EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: March 19, 2020

MEMO TO: Members of the Retirement Board

THROUGH: Laura Acosta, Manager of Human Resources

FROM: Lisa Sorani, Manager of Employee Services

SUBJECT: Retirement Board Regular Meeting – March 19, 2020

A regular meeting of the Retirement Board will convene at 8:30 a.m. on Thursday, March 19, 2020 in the Training Resource Center (TRC1) of the Administration Building. This meeting can also be attended telephonically by calling 1(855)369-0450, and using participant PIN: 658315#.

Enclosed are the agenda for the March 19, 2020 meeting and the minutes for the January 16, 2020 regular meeting. The package also includes the following: **(1) CONSENT** items: Approval of Minutes – Regular meeting of January 16, 2020, Ratifying and Approving Investment Transactions by Counselors for December 2019 and January 2020, Ratifying and Approving Short-Term Investment Transactions by Treasurer for December 2019 and January 2020, Approving Treasurer's Statement of Receipts and Disbursements for December 2019 and January 2020; **(2) ACTION** items: Determine the Annual Retiree Cost of Living Adjustment (COLA) to be effective July 1, 2020, Approve Process for Custodian Search; **(3) INFORMATION** 4th Quarter Performance Review as of December 31, 2019, International Equities: Strategies, Styles and Market Returns Update, Annual ESG Monitoring Report, Review Staffing for East Bay Municipal Utility District Employees' Retirement System Administration, Annual Expense Tracking and Spending Plan, Annual Health Insurance Benefit Survey, Review of EBMUD Retirement System Upgrade Initiative; **(4) REPORTS FROM THE RETIREMENT BOARD**.

LS:jm

Enclosures

AGENDA

EBMUD EMPLOYEES' RETIREMENT SYSTEM
March 19, 2019
Training Resource Center (TRC) 8:30 a.m.

This meeting can also be attended telephonically by calling 1(855) 369-0450, and using participant PIN: 658315#

ROLL CALL:

PUBLIC COMMENT: The Retirement Board is limited by State Law to providing a brief response, asking questions for clarification, or referring a matter to staff when responding to items that are not listed on the agenda.

CONSENT CALENDAR:

1. Approval of Minutes – Regular meeting of January 16, 2020

2. Ratifying and Approving Investment Transactions by Investment Managers for December 2019 and January 2020 (R.B. Resolution No. 6906)

3. Ratifying and Approving Short Term Investment Transactions by Treasurer for December 2019 and January 2020 (R.B. Resolution No. 6907)

4. Approving Treasurer's Statement of Receipts and Disbursements for December 2019 and January 2020

ACTION:

5. Determine the Annual Retiree Cost of Living Adjustment (COLA) to be effective July 1, 2020 (R.B. Resolution No. 6908) – L. Sorani

6. Approve Process for Custodian Search – S. Skoda

INFORMATION:

7. 4th Quarter Performance Review as of December 31, 2019 – S. Skoda

8. International Equities: Strategies, Styles and Market Returns Update – S. Skoda

9. Annual ESG Monitoring Report – S. Skoda

10. Review Staffing for East Bay Municipal Utility District Employees' Retirement System Administration – L. Acosta

11. Annual Expense Tracking and Spending Plan – S. Skoda

12. Annual Health Insurance Benefit Survey – L. Sorani

13. Review of EBMUD Retirement System Upgrade Initiative – L. Sorani

REPORTS FROM THE RETIREMENT BOARD:

14. Brief report on any course, workshop, or conference attended since the last Retirement Board Meeting

ITEMS TO BE CALENDARED:

- Parametric Performance Update
- Covered Calls Training

MEETING ADJOURNMENT:

The next regular meeting of the Retirement Board will be held at 8:30 a.m. on Thursday, May 21, 2020.

2020 Retirement Board Meetings

May 21, 2020
July 16, 2020
September 17, 2020
November 19, 2020

MINUTES OF THE RETIREMENT BOARD
January 16, 2020

A regular meeting of the Retirement Board convened on Thursday, January 16, 2020 at 8:35 a.m. in the Large Training Resource Center (TRC) Room. The meeting was called to order by President Doug Higashi.

Roll Call – The following Retirement Board Members were present: Alex Coate, Doug Higashi, Tim McGowan, Frank Mellon (ABSENT), Marguerite Young, and Lisa Ricketts.

The following staff members were present: Konana Gregory, Lisa Sorani, Laura Acosta, Lourdes Matthew, Sophia Skoda, Robert Hannay, and Damien Charléty.

PUBLIC COMMENT

Eric Larson, Local 444 Representative, noted the news of investment management firm Black Rock's public statement that they will now assess environmental, social, and governance with the same rigor that it analyzes traditional measures such as credit and liquidity risk. Eric then commended the Retirement Board members for their work in understanding the issues of Environmental, Social, and Governance issues on investing.

CONSENT CALENDAR

1-4. **Consent Calendar** – A motion to move the consent calendar was made by Marguerite Young and seconded by Alex Coate. The motion carried (4-0) by the following voice vote: AYES (Coate, Higashi, McGowan, Young), NOES (none), ABSTAIN (none), ABSENT (Mellon).

ACTION

5. Adopt Annual Actuarial Valuations of the Retirement System as of June 30, 2019 – Andy Yeung and Dirk Adamsen of Segal Company presented the actuarial report for the Pension and Health Insurance Benefit (HIB) Plans. Plan assets increased 4.5% to $1.833 billion on a market value basis for the year ending June 30, 2019. The funded ratio for the Pension Plan increased to 75.9%, and in combination with the Health Insurance Benefit (HIB) Plan was 73.8% with a $645.96 million unfunded actuarial accrued liability (UAAL). The actuarially-determined contribution rates were down 1.01% for the 1955/1980 Plan and down 1.02% for the 2013 Plan. Because the assumed rate of return is likely to be lowered in the future, and because of lower expected investment returns going forward, staff recommended that the contribution rates remain unchanged from Fiscal Year 2020 (FY20) to Fiscal Year 2021 (FY21). The staff-recommended employer rates, as compared with the actuarially determined rates for FY21, are shown below.

Actuarially Determined Contribution Rates				
	FY21		FY20 (Adopted)	
Employer	**1955/1980 Plan**	**2013 Plan**	**1955/1980 Plan**	**2013 Plan**
Pension	37.29%	30.52%	37.86%	31.24%
HIB	4.88%	4.62%	5.32%	4.92%
Total	**42.17%**	**35.14%**	**43.18%**	**36.16%**

Doug Higashi made the motion to accept staff's recommendation to maintain the employer contribution rates for FY21 the same as adopted in FY20 instead of accepting the lower actuarially determined employer contribution rates provided by the actuaries, and Tim McGowan seconded the motion. The motion carried (4-0) by the following voice vote: AYES (Coate, Higashi, McGowan, Young), NOES (none), ABSTAIN (none), ABSENT (Mellon).

6. **Declare Interest Rate Credited to Members for Period Ending June 30, 2019** – In accordance with Retirement Ordinance Section 4(d) and Retirement Board Rule B-9, the annual rate of interest credited to Member contributions effective December 31, 2019 will be the lesser of the actuarially assumed rate of return or the five (5) year average rate of return on Retirement System investments for the period ending June 30, 2019. As of June 30, 2019, the actuarially assumed rate of return is 7.25%, and the five-year average rate of return was 7.1%. The annual interest rate to be declared should be 7.1%, and the rate credited to Member accounts will be prorated to a semi-annual rate of 3.55%. The interest will be credited effective December 31, 2019 to the balance of employee contributions and interest as of June 30, 2019. Marguerite Young moved the recommendation, Tim McGowan seconded the motion, and the motion carried (4-0) by the following voice vote: AYES (Coate, Higashi, McGowan, Young), NOES (none), ABSTAIN (none), ABSENT (Mellon).

INFORMATION

7. **Update on Climate Action 100+ Initiative** – Morgan La Manna, Senior Manager for Investor Engagement on Climate Action 100+ at CERES led the board through a review of the first annual progress report on the Climate Actions 100+ Initiative that was released in September, 2019. The annual progress report included global data, regional and sector reviews, and engagement case studies.

8. **3rd Quarter Performance review as of September 30, 2019** – Sara Bernstein of Meketa reviewed 3rd quarter results for 2019 in which plan assets increased by 0.9% or $10.47 million. The plan did outperform its policy benchmark during the period, with all asset classes beating their respective benchmark, except for international equities. Over the longer term, plan performance was above its benchmark for the 1-year, 3-year, 5-year, 10-year, and 20-year time periods.

9. **CS McKee Organization Update** – Staff updated the Retirement Board on the newly announced organizational changes at CS McKee, one of the Retirement System's fixed income managers. On January 7, 2020, CS McKee announced that North Square Investments will

purchase a majority interest in CS McKee. The Retirement Board placed CS McKee on Watch status at the September 19, 2019 Retirement Board meeting following initial organizational changes. CS McKee will remain on watch status at this time.

10. Annual Retirement Board Training Report – Staff provided the Board with a summary of training hours and costs for the past 24 months.

11 Disability Earnings Income Verifications for 2019 – Staff provided the Board an update on the status of 2019 income verifications and steps that will be taken in 2020 to confirm income from retirees living outside of California whose income cannot be confirmed by California Employment Development Department.

12. Retirement System Staffing Change – Staff provided an update on the action taken by the Board of Directors to add a position for retirement system administration. The Board requested staff to provide an update on the current staffing and work of the retirement administration in HR and Finance, including the work that will be done by the newly authorized Principal Management Analyst position.

REPORTS FROM THE RETIREMENT BOARD

13. Brief report on any course, workshop, or conference attended since the last Retirement Board meeting

None

ITEMS TO BE CALENDERED / UPCOMING ITEMS

- Provide an organization chart of the staffing for Retirement Administration and information about the work of each staff member.
- Provide HRIS, Payroll, ETS, and Retirement project update and discussion
- Review of International Equities

ADJOURNMENT – Alex Coate moved to adjourn the meeting at 11:42 a.m. and Marguerite Young seconded the motion; the motion carried (5-0) by the following voice vote: AYES (Coate, Higashi, Mellon, Young, and McGowan), NOES (none), ABSTAIN (none), ABSENT (none).

_____
President

ATTEST: _____
Secretary

3/19/2020

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: February 25, 2020

MEMO TO: Members of the Retirement Board

FROM: Sophia D. Skoda, Director of Finance

SUBJECT: Investment Transactions by Retirement Fund Managers for December 2019 and January 2020

The attached Investment Transactions by Retirement Fund Managers report for the months of December 2019 and January 2020 is hereby submitted for Retirement Board approval.

Attachment

SDS:DSK:AW

INVESTMENT TRANSACTIONS BY RETIREMENT FUND MANAGERS

December 2019

	PURCHASES	SALES	PORTFOLIO VALUE
FIXED INCOME			
C.S. McKee	$18,470,416	$13,122,057	$196,352,548
Federated Bank Loans	$1,446,356	$1,000,097	$44,404,947
Garcia Hamilton Associates	$56,120,834	$9,172,735	$184,530,296
Mackay Shields - HY	$1,519,775	$56	$45,504,907
Western Asset Management Co.-IG	$0	$0	$3,734
Western Asset Management Co.-HI	$0	$0	$5
Western Asset Management Co.-HY	$0	$0	$3
TOTAL	**$77,557,382**	**$23,294,945**	**$470,796,440**
DOMESTIC EQUITY			
Russell 3000 Index Fund	$0	$0	$502,402,802
T. Rowe Price	$0	$0	$860
Total Domestic Equity	**$0**	**$0**	**$502,403,662**
COVERED CALLS			
Parametric (BXM)	$3,568,556	$3,667,014	$129,943,392
Parametric (Delta-Shift)	$1,328,834	$1,092,317	$137,690,592
Van Hulzen	$15,718,835	$15,514,165	$130,840,269
Total Covered Calls	**$20,616,224**	**$20,273,497**	**$398,474,253**
INTERNATIONAL EQUITY			
ACWI Index fund	$0	$0	$184,221,686
Franklin/Templeton	$3,320,095	$2,611,727	$125,129,246
Fisher Investments	$212,244	$210,947	$143,896,049
Global Transition	$0	$0	$757,980
Total International Equity	**$3,532,339**	**$2,822,674**	**$454,004,961**
REAL ESTATE EQUITY			
RREEF America II	$0	$0	$46,985,468
CenterSquare	$4,291,787	$4,112,786	$54,014,168
Total Real Estate	**$4,291,787**	**$4,112,786**	**$100,999,636**
TOTAL ALL FUND MANAGERS	**$105,997,732**	**$50,503,903**	**$1,926,678,952**

January 2020

	PURCHASES	SALES	PORTFOLIO VALUE
FIXED INCOME			
C.S. McKee	$29,986,261	$28,046,542	$200,137,194
Federated Bank Loans	$190,620	$0	$44,478,287
Garcia Hamilton Associates	$11,428,284	$13,746,806	$186,919,518
Mackay Shields - HY	$3,712,458	$560,320	$45,544,366
Western Asset Management Co.-IG	$0	$0	$3,756
Western Asset Management Co.-HI	$0	$0	$5
Western Asset Management Co.-HY	$0	$0	$3
TOTAL	**$45,317,623**	**$42,353,668**	**$477,083,130**
DOMESTIC EQUITY			
Russell 3000 Index Fund	$0	$0	$501,814,312
T. Rowe Price	$0	$0	$848
Total Domestic Equity	**$0**	**$0**	**$501,815,160**
COVERED CALLS			
Parametric (BXM)	$3,781,832	$3,854,863	$129,707,831
Parametric (Delta-Shift)	$1,904,095	$1,804,588	$137,254,751
Van Hulzen	$16,451,622	$17,575,380	$129,711,743
Total Covered Calls	**$22,137,549**	**$23,234,830**	**$396,674,324**
INTERNATIONAL EQUITY			
ACWI Index fund	$0	$0	$178,465,196
Franklin/Templeton	$2,232,005	$3,591,218	$120,662,424
Fisher Investments	$0	$0	$139,353,988
Global Transition	$0	$114,736	$774,718
Total International Equity	**$2,232,005**	**$3,705,954**	**$439,256,326**
REAL ESTATE EQUITY			
RREEF America II	$412,513	$0	$49,601,221
CenterSquare	$3,509,542	$3,318,091	$54,717,645
Total Real Estate	**$3,922,055**	**$3,318,091**	**$104,318,866**
TOTAL ALL FUND MANAGERS	**$73,609,233**	**$72,612,544**	**$1,919,147,806**

Prepared By: _____ Date: 2-25-20

Anjanique Walsh, Accounting Technician

R.B. RESOLUTION NO. 6906

RATIFYING AND APPROVING INVESTMENT TRANSACTIONS BY RETIREMENT FUND MANAGERS FOR MONTHS OF DECEMBER, 2019 AND JANUARY, 2020

Introduced by: ; Seconded by:

WHEREAS, Retirement Board Rule No. B-5 provides for investment transactions without prior specific approval by the Retirement Board; and

WHEREAS, investment transactions have been consummated during December, 2019 and January, 2020, in accordance with the provisions of said rule and in securities designated as acceptable by Retirement Board Resolution No. 4974, as amended;

NOW, THEREFORE, BE IT RESOLVED that the investment transactions appearing on the following exhibits are hereby ratified and approved.

_____
President

ATTEST:

_____
Secretary

3/19/2020

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: February 25, 2020

MEMO TO: Members of the Retirement Board

THROUGH: Sophia D. Skoda, Director of Finance

FROM: D. Scott Klein, Controller

SUBJECT: Short Term Investment Transactions for December 2019

The attached Short Term Investment Transactions report for the month of December 2019 is hereby submitted for Retirement Board approval.

Attachment

SDS:DSK:MH

EBMUD EMPLOYEES' RETIREMENT SYSTEM
SHORT TERM INVESTMENT TRANSACTIONS
CONSUMMATED BY THE TREASURER
MONTH OF DECEMBER 2019

COST/ FACE VALUE	DESCRIPTION	DATE OF PURCHASE	DATE OF SALE/MATURITY	YIELD (%)
$ (10,067,000.00)	Local Agency Investment Fund		3-Dec-19	2.043
4,040,000.00	Local Agency Investment Fund	12-Dec-19		2.043
4,027,000.00	Local Agency Investment Fund	27-Dec-19		2.043
(10,116,000.00)	Local Agency Investment Fund		30-Dec-19	2.043
$ (12,116,000.00)	Net Activity for Month			

$ 24,461,211.00	Beginning Balance
(12,116,000.00)	Net Activity for Month
$ 12,345,211.00	Ending Balance

SUBMITTED BY _____ DATE 2-25-20
D. Scott Klein
Controller

Robert L. Hannay
Treasury Manager

Sandy Lindley
Acctg. Systems Supvr.

prepared by Mhouck

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: February 25, 2020

MEMO TO: Members of the Retirement Board

THROUGH: Sophia D. Skoda, Director of Finance

FROM: D. Scott Klein, Controller

SUBJECT: Short Term Investment Transactions for January 2020

The attached Short Term Investment Transactions report for the month of January 2020 is hereby submitted for Retirement Board approval.

Attachment

SDS:DSK:AW

EBMUD EMPLOYEES' RETIREMENT SYSTEM
SHORT TERM INVESTMENT TRANSACTIONS
CONSUMMATED BY THE TREASURER
MONTH OF JANUARY 2020

COST/ FACE VALUE	DESCRIPTION	DATE OF PURCHASE	DATE OF SALE/MATURITY	YIELD (%)
$ 4,097,000.00	Local Agency Investment Fund	9-Jan-20		1.967
107,295.67	Local Agency Investment Fund	15-Jan-20		1.967
4,090,000.00	Local Agency Investment Fund	23-Jan-20		1.967
(10,223,000.00)	Local Agency Investment Fund		30-Jan-20	1.967
$ (1,928,704.33)	Net Activity for Month			

$ 12,345,211.00	Beginning Balance
(1,928,704.33)	Net Activity for Month
$ 10,416,506.67	Ending Balance

SUBMITTED BY _____ DATE 2-25-20

D. Scott Klein
Controller

Robert L. Hannay
Treasury Manager

Sandy Lindley
Acctg. Systems Supvr.

prepared by Awalsh

R.B. RESOLUTION NO. 6907

RATIFYING AND APPROVING SHORT TERM INVESTMENT TRANSACTIONS BY THE TREASURER FOR DECEMBER, 2019 AND JANUARY, 2020

Introduced by: ; Seconded by:

WHEREAS, Retirement Board Rule No. B-7 provides for the temporary investment of retirement system funds by the Treasurer or Assistant Treasurer in securities authorized by Sections 1350 through 1366 of the Financial Code or holding funds in inactive time deposits in accordance with Section 12364 of the Municipal Utility District Act; and

WHEREAS, investment transactions during December 2019, and January, 2020 have been made in accordance with the provisions of the said rule;

NOW, THEREFORE, BE IT RESOLVED that the investment transactions consummated by the Treasurer and included on the attached Exhibit A for December, 2019, and January, 2020 are hereby ratified and approved.

_____
President

ATTEST:

_____
Secretary

3/19/2020

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: February 25, 2020

MEMO TO: Members of the Retirement Board

THROUGH: Sophia D. Skoda, Director of Finance

FROM: D. Scott Klein, Controller

SUBJECT: Statement of Receipts and Disbursements for December 2019

The attached Statement of Receipts and Disbursements report for the month of December 2019 is hereby submitted for Retirement Board approval.

Attachment

SDS:DSK:MH

STATEMENT OF RECEIPTS AND DISBURSEMENTS
EMPLOYEES' RETIREMENT FUND
MONTH OF DECEMBER 2019

CASH BALANCE at November 30, 2019			$ (6,415,940.75)
Receipts			
Employees' Contributions	$	1,362,128.94	
District Contributions		6,729,790.89	
LAIF Redemptions		20,183,000.00	
Refunds and Commission Recapture		27,228.71	
TOTAL Receipts			28,302,148.54
Disbursements			
Checks/Wires Issued:			
Service Retirement Allowances	$	8,938,220.04	
Disability Retirement Allowances		155,531.71	
Health Insurance Benefit		1,012,892.38	
Payments to Retiree's Resigned/Deceased		170,374.90	
LAIF Deposits		8,067,000.00	
Administrative Cost		194,304.75	
TOTAL Disbursements			(18,538,323.78)
CASH BALANCE at December 31, 2019			$ 3,347,884.01
LAIF			12,345,211.00
LAIF and CASH BALANCE at December 31, 2019			$ 15,693,095.01
Domestic Equity			
Russell 3000 Index Fund	$	502,402,802.35	
T. Rowe Price		859.93	
Subtotal Domestic Equity		502,403,662.28	
Covered Calls			
Parametric (BXM)	$	129,943,391.84	
Parametric (Delta-Shift)		137,690,592.19	
Van Hulzen		130,840,268.88	
Subtotal Covered Calls		398,474,252.91	
International Equity			
ACWI Index fund	$	184,221,686.24	
Franklin Templeton		125,129,245.91	
Fisher Investments		143,896,049.36	
Global Transition		757,979.57	
Subtotal International Equity		454,004,961.08	
Real Estate			
RREEF America REIT II	$	46,985,468.00	
Center Square		54,014,167.81	
Subtotal Real Estate		100,999,635.81	
Fixed Income			
CS Mckee	$	196,352,547.78	
Federated Bank Loans		44,404,947.49	
Garcia Hamilton Associates		184,530,295.59	
Mackay Shields-High Yield		45,504,907.39	
Western Asset Mgt Co-Short Term Inv Grade		3,734.26	
Western Asset Mgt Co-Short Term High Income		4.56	
Western Asset Mgt Co-Short Term High Yield		3.22	
Subtotal Fixed Income		470,796,440.29	
Total for Domestic and International Equities			1,926,678,952.37
MARKET VALUE of ASSETS at December 31, 2019			$ 1,942,372,047.38

Respectfully submitted,

D. Scott Klein
Controller

Robert L. Hannay
Treasury Mgr.

S. F. Lindley
Acctg Sys Supvr.

prepared by Mhouck

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: February 25, 2020

MEMO TO: Members of the Retirement Board

THROUGH: Sophia D. Skoda, Director of Finance

FROM: D. Scott Klein, Controller

SUBJECT: Statement of Receipts and Disbursements for January 2020

The attached Statement of Receipts and Disbursements report for the month of January 2020 is hereby submitted for Retirement Board approval.

Attachment

SDS:DSK:AW

STATEMENT OF RECEIPTS AND DISBURSEMENTS
EMPLOYEES' RETIREMENT FUND
MONTH OF JANUARY 2020

CASH BALANCE at December 31, 2019			$ 3,347,884.01
Receipts			
Employees' Contributions	$ 1,453,297.72		
District Contributions	6,868,993.75		
LAIF Redemptions	10,223,000.00		
Refunds and Commission Recapture	39,913.01		
TOTAL Receipts			18,585,204.48
Disbursements			
Checks/Wires Issued:			
Service Retirement Allowances	$ 9,050,143.99		
Disability Retirement Allowances	151,429.71		
Health Insurance Benefit	1,012,917.42		
Payments to Retiree's Resigned/Deceased	27,444.45		
LAIF Deposits	8,187,000.00		
Administrative Cost	92,336.56		
TOTAL Disbursements			(18,521,272.13)
CASH BALANCE at January 31, 2020			$ 3,411,816.36
LAIF			10,416,506.67
LAIF and CASH BALANCE at January 31, 2020			$ 13,828,323.03
Domestic Equity			
Russell 3000 Index Fund	$ 501,814,312.18		
T. Rowe Price	847.90		
Subtotal Domestic Equity	501,815,160.08		
Covered Calls			
Parametric (BXM)	$ 129,707,830.97		
Parametric (Delta-Shift)	137,254,750.84		
Van Hulzen	129,711,742.51		
Subtotal Covered Calls	396,674,324.32		
International Equity			
ACWI Index fund	$ 178,465,196.09		
Franklin Templeton	120,662,423.71		
Fisher Investments	139,353,988.31		
Global Transition	774,717.67		
Subtotal International Equity	439,256,325.78		
Real Estate			
RREEF America REIT II	$ 49,601,221.00		
Center Square	54,717,645.38		
Subtotal Real Estate	104,318,866.38		
Fixed Income			
CS Mckee	$ 200,137,194.01		
Federated Bank Loans	44,478,287.42		
Garcia Hamilton Associates	186,919,517.87		
Mackay Shields-High Yield	45,544,366.10		
Western Asset Mgt Co-Short Term Inv Grade	3,756.42		
Western Asset Mgt Co-Short Term High Income	4.56		
Western Asset Mgt Co-Short Term High Yield	3.22		
Subtotal Fixed Income	477,083,129.60		
Total for Domestic and International Equities			1,919,147,806.16
MARKET VALUE of ASSETS at January 31, 2020			$ 1,932,976,129.19

Respectfully submitted,

D. Scott Klein
Controller

Robert L. Hannay
Treasury Mgr.

S. F. Lindley
Acctg Sys Supvr.

prepared by Awalsh

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: March 19, 2020

MEMO TO: Members of the Retirement Board

FROM: Lisa Sorani, Manager of Employee Services LS.

SUBJECT: Determination of Retiree Cost of Living Adjustment

ACTION: Vote on Resolution No. 6908

RECOMMENDATION

Adopt Resolution No. 6908 authorizing a 3.0% COLA for retirees effective July 1, 2020 including a 0.3% increase to retiree COLA banks

DISCUSSION

Staff requested that Retirement System actuary, Segal, calculate the COLA on behalf of the Retirement System based on review of our Retirement Ordinance and Retirement Board Rules. Segal's memo detailing their review and determination of the July 2020 COLA amount is attached.

As previously reported, staff is working on correcting the error in the administration of the COLA benefit in Fiscal Years 2014, 2015, and 2016. Once the corrections to the Retirement allowances and COLA banks of affected Members are complete, the COLA to be effective on July 1, 2020 shall apply to the corrected Retirement Allowance for each of those Members.

LS

R. B. RESOLUTION NO. 6908

DECLARING THE COST OF LIVING ADJUSTMENT
TO BE EFFECTIVE AS OF JULY 1, 2020

Introduced by: ; seconded by:

Pursuant to the provision of Section 33 of Ordinance No. 40 as amended, the Retirement Board adopted in accordance with said Section 33, the Cost of Living Adjustment to be effective July 1, 2020 is hereby established to be 3.0 percent.

Members who retired on or before July 1, 2019 will receive a 3% percent increase, and their COLA bank will be credited with a 0.3% increase. Employees who retired after July 1, 2019 will receive a proration of 3% percent, or 1/12 of the full COLA for each full month retired since July 1, 2019, and their COLA banks will increase by a proration of 0.3%.

Due to the error in the administration of the COLA benefit in Fiscal Years 2014, 2015, and 2016, the Retirement Allowances and COLA banks of affected Members who retired on or before July 1, 2016 shall be corrected and adjusted and the COLA to be effective on July 1, 2020 shall apply to the corrected Retirement Allowance for each of those Members.

Any other resolution or parts of resolution in conflict herewith are hereby rescinded and cancelled.

_____
President

ATTEST: _____
Secretary

3/19/2020

Segal

Andy Yeung, ASA, MAAA, EA, FCA
Vice President & Actuary
T 415.263.8283
ayeung@segalco.com

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San Francisco, CA 94105-6147
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March 12, 2020

Ms. Sophia Skoda
Director of Finance
East Bay Municipal Utility District
375 11th Street
Oakland, CA 94607-4240

Re: East Bay Municipal Utility District Employees' Retirement System (EBMUDERS)
Cost of Living Adjustment (COLA) as of July 1, 2020

Dear Sophia:

We have determined the cost of living adjustment for retirees effective July 1, 2020 in accordance with Section 33 of the Employees' Retirement System Ordinance.

Pursuant to our understanding of the Ordinance, the cost of living adjustment to be used by the System each July 1 is determined by the change in the Consumer Price Index for All Urban Consumers (CPI-U) for the San Francisco-Oakland-Hayward Area[1] as published by the Bureau of Labor Statistics, for each of the two immediately preceding calendar years (i.e., the annual average CPI). The ratio of the past two annual average CPI, 295.004 in 2019 and 285.550 in 2018,[2] is 1.033 and the resulting percentage change (rounded to the nearest one-tenth of one percent) is 3.3%.

Under Section 33 of the Ordinance, the annual retiree COLA is limited to 3%, unless the Retirement System is funded on a Projected Benefit Obligation (PBO) basis at or above 85%, in which case the maximum COLA is 5%. This funding measure is defined as the ratio of the market value of assets to the PBO. Any excess of the change in the CPI above the maximum COLA is accumulated in individual retiree COLA banks. Withdrawals from the COLA banks can be made in years when the change in the CPI is less than 3%. We further understand that, effective October 1, 2000, in years when the Retirement System is more than 85% funded on a PBO basis (which allows for up to 5% COLA) and the change in the CPI is less than 4%, withdrawals from the banks can be made to allow COLAs up to 4% (not up to 5%).

Based on the June 30, 2019 actuarial valuations, the PBO funding ratio of the Retirement System as a whole (including both the Pension and Health Plans) was 75.9%, while the PBO funding ratios for each of the Pension and Health Plans were 78.4% and 31.7%, respectively. Accordingly, the maximum COLA payable effective July 1, 2020 is 3.0%. Since the change in the CPI mentioned above was 3.3%, this means that 0.3% is available to be added to each

[1] We note that reference was made to the change in the Consumer Price Index in the San Francisco-Oakland Metropolitan Area in the Ordinance, but such Index is now only available for the San Francisco-Oakland-Hayward Area from the Bureau of Labor Statistics.

[2] Source: https://data.bls.gov/timeseries/CUURS49BSA0

eligible retiree's COLA bank as of July 1, 2020. For retirees who retired (or Members who died) less than one full year before July 1, 2020, the 3.0% maximum COLA is to be prorated by one-twelfth of 3.0% for each full calendar month between the date of retirement (or date of death) and July 1, 2020.

Please give us a call if you have any questions.

Sincerely,

Andy Yeung

Andy Yeung, ASA, MAAA, FCA, EA
Vice President & Actuary

DNA/gxk

cc: Robert Hannay
Lisa Sorani

Segal

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: March 19, 2020

MEMO TO: Members of the Retirement Board

FROM: Sophia D. Skoda, Director of Finance

SUBJECT: Approve Process for Retirement System Custodian Search

SUMMARY

Staff is working with the Retirement System's General Investment Consultant, Meketa Investment Group (Meketa), to conduct a custodian search. Staff is seeking approval from the Retirement Board on the process for final selection of a new custodian.

BACKGROUND

Northern Trust is the Retirement System's current custodian and securities lending provider. The Retirement System entered into its current master custody and securities lending services agreements in 1997. While the agreements have been amended since 1997 to include updated regulatory requirements, terms, and pricing, no search for custodian has been conducted since the initial agreement. Staff is working with Meketa to conduct a custodian search this calendar year.

Each year Meketa sends a Request for Information (RFI) to custodial service providers that includes questions on the custodian's corporate structure, client servicing capabilities, online services, recordkeeping, disaster recovery, cash management, securities lending, and other services. Meketa then compiles responses and uses this information to assist in client custody searches. Clients can also send out a separate shorter RFI to request supplementary information not included in Meketa's RFI.

Staff is developing a separate EBMUDERS RFI to ask questions pertinent to the Retirement System. Meketa will provide a list of recommended custodians to receive the EBMUDERS RFI based on Meketa's experience with the firms and the firms' suitability to the needs of the Retirement System.

Staff plans to work with Meketa to analyze the RFI responses, conduct interviews, and recommend a finalist to the Retirement Board for approval. Additionally, the Retirement Board can consider directing the Administrative-Investment Committee to assist in the custodian search process. Under Retirement Board Rule No. B-1, the Administrative-Investment Committee consists of the Manager of Finance, Secretary to the Retirement Board and the President of the Retirement Board or the President's designee. Upon direction from the Retirement Board, the Committee would work with staff to conduct the custodian search and determine a finalist to present to the full Retirement Board for selection.

RECOMMENDATION

Staff recommends the Retirement Board approve the proposed custodian search process of analyzing RFI responses, conducting interviews, and recommending a finalist to the Retirement Board for selection. The Retirement Board can additionally direct the Administrative-Investment Committee to assist in the custodian search. If this Committee is directed to participate, the President of the Retirement Board can consider designating another Retirement Board Member for the Committee.

SDS:RLH

MEKETA
INVESTMENT GROUP

East Bay Municipal Utility District

March 19, 2020

Q4 2019 Quarterly Report

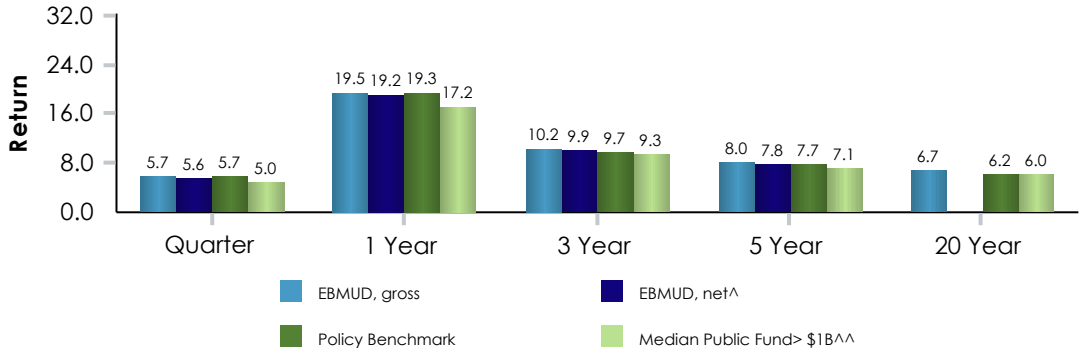
Agenda

1. Introduction
2. Capital Markets Outlook & Risk Metrics
3. World Markets in the Fourth Quarter of 2019
4. EBMUD Portfolio Review
5. Manager Watch Screens
6. Manager Compliance Certification Responses
7. Appendix

Introduction

Performance and Market Values As of December 31, 2019

Investment Performance



Portfolio Valuation (000's)

	Quarter	1 Year
EBMUD Total Plan		
Beginning Market Value	1,837,939	1,644,731
Net Contributions	-1,456	-18,910
Gain/Loss/Expenses	104,078	314,741
Ending Market Value	1,940,561	1,940,561

Asset Class Performance (gross of fees)

	Quarter	1 Year	3 Year	5 Year	10 Year	20 Year
EBMUD Total Plan	5.7	19.5	10.2	8.0	9.8	6.7
*Policy Benchmark^^^*	*5.7*	*19.3*	*9.7*	*7.7*	*9.2*	*6.2*
Domestic Equity	9.0	30.9	15.4	11.8	13.6	7.4
*Russell 3000**	*9.1*	*31.0*	*14.6*	*11.2*	*13.4*	*7.2*
International Equity	9.5	21.8	9.3	5.4	5.8	4.9
*MSCI ACWI x US (blend)***	*9.0*	*22.1*	*10.4*	*6.0*	*5.4*	*3.8*
Covered Calls	5.7	19.4	9.5	8.3	-	-
CBOE BXM	*5.1*	*16.6*	*7.8*	*7.2*	*-*	*-*
Fixed Income	0.5	8.5	4.3	3.3	4.4	5.3
*Fixed Income benchmark (blend)****	*0.6*	*7.9*	*3.9*	*3.3*	*3.9*	*5.1*
Real Estate	0.4	18.2	8.5	8.7	11.6	-
*NCREIF/NAREIT (blend)*****	*0.3*	*15.9*	*7.6*	*8.1*	*10.3*	*-*
Cash	0.3	2.5	1.7	1.2	0.8	2.3
FTSE 3 Month T-Bill	*0.5*	*2.3*	*1.7*	*1.0*	*0.6*	*1.7*

^Historical net returns for the Total Portfolio aggregate are currently available from 2Q 2011.

^^ IM Total Public Fund >$1B Universe includes BNY Mellon Public>$1B Fund Universe and IM client data.

^^^ Policy Benchmark consists of 25% Russell 3000 (blend), 25% MSCI ACWIxU.S. (blend), 20% CBOE BXM, 20% BB Aggregate, 1% BB US 1-3 Year Government/Credit, 2.5% BB 1-5 Year U.S. High Yield Cash Pay, 1.5% S&P/LSTA Performing Loans, 2.5% NCREIF (lagged), and 2.5% FTSE NAREIT Equity REITs index 7/1/18-present; see Appendix for historical Policy Benchmark composition.

*Russell 3000 as of 10/1/05. Prior: 30% S&P500, 10% S&P400, 10% Russell 2000 (4/1/05-9/30/05); 33% S&P500, 10% S&P400, 10% Russell 2000 (9/1/98-3/31/05); 30% S&P500, 15% Wilshire 5000 (4/1/96-8/31/98).

**MSCI ACWIxU.S. as of 1/1/07; MSCI EAFE ND thru 12/31/06.

***60% BB Aggregate, 20% BB US 1-3 Year Government/Credit, 10% ICE BofA ML U.S. Corp Cash Pay BB-B 1-5 Year, and 10% Blend 60% Credit Suisse Leverage Loan/40% BBg BC Short Term Gov/Corp 3/1/2019-present. See Appendix for historical Composite benchmark.

****50% NCREIF (lagged), 50% FTSE NAREIT Equity REITs Index as of 11/1/11; NCREIF (lagged) thru 10/31/11.

Capital Markets Outlook & Risk Metrics

As of December 31, 2019

Capital Markets Outlook

Takeaways

- December capped off a historically strong year for most risk-oriented markets. Global equity markets generally produced gains in the 2-4% range during the month, with full calendar year returns ending up approximately in the 18-32% range.
- With the exception of long-term interest rates (which ticked up during the month), the yield curve remained relatively stable in December. On a trailing one-year basis, however, interest rates declined by a material margin as the Federal Reserve lowered rates three times in 2019. From a performance perspective, broad investment grade bonds produced one-year returns in the high single-digits whereas long US Treasury bonds generated a return of nearly 15% for the year.
- Due in part to strong returns across nearly all asset classes in 2019, investors should anticipate that long-term, forward-looking returns will be lower as of early-2020 when compared to early-2019 capital market assumptions.
- US equity markets remain expensive whereas non-US equity markets remain reasonably valued relative to their histories. US credit and emerging markets debt spreads remain reasonably valued relative to their histories, although the richness of US high yield has recently increased (i.e., is now more expensive).
- Relative to their counterparts (growth and large cap), value and small cap equities continue to remain attractive from a valuation perspective.

Capital Markets Outlook

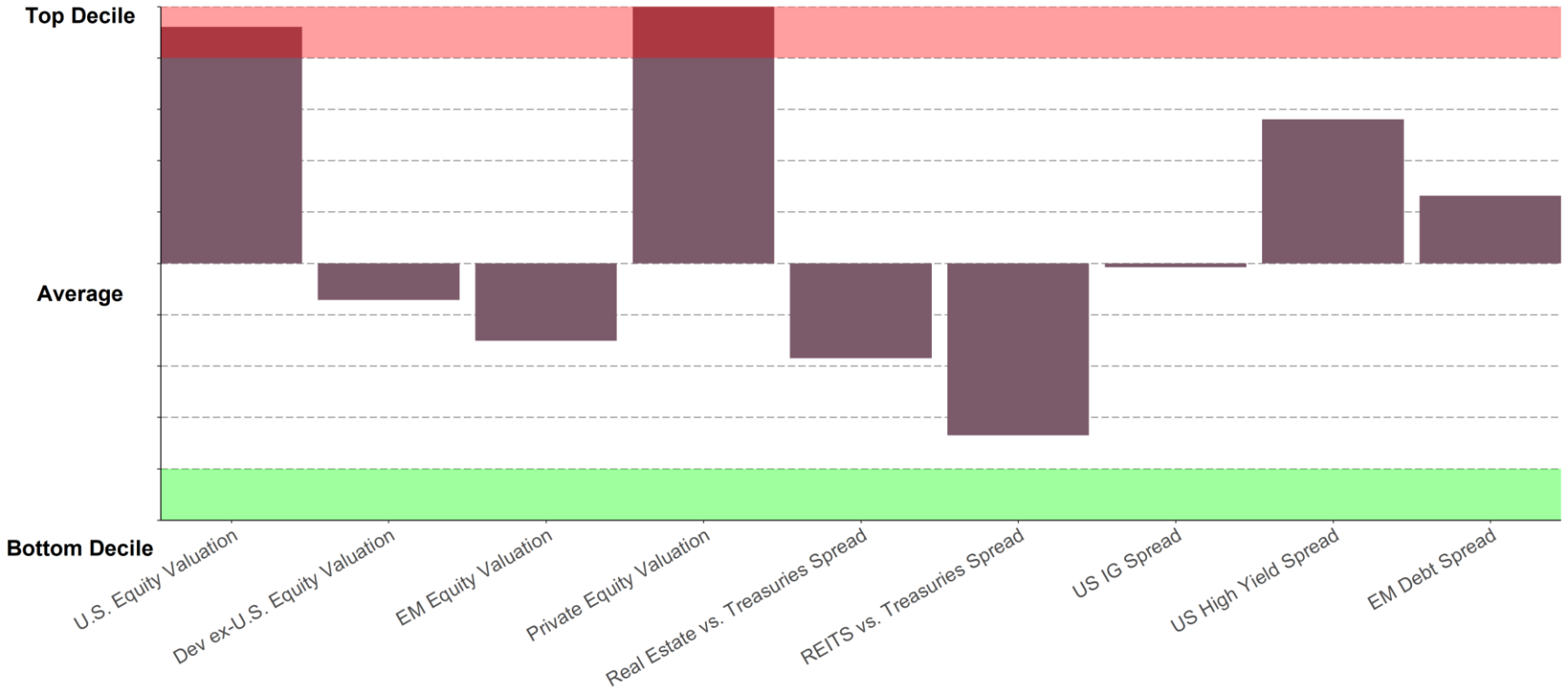
Takeaways

- Implied equity market volatility[1] remained at relatively low levels throughout December, generally staying in the 12-16 range throughout the entire month (the historical average is ~19).
- The Market Sentiment Indicator[2] stayed green at month end.

[1] As measured by VIX Index.

