.5</b>	<b>12.1</b>	<b>10.2</b>	<b>Apr-14</b>
<i>CBOE S&amp;P 500 BuyWrite USD</i>			<i>1.2</i>	<i>12.5</i>	<i>21.0</i>	<i>4.4</i>	<i>7.1</i>	<i>6.4</i>	<i>Apr-14</i>
Excess Return			-0.4	1.7	4.9	7.1	5.0	3.8	
Parametric DeltaShift	21,129,454	56.2	1.0	16.3	30.4	14.8	14.9	12.7	Apr-14
<i>CBOE S&amp;P 500 BuyWrite USD</i>			<i>1.2</i>	<i>12.5</i>	<i>21.0</i>	<i>4.4</i>	<i>7.1</i>	<i>6.4</i>	<i>Apr-14</i>
Excess Return			-0.2	3.8	9.4	10.4	7.8	6.3	
<i>eV US Large Cap Core Equity Gross Rank</i>			<i>26</i>	<i>42</i>	<i>46</i>	<i>52</i>	<i>75</i>	<i>67</i>	<i>Apr-14</i>
Parametric BXM	16,497,886	43.8	0.6	11.5	20.5	7.9	9.0	8.0	Apr-14
<i>CBOE S&amp;P 500 BuyWrite USD</i>			<i>1.2</i>	<i>12.5</i>	<i>21.0</i>	<i>4.4</i>	<i>7.1</i>	<i>6.4</i>	<i>Apr-14</i>
Excess Return			-0.6	-1.0	-0.5	3.5	1.9	1.6	
<i>eV US Large Cap Core Equity Gross Rank</i>			<i>35</i>	<i>89</i>	<i>94</i>	<i>98</i>	<i>99</i>	<i>99</i>	<i>Apr-14</i>

### Manager Performance - Gross of Fees | As of September 30, 2021

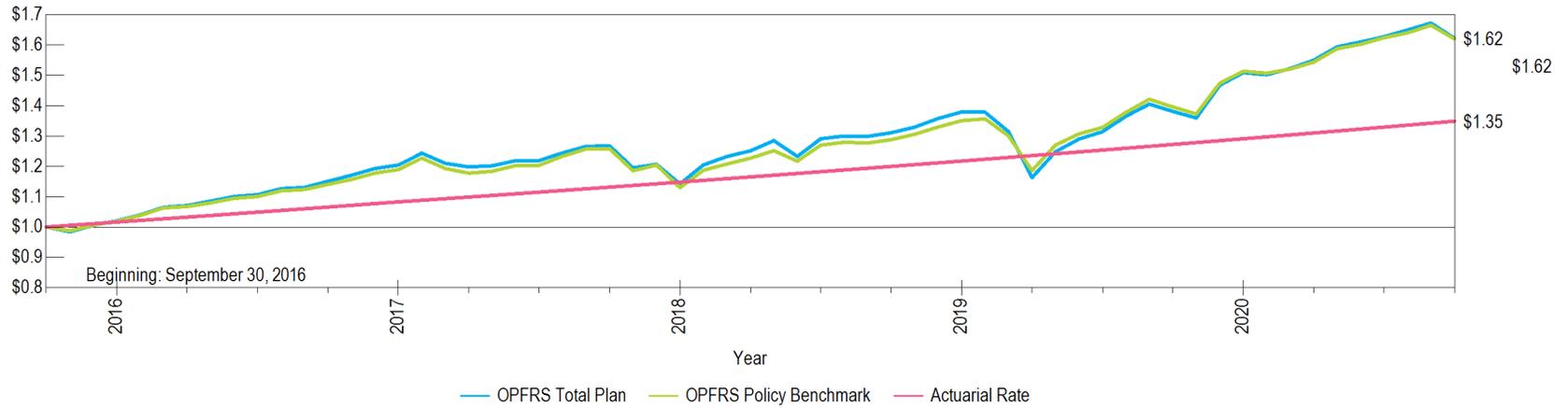
	Market Value	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	S.I.	S.I. Date
<b>Credit</b>	<b>9,338,573</b>	<b>100.0</b>	<b>1.9</b>	<b>9.0</b>	<b>17.1</b>	<b>6.2</b>	<b>7.6</b>	<b>6.7</b>	<b>Feb-15</b>
<i>Bloomberg US High Yield TR</i>			<i>0.9</i>	<i>4.5</i>	<i>11.3</i>	<i>6.9</i>	<i>6.5</i>	<i>6.2</i>	<i>Feb-15</i>
Excess Return			1.0	4.5	5.8	-0.7	1.1	0.5	
DDJ Capital	9,338,573	100.0	1.9	9.0	17.1	6.2	7.6	6.7	Feb-15
<i>ICE BofA High Yield Master TR</i>			<i>0.9</i>	<i>4.7</i>	<i>11.5</i>	<i>6.6</i>	<i>6.4</i>	<i>6.1</i>	<i>Feb-15</i>
Excess Return			1.0	4.3	5.6	-0.4	1.2	0.6	
<i>eV US High Yield Fixed Inc Gross Rank</i>			<i>1</i>	<i>4</i>	<i>4</i>	<i>78</i>	<i>11</i>	<i>22</i>	<i>Feb-15</i>

Manager Performance - Gross of Fees | As of September 30, 2021

	Market Value	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	S.I.	S.I. Date
<b>Crisis Risk Offset</b>	<b>19,509,949</b>	<b>100.0</b>	<b>0.0</b>	<b>-8.5</b>	<b>-10.3</b>	<b>-10.6</b>	<b>--</b>	<b>-9.2</b>	<b>Aug-18</b>
<i>SG Multi Alternative Risk Premia Index</i>			<i>0.2</i>	<i>6.0</i>	<i>3.9</i>	<i>-2.6</i>	<i>--</i>	<i>-2.6</i>	<i>Aug-18</i>
Excess Return			-0.2	-14.5	-14.2	-8.0		-6.6	
Vanguard Long-Term Treasury ETF	19,509,949	100.0	0.0	-8.5	-10.4	--	--	5.0	Jul-19
<i>Bloomberg US Govt Long TR</i>			<i>0.5</i>	<i>-7.4</i>	<i>-10.1</i>	<i>--</i>	<i>--</i>	<i>5.4</i>	<i>Jul-19</i>
Excess Return			-0.5	-1.1	-0.3			-0.4	
<i>eV US Long Duration - Gov/Cred Fixed Inc Net Rank</i>			<i>65</i>	<i>99</i>	<i>99</i>	<i>--</i>	<i>--</i>	<i>99</i>	<i>Jul-19</i>

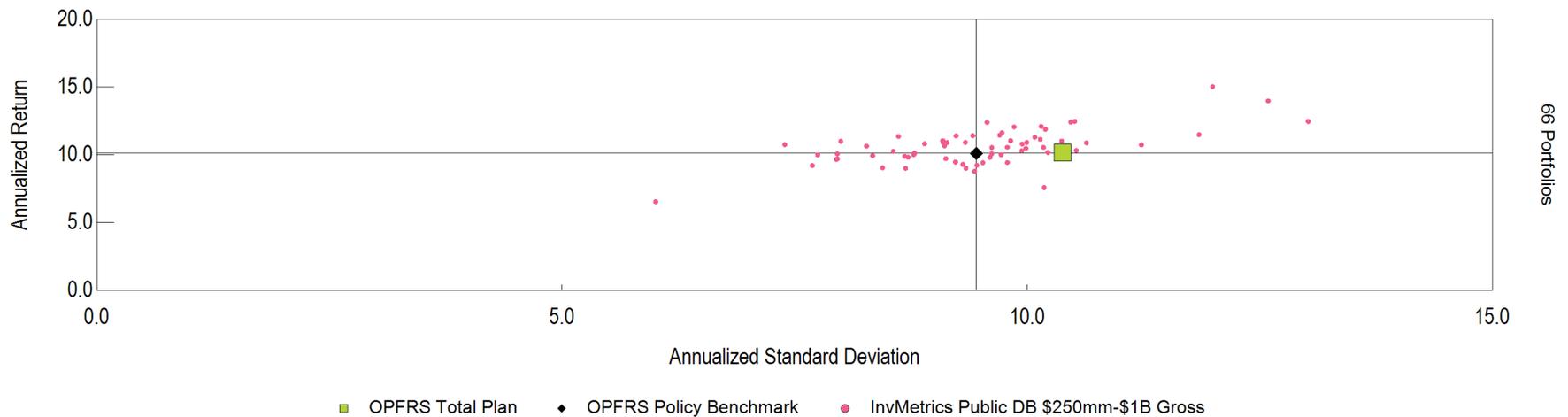
### Total Portfolio 5-Year Performance | As of September 30, 2021

#### Growth of a Dollar



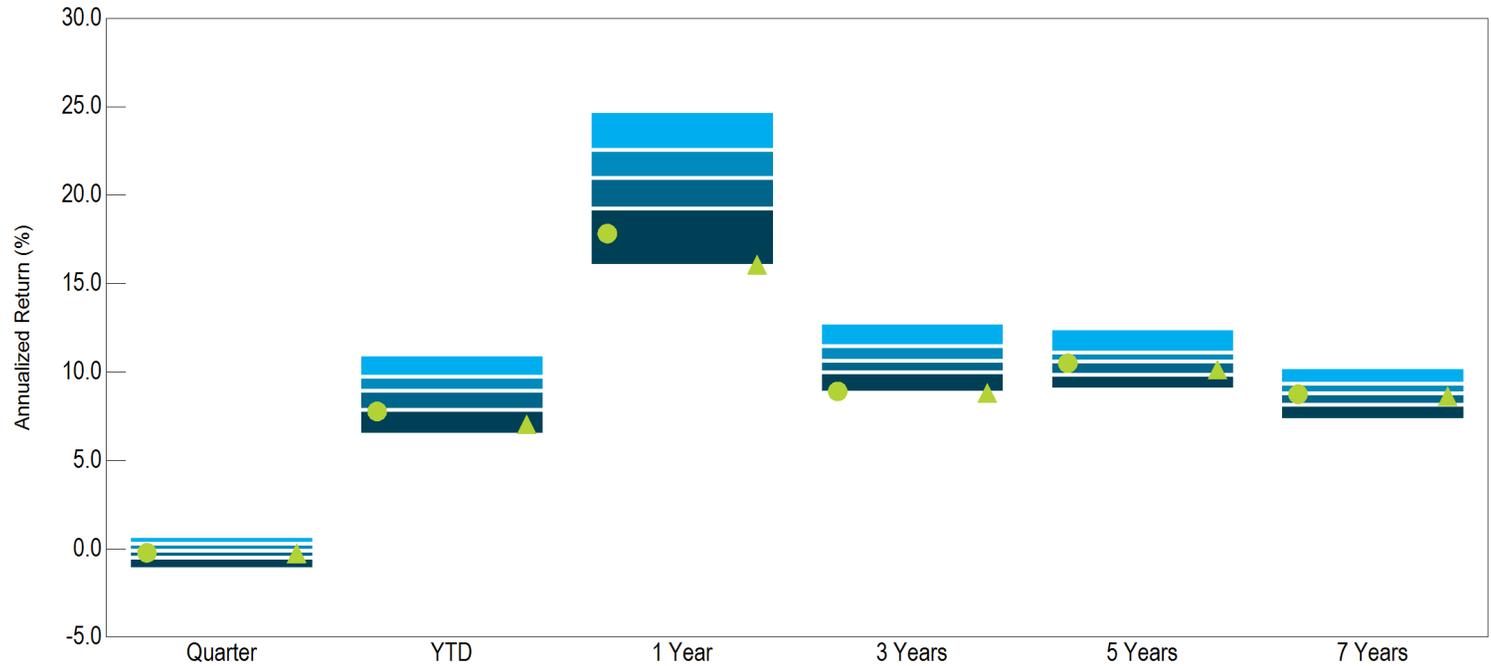
The actuarial expected rate of return was 8% through 6/30/2009, 7.5% through 6/30/2010, 7% through 6/30/2011, 6.75% through 6/30/2014, 6.5% through 2/31/2017 and 6.0% currently

#### Annualized Return vs. Annualized Standard Deviation 5 Years Ending September 30, 2021



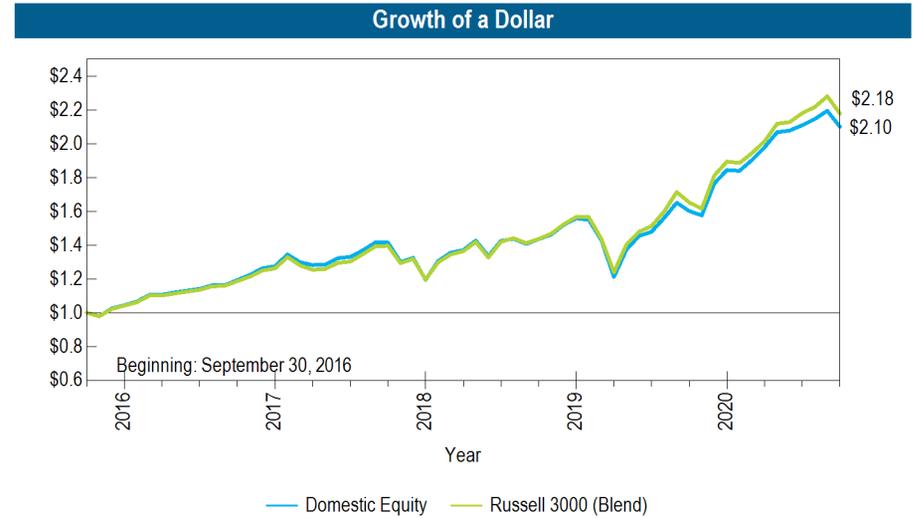
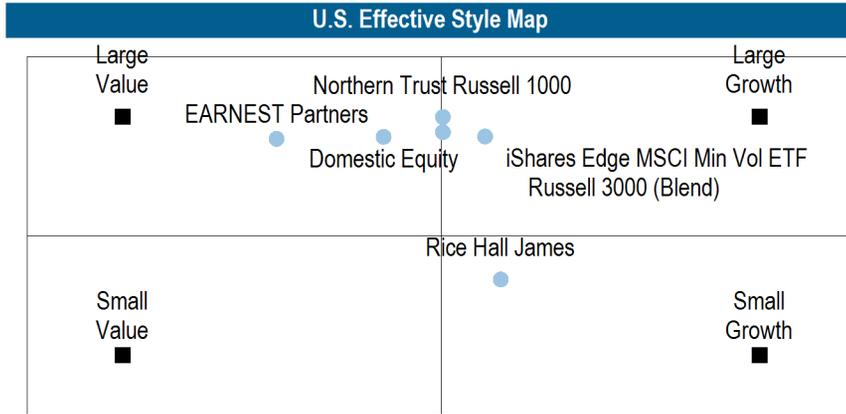
### Plan Sponsor Peer Group Analysis | As of September 30, 2021

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

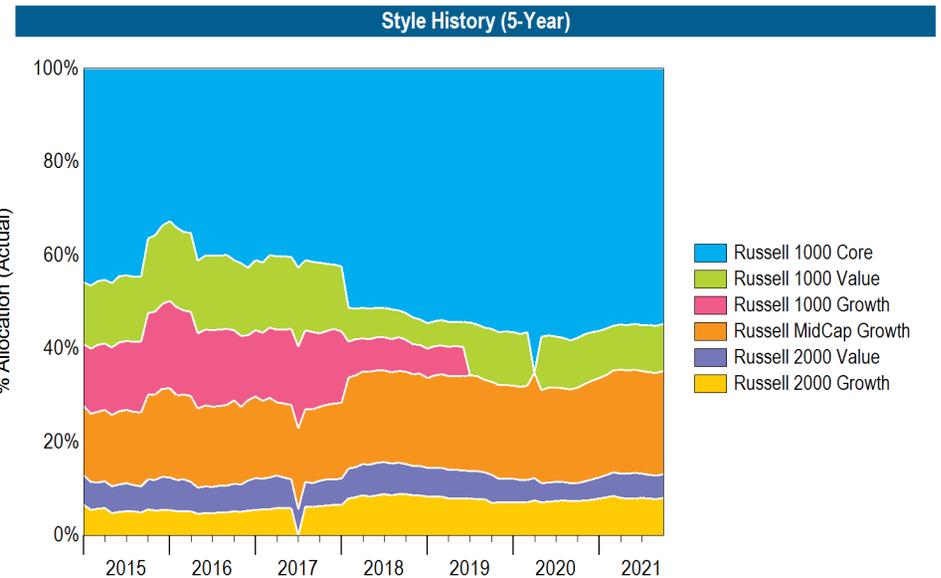
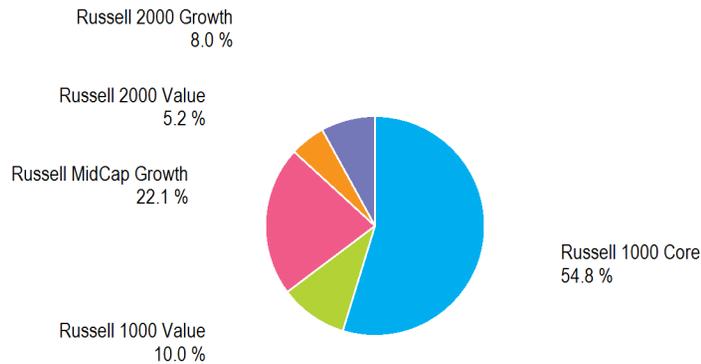


	Return (Rank)											
	Quarter	YTD	1 Year	3 Years	5 Years	7 Years	Quarter	YTD	1 Year	3 Years	7 Years	
5th Percentile	0.7	11.0	24.7	12.8	12.5	10.3	-0.2	7.8	17.8	8.9	10.5	8.7
25th Percentile	0.3	9.7	22.6	11.5	11.1	9.4	(59)	(78)	(90)	(94)	(56)	(52)
Median	-0.1	9.0	21.0	10.6	10.6	8.8						
75th Percentile	-0.5	7.9	19.3	10.0	9.8	8.1						
95th Percentile	-1.1	6.5	16.0	8.8	9.0	7.3						
# of Portfolios	71	71	71	69	66	65						
● OPFRS Total Plan	-0.2	7.8	17.8	8.9	10.5	8.7	(59)	(78)	(90)	(94)	(56)	(52)
▲ OPFRS Policy Benchmark	-0.3	7.0	16.1	8.8	10.1	8.6	(61)	(89)	(95)	(97)	(64)	(55)

### Domestic Equity | As of September 30, 2021

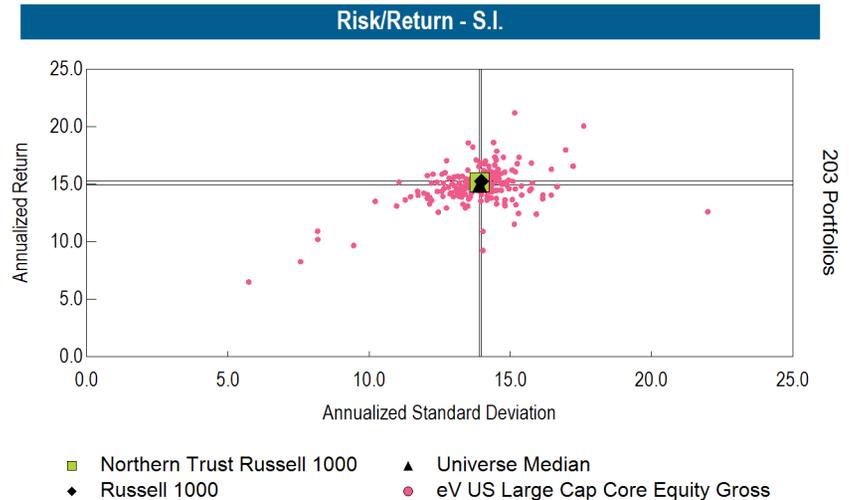
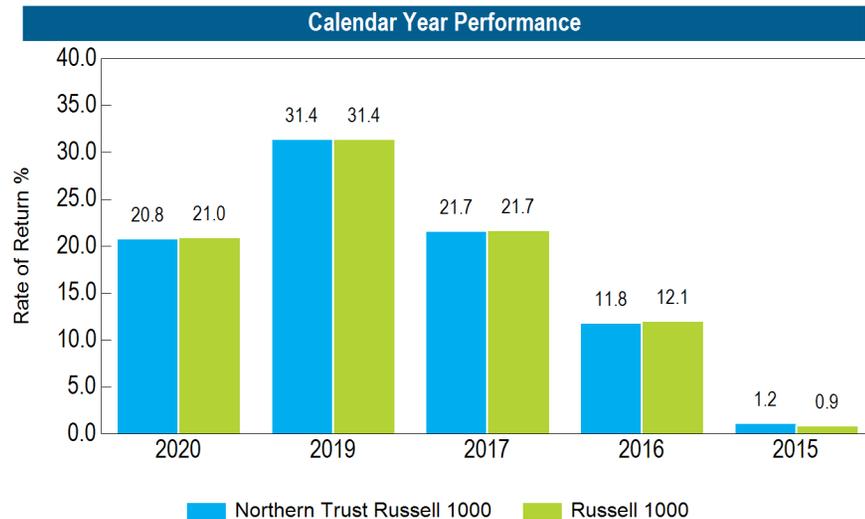
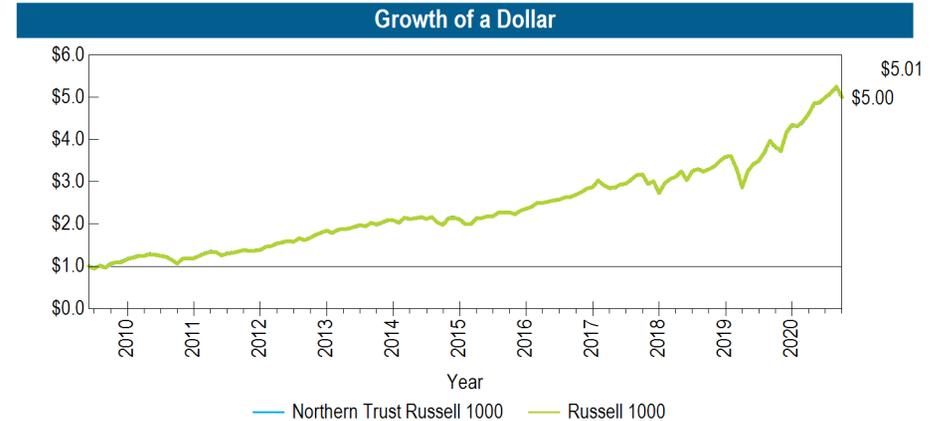
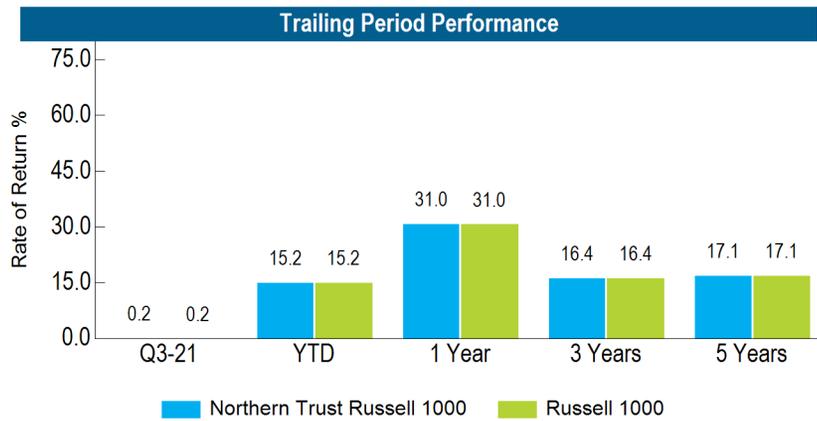


#### Style Exposure



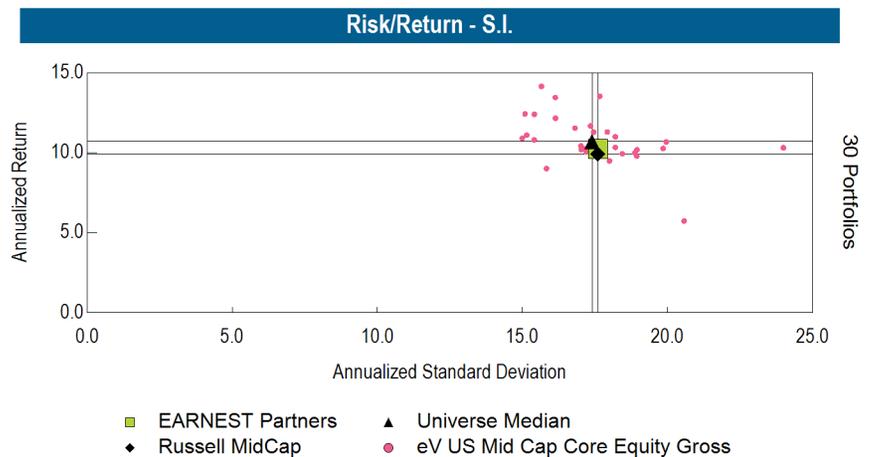
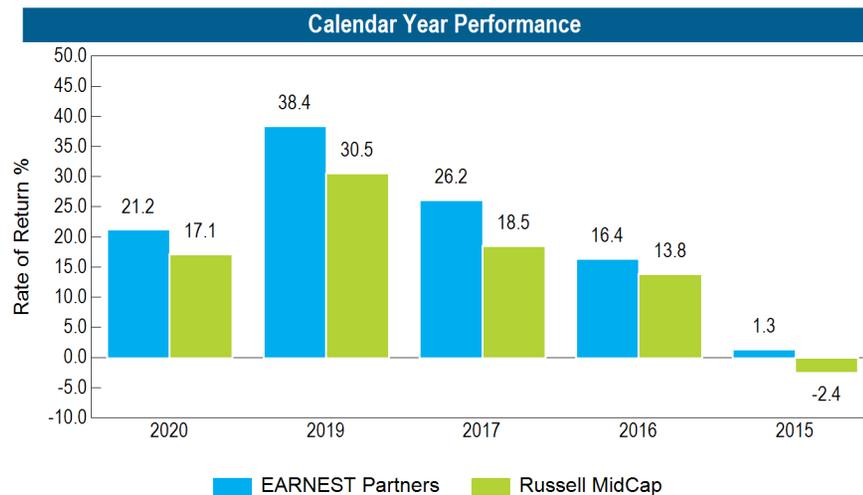
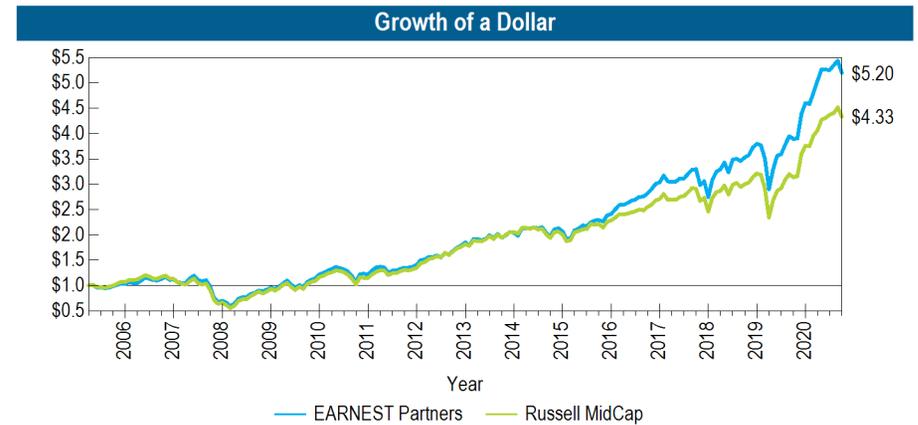
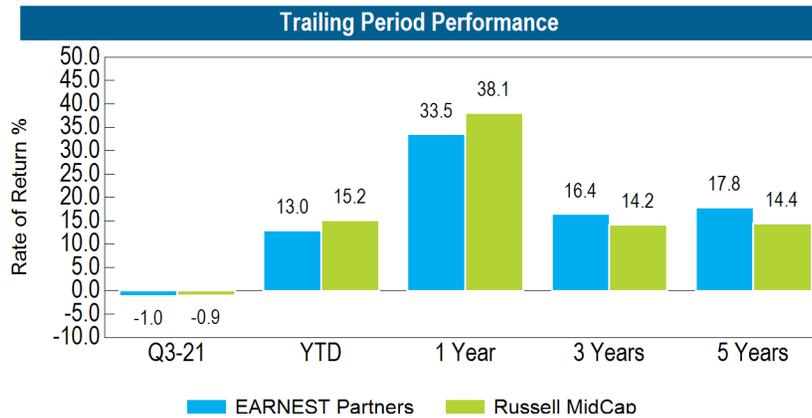
### Northern Trust Russell 1000 | As of September 30, 2021

	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
Northern Trust Russell 1000	15.18%	13.91%	0.00%	1.00	0.13%	98.37%	99.77%
Russell 1000	15.27%	13.97%	0.00%	1.00	0.00%	100.00%	100.00%



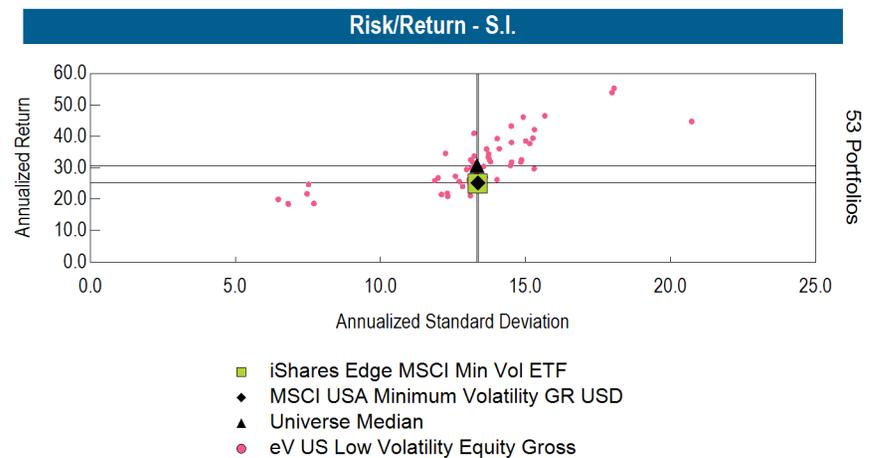
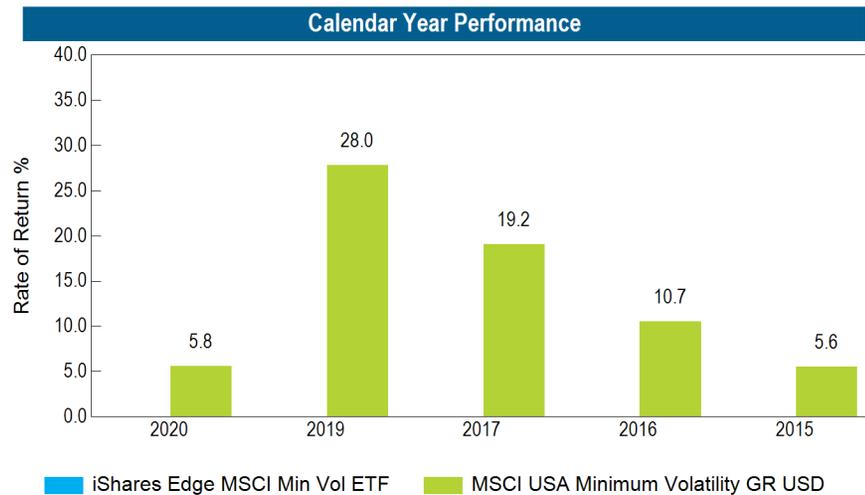
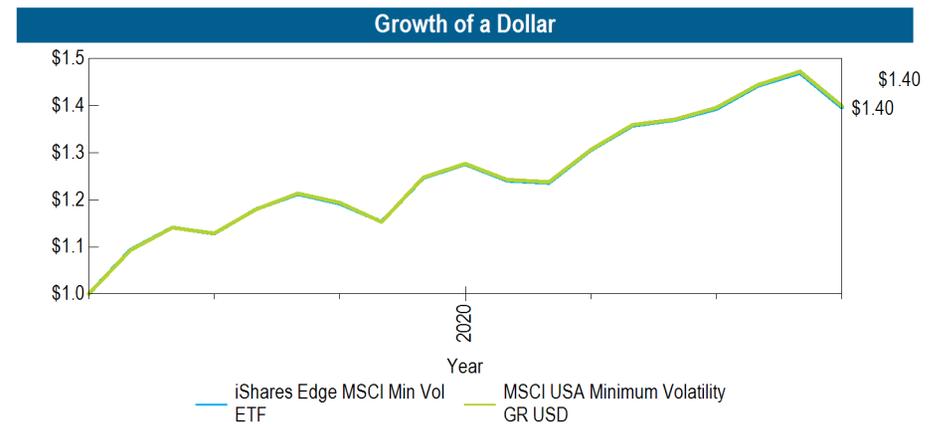
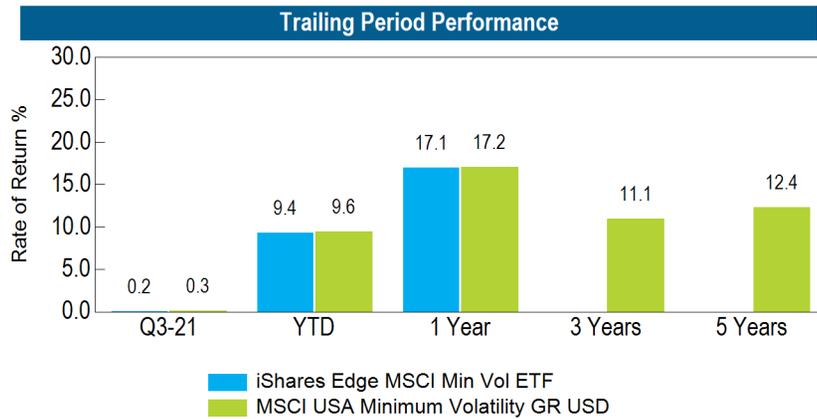
### EARNEST Partners | As of September 30, 2021

	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
EARNEST Partners	10.24%	17.61%	0.04%	0.98	0.09	3.36%	92.99%	99.17%
Russell MidCap	9.92%	17.60%	0.00%	1.00	--	0.00%	100.00%	100.00%



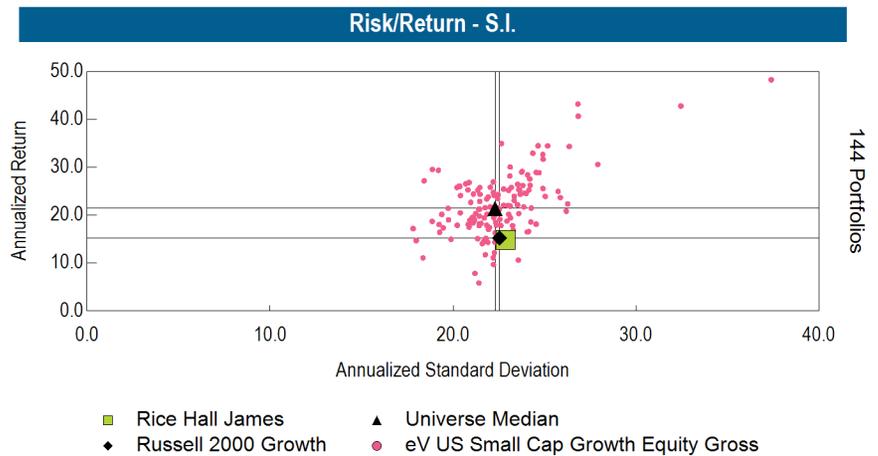
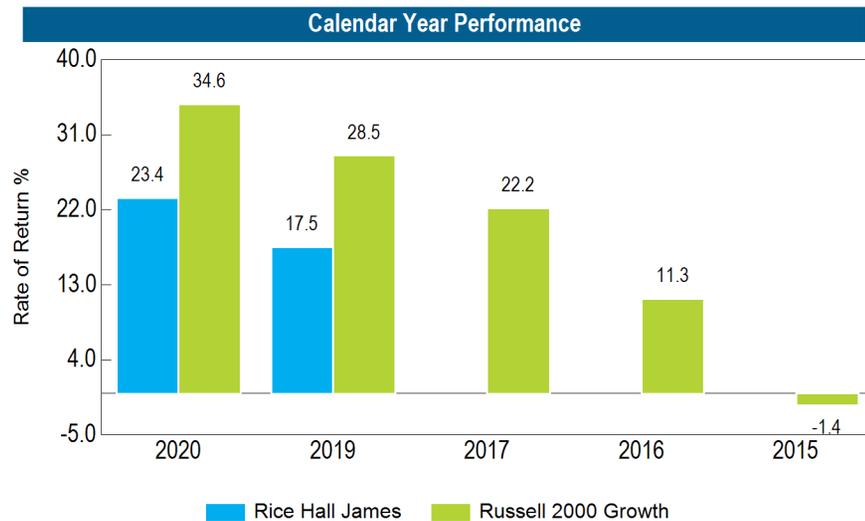
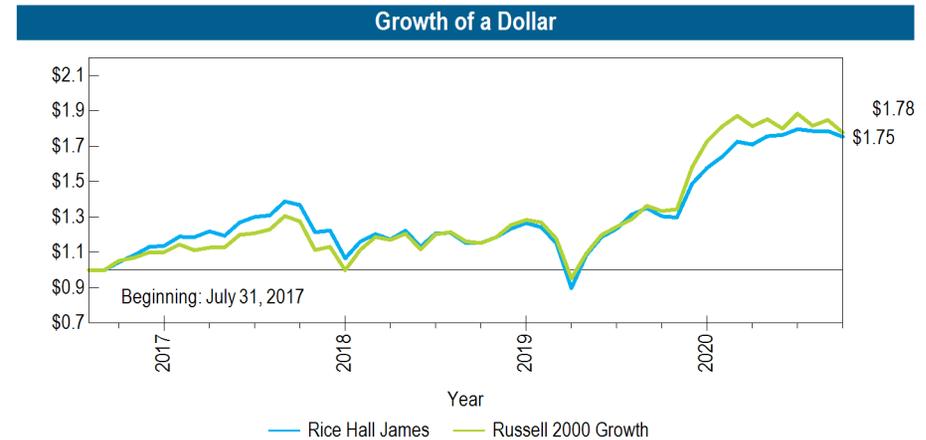
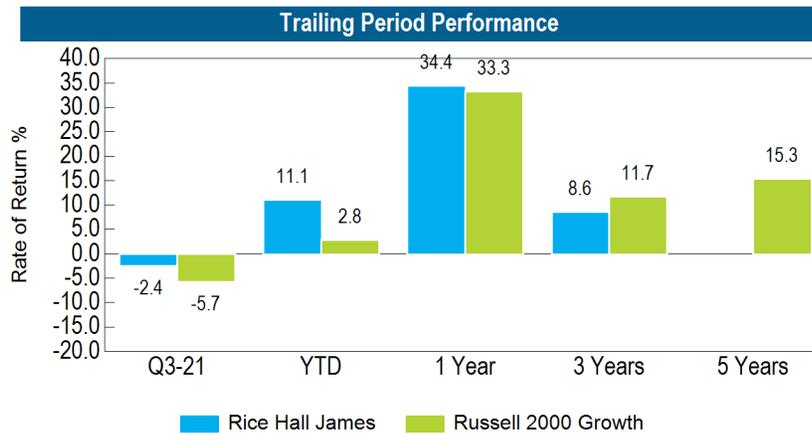
### iShares Edge MSCI Min Vol ETF | As of September 30, 2021

	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
iShares Edge MSCI Min Vol ETF	24.89%	13.34%	-0.01%	1.00	-0.67	0.29%	99.30%	99.80%
MSCI USA Minimum Volatility GR USD	25.09%	13.36%	0.00%	1.00	--	0.00%	100.00%	100.00%