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

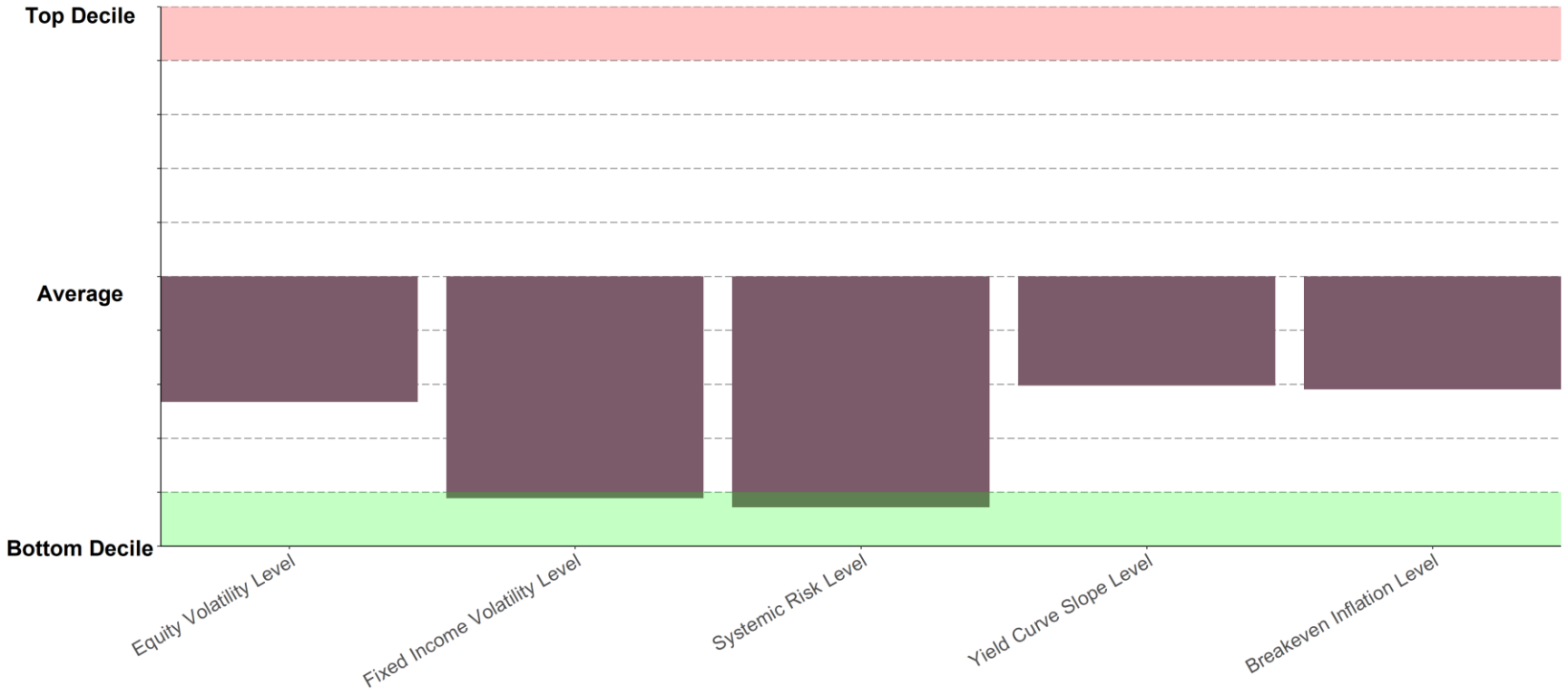
Risk Overview/Dashboard (1)
(As of December 31, 2019)[1]



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

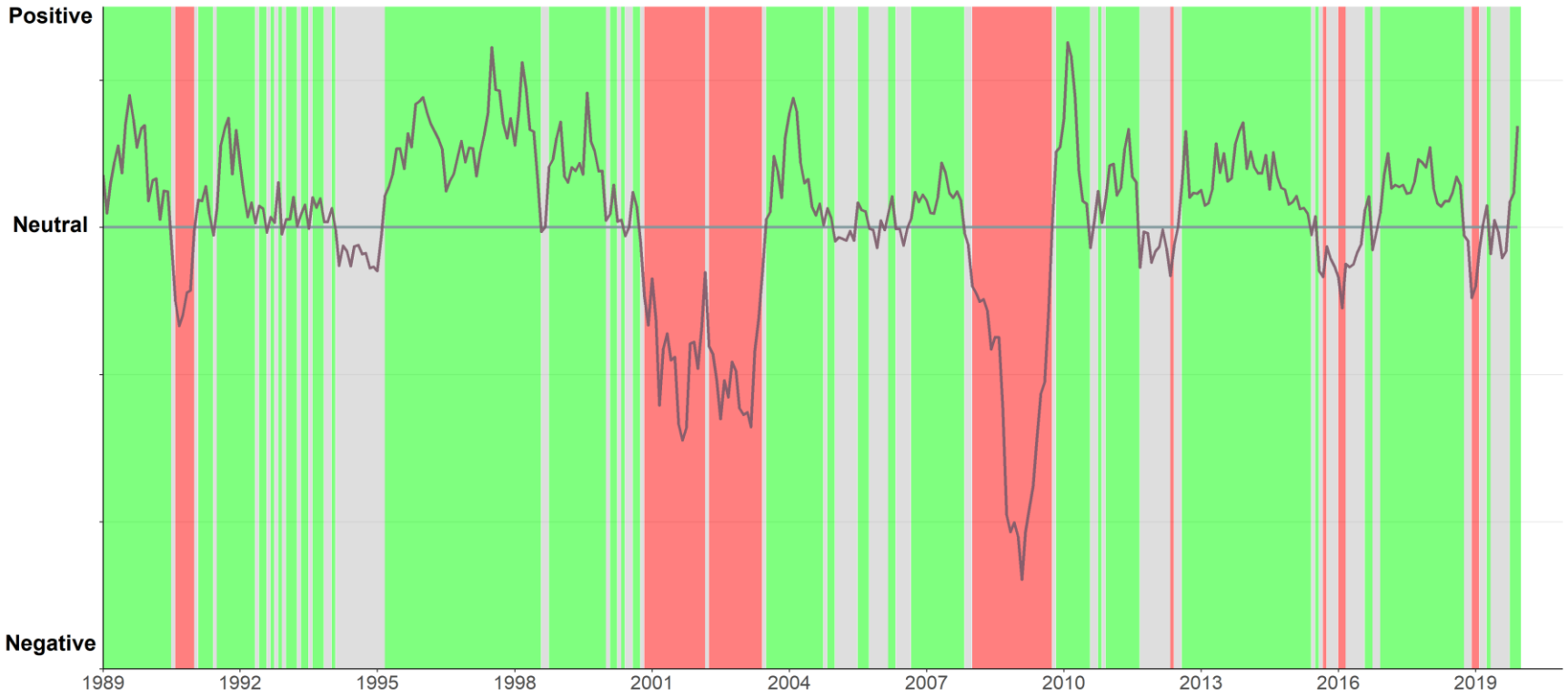
[1] With the exception of Private Equity Valuation, that is YTD as of November 30, 2019.

Risk Overview/Dashboard (2)
(As of December 31, 2019)

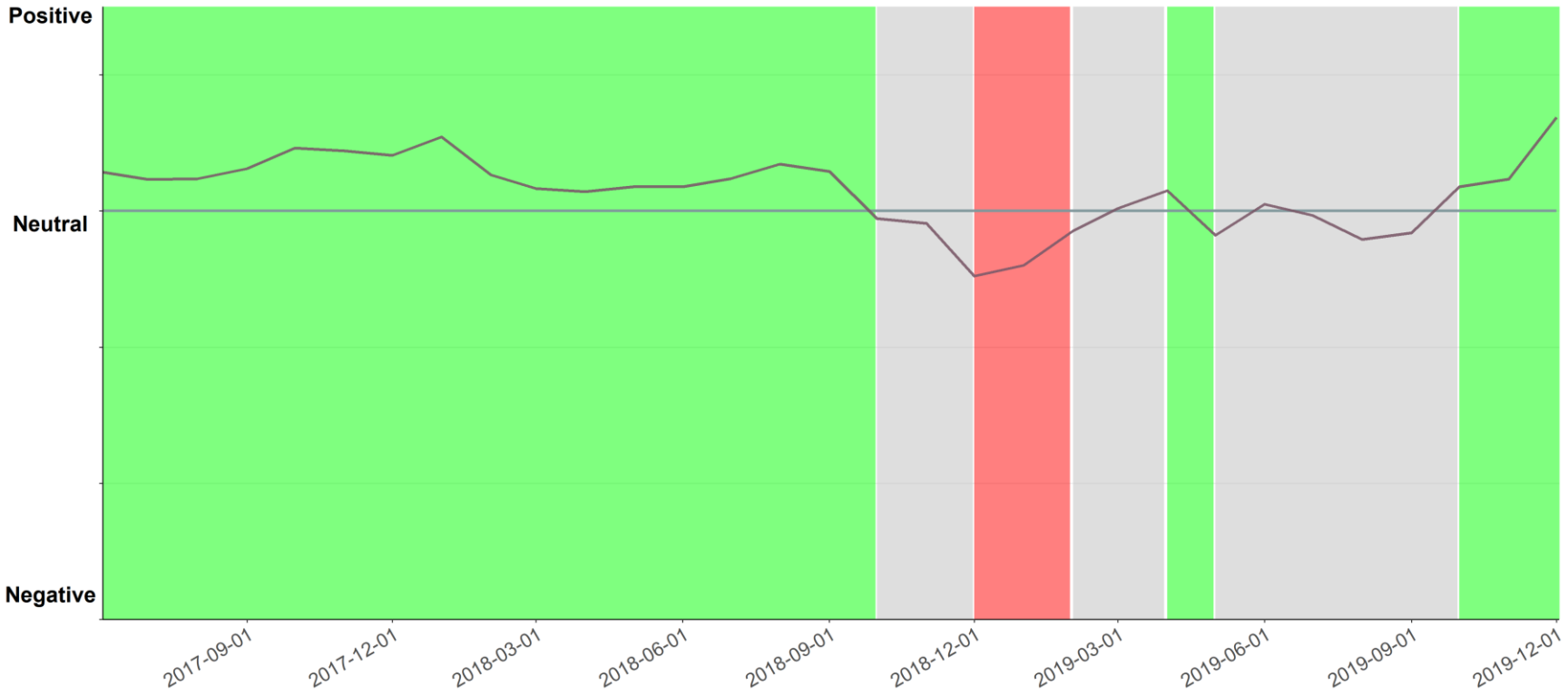


- Dashboard (2) shows how the current level of each indicator compares to its respective history.

Market Sentiment Indicator (All History)
(As of December 31, 2019)



Market Sentiment Indicator (Last Three Years)
(As of December 31, 2019)

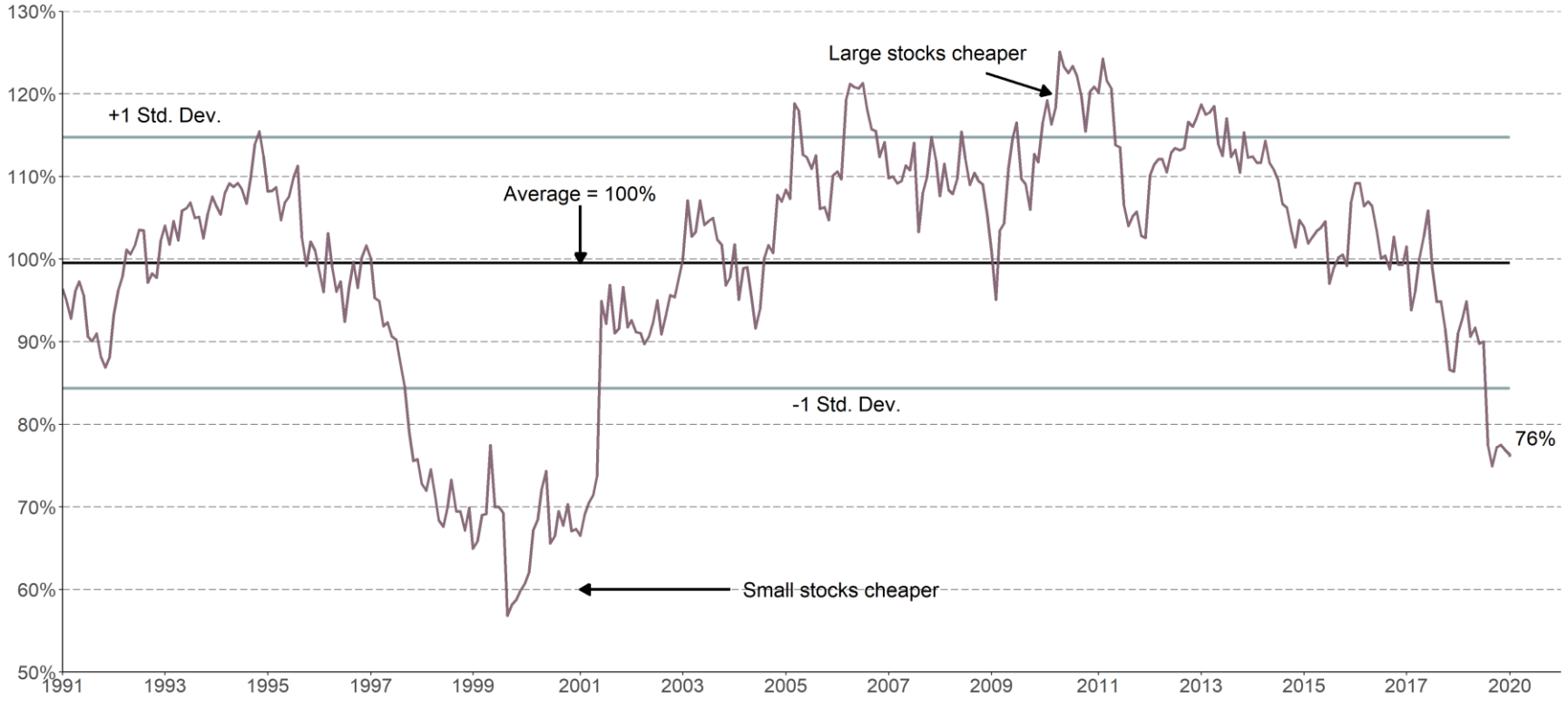


US Equity Cyclically Adjusted P/E[1]
(As of December 31, 2019)

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

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

Small Cap P/E vs. Large Cap P/E[1]
(As of December 31, 2019)



- This chart compares the relative attractiveness of small cap US equities vs. large cap US equities on a valuation basis. A higher (lower) figure indicates that large cap (small cap) is more attractive.

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

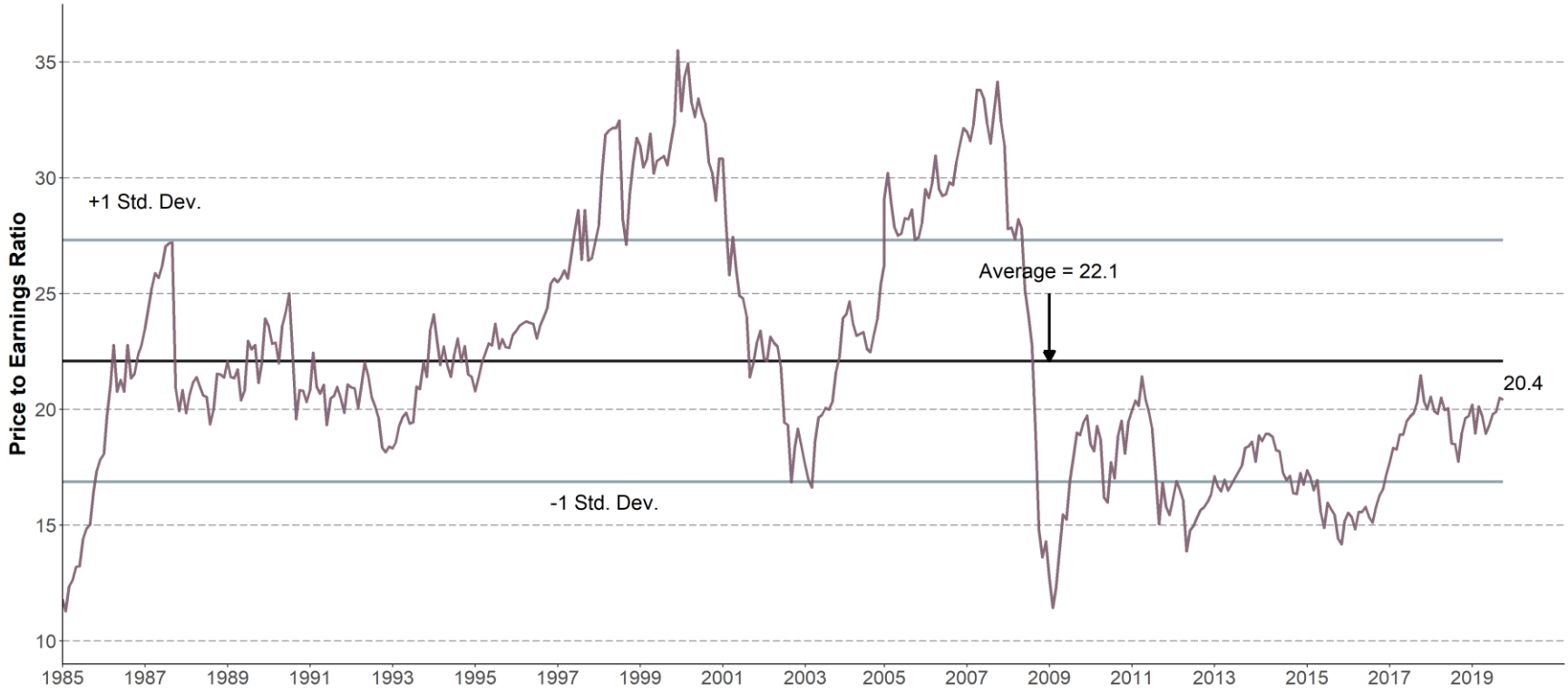
Growth P/E vs. Value P/E[1]
(As of December 31, 2019)

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

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

Developed International Equity Cyclically Adjusted P/E[1]

(As of December 31, 2019)



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

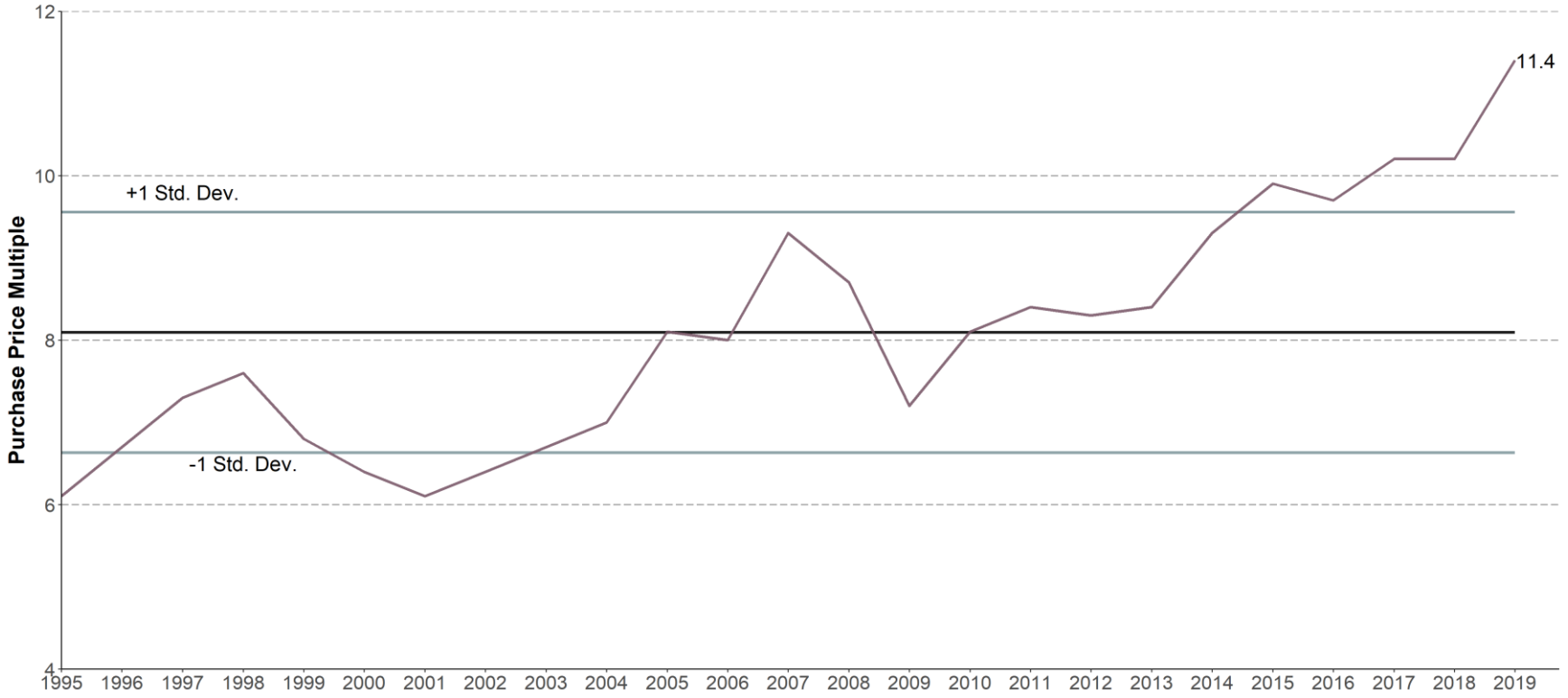
[1] Developed International Equity (MSCI EAFE ex Japan Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years.

Emerging Market Equity Cyclically Adjusted P/E[1]
(As of December 31, 2019)

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

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

Private Equity Multiples[1]
(As of November 30, 2019)[2]

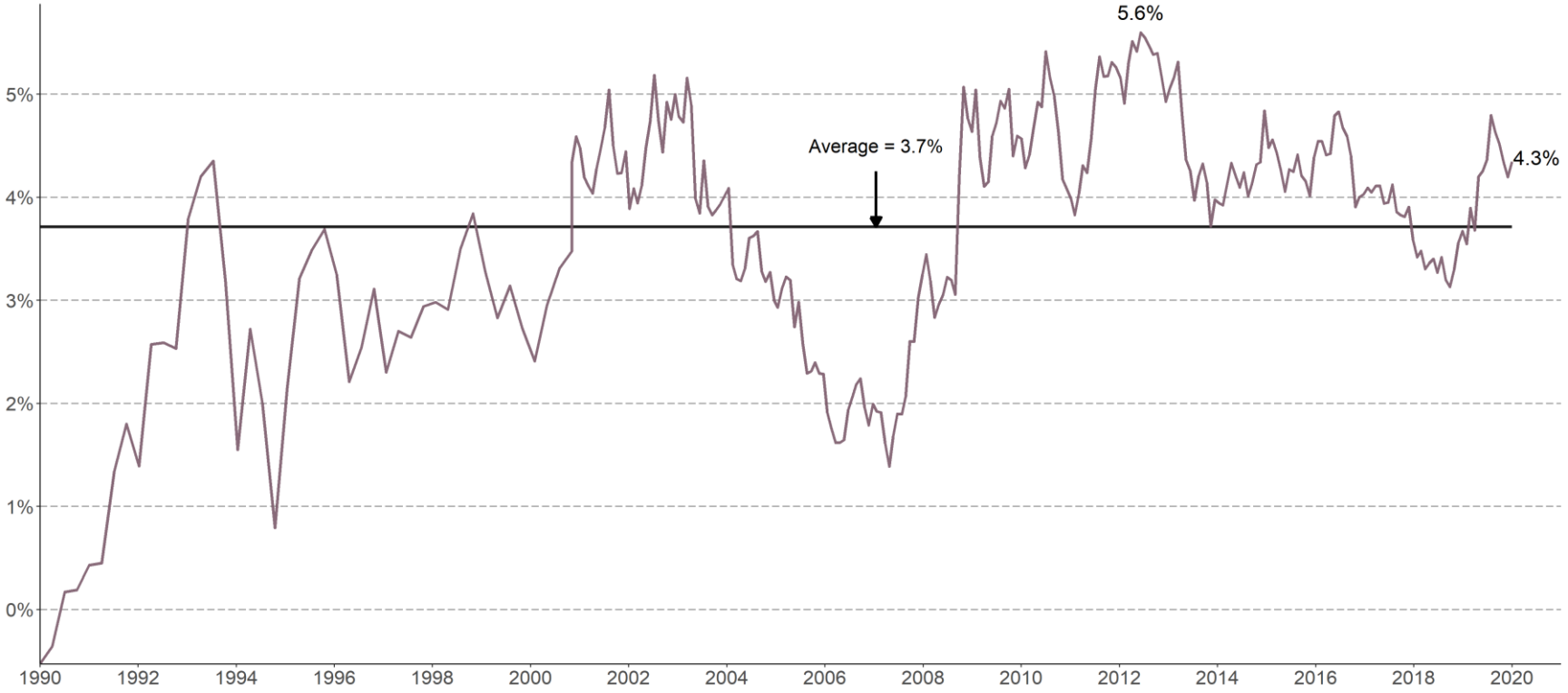


- This chart details one valuation metric for the private equity market. A higher (lower) figure indicates more expensive (cheaper) valuation relative to history.

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

[2] Annual figures, except for 2019 (YTD).

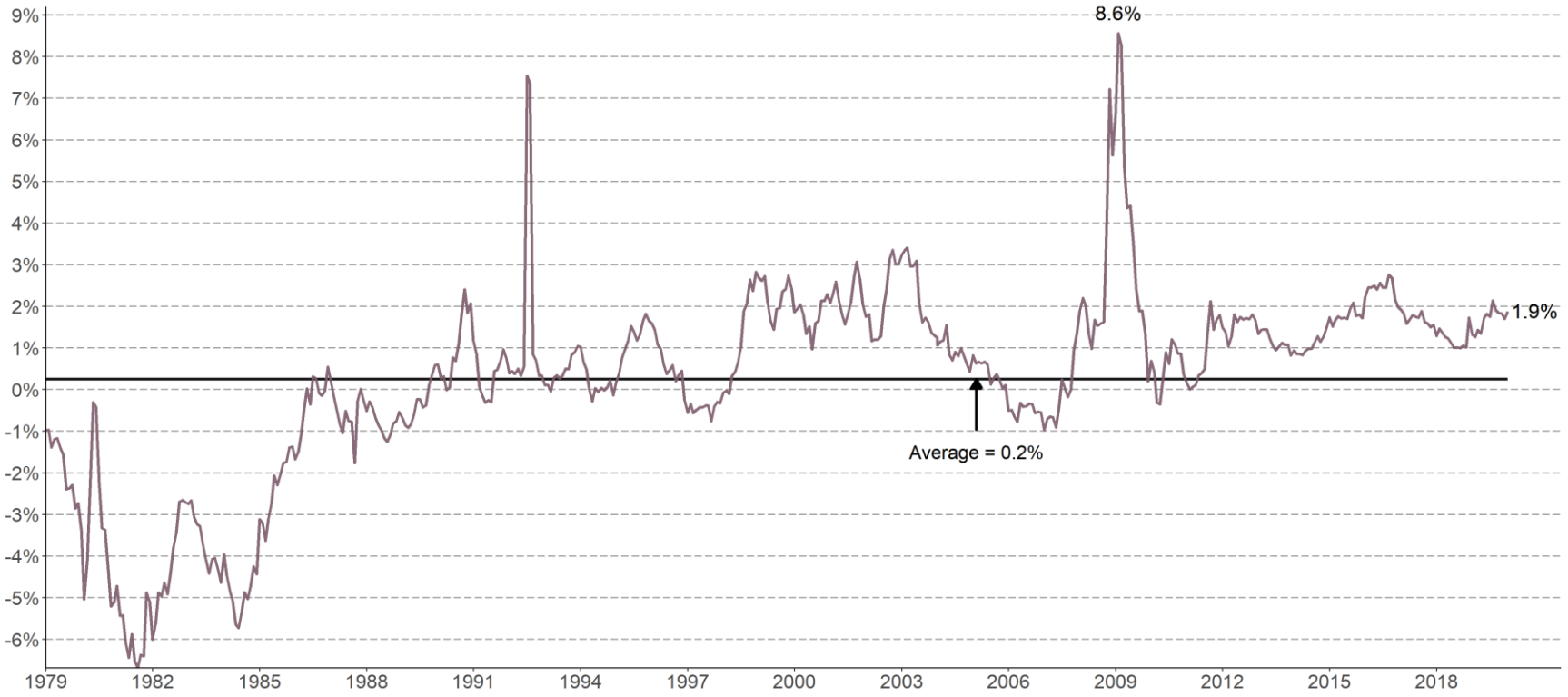
Core Real Estate Spread vs. Ten-Year Treasury[1]
(As of December 31, 2019)



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

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

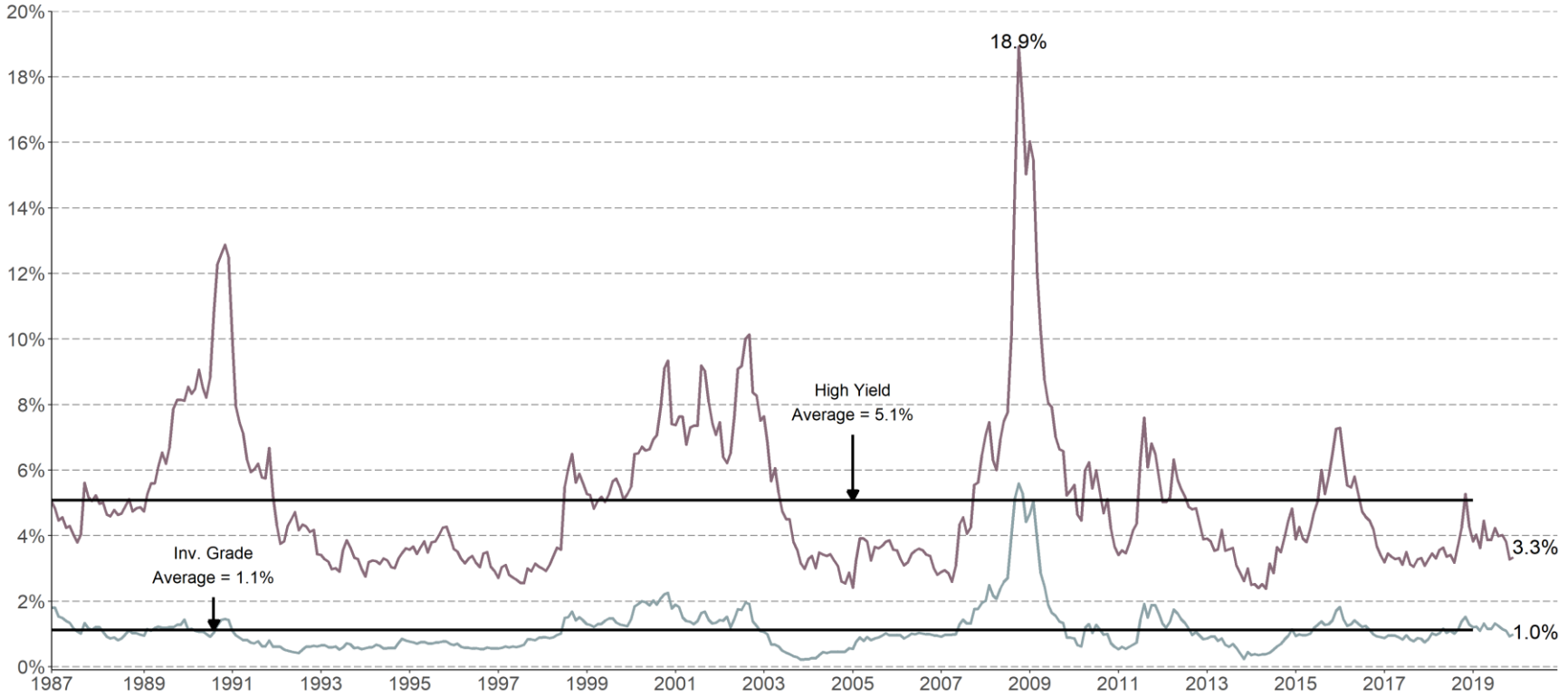
REITs Dividend Yield Spread vs. Ten-Year Treasury[1]
(As of December 31, 2019)



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

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

Credit Spreads[1]
(As of December 31, 2019)



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

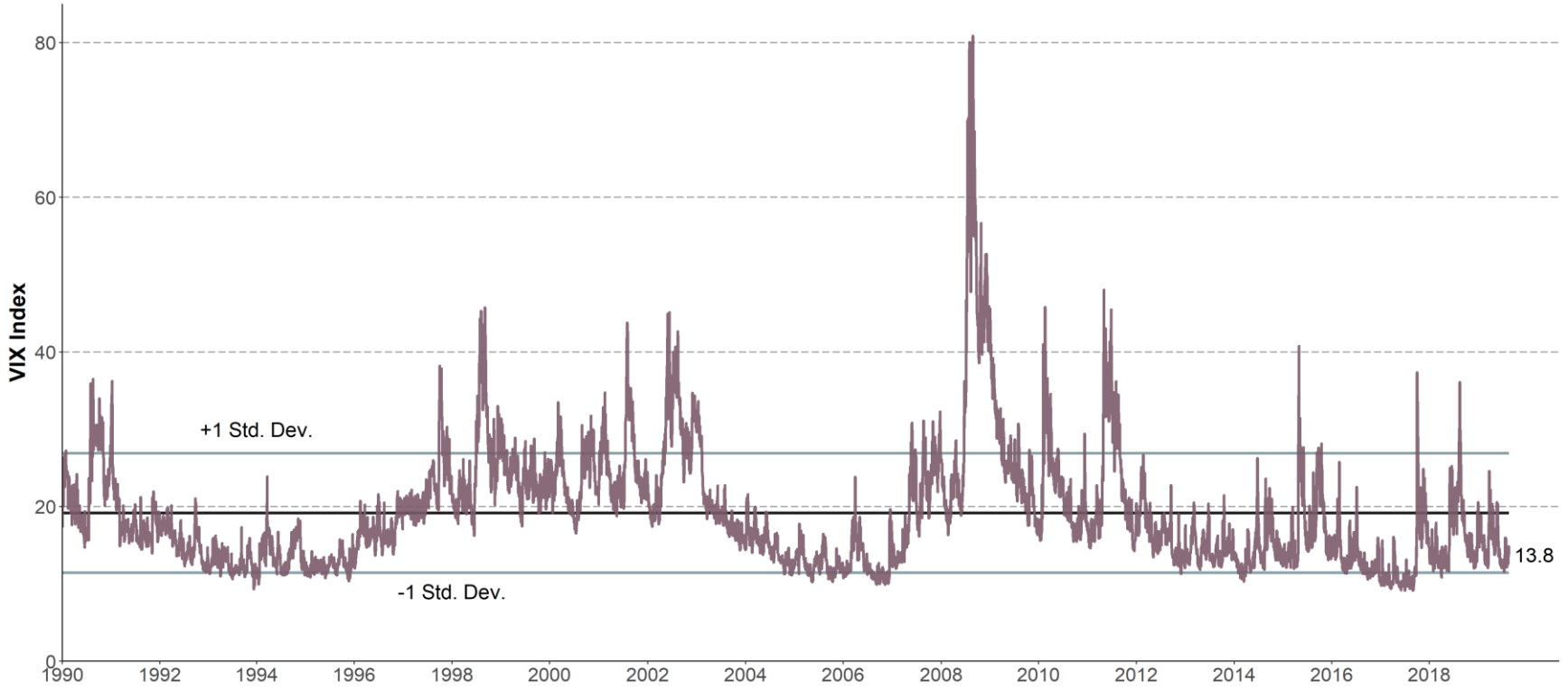
[1] Credit Spreads – Source: Barclays Capital. High Yield is proxied by the Barclays High Yield index and Investment Grade Corporates are proxied by the Barclays US Corporate Investment Grade index.

Emerging Market Debt Spreads[1]
(As of December 31, 2019)

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

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

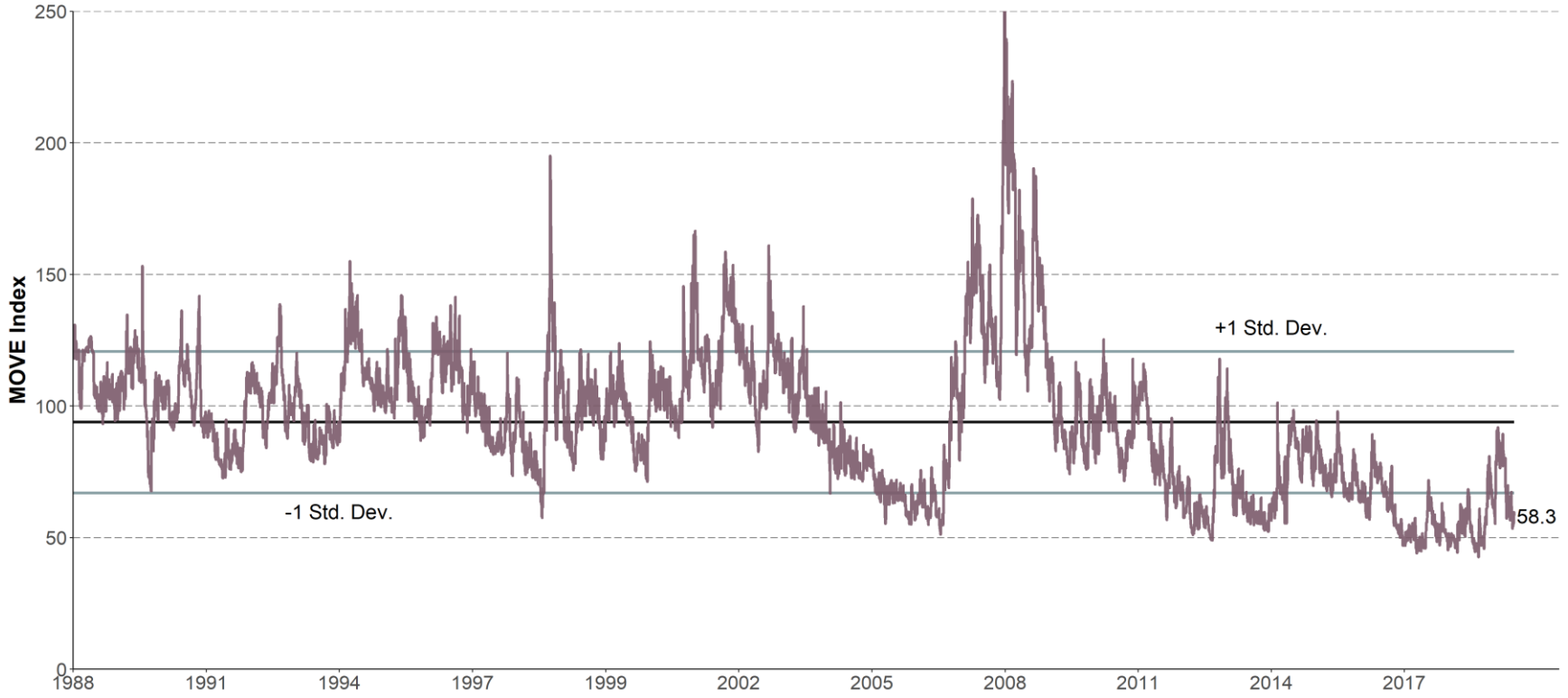
Equity Volatility[1]
(As of December 31, 2019)



- This chart details historical implied equity market volatility. This metric tends to increase during times of stress/fear and while declining during more benign periods.

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

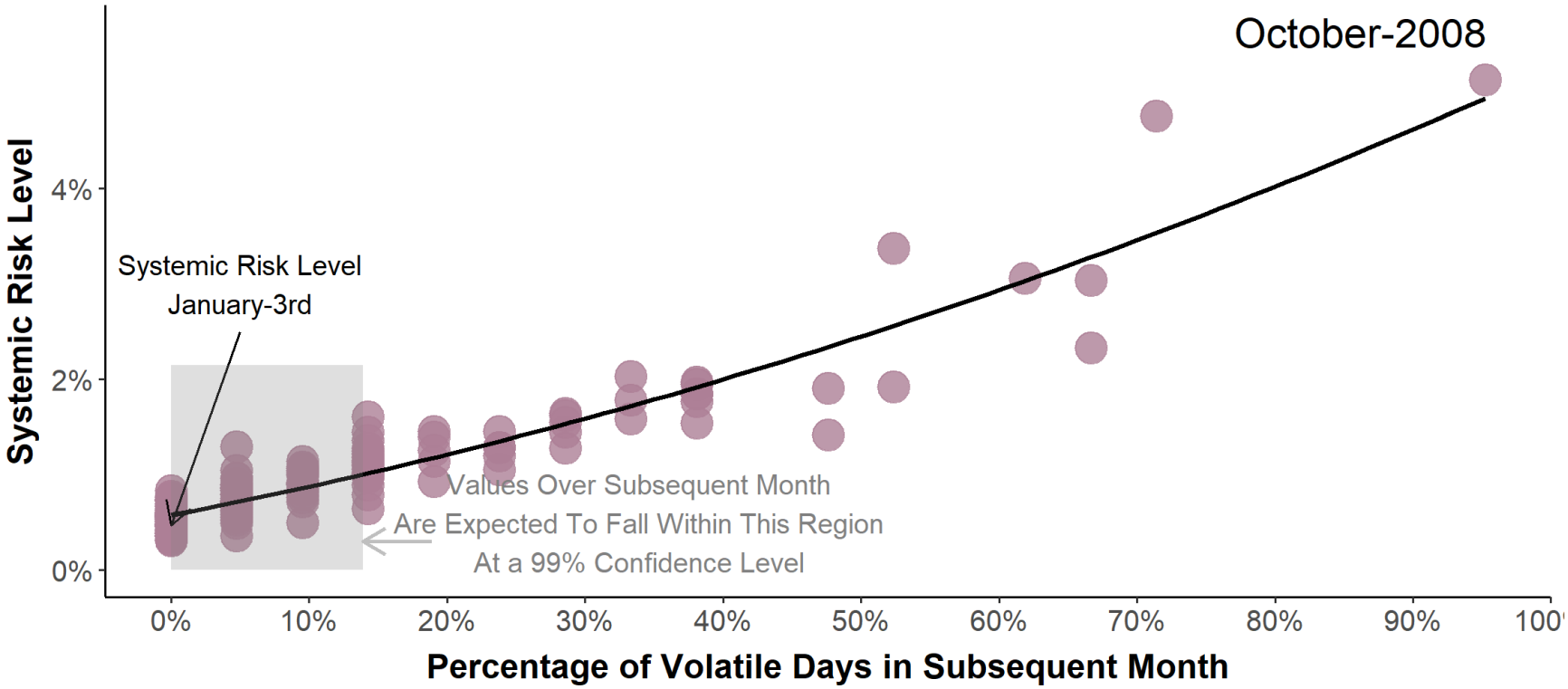
Fixed Income Volatility[1]
(As of December 31, 2019)



- This chart details historical implied fixed income market volatility. This metric tends to increase during times of stress/fear and while declining during more benign periods.

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

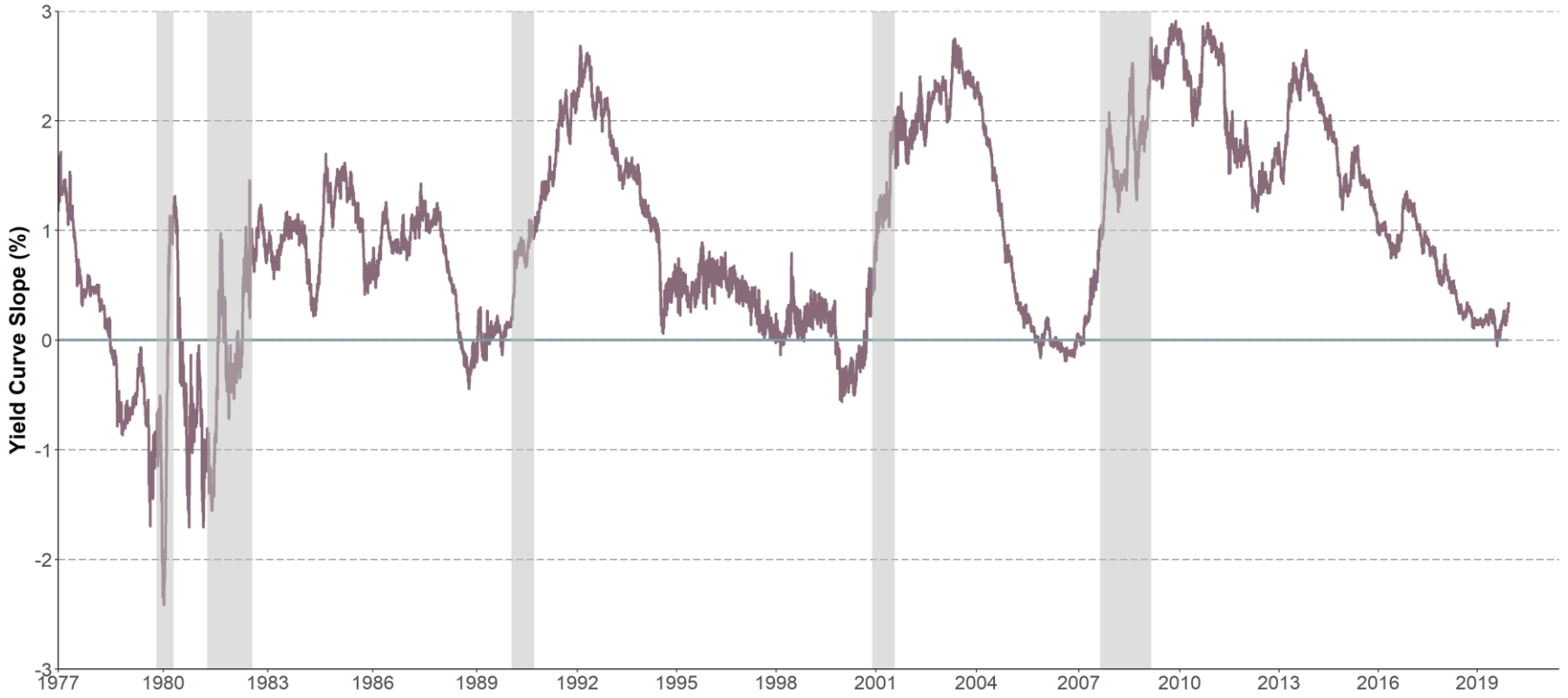
Systemic Risk and Volatile Market Days[1]
(As of January 3, 2020)



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

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

Yield Curve Slope (Ten Minus Two)[1]
(As of December 31, 2019)



- This chart details the historical difference in yields between ten-year and two-year US Treasury bonds/notes. A higher (lower) figure indicates a steeper (flatter) yield curve slope.