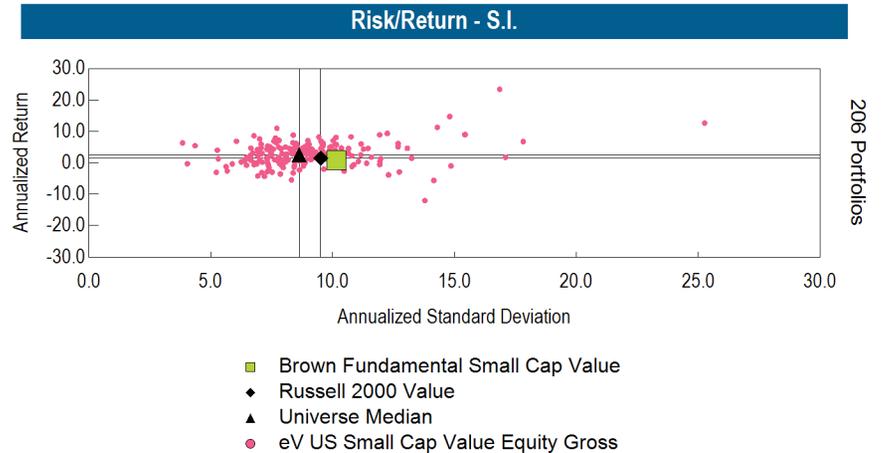
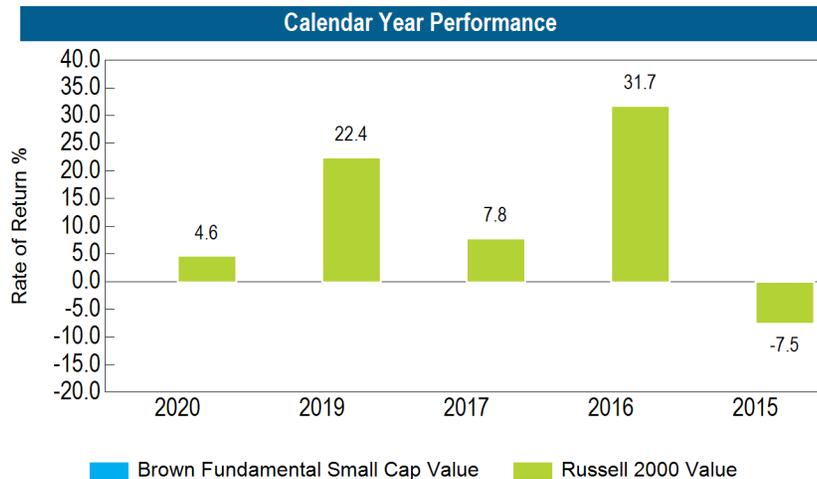
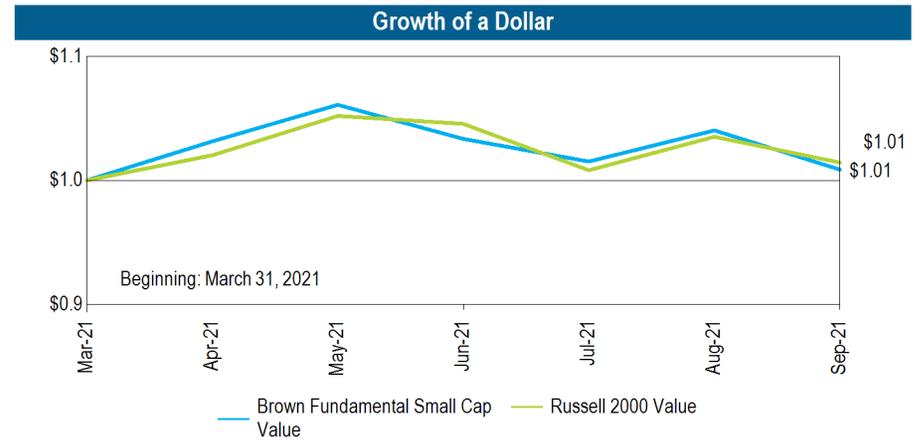
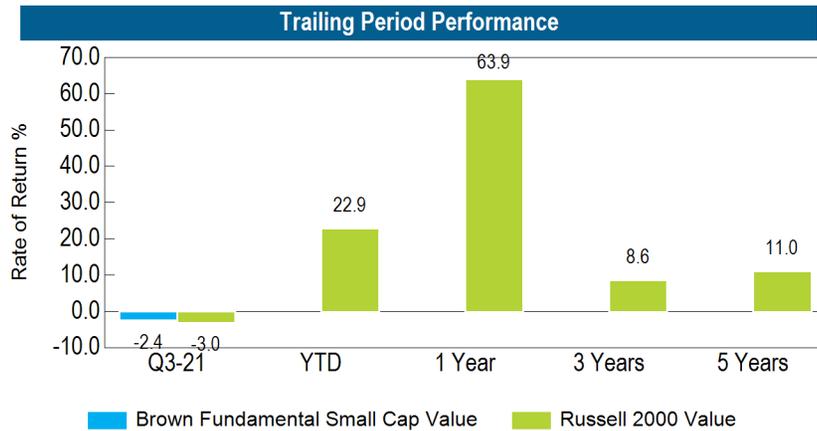
### Rice Hall James | As of September 30, 2021

	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
Rice Hall James	13.27%	22.66%	-0.06%	0.97	-0.23	6.75%	85.36%	95.51%
Russell 2000 Growth	14.79%	22.31%	0.00%	1.00	--	0.00%	100.00%	100.00%

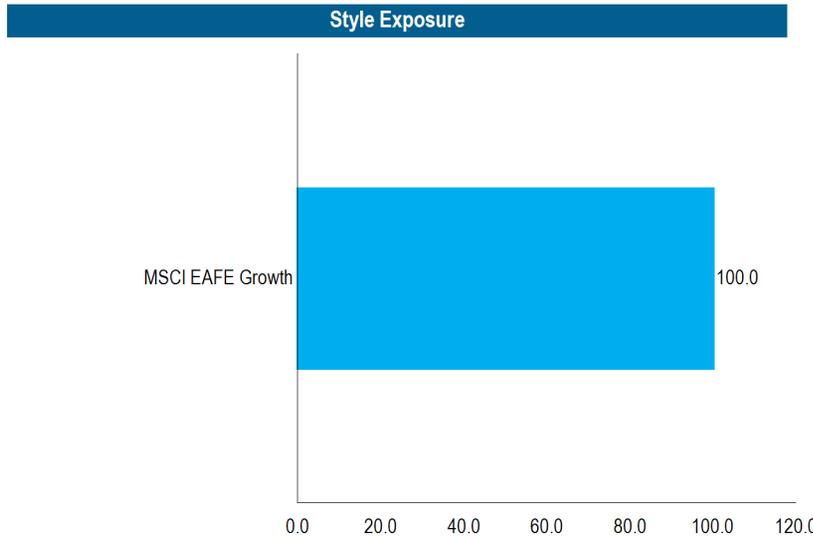
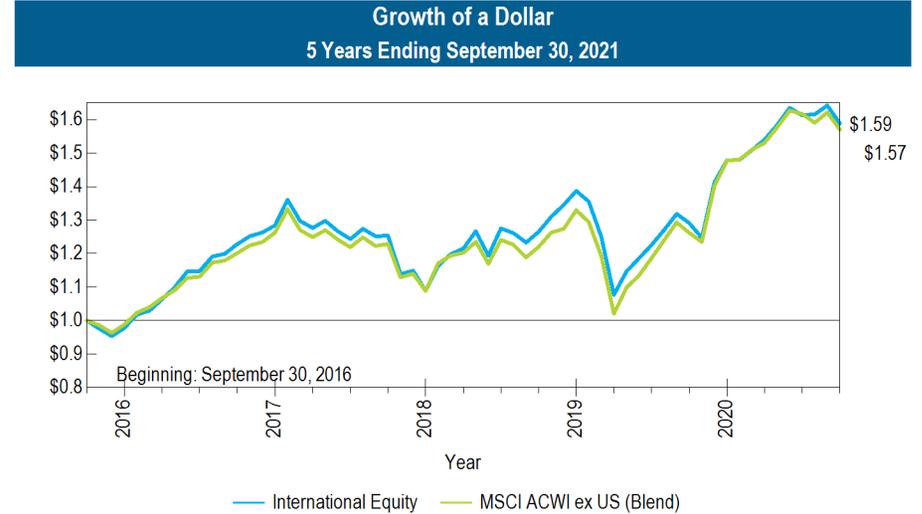
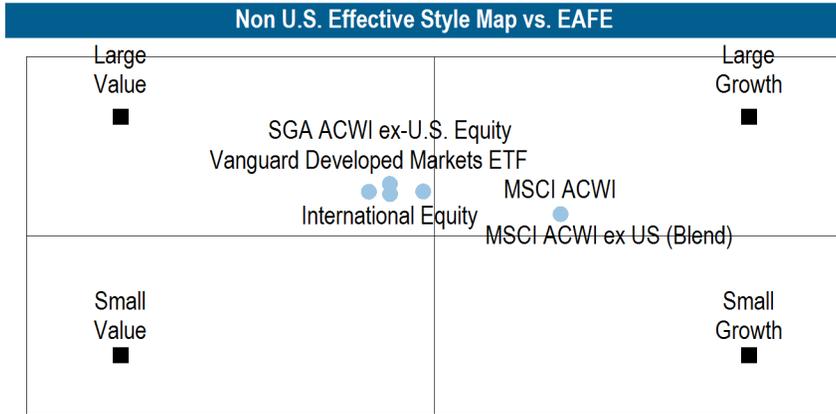


### Brown Fundamental Small Cap Value | As of September 30, 2021

	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
Brown Fundamental Small Cap Value	0.44%	10.15%	-0.15%	0.94	-0.21	4.80%	105.88%	121.85%
Russell 2000 Value	1.44%	9.51%	0.00%	1.00	--	0.00%	100.00%	100.00%

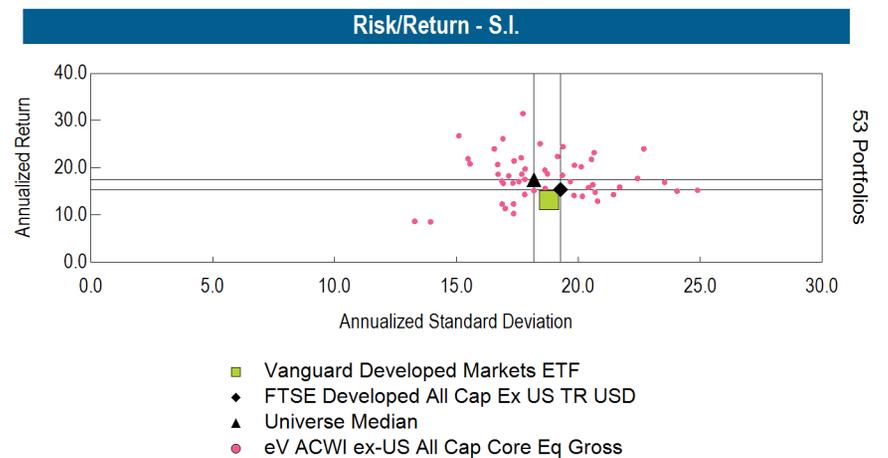
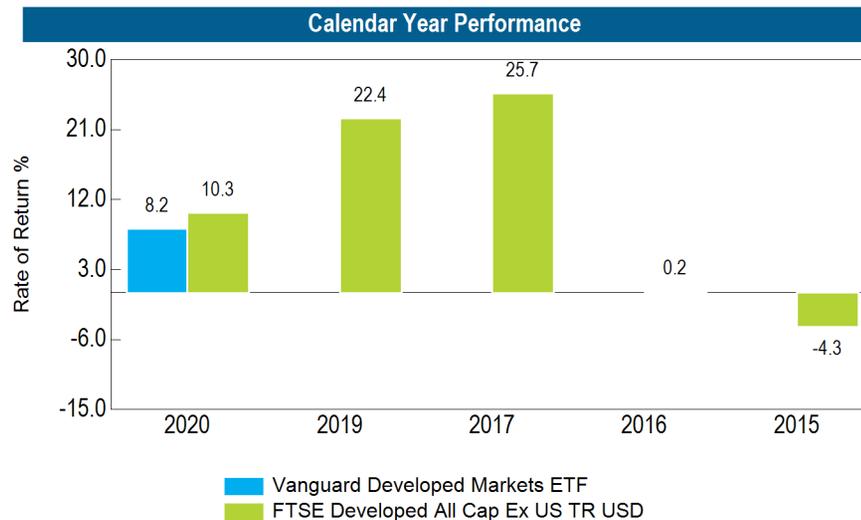
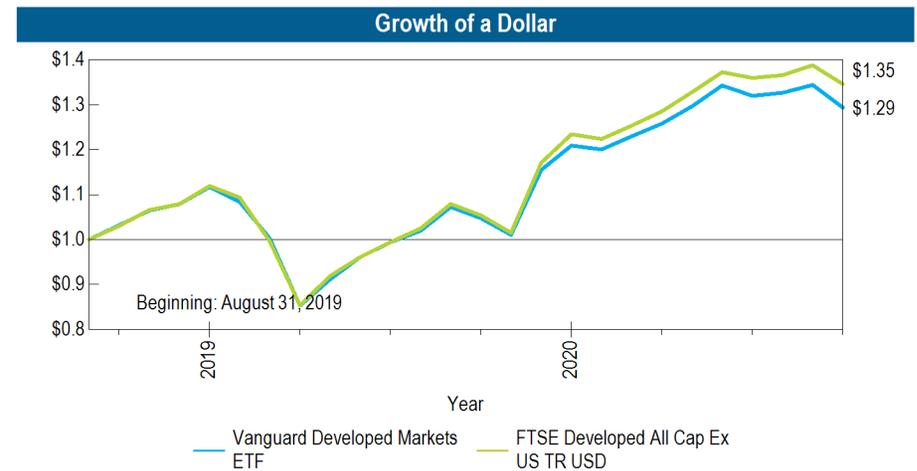
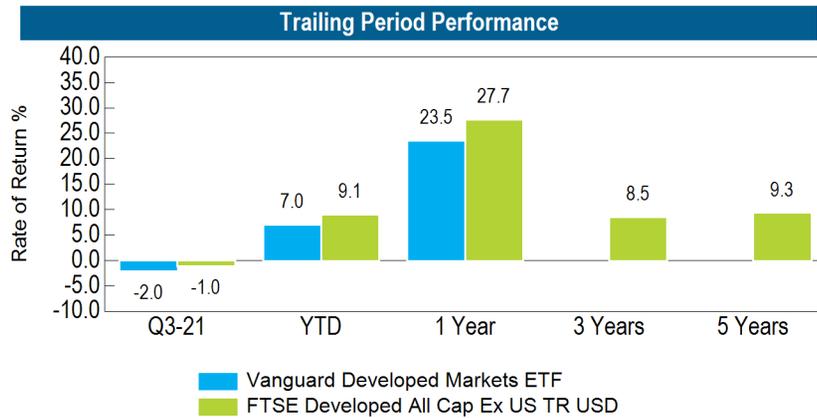


### International Equity | As of September 30, 2021



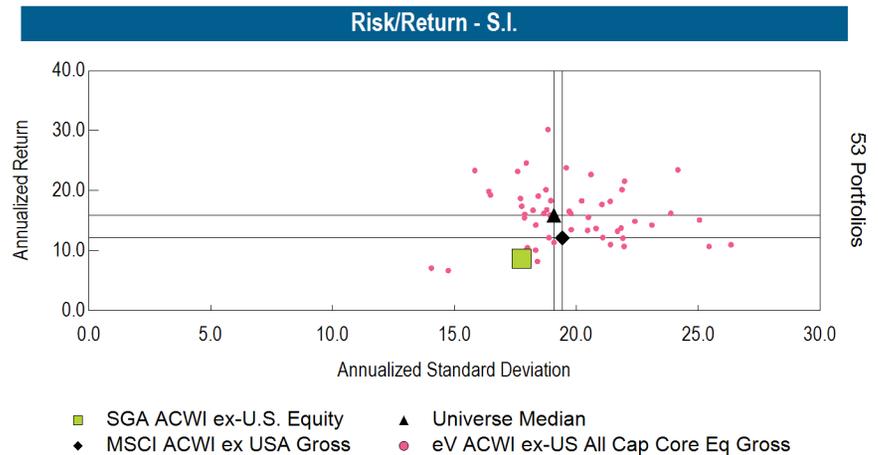
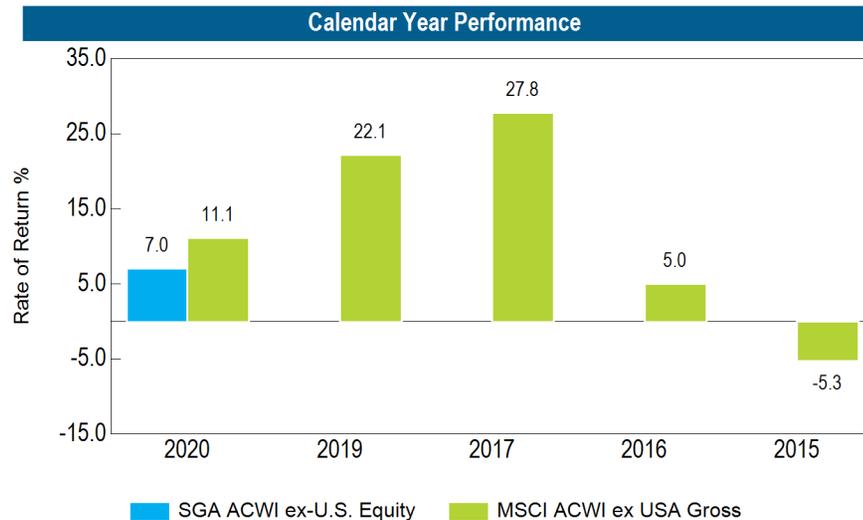
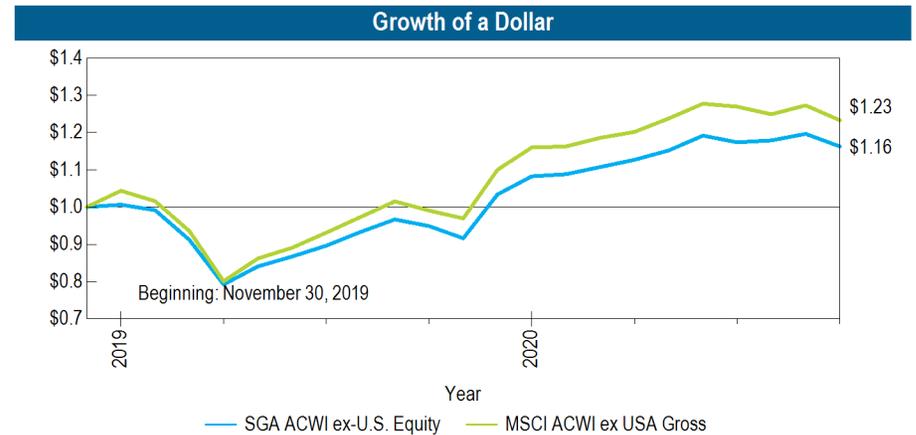
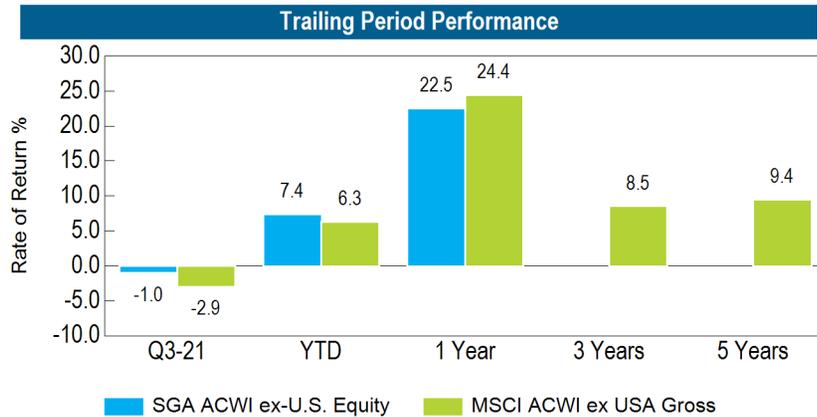
### Vanguard Developed Markets ETF | As of September 30, 2021

	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
Vanguard Developed Markets ETF	13.11%	18.80%	-0.13%	0.97	-1.18	1.87%	94.10%	102.36%
FTSE Developed All Cap Ex US TR USD	15.33%	19.28%	0.00%	1.00	--	0.00%	100.00%	100.00%



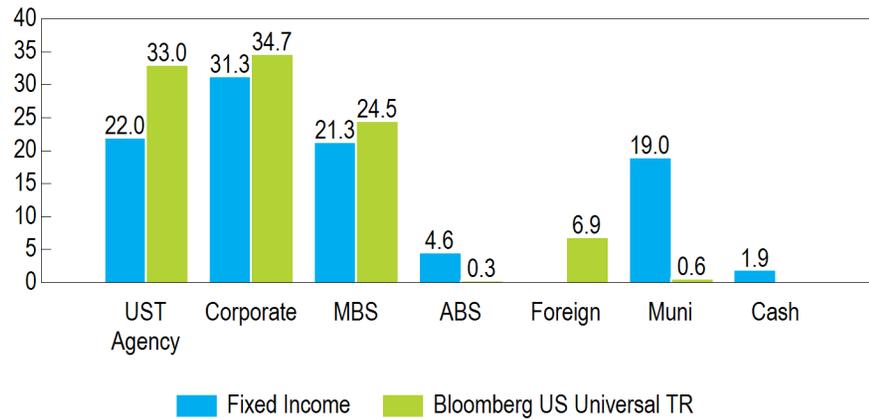
### SGA ACWI ex-U.S. Equity | As of September 30, 2021

	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
SGA ACWI ex-U.S. Equity	7.89%	17.71%	-0.23%	0.89	-1.03	4.06%	78.36%	93.26%
MSCI ACWI ex USA Gross	12.09%	19.43%	0.00%	1.00	--	0.00%	100.00%	100.00%



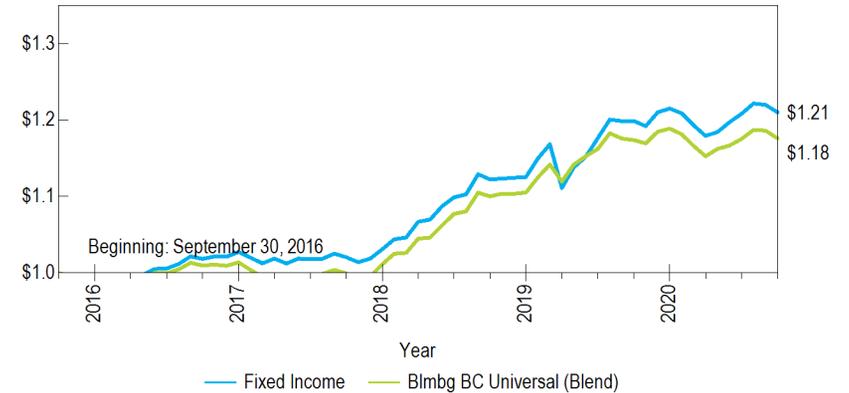
### Fixed Income | As of September 30, 2021

#### US Sector Allocation

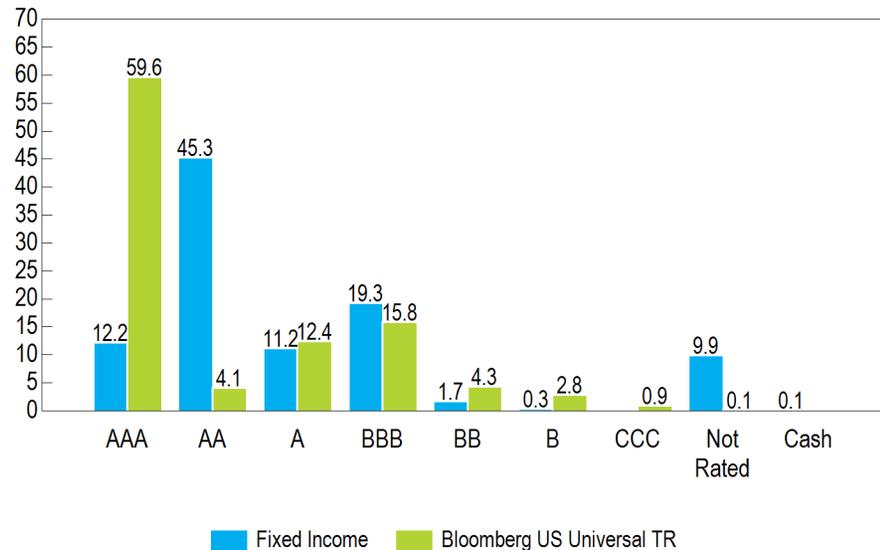


#### Growth of a Dollar

5 Years Ending September 30, 2021



#### Credit Quality Allocation

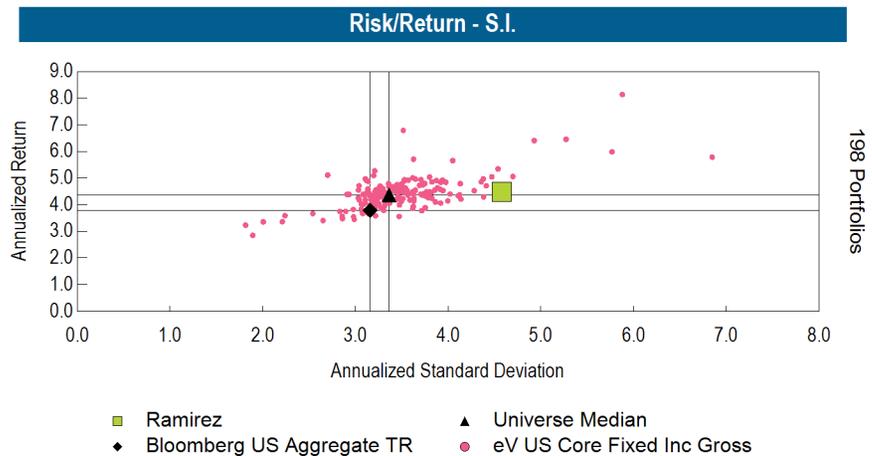
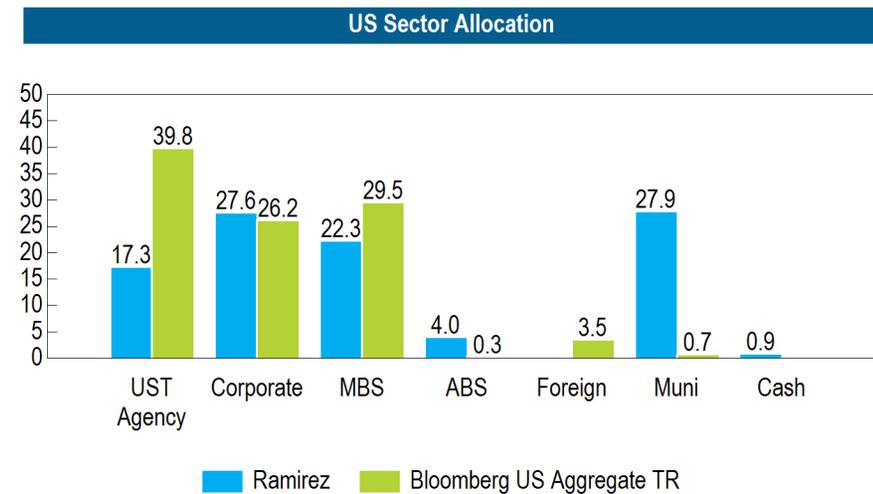
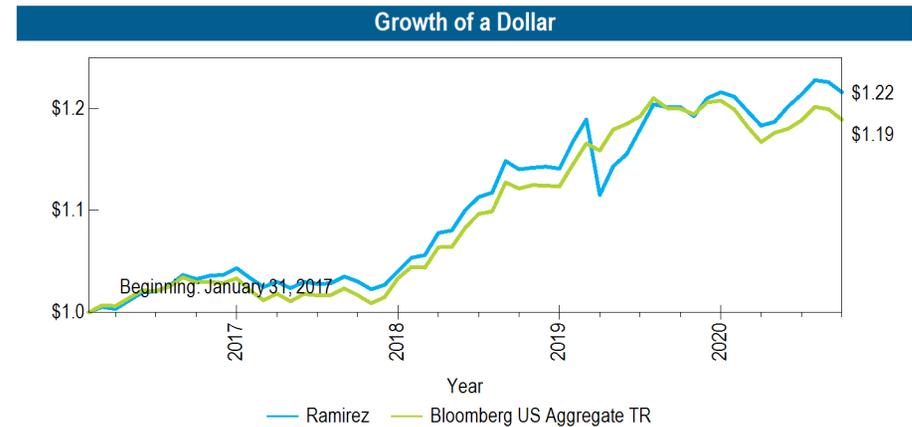
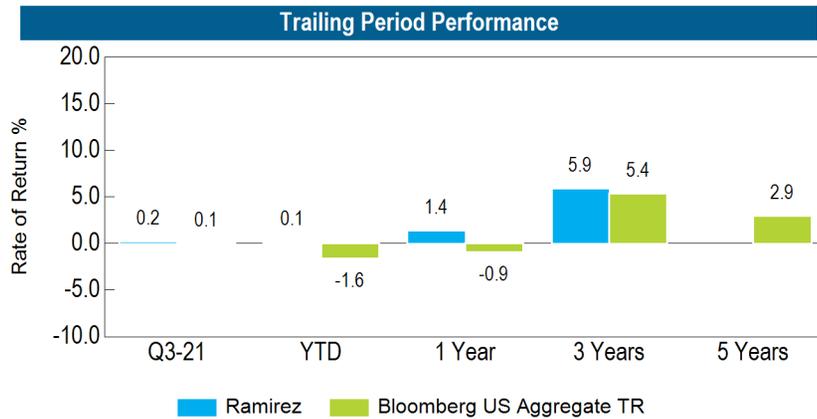


#### Fixed Income Fixed Income Characteristics vs. Bloomberg US Universal TR

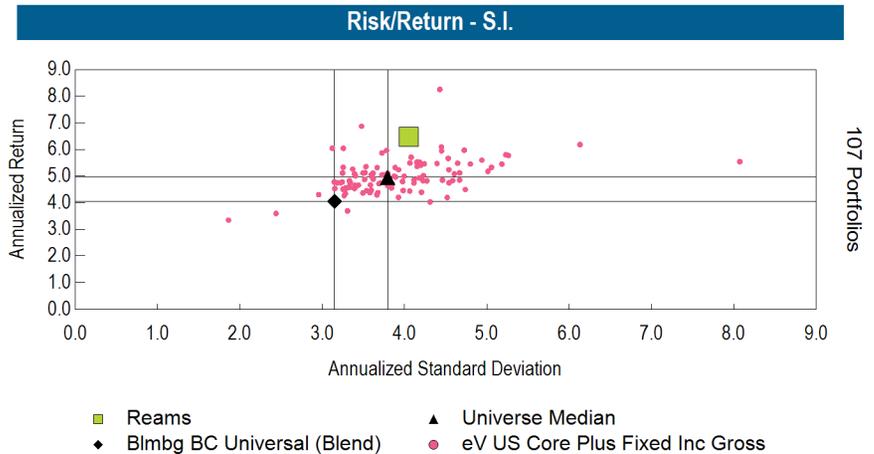
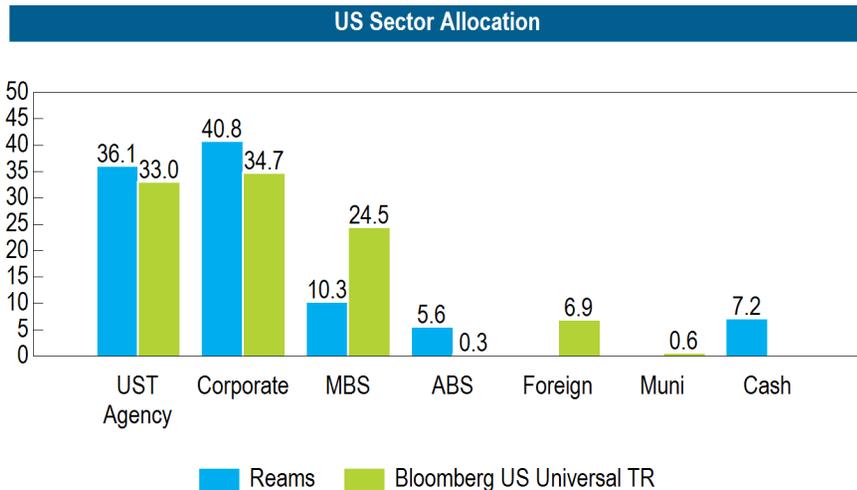
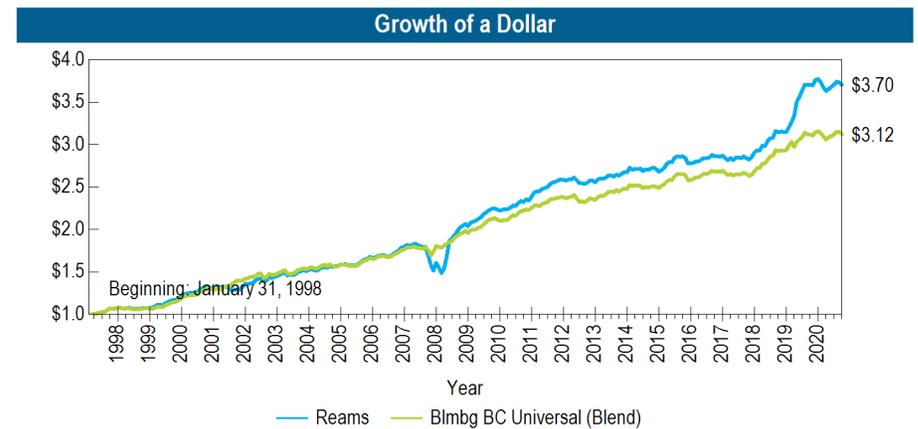
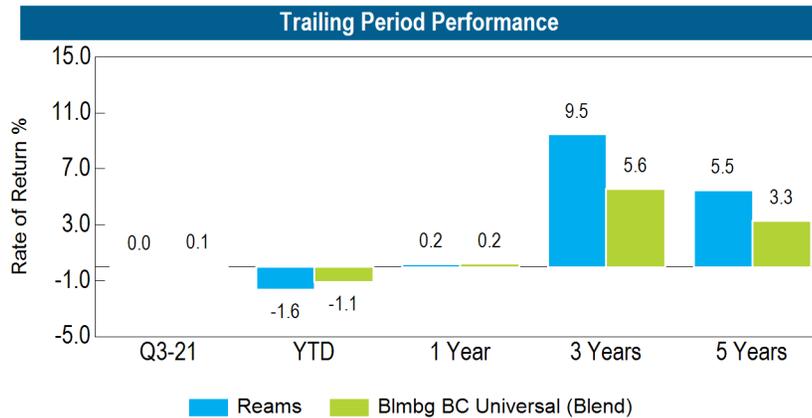
	Portfolio Q3-21	Index Q3-21
<b>Fixed Income Characteristics</b>		
Yield to Maturity	1.75	1.87
Average Duration	5.87	6.60
Average Quality	A	AA
Weighted Average Maturity	8.86	12.76

Ramirez | As of September 30, 2021

	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
Ramirez	4.28%	4.57%	0.00%	1.13	0.17	2.90%	123.39%	126.90%
Bloomberg US Aggregate TR	3.78%	3.16%	0.00%	1.00	--	0.00%	100.00%	100.00%

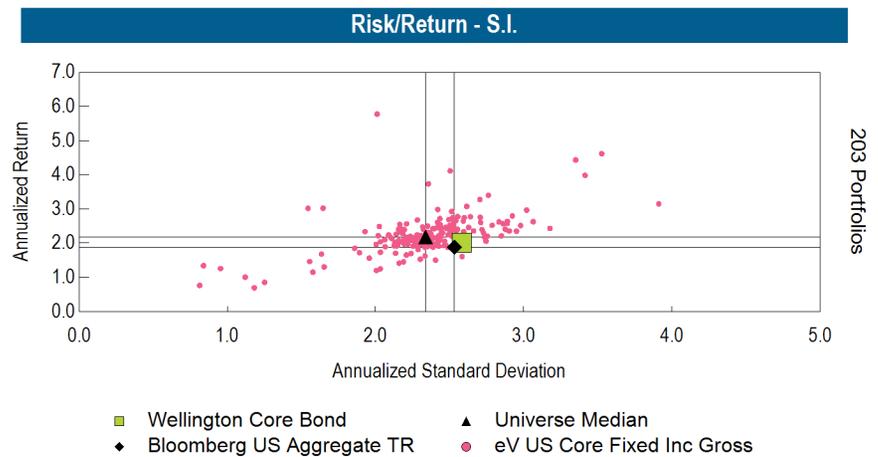
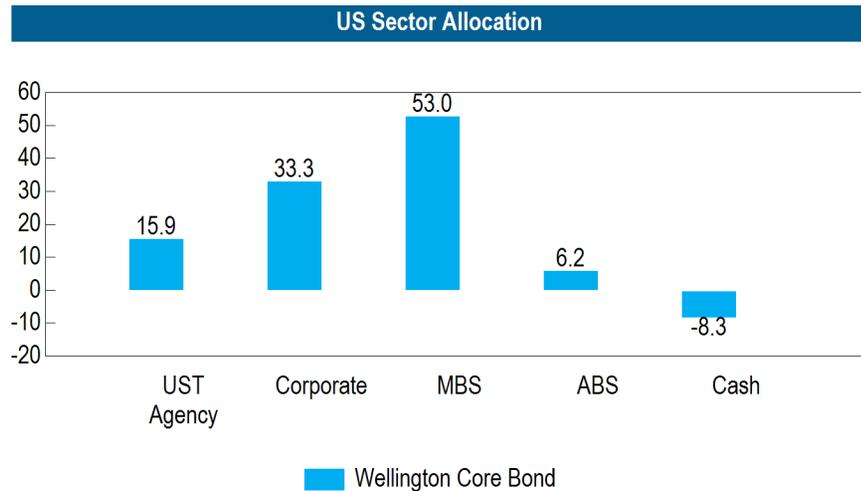
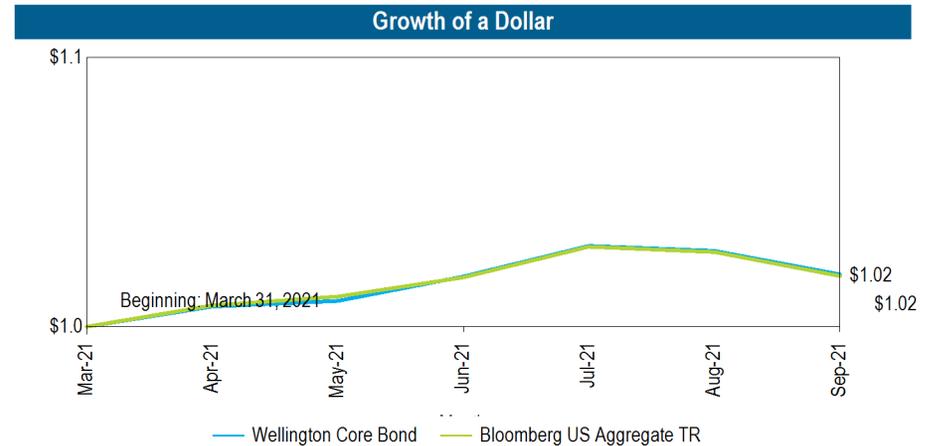
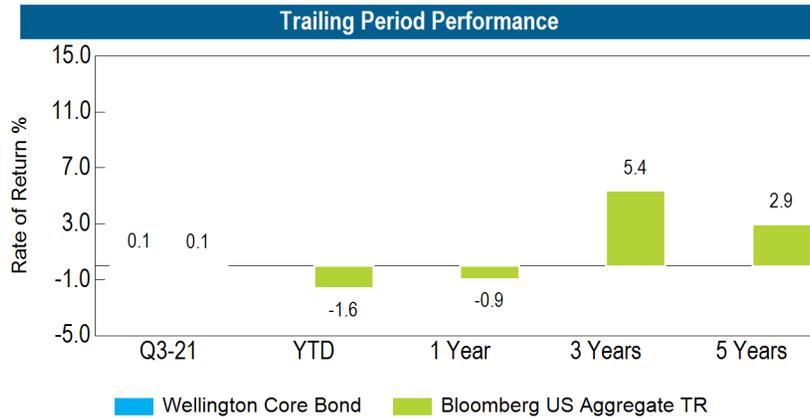


	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
Reams	5.69%	5.29%	0.05%	1.05	0.19	3.93%	121.62%	99.25%
Blmbg BC Universal (Blend)	4.93%	3.39%	0.00%	1.00	--	0.00%	100.00%	100.00%