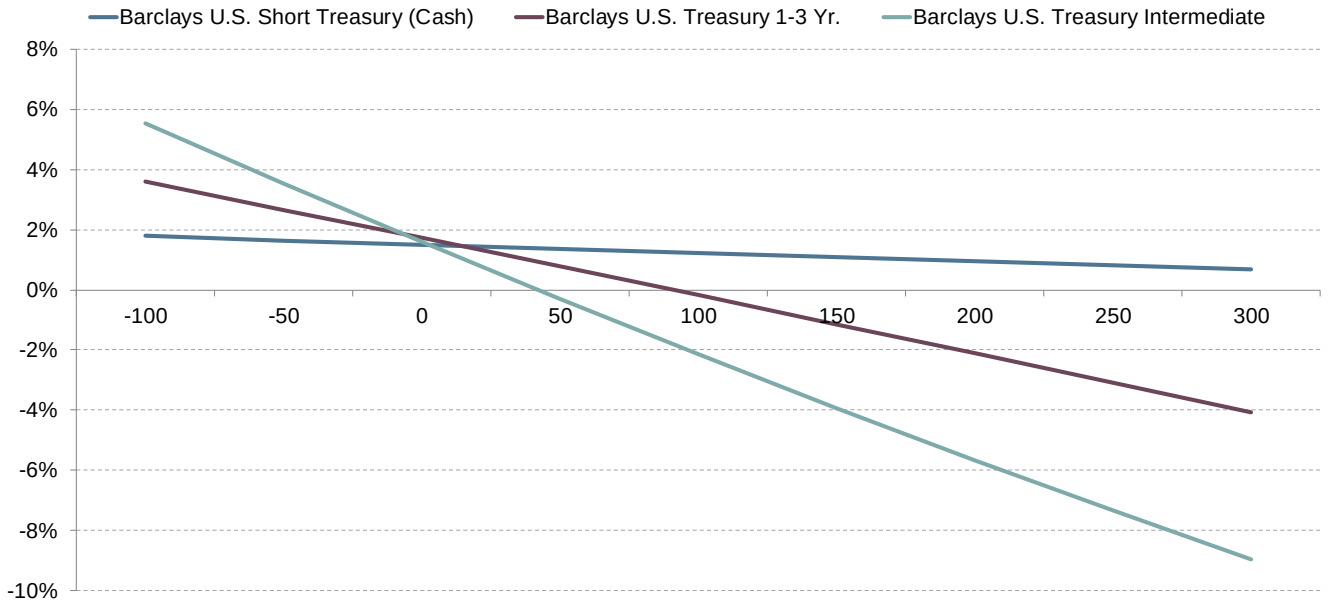
[1] Yield Curve Slope (Ten Minus Two) – Source: Bloomberg, and Meketa Investment Group. Yield curve slope is calculated as the difference between the 10-Year US Treasury Yield and 2-Year US Treasury Yield.

Ten-Year Breakeven Inflation[1]
(As of December 31, 2019)

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

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

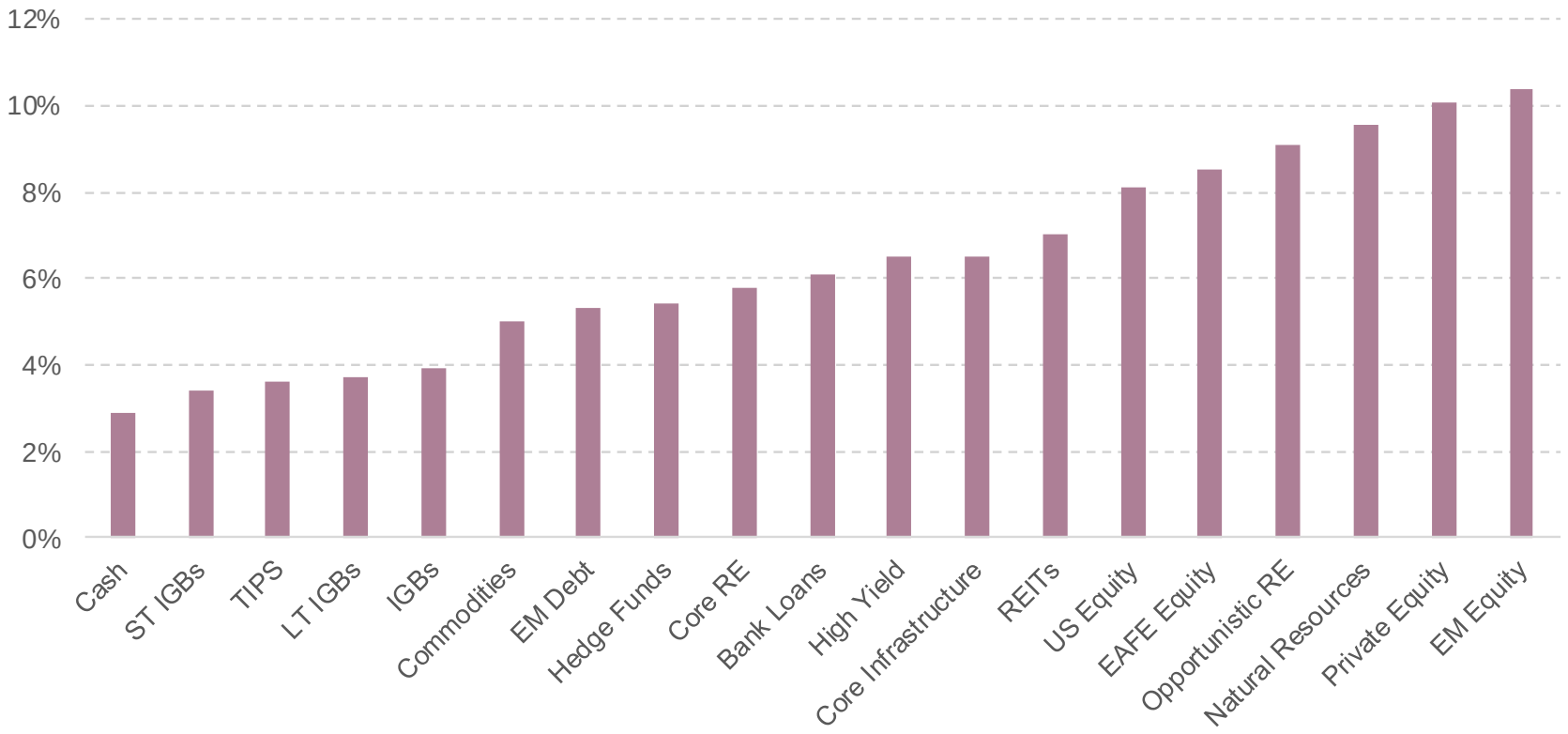
Total Return Given Changes in Interest Rates (bps)[1]
(As of December 31, 2019)



	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)	1.9%	1.8%	1.7%	1.5%	1.4%	1.2%	1.1%	1.0%	0.8%	0.7%	0.28
Barclays US Treasury 1-3 Yr.	4.5%	3.6%	2.7%	1.7%	0.8%	-0.2%	-1.1%	-2.1%	-3.1%	-4.1%	1.89
Barclays US Treasury Intermediate	7.6%	5.6%	3.6%	1.6%	-0.3%	-2.1%	-3.9%	-5.7%	-7.3%	-9.0%	3.85
Barclays US Treasury Long	34.1%	22.4%	11.8%	2.2%	-6.3%	-13.9%	-20.3%	-25.7%	-30.1%	-33.4%	18.15

[1] Data represents the expected total return from a given change in interest rates (shown in basis points) over a 12-month period assuming a parallel shift in rates. Source: Bloomberg, and Meketa Investment Group.

Long-Term Outlook – 20-Year Annualized Expected Returns[1]



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

[1] Source: Meketa Investment Group's 2019 Annual Asset Study.

Appendix

Data Sources and Explanations[1]

- US Equity Cyclically Adjusted P/E on S&P 500 Index – Source: Robert Shiller and Yale University.
- Small Cap P/E (Russell 2000 Index) vs. Large Cap P/E (Russell 1000 Index) - Source: Russell Investments. Earnings figures represent 12-month "as reported" earnings.
- Growth P/E (Russell 3000 Growth Index) vs. Value (Russell 3000 Value Index) P/E - Source: Bloomberg, MSCI, and Meketa Investment Group. Earnings figures represent 12-month "as reported" earnings.
- Developed International Equity (MSCI EAFE ex Japan Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years.
- Emerging Market Equity (MSCI Emerging Markets Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years
- Private Equity Multiples – Source: S&P LCD Average EBITDA Multiples Paid in All LBOs
- Core Real Estate Spread vs. Ten-Year Treasury – Source: Real Capital Analytics, US Treasury, Bloomberg, and Meketa Investment Group. Core Real Estate is proxied by weighted sector transaction based indices from Real Capital Analytics and Meketa Investment Group.

[1] All Data as of December 31, 2019 unless otherwise noted.

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

Appendix

Data Sources and Explanations[1]

- Credit Spreads – Source: Barclays Capital. High Yield is proxied by the Barclays High Yield index and Investment Grade Corporates are proxied by the Barclays US Corporate Investment Grade index.
- EM Debt Spreads – Source: Bloomberg, and Meketa Investment Group. Option Adjusted Spread (OAS) for the Bloomberg Barclays EM USD Aggregate Index.
- Equity Volatility – Source: Bloomberg, and Meketa Investment Group. Equity Volatility proxied by VIX Index, a Measure of implied option volatility for US equity markets.
- Fixed Income Volatility – Source: Bloomberg, and Meketa Investment Group. Equity Volatility proxied by MOVE Index, a Measure of implied option volatility for US Treasury markets.
- Systemic Risk and Volatile Market Days – Source: Meketa Investment Group. Volatile days are defined as the top 10 percent of realized turbulence, which is a multivariate distance between asset returns.
- Systemic Risk, which measures risk across markets, is important because the more contagion of risk that exists between assets, the more likely it is that markets will experience volatile periods.
- Yield Curve Slope (Ten Minus Two) – Source: Bloomberg, and Meketa Investment Group. Yield curve slope is calculated as the difference between the 10-Year US Treasury Yield and 2-Year US Treasury Yield.
- Ten-Year Breakeven Inflation – Source: US Treasury and Federal Reserve. Inflation is measured by the Consumer Price Index (CPI-U NSA).

[1] All Data as of December 31, 2019 unless otherwise noted.

Meketa Market Sentiment Indicator

Explanation, Construction and Q&A

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

This appendix explores:

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

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

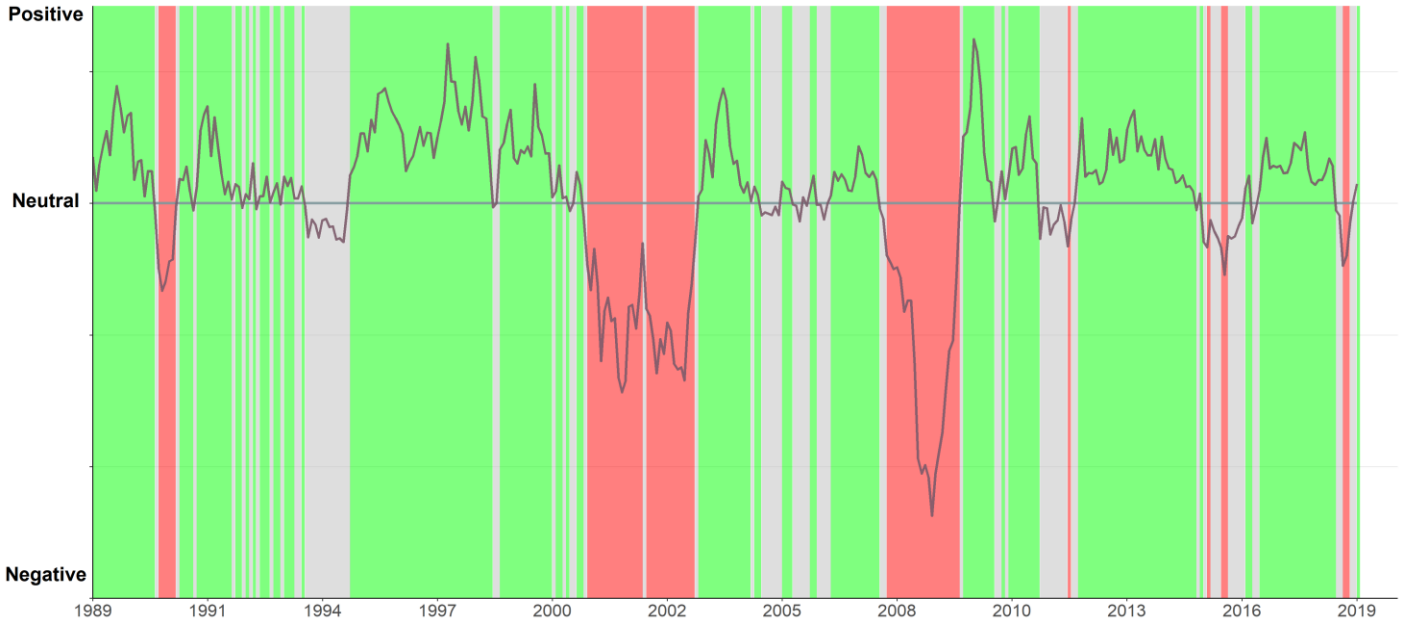
- Meketa's Risk Metrics, which rely significantly on standard market measures of relative valuation, often provide valid early signals of increasing long-term risk levels in the global investment markets. However, as is the case with numerous valuation measures, the Risk Metrics may convey such risk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

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

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

How do I read the Meketa Market Sentiment Indicator graph?

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



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

- The MIG-MSI is constructed from two sub-elements representing investor sentiment in stocks and bonds:
  - Stock return momentum: Return momentum for the S&P 500 Equity Index (trailing 12-months)
  - Bond yield spread momentum: Momentum of bond yield spreads (excess of the measured bond yield over the identical duration US Treasury bond yield) for corporate bonds (trailing 12-months) for both investment grade bonds (75% weight) and high yield bonds (25% weight).
  - Both measures are converted to Z-scores and then combined to get an "apples to apples" comparison without the need of re-scaling.
- The black line reading on the graph is calculated as the average of the stock return momentum measure and the bonds spread momentum measure.[1] The color reading on the graph is determined as follows:
  - If both stock return momentum and bond spread momentum are positive = GREEN (positive)
  - If one of the momentum indicators is positive, and the other negative = GRAY (inconclusive)
  - If both stock return momentum and bond spread momentum are negative = RED (negative)

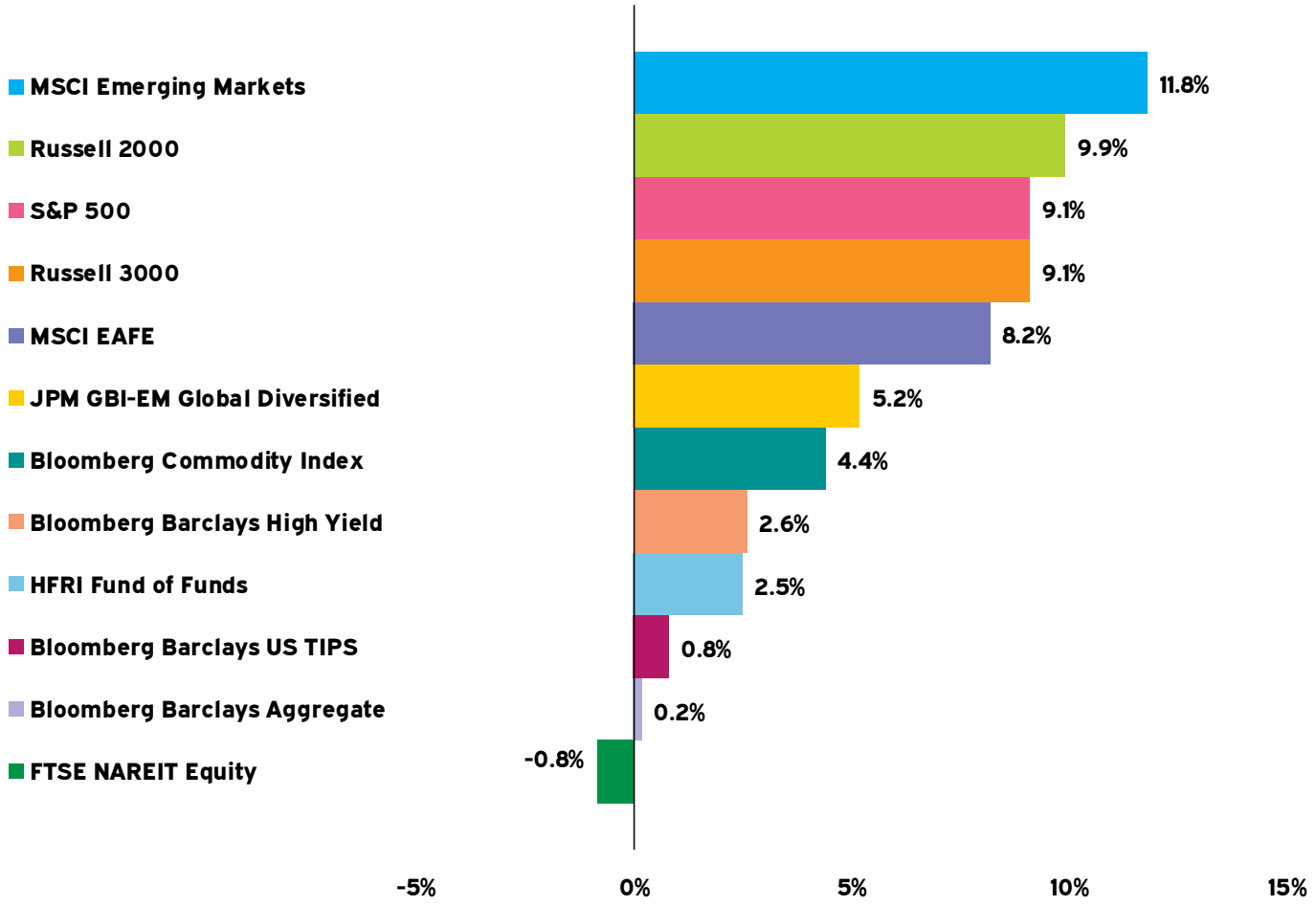
[1] Momentum as we are defining it is the use of the past behavior of a series as a predictor of its future behavior.
"Time Series Momentum" Moskowitz, Ooi, Pedersen, August 2010. *http://pages.stern.nyu.edu/~lpederse/papers/TimeSeriesMomentum.pdf*

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

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

The World Markets
Fourth Quarter of 2019

The World Markets[1]
Fourth Quarter of 2019



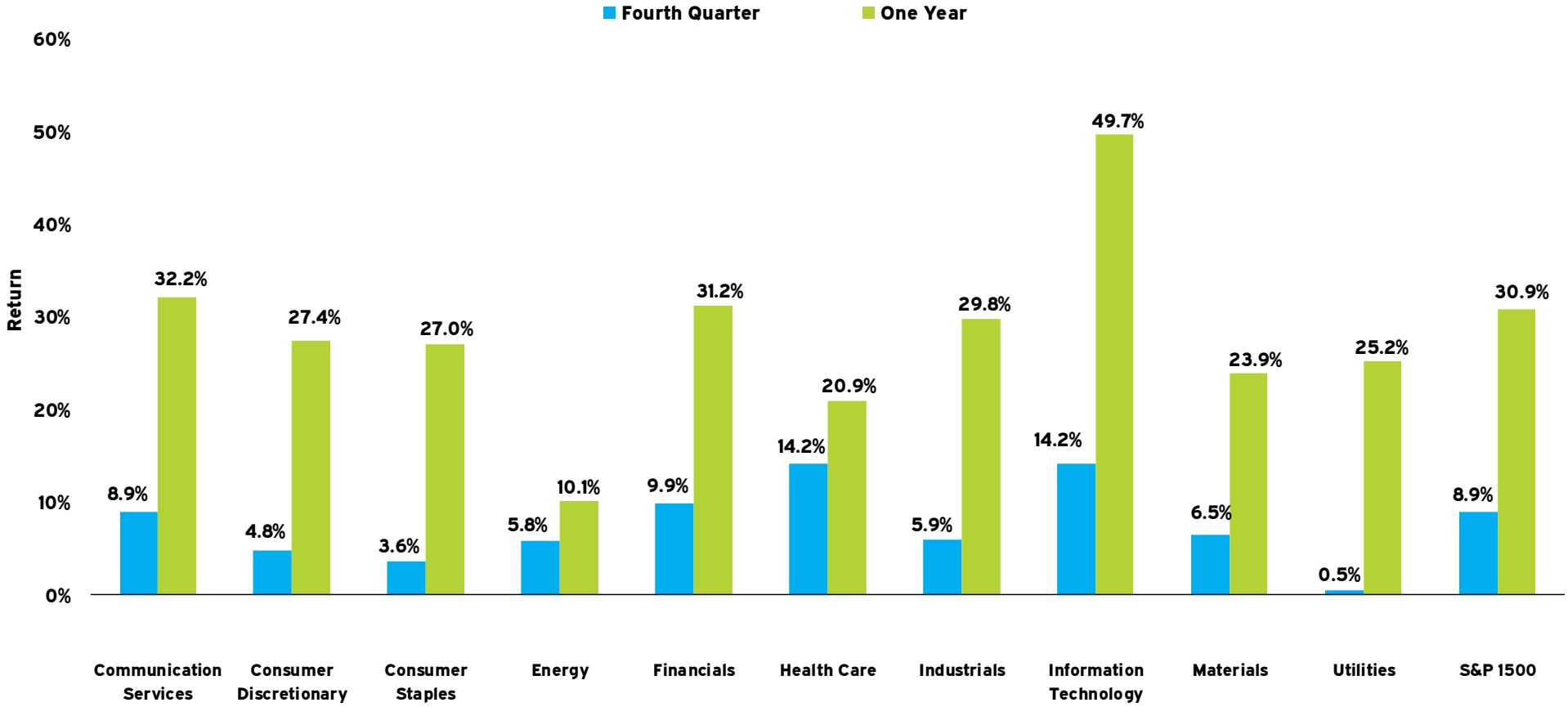
[1] Source: InvestorForce.

Index Returns[1]

	4Q19 (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
Domestic Equity					
S&P 500	9.1	31.5	15.3	11.7	13.6
Russell 3000	9.1	31.0	14.6	11.2	13.4
Russell 1000	9.0	31.4	15.0	11.5	13.5
Russell 1000 Growth	10.6	36.4	20.5	14.6	15.2
Russell 1000 Value	7.4	26.5	9.7	8.3	11.8
Russell MidCap	7.1	30.5	12.1	9.3	13.2
Russell MidCap Growth	8.2	35.5	17.4	11.6	14.2
Russell MidCap Value	6.4	27.1	8.1	7.6	12.4
Russell 2000	9.9	25.5	8.6	8.2	11.8
Russell 2000 Growth	11.4	28.5	12.5	9.3	13.0
Russell 2000 Value	8.5	22.4	4.8	7.0	10.6
Foreign Equity					
MSCI ACWI (ex. US)	8.9	21.5	9.9	5.5	5.0
MSCI EAFE	8.2	22.0	9.6	5.7	5.5
MSCI EAFE (Local Currency)	5.2	21.7	7.7	6.7	7.2
MSCI EAFE Small Cap	11.5	25.0	10.9	8.9	8.7
MSCI Emerging Markets	11.8	18.4	11.6	5.6	3.7
MSCI Emerging Markets (Local Currency)	9.5	18.1	11.5	7.5	6.1
Fixed Income					
Bloomberg Barclays Universal	0.5	9.3	4.3	3.4	4.1
Bloomberg Barclays Aggregate	0.2	8.7	4.0	3.0	3.7
Bloomberg Barclays US TIPS	0.8	8.4	3.3	2.6	3.4
Bloomberg Barclays High Yield	2.6	14.3	6.4	6.1	7.6
JPM GBI-EM Global Diversified	5.2	13.5	7.0	2.8	2.7
Other					
FTSE NAREIT Equity	-0.8	26.0	8.1	7.2	11.9
Bloomberg Commodity Index	4.4	7.7	-0.9	-3.9	-4.7
HFRI Fund of Funds	2.5	7.8	3.7	2.2	2.8

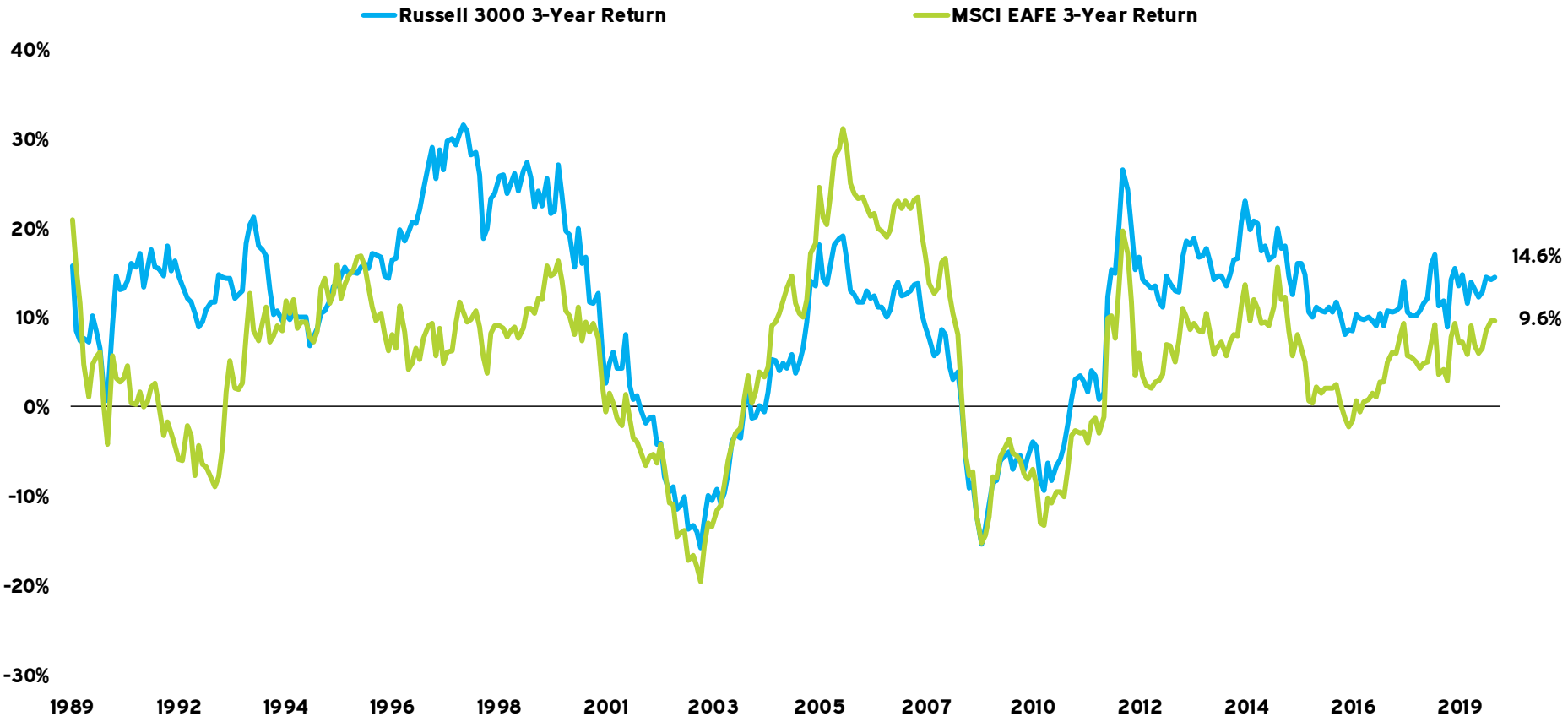
[1] Source: InvestorForce.

S&P Sector Returns[1]



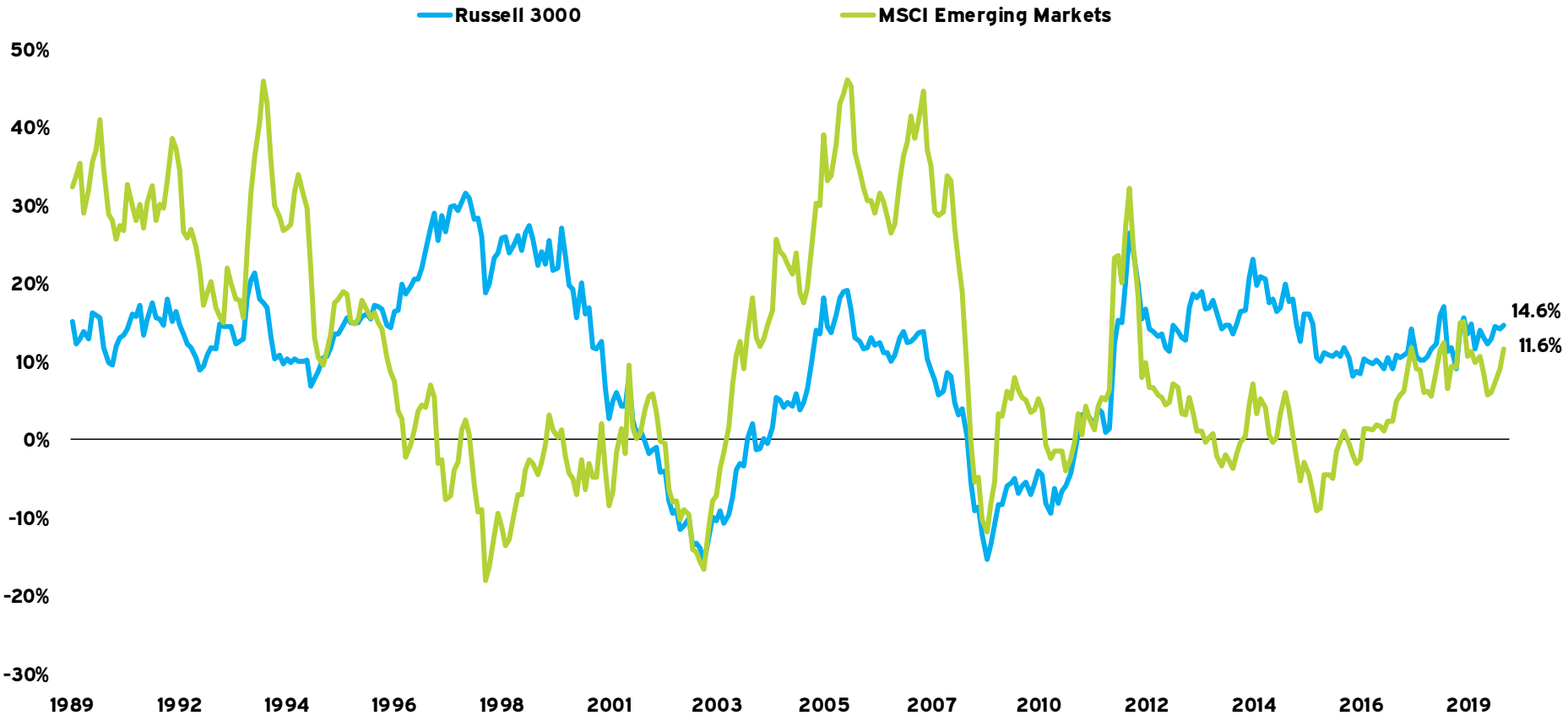
[1] Source: InvestorForce. Represents S&P 1500 (All Cap) data.

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



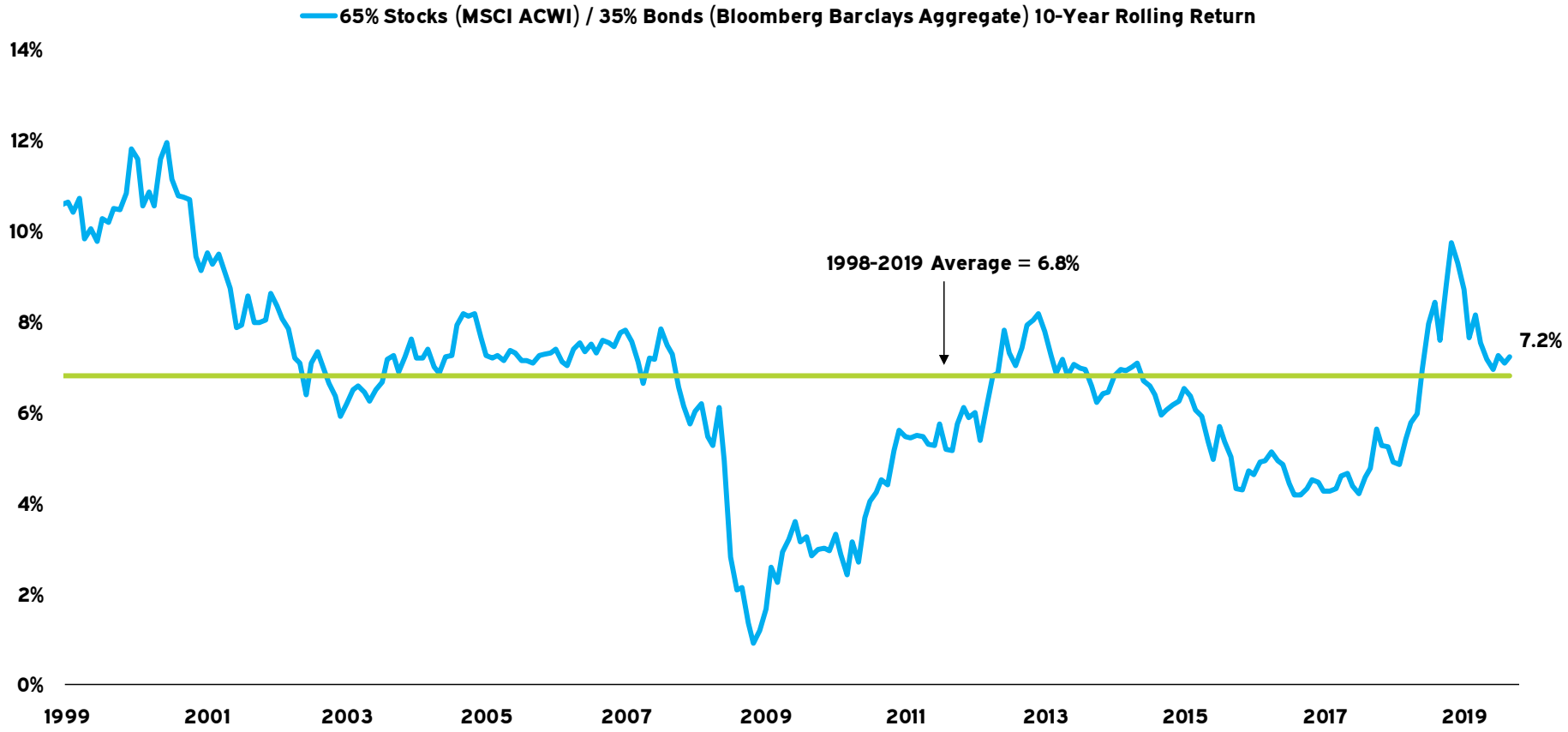
[1] Source: InvestorForce.

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



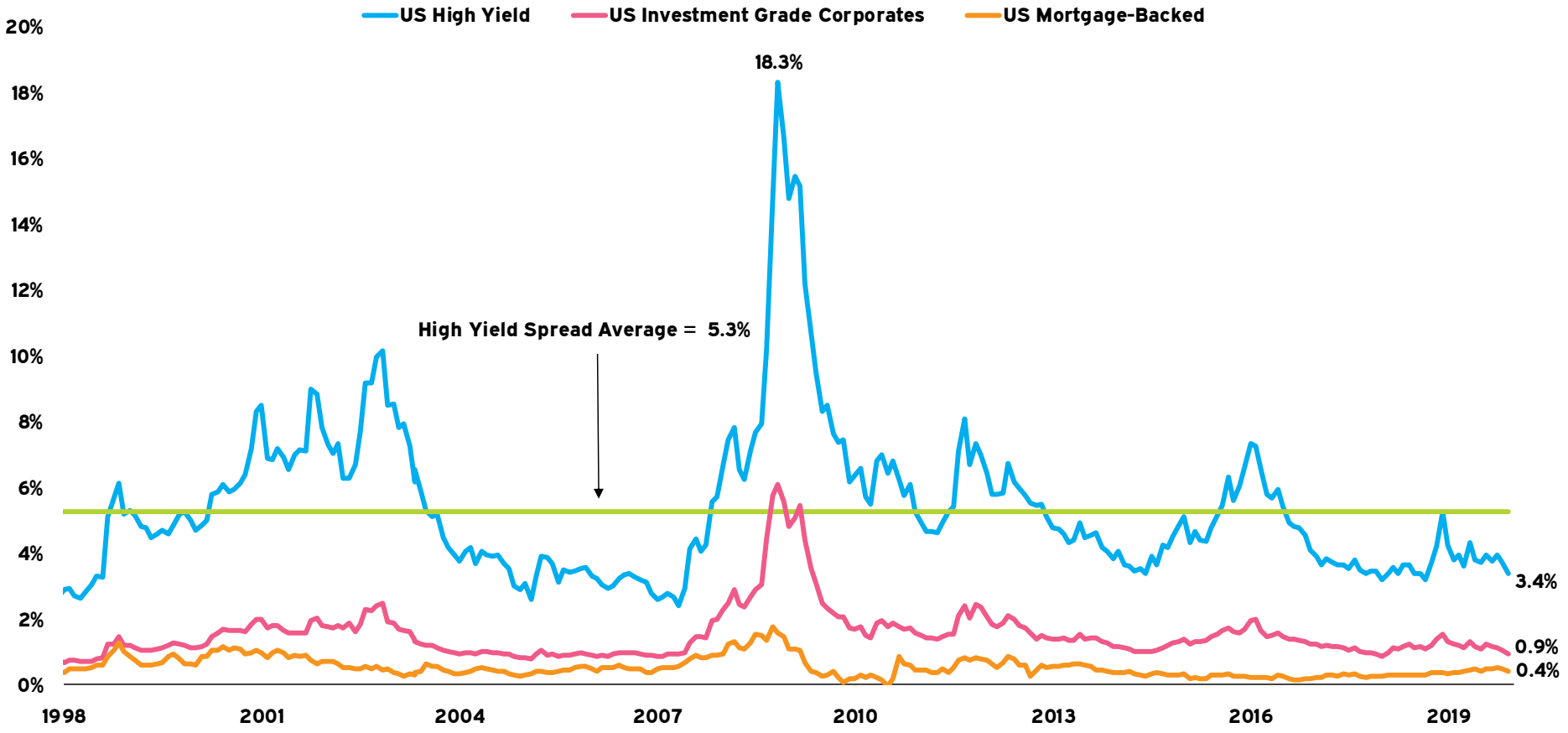
[1] Source: InvestorForce.

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



[1] Source: InvestorForce.

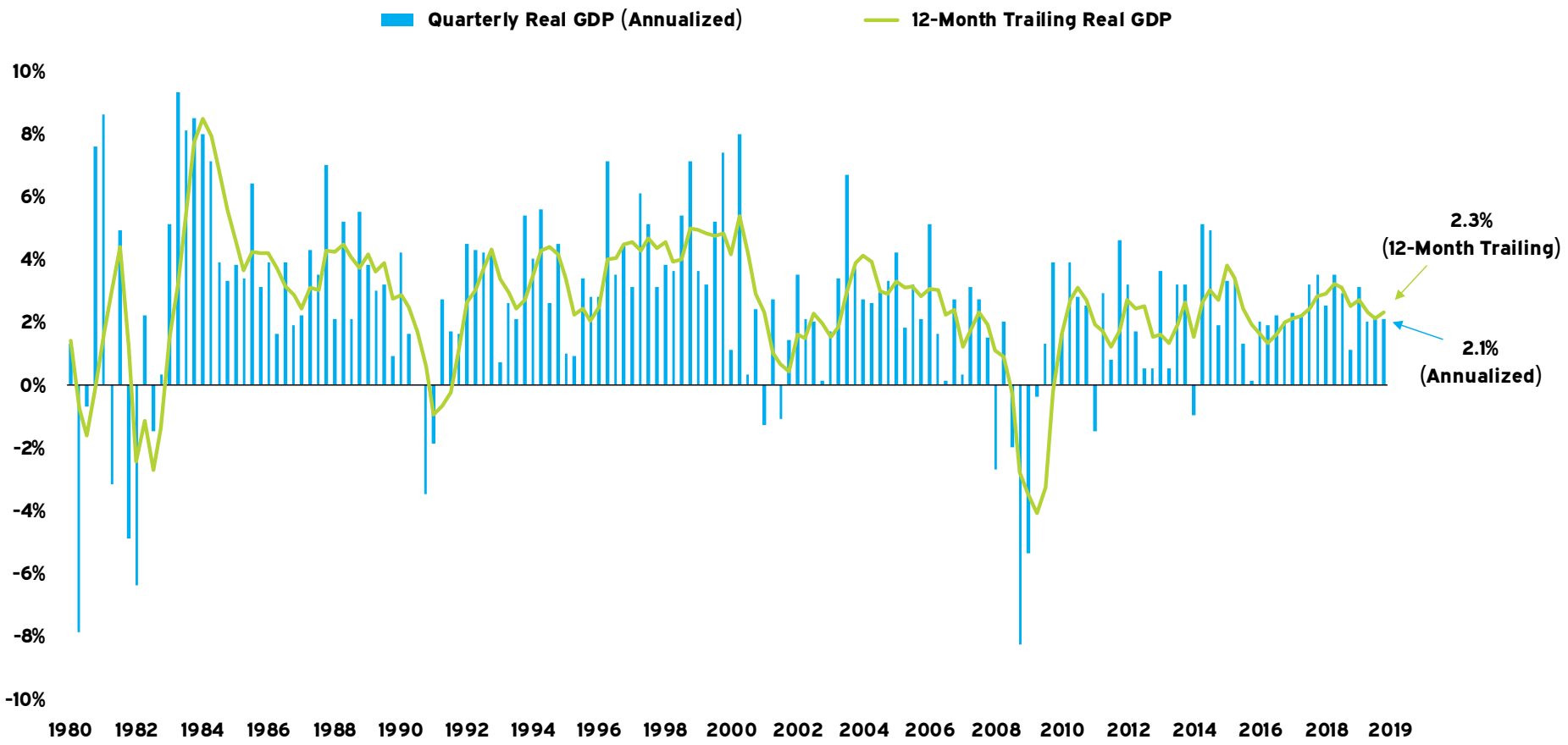
Credit Spreads vs. US Treasury Bonds[1,2]



1 Source: Barclays Live. Data represents the OAS.

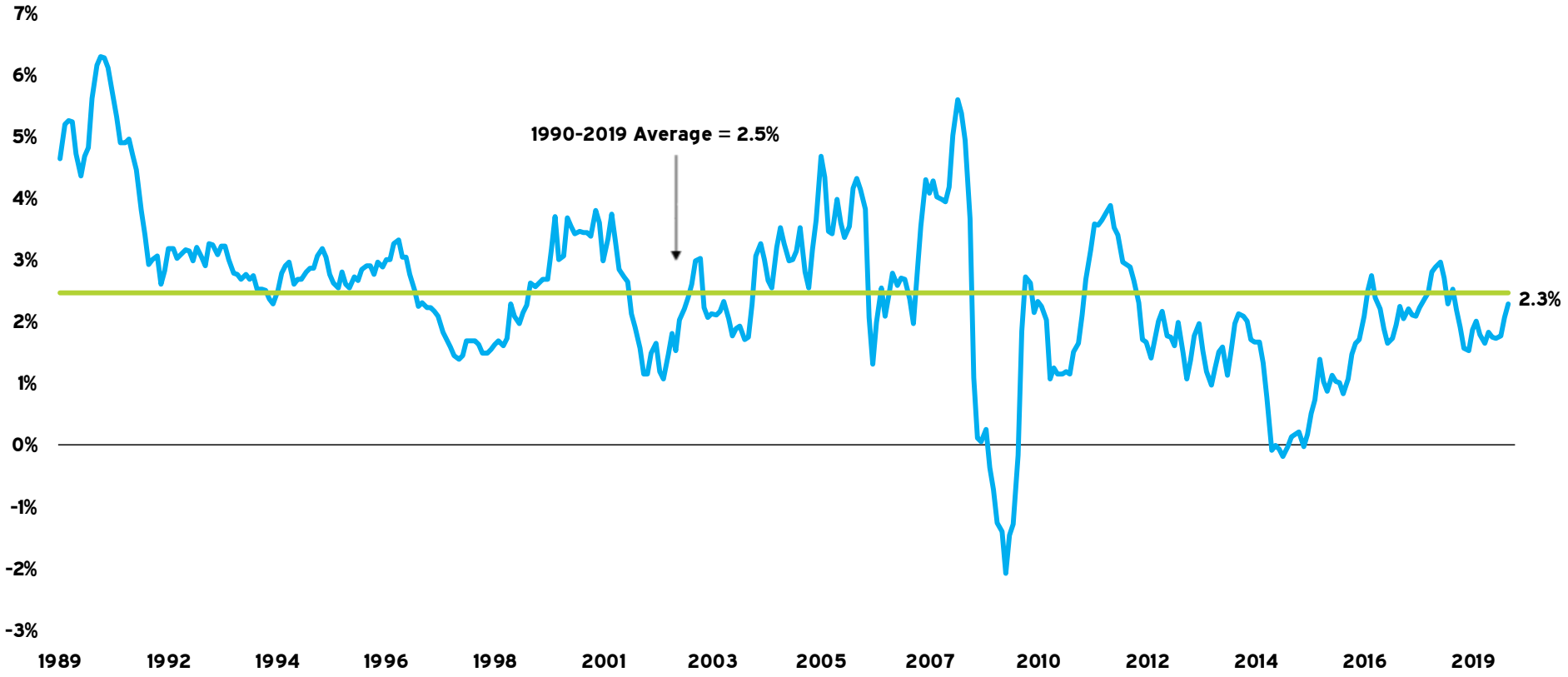
2 The median high yield spread was 4.7% from 1997-2019.