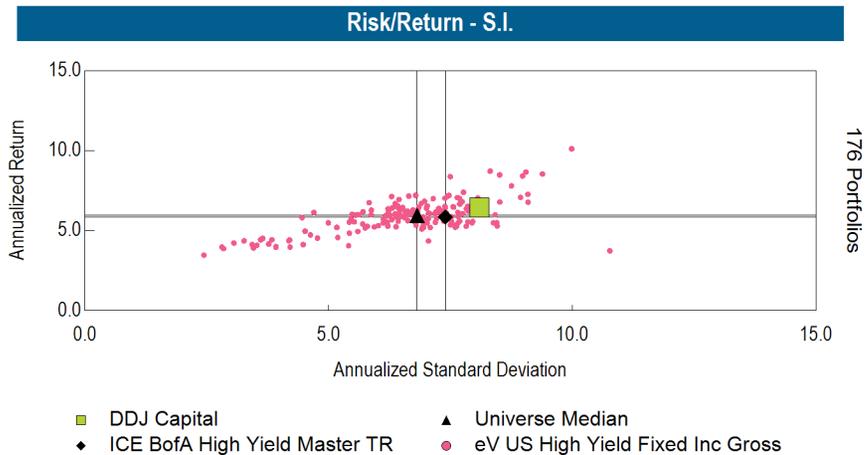
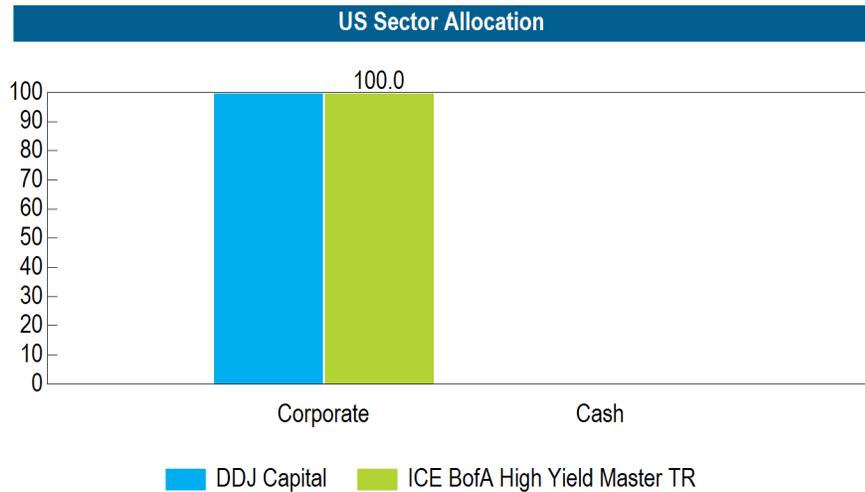
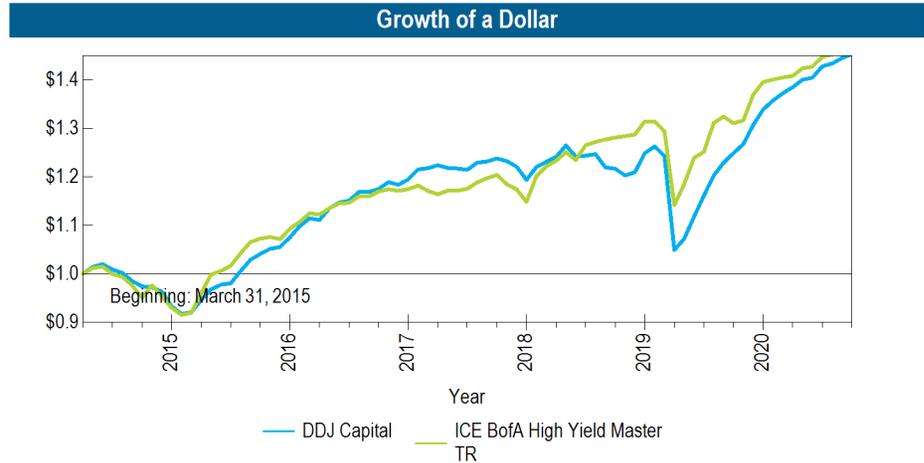
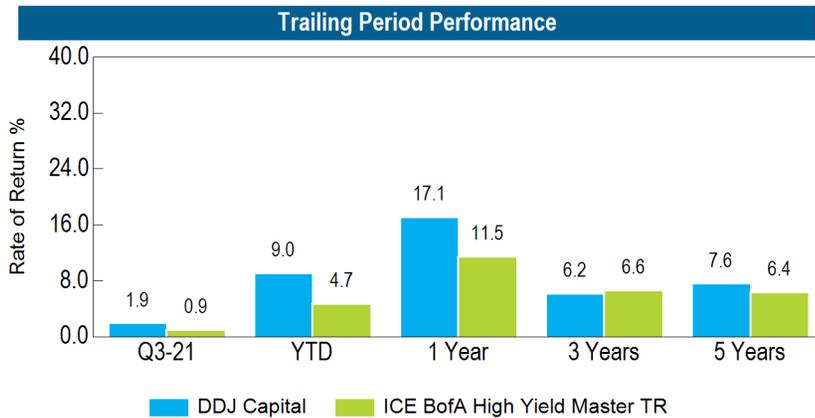
### Wellington Core Bond | As of September 30, 2021

	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
Wellington Core Bond	1.94%	2.58%	0.01%	1.01	0.17	0.36%	101.00%	97.16%
Bloomberg US Aggregate TR	1.88%	2.53%	0.00%	1.00	--	0.00%	100.00%	100.00%



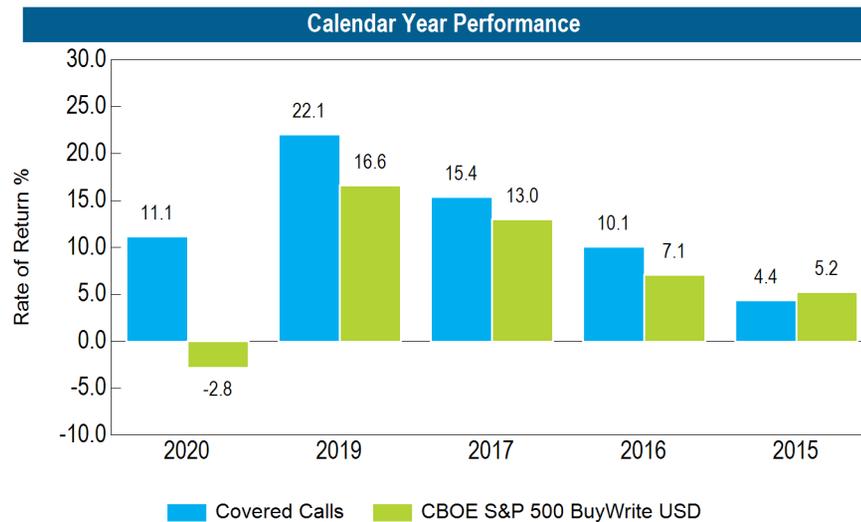
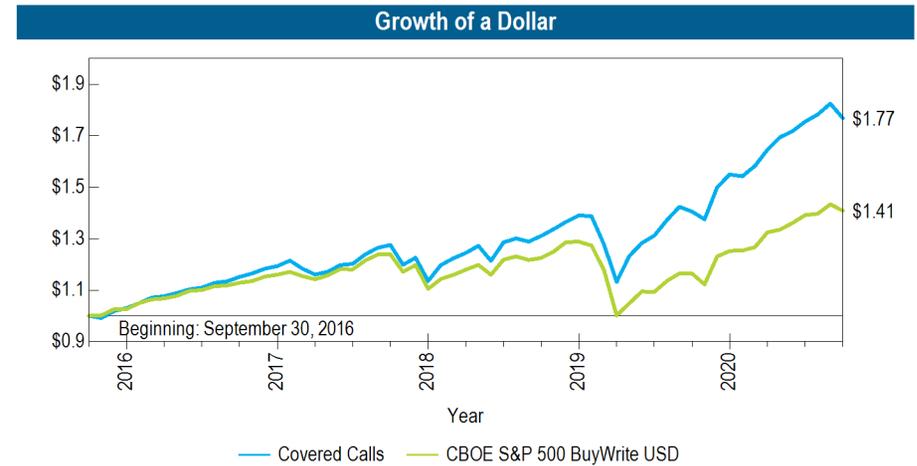
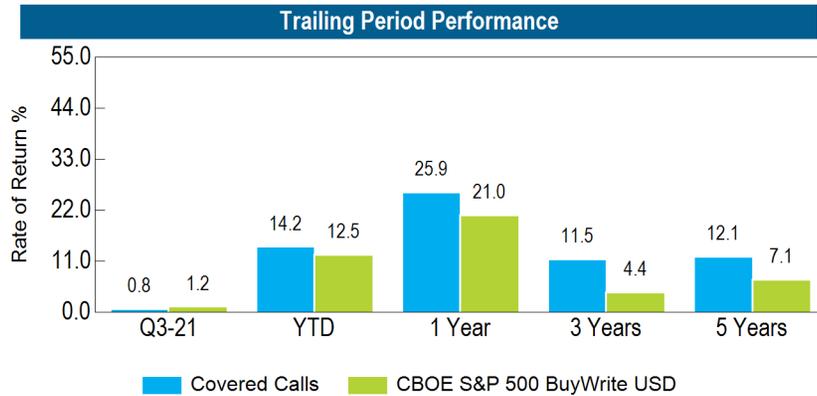
### DDJ Capital | As of September 30, 2021

	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
DDJ Capital	6.03%	8.07%	0.02%	0.96	-0.03	3.80%	91.54%	90.93%
ICE BofA High Yield Master TR	6.14%	7.39%	0.00%	1.00	--	0.00%	100.00%	100.00%



### Covered Calls | As of September 30, 2021

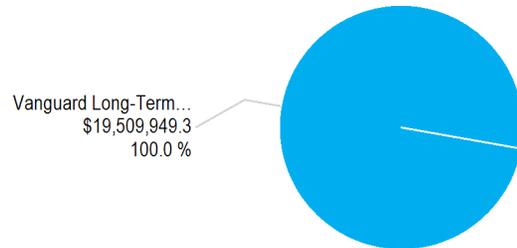
	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Up Mkt Capture Ratio	Down Mkt Capture Ratio
Covered Calls	9.93%	10.61%	0.29%	0.98	1.04	3.36%	137.38%	98.20%
CBOE S&P 500 BuyWrite USD	6.42%	10.31%	0.00%	1.00	--	0.00%	100.00%	100.00%



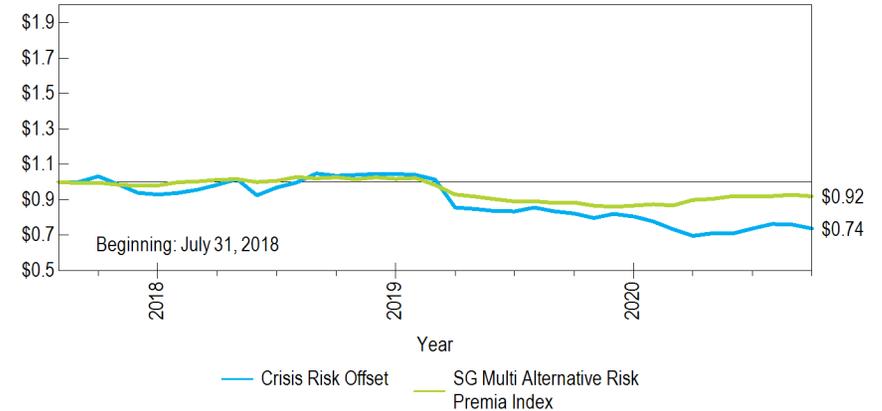
### Crisis Risk Offset | As of September 30, 2021

	Anlzd Return	Anlzd Standard Deviation	Alpha	Beta	Information Ratio	Tracking Error	Sortino Ratio	Sharpe Ratio	R-Squared	Up Mkt Capture Ratio	Down Mkt Capture Ratio
Crisis Risk Offset	-9.46%	13.89%	-0.48%	1.27	-0.57	12.09%	-0.77	-0.76	0.25	66.60%	152.67%
SG Multi Alternative Risk Premia Index	-2.62%	5.52%	0.00%	1.00	--	0.00%	-0.59	-0.67	1.00	100.00%	100.00%

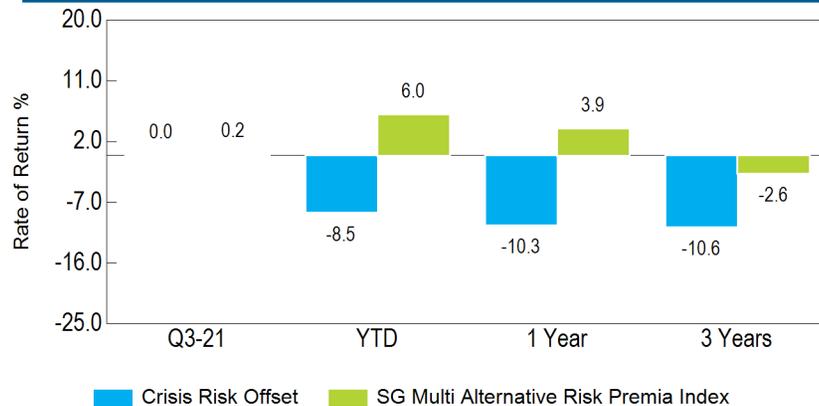
#### Current Allocation



#### Growth of a Dollar



#### Trailing Period Performance



#### Correlation Matrix

9 Months Ending September 30, 2021

	Crisis Risk Offset	MSCI ACWI	S&P 500	Bloomberg Global Aggregate TR
Crisis Risk Offset	1.00	--	--	--
MSCI ACWI	0.18	1.00	--	--
S&P 500	0.24	0.96	1.00	--
Bloomberg Global Aggregate TR	0.73	0.36	0.32	1.00

## **Manager Monitoring / Probation List**

**Manager Monitoring/Probation Status**  
**Return vs. Benchmark since Corrective Action**  
 As of September 30, 2021

Portfolio	Status	Concern	Months Since Corrective Action	Performance <sup>1</sup> Since Corrective Action (Gross, %)	Peer Group Percentile Ranking <sup>2</sup>	Date of Corrective Action <sup>3</sup>
DDJ Capital	On Watch	Performance	24	7.6	52	5/29/2019
Ice BofAML US High Yield			---	7.5		
Rice Hall James	On Watch	Performance	24	20.6	90	5/29/2019
Russell 2000 Growth	---	---	---	22.0		
Parametric	On Watch	Org changes	8	20.5	NA	10/28/2020
CBOE S&P 500 BuyWrite USD				21.0		

**Investment Performance Criteria for Manager Monitoring/Probation Status**

Asset Class	Short-term (Rolling 12 months)	Medium-term (Rolling 36 months)	Long-term (60 + months)
Active Domestic Equity	Fund return < benchmark return by 3.5%	Annualized Fund return < benchmark return by 1.75% for 6 consecutive months	VRR <sup>4</sup> < 0.97 for 6 consecutive months
Active International Equity	Fund return < benchmark return by 4.5%	Annualized Fund return < benchmark return by 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	Annualized Fund return < benchmark return by 0.40% for 6 consecutive months
Fixed Income	Fund return < benchmark return by 1.5%	Annualized Fund return < benchmark return by 1.0% for 6 consecutive months	VRR < 0.98 for 6 consecutive months

<sup>1</sup> Annualized performance if over one year

<sup>2</sup> Ranking over most recent quarter if on watch for less than 1 year, or over 1 year if on watch for more than a year.

<sup>3</sup> Approximate date based on when the Board voted to either monitor a manager at a heightened level or place it on probation.

<sup>4</sup> VRR (Value Relative Ratio) is calculated as manager cumulative return/ benchmark return.

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

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

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

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

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

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

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

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

**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.

## MEMORANDUM

**TO:** Oakland Police and Fire Retirement System (PFRS)  
**FROM:** Meketa Investment Group ("Meketa")  
**CC:** David Sancewich; Paola Nealon - Meketa  
Teir Jenkins – PFRS  
**DATE:** November 17, 2021  
**RE:** 2021 Asset Allocation Memo – Inflation Update

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### Summary and Recommendation:

During the August 2021 meeting, Meketa presented the board with expected return estimates for the next 20-years utilizing our 2021 Capital Market assumptions. Following discussion with the board, Meketa was asked to evaluate any potential changes to the asset allocation regarding the addition of an inflation sensitive component.

Currently, there is no allocation in the PFRS portfolio to inflation sensitive assets. The portfolio has three general components; public equities, fixed income and CRO. However, as PFRS continues to move towards de-risking the plan the need for risky assets (public equities) decreases.

There are three portfolio options for PFRS to consider with regard to changing the PFRS asset allocation.

1. Do Nothing – Keep the long-term asset allocation.
2. Keep the current Interim allocation. The current interim allocation has a lower allocation to CRO and a larger allocation to fixed income.
3. Create an Inflation sensitive class. Allocation 5% of the portfolios assets to an inflation sensitive component utilizing short-duration TIPs.
  - a. As of 9/30/2021 PFRS fixed income managers (Wellington, Ramirez, and Reams) had a total of 0.001% in TIPs.

***While all three of the options listed are reasonable, Meketa recommends Option #3.***

The general theme of the 2021 Meketa Capital Market Assumptions are lower future expected returns. This is a theme which is consistent across the board in the industry and largely driven by the significant changes in interest rates during 2020. Lower interest rates result in lower expected returns for most yield oriented asset classes as starting yield is often a fairly reasonable predictor of future returns for many fixed income related classes. Other approaches which focus on building forecasts from a more bottom-up or fundamental view point for equities and other economic growth risk linked classes are often (or at least in some part) influenced by valuation levels. With a strong year across the board for equity markets, valuations increased across many measures.

As such, expected returns are lower for anyone relying solely on a valuation approach as well. It's important to remember that our capital market assumptions and those of other practitioners and peers have a significant range of error in terms of potential future outcomes. For example, the higher the expected standard deviation, the higher the range of possible outcomes is expected to be for any asset class or portfolio. It is also important to note that the long-term expected portfolio compound return assumes net-of-fee returns, with no attempt to seek added value via active management.

It is important to note that our capital market assumptions are over a 20-year time horizon which is different from the time horizon used by PFRS's actuary, Chieron which projects out over 30-years. Further summary comments of our 2021 capital market assumptions and the detailed projections by asset class are shown on the following page.

- In 2021 our cash return expectations declined materially from 2020 from 2.4% to 1.1% pushing the real return expectation even further into negative territory.
  - Short-term rates declined significantly, with 3 month treasury yields starting at 1.55% and dropping to 0% on March 25th and 26<sup>th</sup> 2020, before remained low the rest of the year and ending at 0.09%.
- Fixed income yields across the maturity and quality spectrum fell significantly during 2020 reducing return expectations for Fixed Income, High Yield, and Long Duration (a part of Crisis Risk Offset).
- With the exception of Public Equities, no class in the PFRS portfolio is forecasted to achieve a compound return above 7.00% over the next 20 years.
  - Public Equity contains U.S. Equity and International Equity. The next highest returning sub-asset class is Covered Calls at ~4.7%.
- Over the next 20-years the PFRS Long-term policy portfolio is projected to produce a return of 5.63%. The addition of an inflation component reduces this return expectation to 5.48%, however this assumes normal expected inflation.

### Current Interim Policy

Investment Class	Target * (%)	2021 20-Year Assumptions	
		Exp. Comp. Return**	Expected Std. Dev.
US Equity	40	6.80	18.00
International Equity	12	7.10	19.00
Covered Calls	5	4.70	13.00
Fixed Income	31	1.80	4.00
Credit	2	4.20	11.00
Crisis Risk Offset	10	4.05	8.90
Cash	---	1.10	1.00
<b>Total</b>	<b>100</b>	<b>5.37</b>	<b>10.24</b>

### Current Long-Term Policy

Investment Class	Target * (%)	2021 20-Year Assumptions	
		Exp. Comp. Return**	Expected Std. Dev.
US Equity	40	6.80	18.00
International Equity	12	7.10	19.00
Covered Calls	5	4.70	13.00
Fixed Income	21	1.80	4.00
Credit	2	4.20	11.00
Crisis Risk Offset	20	4.05	8.90
Cash	---	1.10	1.00
<b>Total</b>	<b>100</b>	<b>5.63</b>	<b>10.21</b>

### Long-Term Policy with Inflation

Investment Class	Target * (%)	2021 20-Year Assumptions	
		Exp. Comp. Return**	Expected Std. Dev.
US Equity	40	6.80	18.00
International Equity	12	7.10	19.00
Covered Calls	5	4.70	13.00
Fixed Income	21	1.80	4.00
Credit	2	4.20	11.00
Crisis Risk Offset	15	4.05	8.90
Inflation (Short-Term Tips)	5	1.50	5.00
Cash	---	1.10	1.00
<b>Total</b>	<b>100</b>	<b>5.48</b>	<b>10.28</b>

DS, PN, pq

# Memo

**To:** Oakland Police & Fire Retirement System Board (PFRS)  
**CC:** Téir A. Jenkins, Maxine M Visaya, David Sancewich (Meketa), Paola Nealon (Meketa)  
**From:** Tamara Doi Beck  
**Date:** September 30, 2021  
**Re:** Northern Trust's Diversity, Equity and Inclusion Structure

Northern Trust's core values of service, expertise and integrity are foundational to our commitment to an inclusive culture in which all individuals feel welcomed, respected, supported and valued so that they can fully participate in and contribute to our success. Our focus on Diversity, Equity & Inclusion ("DE&I") helps us provide unrivaled service to clients and creates a healthy, thriving work environment for employees from diverse demographic groups, leadership styles and skill sets.

## DE&I Strategy

DE&I is connected to the organization's purpose and how a diverse and inclusive workforce enables our ability to deliver our business. Our strategy is driven by three primary components: Drive Accountability, Enhance Development Programs and Placement, and Advance Culture. These strategies enhance our focus on the hiring, development, and advancement of women and POC at every level.

**Drive Accountability** – our focus is to track progress of, and hold managers accountable for, measurable outcomes through the creation of a DE&I dashboard and refinement of our governance model. Our DE&I dashboard is a mechanism to increase representation at all levels through continued measurement of hiring, promotion and retention. As part of our enhanced governance model, senior leaders report progress to the Management Group through our DE&I Executive Council. Our Business Unit Leadership, Regional Councils and Business Resource Councils facilitate the development of an inclusive culture that values and leverages DE&I to achieve and sustain superior business results.

**Enhance Development and Placement** – our focus is to create targeted and scalable programs and provide tools focused on early, mid-career and senior-level advancement. Some key internal and external development programs which support and promote our DE&I goals include:

<b>Enterprise Talent Leadership Program</b>	Global internal program that seeks to prepare diverse, mid-career talent for leadership success. Over 50 percent of the program's alumni hold key leadership roles today.
<b>Women's Leadership Development Forum</b>	U.S. program focused on women and designed to address Northern Trust's corporate need to grow and develop strategic thinkers and leaders.
<b>Black Business Resource Council PREP Program</b>	PREP (Perform, Refine, Engage, Progress) is focused on Black and Hispanic partners at the entry levels to develop the skills and capabilities needed for next level roles.
<b>Next Gen Leadership Program</b>	Launched in 2019 in our Tempe, Arizona office, this program was created to support the pipeline of future leaders and develop newly promoted team leaders.



<b>HACE Leadership Programs</b>	Mujeres de HACE and HACE Leadership Academy are external leadership programs geared towards empowering Latin professionals.
<b>Top Talent Dialogue</b>	At the senior level, this program provides top talent with exposure to our Board of Directors and enables the Board to engage with talent throughout the organization.

**Advance Culture** – our focus is to advance the Northern Trust culture to create a more diverse and inclusive environment. This includes sharing external and internal DE&I messages to create transparency and elicit action, enhanced global work-life related policies to mitigate potential bias and promote retention of diverse talent, and train our partners to practice inclusive leadership. We offer a number of training sessions including:

- Understanding Bias to Unleash Potential – required for all employees
- Unconscious Bias & Inclusive Leadership Training- a three-part series on unconscious bias for managers
- Managing Bias in Interviewing - Required for all involved in the interviewing process.

Furthermore, our Business Resource Councils (BRCs) provide tools and resources to support the development of an inclusive culture. We sponsor eleven BRCs as listed below:

Advancing Professionals Resource Council (APRC)	Asian Leadership Business Resource Council (ALBRC)	Black Business Resource Council (BBRC)	Disability Business Resource Council (DBRC)
Latin Heritage Leadership Council (LHLC)	Leveraging Experiences and Perspectives Business Resource Council (L.E.A.P.)	Living In Fullness Everyday Business Resource Council (L.I.F.E.)	Military Assistance and Appreciation Resource Council (MAARC)
NT Pride Business Resource Council (NT Pride)	Women in Leadership Business Resource Council (WILBRC)	Working Families Business Resource Council (WFBRC)	

**Recruiting Strategies** – Our Talent Acquisition team employs a variety of strategies to promote successful, targeted recruitment of a diverse talent pool for entry-level positions as well as experienced hires. Entry-level and new graduate recruitment is focused on campus career fairs, diversity-focused campus events and on-site interviewing at Historically Black Colleges and Universities (HBCUs). Diverse, experienced hires are sourced through diversity-focused financial services industry events, sponsorship and support of programs hosted by diverse professional affinity groups, and attendance at professional forums and networking opportunities.

Additionally, our Campus Recruiting team has established relationships with universities and student groups across the U.S. to create and build an entry level pipeline for the organization. Key programs include Rotational Development Program (RDP) and our College Intern Program.

Northern Trust is also focused on the retention of our employees and in 2020, we launched a Global Internal Mobility Program designed to enhance the professional development and growth of our employees.

Northern Trust Asset Management

# CITY OF OAKLAND POLICE AND FIRE RETIREMENT BOARD



PERFORMANCE as of August 31, 2021

		One Month	Quarter	YTD	1-Year	ANNUALIZED			Since Inception
						3-Year	5-Year	10-Year	
<b>City of Oakland Police &amp; Fire Retirement System</b>	<b>Gross of Fees</b>	<b>2.89</b>	<b>7.65</b>	<b>20.77</b>	<b>32.29</b>	<b>18.43</b>	<b>18.25</b>		7/1/2013
2698026	Net of Fees	2.89	7.65	20.75	32.26	18.40	18.23		15.87
	Russell 1000	2.89	7.66	20.74	32.25	18.42	18.24		15.86

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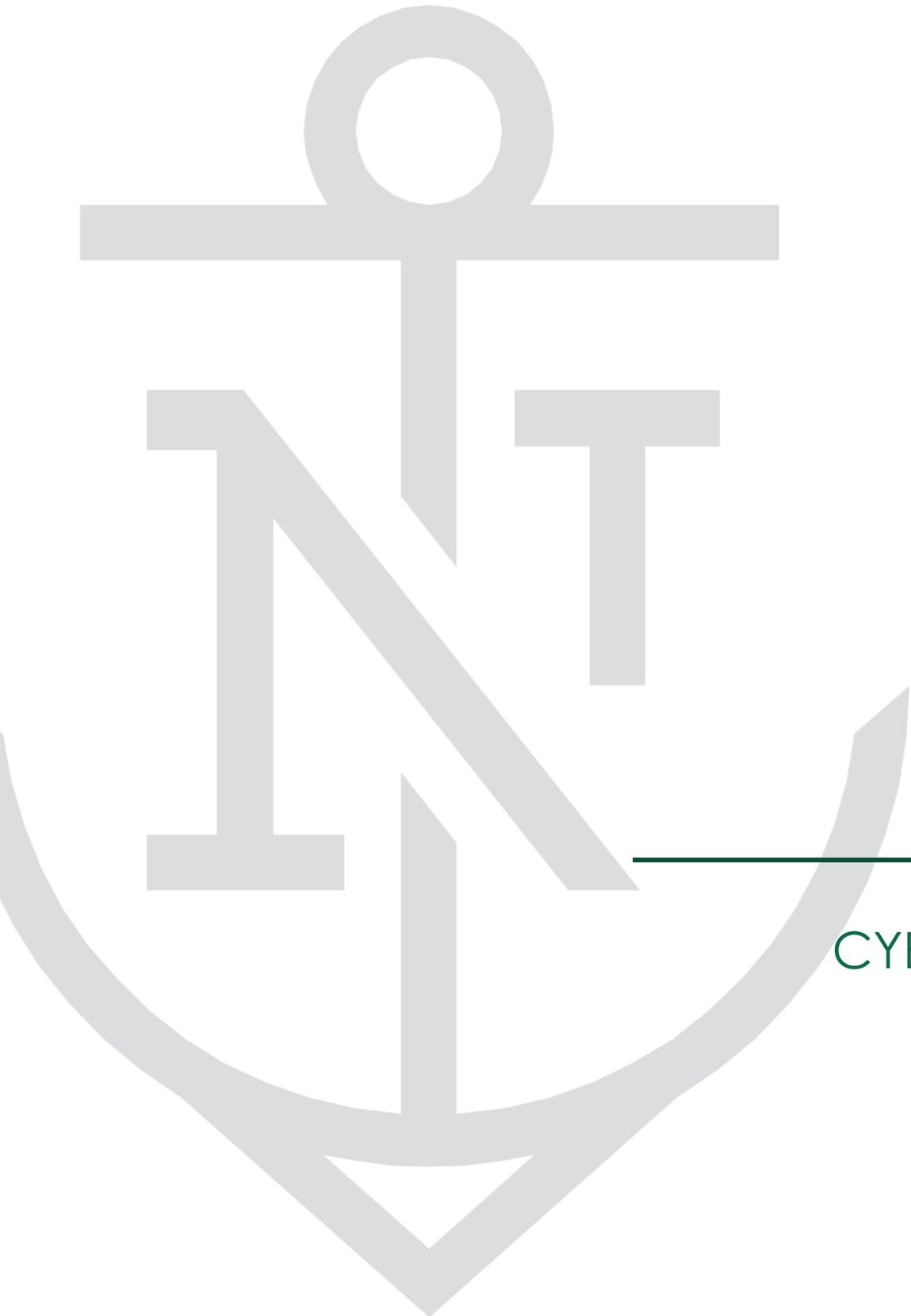
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# CLIENT TECHNOLOGY RESPONSE PROGRAM



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## CYBER SECURITY VERSION 2.8

June 9, 2021

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# CYBER SECURITY

Northern Trust's structured approach begins with a firm foundation built upon our Information Security and Technology Risk Management Policy and Program. These documents provide an Information Security Roadmap in alignment with regulatory expectations and industry best practices. As part of the roadmap, we conduct regular assessments to validate our security compliance as well as our ability to withstand cyber-attacks. As a result of these assessments, we identify potential concerns and provide management sufficient information to understand our exposures and prioritize corrective actions, where needed. We recognize that the threat landscape is continuously changing and that it is imperative that we aggressively enhance our program. We constantly evaluate new products in the marketplace, determining appropriate fit for our technology risk profile. Our Information Security and Technology Risk Management Policy and Program provide a strong roadmap in alignment with regulatory guidance and industry best practices. The supporting Information Security and Technology Risk Management Program provides explicit, tactical direction that ensures on-going protection of our critical information assets.

Northern Trust employs a multi-layered approach to protecting clients from various cyber threats that could compromise their privacy and financial wellbeing. These layers include but are not limited to:

- firewall protected and segmented networks;
- intrusion detection systems;
- fraud detection systems that alert on suspicious login activity;
- data loss prevention systems;
- client-side malware identification systems that allow Northern Trust to disable accounts logging in from malware infected computers; and
- multi-factor authentication for various types of activities, such as transferring funds outside of Northern Trust.

Northern Trust's ongoing cyber threat analysis results in its continual deployment of additional strategic layers for the security of client information.

## INDUSTRY AND REGULATORY ALIGNMENT

The Northern Trust Information Security Risk Program aligns with industry and regulatory standards and guidelines, such as those prescribed by the NIST Cyber Security Framework, ISO 27000 and COBIT.

Northern Trust also incorporates global industry leading practices in information security and technology risk management. This includes, but is not limited to, the following regulatory entities:

- Australian Prudential Regulatory Authority (APRA)
- Bangko Sentral ng Pilipinas (BSP) (Phillippines)
- Central Bank of Ireland (CBI)
- China Banking Regulatory Commission (CBRC)
- Commission de Surveillance du Secteur Financier (CSSF) (Luxembourg)
- De Nederlandsche Bank NV (DNB) (Netherlands)
- Federal Reserve Bank of Chicago
- Finansinspektionen (FI) (Sweden)
- Illinois Department of Financial and Professional Regulation (IDFPR)
- Japan Financial Services Agency (JFSA)
- Monetary Authority of Singapore (MAS)
- National Futures Association (NFA)
- Office of the Superintendent of Financial Institutions (OSFI) (Canada)
- Securities and Exchange Commission (SEC)
- Securities and Futures Commission (SFC) (Hong Kong)
- UK Financial Conduct Authority (FCA)
- UK Prudential Regulatory Authority (PRA)
- Cayman Islands Monetary Authority (CIMA)

## PERIMETER AND NETWORK SECURITY

The Northern Trust Network Perimeter Security Control Standard provides the requirements for the security of Northern Trust's network infrastructure which is critical to protect the confidentiality, integrity and availability of information assets.

The standard applies to Northern Trust's approved and supported network infrastructure devices (e.g., firewalls, routers, switches, and intrusion detection and/or prevention systems) and approved third party systems and devices attached to a Northern Trust managed network.

Northern Trust uses a collection of firewalls and routers to separate the public network (the Internet) from Northern Trust's internal network. Redundant connections exist from multiple Internet providers. Management configures firewalls to restrict inappropriate internet traffic. Redundant firewalls – with stateful fail-over – are placed behind the border router on each Internet connection. Access is logged and the log records retained for a minimum of 12 months.

### INTRUSION DETECTION & PREVENTION

Real time intrusion detection is managed through the Northern Trust Security Incident Response Process. IDS/IPS sensors are located on both the interior and exterior of the network, are monitored by the Northern Trust Cyber Coordination Center (NTC3) and configured to monitor internet traffic, identify patterns of known attack signatures and log critical information for trend analysis. Prevention capabilities are enabled after thorough testing is conducted to avoid business interruption. IDS/IPS Signature files are kept up-to-date at least daily. IDS/IPS sensors also feature advanced malware protection capabilities.

Security incidents identified from logged activity are summarized and reported to management, and appropriate follow-up action is taken. Also, Northern Trust uses real time monitoring for performance analysis to help ensure system availability.

### WIRELESS NETWORKS

Northern Trust permits limited private wireless functionality for Northern Trust owned workstations. Northern Trust requires two-factor authentication to connect to the Private wireless network. The following must be true in order to authenticate and connect to the private network:

- The local workstation is a registered Northern Trust owned machine.
- Valid login credentials to the local workstation and Northern Trust network.

Northern Trust permits public wireless functionality for non-Northern Trust devices. The device will be redirected to the public internet portal. Per the vendor's requirements, the user must agree to the User Acceptance Policy order to gain full connectivity to the public Internet. If a user connects to the public wireless infrastructure, they will not have access to Northern Trust's internal network.

Northern Trust, as part of its network scanning process, continually performs tests for rogue wireless access points connected to corporate network. Also, Northern Trust, as part of its annual Penetration Assessment, which is performed by an independent third party firm finds wireless access points (APs) connected to the Northern Trust internal network by conducting a sampling of five Northern Trust locations.

### REMOTE ACCESS CONTROLS

Remote access to Northern Trust's internal network resources requires the use of dual authentication mechanism(s). KEY Authentication measures include a combination of the following: a One Time Password (OTP) token, network ID, and Password (changed monthly). To obtain an OTP token and passcode a partner or partner's manager must initiate a request via Northern Trust's Identity Management System (IdM).

VPN will create an encrypted network session on the Internet. The VPN client is preset to only link to the IP address of a Northern Trust VPN router. After the router handshake with the remote client PC, the partner is prompted to authenticate using his/her OTP token. The partner enters his/her network login ID and the OTP token passcode. Once the partner is authenticated the partner connection will appear as a local node on the internal network, the same as if connected from within Northern Trust's physical network. Management controls VPN access to the network by logging access attempts and reviewing the OTP token access annually.

### **DENIAL OF SERVICE PROTECTION**

Through the use of automated alerts on internal systems, Northern Trust utilizes managed services to detect and respond to DDoS and DoS attacks. Northern Trust employs solutions for both layer 7 and volumetric attacks. In the event an attack is identified, Northern Trust has a Technology Security Incident Response Standard which outlines the requirements for responding to Technology-related Security Incidents such as Distributed Denial of Service (DoS) attacks and assigns responsibilities to the Technology Incident Response Team.

Procedures include the use of third party's Anti-DDoS services and/or devices. Specifically Northern Trust has developed a playbook specifically tailored to Denial of Service (DoS) attacks that impacts the quality of our Internet-based service (including Distributed DoS attacks). Our playbook includes intelligence and monitoring, pre-established communications for both clients and employees, operational and technical methodologies for maintaining/restoring operational quality of service, incident management coordination and ownership, and contingency plans for issues that cannot be conceived of or planned for.

### **BOTNET PROTECTION**

Northern Trust utilizes several mechanisms to combat its network from botnet intrusion, such as, but not limited to: employing intrusion detection services, malware management and applying fixes/patches as needed. No one control is a silver bullet, rather we use an "overlap" approach that provides a diverse set of technology mitigations from multiple providers. Our philosophy is that we cannot prevent all cybercrime, so detection and quick response is a priority.

### **SECURITY INCIDENT MANAGEMENT AND RESPONSE**

The Northern Trust Technology Security Incident Response Control Standard outlines the requirements that Security Incidents must be identified and appropriately addressed to sufficiently restore affected Northern Trust Information Systems in a timely fashion. Incident response procedures must include appropriate monitoring and escalation of incidents to ensure proper remediation and implementation of preventative measures to reduce the likelihood of Incidents reoccurring.

A Technology Security Incident or cyber security incident is defined as a suspected or actual breach of the Northern Trust Technology environment or the act of willfully exploiting a vulnerability in an Information Security control. Examples include:

- Introduction of a virus or malware into the Technology environment;
- Successful or threatened denial of service (DoS) attack or malicious disruption of an Information System, or;
- Unauthorized access to an Information System that results in the malicious alteration or theft of information.

### **CYBER THREAT FUSION (CTF) PROGRAM**

The Northern Trust Cyber Threat Fusion (CTF) Program provides intelligence-driven capabilities to proactively prevent detect and respond to cyber threats in a consistent fashion. The CTF program considers a holistic approach to cybersecurity by defining the processes and collaboration required between various Northern Trust resources, such as Northern Trust Cyber Coordination Center (NTC3), Fraud Prevention Investigation Unit (FPUI), Corporate Risk, Anti-Money Laundering Group, Global Business Continuity and Recovery Services, Technology, Human Resources, Legal and Corporate Communications.

The Cyber Threat Fusion (CTF) Group is a mechanism to bring together these cross functional resources to facilitate the execution of an effective response in the event of an enterprise level cybersecurity incident. This may be an incident that has not been encountered before, requires a high level of cooperation across the organization or whose size or scale requires the involvement of senior organization stakeholders.

The CTF group oversees the cybersecurity incident response, including completion of post incident assessments and monitoring / tracking of any issues documented from that exercise. The CTF group may escalate items to the Information Technology Risk Committee and also plays a role as an escalation point for cyber threat information.

### **NORTHERN TRUST CYBER COORDINATION CENTER (NTC3)**

The Northern Trust Cybersecurity Coordination Center (NTC3) conducts 24x7x365 security monitoring, analysis, reporting and security incident identification, determination, prioritization, and directed response support functions in order to improve the information security risk management program. The process consists of the following steps: detection, incident analysis, response and recovery, and post-incident analysis.

### **THREAT INTELLIGENCE AND DETECTION**

Threats are brought to the attention of Northern Trust by a variety of sources including multiple threat intelligence services, activities seen in various system security logs, The Northern Trust Help Desk, Northern Trust Cyber Coordination Center (NTC3), Fraud Prevention Investigation Unit (FPUI), Corporate Risk and Anti-Money Laundering Group, the Financial Services Information Sharing and Analysis Center (FS-ISAC), and technology specific alerts (such as Microsoft or Oracle).

Northern Trust's threat detection capabilities are enabled through an enterprise big data platform for log capture, indexing, correlation and analysis. The Security Information Event Management (SIEM) platform has been configured to ingest logs that include, but not limited to: firewall, intrusion detection/prevention, network devices, data loss prevention, operation system platforms, database management systems, workstations, and other security monitoring systems. Threat intelligence feeds as well vulnerability scan findings are also fed into the platform. The platform also provides controls to secure logs from unauthorized alteration or deletion, as well as retention for at least 12 months per Northern Trust policy.

### **INCIDENT ANALYSIS**

Security incident response procedures require that incidents are recorded and analyzed to assign an appropriate priority based on type, urgency and impact to Northern Trust.

Upon identification of an actual or suspected incident, a threat analysis is performed to prioritize the Technology Security Incident based on its type, urgency and impact to Northern Trust. A documented process is in place for classifying and prioritizing incidents.

### **RESPONSE AND RECOVERY**

The Cyber Security Incident Response Process is formally documented in the Enterprise Cyber Incident Response Plan and defines the roles and responsibilities for the Cyber Threat Fusion Council (CTF) to identify, protect, detect, respond, and recover from the cyber security incidents affecting Northern Trust in a timely fashion.