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



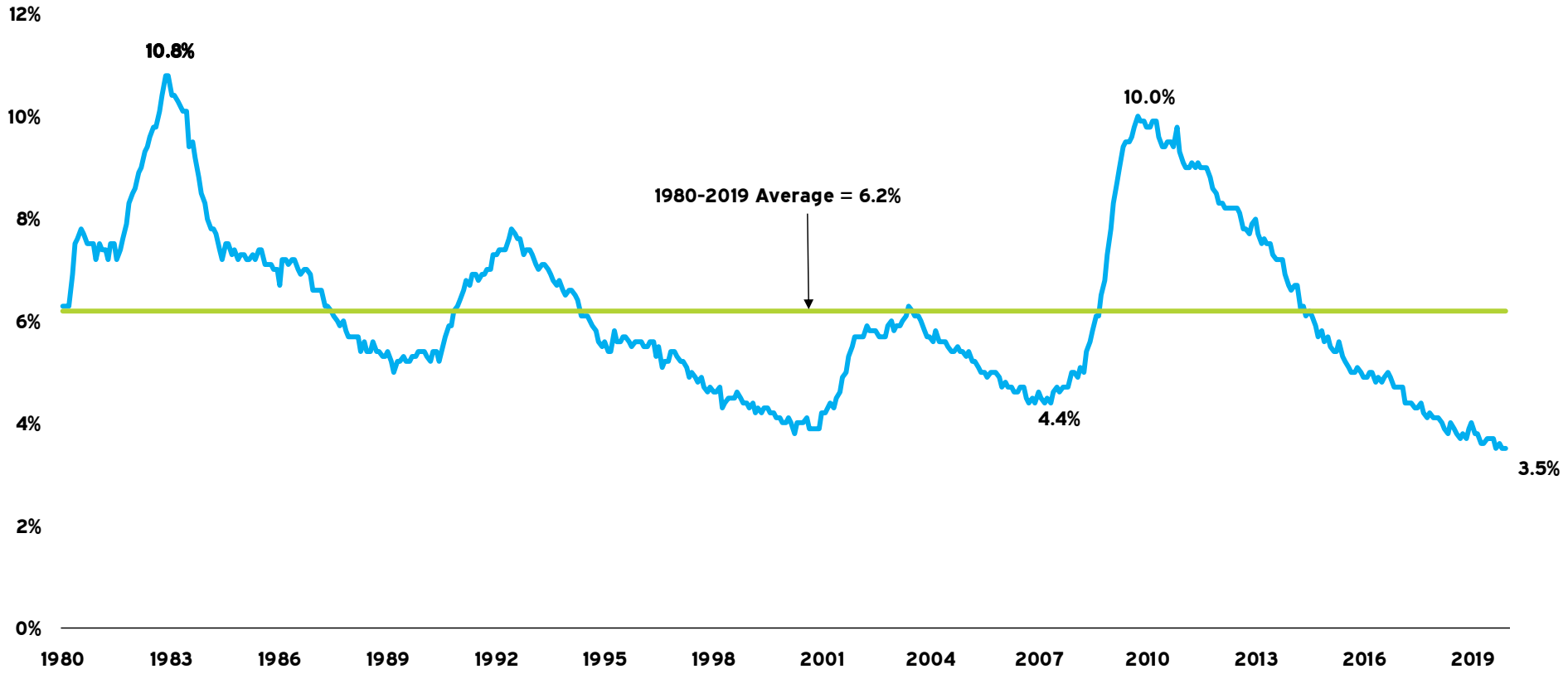
[1] Source: Bureau of Economic Analysis. Data is as of Q4 2019 and represents the first estimate.

US Inflation (CPI)
Trailing Twelve Months[1]



[1] Source: Bureau of Labor Statistics. Data is non-seasonally adjusted CPI, which may be volatile in the short-term. Data is as of December 31, 2019.

US Unemployment[1]

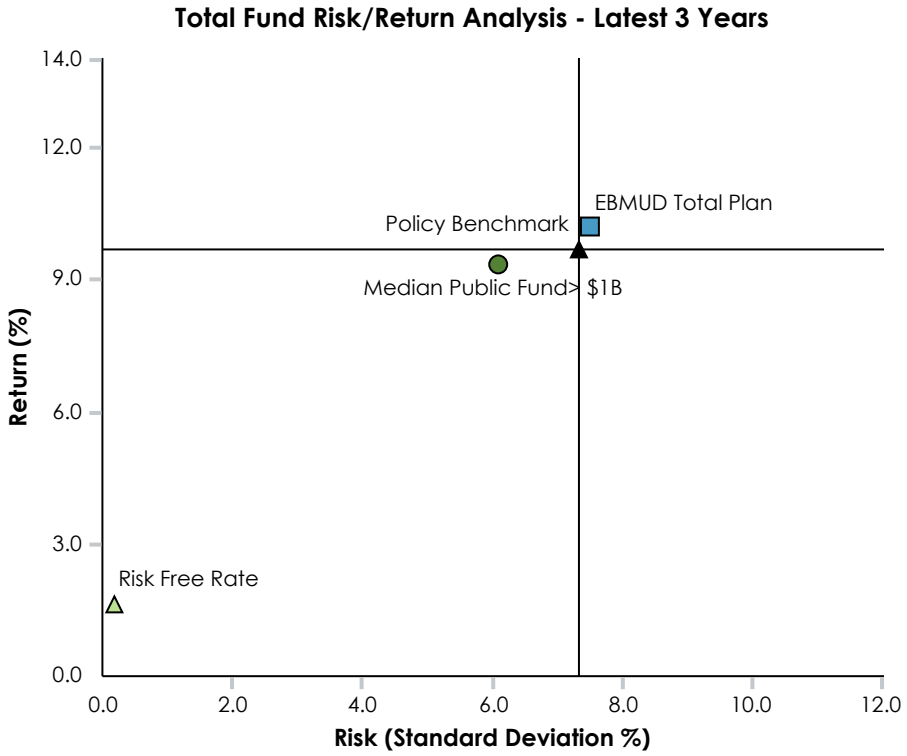


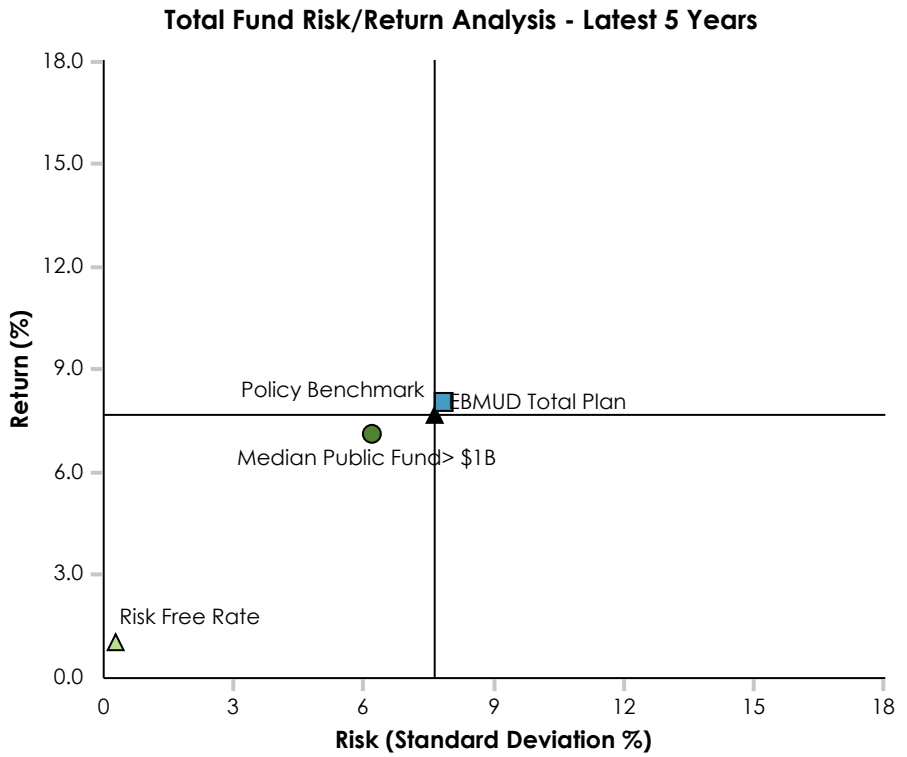
[1] Source: Bureau of Labor Statistics. Data is as of December 31, 2019.

EBMUD Portfolio Review

EBMUD Portfolio Review

Gross Investment Performance As of December 31, 2019



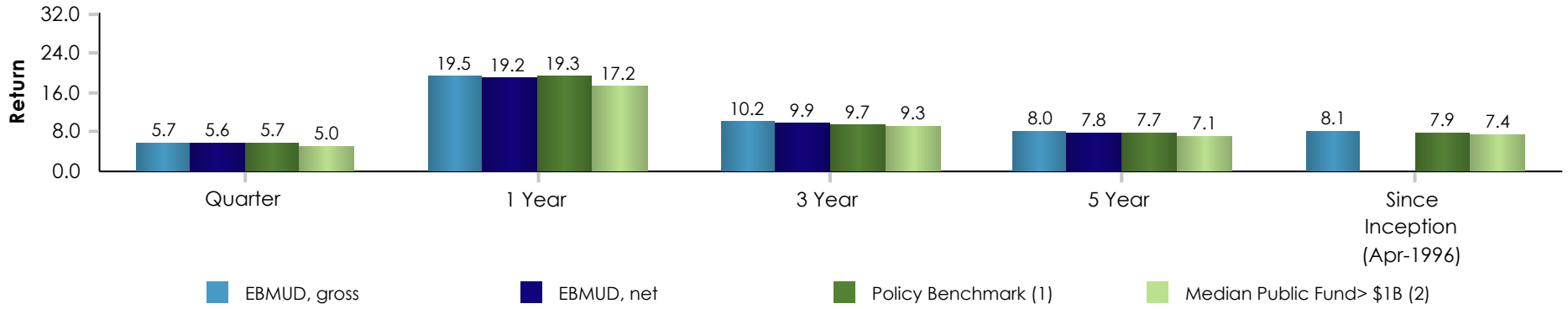


	3 Years Return	3 Years Standard Deviation	3 Years Sharpe Ratio	5 Years Return	5 Years Standard Deviation	5 Years Sharpe Ratio
EBMUD Total Plan	10.2	7.5	1.1	8.0	7.9	0.9
Policy Benchmark	*9.7*	*7.3*	*1.1*	*7.7*	*7.6*	*0.9*
Median Public Fund> $1B Median	9.3	6.1	1.2	7.1	6.2	1.0

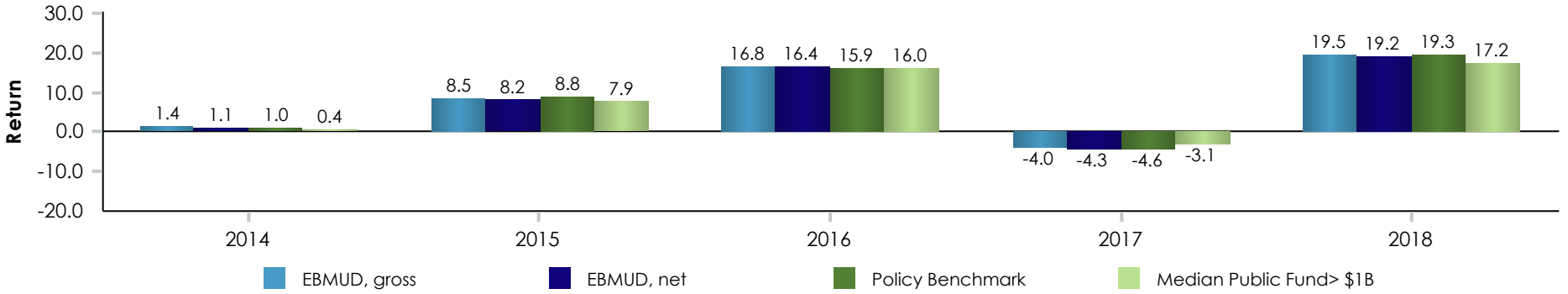
EBMUD Portfolio Relative Performance Results

As of December 31, 2019

Trailing Period Perfomance (annualized)



12-month Performance- As of December 31, 2019



(1) Policy Benchmark consists of 25% Russell 3000 (blend), 25% MSCI ACWIxU.S. (blend), 20% CBOE BXM, 15% BC Aggregate, 5% BC US 1-3 Year Government/Credit, 2.5% ICE BofA ML U.S. Corp Cash Pay BB-B 1-5 Year, 2.5% Blend 60% Credit Suisse Leverage Loan/40% BBg BC Short Term Gov/Corp, 2.5% NCREIF (lagged), and 2.5% FTSE NAREIT Equity REITs index 3/1/19-present; see Appendix for historical Policy Benchmark composition.

(2) IM Total Public Fund >$1B Universe includes BNY Mellon Public>$1B Fund Universe and IM client data.

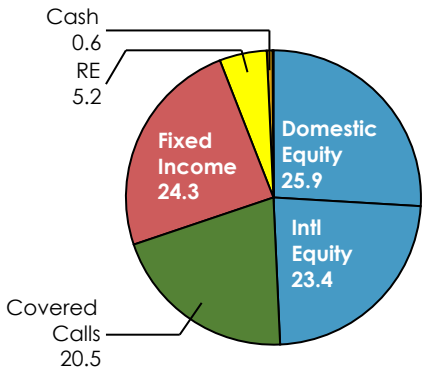
Actual vs. Target Allocation
As of December 31, 2019

	Asset Allocation ($000)	Asset Allocation (%)	Target Allocation* (%)	Variance (%)	Minimum Allocation** (%)	Maximum Allocation** (%)
EBMUD Total Plan	1,940,561	100.0	100.0	0.0	-	-
Domestic Equity	503,161	25.9	25.0	0.9	20.0	30.0
International Equity	453,247	23.4	25.0	-1.6	20.0	30.0
Core Fixed Income	380,883	19.6	20.0	-0.4	17.0	23.0
Non-Core Fixed Income	89,909	4.6	5.0	-0.4	3.0	7.0
Covered Calls	398,474	20.5	20.0	0.5	17.0	23.0
Real Estate	100,613	5.2	5.0	0.2	3.0	7.0
Cash	12,345	0.6	0.0	0.6	0.0	0.0

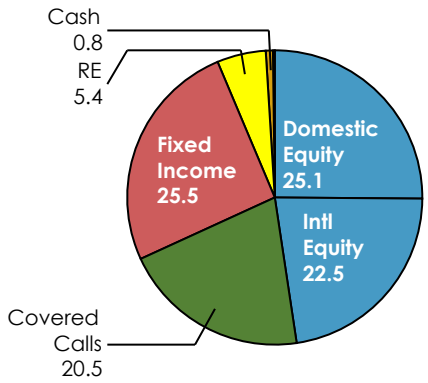
*Current policy target allocations elected by the Board in January 2019 took effect March 2019 upon the transition to the new long-term strategic allocation.
**Policy rebalancing ranges shown are for non-turbulent market periods. The Plan also has established rebalancing ranges to be in effect during turbulent market periods.
^Includes approximately $859 in the closed T.Rowe Price account, $3,734 in the closed Western Asset account and $1,925,000 in lagged cash (due to a distribution from CenterSquare in 3Q19 and contribution to RREEF in 1Q20) as of December 31, 2019.
^^Includes approximately $757,980 in the global transition account.
^^^RREEF performance results and allocation are lagged one-quarter.

Actual Asset Allocation Comparison

December 31, 2019 : $1,940,561,471



September 30, 2019 : $1,837,939,132



Manager Performance - Gross of Fees

As of December 31, 2019

Domestic and International Equity

Manager - Style	Market Value ($000)	Quarter	1 Year	3 Year	5 Year
Domestic Equity - All Cap Core					
Northern Trust (R3000) - Passive	502,403	9.1	31.0	-	-
Russell 3000 Index		*9.1*	*31.0*	*14.6*	*11.2*
International Equity					
Franklin Templeton	125,129	8.4	14.5	5.8	3.1
Fisher Investments	143,896	11.4	29.0	12.3	7.4
*MSCI ACWI xUS (blend)**		*9.0*	*22.1*	*10.4*	*6.0*
Northern Trust (ACWI xUS) - Passive	184,222	8.9	21.8	-	-
MSCI ACWI xUS		*9.0*	*22.1*	*10.4*	*6.0*

*As of January 1, 2007, the benchmark changed from MSCI EAFE to MSCI ACWI xUS.

- The EBMUD Domestic Equity class is currently 100% passively-managed. The Plan liquidated all of its actively-managed domestic equity mandates in June 2018 to move towards the Plan's new strategic policy target allocations effective July 1, 2018.
- The International Equity class is 60% actively-managed by two managers, Franklin Templeton and Fisher Investments, and 40% passively-managed by Northern Trust.
- Both of EBMUD's active International Equity managers produced material outperformance/underperformance relative to their respective benchmarks over various trailing periods ending 12/31/2019. The following addresses the drivers of these excess results.

    - Fisher **outperformed** the MSCI ACWI x US (blend) Index over all the reported periods by 2.4%, 6.9%, 1.9% and 1.4% respectively. An overweight to and selection within Semiconductors and Semiconductor was the largest contributor to relative return over the quarter and 1-year. An overweight to and selection within Information Technology boosted the 3-year return while an overweight to and selection within Germany dampened the results.

    - The Franklin Templeton account **trailed** the MSCI ACWI x US (blend) Index over all the reported time periods by (0.6%), (7.6%), (4.6%) and (2.9%) respectively. Poor stock selection, particularly in Consumer Discretionary dampened the quarter results. Overweight in Health Care and Industrials contributed to negative results over the 3-year period and poor stock selection in Communication Services contributed to the underperformance over the 5-year period.

Manager Performance - Gross of Fees

As of December 31, 2019

Covered Calls

Manager - Style	Market Value ($000)	Quarter	1 Year	3 Year	5 Year
Parametric BXM	129,943	4.6	16.3	8.4	8.1
Parametric Delta Shift	137,691	7.6	27.9	12.4	10.4
Van Hulzen	130,840	4.9	14.5	7.5	6.1
CBOE BXM		*5.1*	*16.6*	*7.8*	*7.2*

- Over the latest quarter ending December 31, 2019, one of EBMUD's three Covered Calls mandates outperformed the CBOE BXM Index.
    - The Parametric BXM strategy **trailed** the CBOE BXM Index over the quarter and 1-year period by (0.5%) and (0.3%) respectively, while **outperforming** over the 3- and 5-year periods by 0.6% and 0.9% respectively. The Buy-Write Portfolio is implemented by writing at-the-money options and diversifying option expiration dates which eliminates the path-dependency of the mechanical, passive BXM Index.
    - Parametric Delta Shift strategy **outperformed** the benchmark over all reported periods. Deltashift generally performs best in down, flat, moderately trending or range bound equity markets.
    - Van Hulzen, **trailed** the CBOE BXM Index over all reported periods by (0.2%), (2.1%), (0.3%), and (1.1%) respectively. The Van Hulzen covered call strategy uses call options with the goal of reducing portfolio volatility and creating incremental income.

Manager Performance - Gross of Fees

As of December 31, 2019

Total Fixed Income

Manager - Style	Market Value ($000)	Quarter	1 Year	3 Year	5 Year
Core Fixed Income					
CS McKee - Active	196,353	0.2	9.3	4.3	3.5
Garcia Hamilton	184,530	-	-	-	-
BBg BC US Aggregate Index		*0.2*	*8.7*	*4.0*	*3.0*
Non- Core Fixed Income					
Federated - Bank Loans – Active	44,405	1.4	-	-	-
40% Bloomberg BC Short Term Gov/Credit, 60% Credit Suisse Leverage Loan		*1.2*	*-*	*-*	*-*
MacKay Shields - Short-Term High Yield – Active	45,504	2.0	-	-	-
ICE BofA ML U.S. Corporates, Cash Pay, BB-B Rated 1-5 Years Index		*2.0*	*-*	*-*	*-*

- The Plan terminated WAMCO Short Duration and Northern Trust BBg BC Aggregate as of 11/30/2019 and opened Garcia Hamilton.

Manager Performance - Gross of Fees

As of December 31, 2019

Real Estate

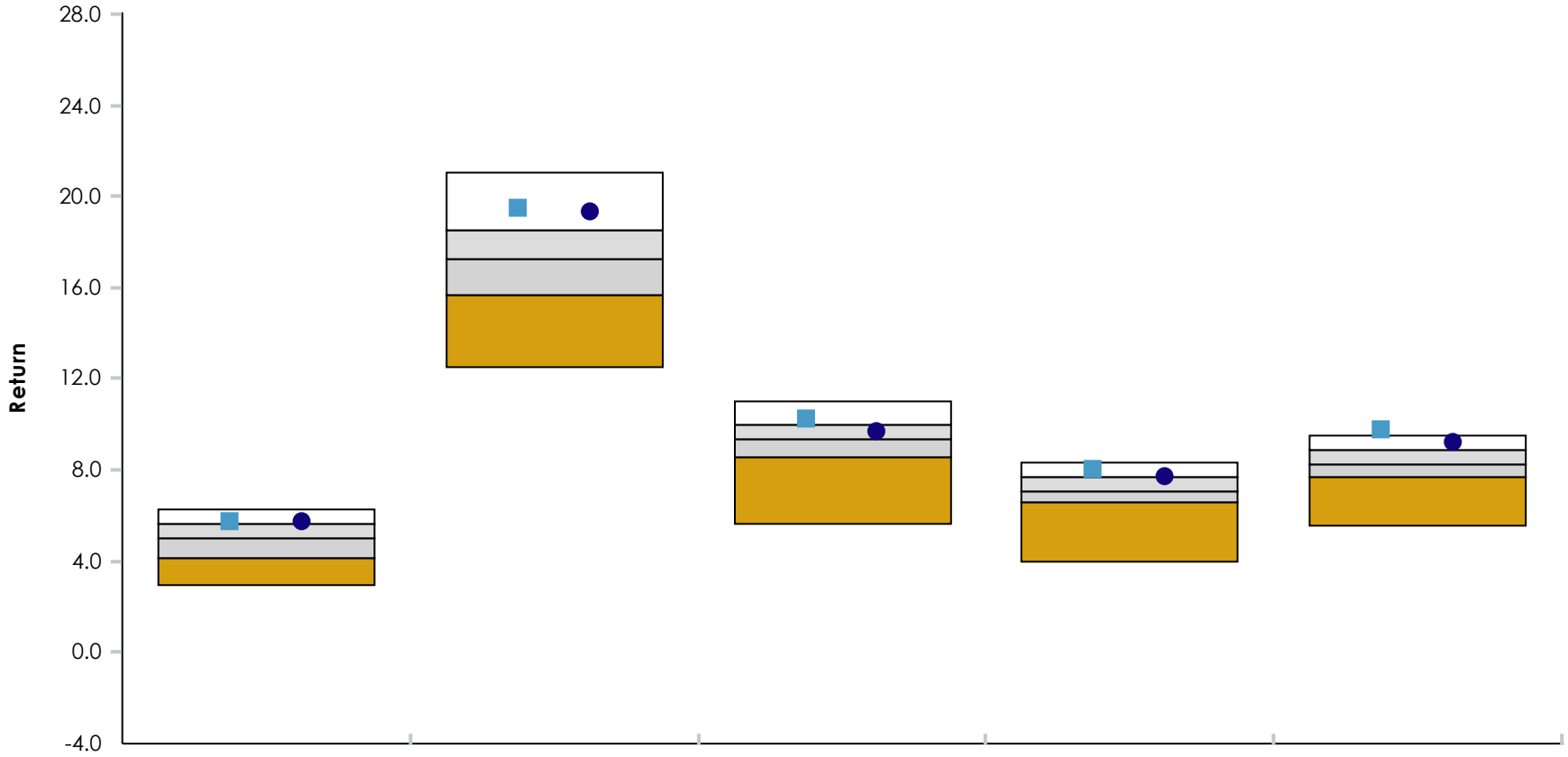
Manager - Style	Market Value ($000)	Quarter	1 Year	3 Year	5 Year
RREEF America II (Lag)*	46,599	1.8	6.7	8.1	10.0
*NCREIF NPI (Lag)**		*1.4*	*6.2*	*6.8*	*8.6*
CenterSquare	54,014	-0.8	27.5	9.1	8.4
FTSE NAREIT Equity REIT Index		*-0.8*	*26.0*	*8.1*	*7.2*

*Results are lagged one quarter

- East Bay's Real Estate manager, RREEF II, **outperformed** its benchmark, the NCREIF Property Index, over all reported time periods. During the lagged 12-month period, RREEF America REIT II operations generated an income return of 4.2% before fees. Same store net operating income for the 1-year period increased to 3.0%, extending the trend of improving same store income from operations. Occupancy at the end of the quarter at 93 percent overall, slightly increasing from the prior quarter.

- CenterSquare, East Bay's REIT manager, **matched** the FTSE NAREIT Equity REITs Index in the current quarter and **outperformed** over the 1-, 3- and 5-year periods. Sector returns for the NAREIT Equity REITs Index lagged for the quarter.

Plan Sponsor Peer Group Analysis
As of December 31, 2019



	1 Quarter	1 Year	3 Years	5 Years	10 Years
EBMUD Total Plan	5.7 (22)	19.5 (17)	10.2 (19)	8.0 (13)	9.8 (1)
Policy Benchmark	5.7 (25)	19.3 (18)	9.7 (41)	7.7 (23)	9.2 (13)
5th Percentile	6.3	21.1	11.0	8.3	9.5
1st Quartile	5.7	18.5	10.0	7.7	8.9
Median	5.0	17.2	9.3	7.1	8.3
3rd Quartile	4.2	15.6	8.6	6.6	7.7
95th Percentile	3.0	12.5	5.6	4.0	5.6

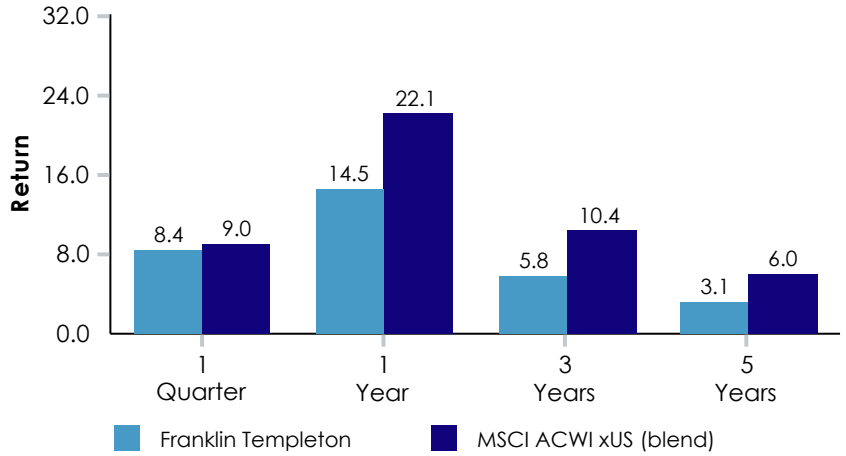
Parentheses contain percentile rankings.
Calculation based on monthly periodicity.

Franklin Templeton - gross of fees

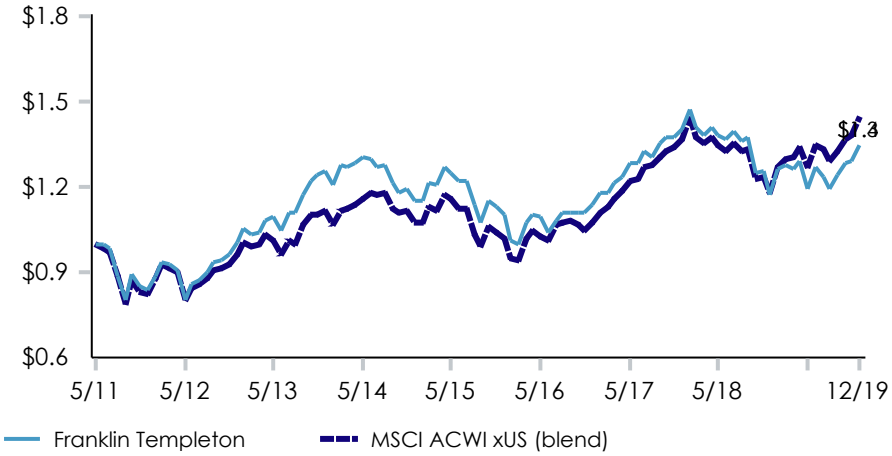
As of December 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Franklin Templeton	-0.82	1.02	-0.20	0.27	3.61	0.94	99.46	103.81	06/01/2011
MSCI ACWI xUS (blend)	0.00	1.00	-	0.33	0.00	1.00	100.00	100.00	06/01/2011

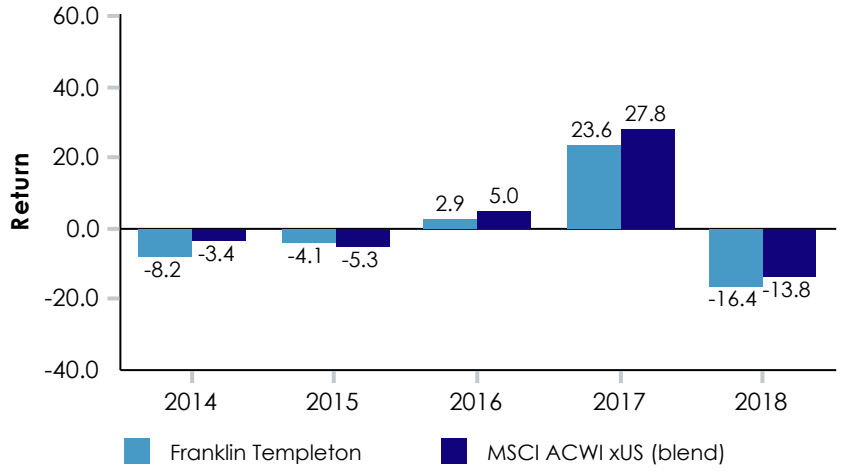
Trailing Period Performance



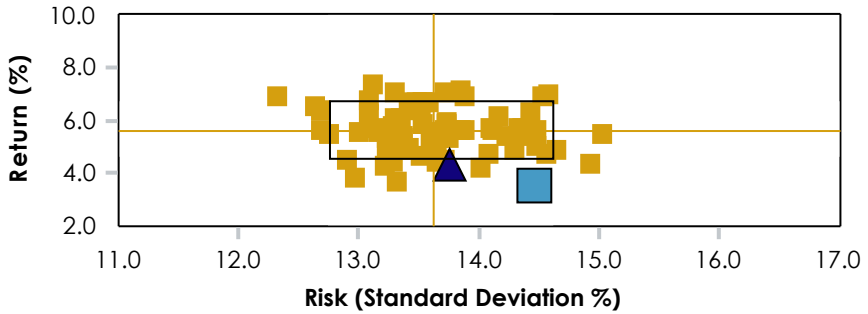
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



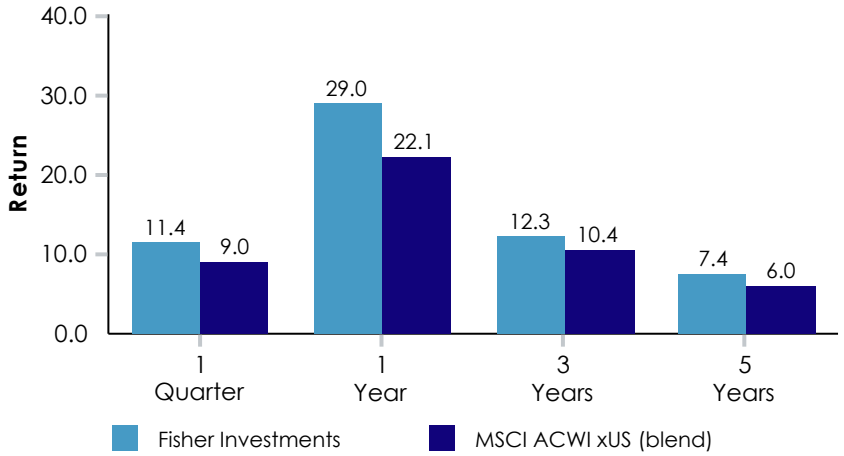
	Return	Standard Deviation
Franklin Templeton	3.5	14.5
MSCI ACWI xUS (blend)	4.4	13.8
Median	5.6	13.6

Fisher Investments - gross of fees

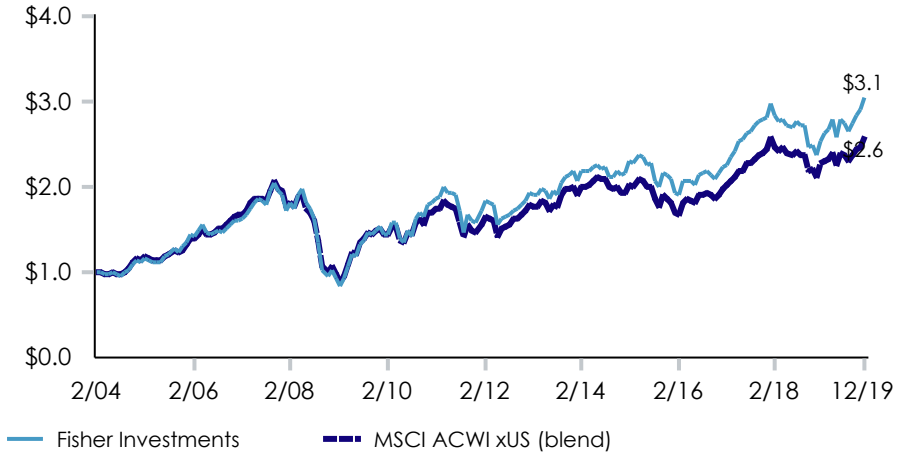
As of December 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Fisher Investments	0.57	1.13	0.38	0.40	3.97	0.97	113.31	110.27	03/01/2004
MSCI ACWI xUS (blend)	0.00	1.00	-	0.37	0.00	1.00	100.00	100.00	03/01/2004

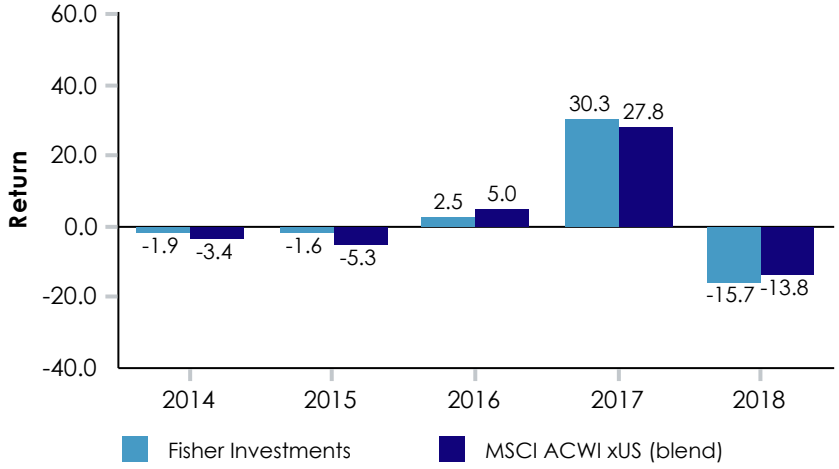
Trailing Period Performance



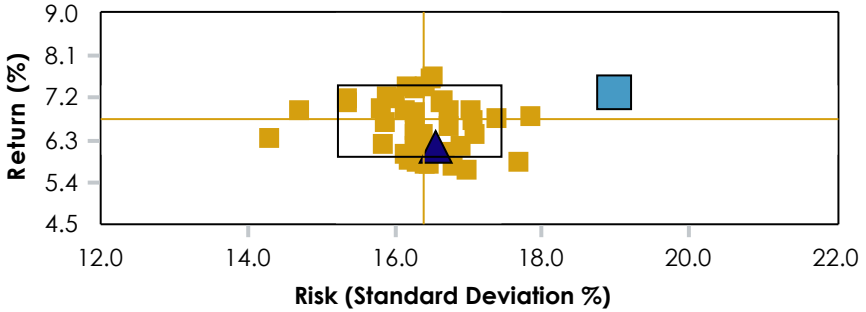
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



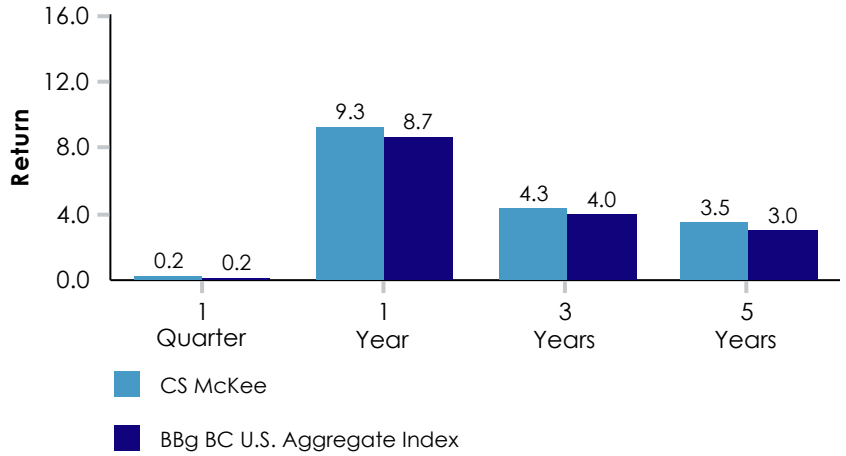
	Return	Standard Deviation
Fisher Investments	7.3	19.0
MSCI ACWI xUS (blend)	6.2	16.5
Median	6.8	16.4

CS McKee - gross of fees

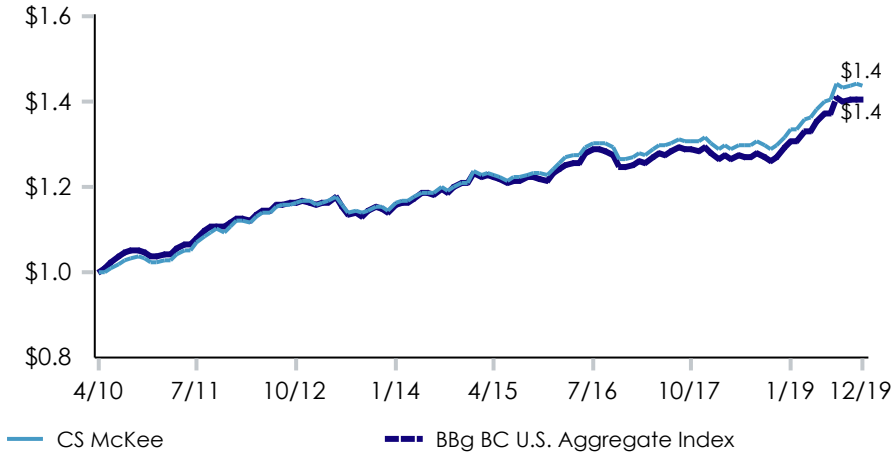
As of December 31, 2019

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
CS McKee	0.60	0.90	0.30	1.21	0.78	0.93	98.92	86.79	05/01/2010
BBg BC U.S. Aggregate Index	0.00	1.00	-	1.05	0.00	1.00	100.00	100.00	05/01/2010

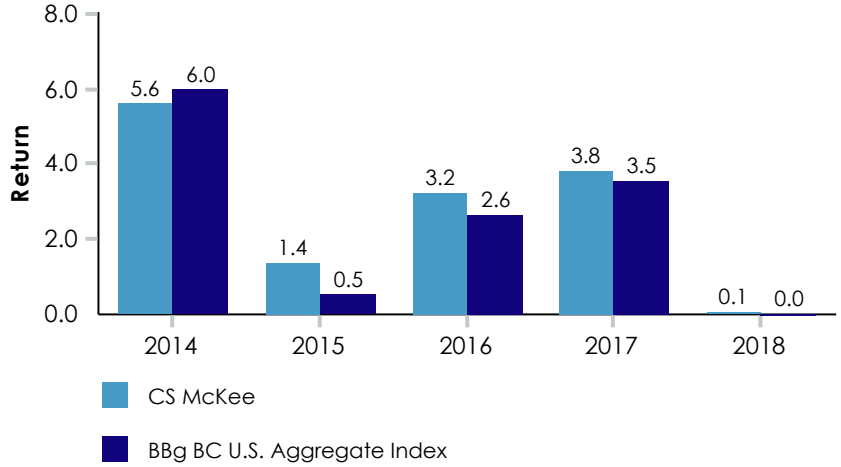
Trailing Period Performance



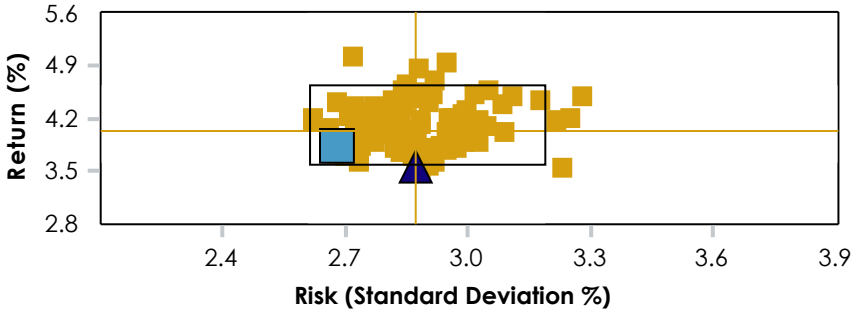
Growth of $1 - Since Inception



Calendar Year Performance



Risk/Return - Since Inception



	Return	Standard Deviation
CS McKee	3.8	2.7
BBg BC U.S. Aggregate Index	3.6	2.9
Median	4.0	2.9

PERFORMANCE MONITORING SUMMARY

				CURRENT STATUS			
Portfolio	**Violation Type (Window)***	**Date of Initial Violation**	**Correction Action(s)**	**Current Status**	**Est. Beg. Date of Current Status**	**Months Since Est. Beg. Date**	**Performance Since Est. Beg. Date****
Franklin	Medium	3/31/2019	Placed on Watch (May-19)	Watch	5/31/2019	6	3.9
MSCI ACWI x US (Blend)							*7.3*
Fisher	Qualitative	10/31/2019	Placed on Watch (Oct-19)	Watch	11/01/2019	2	7.4
MSCI ACWI x US (Blend(							*5.3*

*Defined as: Short-Term (12 months), Medium-Term (36 months), Long-Term (60 months)
**Annualized for periods greater than 12 months

- Meketa recommended that the Board place the Franklin International Equity strategy on Watch at the May 2019 Board meeting due to performance concerns.
    - The Franklin International Equity portfolio breached the medium-term relative to benchmark Watch criteria as of 3/31/2019.