An escalation process is used to notify appropriate individuals of an incident and enable appropriate management oversight and monitoring of the incident resolution timeframe and aging.

If a cyber security incident is identified as a breach, Northern Trust would employ its Cyber Security Incident Response Playbook which includes the security breach response process. The process is followed along with an immediate review and investigation of the circumstances of the reported event. The Security Breach Response Team (SBRT), which is led by Northern Trust's Chief Privacy Officer and includes representatives from Global Compliance, Legal, Fraud Prevention, Technology Risk Management and Technology, will bring together the appropriate business unit experts to evaluate the potential breach and its impact. In those cases when client information has been accessed by unauthorized persons or used inappropriately, the team will work with business partners to contain and control the incident to prevent further unauthorized access or use and notify regulators, law enforcement authorities, and clients as appropriate and/or legally required. Also, the process includes procedures for communicating security breaches to clients as required by law, and without undue delay.

Efforts to remediate or recover from an incident are communicated to impacted individuals, as necessary, commensurate with the type and severity of the incident.

A Post-Incident analysis (PIA) is performed and documented according to the Enterprise Cyber Incident Response Plan to identify the root cause of the incident. Lessons learned from the incident are documented as follow-up action items

and are tracked through completion. These are often seen as updates to the incident response procedures, Technology Control Standards or IT procedures are made – if necessary – to help prevent similar incidents from occurring.

### **CYBER SIMULATIONS**

Northern Trust conducts regular cyber threat exercises throughout the year. A dedicated team prepares, plans, designs, and executes the exercises as well as coordinates follow-up actions based on the findings of each exercise. The scenarios include both ‘tabletop exercises’ as well as more immersive cyber rehearsals such as a data breach, website defacement, denial of service attack or the discovery of sophisticated malware on a corporate network. To date, these exercises have been both closed loop and distributed. Scenario participants vary, but represent members from Risk Management, Information Security Operations, Incident Response, Audit, Corporate Communications, Business Continuity, Human Resources, Information Technology Operations, Legal, Physical Security, Privacy and regional and global business areas. Upon the completion of each exercise, material lessons learned are incorporated into operational practices.

Northern Trust participates in various cyber exercises with industry groups to contribute and gain insight on cyber resiliency leading practices. Industry groups include, among others; InfraGard (FBI private sector relationship), Financial Services - Information Sharing and Analysis Center (FS-ISAC), the Financial Services Sector Coordinating Council (FSSCC), and the UK CERT - Cyber-security Information Sharing Partnership (CiSP).

### **CYBER INSURANCE**

Northern Trust carries Cyber Network Security Liability that protects against claims involving information theft, damage to or destruction of electronic information, intentional and/or unintentional release of Confidential or Personally Identifiable Information, alteration of electronic information, extortion, regulatory enforcement, denial of services and network security. Policy also covers costs incurred for hardware or equipment replacement due to or resulting from a cyber breach incident. Policy includes legal costs incurred to defend Northern Trust Corporation, The Northern Trust Company and its subsidiaries against allegations brought by third party for loss/theft of data and personally identifiable information due to a cyber breach incident.

### **MALWARE MANAGEMENT**

Malware, or malicious software, continues to be one of the top cyber security threats faced by businesses and individuals. Northern Trust employs a multi-layered approach to malware management.

The Information System and Desktop Security Configuration Control Standard provides the requirements for configuring, deploying and managing to meet the security requirements of the Corporation. Information Systems must employ appropriate virus and malware prevention mechanisms – including security hardening and patch management – to limit possible attack vectors and help prevent malware incidents from occurring.

### **MALWARE PREVENTION AND DETECTION CONTROLS**

Northern Trust utilizes solutions from several industry leading vendors to provide layers of defense for prevention and detection of malware and viruses. Virus scanning software is installed, with updates automatically downloaded from the vendor and pushed out on no less than a daily basis on all network servers, desktops and laptops and configured to identify potentially harmful software. Advanced malware protection software with blocking capability is also enabled on desktops, laptops, servers and at the network level (via intrusion prevention appliances).

Email is one of the most common vectors for introduction of malware; as such additional controls have been employed. Before incoming email enters the Northern Trust network, it is routed through security software for deep message level inspection and threat analysis. Detection and prevention capabilities provided by this software include, but are not limited to:

- Block and quarantine messages with known malicious attachments or links (URLs) to prevent them from reaching user inboxes;
- Sandbox capabilities that are constantly updated to detect new tool, tactics and targets; and
- Predictive, machine-learning analysis capabilities to identify and sandbox suspicious URLs.

As an added layer of protection to intercept and proxy requests through web browsing, Northern Trust has enabled an intelligent security software proxy policy for HTTP and HTTPS traffic. This proxy policy protects Northern Trust partners from potentially malicious web sites by brokering the connection between the partner and the potentially malicious web content. The proxy policy allows access to known good sites without being proxied, avoids the need to proxy requests to domains that are known to be malicious as they are blocked at the DNS layer, and proxying those sites that could pose a potential risk by filters and blocks against specific URLs hosting malware.

Removable media (USB drives, CD/DVDs, etc.) is also another vector for introduction of malware. As such, Northern Trust blocks by default the ability for all workstations to read any type of removable media or mass storage device.

Security event logs from these various detective and preventive solutions are ingested into Northern Trust's centralized logging platform for correlation and analysis, along with logs from many other platforms including IDS/IPS, workstations, and servers. This allows Northern Trust's Cybersecurity Coordination Center (NTC3) to detect and respond to isolated or more significant malware events.

Ransomware is a specific type of malware designed to block access to computer systems unless a ransom is paid. Typically this is achieved via encrypting file systems. Northern Trust has controls at the data backup layer to minimize loss of data in the event a ransomware attack.

The Trusteer Pinpoint system is a non-invasive product that detects banking malware on client's computers when they access a Northern Trust Portal. The Fraud Prevention Team (FPT) notifies the Call Center and the client's Relationship Manager when such alerts are generated so the client may be notified of the malware infection on their computer. The client's passport access remains revoked until the client provides notice that their machine has been cleaned of the malware.

## **SECURITY HARDENING**

Northern Trust has a suite of security hardening requirement documents that establish the requirements for hardening Northern Trust's infrastructure to prevent malware and other cyber security threats. These requirements are derived from industry standards including the Center for Internet Security (CIS) and refreshed at least annually. These include requirements including but not limited to disabling unnecessary services, default accounts (e.g., guest accounts, administrator or root level accounts, accounts associated with local and network services) and network protocols. All new builds are required to comply with these.

Northern Trust partners and contractors are not granted administrator rights to their desktops and laptops, thus preventing them from being able to install any software on their computers. Each Northern Trust laptop or desktop is built with a standard build and deployed from a central location.

## **VULNERABILITY AND PATCH MANAGEMENT**

Northern Trust follows procedures for staying current with threats and applying fixes/patches as appropriate. A risk-based approach is taken to addressing vulnerabilities and can involve patching, reconfiguration or other accepted means of mitigation. Patch management procedures include steps to evaluate implementation based on the risk of the identified threat. Evolving risks and threats are routinely monitored by the platform team and considered for implementation based on compatibility risk. Northern Trust utilizes platform specific tools/utilities and/or processes to apply patches in line/comply with its standards.

Northern Trust's Technology Security team manages a formal vulnerability management process. Network vulnerability scans are performed using industry leading vulnerability scanning products against the Northern Trust network from sources internal to the network (monthly scans) and sources outside the network's perimeter (weekly scans). These scans are performed to identify security vulnerabilities resulting from insecure systems configurations, missing or misapplied security patches or use of outdated third party software. Conducting scans both internally and externally provides a comprehensive understanding of the risks posed by both public and internal threats. Authenticated scan are used wherever possible to enable interrogation of all software on the host.

## INTERNAL ACCESS CONTROLS

Northern Trust uses a multi-layered approach for access to application data files and programs, and therefore ensures access is limited to properly authorized individuals. Northern Trust has an enterprise identity and access management system, referred to as Identity Manager (IDM). IDM serves as a centralized data store and workflow engine for the access control process.

The assignment of access rights is based on the role performed by the user and therefore, access to Northern Trust data is granted on a "need to know" or "least privilege" basis. Through the enforcement of this policy, only partners that need access to certain information to perform their job are granted access.

The Identity Management system is configured to highlight several types of access privileges for which the requesters and approvals should take extra diligence. This includes applications with information classified as Highly Sensitive, access privileges categorized as High Risk, and access privileges that present potential segregation of duties conflicts. For privileges designated as High Risk, as well as any other privileges designated by the system owner, access requests must be approved by the system owner in addition to the user's manager.

Once all necessary approvals have been retained, access provisioning processes may begin. In some cases, Identity Manager is able to systemically provision the approved access. In other cases, manual provisioning tasks are necessary, such as those performed by Global Access Provisioning of Security Technology.

## TRANSFERS AND TERMINATIONS

The Identity Management system receives a feed of transfer employee information from the Human Resources system to trigger the transfer access control processes. Firstly, Global Access Provisioning is notified to remove sensitive access rights (for example, applications that perform money movements).

Additionally, managers are required to perform a Transfer Retention Review within 30 days of the Transfer Date. This review is meant to make sure that only the access required for the employee's new job or temporary support of the old job is retained. All other access will be removed due to the transfer.

The Identity Management system also receives a feed of employee termination information from the Human Resources system to trigger the termination access control processes. Network access is suspended systematically via the IDM system's automated provisioning capabilities. Removal of further access rights is then performed via automated and manual provisioning processes. Procedures are also in place to handle special access removal or monitoring requirements in the event of high risk terminations.

## ACCESS CERTIFICATION

Northern Trust's policy requires that a system access review is completed at least annually by the business unit management to validate the following:

- Access is limited to the appropriate information systems and privileges that are required for each individual to perform their job functions and responsibilities;
- Access has been removed for all terminated individuals, and;
- Access is updated for individuals who may have transferred between departments.

Similar to the access request process, the access certification workflows in Identity Manager have been configured to highlight several types of access privileges (applications with information classified as Highly Sensitive, access privileges categorized as High Risk, and access privileges that present potential segregation of duties conflicts) for which the manager should have increased diligence during certification.

If an access certification is not completed within 30 days of the due date, the user's access (other than basic access such as email, etc.) is suspended until the review is completed by the manager.

## PRIVILEGED ACCESS MANAGEMENT

Northern Trust addresses Privileged Access Management (PAM) through a framework of controls designed to provide additional security to highly privileged accounts, such as those used for system or security administration. The framework includes controls based upon requirements documented in several Northern Trust Technology Control Standards:

- User Identification and Authentication Control Standard,
- Information System Development and Maintenance Control Standard, and
- Access Certification Control Standard.

### ACCESS MANAGEMENT AND CERTIFICATION FOR PRIVILEGED ACCOUNTS

Authorization rights are controlled by general data security procedures for granting access to specific computer logon IDs upon receipt of an approved request through the Identity Manager (IDM) online request mechanism. Accounts used by individuals with platform security administration functions and elevated privileges are considered Privileged Accounts and must be approved by management and the platform owner. Per the standard, validation of these accounts is performed at least semi-annually while technology specific account certification is performed quarterly by application and/or platform owners and includes but not limited to the following:

- Access is limited to the appropriate individuals and required to perform job functions and responsibilities;
- Access has been removed for terminated individuals;
- Access is updated correctly for individuals who may have transferred between departments; and
- Unnecessary, excessive, or unused access privileges are removed.

Results of the Access Certification for Privileged Accounts must be documented and retained for a period of at least 12 months.

### ENTERPRISE PASSWORD VAULT (EPV)

The Enterprise Password Vault (EPV) is a core component of Northern Trust's Privileged Access Management control framework. EPV is a highly secured (FIPS compliant) and highly available system that provides a single point of access which secures and manages passwords associated with privileged accounts. The tool allows a user to check out a one-time, exclusive use password for a privileged account when access to a production environment is needed. This access expires in 24 hours.

Multifactor authentication is required to access the Enterprise Password Vault. The user must successfully authenticate into the Enterprise Password Vault using both their LAN ID and passwords and a one-time use token value. Only individuals authorized to use a specific EPV Production ID will have the ability to check out the Production ID and obtain a password. Access is requested and provisioned through Northern Trust's enterprise Identity Management (IDM) system.

### SEPARATION OF DUTIES PROGRAM (SDP)

The Separation of Duties Program (SDP) is an extension of Privileged Access Management which implements controls related to making changes in the Northern Trust's application production environments. IT developers update production data or code by one of the following methods:

- Use of a third-party team to perform the update
- Use of systematic tools to perform the update

Where this is not possible due to technical constraints (e.g., some vended applications), the SDP governs nonsystematic updates of production code and data by IT developers. These controls are used to restrict and monitor developer access to the production environments, which is accomplished by logging when changes are made and validating changes were authorized. SDP addresses security and data integrity risk by protecting the production environment. Specifically, Separate of Duties controls:

- Restrict developer access to production,
- Log application data and code changes in the production environment, and
- Validate that changes are recorded and approved.

## **CLIENT ACCESS CONTROLS**

Northern Trust segregates data based upon logical security. Northern Trust employs a Row Level Security Model based on the identity of the client. Therefore, data from client A cannot be viewed by client B. Also, Row Level Security is used for data storage.

For clients, each user is given a unique ID and a password. Associated with the ID is a client identifier that denotes the client entity with which the user is associated. Users are given a seven digit ID; the first five digits representing the client organization and the last two digits representing the individual user within the organization. The five digit number is unique to each client and will allow the user to gain access the client entity data. The link between the User ID and client identifier segregates data and prevents disclosure or access by another client firm. The two digit user identifier allows each user to be further segregated; this allows a further segregation of data access within each organization. Therefore, each organization will be allowed to restrict an individual's data access based upon their role within their organization. In addition to the seven digit ID, each organization is assigned a unique account number, which must be entered along with the seven digit ID and password in order to gain access to the client data.

Highly sensitive applications such as money movement and trade instructions require authentication via a One Time Password (OTP) token in addition to the client unique ID and password. Based upon successful authentication, the client identifier associated with the ID is used to determine which specific records in the database the user will be allowed to see.

## **DATA PROTECTION**

The Northern Trust has a number of corporate policies, programs and guidelines that contain important information pertaining to the use of confidential information and the protection thereof. Information security measures at the Northern Trust Corporation are intended to preserve the integrity of client relationships, protect valuable information assets, and protect the Corporation's legal interests.

### **ACCEPTABLE USE POLICY (AUP)**

The Acceptable Use Policy's objective is to instruct Individuals with regards to the proper use of Northern Trust Communication Systems and requirements that must be understood and followed.

### **CODE OF BUSINESS CONDUCT AND ETHICS**

The Code establishes a number of basic principles to be followed in all dealings within Northern Trust, and with clients, suppliers, shareholders and regulatory agencies worldwide.

### **STANDARDS OF CONDUCT POLICY**

Employees attest to having read and in compliance with the Standards of Conduct Policy as part of their annual Information Security Policy attestation.

The policy is a statement of basic principles to be followed by all directors, officers and employees of Northern Trust Corporation and its subsidiaries at all levels throughout the world.

### **INFORMATION ASSET CLASSIFICATION STANDARD**

The Information Asset Classification Standard provides the criteria and requirements for classifying and handling Information Assets based on their sensitivity, and level of risk that may result if the Information Asset were to be inappropriately used, lost, disclosed, modified or accessed by an authorized or unauthorized party. The standard enables Northern Trust partners to:

- Recognize the sensitivity of Information Assets and associate the information to one of three categories: Highly Sensitive, Sensitive or Not Sensitive – Business Use.
- Apply appropriate handling and security controls to protect information commensurate with its sensitivity level.

An Information Asset includes both documents and data, regardless of their format, whether physical or electronic (e.g., paper documents stored in file cabinets, electronic documents stored on a computer, or data in a database) that are used for a business purpose.

Personally Identifiable Information (PII), per the Northern Trust Information Asset Classification Standard, is information of the highest personal, technical or business sensitivity that warrants the greatest measure of protection. This information is critical to the financial success of Northern Trust or the protection of its client's privacy and

financial security. Information which can be used in combination with a person's name, address or telephone number, to determine the identity of any individual are examples of Personally Identifiable Information (PII). Specifics include, but are not limited to:

- Social Security Number
- Individual Taxpayer Identification Number
- Date of birth
- Driver's license number
- Individual National or State Identification Number
- Individual National or State Healthcare Identification Number
- Passport number
- Government issued Visa number
- Credit information
- A person's name in combination with their racial or ethnic origin, political opinions, religious beliefs, union membership status, physical or mental health or condition, sexual life and criminal history
- Details pertaining to prospective clients covered by non-disclosure agreement and/or when specific instructions are given not to disclose the prospective client name

#### **ELECTRONIC MESSAGING COMMUNICATION CONTROL STANDARD**

The Electronic Messaging Communication Control Standard describes the requirements for sending electronic messaging communication containing Highly Sensitive and Sensitive Information Asset types, as defined in the Information Asset Classification Standard, to external parties, retaining electronic communication, and receiving emails that contain transactional instructions.

#### **DATA STORAGE CONTROLS**

For data stored on Northern Trust systems or traversing its network, Northern Trust has numerous layered controls for the protection of Highly Sensitive (including those fields included in the Law), Sensitive, and Internal Use information at the Northern Trust. They include and not limited to Access Controls, Perimeter Protections (e.g., Firewalls/ Proxies), Intrusion Detection Systems, Data Exfiltration Protection, enterprise application and system vulnerability scanning, 3rd party penetration testing/validation, log review and alert services, and retainer based third party forensic services; all of which are governed by a set of Policies/Standards/Guidelines that are reviewed at least annually. For information copied to portable media (laptops, USB, CD, DVD drives, etc.) Northern Trust forces the use of encryption and monitors for Highly Sensitive data being placed on mobile devices via Data Loss Prevention software (see the following section for further restriction regarding the of use of mobile media/mass storage devices).

Northern Trust segregates client data based upon logical security. In addition, Northern Trust employs a Row Level Security Model based on the identity of the client for data storage. Therefore, data from client 1 cannot be viewed by client 2. Web and application servers are behind multiple layers of firewalls.

#### **DATA LOSS PREVENTION**

Data Loss Prevention (DLP) refers to the use of technology to monitor and potentially block the use of specific data within an organization and the electronic transmission of data outside of the organization. Northern Trust uses its data loss prevention tool to inspect the contents of emails, file transmissions, web transmissions, printed documents and faxes. The content is inspected, compared against policies, and any deviations from policy are logged as alerts. A combination of manual and automated workflows is then used to track and resolve these alerts. This blocking capability protects client information in keeping the Acceptable Use Policy and Northern Trust Electronic Messaging Communication Standard.

#### **DLP CONTROLS**

In order to ensure adherence to the Northern Trust's Acceptable Use Policy and Electronic Messaging Communication Control Standard, the DLP system monitors emails to external parties that contain any the following types information:

- Personal client account numbers i.e. block if a client name and account are in an email and they match
- Tax or National Insurance identification numbers

- Credit card and passport numbers
- Names of anonymized clients
- Documents intended for Northern Trust Internal Use
- Attachments without password protection

DLP policies either block or auto-encrypt emails that contain this type of information. If the recipient has TLS, all messages between Northern Trust and the recipient are always encrypted.

#### **ENDPOINT POLICIES**

A DLP agent has been installed on all Northern Trust desktops and laptops in order to provide additional monitoring of sensitive data that is printed, downloaded to portable media (after business justification is reviewed and approved by the Data Protection Working Group), or posted to encrypted websites.

The endpoint agent also prevents employees from transmitting through the File Transmission Protocol (FTP) from their desktops and laptops.

#### **ALERT REVIEW AND NOTIFICATION**

Certain policies have automated workflows to block or auto-encrypt messages and notify the employee and his or her manager of the potential violation. Alerts from other policies are tracked and reviewed by the Fraud Prevention Team and escalated as appropriate.

#### **DATA EXFILTRATION CONTROLS**

Northern Trust has several layers of controls in place to protect PII in regards to storing or taking PII offsite, including but not limited to:

- Access to all Northern Trust data is granted with a "need to know" or "least privilege" granted. Access requires management approval and sign-off before it is granted. Through the enforcement of this policy, only partners that need access to PII to perform their job are granted access. Furthermore, entitlement reviews are conducted at a minimum of once a year, and the controls are tested as part of a SOC1 Report.
- Northern Trust blocks by default the ability for all workstations to read or write to any type of removable media or mass storage device (USBs, CDs, DVDs) per corporate policy unless the partner has a justifiable business reason for needing to do so. There is a formal documented procedure in place for allowing encrypted write access to removable/portable media. The request to enable this ability is reviewed by the Data Protection Working Group, and only approved if a valid justification is provided.
- Northern Trust laptops use whole disk encryption that meets the National Institute of Standards and Technology (NIST) encryption standards. This is an added safeguard to prevent PII falling into the wrong hands should a partner's laptop be lost or stolen.
- Northern Trust email transmissions are logged and stored into an email compliance system. Sending client information without authorization via email is strictly prohibited. All email messages are saved from the email server journal file automatically.
- Access to external personal Internet email accounts and web storage is blocked. (Yahoo, Gmail, DropBox, Box, etc.).
- Access to all websites categorized as "social networking" are blocked (e.g., Facebook, Twitter, Instagram, Tumblr, Pinterest, etc.) with the exception of LinkedIn.
- Northern Trust blocks external access to Instant Messaging through its proxy.
- Guidelines also state that client information stored on removable media (laptops, USBs, CDs, DVDs) and removed from premise when a legitimate business need exists, the PII must be removed from the removable media when storage is no longer necessary.

## ENCRYPTION AND KEY MANAGEMENT

The Northern Trust Cryptography and Key Management Control Standard provides the requirements for protecting Highly Sensitive and Sensitive information from unauthorized access and alteration. Where appropriate, cryptographic controls are applied to electronic information in storage, before it is transmitted to an external party, or during transit over public or company networks. Northern Trust's cryptographic controls are managed appropriately to prevent unauthorized access to, or disclosure of, keys used to encrypt and decrypt information.

Client-sensitive application data transmitted over the public Internet is encrypted. Application users must use browsers with a minimum of 128-bit encryption while Northern Trust recommends the use of 256 bit.

Northern Trust encryption specifics include but not limited to the following:

- Northern Trust supports PGP, TLS and S/MIME.
- Web-based services require that clients use a Transport Layer Security (TLS) compliant browser. TLS uses a minimum of 128 bit encryption while Northern Trust recommends the use of 256 bit.
- PGP Key Size setting is 2048.
- PGP Universal Server is used for encrypting e-mail sent to/from outside parties.
- PGP Universal Server is used for key management for secure email.
- PGP keys are also used and managed by the File Transmission team.
- For external certificates, Northern Trust uses a managed PKI service.
- Northern Trust has an established program for managing PKI for both internal and public facing certificates.
- Issuance of keys and certificates follows industry best practices.
- Northern Trust laptops and desktops use whole disk encryption solution BitLocker which is a product that meets the National Institute of Standards and Technology (NIST) encryption standards.
- By default, Northern Trust blocks the ability for all workstations to read or write to any type of removable media or mass storage device (USBs, CDs, DVDs) per corporate policy. USBs, CDs, and DVDs use removable media encryption when a valid business justification has been provided and approved to enable the ability to write in an encrypted format. The request to enable this ability is reviewed by the Data Protection Working Group.

## FRAUD AND IDENTITY PROTECTION CONTROLS

### ONLINE FRAUD DETECTION SERVICES

With the help of unique clustering algorithms, The Northern Trust Fraud Detection System is able to detect suspicious activity. While the system observes the user's transactions, it discovers common behavior patterns by grouping similar transactions together. Controls include behavioral analysis of login activity and sensitive actions such as money movement transactions, allowing for the identification of money movement transactions that appear anomalous to a client's normal activity. This will allow Northern Trust to work with clients to ensure the transaction is legitimate, reducing the risk of fraud against client accounts.

When suspicious activity is detected, the system presents a set of challenge/ response questions to verify the client's identity.

Multi-factor authentication options include out of band authentication, allowing for delivery of passcodes via SMS Texts or Voice Calls, as well as out of wallet challenge response questions.

### IDENTITY THEFT

Northern Trust maintains a formal Identity Theft Prevention Program to detect, prevent, and mitigate identity theft in connection with the opening of accounts or the processing of transactions through existing accounts. The Program includes a listing of forty-two "red flags" that may signal that Identity Theft has occurred, including procedures for detecting and responding to those red flags. Northern Trust also employs a number of automated systems that are designed to detect and/or prevent a variety of fraud types, including check fraud, identity theft, unauthorized system access, and internal fraud.

## **INDEPENDENT VULNERABILITY / PENETRATION ASSESSMENT**

Northern Trust performs an annual vulnerability/ penetration Assessment. This assessment is executed by an independent third party firm who performs a series of security penetration and diagnostic activities directed at key components of The Northern Trust computing environment.

The assessment includes but not limited to the following:

- External Penetration Testing,,
- Wireless Penetration Testing,
- Web Application Penetration Testing, and
- Social Engineering - User Awareness Exposure.

The objective of the assessment is to assist management in determining if Northern Trust's information resources and networks are subject to undue security risks and exposure to malicious or unauthorized individuals. The results of the assessment are incorporated into a report and conveyed to senior management for review and appropriate follow-up.



**NORTHERN  
TRUST**



## Shared Value

Since our founding in 1889, Northern Trust has actively advanced a culture of caring and a commitment to invest responsibly in the communities we serve worldwide.

# Diversity, Equity & Inclusion



Northern Trust's core values of service, expertise and integrity are foundational to our commitment to an inclusive culture in which all individuals must be welcomed, respected, supported and valued so that they can fully participate in and contribute to our success. Our focus on DE&I helps us provide unrivaled service to clients and creates a healthy, thriving work environment for employees from diverse demographic groups, leadership styles and skill sets.

Our vision for DE&I is embedded at all levels of the organization, with women and ethnic minorities representing more than half the members of our Board of Directors as well our U.S. Executive Vice President population. Reflecting the importance of DE&I, our Head of Corporate Social Responsibility and Global DE&I serves as an Executive Vice President and reports directly to our Chairman, President and CEO. Two Chief DE&I Officers are responsible for the design and execution of topic-relevant programs across North America, EMEA and APAC. Our Board, through its Corporate

Governance Committee, also engages in active oversight of our DE&I strategies, programs and principles.

**Our strategy is driven by three priorities: Drive Accountability, Enhance Development Programs and Placement, and Advance Culture.**

As part of our enhanced governance model, senior leaders report progress to senior management through our DE&I Executive Council. Our Business Unit leadership, Regional Councils and Business Resource Councils facilitate the development of an inclusive culture that values and leverages DE&I to achieve and sustain superior business results. Our strategy is driven by three priorities: Drive Accountability, Enhance Development Programs and Placement and Advance Culture. These strategies enhance our focus on the hiring, development and advancement of women and people of color at every level.

Through our robust job system, employees have transparency into available positions, can set up job alerts, and can easily find and apply for roles that match their career aspirations.

### Drive Accountability

We use a DE&I dashboard as a mechanism to increase representation at all levels through continued measurement of hiring, promotion and retention. To ensure diversity, we require recruiters to present diverse candidate slates. We have also implemented diverse interview panels and decision-makers in the interview process.

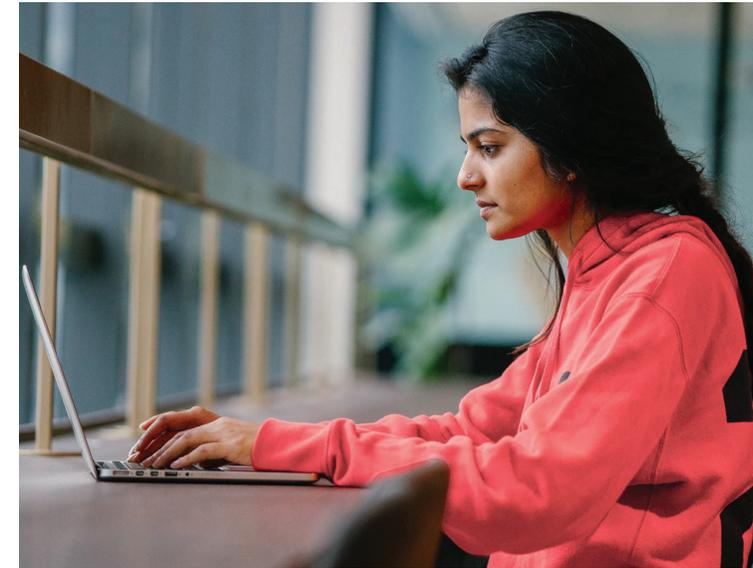
### Enhance Development Programs and Placement

Our Global Internal Mobility Program enhances the professional development and growth of our employees. Through our robust job-listing system, employees have transparency into available positions, can set up job alerts, and can find and apply for roles that match their career aspirations. The system supports Northern Trust's global framework and allows us to engage a deep and diverse pool of internal talent to enable future growth. To further identify and develop a deep pipeline of diverse talent at various levels across the

globe, our employees have access to a variety of external and internal programs.

In September 2020, we invited more than 150 Black Northern Trust employees in the U.S. to participate in the McKinsey Black Leadership Academy. This Academy is focused on accelerating Black leaders on a global scale and is comprised of two programs: A Black Executive Leadership Program targeting executives and a Management Accelerator Program targeting early-to-mid-career leaders. These programs are focused on building leadership capabilities and giving our employees critical skills to grow personally and professionally.

In India, we host development programs targeted for high-potential women across various levels of the organization. The first program focuses on women at both the individual contributor and junior management levels. Its modules explore personal power, assertive influencing and building and leveraging a powerful network for success. Our



second program focuses on women at the middle-management level with a focus on mindful leadership. This program utilizes individual assessments, one-on-one coaching and group and individual activities. We also conducted three workshops on “women and ambition” for high-potential employees at the early-career level. Since the program's inception in 2018, 93 percent of participants have been promoted and our current retention across both cohorts is 94 percent.

## Advance Culture

With a focus on advancing Northern Trust culture to create a more diverse and inclusive environment, we introduced the following in 2020:

### DE&I Training

We launched a global unconscious bias training module course for all employees as well as a three-part Unconscious Bias & Inclusive Leadership training designed specifically for managers. The trainings help our employees recognize their own biases, understand how these biases affect their decisions and interactions, and develop skills and strategies to mitigate them. To enhance our inclusion efforts, we added inclusive leadership language to many of our manager training courses.

### Pronouns in Email Signatures

To support a culture of respect and belonging, we introduced the option for employees to add pronouns in their email signatures. As part of this global initiative, we conducted Pronouns & Gender-Inclusive Language training to promote inclusion of gender identity and expression at Northern Trust.

**In a year that brought extraordinary challenges, including the COVID-19 pandemic and the racial injustices experienced by Black people in the U.S., 2020 was a year focused on compassion, communication and support.**

### Conversations around Racial Inequity

In a year that brought extraordinary challenges, including the COVID-19 pandemic and the racial injustices experienced by Black people in the U.S., 2020 was a year focused on compassion, communication and support. Northern Trust openly engaged in conversations around racial inequity and action in support of DE&I and developed resources to support the positive mental health of our employees.

### Global Knowledge Center

We launched our DE&I Knowledge Center to help our employees gain deeper understanding and insight into the root causes of racism, as well as educate and engage our employees on ways to feel empowered, seek solutions and take action. The Knowledge Center supports our culture of engagement, in which we share external and internal DE&I messages to create transparency and elicit action.

### Culture of Engagement

To further support our culture of engagement, we strengthened our DE&I employee communications, including messages from our executives and senior leaders. We conducted a series of panel discussions, small group discussions and individual conversations to create a structured dialogue about racial inequities and to empower employees to share their experiences.

### Juneteenth

Northern Trust closed its U.S. offices early on June 19, in honor of Juneteenth, the oldest nationally celebrated commemoration of the ending of slavery in the United States. Employees were encouraged to take this time for reflection and to serve their communities, re-commit to DE&I and learn about the significance of Juneteenth.

## Mental Health and Well-Being

With the health of our employees across the globe at the forefront, we developed a dedicated Mental Health and Well-Being site. Containing internal and external resources, the site supports our employees

**Our virtual forum, "Connect in the Cloud," allowed our employees across the globe to connect with each other in a more casual way by responding to weekly prompts and sharing pictures and thoughts.**

in areas including Protecting Health During COVID-19 and Personal Resiliency Tips. With the objective of engaging employees in something fun in a remote work environment, the Human Resources team launched "Connect in the Cloud." This virtual forum allowed our employees across the globe to connect with each other in a more casual way by responding to weekly prompts by sharing pictures and thoughts.



## Business Resource Councils

Northern Trust offers a series of Business Resource Councils (BRCs), employee-initiated and governed groups that increase education and awareness through engagement-based activities. BRC participation is voluntary and open to all employees who are interested in the mission of the group. Each BRC is sponsored by an executive leader who advocates for the group internally and

externally. The groups work with our DE&I team to align initiatives to the BRC pillar framework, DE&I strategies, and corporate priorities.

Our BRCs support our culture of engagement through programs and initiatives centered around professional development, assisting in attracting diverse talent, providing diverse insights to the

business through focus groups, and enhancing cultural understanding across our employee population.

In 2020, with most of our employee population working remotely, the BRCs' programming and initiatives shifted to a virtual setting, allowing for expanded employee participation as well as opportunities for BRC collaboration across the regions.

**A few key programs and initiatives included:**

**International Day for Persons with Disabilities**

Observed annually on December 3rd, this day promotes the rights and well-being of people with disabilities. Led by the Disability BRC chapters globally, we marked the date across our Northern Trust offices with a number of programs including a global disability inclusion panel event in partnership with Disability:IN Chicagoland, educational seminars with Humanity and Inclusion in Manila, and a session on the power of storytelling with international disability rights advocate Joanne O'Riordan.



**Pride Month Commemoration**

The Pride BRC chapters across the globe commemorated the month of June with initiatives focused on allyship, awareness and advocacy. Highlights include our India and Ireland locations winning the Global Ally Gamification challenge sponsored by Pride Circle; North America hosting a month-long learning series focused on "Breaking Down the Acronym;" and offices across the APAC region hosting LGBTQ+ 101 workshops for managers. To show virtual support for our internal and external communities, many of our employees,

including our CEO and members of senior management, inserted a Pride flag filter over their Northern Trust profile pictures. Additionally, employees participated in the Rainbow Around the World virtual Pride Parade.

**World Mental Health Day**

The impact of COVID-19 on the mental health of millions of people globally gave 2020's World Mental Health Day on October 10th particular significance. Recognizing the importance of mental health to the well-being of our employees, we encouraged our employees to support their own well-being, practice self-care and learn where they can access help and support when they need it. Programming included workshops on stress management and mindfulness, virtual yoga sessions and a global broadcast featuring a mental health expert and psychologist discussing the pandemic's impact on mental well-being and where to get expert help.

# Northern Trust's Business Resource Councils:

<b>ADVANCING PROFESSIONALS RESOURCE COUNCIL (APRC)</b>	<b>ASIAN LEADERSHIP BUSINESS RESOURCE COUNCIL (ALBRC)</b>	<b>BLACK BUSINESS RESOURCE COUNCIL (BBRC)</b>	<b>DISABILITY BUSINESS RESOURCE COUNCIL (DBRC)</b>
<b>LATIN HERITAGE LEADERSHIP COUNCIL (LHLC)</b>	<b>LEVERAGING EXPERIENCES AND PERSPECTIVES BUSINESS RESOURCE COUNCIL (L.E.A.P.)</b>	<b>LIVING IN FULLNESS EVERYDAY BUSINESS RESOURCE COUNCIL (L.I.F.E.)</b>	<b>MILITARY ASSISTANCE AND APPRECIATION RESOURCE COUNCIL (MAARC)</b>
<b>NT PRIDE BUSINESS RESOURCE COUNCIL (NT PRIDE)</b>	<b>WOMEN IN LEADERSHIP BUSINESS RESOURCE COUNCIL (WILBRC)</b>	<b>WORKING FAMILIES BUSINESS RESOURCE COUNCIL (WFBRC)</b>	

# Human Rights and Workforce Principles

Northern Trust's human rights and workforce principles apply to all global operations and clearly signify our support for the rights of minority groups, women and workers. Our principles expressly reference our conformance with public policies including the International Labour Organization's (ILO) standards and the Organisation for Economic Co-operation and Development's (OECD) guidelines for multinational enterprises. Employees worldwide may exercise freedom of association regarding collective bargaining and trade agreements as permitted by applicable regional laws.



**Northern Trust's human rights and workforce principles apply to all global operations and clearly signify our support for the rights of minority groups, women and workers.**

We apply these standards to our suppliers and vendors as well as our employees, who receive training on anti-discrimination, DE&I, and the prevention of sexual harassment. We also provide training on cultural change, which is especially helpful for expatriates and employees serving short-term assignments abroad or experiencing

global relocation. Several senior-level company officers are responsible for overseeing the execution of our human rights and workforce standards. These standards commit us to providing fair and equal wages to employees regardless of gender and offering competitive compensation and benefits to our workforce.

## Employee Diversity & Inclusion

FN-AC-330a.1 - Percentage of gender and racial/ethnic group representation for (1) executive management, (2) non-executive management, (3) professionals, and (4) all other employees

Job Categories	Hispanic or Latino		Non-Hispanic or Latino												Overall Totals
	Male	Female	Male						Female						
			White	Black or African American	Native Hawaiian Or Pacific Islander	Asian	American Indian or Alaska Native	Two or More Races	White	Black or African American	Native Hawaiian or Pacific Islander	Asian	American Indian or Alaska Native	Two or More Races	
Exec/Sr. Officials & Mgrs	14	4	193	9	0	14	0	3	105	8	1	4	1	1	357
First/Mid Officials & Mgrs	58	83	724	54	0	115	1	10	445	89	0	77	1	8	1,665
Professionals	349	526	2,591	265	14	477	3	72	1,784	549	5	342	3	51	7,031
Technicians	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3
Administrative Support	12	49	18	7	0	0	0	1	133	52	0	12	0	4	288
Service Workers	10	5	6	6	0	0	0	0	2	3	0	0	0	1	33
<b>Total</b>	<b>443</b>	<b>667</b>	<b>3,532</b>	<b>343</b>	<b>14</b>	<b>606</b>	<b>4</b>	<b>86</b>	<b>2,469</b>	<b>701</b>	<b>6</b>	<b>436</b>	<b>5</b>	<b>65</b>	<b>9,377</b>
<b>Previous Year Total</b>	<b>418</b>	<b>660</b>	<b>3,512</b>	<b>324</b>	<b>16</b>	<b>553</b>	<b>4</b>	<b>83</b>	<b>2,439</b>	<b>732</b>	<b>5</b>	<b>403</b>	<b>5</b>	<b>61</b>	<b>9,215</b>

The table is based on Northern Trust's 2020 consolidated EEO-1 report filed with the U.S. Equal Employment Opportunity Commission. Lines from the EEO-1 report for which there are zero employees have been omitted here. For payroll period dates from December 16, 2020 to December 30, 2020.

Job Categories	Female	Male	Total
Executive Management	180	365	545
Non-Executive Management	1,544	2,324	3,868
Professionals	7,495	8,673	16,168
All Other Employees	475	210	685
<b>Total</b>	<b>9,694</b>	<b>11,572</b>	<b>21,266</b>

Global employee as of December 31, 2020.

## MEMORANDUM

**TO:** Oakland Police and Fire Retirement System (OPFRS)  
**FROM:** David Sancewich, Paola Nealon, Jason Leong Campbell, Meketa Investment Group  
**DATE:** November 17, 2021  
**RE:** 2021 Ongoing Strategic Investment Agenda

On an ongoing (monthly) basis, Meketa develops a list of projects that we expect to work closely with OPFRS to complete throughout the calendar year (see table below). In an attempt to coordinate the scheduling of these tasks, this memo details a Preliminary Investment Project Agenda by calendaring and prioritizing the expected tasks and deliverables that would be required to fulfill the Agenda. Meketa welcomes any suggestions and/or modifications to the proposed timeline.

### 2021 Preliminary Investment Project Agenda

Expected Completion Date	Task
December 2021	<ul style="list-style-type: none"><li>Cash Flow Report (1Q 2022)</li><li>Flash performance – November</li><li>Educational Item: Developments in ESG</li><li>Manager Update: DDJ</li><li>2022 Preliminary Investment Project Agenda</li></ul>

**Bold** are priority strategic items.

This agenda includes only major strategic items. Meketa also expects to work with the Staff and Board to complete more routine tasks and projects, as expected.

DS/PN/JLC/ep