- **As of the end of the latest quarter, no new managers are recommended for Watch due to performance concerns** (please refer to Section 5). **However, is has been recommended that Fisher be placed on Watch for organizational issues** (please refer to Section 6).

Manager Watch Screens

ACTIVE MANAGEMENT CRITERIA

- Active investment managers are expected to outperform their respective passive benchmarks related to both their asset class and investment style.
- Relative excess performance that falls below the red acceptable threshold stated in the Watch Criteria for six consecutive months may be a trigger for Watch status.

PASSIVE MANAGEMENT CRITERIA

- Passive investment managers are expected to track the performance of their respective passive benchmarks related to both their asset class and their investment style.
- Tracking error is a measure of how closely a portfolio follows the index to which it is benchmarked.
- For short- and medium-term performance monitoring, a portfolio with tracking error that is above the red acceptable threshold stated in the Watch Criteria for six consecutive months may be a trigger for Watch status.
- For long-term performance monitoring, relative excess performance that falls below the red acceptable threshold stated in the Watch Criteria for six consecutive months may be a trigger for Watch status.

Quantitative Monitoring Results - Overall Status Summary

	Prior Qtr Status	Current Qtr Status
Northern Trust – R3000	N/A	N/A
Franklin Templeton	Caution	Caution
Fisher Investments	Acceptable	Caution
Northern Trust – ACWIxUS	N/A	N/A
Parametric – BXM	Acceptable	Acceptable
Parametric – Delta Shift	Acceptable	Acceptable
Van Hulzen	Acceptable	Acceptable
CS McKee	Acceptable	Acceptable
WAMCO – Short Duration	Acceptable	Acceptable
Mackay Shields – Short Term HY	Acceptable	Acceptable
Federated – Bank Loans	Acceptable	Acceptable
CenterSquare	Acceptable	Acceptable

Investment Performance Criteria by Asset Class

Asset Class	Short-term (rolling 12-month periods)	Medium-term (rolling 36-month periods)	Long-term (60+ months)
Domestic Equity - Active	Fund return < benchmark return - 3.5%	Fund annualized return < benchmark annualized return -1.75% for 6 consecutive months	VRR < 0.97 for 6 consecutive months
Domestic Equity - Passive	Tracking error > 0.30%	Tracking error > 0.25% for 6 consecutive months	Fund annualized return < benchmark annualized return -0.40% for 6 consecutive months
International Equity - Active	Fund return < benchmark return - 4.5%	Fund annualized return < benchmark annualized return -2.0% for 6 consecutive months	VRR < 0.97 for 6 consecutive months
Covered Calls - Active	Fund return < benchmark return - 3.5%	Fund annualized return < benchmark annualized return -1.75% for 6 consecutive months	VRR < 0.97 for 6 consecutive months
Covered Calls - Replication	Fund return < benchmark return - 3.5%	Fund annualized return < benchmark annualized return -1.75% for 6 consecutive months	Fund annualized return < benchmark annualized return - 0.40% for 6 consecutive months
Fixed Income - Core – Active	Fund return < benchmark return - 1.5%	Fund annualized return < benchmark annualized return -1.0% for 6 consecutive months	VRR < 0.98 for 6 consecutive months
Fixed Income - Core – Passive	Tracking error > 0.25%	Tracking error > 0.20% for 6 consecutive months	Fund annualized return < benchmark annualized return - 0.30% for 6 consecutive months
Fixed Income - Non-Core	Fund return < benchmark return - 4.5%	Fund annualized return < benchmark annualized return - 2.0% for 6 consecutive months	VRR < 0.97 for 6 consecutive months

All criteria are on an annualized basis.
VRR – Value Relative Ratio – is calculated as: manager cumulative return / benchmark cumulative return.

Franklin Templeton - International Equity

Manager Performance

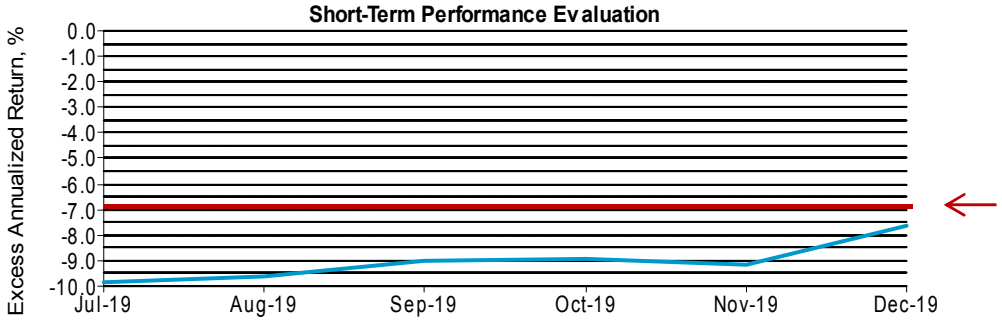
	Quarter	1 Year	3 Year	5 Year
Franklin Aggregate	8.4	14.5	5.8	3.1
EBMUD MSCI ACWI ex US Blend	9.0	22.1	10.4	6.0

Overall Status: Caution

Short-Term Criteria (rolling 12-month periods)

Fund return < benchmark return -4.5% for 6 consecutive months

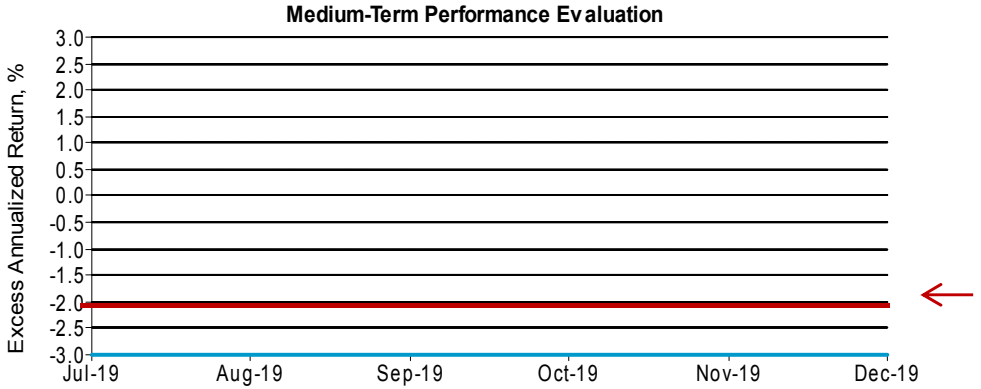
Current Status: Caution



Medium-Term Criteria (rolling 36-month periods)

Fund annualized return < benchmark annualized return -2.0% for 6 consecutive months

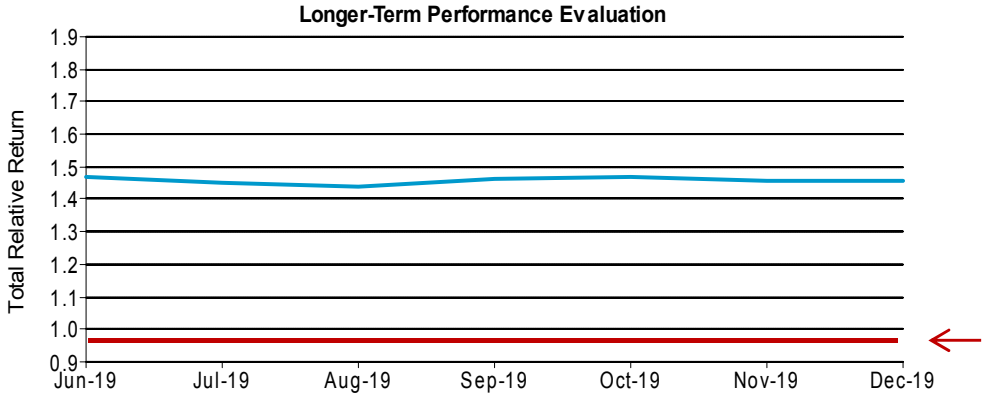
Current Status: Caution



Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: Acceptable



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Fisher - International Equity

Manager Performance

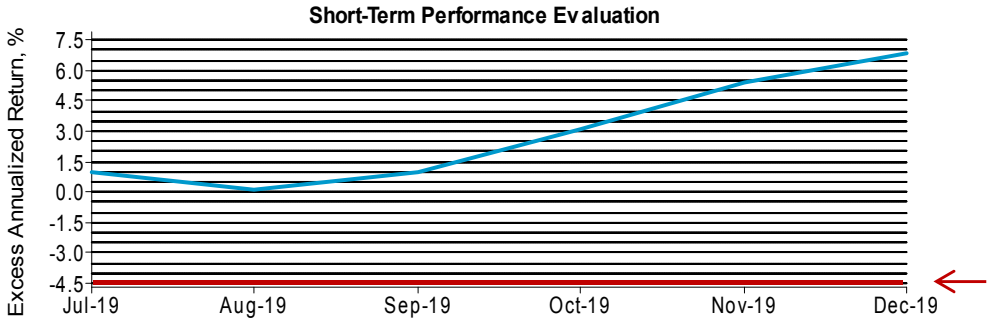
	Quarter	1 Year	3 Year	5 Year
Fisher	11.4	29.0	12.3	7.4
EBMUD MSCI ACWI ex US Blend	9.0	22.1	10.4	6.0

Overall Status: Acceptable

Short-Term Criteria (rolling 12-month periods)

Fund return < benchmark return -4.5% for 6 consecutive months

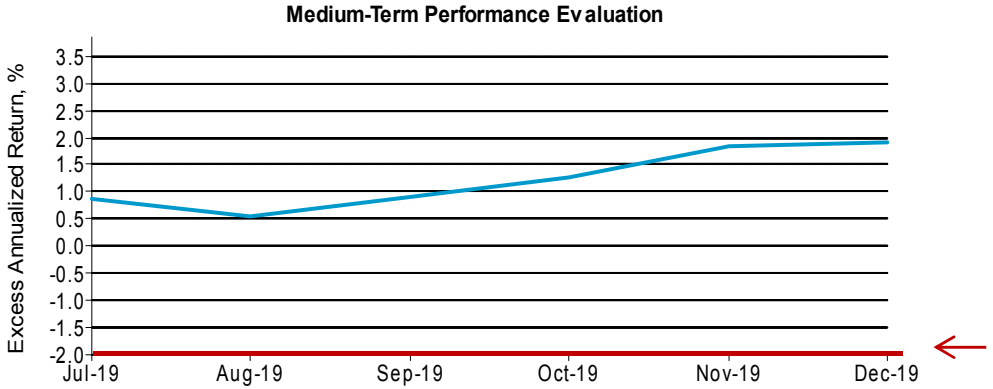
Current Status: Acceptable



Medium-Term Criteria (rolling 36-month periods)

Fund annualized return < benchmark annualized return -2.0% for 6 consecutive months

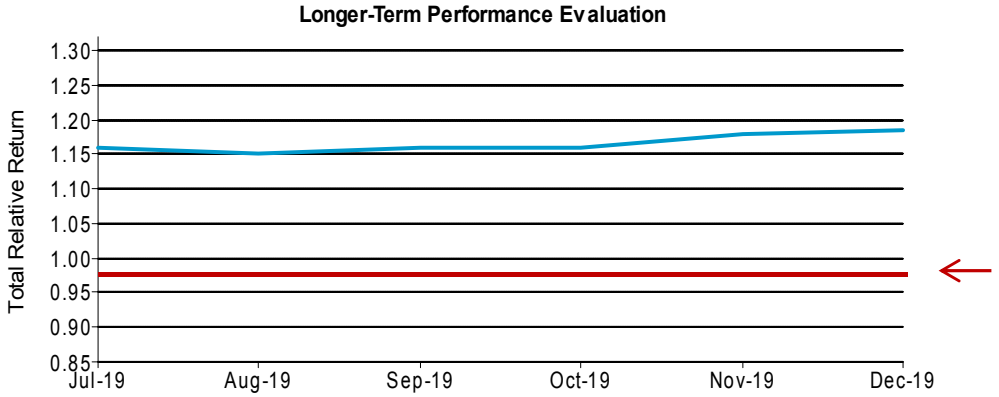
Current Status: Acceptable



Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: Acceptable



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Parametric - BXM - Covered Calls: Replication

Manager Performance

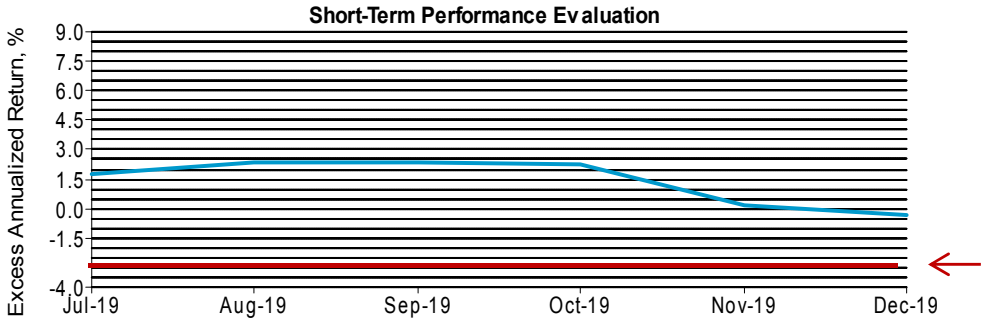
	Quarter	1 Year	3 Year	5 Year
Parametric BXM	4.6	16.3	8.4	8.1
CBOE BXM Index	5.1	16.6	7.8	7.2

Overall Status: Acceptable

Short-Term Criteria (rolling 12-month periods)

Fund return < benchmark return -3.5% for 6 consecutive months

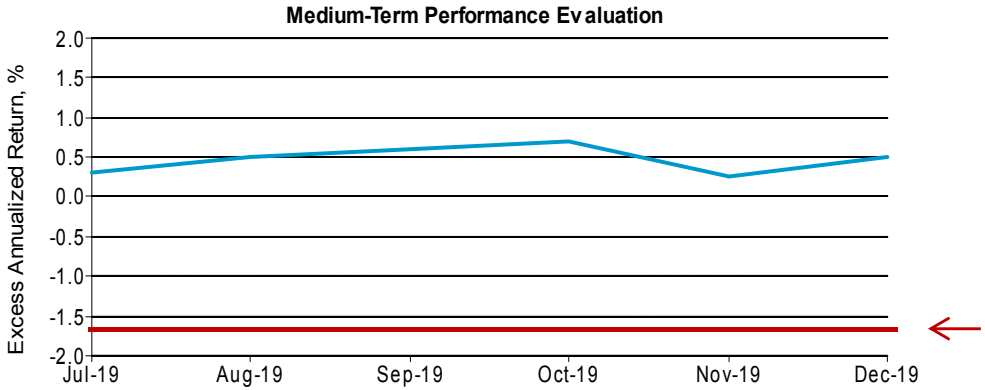
Current Status: Acceptable



Medium-Term Criteria (rolling 36-month periods)

Fund annualized return < benchmark annualized return -1.75% for 6 consecutive months

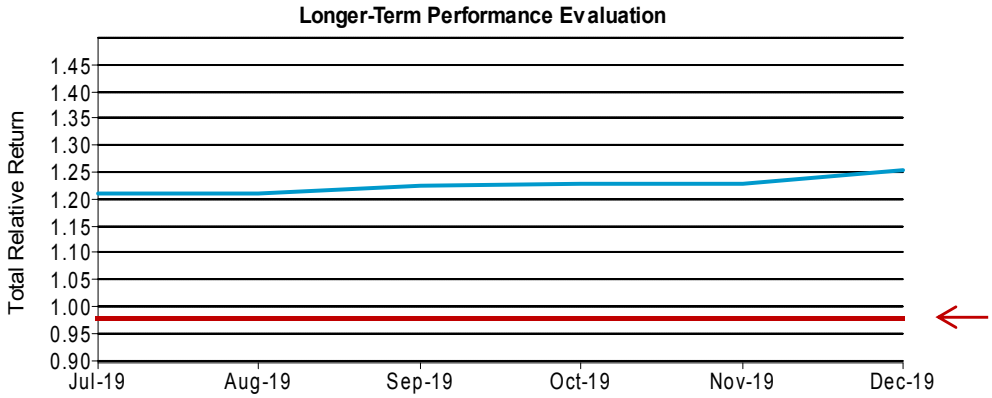
Current Status: Acceptable



Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: Acceptable



MEKETA

Parametric - Delta Shift - Covered Calls: Semi-Active

Manager Performance

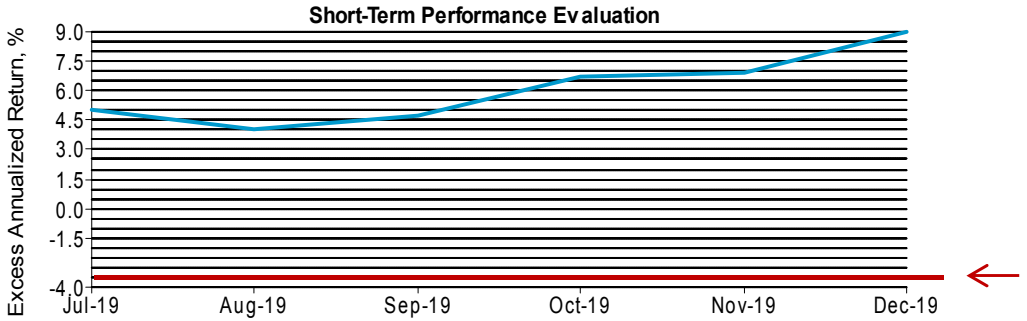
	Quarter	1 Year	3 Year	5 Year
Parametric Delta	7.6	27.9	12.4	10.4
CBOE BXM Index	5.1	16.6	7.8	7.2

Overall Status: Acceptable

Short-Term Criteria (rolling 12-month periods)

Fund return < benchmark return -3.5% for 6 consecutive months

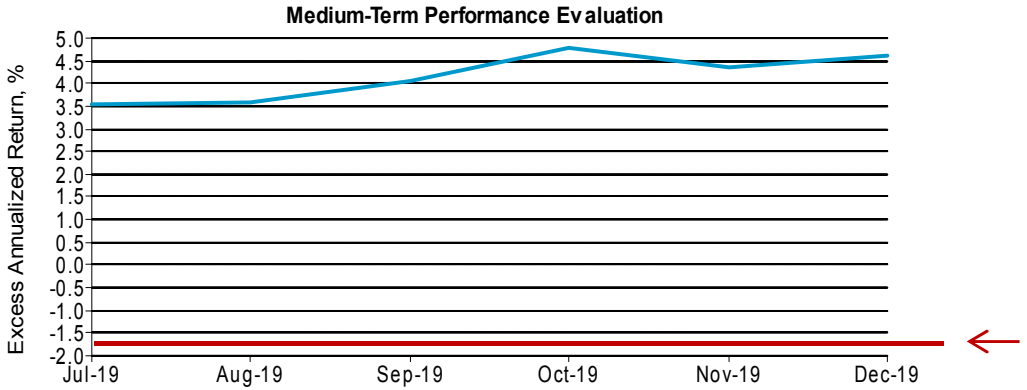
Current Status: Acceptable



Medium-Term Criteria (rolling 36-month periods)

Fund annualized return < benchmark annualized return -1.75% for 6 consecutive months

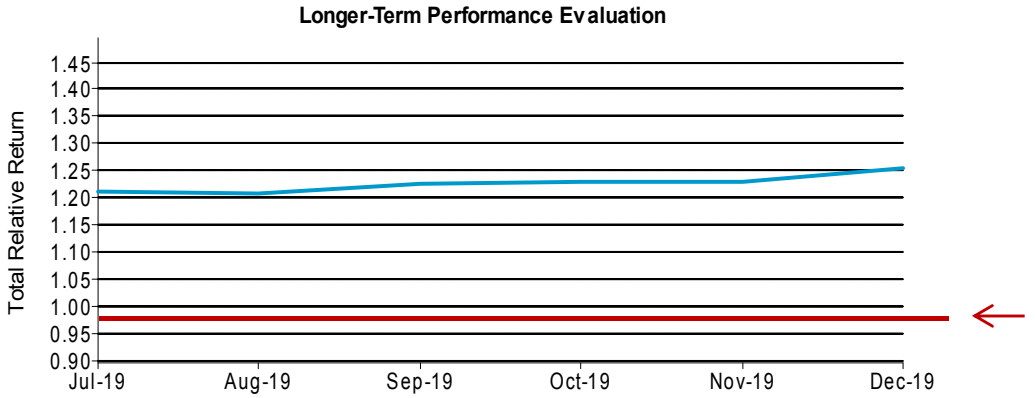
Current Status: Acceptable



Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: Acceptable



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Van Hulzen - Covered Calls: Active

Manager Performance

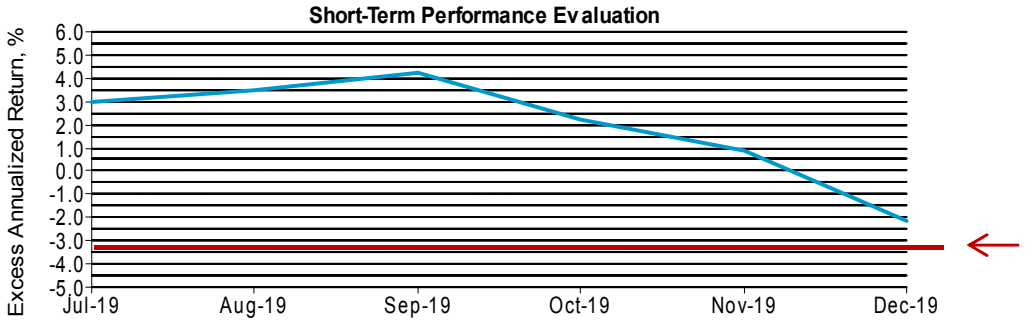
	Quarter	1 Year	3 Year	5 Year
Van Hulzen	4.9	14.5	7.5	6.1
CBOE BXM Index	5.1	16.6	7.8	7.2

Overall Status: Acceptable

Short-Term Criteria (rolling 12-month periods)

Fund return < benchmark return -3.5% for 6 consecutive months

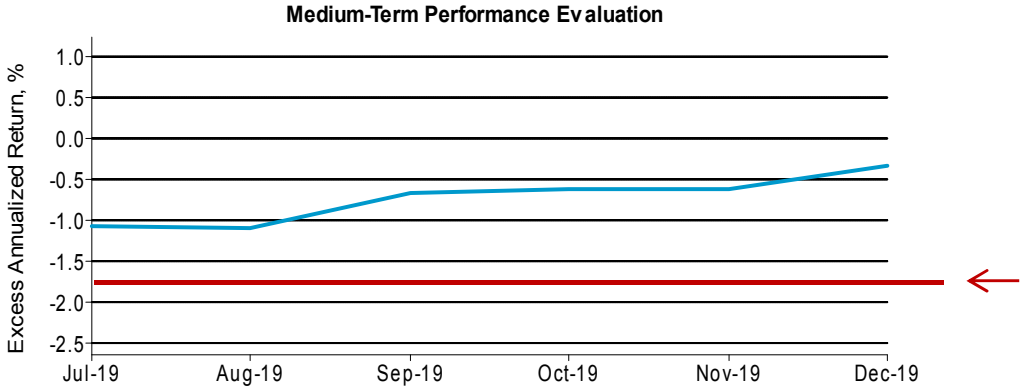
Current Status: Acceptable



Medium-Term Criteria (rolling 36-month periods)

Fund annualized return < benchmark annualized return -1.75% for 6 consecutive months

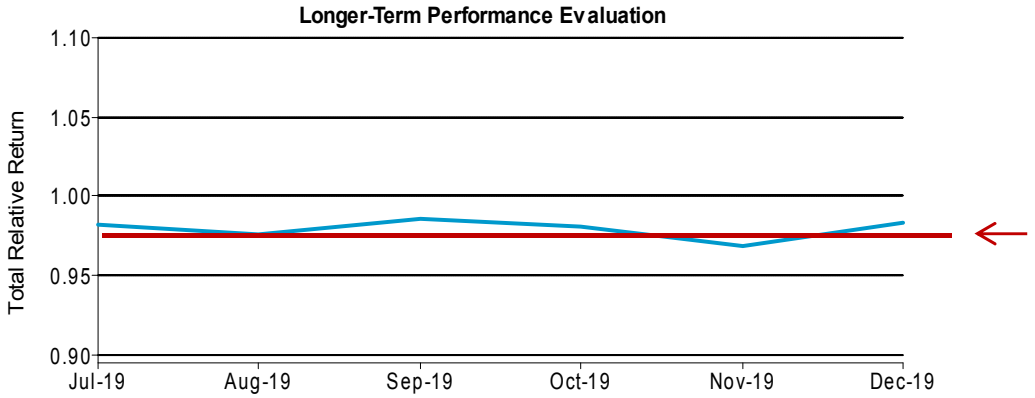
Current Status: Acceptable



Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: Acceptable



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CS McKee - Fixed Income: Core

Manager Performance

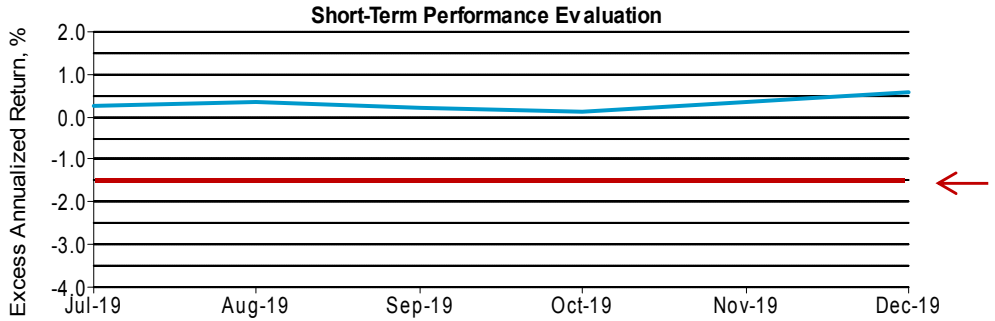
	Quarter	1 Year	3 Year	5 Year
CS McKEE	0.2	9.3	4.3	3.5
BC Aggregate Bond	0.2	8.7	4.0	3.0

Overall Status: Acceptable

Short-Term Criteria (rolling 12-month periods)

Fund return < benchmark return -1.5% for 6 consecutive months

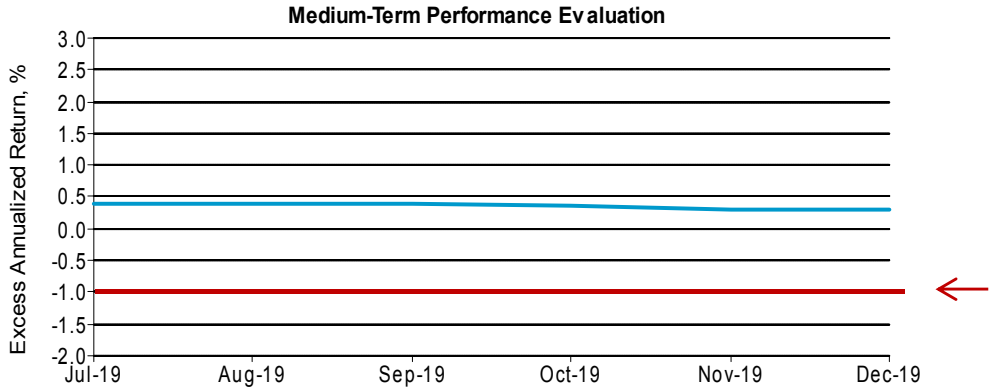
Current Status: Acceptable



Medium-Term Criteria (rolling 36-month periods)

Fund annualized return < benchmark annualized return -1.0% for 6 consecutive months

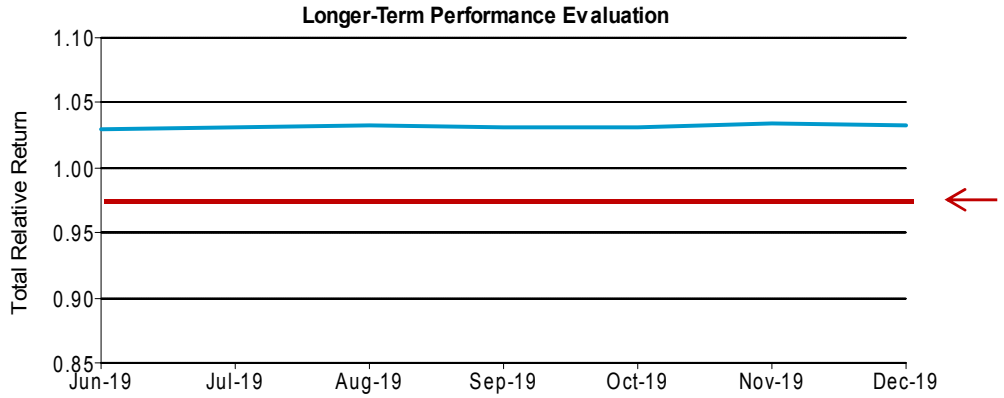
Current Status: Acceptable



Long-Term Criteria (60+ months)

VRR < 0.98 for 6 consecutive months

Current Status: Acceptable



MEKETA

CenterSquare - Real Estate: Public REITs

Manager Performance

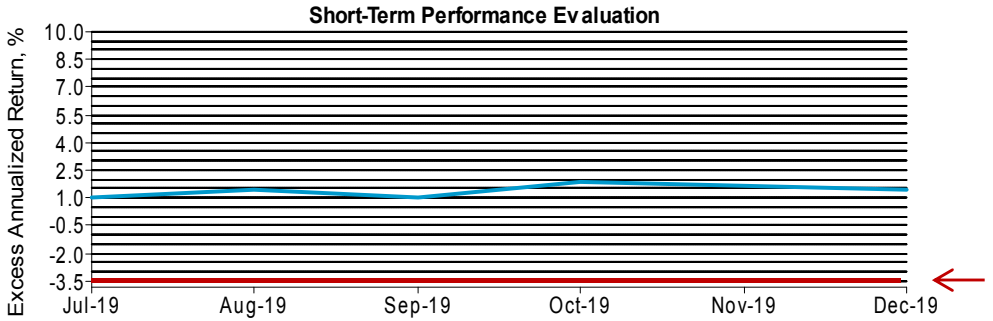
	3 Months	1 Year	3 Years	5 Years
CenterSquare	-0.8	27.5	9.1	8.4
FTSE NAREIT Equity REITS	-0.8	26.0	8.1	7.2

Overall Status: Acceptable

Short-Term Criteria (rolling 12-month periods)

Fund return < benchmark return -3.5% for 6 consecutive months

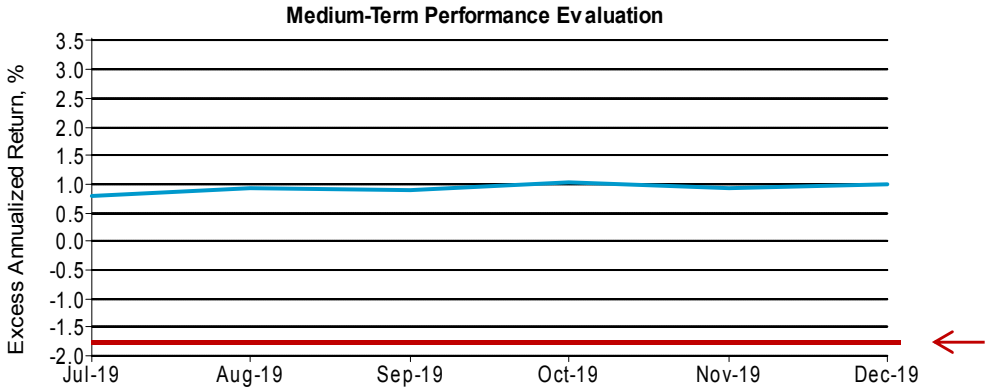
Current Status: Acceptable



Medium-Term Criteria (rolling 36-month periods)

Fund annualized return < benchmark annualized return -1.75% for 6 consecutive months

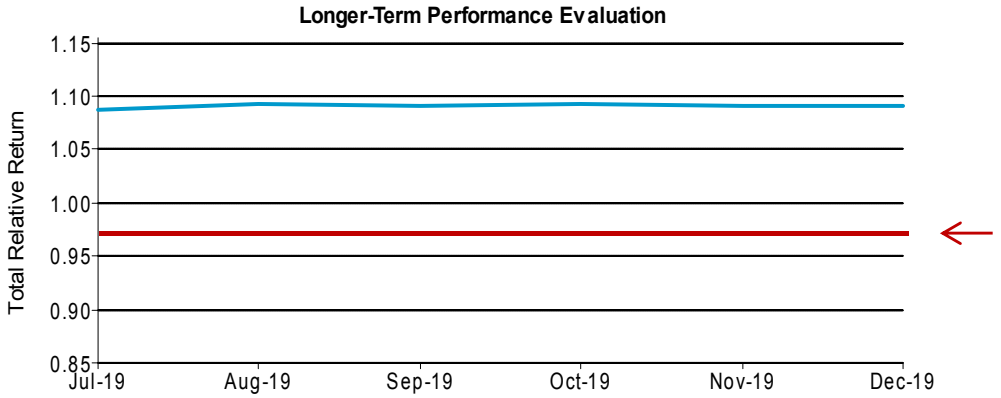
Current Status: Acceptable



Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: Acceptable



MEKETA

Manager Compliance Certification Responses

MANAGER COMPLIANCE CERTIFCATION RESPONSES – Qualitative Compliance Monitoring per EBMUD Investment Policy

Each of EBMUD's managers is required to respond to a questionnaire on a quarterly basis to certify their compliance with EBMUD's Investment Policy Statement and provide an update on specific qualitative indicators to be evaluated.

These indicators include:

- Compliance with the guidelines of 'Eligible Investments' for the manager's specific mandate
- Any litigation or governmental regulatory proceedings involving the firm/manager
- Changes to the manager's investment outlook, investment strategy, and/or portfolio structure
- Personnel changes to the investment team responsible for the EBMUD mandate
- Significant personnel changes at the management level of the firm
- Material client terminations
- Compliance with EBMUD's current Investment Policy Statement

The manager's responses are rated based on the potential effects these factors could pose to the performance and management of the EBMUD portfolio.

Reasons for heightened concern triggering Watch status include, but are not limited to:

- Instability of key members of the portfolio management team and organization
- Changes in investment strategy and style
- Failure to comply with investment guidelines

A summary of manager responses as of the latest quarter-end is provided below.

MANAGER COMPLIANCE CERTIFCATION RESPONSES

		Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	
Manager	Asset Class	Compliance with 'Eligible Investments' for mandate	Good standing as Registered Investment Advisor	Litigation?	Changes in manager's investment outlook, strategy, structure	Investment team personnel changes	Management level personnel changes	Material business changes	Compliance with IPS	Additional Comments
Northern Trust R3000	Domestic Equity – All Cap	Yes	Yes	Yes*	No	No	Yes*	No	Yes	
Franklin Templeton	International Equity	Yes	Yes	No*	No	Yes*	Yes*	No	Yes	
Fisher	International Equity	Yes	Yes	No	No	No	No	Yes*	Yes	
Northern Trust ACWI ex US	International Equity	Yes	Yes	Yes*	No	No	Yes*	No	Yes	
Parametric	Covered Calls	Yes	Yes	No*	No	No	Yes*	No	Yes	
Van Hulzen	Covered Calls	Yes	Yes	No	No	No	No	No	Yes	
CS McKee	Fixed Income – Core	Yes	Yes	No	No	No	No	No	Yes	
Northern Trust BBg BC Agg	Fixed Income – Core	Yes	Yes	Yes*	No	No	Yes*	No	Yes	
Mackay Shields	Fixed Income – Short-term HY	Yes	Yes	No	No	Yes*	Yes*	No	Yes	
Federated	Fixed Income – Bank Loans	Yes	Yes	No	No	No	No	No	Yes	
RREEF	Real Estate	Yes	Yes	No	No	No	No	No	Yes	
CenterSquare	Real Estate	Yes	Yes	No	No	No	No	Yes*	Yes	

*see detailed manager response below

= no concern; = low concern; = high concern (Watch status)

Northern Trust – R3000, ACWI ex US, and BBg BC Agg

Question 3: Is there any litigation or governmental regulatory proceedings involving your Firm, the Manager?

Yes; As one of the world's largest asset managers, Northern Trust Investments, Inc. (NTI) is occasionally named as a defendant in asset management-related litigation. NTI is not currently party to any litigation that has had (or will have) a material effect on its ability to perform services for its clients. At this time, there are no significant pending cases. As one of the world's leading providers of asset servicing, Northern Trust and its subsidiaries occasionally receive requests for information from government and regulatory agencies. Northern Trust frequently does not know if such requests are related to a formal government or regulatory investigations or, assuming an investigation is underway, whether Northern Trust is a target of such investigation or simply thought to be in possession of information pertinent to such investigation. Northern Trust is not currently involved in any government or regulatory investigation or proceeding that would have a material impact on its ability to provide advisory services to its clients.

Question 6: Have there been any significant changes at the management level of the Firm during the quarter?

Yes; As a result of the constantly changing landscape of asset management, we believe the occasional organizational changes are a natural progression and necessary in order to adapt to new market and regulatory environments. The most recent and anticipated changes to senior personnel are the following: Effective January 1, 2020, S. Biff Bowman will step down from his role as Chief Financial Officer and retire from Northern Trust on February 28, 2020. Jason Tyler, currently Chief Financial Officer of Northern Trust's Wealth Management business, will succeed Mr. Bowman as CFO for the Corporation and serve as a member of the Management Group, effective January 1, 2020. September 2019, Brian Meikel, former acting CCO of 50 South and the Alpha Core Strategies fund (the "Fund") left the Firm to pursue other opportunities. Rita Tholt and Ken Kalina, employees of Foreside Financial Group, LLC have been appointed interim CCOs of 50 South for the advisor and the Fund respectively.

Franklin Templeton

Question 3: Is there any litigation or governmental regulatory proceedings involving your Firm, the Manager?

No, with respect to investment-related regulatory proceedings, during the quarter ended December 31, 2019, Templeton Investment Counsel, LLC (TIC) was not named as a respondent in any such proceedings brought by any U.S. federal or state regulatory agency, foreign financial regulatory authority or self-regulatory organization. For a summary of investment-related proceedings, findings or orders brought or issued by any such regulatory entity against TIC and/or certain of its advisory affiliates in the past 10 years ended September 30, 2019, as well as certain other regulatory matters, please see Appendix 1: Templeton Investment Counsel, LLC Litigation History. In addition, from time to time, TIC and its advisory affiliates receive subpoenas and inquiries, including requests for documents or information, from governmental authorities or regulatory bodies, and also are the subject of governmental or regulatory examinations or investigations. Investment-related proceedings, findings or orders resulting from such subpoenas, inquiries, examinations or investigations, if any, will be reported, to the extent required and permitted by law, on TIC's Form ADV filed with the U.S. Securities and Exchange Commission.

With respect to investment-management-related private litigation, during the quarter ended September 30, 2019, TIC was not named as a defendant in any such litigation. For a summary of material, investment-management-related private litigation in which TIC and/or certain of its advisory affiliates were named as defendants at any point in the past five years ended September 30, 2019, please see Appendix 2: Templeton Investment Counsel, LLC Regulatory History. In addition, TIC and its advisory affiliates are from time to time named in litigation in the ordinary course of business, including currently. To the extent any such litigation is currently pending, as of the date of this response, none is reasonably expected to have a material adverse effect on TIC's financial condition or ability to provide investment management services. (Italicized terms are as defined on the U.S. Securities and Exchange Commission's Form ADV.)

Question 5: Have there been any personnel changes to the investment team responsible for the EBMUD portfolio during the quarter?

The following personnel changes to the investment team occurred over the latest quarter. None of these individuals were involved in the day-to-day management of the portfolio.

Additions

Name	Title/Responsibilities	Date of Hire
John Reynolds	Research Analyst/Portfolio Manager	12/2/2019

Departures

Name	Title/Responsibilities	Date of Departure
Peter Wilmshurst	Research Analyst/Portfolio Manager	12/2/2019
Norm Boersma	CIO	12/31/2019
Heather Arnold	Director of Research	12/31/2019

Franklin Templeton (continued)

Question 6: Have there been any significant changes at the management level of the Firm during the quarter?

Yes, during the quarter ended December 31, 2019, the following personnel changes occurred at the management level of Franklin Templeton:

- On November 21, the company announced the appointment of Jennifer M. Johnson as President and chief executive officer. Current CEO Gregory E. Johnson will become executive chairman of Franklin Resources, Inc. and continue in his role as chairman of the Company's board of directors. The CEO appointment was approved by the Company's board of directors, and both appointments will become effective at the Company's 2020 Annual Meeting of Stockholders on February 11, 2020.
- In December, Kelsey Biggers, Senior Vice President and Head of Investment Risk Management, announced plans to retire. Effective March 2, 2020, Suzanne Akers and Tilak Lal, currently direct reports of Mr. Biggers, will succeed him and become Co-Heads of the Investment Risk Management Group.

Fisher

Question 7: Have there been any material change in your firm's business during the quarter, including but not limited to:

a) Any client(s) that terminated its relationship whose terminated portfolio account represents >1% of the Manager's aggregate portfolio on the day of notice of termination, and/or

b) Any client(s) that terminates its relationship when the cumulative terminations for a calendar month is >1% of the Manager's aggregate portfolio as of the first business day of the month.

During the month of October 2019, total terminations were 2.30% of total Firm AUM. During the month of November 2019, total terminations were 1.80% of total Firm AUM. In October 2019, at an offsite event unaffiliated with Fisher Investments, Ken Fisher attended a private industry conference where he was asked to speak candidly during a fireside chat about how he built Fisher Investments (FI), as well as his views on various topics. In that 45-minute session, Ken spoke on numerous topics. While attempting to provide relevant analogies, Ken used inappropriate words and phrases which led to media coverage. He has since publically apologized for any inappropriate comments made.

Relating to this event, we have seen terminations on the institutional side of our business, some of which have been publicized in the media. Please note, FI as a whole remains exceptionally stable and well-resourced. As of 9/30/19, FI and its subsidiaries managed over $112 billion. As of 12/31/19, FI and its subsidiaries managed over $120 billion. All assets as of 12/31/19 are preliminary and subject to final reconciliation of accounts.

Parametric

Question 3: Is there any litigation or governmental regulatory proceedings involving your Firm, the Manager?

Parametric is not currently a plaintiff or defendant in any lawsuits or arbitration proceedings related to its investment management services, nor have there been any such lawsuits or arbitration proceedings in the last year, against Parametric or any affiliates controlled by Parametric. From time to time, Parametric receives subpoenas and/or information requests relating to lawsuits to which Parametric is not a party. These subpoenas and/or information request were/are incidental to Parametric's business and were/are handled in the ordinary course of business. Parametric believes that these actions have not and will not have a material adverse effect on the firm's ability to manage client assets.

Question 6: Have there been any significant changes at the management level of the Firm during the quarter?

- James Evans, longtime Director of EVM's TABS division, joined Parametric as Chief Investment Officer, Fixed Income, as of January 1, 2020. Jim reports to Parametric's CEO, Brian Langstraat.
- Jodi Wong, Managing Director, Global Equities Portfolio Management, left Parametric at the end of 2019. Effective January 1, 2020, Geoff Longmeier assumed Jodi's role and became a voting member of the emerging markets (EM) investment committee, reporting to Tom Seto, Managing Director, Head of Investment Management. Geoff led the firm's Centralized Portfolio Management (CPM) team and was previously a member of the EM portfolio management team, reporting to Jodi. In that role he was central to the development of the systematic alpha equity portfolio management platform. Jennifer Mihara, Director, Custom Core Portfolio Management, now heads the CPM team.
- Christine Smith, Parametric's Chief Operating Officer, left Parametric at the end of the year. She transitioned responsibilities to her team after announcing her plans in October.
- Orison "Kip" Chaffee, Managing Principal, retired from Parametric on November 1, 2019. He will continue in an advisory role through March 1, 2020, to support the transitioning of his roles and responsibilities.
- Effective November 1, 2019, following Jack Hansen's retirement, Tom Lee serves as Parametric's CIO and reports to Brian Langstraat, Parametric's CEO. Tom was Managing Director, Investment Strategy & Research for Parametric's derivative-based strategies. Paul Bouchey, previously CIO and Head of Research for Parametric's equity strategies, became Parametric's Global Head of Research and Development. He and Parametric's other equity and derivatives investment leaders and teams report to Tom Lee.
- Jack Hansen, CIO, retired on October 31, 2019. Jack continued in his role until retirement to ensure a seamless transition. He will stay on as a special advisor to Parametric for six months.

CenterSquare

Question 7: Have there been any material change in your firm's business during the quarter, including but not limited to:

a) Any client(s) that terminated its relationship whose terminated portfolio account represents >1% of the Manager's aggregate portfolio on the day of notice of termination, and/or

b) Any client(s) that terminates its relationship when the cumulative terminations for a calendar month is >1% of the Manager's aggregate portfolio as of the first business day of the month.

During the 4th quarter of 2019, 2 clients, each representing assets greater than 1% of the aggregate assets managed have decided to terminate their relationship with CenterSquare due to a change in their respective plan's strategy.

MakCay Shields

Question 5: Have there been any personnel changes to the investment team responsible for the EBMUD portfolio during the quarter?

Maureen O'Callaghan has joined the High Yield Group as a Managing Director covering the telecommunications and media sectors.

Question 6: Have there been any significant personnel changes at the management level of the Firm during the quarter?

Lucille Protas, President and Chief Operating Officer, will be retiring at the end of 2020. Ms. Protas will continue to actively oversee the management of non-investment functions and transition them throughout the year. Rene Bustamante, Chief Compliance Officer, will be assuming the Chief Administrative Officer (CAO) role on January 1, 2020 and will continue to be the CCO until a successor is appointed. We expect to add a Chief Technology and Operations Officer (CTOO) in 2020.

REQUIRED CALIFORNIA AB 2833 DISCLOSURE – RREEF AMERICA II (2019 Calendar Year)

Effective January 1, 2017 RREEF America REIT II, Inc. ("alternative investment vehicle") is required to provide to the East Bay Municipal Utility District ("public investment fund" or "District") specific information at least annually pursuant to Section 7514.7 of the California Government Code ("Section 7514.7").

1. The fees and expenses that the public investment fund pays directly to the alternative investment vehicle, the fund manager, or related parties.

   EBMUD asset management fees – January 2019 – December 2019 = $429,818.51

2. The public investment fund's pro rata share of fees and expenses not included in paragraph (1) that are paid from the alternative investment vehicle to the fund manager or related parties.

   $0.00

3. The public investment fund's pro rata share of carried interest distributed to the fund manager or related parties.

   N/A

4. The public investment fund's pro rata share of aggregate fees and expenses paid by all of the portfolio companies held within the alternative investment vehicle to the fund manager or related parties.

   EBMUD asset management fees – January 2019 – December 2019 = $429,818.51

5. Any additional information described in subdivision (b) of Section 6254.26.

   N/A

6. The gross and net rate of return of each alternative investment vehicle since inception.

   Gross = 6.52% Net = 5.70%

7. Any other information required to be collected pursuant to Section 7514.7.

   N/A

Source: Deutsche Asset Management

Appendix

EBMUD PERFORMANCE – Net of Fees

Manager	Mandate	Estimated Annual Fee (bps)*
Northern Trust – R3000	Passive – All Cap Core	1.5
Franklin Templeton	Active – International Equity	53
Fisher	Active – International Equity	62
Northern Trust – ACWI ex US	Passive – International Equity	4
Parametric – BXM	Replication – Covered Calls	17
Parametric – Delta Shift	Semi-Active – Covered Calls	32
Van Hulzen	Active – Covered Calls	25
CS McKee	Active – Core Fixed Income	20
Northern Trust – BBg BC Agg	Passive – Core Fixed Income	1.75
WAMCO – Short Duration	Active – Non-Core Fixed Income	15
Mackay Shields – Short-Term High Yield	Active – Non-Core Fixed Income	42
Federated – Bank Loans	Active – Non-Core Fixed Income	50
RREEF	Real Estate	95
CenterSquare	Real Estate	27.5 bps + 15% on excess returns

*as of 6/30/2019

Asset Class and Manager Performance (Net of Fees)^

As of December 31, 2019

Asset Class	Quarter	1 Year	3 Years	5 Years
EBMUD Total Plan	5.6	19.2	9.9	7.8
*Policy Benchmark^^*	*5.7*	*19.3*	*9.7*	*7.7*
Domestic Equity	9.0	30.9	15.3	11.6
*Russell 3000**	*9.1*	*31.0*	*14.6*	*11.2*
International Equity	9.4	21.4	8.7	4.9
*MSCI ACWI x US (blend)***	*9.0*	*22.1*	*10.4*	*6.0*
Covered Calls	5.6	19.1	9.2	8.0
CBOE BXM	*5.1*	*16.6*	*7.8*	*7.2*
Fixed Income	0.4	8.3	4.1	3.1
*Fixed Income benchmark (blend)****	*0.6*	*7.9*	*3.9*	*3.3*
Real Estate	0.3	17.6	8.0	8.1
*NCREIF/NAREIT (blend)*****	*0.3*	*15.9*	*7.6*	*8.1*
Cash	0.3	2.5	1.7	-
FTSE 3 Month T-Bill	*0.5*	*2.3*	*1.7*	-

^Historical net returns for the Total Portfolio aggregate is currently available from 2Q 2011

^^ Policy Benchmark consists of 25% Russell 3000 (blend), 25% MSCI ACWIxU.S. (blend), 20% CBOE BXM, 20% BB Aggregate, 1% BB US 1-3 Year Government/Credit, 2.5% BB 1-5 Year U.S. High Yield Cash Pay, 1.5% S&P/LSTA Performing Loans, 2.5% NCREIF (lagged), and 2.5% FTSE NAREIT Equity REITs index 7/1/18-present; see Appendix for historical Policy Benchmark composition.

*Russell 3000 as of 10/1/05. Prior: 30% S&P500, 10% S&P400, 10% Russell 2000 (4/1/05-9/30/05); 33% S&P500, 10% S&P400, 10% Russell 2000 (9/1/98-3/31/05); 30% S&P500, 15% Wilshire 5000 (4/1/96-8/31/98)

**MSCI ACWIxU.S. as of 1/1/07; MSCI EAFE ND thru 12/31/06

***60% BC Aggregate, 20% BC US 1-3 Year Government/Credit, 10% ICE BofA ML U.S. Corp Cash Pay BB-B 1-5 Year, and 10% Blend 60% Credit Suisse Leverage Loan/40% BBg BC Short Term Gov/Corp 3/1/2019-present; 60% BC Aggregate, 20% BC US 1-3 Year Government/Credit, 10% BC 1-5 Year U.S. High Yield Cash Pay, and 10% S&P/LSTA Performing Loans index 7/1/18-2/28/2019; 50% BC Aggregate, 25% BC US 1-3 Year Government/Credit, 12.5% BC 1-5 Year U.S. High Yield Cash Pay, and 12.5% S&P/LSTA Performing Loans index 4/1/14-6/30/18; 75% BC Aggregate, 12.5% BC 1-5 Year U.S. High Yield Cash Pay, and 12.5% S&P/LSTA Performing Loans index 3/1/14-3/31/14; BC Universal 1/1/08-2/28/14; BC Aggregate thru 12/31/07

****50% NCREIF (lagged), 50% FTSE NAREIT Equity REITs Index as of 11/1/11; NCREIF (lagged) thru 10/31/11

Manager Performance (Net of Fees)

As of December 31, 2019

Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years
Domestic Equity					
Northern Trust (Russell 3000) - Passive	502,403	9.1	30.9	-	-
Russell 3000 Index		*9.1*	*31.0*	-	-
International Equity					
Fisher Investments - Active	143,896	11.2	28.2	11.6	6.7
Franklin Templeton - Active	125,129	8.3	13.9	5.2	2.6
*MSCI ACWI xUS (blend)**		*9.0*	*22.1*	*10.4*	*6.0*
Northern Trust (ACWI ex-US) - Passive	184,222	8.9	21.8	-	-
MSCI ACWI xUS		*9.0*	*22.1*	-	-

* As of January 1, 2007, the benchmark changed from MSCI EAFE to MSCI ACWI x U.S.

Manager Performance (Net of Fees)

As of December 31, 2019

Manager - Style	Mkt Value ($000)	1 Quarter	1 Year	3 Years	5 Years
Covered Calls					
Parametric BXM - Replication	129,943	4.6	16.0	8.2	7.9
Parametric Delta Shift - Semi-active	137,691	7.5	27.5	12.1	10.1
Van Hulzen	130,840	4.8	14.2	7.2	5.9
CBOE BXM		*5.1*	*16.6*	*7.8*	*7.2*
Real Estate					
RREEF America II (Lag)*	46,599	1.5	5.7	7.1	9.0
*NCREIF NPI (Lag)**		*1.4*	*6.2*	*6.8*	*8.6*
CenterSquare	54,014	-0.9	27.1	8.8	8.0
FTSE NAREIT Equity REIT Index		*-0.8*	*26.0*	*8.1*	*7.2*
Total Fixed Income					
Core Fixed Income					
CS McKee - Active	196,353	0.2	9.1	4.1	3.3
Garcia Hamilton	184,530	-	-	-	-
BBg BC US Aggregate Index		*0.2*	*8.7*	*4.0*	*3.0*
Non-Core Fixed Income					
Federated - Bank Loans - Active	44,405	1.3	-	-	-
60% Credit Suisse Leverage Loan / 40% Bloomberg Barclays Short Term Gov/Corp		*1.2*	*-*	*-*	*-*
MacKay Shields - Short-Term High Yield - Active	45,504	1.9	-	-	-
ICE BofA Merrill Lynch U.S. Corporates, Cash Pay, BB-B Rated 1-5 Years Index		*-*	*-*	*-*	*-*

*Results are lagged one quarter.

GLOSSARY OF TERMS

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

Annualized Performance: The annual rate of return that when compounded t times generates the same t-period holding return as actually occurred from period 1 to period t.

Batting Average: Percentage of periods a portfolio outperforms a given index.

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

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

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

Growth Stocks: Common stock of a company that has an opportunity to invest money and earn more than the opportunity cost of capital.

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

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

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

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

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

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

Tracking Error: The standard deviation of the difference between the performance of a portfolio and an appropriate benchmark.

Turnover: For mutual funds, a measure of trading activity during the previous year, expressed as a percentage of the average total assets of the fund. A turnover rate of 25% means that the value of trades represented one-fourth of the assets of the fund.

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

EBMUD POLICY BENCHMARK COMPOSITION

Time Period	EBMUD Total Fund Policy Benchmark
4/1/2005 – 9/30/2005	30% S&P 500, 10% S&P Midcap, 10% Russell 2000, 20% MSCI EAFE ND, 25% BB Aggregate, 5% NCREIF (lagged)
10/1/2005 – 12/31/2006	50% Russell 3000, 20% MSCI EAFE ND, 25% BB Aggregate, 5% NCREIF (lagged)
1/1/2007 – 12/31/2007	50% Russell 3000, 20% MSCI ACWI x U.S. GD, 25% BB Aggregate, 5% NCREIF (lagged)
1/1/2008 – 10/31/2011	50% Russell 3000, 20% MSCI ACWI x U.S. GD, 25% BB Universal, 5% NCREIF (lagged)
11/1/2011 – 2/28/2014	50% Russell 3000, 20% MSCI ACWI x U.S. GD, 25% BB Universal, 2.5% NCREIF (lagged), and 2.5% FTSE NAREIT Equity REITs
3/1/2014 – 3/31/2014	40% Russell 3000, 20% CBOE BXM, 15% MSCI ACWI x U.S. GD, 15% BB Aggregate, 2.5% BB 1-5 Year U.S.High Yield Cash Pay, 2.5% S&P/LSTA Performing Loans, 2.5% NCREIF (lagged), 2.5% FTSE NAREIT Equity REITs
4/1/2014 – 6/30/2018	40% Russell 3000, 20% CBOE BXM, 15% MSCI ACWI x U.S. GD, 10% BB Aggregate, 5% BB US 1-3 Year Government/Credit, 2.5% BC 1-5 Year U.S. High Yield Cash Pay, 2.5% S&P/LSTA Performing Loans, 2.5% NCREIF (lagged), 2.5% FTSE NAREIT Equity REITs
7/1/2018 – 2/28/2019	25% Russell 3000, 20% CBOE BXM, 25% MSCI ACWI x U.S. GD, 15% BB Aggregate, 5% BB US 1-3 Year Government/Credit, 2.5% BB 1-5 Year U.S. High Yield Cash Pay, 2.5% S&P/LSTA Performing Loans, 2.5% NCREIF (lagged), 2.5% FTSE NAREIT Equity REITs
3/31/2019 – present	25% Russell 3000, 20% CBOE BXM, 25% MSCI ACWI x U.S. GD, 15% BB Aggregate, 5% BBg BC U.S. 1-3 Year Government/Credit, 2.5% ICE BofA ML U.S. Corp Cash Pay BB-B 1-5 Year, 2.5% Blend 60% Credit Suisse Leverage Loan/40% BBg BB Short Term Gov/Corp, 2.5% NCREIF (lagged), 2.5% FTSE NAREIT Equity REITs

EBMUD FIXED INCOME CLASS BENCHMARK COMPOSITION

Time Period	EBMUD Total Fund Policy Benchmark
Inception – 12/31/2007	BBg BC Aggregate
1/1/2008 – 2/2/2014	BBg BC Universal
3/1/2014 – 3/31/2014	75% BBg BC Aggregate; 12.5% BBg BC 1-5 Year U.S. High Yield Cash Pay, and 12.5% S&P/LSTA Performing Loans Index
4/1/2014 – 6/30/2018	50% BBg BC Aggregate, 25% BBg BC US 1-3 Year Government/Credit, 12.5% BBg BC 1-5 Year U.S. High Yield Cash Pay, and 12.5% S&P/LSTA Performing Loans index
7/1/2018 – 2/28/2019	60% BBg BC Aggregate, 20% BBg BC U.S. 1-3 Year Government/Credit, 10% BBg BC 1-5 Year U.S. High Yield Cash Pay, and 10% S&P/LSTA Performing Loans index.
3/1/2019 – present	60% BBg BC Aggregate, 20% BBg BC U.S. 1-3 Year Government/Credit, 10% ICE BofA ML U.S. Corp Cash Pay BB-B 1-5 Year, and 10% Blend 60% Credit Suisse Leverage Loan/40% BBg BC Short Term Gov/Corp.

DEFINITION OF BENCHMARKS

BB Aggregate: an index comprised of approximately 6,000 publicly traded investment-grade bonds including U.S. Government, mortgage-backed, corporate, and yankee bonds with an approximate average maturity of 10 years.

BB High Yield: covers the universe of fixed rate, non-investment grade debt. Eurobonds and debt issues from countries designated as emerging markets (e.g., Argentina, Brazil, Venezuela, etc.) are excluded, but Canadian and global bonds (SEC registered) of issuers in non-EMG countries are included. Original issue zeroes, step-up coupon structures, 144-As and pay-in-kind bonds (PIKs, as of October 1, 2009) are also included. Must be rated high-yield (Ba1/BB+ or lower) by at least two of the following ratings agencies: Moody's, S&P, Fitch. If only two of the three agencies rate the security, the lower rating is used to determine index eligibility. All issues must have at least one year to final maturity regardless of call features and have at least $150 million par amount outstanding.

BB Multiverse Non-US Hedged: provides a broad-based measure of the international fixed-income bond market. The index represents the union of the BC Global Aggregate Index and the BC Global High Yield Index. In this sense, the term "Multiverse" refers to the concept of multiple universes in a single macro index.

BB US Credit: includes publicly issued U.S. corporate and foreign debentures and secured notes that which are rated investment grade or higher by Moody's Investor Services, Standard and Poor's Corporation, or Fitch Investor's Service, with all issues having at least one year to maturity and an outstanding par value of at least $250 million. Issues must be publicly issued, dollar-denominated and non-convertible.

BB US Government: includes treasuries (i.e., public obligations of the U.S. Treasury that have remaining maturities of more than one year) and agencies (i.e., publicly issued debt of U.S. Government agencies, quasi-federal corporations, and corporate or foreign debt guaranteed by the U.S. Government).

BB Universal: includes market coverage by the Aggregate Bond Index fixed rate debt issues, which are rated investment grade or higher by Moody's Investor Services, Standard and Poor's Corporation, or Fitch Investor's Service, with all issues having at least one year to maturity and an outstanding par value of at least $100 million) and includes exposures to high yield CMBS securities. All returns are market value weighted inclusive of accrued interest.

Citigroup 3-Month Treasury Bills (T-bills): tracks the performance of U.S. Treasury bills with 3-month maturity.

MSCI ACWI x US ND: comprises both developed and emerging markets less the United States. As of August 2008, the index consisted of 23 counties classified as developed markets and 25 classified as emerging markets. This series approximates the minimum possible dividend reinvestment. The dividend is reinvested after deduction of withholding tax, applying the rate to non-resident individuals who do not benefit from double taxation treaties. MSCI Barra uses withholding tax rates applicable to Luxembourg holding companies, as Luxembourg applies the highest rates.

MSCI EAFE Free (Europe, Australasia, Far East) ND: is a free float-adjusted market capitalization index that is designed to measure developed market equity performance, excluding the US & Canada. This series approximates the minimum possible dividend reinvestment. The dividend is reinvested after deduction of withholding tax, applying the rate to non-resident individuals who do not benefit from double taxation treaties. MSCI Barra uses withholding tax rates applicable to Luxembourg holding companies, as Luxembourg applies the highest rates.

MSCI EM (Emerging Markets) GD: is a free float-adjusted market capitalization index that is designed to measure equity market performance in the global emerging markets. This series approximates the maximum possible dividend reinvestment. The amount reinvested is the entire dividend distributed to individuals resident in the country of the company, but does not include tax credits.

MSCI Europe is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of the developed markets in Europe. As of June 2007, this index consisted of the following 16 developed market country indices: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

MSCI Pacific is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of the developed markets in the Pacific region. As of June 2007, this index consisted of the following 5 Developed Market countries: Australia, Hong Kong, Japan, New Zealand, and Singapore.

NAREIT Index: consists of all tax-qualified REITs listed on the New York Stock Exchange, American Stock Exchange, and the NASDAQ National Market System. The data is market weighted.

NCREIF Property Index: the NPI contains investment-grade, non-agricultural, income-producing properties which may be financed in excess of 5% gross market value; were acquired on behalf of tax exempt institutions; and are held in a fiduciary environment. Returns are gross of fees; including income, realized gains/losses, and appreciation/depreciation; and are market value weighted. Index is lagged one quarter.

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

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

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

Russell 2000: measures the performance of the 2,000 smallest companies in the Russell 3000 Index, which represents approximately 8% of the total market capitalization of the Russell 3000 Index.

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

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

Russell 3000: represents the largest 3,000 US companies based on total market capitalization, representing approximately 98% of the investable US equity market.

RISK METRIC DESCRIPTION – Rationale for selection and calculation methodology

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

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

Developed Equity Markets Excluding the US
Metric: P/E ratio = Price / "Normalized" earnings for the MSCI EAFE Index

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

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

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

To represent the Emerging Markets P/E Ratio, we have chosen the MSCI Emerging Market Free Index, which has P/E data back to January 1995 on Bloomberg. To represent the Developed Markets PE Ratio, we have chosen the MSCI World Index, which also has data back to January 1995 on Bloomberg. Although there are issues with published, single time period P/E ratios, in which the denominator

effect can cause large movements, we feel that the information contained in such movements will alert investors to market activity that they will want to interpret.

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

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

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

US Private Real Estate Markets
Metrics: US Cap Rates, Cap Rate Spreads, and Transactions as a % of Market Value

Real estate cap rates are a measure of the price paid in the market to acquire properties versus their annualized income generation before financing costs (NOI=net operating income). The data, published by NCREIF, describes completed and leased properties (core) on an unleveraged basis. We chose to use current value cap rates. These are capitalization rates from properties that were revalued during the quarter. This data relies on estimates of value and therefore tends to be lagging (estimated prices are slower to rise and slower to fall than transaction prices). The data is published quarterly.

Spreads between the cap rate (described above) and the 10-year nominal Treasury yield, indicate a measure of the cost of properties versus a current measure of the cost of financing.

Transactions as a % of Market Value Trailing-Four Quarters is a measure of property turnover activity in the NCREIF Universe. This quarterly metric is a measure of activity in the market.

Credit Markets Fixed Income
Metric: Spreads

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

Measure of Equity Market Fear / Uncertainty
Metric: VIX – Measure of implied option volatility for US equity markets

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

Measure of Monetary Policy
Metric: Yield Curve Slope

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

Measures of US Inflation Expectations
Metrics: Breakeven Inflation and Inflation Adjusted Commodity Prices

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

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

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

Measures of US Treasury Bond Interest Rate Risk
Metrics: 10-Year Treasury Forward-Looking Real Yield and 10-Year Treasury Duration

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

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

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

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MEKETA
INVESTMENT GROUP

EBMUD Employees' Retirement System

March 19, 2020

International Equity Review

Agenda

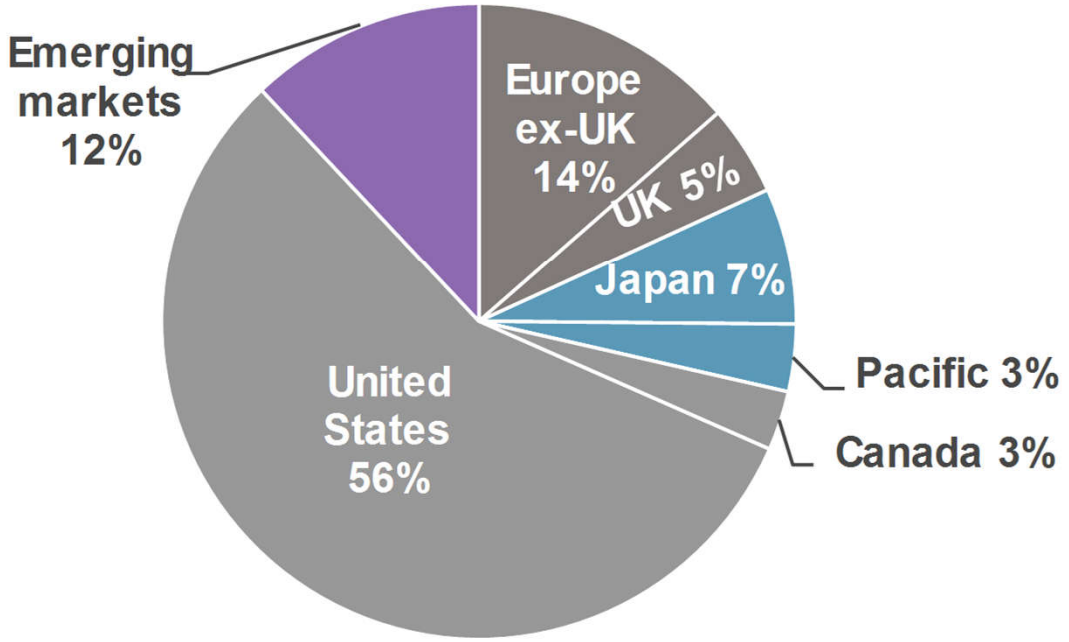
1. Global Equity Asset Class
2. EBMUDERS Equity Allocation
3. Active vs Passive in International Equities
4. Core vs Growth/Value in International Equities
5. Appendix

Global Equity Asset Class

- The Global Equity asset class is composed of stocks issued by corporations domiciled both inside and outside the United States based on their relative market capitalization
- Global Equity = International Equity + US Equity
- Since most investors exhibit a "home bias" (an overweight to domestic assets) moving to a Global equity allocation involves allowing the International equity allocation to reflect its market-weighted proportion versus US equity

Weights in MSCI All Country World Index

% global market capitalization, float adjusted



Source: JP Morgan Guide to the Markets; weights as of 02/26/2020

International equities enables investors to gain exposure to different markets each with their own market dynamics

- Different market conditions
- Different economic growth trends
- Different monetary and fiscal policy
- Different business cycle
- Different demographics
- Different industry concentrations

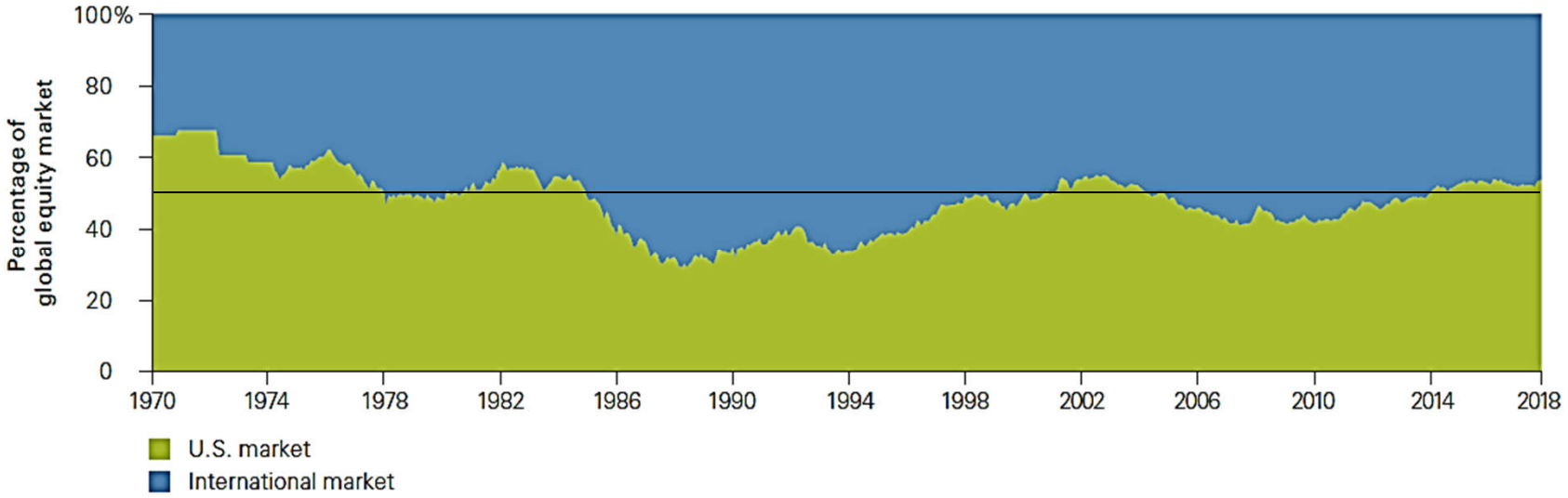
As economic globalization continues, there is strong evidence that global market integration continues to unfold

Market liberalization has systematically reduced the barriers to capital mobility and enhanced the quality of market information and execution

¾ of world GDP and 95% of world population is outside the US

EBMUDERS Equity Allocation

- EBMUDERS' current equity allocation is split evenly between US and International equities; approximately the Global equity market cap allocation
- EBMUDERS does not exhibit home bias within the equity portfolio
- EBMUDERS exhibits a static 50/50 allocation whereas the Global equity allocation has varied around the 50/50 mark over time



Source: Vanguard.

Since moving to the effectively global allocation following the 2018 asset liability study, EBMUDERS has experienced lower returns than if the Plan has maintained it prior equity allocation split

This is due to international equities trailing US equities over the measurement period

The question arises, Is EBMUDERS' current equity split between US and international equities still optimal?

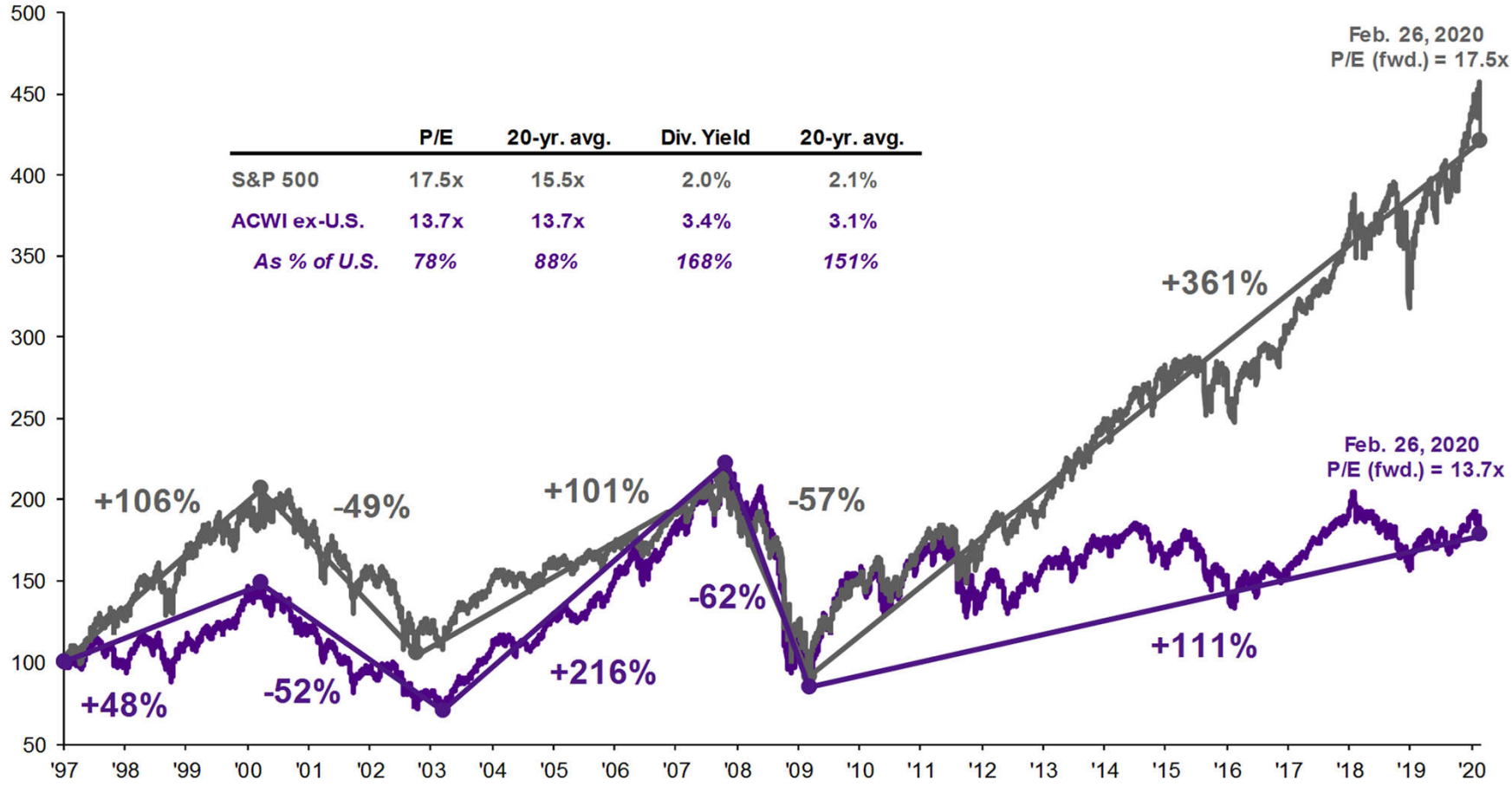
To help explore that questions we'll look at:

- The current return differential
- Valuation levels and reversion to the mean
- Meketa's capital market assumptions

There has been a divergence in returns between US and International equity markets over the past decade

MSCI All Country World ex-U.S. and S&P 500 Indices

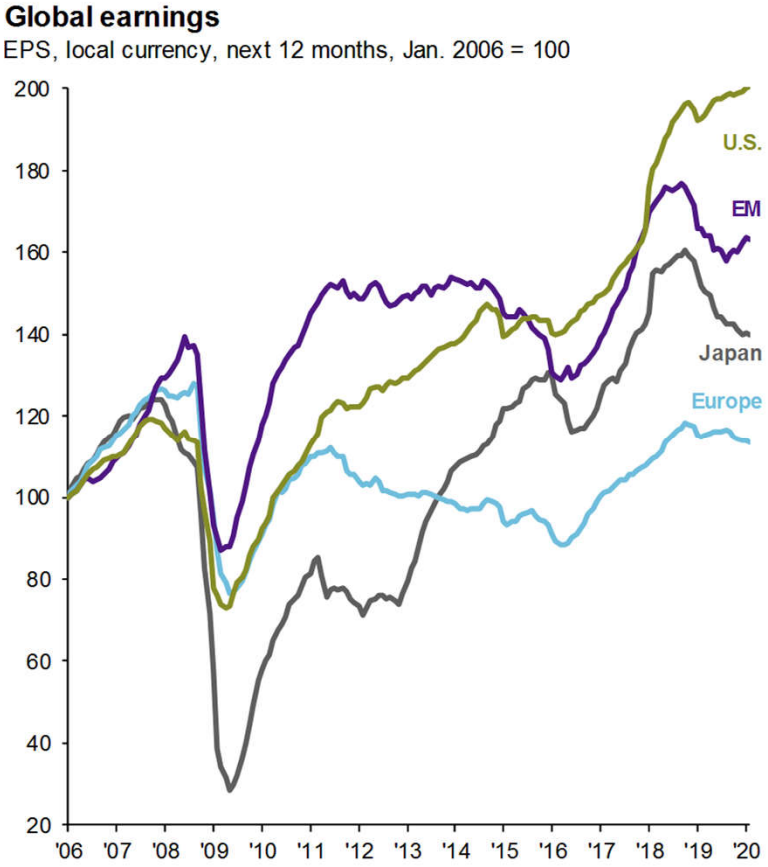
Dec. 1996 = 100, U.S. dollar, price return

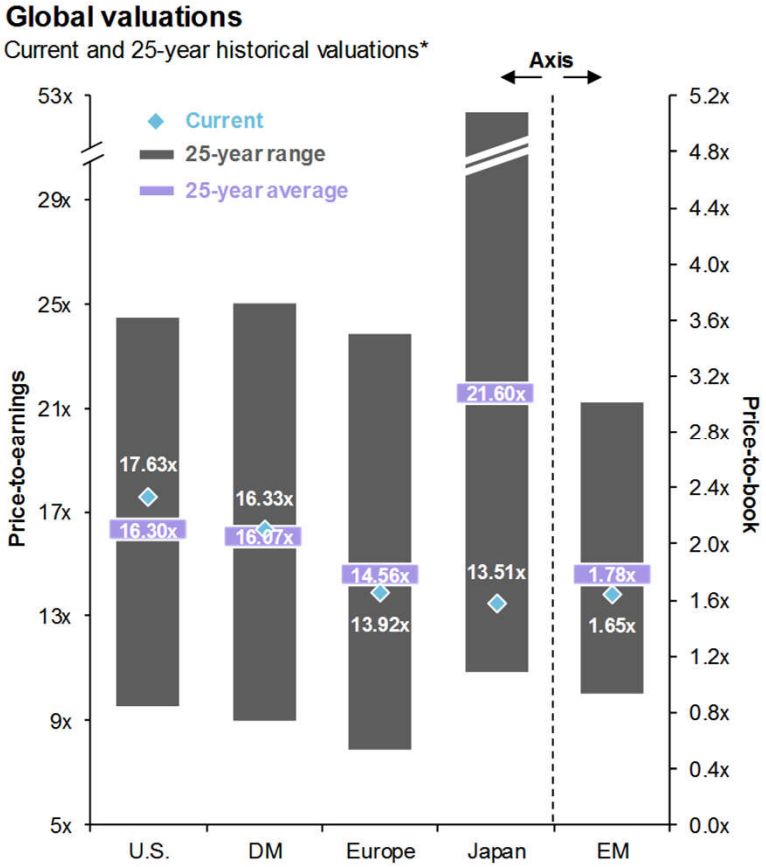


Source: JP Morgan Guide to the Markets; weights as of 02/26/2020

Divergence could lead to reversion to the mean with International equities outpacing US equities

- Fundamentals have been better in the US but valuation differences may outweigh this difference especially if International fundamentals improve with time



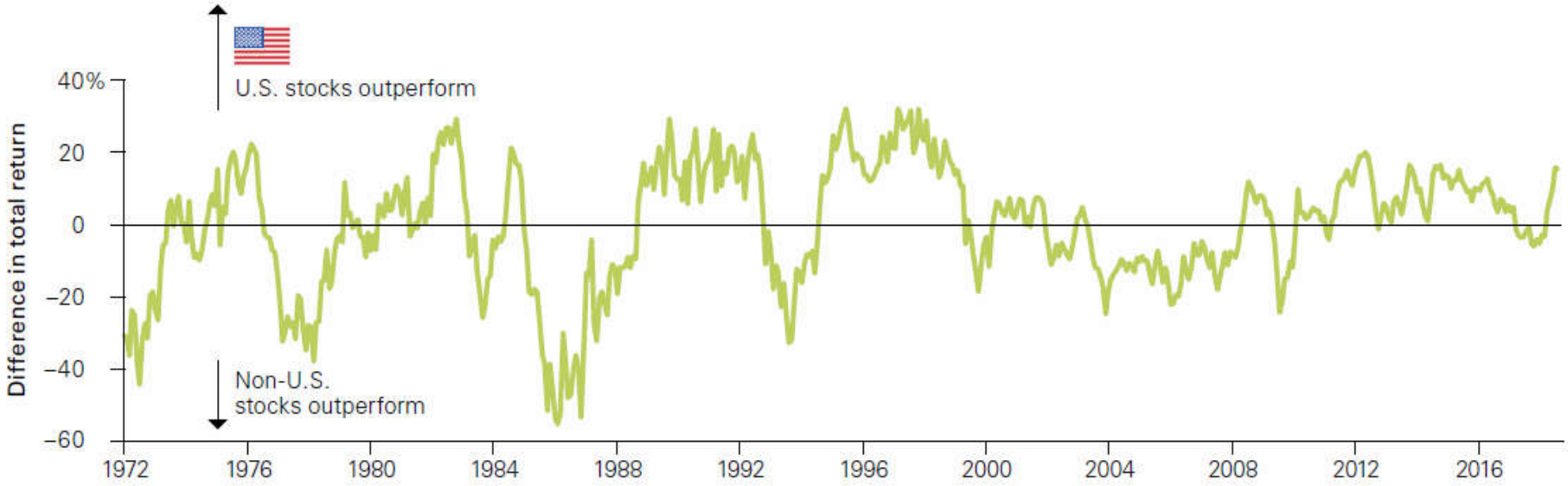


Source: JP Morgan Guide to the Markets; weights as of 02/26/2020

While the most recent time period has favored US equities relative to International equities longer term data exhibits a cyclical pattern

Over time, the differential has compressed due to globalization and market integration

Rolling 12-Month Return Differential Between US and International Equities



Source: Vanguard.

History shows an apparent reversion to mean that takes place between the relative returns of US and international equities over time

The time period over which this reversion to the mean takes place can be over quite long periods of time which makes it difficult from a policy standpoint

Likely one regime will dominate during the tenure of a trustee

Difficult to maintain a policy that has underperformed in the intermediate-to-long time

Due to the valuation differential that has arisen overtime Meketa is predicting that over the next 20 years there will be a reversion to the mean with international equities outperforming US equities

Meketa's 20-year return expectation is for international equities to return approximately 75 bps more than their US counterparts

- Meketa expects US equities to return 7.4% per year (geometrically compounded)
- Meketa expects developed international equities to return 7.9% and for emerging markets to return 9.1% respectively per year
- Please see Appendix A for a copy of Meketa's Capital Market Assumptions

Active vs Passive in International Equities

The current EBMUDERS' international equity allocation is 60% actively managed and 40% passively managed

Over the long term the Plan's active international managers have been able to add value relative to the benchmark

However, the last 7 years have been challenging from a relative return perspective

EBMUDERS' international equity long-term relative performance appears to be a positive outlier compared to peers

Meketa's analysis shows that overtime investors have not been rewarded for active management in the international equity class (Please see Appendix B for a full analysis)

- Return figures are gross of management fees

Asset Class/Style	Median Outperformance (Annualized)	Inception
US Large Cap Core	-58 bp	Jan. 1979
US Large Cap Growth	-25 bp	Jan. 1979
US Large Cap Value	-27 bp	Jan. 1979
US Small Cap Core	+34 bp	Jan. 1979
US Small Cap Growth	+73 bp	Jan. 1979
US Small Cap Value	+30 bp	Jan. 1979
Foreign Large Cap Core	-49 bp	Jan. 2001
Foreign Large Cap Growth	+67 bp	Jan. 2001
Foreign Large Cap Value	-34 bp	Jan. 2001

Core vs Growth/Value in International Equities

EBMUDERS' international equity is currently split between a value oriented active manager and a growth biased manager

There appears to be a small benefit from structuring an international equity class in this fashion with growth managers demonstrating some excess returns while value managers trailed by less than core oriented managers

- Return figures are gross of management fees, when fees are accounted for it may still not be beneficial to structure a portfolio in this fashion

Asset Class/Style	Median Outperformance (Annualized)	Inception
US Large Cap Core	-58 bp	Jan. 1979
US Large Cap Growth	-25 bp	Jan. 1979
US Large Cap Value	-27 bp	Jan. 1979
US Small Cap Core	+34 bp	Jan. 1979
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US Small Cap Value	+30 bp	Jan. 1979
Foreign Large Cap Core	-49 bp	Jan. 2001
Foreign Large Cap Growth	+67 bp	Jan. 2001
Foreign Large Cap Value	-34 bp	Jan. 2001

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Appendix A

Meketa Investment Group

2020 Asset Study

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Introduction

In order to construct the best portfolio from a risk-return standpoint, conventional financial wisdom dictates that one develops return, volatility, and correlation expectations over the relevant investing horizon. Because of its impact on our clients' wealth, the development of these expectations is one of Meketa Investment Group's (MIG) most important fiduciary roles. However, given the uncertainty surrounding financial and economic forecasts, expectations development is challenging, and any of several methodological approaches may meaningfully contribute to this complex task.

Our process relies on both quantitative and qualitative methodologies. First, we employ a large set of quantitative models to arrive at a set of baseline expected ten-year annualized returns for major asset classes. These models attempt to forecast a gross "beta" return for each *public market* asset class—that is, we explicitly do not model "alpha," nor do we apply an estimate for management fees or other operational expenses.[1] Our models may be econometrically derived (based on a historical return relationship with current observable factors), factor-based (based on a historical return relationship with predicted factors), or fundamentally based (based on some theoretically defined return relationship with current observable factors). Some of these models are more predictive than others: for example, the model for U.S. investment grade bonds, which relies on yields, is much more accurate in forecasting future returns than the model for U.S. equities, which relies on fundamental valuation metrics. For this reason, we next overlay a qualitative analysis, which takes the form of a deliberation among the research team and our Investment Policy Committee. We ask: Why are different models within the same asset class leading to different conclusions? Are the assumptions consistent across asset classes? What are our models missing about the possible evolution of the next ten years? Naturally, return assumptions for hard-to-predict asset classes will be influenced more heavily by our qualitative analysis.

Our ten-year expectations serve as the primary foundation for our longer-term, twenty-year expectations. We form our twenty-year annualized return expectations by combining our ten-year expectations for each asset class with the observed historical returns for each asset class. We do this by performing a weighted average of our ten-year expectations with average historical returns in each asset class, with the weights determined by a qualitative assessment of the value of the long-term historical data. Generally, if we have little confidence that the historical average return is representative of what an investor can expect in the not-too-distant future[2], we will weight our ten-year forecasts more heavily. If we have great confidence in the historical average, we will weigh the ten-year forecasts and historical average equally. Therefore, the weight on our ten-year forecasts ranges from 0.5 to 0.9 (with an average of 0.8). Generally, the weights are similar within broad asset class categories, such as public equities, fixed income, or hedge funds. Finally, we discuss the results with the wider consultant community at MIG, who pose questions to the research team and help us refine our models and assumptions.

[1] Our expectations are net of fees where passive management is not available (e.g., private markets and hedge funds).

[2] For example, we have less confidence in historical data that do not capture many possible market scenarios or are overly polluted by survivorship bias.

We develop our twenty-year volatility and correlation expectations slightly differently. For these parameters, we do not first develop separate ten-year expectations. Instead, we rely primarily on historical averages, with an emphasis given to the experience of the trailing fifteen years[1]. Qualitative adjustments, when applied, usually serve to increase the correlations and volatility over and above the historical estimates (e.g., using the higher correlations usually observed during a volatile market). In the case of private markets and other illiquid assets, where historical volatility and correlations have been artificially dampened, we seek public market equivalents on which to base our estimates before applying any qualitative adjustments. These volatility and correlation expectations are then combined with our twenty-year return expectations to assist us in subsequent asset allocation work, including mean-variance optimization and scenario analyses.

Throughout the process, we remind ourselves of our overarching goals:

- Consistency of results with historical experience and fundamentals
- Consistency of results with macroeconomic reality
- Consistency of results across asset classes
- Recognition of forecasting error and its implications

The rest of this document is organized as follows. In tables 1 and 2, we present our twenty-year return, volatility, and correlation expectations for all covered asset classes. Following this, we further discuss our quantitative models and how we bridge from ten-year return expectations to twenty-year expectations.

[1] From a risk management perspective, the research group made the decision in 2019 to expand the historical window from 10 to 15 years in order to continue accounting for the effects of the Global Financial Crisis (2008).

Introduction

In this section, we present our twenty-year annualized return, volatility,[4] and correlation expectations for a set of significant asset classes. Table 1 contains our expectations for return (geometrically compounded) and volatility, while Table 2 contains our correlation expectations for a subset of major asset classes[5].

Table 1. Twenty-Year Annualized Return and Volatility Expectations

Asset Class	Expected Return (%)	Volatility (%)
Fixed Income		
Cash Equivalents	2.9	1.0
Short-term Investment Grade Bonds	2.6	1.0
Investment Grade Bonds	3.0	4.0
Investment Grade Corporate Bonds	3.6	7.0
Long-term Government Bonds	3.2	12.0
Long-term STRIPS	3.4	19.0
TIPS	2.9	7.0
High Yield Bonds	5.2	11.0
Bank Loans	5.0	9.0
Foreign Bonds	2.4	8.0
Emerging Market Bonds (major)	4.5	11.0
Emerging Market Bonds (local)	4.8	14.0
Equities		
U.S. Equity	7.4	17.0
Developed Market Equity	7.9	19.0
Emerging Market Equity	9.1	24.0
Frontier Market Equity	10.0	21.0
Global Equity	7.8	17.0
Private Equity/Debt	9.1	23.0
Buyouts	9.4	24.0
Venture Capital	9.3	34.0
Mezzanine Debt	7.0	15.0
Distressed Debt	7.0	20.0
Real Assets		
Real Estate	7.5	15.0
REITs	7.0	26.0
Core Private Real Estate	6.3	11.0
Value Added Real Estate	8.4	18.0
Opportunistic Real Estate	9.9	24.0
Natural Resources (Public)	8.3	22.0
Natural Resources (Private)	8.8	21.0
Commodities (naïve)	4.3	17.0
Infrastructure (Public)	7.5	17.0
Core Infrastructure (Private)	6.7	14.0
Non-Core Infrastructure (Private)	9.1	22.0
Other		
Hedge Funds	4.9	7.0
Long-Short	4.3	9.0
Event-Driven	5.8	8.0
Global Macro	4.6	5.0
Risk Parity (10% vol)	5.4	10.0
Tactical Asset Allocation	4.4	10.0

[4] We measure volatility in terms of annualized standard deviation.

[5] For a complete list of inputs, please contact the MIG research team.

Table 2. Correlation Expectation for Major Asset Classes

	Investment Grade Bonds	TIPS	High Yield Bonds	U.S. Equity	Developed Market Equity	Emerging Market Equity	Private Equity/Debt	Real Estate	Natural Resources (private)	Commodities	Core Infrastructure (private)	Hedge Funds
Investment Grade Bonds	1.00											
TIPS	0.80	1.00										
High Yield Bonds	0.20	0.30	1.00									
U.S. Equity	0.05	0.00	0.70	1.00								
Developed Market Equity	0.05	0.15	0.70	0.90	1.00							
Emerging Market Equity	0.05	0.15	0.70	0.80	0.90	1.00						
Private Equity/Debt	0.05	0.05	0.65	0.85	0.80	0.75	1.00					
Real Estate	0.20	0.10	0.50	0.50	0.45	0.40	0.45	1.00				
Natural Resources (private)	0.10	0.10	0.45	0.65	0.60	0.60	0.55	0.45	1.00			
Commodities	0.05	0.30	0.40	0.35	0.55	0.60	0.30	0.15	0.65	1.00		
Core Infrastructure (private)	0.30	0.30	0.60	0.55	0.55	0.50	0.45	0.60	0.60	0.35	1.00	
Hedge Funds	0.05	0.20	0.70	0.80	0.85	0.85	0.65	0.45	0.65	0.65	0.60	1.00

Ten-Year Return Quantitative Models

Fixed Income

Cash Equivalents

For cash equivalents, we use an average of the current rate and the modified Taylor rule. The Taylor rule is a monetary-policy rule that central banks use to determine what the nominal short-term interest rate should be, based on factors such as inflation, GDP, and potential output.

Short-term Investment Grade Bonds
Investment Grade Bonds
Investment Grade Corporate Bonds
Medium-term Government Bonds
Long-term Government Bonds
Long-term Strips
Long-term Corporate Bonds

Our estimates for investment grade bonds are based on a fundamental model whose primary input is yield-to-worst. Unsurprisingly, the model is more accurate for the intermediate-term investment grade bonds. We also take the expected term structure in the future and the probability of default (and recovery) into account, though these have a much more limited impact.

TIPS

Our estimate for TIPS is based on the real yields for the TIPS index plus an estimate for inflation. We use the ten-year breakeven inflation rate to represent an unbiased prediction for inflation.

High Yield Bonds
Bank Loans

Our estimate for high yield bonds is based on a fundamental model that uses the current yield-to-worst, as well as presumed default and recovery rates. We use Moody's historical average global default and recovery data when estimating default and recovery rates.

Foreign Bonds
Emerging Bonds (major)
Emerging Bonds (local)

Our estimates for foreign (developed market) and emerging market bonds are based on a fundamental model that uses the current yield-to-worst, the presumed default and recovery rates, and a currency adjustment (as we assume the investments are unhedged). We use Moody's historical average global default and recovery data when estimating default and recovery rates, though we base it on the current, not historical ratings for each universe. Our currency adjustment is based on a model that incorporates Purchasing Power Parity (PPP) theory, Interest Rate Parity (IRP) theory, and the current account differential among markets[6].

[6] We have two sets of currency adjustments that are used across most foreign asset classes. One is for assets denominated in a basket of EAFE/OECD (ex-U.S.)-currencies, and the other is for assets denominated in a basket of Emerging Market currencies.

Equities

U.S. Equity
Developed Market Equity
Emerging Market Equity
Frontier Market Equity
Global Equity

Our estimate for public equities is based on two fundamental models. Both models use a "building blocks" approach that adds dividend yield, expected earnings growth, and expected change in valuation multiples. The multiplier effect is based on the principal of mean-reversion to several long-term valuation relationships, and both models use the current dividend yield on the respective index.

For the first model, the growth rate for earnings is based on projected nominal GDP growth[7] and the multiple effect is based on future PE10[8]. For Emerging and Frontier Markets, we assume a meaningful percentage of GDP does not translate to earnings growth due to graft, corruption, etc. For the second model, the growth rate is subjective, and the multiple effect is based on future PE, though in both cases we anchor our expectations to their historical averages. For foreign equities, we also make an adjustment for the expected impact of currency movements.

Private Equity/Debt
Private Equity Composite
Private Debt Composite

Buyouts
Venture Capital
Mezzanine Debt
Distressed Debt

Our estimate for private equity/debt is a weighted average of the four subcomponents (75% buyout; 15% VC; 5% mezzanine debt; 5% distressed debt). Furthermore, we have added a Private Equity Composite (80% buyouts and 20% venture capital) as well as a Private Debt Composite (40% mezzanine debt, 40% distressed debt, and 20% direct lending).

For Buyouts, our fundamental model uses data from public equities returns, and combines it with private equity leverage, cost of debt, operational efficiencies and, relative pricing to public markets. For Venture Capital, we create a public market proxy (composed of traditional technology, biotech, pharmaceuticals, life sciences, IT services, internet, and clean tech stocks) and compare its pricing to the small cap stock market to again determine if returns are likely to be higher or lower than the historical average. For mezzanine and distressed debt, we use the same model as for high yield bonds, though we add inputs such as an expected equity kicker and upfront fees.

[7] We use real GDP projections from the IMF World Economic Outlook and Oxford Economics, and we construct our inflation projections based on the IMF World Economic Outlook, historical averages and, where available, 5-yr Inflation swaps maturing 5 years from now (U.S., Euro Area, UK, and Japan).

[8] PE10 refers to the price divided by the trailing ten years of earnings.

Real Assets

Real Estate

REITs
Core Private Real Estate
Value Added Real Estate
Opportunistic Real Estate
Real Estate Debt (High Yield)

For core real estate, the model is based primarily on the cap rate. As is common, we assume some mean reversion versus bond yields (using the forward yield curve). For value added and opportunistic real estate, we use historical premiums versus core real estate to construct estimates for each risk premium, while also taking into account current pricing and leverage. For REITs, we focus on the yield and its historical relationships, including the historical return premium over the yield as well as spreads versus bonds. The broader real estate estimate is based on a weighted average of the various subcomponents (10% REITs, 40% Core Private, 20% Value Added, 20% Opportunistic, and 10% High Yield Real Estate Debt). For high yield real estate debt, we use our high yield bond model, using a spread over BBB-rated CMBS as a proxy.

Natural Resources (Public)
Natural Resources (Private)

For public market natural resources, we start by taking a representative weighted average of the regional public equity returns. We then compare the P-E ratio of the natural resources index to the global equity market to derive a signal as to how discounted or expensive natural resources stocks may be. We take a similar approach for mining and oil & gas, as most "private" mining partnerships consist of investments in junior mining stocks and we lack adequate data for private oil & gas transactions. For both timberland and farmland, our fundamental model combines expectations for land price appreciation (or depreciation) with income potential. To arrive at the aggregate natural resources assumption, we take a weighted average of our expectations for each of the four components (5% timberland, 15% farmland, 60% oil & gas, and 20% mining).

Our expected return projection for MLPs is constructed in a similar way as Equities, with two fundamental models that use a "building blocks" approach that adds dividend yield, expected earnings growth, and expected change in valuation multiples[9].

[9] We use the Alerian MLP Index to compute the necessary inputs for the asset class.

Commodities

Our fundamental model for commodities uses a building blocks approach that adds our estimates for collateral yield, roll return, spot return, and diversification return. The first component, the collateral yield, represents our expected return from cash. Since more than half of the major commodities were contangoed as of December 2018, we estimate a negative roll return. For the spot return, we use our expectation for inflation. For the diversification return, which results from the regular rebalancing between commodity futures, we use a number slightly below that which has been observed historically[10].

Infrastructure (Public)
Core Infrastructure (Private)
Non-Core Infrastructure (Private)

For public market infrastructure, we start by taking a representative weighted average of the regional public equity returns. We then compare the P-E ratio of the infrastructure index to the global equity market to derive a signal as to how discounted or expensive infrastructure stocks may be. For private infrastructure, we use our best estimates of average yields and leverage, while assuming capital appreciation that should keep up with either inflation or GDP growth.

Other Assets & Strategies

Hedge Funds

Long-short
Event-driven
Global Macro
CTA-Trend Following
Fixed Income/Long-Short Credit
Relative Value/Arbitrage

To construct the hedge fund models, we use a variety of traditional and alternative betas to develop fundamental models at the strategy level. The traditional betas include equities, distressed debt, credit, commodities, and bonds (i.e., interest rates). The alternative betas include premia for the carry trade, convertible arbitrage, and currency strategies (both value and momentum). We also add leverage (where appropriate) and subtract fees. These hedge fund strategy estimates do *not* include any alpha component. The aggregate hedge fund estimate is a weighted average of the subcomponent strategies (30% long-short, 25% event-driven, 20% global macro, 10% fixed income, and 15% arbitrage).

[10] De Chiara and Raab (2002) document a 2.8% diversification return for the rebalanced Dow Jones AIG Commodities index during the time period 1991 to 2001. Gorton and Rouwenhorst suggest a diversification return of between 3.0% and 4.5% for an equally-weighted basket of commodity futures.

Risk Parity

To build our fundamental model, we use the five most common risk parity betas: equities, credit, commodities, currencies, and interest rates. We weight each beta such that their contribution to risk is equal, and we leverage the group such that the aggregate standard deviation achieves a standard target (10%).

Tactical Asset Allocation

To build our fundamental model, we use a compilation of many traditional betas and apply weightings that roughly approximate the average of those we have observed for the industry. The betas we use and their respective weightings are as follows: U.S. equities (25%), EAFE equities (15%), emerging market equities (10%), commodities (10%), investment grade bonds (15%), emerging market debt (10%), high yield (5%), and TIPS (10%).

Appendix B

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Manager Alpha: Does Active Management Add Value?

WHITEPAPER
OCTOBER 2019

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The purpose of this paper is to measure and analyze the historical outperformance of actively managed funds compared to market benchmarks. This topic has been discussed before in numerous platforms and contexts, but this paper aims to clear as much bias as possible to create an accurate historical and quantitative picture of outperformance over time.

We found that the median manager in more than half of the observed asset classes outperformed their benchmark before fees. However, even in these cases, the outperformance was insufficient to overcome the median fee for that asset class. This is consistent with finance theory and with past versions of our research. Our research continues to find that US small cap and emerging market equities have exhibited the largest positive median manager alpha. Still, our analysis indicates that there does not appear to be an asset class or style where it is particularly easy for active managers to add value, net of fees.

That said, the level of dispersion among managers varies by asset class. This implies that skilled (or lucky) active management can add more value in certain asset classes than others. These tend to be more volatile asset classes, such as equities. We also note that there seems to be a connection between a temporary widening of interquartile spreads and extreme market events.

Manager alpha has also been cyclical, exhibiting long periods of median out- and under performance relative to the benchmark. Across most asset classes, the interquartile spread has been declining. This implies that either markets have become more efficient over time or managers have structured their portfolios in a manner such that they more closely resemble each other.

Introduction

Whether active management adds value has been a common question for decades. For many active investors, their goal is to outperform their target market (or *benchmark*) or to at least do better than their peers. The question, then, is whether these are practical goals, and if they are, whether they can be achieved consistently.

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Aside from the possible value of investing in an actively managed fund, this paper aims to ascertain whether a manager will likely outperform the market, and if it does, whether that benefit will go back to the investor after fees are applied. This paper will also endeavor to answer whether the odds of outperformance are high, low, or purely random, and whether the amount of value added from active management varies across asset classes, styles, and time.

To differentiate this paper from other research on the same topic, we will take the time to filter the data to clear it of as much bias as possible, including double counting and survivorship bias. This way, we can develop more reasonable expectations regarding the reality of investing in an actively managed fund.

Data

The two main data sources used for the paper are Morningstar Direct and eVestment.[1] Morningstar Direct allows us to sort through both 'living' (active) and 'dead' (inactive) funds. This should clear the data analysis from *survivorship bias*, or bias that comes from only viewing the funds that are still alive. If one were to look only at living funds, then the results would probably be skewed toward outperformance, as the majority of funds that have dropped out of the market are likely to have underperformed (see appendix).

[1] eVestment will only be used for fund fee calculations.

The second bias we consider is selection bias. In Morningstar Direct, all managers that are part of the database must report their returns (as opposed to databases such as eVestment, which allows managers to report different vehicles at their own discretion). This keeps managers from starting multiple vehicles, picking those that outperform, reporting them, and then omitting the vehicles that did not perform to satisfaction, thus skewing the data unrealistically. While selection bias is difficult to eliminate fully, one can at least work from a database with a better guarantee to root out selection bias. Morningstar also organizes its managed funds on the basis of return, benchmark, and structure, as opposed to allowing managers to self-report their fund asset class, even if the fund does not necessarily match the class in which it is included.

Morningstar also uses its own standardized benchmarks for each asset class, an approach that should prevent any potential artificial out- or underperformance due to non-standardized benchmarking. A large amount of "noise" can result from the mismatch between funds' strategies and their benchmarks. Often this takes the form of managers holding securities that are not included in their benchmark, or structuring their portfolio such that it is riskier than the benchmark. If a significant segment of managers in an asset class run portfolios that are meaningfully different

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from the benchmark, it can lead to erroneous conclusions. Morningstar allocates funds to a standardized asset class independent of what a firm might market their fund to be, which allows us to better trust that the funds are actually aligned with their benchmark and minimizes the noise that comes from benchmark mismatching.

To prevent double counting, we opted to only consider a single share class of each fund. Share classes differ by fee structures but not by portfolio composition. To not incur selection bias and because we calculate performance before fees, we chose the oldest share class from duplicate funds to maintain uniformity.

To maintain the most accurate calculation methods, we removed any funds with less than twelve months of return history. While this decision does slightly increase the risk of survivorship bias and add a bias against new funds, the amount of funds deleted was small enough as to not warrant an extraordinary amount of concern (see the Appendix for the exact numbers for each asset class).

For our analysis, we decided to assess six asset classes: US Core Bonds, US High Yield Bonds, US Large Cap Equity, US Small Cap Equity, Foreign Large Cap Equity, and Emerging Market Equity. We chose these asset classes because they represent a broad collection of the public markets and have a long enough history to provide a comprehensive and robust picture of outperformance in the their respective markets.

When comparing active and passive management, it is important that investors consider the fees they would likely bear.

The available data goes as far back as 1979, depending on the asset class. Using as long a historical period as possible should produce the most comprehensive results, as it includes multiple and different types of market cycles and environments. It should also minimize the impact of any possible *endpoint* or *recency bias*. Since we will be using the Morningstar-preferred benchmark, and some benchmarks started later than 1979, some asset classes will not have as long of a time window as others.[2]

[2] See the appendix for further explanation of our methodology regarding benchmark and timetable selection.

Fees and expenses

Expenses, fees, and trading costs can be a high hurdle for managers to overcome. All of the results in this paper are shown *before fees*. The decision to compare gross of fee returns was made so that the benchmark index could be used directly for comparison. Furthermore, fees will vary for different investors. For example, institutions investing larger mandates will likely be able to negotiate lower fees than those available to smaller institutions.

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When comparing active and passive management, it is important that investors consider the fees they would likely bear. Note that even index investing requires investors to bear some costs, albeit at a much lower level.

Manager alpha

Calculations and results

The table below shows the median manager outperformance by broad asset class before fees. The comparison period goes as far back as each benchmark and asset class can. Outperformance is defined as the geometric mean of the manager performance minus the preferred benchmark performance over a rolling 12-month period.[3]

[3] For each asset class, the medians were concatenated and evaluated, as opposed to the prior paper, which took a weighted average of the medians in each preferred benchmark.

TABLE 1
Median Outperformance, Gross of Fees (From Inception Through September 2019)

Asset Class	Median Outperformance (Annualized)	Inception
US Core Bonds	18 bp	Jan. 1976
US High Yield Bonds	5 bp	Sep. 1986
US Large Cap	-40 bp	Jan. 1979
US Small Cap	49 bp	Jan. 1979
Foreign Large Cap	-11 bp	Jan. 2001
Emerging Markets	24 bp	Jan. 1999

As the table illustrates, the median active manager outperformed in four asset classes and underperformed in two of them. The highest outperforming median was US Small Cap, and the lowest was US Large Cap. For Foreign Large Cap, Core Bonds, and High Yield Bonds, the median was relatively close to zero.

Fees are a necessary part of evaluating the value of investing in an active manager. The following table displays the median fees for $10 million and $100 million mandates.[4] Depending on the situation and size of the mandate, the investor can often negotiate a much lower fee than those listed below.

[4] Data pulled from eVestment Alliance as of June 2019

TABLE 2
Median Fund Fee

Asset Class	Median Fee on $10 mm	Median Fee on $100 mm
Core Bonds	35 bp	28 bp
High Yield	55 bp	50 bp
US Large Cap	68 bp	55 bp
US Small Cap	98 bp	89 bp
Foreign Large Cap	75 bp	65 bp
Emerging Markets	95 bp	90 bp

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When comparing the median performance to the median fee for each asset class, the gross performance of the median manager has not justified the historical median fee. In other words, performance would have to be much greater than median in order to justify the median level of fees. Two of the asset classes' median fund returns were negative already, so the fees would pull the loss amount even higher.[5] On the other hand, the positive alpha asset classes' median fees would have nullified any of the positive alpha generated for the investor. The fees tended to be highest in those asset classes that many investors consider to be the least efficient (e.g., small cap stocks and emerging markets).

[5] Traditionally, active management fees are often higher than passive management fees, so an active manager would have to outperform the benchmark by its higher fee for the investor to even break even.

Literature review

Our analysis appears to align well with other existing papers on the subject. Fama and French suggested in a 2009 essay[6] that actively managed funds, in aggregate, are equal to the sum of the market, making active management a zero sum game, before trading costs and fees are applied. This implies that in aggregate, active managers will underperform the market by an amount equal to fees and expenses. A 2018 research note by Vanguard[7] found that the majority of active managers do not always outperform in bear or bull markets.[8] The note refers to the market as a 'zero-sum game' that turns into a negative-sum game once an investor factors in management fees. In another 2018 paper by AQR Management,[9] researchers assessed actively managed fixed income funds and found that, after adjusting for risk premiums, there was very little significant alpha on average even before fees.

[6] Source: "Why Active Investing Is a Negative Sum Game" Fama and French, 2009.

[7] Source: "Myth: Active Management Performs Better in Bear Markets" Vanguard 2018.

[8] Vanguard's note does not cover in detail the methodology, benchmarking, or asset classes of their study, even though all of these factors have the ability to affect the final results.

[9] Source: "The Illusion of Active Fixed Income Alpha" AQR 2018.

Interquartile spreads

Another important metric to consider is the dispersion of manager performance. We measure this dispersion by interquartile spreads, which is the top quartile subtracted by the bottom quartile. For example, if 100 managers were ranked by performance, and 1 was the highest rank, the interquartile spread would be the 25th manager minus the 75th. The size of this spread is a good indicator of how much value a "skilled" (or lucky) manager can add relative to an "unskilled" (or unlucky) manager. Another way to interpret these results is to think of the size of the spread as an indicator of how much potential value lies in selecting a superior active manager within these asset classes.

The following chart illustrates interquartile spread for each asset class.

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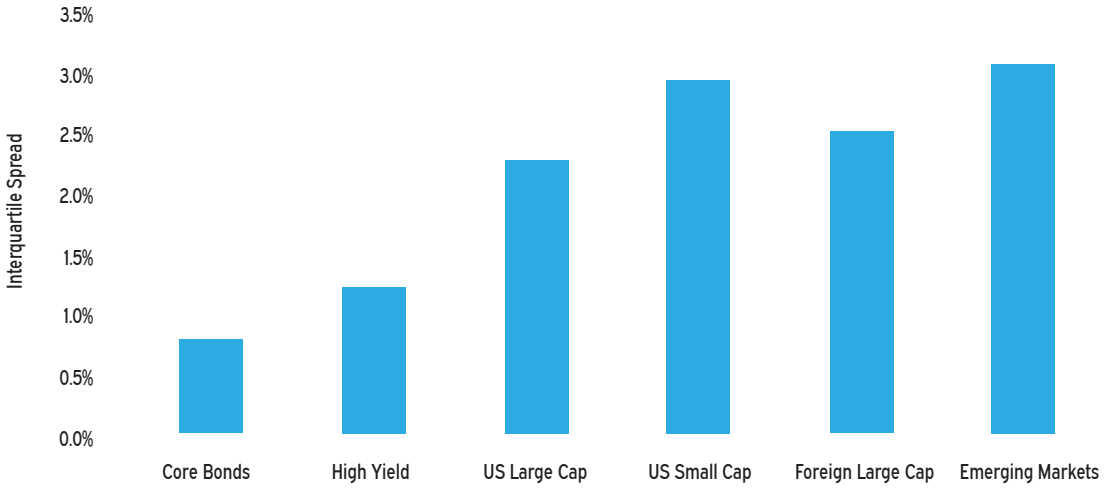

CHART 1

Interquartile Spreads[10] (From Inception Through September 2019)

[10] The interquartile spreads are evaluated by taking the historical medians of each firm's returns and taking the interquartile spread as far back as we can go.

As the chart illustrates, there is a relatively large difference in interquartile spreads among asset classes, reaching up to 3.1% for emerging market funds. There was much more divergence in the returns of equity managers than there was for bond managers, perhaps reflecting the difference in volatility of the underlying asset classes, or perhaps revealing the amount of heterogeneity in the securities held by managers in these sectors. Emerging Market equity managers exhibited the most divergence from each other historically, followed by US Small Cap managers. On the other hand, US High Yield Bond and US Core Bond managers had the lowest levels of historical divergence.

Style

In active equity management, managers may opt to invest from a value, growth, or core (blend) strategy. The following table illustrates the median outperformance of equities based on strategy.[11]

[11] Each asset strategy was benchmarked against its value or growth counterpart i.e. Small Cap Growth equities were benchmarked against the Russel 2000 Growth, while Small Cap Core equities were benchmarked against the Russell 2000 standard.

TABLE 3

Median Outperformance, Gross of Fees (From Inception Through May 2019)

Asset Class/Style	Median Outperformance (Annualized)	Inception
US Large Cap Core	-58 bp	Jan. 1979
US Large Cap Growth	-25 bp	Jan. 1979
US Large Cap Value	-27 bp	Jan. 1979
US Small Cap Core	+34 bp	Jan. 1979
US Small Cap Growth	+73 bp	Jan. 1979
US Small Cap Value	+30 bp	Jan. 1979
Foreign Large Cap Core	-49 bp	Jan. 2001
Foreign Large Cap Growth	+67 bp	Jan. 2001
Foreign Large Cap Value	-34 bp	Jan. 2001

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Roughly half of the styles underperformed their benchmarks, regardless of cap size or whether they were domestic or overseas. The median growth-oriented manager tended to fare relatively well, especially in the US Small Cap and the Foreign Large Cap universes. Overall, the growth style outperformed its benchmark the most often, and it had a higher alpha than either the core or value style of the same asset class.

In this comparison, it is important to note that performance is being measured specifically against the style benchmark. Hence it is not measuring how well one style performs relative to another, but how well an actively managed style fund does against its own style peers.

Cyclicality

Up to this point, this paper has only shown snapshot estimates of outperformance using all available data. Using this method gives the most robust estimates due to the high number of data points, but it may be misleading because it implies a static level of outperformance. As the following charts indicate, this is not the case. For US large and small cap managers, periods of over- and under-performances are highly cyclical and can be rather long lived.

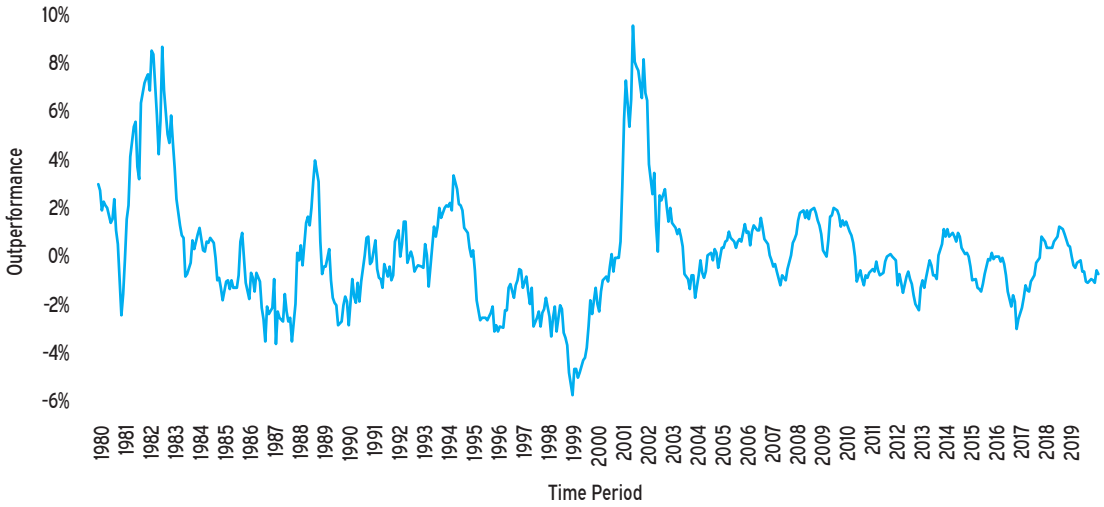

CHART 2
Rolling Median Outperformance US Large Cap

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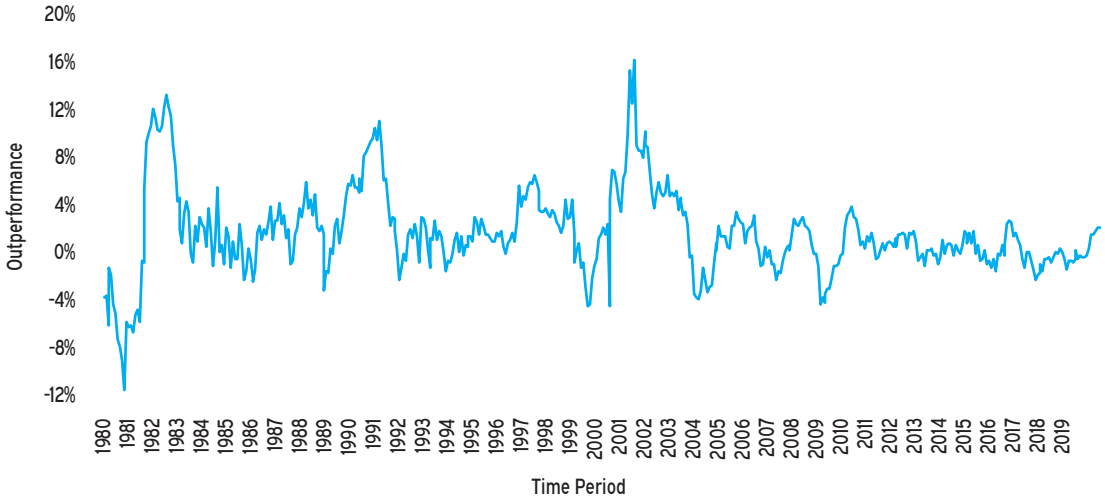

CHART 3
Rolling Median Outperformance US Small Cap

As the above graphs illustrate, the median outperformance for US Small and Large Cap Equities fluctuates, with cycles of positive and negative outperformance lasting for multiple years at a time. The other asset classes produce similar cycles (their respective graphs can be found in the appendix).

One very interesting aspect of both charts is that outperformance tended to occur during bear markets.[12] For example, during the bursting of the technology bubble from 2000 to 2002, there was a large amount of persistent manager outperformance. This implies that managers were more conservatively positioned and/or benefited from holding cash during these periods. However, this trend was less noticeable during the Global Financial Crisis ("GFC").

[12] Please see our 2018 paper on Cycles in Active Management for a more detailed discussion of the topic.

In general, the domestic large and small cap medians follow a similar trend, in that their performance, both over and under the benchmark, has been trending closer to zero over time. However, high yield exhibits a different kind of behavior.

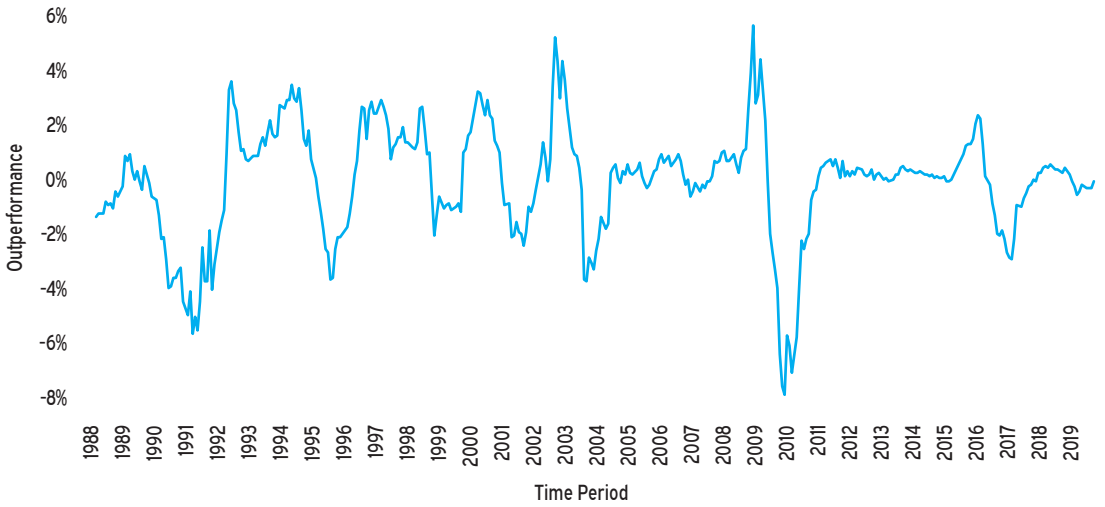

CHART 4
Rolling Median Outperformance High Yield Bonds

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For high yield, the outperformance runs in an oscillating pattern, with the highest amplitudes being in the 2000s, coinciding with the Dot Com Bubble and the Global Financial Crisis. While the most recent spike and decline were not as drastic as prior cycles, there does not seem to be a trend towards zero.

Another way to look at cyclicality is through the lens of manager dispersion. Below are the interquartile spreads for US High Yield bonds and US Large Cap Equities.

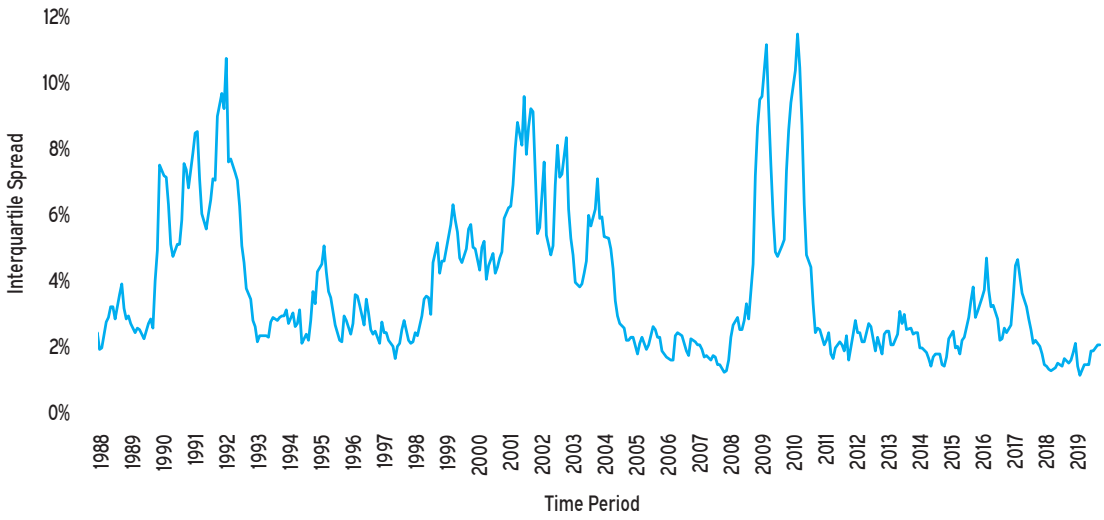

CHART 5
Rolling Interquartile Spreads High Yield Bonds

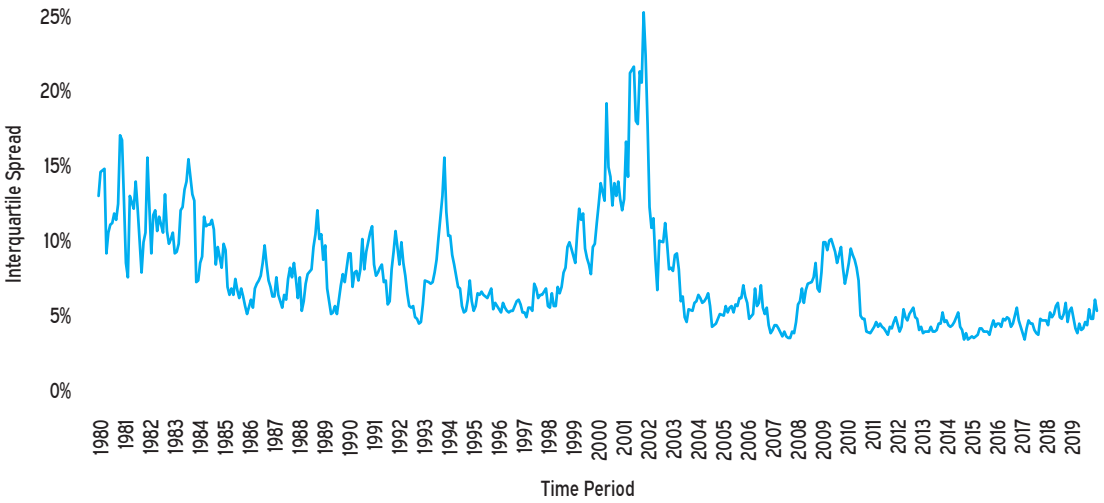

CHART 6
Rolling Interquartile Spreads US Large Cap

The interquartile spread greatly increases during periods of market stress, even if the median outperformance does not go above zero. For instance, during the 1989 High Yield Bond Crash, the spread increased, yet the outperformance remained negative. In the Large Cap case, the spread during the 2000s Dot Com Bubble Burst was large enough such that the top quartile outperformed well beyond its benchmark, while the lowest quarter performed below it.

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Hence it appears - and seems intuitive—that active managers have a greater ability to add (or detract) value during periods of market stress (and the immediate recovery thereafter).[13]

[13] While there does seem to be a correlation visible for these asset classes, there are times where this is not always true, such as the early 1990s recession for US Large Cap or the 1994 bond market crash.

Market efficiency

To evaluate market efficiency based on outperformance, we must define market efficiency and understand the implications of the given data sets. For our purposes, we will define an efficient market as a market in which it is difficult for active managers to consistently outperform the market (as proxied by an appropriate benchmark) and their peers. The idea on the market side is that when the investors learn about new information regarding a certain asset, the information is already incorporated into the current price of the asset, hence limiting the ability to find undervalued securities for arbitrage. On the peer group side, once a profitable, new investment strategy becomes known, then as other managers utilize it, the information is reflected in the market price, thus reducing the potential return of the previously profitable investment strategy.

Outperformance trends over time provide information on market efficiency. If the overall median outperformance trends down from positive outperformance, then it means that the median manager is not as readily able to find undervalued assets in the market in order to produce excess returns. In contrast, the interquartile spreads provide a better description of market efficiency on the peer level. If the interquartile spread trends down, then it means that the difference in potential value between the top quartile and the bottom quartile is shrinking, meaning the additive value of a successful actively managed strategy is declining.

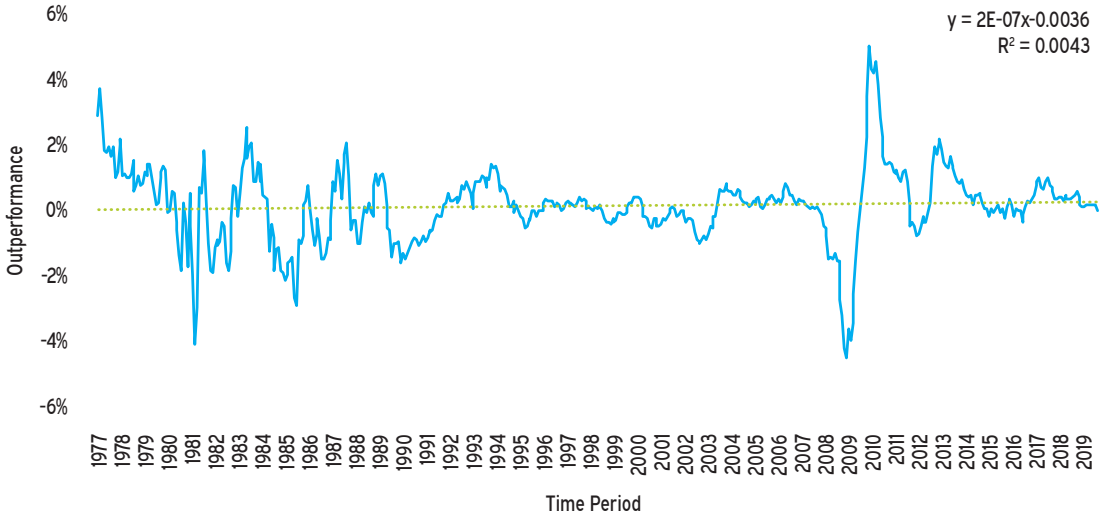

CHART 7
Rolling Median Outperformance Core Bonds

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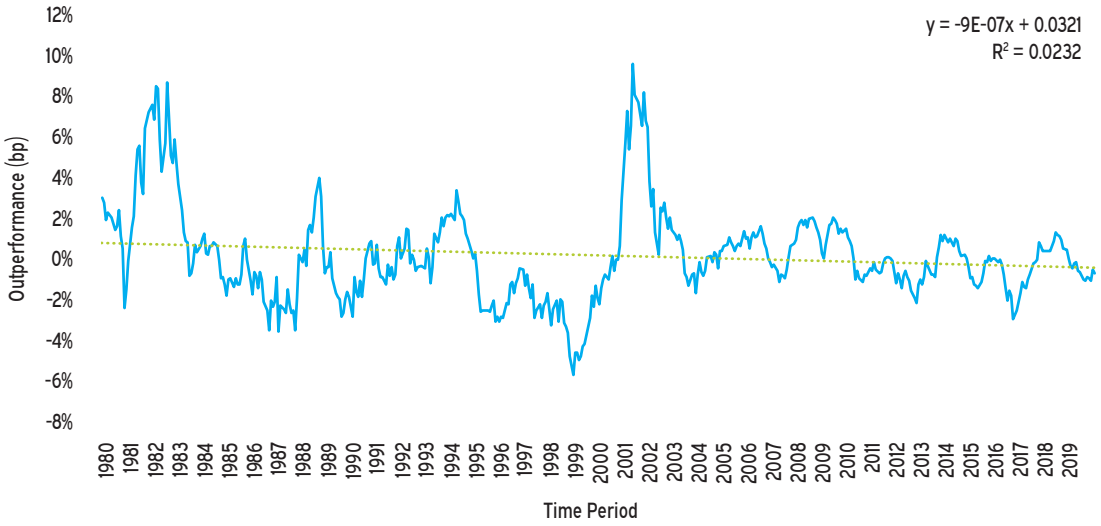

CHART 8
Rolling Median Outperformance US Large Cap

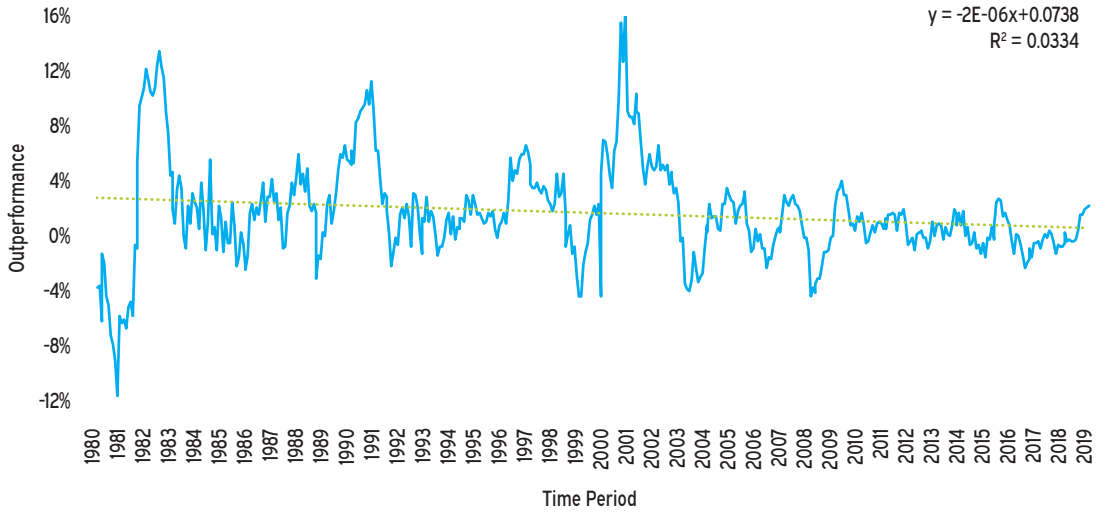

CHART 9
Rolling Median Outperformance US Small Cap

Each chart shows a "best fit" line that denotes the trend in median manager alpha. In most cases, the trend is down and approaching zero, implying greater market efficiency over time. However, these calculations should be taken with a large grain of salt, as the R2 value—the value that describes the relationship between the regression line and the actual data—is exceedingly low and close to zero, implying there is a very low correlation between the linear line and the actual data.

The next question to answer is whether the markets have become more efficient by the peer metric. The following charts illustrate the historical interquartile spread for US Large Cap and Core Bonds, as well as a linear best-fit line for each.

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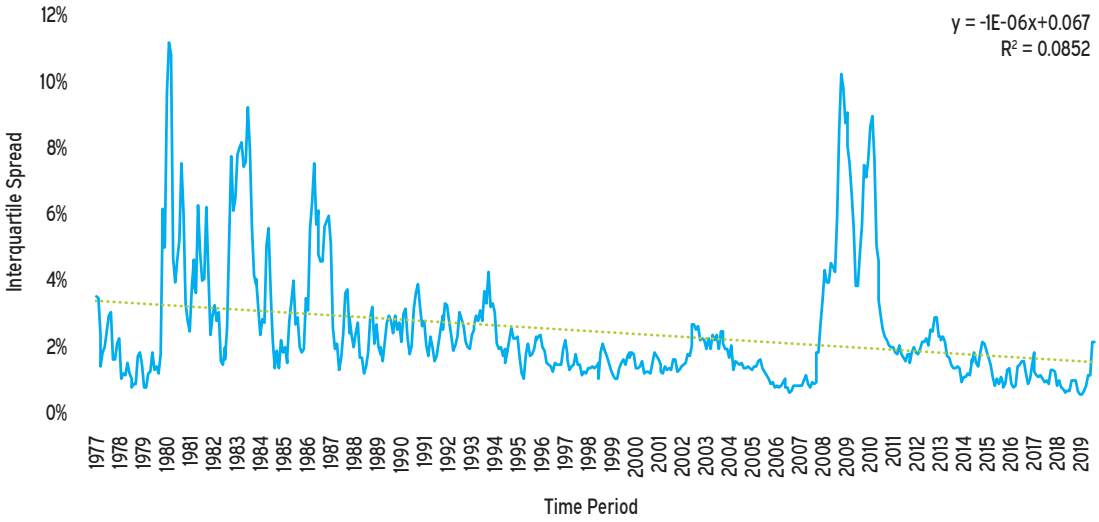

CHART 10
Rolling Interquartile Spread
Core Bonds

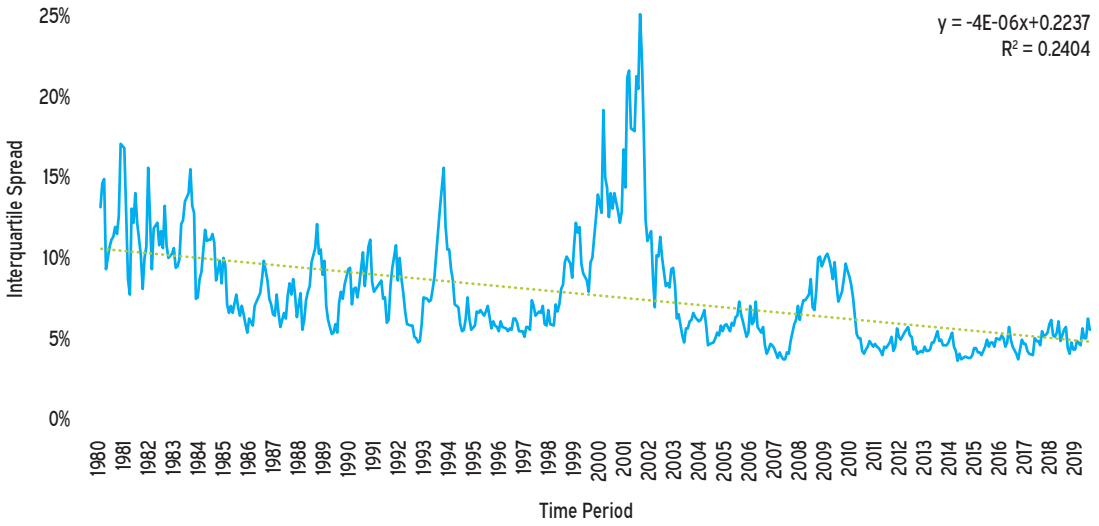

CHART 11
Rolling Interquartile Spread
US Large Cap

Both of these graphs' linear best-fit lines illustrate a downward trend over time, and the magnitude of cyclicality has decreased. However, the R2 value is still low, implying again that there is little explanatory power to these trend lines.

To get a better idea of the change in spread over time, we conducted a comparison between the average interquartile spread before and after 2001.[14]

[14] 2001 was chosen as a cutoff because of the likely impact of the internet and Reg FD (see subsequent footnote).

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Asset Class	Avg. IQ Spread Pre—2001 (%)	IQ Spread 2001 — 2019 (%)	Difference[15] (%)
Core Bonds	2.67	2.02	-0.65
High Yield	4.06	3.51	-0.55
US Large Cap	8.81	6.27	-2.54
US Small Cap	12.37	8.47	-3.90
Foreign Large Cap	10.82	5.86	-4.96
Emerging Markets	8.42	6.54	-1.88

TABLE 4

[15] These measurements were statistically significant on a 95% confidence interval.

For all asset classes, there has been a decrease in the average interquartile spread since 2001. Foreign Large Cap experienced the largest decrease with -4.96%. US Small Cap had the highest pre-2001 and post-2001 interquartile spreads.

The supporting argument for the thesis that markets are becoming more efficient is that, as time passes, successful investment strategies become more widely known.

The supporting argument for the thesis that markets are becoming more efficient is that, as time passes, successful investment strategies become more widely known. As more managers adopt and execute the strategy, the informational advantages of the strategy decrease as more information is reflected in market prices, thus reducing arbitrage opportunities and mispricings.

While we cannot know for sure why this has happened, several possible theories stand out. First, the advent of the internet and the adoption of Regulation FD[16] made security analysis more of a commodity than it was in the 1980s and 1990s. This development likely reduced the information advantage that some managers possessed. Although correlation does not suggest or imply causation, the fact that the reduction in the magnitude of outperformance occurred at roughly the same time as these events lends some credence to this theory. In addition, as mentioned earlier, the strategies used by managers have become more widely known and adopted, resulting in portfolios more closely resembling each other (and the market) than they did in the 1980s and 1990s.

[16] On August 15, 2000, the SEC adopted Regulation FD to address the selective disclosure of information by publicly traded companies and other issuers. Regulation FD provides that when an issuer discloses material nonpublic information to certain individuals or entities—generally, securities market professionals, such as stock analysts, or holders of the issuer's securities who may well trade on the basis of the information—the issuer must make public disclosure of that information.

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Conclusion

The results of our analysis show how difficult it is for active managers to consistently add value. We found that the median manager in more than half of the observed asset classes outperformed their benchmark before fees. However, even in these cases, the outperformance was insufficient to overcome the median fee for that asset class. This is consistent with finance theory and with past versions of our research. Our research continues to find that US small cap and emerging market equities have exhibited the largest positive median manager alpha. Still, our analysis indicates that there does not appear to be an asset class or style where it is particularly easy for active managers to add value, net of fees.

That said, the level of dispersion among managers varies by asset class. This implies that skilled (or lucky) active management can add more value in certain asset classes than others. These tend to be more volatile asset classes, such as equities. In addition, there seems to be a connection between a temporary widening of interquartile spreads and extreme market events.

Outperformance has also been cyclical, exhibiting long periods of median positive and negative relative performance. Across most asset classes, the interquartile spread has been declining. This implies that either markets have become more efficient over time or that managers have structured their portfolios in a manner such that they more closely resemble each other.

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Appendix A: Data filtering

All the manager and benchmark data was gathered from MorningStar Direct's online database. We gathered data for 5,320 managers across the asset classes. From the outset, we included inactive funds (to ward off survivorship bias) and only used the oldest share class of each fund (to prevent double counting).

MorningStar Direct filters and sorts funds by asset class using their own definitions. Unlike a manager-reporting platform like eVestment, MorningStar allocates funds to their asset class using their standardized definitions of asset classes and taking into account returns and fund composition. To keep out subjectivity, we decided to use only Morningstar's definitions of asset classes and did not try to filter based on fund name (which a previous version of this paper did). The reason is that choosing a benchmark based on fund names can be subjective, and if Morningstar has already allocated the fund based on its own definition of an asset class, it would prove neither productive nor practical to make a separate judgement based on the fund's name.

We next had to make sure that we were not double counting funds that were the same but in different vehicles. To do so, if we found a pair of funds from the same firm that exhibited a correlation above 99.8%, we deleted one of the funds in the pair.

TABLE 5

Asset Class	Original Number of Funds	Funds After Scrub	Funds After Rolling	Difference
Core Bonds	407	403	378	-29
High Yield	305	298	281	-24
US Large Cap	2,515	2,392	2,259	-256
US Small Cap	1,013	985	938	-75
Foreign Large Cap	724	684	619	-105
Emerging Markets	356	344	316	-40
Total	**5,320**	**5,106**	**4,791**	**-529**

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Appendix B: Bias and areas for improvement

While this data analysis takes lengths to scrub the data and processing from bias, possible skewing is inevitable. With that said, this allows for new opportunities regarding areas for further research and analysis.

We gathered our data from MorningStar Direct's database. The benchmarks used are located in another appendix. The magnitudes of the outperformance of the asset classes will inevitably be different depending on the benchmark chosen to measure outperformance, but the basic trends and spreads should be the same.

While MorningStar Direct allows us to root out selection bias as opposed to a database like eVestment, there were less available funds on MorningStar than on eVestment, thus slightly limiting the amount of data points. However, because we cannot guarantee selection bias or asset class mismatch like we can with MorningStar, we opted for using MorningStar Direct. One could possibly do a comparison of the data between the two and find out if there is any difference when assessing the two databases. If the data skews more positively in the eVestment data, it could be possible evidence of selection bias at play.

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Appendix C: Benchmarking and time periods

Morningstar Direct only provides single benchmarks per asset class at a time. The following table illustrates the benchmark we used for each asset class. The style benchmarks for US Large Cap, US Small Cap, and Foreign Large Cap have the same respective inception dates.[17]

Asset Class	Benchmark	Inception Date
Core Bonds	Bloomberg Barclays US Aggregate Bond	Jan. 1976
High Yield	BofAML US High Yield	Sep. 1986
US Large Cap	Russell 1000	Jan. 1979
US Small Cap	Russell 2000	Jan. 1979
Foreign Large Cap	MSCI ACWI ex-US	Jan. 1988[18]
Emerging Markets	MSCI-EM	Jan. 1988[19]

TABLE 6

[17] For asset classes with certain styles (i.e., growth or value), we used the style benchmark for outperformance (such as using the Russell Value for US Value Large Cap Equity). The growth and value variants were applied to the US Large Cap, US Small Cap, and Foreign Large Cap benchmarks when necessary. Unless otherwise noted, the style benchmarks' inception dates were the same as their core counterparts.

[18] The MSCI ACWI ex-US started in January 1988, but the style benchmarks started in January 1997. For uniformity and accuracy when comparing style strategies, the Foreign Large Cap funds were assessed from January 1997 on.

[19] While the Emerging Market Index started in 1988, the graph for outperformance did not start until 1991, as there was not enough fund data.

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Appendix D: Reasons for fund closures

Fund closures are a common yet dreaded part of the market landscape. Funds can close to new investors and become closed-ended, or they can fully close and liquidate. The primarily accepted cause of fund closures is that the fund was underperforming and/or did not have sufficient assets under management. Investors tend to not buy into a fund that is not doing well, and once the fund becomes unprofitable, a firm will likely terminate it.

Not all funds are closed due to underperformance. For example, in January 2019 the Vanguard Convertible Securities Fund shut down after 33 years. It had been returning a positive performance on average for the prior decade, but according to Vanguard, it was one of the smallest offerings and struggled to gain any broad acceptance. Funds, even if they are performing well, can close due to lack of investors. Niche market funds can also suffer from lack of investor traction and close. According to Scott Cody of Latitude Financial Group, funds can even close because they were doing so well that it cannot buy hard-to-find assets in its asset class.

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Appendix E: Median outperformance graph by asset class[20]

[20] Due to lack of fund data, some of the asset classes' early year relative returns may be skewed.

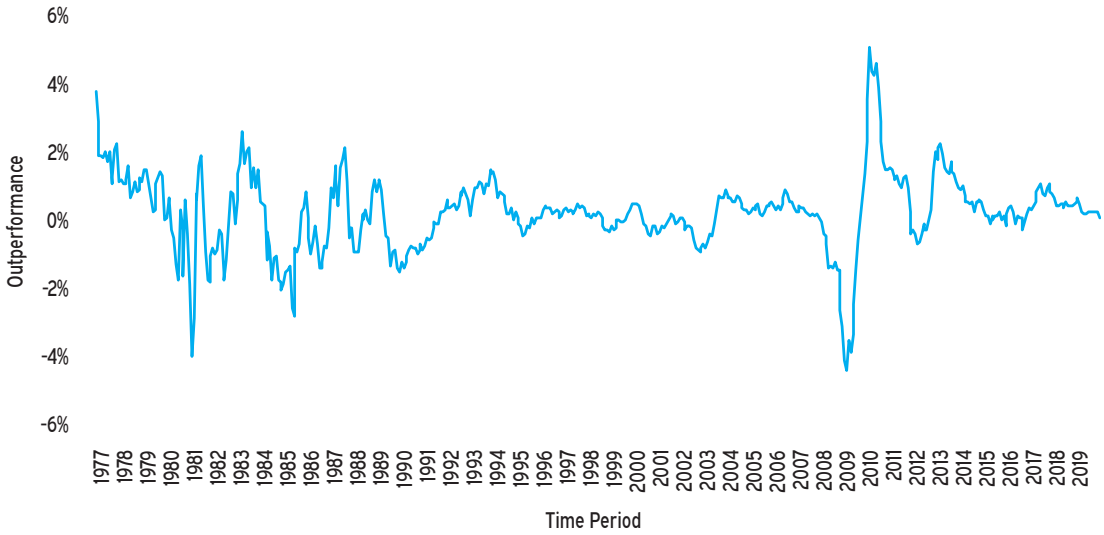

CHART 12

Core Bonds Median Outperformance

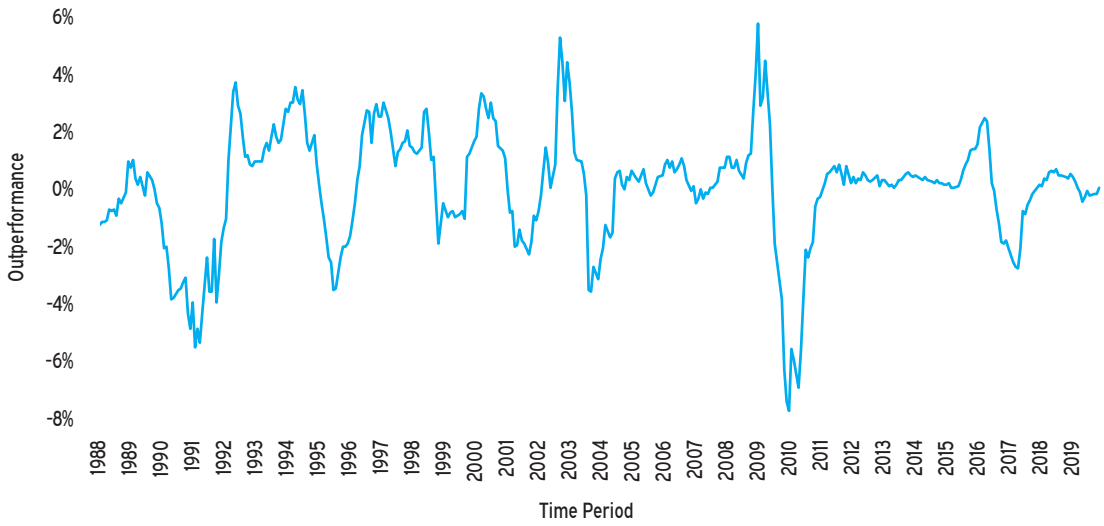

CHART 13

High Yield Median Outperformance

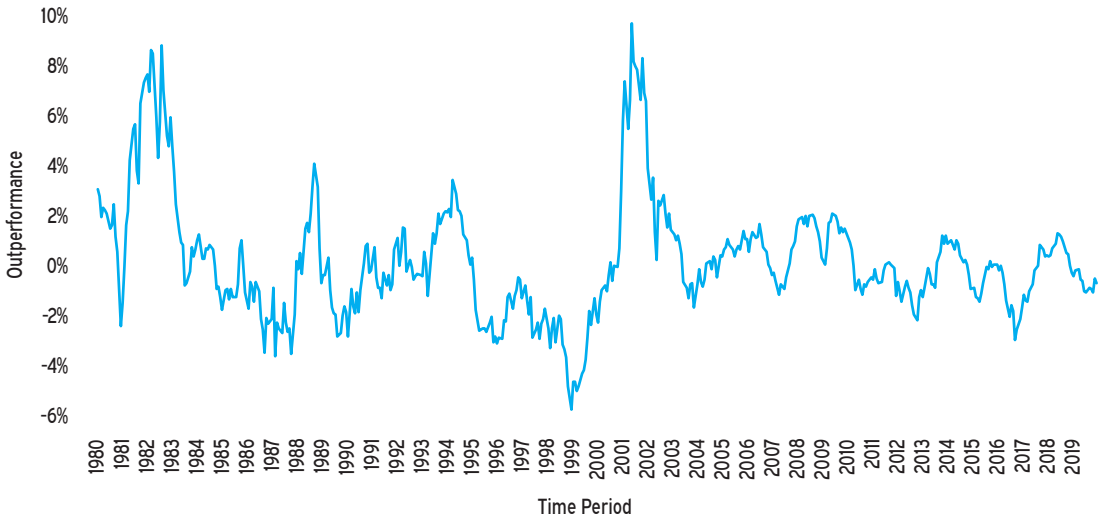

CHART 14

US Large Cap Median Outperformance

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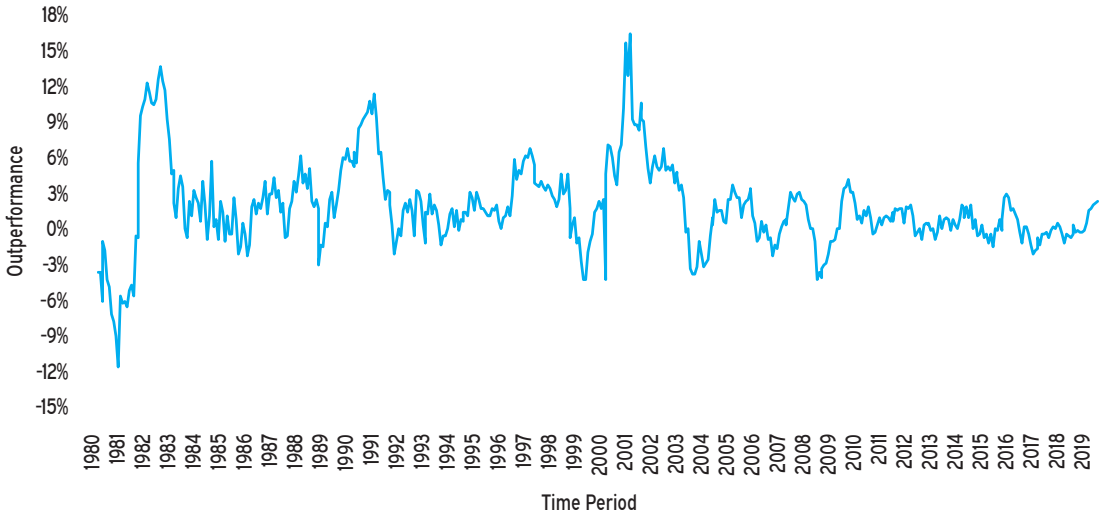

CHART 15

US Small Cap Median Outperformance

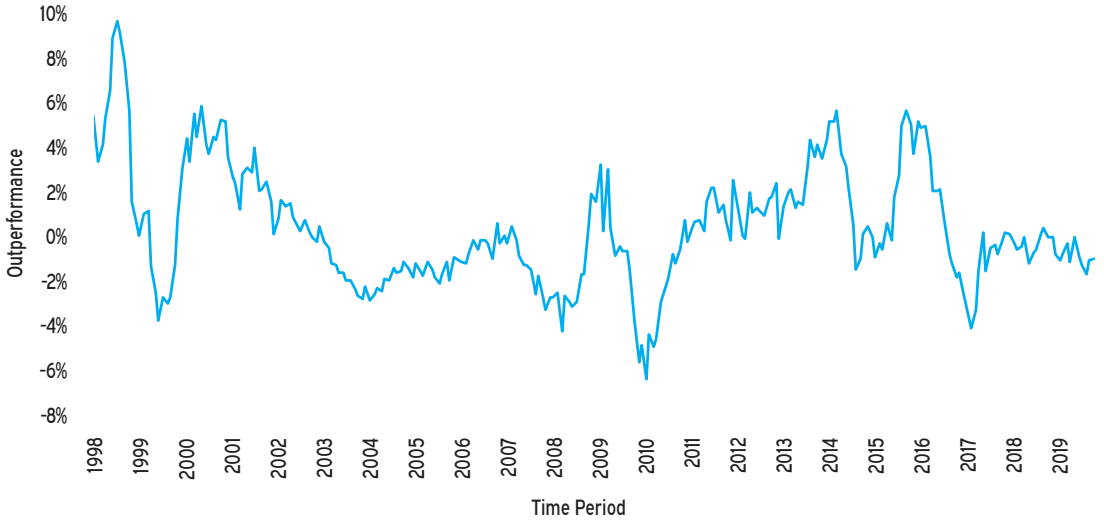

CHART 16

Foreign Large Cap Outperformance

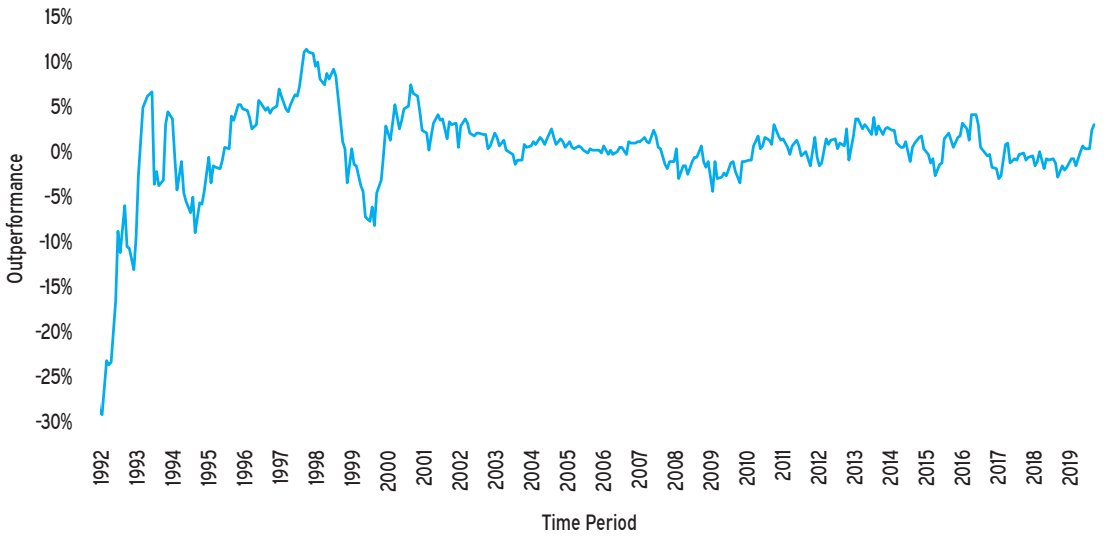

CHART 17

Emerging Market Outperformance

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Appendix F: Areas for further research

While we covered a relatively wide array of asset classes and styles, there is still opportunity to analyze other asset classes such as global equities, emerging market bonds, and commodities, though some of these may be harder to benchmark or study in the same manner as the asset classes we surveyed in this paper. While this paper reviews the more commonly used public market asset classes, it may prove useful to find out if any other areas fare better in beating the market or more consistently beat the market. It may also be useful to look further into the effects of bear markets, bull markets, and recessions on active manager performance.

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MEMORANDUM

TO: East Bay Municipal Utility District Employees' Retirement System
FROM: Sarah Bernstein, Meketa Investment Group
DATE: March 19, 2020
RE: ESG Survey of EBMUDERS Investment Managers

The first annual survey of the East Bay Municipal Utility District Employees' Retirement System (EBMUDERS) has been completed. Responses are summarized below.

The exercise received responses from all managers. Meketa believes all managers' ESG policies and firm infrastructure is appropriate, given their respective mandates at this time.

Survey Questions:

- Is your firm a member of PRI and/or other institutional investor ESG related organizations? Please list.
- Do you integrate ESG factors into your investment approach? If so, please describe.
- Have ESG factors affected your investing? If so, please provide example/s.
- What impact have ESG factors had on the fund's risk, return and diversification performance?
- What reporting on ESG does your firm provide for clients?
- How is your organization staffed regarding ESG analysis and investments?
- Do you have ESG Investment Policy and Guidelines? If so, please provide.
- Please provide, if available, an ESG scoring for your mandate and a comparison to its relevant benchmark. Please comment on differences between the scores for you mandate and its benchmark.

The survey received a wide range of responses from managers. The ESG investment landscape has a variety of solutions. There is no one-size-fits all strategy. Most managers have specific ESG policy or guidelines. The implementation and practice of incorporating these policies into their respective operations varies widely.

Qualitative measures that directly impact portfolio construction on a broad level are one example of this impact. Another example of this impact is the development of ESG specific strategies.

ESG factors did not directly impact portfolio construction for all managers. Some managers prefer to practice ESG policy through stewardship and engagement with issuers and management. In conclusion, the managers surveyed all appear to have some degree of ESG consideration incorporated in their current business practice, perhaps with the exception of Van Hulzen who implements ESG screens only at the client's request.

Manager	PRI/ESG Organization Member?	Integrate ESG Factors?	Investing Affected by ESG Factors?	Impact of ESG Factors on Risk/Return	ESG Reporting Provided?	ESG Staffing	ESG Investment Policy/Guidelines?	ESG Score (Benchmark)
CenterSquare	Yes (PRI and others)	Yes	Yes	Investment Approach/Risk Management	Quarterly responsible investment updates	Global ESG Cooordinator	Yes	72 (GRESB 72)
CS McKee	Not members but signatories	Yes	Yes	Negative return impact, though also lowering performance variance	Yes, customized to client needs	No ESG specific staffing	Not Provided	71.3 (GRESB 72)
DWS RREEF	Yes (PRI and others)	Yes	Yes	Policies and practices in place that reduce risk and increase return	Yes, numerous standardized reports	Yes, Sustainabity Office, Thematic Research Team, Corporate Governance Center	Yes	85 (GRESB 72)
Federated Hermes	Yes (PRI and others)	Yes	Yes, Corporate Governance	Not Provided	Firm-level PRI Transparency Report	Responsible Investing Office, no ESG specific analysts	Yes	Not Provided
Fisher	Yes (PRI and others)	Yes	Yes	No expected material impact on risk or return characteristics	Yes, numerous standardized reports and customized reports	Four ESG research analysts, ESG Project Manager, and VP of Engagement	Yes	MSCI ESG Score 6.71 (MSCI ACWI ex US Index 6.15)
Franklin Templeton	Yes (PRI and others)	Yes	Yes	No material impact	Various upon request	3 dedicated ESG specialists	Yes	Not Provided
MacKay Shields	Yes (PRI)	Yes	Yes	Risk management and return opportunities	Yes	No ESG specific staffing	Yes	Not Provided
Northern Trust	Yes (PRI and others)	Not a direct factor in investment process	Yes	Not Applicable to EBMUD	Yes	Sustainable Investing Team	Yes	Russell 3000 - BBB ACWI ex US- A Aggregate Bond Index - A (All ratings match benchmark)
Parametric	Yes (PRI)	Not a direct factor in investment process	Not Provided	Not Provided	Yes	8 full-time equivalents	Yes	Not Provided
Van Hulzen	No	No	No	No	Yes	None (Rely on third party information)	No (Only specific to client policy)	Not Applicable

CenterSquare

- CenterSquare is a member of UNPRI and involved with GRESB, Climate Action 100+, Task Force on Climate-related Financial Disclosures, Nareit, EPRA, and APREA.
- CenterSquare provides quarterly responsible investment updates to clients and reports regarding responsible investment practices through the UNPRI reporting process.
- A Global ESG Coordinator is responsible for facilitating the implementation of ESG considerations into all investment decisions.
- CenterSquare scores on par with the GRESB ESG average score.

CS McKee

- CS McKee is not a PRI member, however they were a signatory to the Global Investor Statement to Governments on Climate Change and support the Task Force on Climate-Related Financial Disclosures.
- Reporting on ESG is client specific.
- CS McKee does not have any dedicated ESG staff but implements the Charles River Compliance Module which enables rules based compliance procedures that can support ESG initiatives.
- The CS McKee Aggregate SRI composite has a 71.3 ESG score compared to 66.65 for the Aggregate composite and 62.47 for the Barclays IG Corporate. The GRESB industry average is 72.

DWS RREEF

- DWS is a member of UNPRI, International Integrated Reporting Council (IIRC), Institutional Investors Group on Climate Change (IIGCC), Ceres Investor Network on Sustainability and Climate Risk (INCR/Ceres), Forum Nachhaltige Geldanlagen (FNG) and the UK Sustainable Investment Forum (UKSIF), Global Real Estate Sustainability Benchmark (GRESB) and others that were not reported.
- Reporting capabilities include sharing of annual GRESB results and scorecard, investor ESG scorecard, investor ESG letter, case studies, and annual fund investment plan.
- The ESG team includes the Sustainability Office, Thematic Research team, and the Corporate Governance Center. These components of the CIO Office for Responsible Investments support all DWS investment platforms.
- For 2019 DWS scored an 85 in the GRESB assessment, the industry average is 72.

Federated Hermes

- Federated Hermes is a member and/or signatory to UNPRI, the Responsible Investment Association, the CDP, the SASB, and the Council for Institutional Investors.
- ESG principles are included in the qualitative framework of the investment process. It is considered alongside quantitative information when making investment decisions.
- The firm provides firm level ESG reports in compliance with the PRI Transparency Report. They are currently working on a client reporting tool for portfolio level reports.
- The Responsible Investing Office oversees responsible investing initiatives. The Director of Responsible Investing works with investment staff to provide advanced ESG investment research and data.

Fisher

- Fisher Investments is a member and/or signatory to UNPRI, Japanese Stewardship Code, UN Global Compact, CDP, Climate Action 100+, and supporter of the Task Force on Climate-related Financial Disclosure.
- ESG factors are evaluated at multiple stages of the investment process.
- Fisher provides ESG Quality Score Reporting, Carbon Impact Reporting, Environmental Analysis, and Engagement Examples.
- As of December 31, 2019, Fisher scored a 6.71 (out of 10) from MSCI ESG, compared to the MSCI ACWI ex US Index which scored a 6.15.

Franklin Templeton

- Franklin Templeton is a member and/or signatory to the PRI, Institutional Corporate Governance Network (ICGN), UK Sustainable Investment and Finance Association (UKSIF), Eurosif, Responsible Investment Association (RIA), Canadian Coalition for Good Governance, (CCGG), GRESB, Sustainable Accounting Standards Board (SASB), Harvard Law School Corporate Governance Roundtable, UK Stewardship Code, Japan Stewardship Code, Singapore Stewardship Principles, Pensions for Purpose, The Grow Impact Investing Taskforce, and The Board Director Training Institute of Japan.
- Investment approach is governed by Responsible Investment Policies and Procedures. The ESG team monitors this process.
- Reporting capabilities include the Franklin Templeton Responsible Investment Policy, PRI Transparency Report, Investment Management Proxy Voting Policy, Statement on Compliance with the UK Stewardship Code, Controversial Weapons Policy, and Insights on Environmental, Social and Governance topics.
- Three dedicated ESG specialists implement ESG efforts through collaboration with global portfolio teams.

MacKay Shields

- MacKay Shields is a member of PRI.
- MacKay shields actively engages with issuers to discuss various improvements to their ESG standing.
- The firm does not have specific stand-alone ESG staff. Instead, members of various investment teams are given the role of leading ESG considerations. These individuals are supported by the Responsible Investment Advisory Committee.

Northern Trust

- Northern Trust is a member and/or signatory to PRI, The Diversity Project, SASB, Council of Institutional Investors, IIGCC, UNEP FI, Investor Stewardship Group, UK Women in Finance Charter, CEO Action for Diversity and Inclusion, UK Stewardship Code, Hong Kong Stewardship Code, Everglass Foundation, The Nature of Conservancy, Climate Action 100+, and Responsible Investment Association Australasia.
- ESG factors are not employed in the portfolio construction process for EBMUDERS.
- Custom client reports with regards to ESG are available upon request.
- Northern Trust has a Sustainable Investing Team. The team is responsible for ESG research, innovation, product development, and product management.
- EBMUDERS' specific investments are passive funds that are in line with the benchmark sustainability ratings.

Parametric

- Parametric is a member and/or signatory to the PRI, CERES, Council of Institutional Investors, and ICCR.
- ESG factors are a component of the investment process. Separate accounts can be developed around ESG factors for specific client goals. They are not currently a part of EBMUDERS.
- Parametric offers a variety of customizable client reports, and the UN PRI transparency report.
- Parametric has six dedicated ESG employees in Strategy and Product Management. These individuals are supported by responsible investing teams that bring the ESG staffing resources to eight full-time equivalents.
- Parametric did not include an ESG scorecard, but has included the UN PRI transparency report with their response.

Van Hulzen

- Van Hulzen is not a member of PRI nor any other ESG specific organization.
- ESG screening and factor investing is not a part of the standard procedure for the firm.
- Client requested ESG investing is provided.

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: March 19, 2020

MEMO TO: Members of the Retirement Board

FROM: Laura Acosta, Manager of Human Resources

SUBJECT: Staffing for East Bay Municipal Utility District Employees' Retirement System

Over the last decade, the number of beneficiaries administered by the EBMUD Employee Retirement System (ERS) has nearly doubled. Over that period, there has been no change in staffing of the system. At the same time, the complexity of administering the ERS also has grown with the introduction of PEPRA which created a new tier of benefit consideration. Staff has shared with the Retirement Board that the staffing level of the ERS is low compared to peer agencies. At the January 16, 2020 Retirement Board meeting, staff brought an information item to the Retirement Board regarding a new Principal Management Analyst position for the administration of the ERS.

Below is information requested by the Retirement Board regarding the staffing of the ERS and the authority for staffing.

DISCUSSION

The daily administrative duties of the ERS are performed by employees of the District within the Human Resources Department, Finance Department, and the Office of General Counsel. Staff assigned to perform work on behalf of the ERS are District employees. Under the MUD Act, the Board of Directors determines the number of positions to be allocated to the ERS. The Retirement Ordinance further provides the Manager of Finance shall act as the accountant for the Retirement Board and the Attorney for the District shall act as the attorney for the Retirement Board. Selection of ERS staff is governed by the MUD Act, the District's Civil Service Rules and the Retirement Ordinance.

Below are general duties and responsibilities of staff currently assigned to the ERS. Unless noted, these staff are not full-time equivalents as many of the staff serve the District in other capacities.

1. Finance Department
    - Director of Finance – Accountant for the Retirement Board.
    - Treasury Manager and Principal Management Analyst – Provide support on matters related to the finances and investments of the ERS. Treasury manages the relationships with the General Investment Consultant, Actuary, custodian, investment managers, and other service providers.

Treasury facilitates the management of the ERS investment portfolio through implementation of asset allocation decisions, investment manager searches, manager onboarding, and other investment-related tasks. Treasury additionally implements Retirement Board policies such as Environmental, Social and Governance in the management of the ERS assets. On an ongoing basis, Treasury oversees cash management for the ERS ensuring adequate liquidity is available for ongoing expenses.

- Accounting/Payroll Division – Provides accounting, financial recordkeeping, and reporting support to the ERS. The Accountant III provides financial reporting and funds reporting support to Treasury. Payroll staff manages the payroll operations for the District including the monthly Retirement payroll. Payroll staff handles the deductions, tax exemption changes and other garnishments. The rate and rate adjustments are handled by the HR Retirement section.

2. Human Resources Department
    - Manager of Human Resources – Secretary of the Retirement Board.
    - Manager of Employee Services – Assistant Secretary of the Retirement Board. Responsible for maintaining health insurance plans for retirees and will supervise the new Principal Management Analyst position.
    - Human Resource Analysts II (2 FTEs) – Responsible for counseling, advising, and training employees and retirees on various aspects of the retirement system; calculates estimated and actual retirement benefits; calculates retro-payments; evaluate and process retirement applications; evaluate and process Domestic Relations Orders (DRO); oversee and prepare disability applications for the Retirement Board; annually review disability income; run health insurance benefit surveys; provide recommendations for updates to administrative procedures and the Retirement Ordinance.
    - Human Resource Technicians (1.2 FTEs) – Responsible for tasks necessary to process benefits and health insurance for retirees (HIB), surviving spouses, DRO spouses, and beneficiaries, Retirement Board elections, low income adjustments, health insurance billing statements, benefit vendor integration reports, processing retirement contributions statements, and annual HIB audit.
    - Administrative Clerk (1 FTE) – Responsible for administrative tasks that support the Retirement staff, schedules and sets up for Retirement Board-related meetings, processes packets for Retirement Board meetings and retirement training classes, monitors Retirement Board member training, gathers personnel record data for the HR Analysts necessary for calculating retirement benefits, collection of HIB overpayments and health premium differences, updates retiree records, and monitors the District's Retirees email box.

The new Principal Management Analyst representing one additional FTE will be responsible for planning, organizing and supervising the administration of the Retirement System; implementing the pertinent policies and rules of the Board of Directors and Retirement Board; counseling and advising employees and retirees on various aspects of the retirement system; supervising staff; staying abreast of current laws pertaining to the Retirement System and making recommendations for amendments to the Retirement Ordinance when necessary; preparing Retirement Board meeting agenda and preparing minutes; and serving as the subject matter expert for all things related to the administration of the Retirement System Ordinance. This position will collaborate with the Finance Department and Office of General Counsel to administer the Retirement Ordinance

3. Office of General Counsel
    - Attorney III acts as the attorney for the Retirement Board. Provides legal oversight and guidance for Retirement Board meetings, closed sessions, and administration of the Retirement Ordinance.

Staff will continue to review and evaluate the administration of the Retirement System to determine the optimal staffing required, particularly with respect to implementation of the new information system. Staff will continue to apprise the Retirement Board of its findings.

LA:ls

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: March 19, 2020

MEMO TO: Members of the Retirement Board

FROM: Sophia D. Skoda, Director of Finance

SUBJECT: Annual Expense Tracking and Spending Plan

SUMMARY

Reporting of the revenues and the expenses of the Retirement System is conducted annually through the review of the audited financial statements at the Retirement Board meeting in November. The Retirement System does not currently prepare an annual projected expenditure schedule. Staff is developing a more robust expenditure plan and will provide the Retirement Board with periodic updates throughout the process.

BACKGROUND

The revenues and expenses of the Retirement System are tracked separately from those of the District. Retirement System income consists primarily of employer contributions, employee contributions, and investment earnings (realized and unrealized). The expenses of the Retirement System include benefit payments, investment manager fees, professional services fees, actuarial services, reimbursement to the District for labor and overhead and other expenses. The Retirement System publishes an audited financial statement annually that is distinct from that of the District.

Staff is analyzing past expenses with the intent of developing an annual expense planning process. Staff plans to provide a summary of past expenses at the May 2020 Retirement Board meeting. Staff will additionally provide an analysis of planned spending for Fiscal Year 2021.

SDS:RLH

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: March 19, 2020

MEMO TO: Members of the Retirement Board

THROUGH: Lisa Sorani, Manager of Employee Services L.S.

FROM: Konana Gregory, Human Resources Analyst II

SUBJECT: Annual Health Insurance Benefit Survey

BACKGROUND

Post-employment health care benefit allowances are provided to eligible Retirement System Members through the Health Insurance Benefit (HIB). For members entering the System prior to July 1, 1996, a monthly allowance of up to $450 ($550 for married retirees and retirees with financially dependent registered domestic partners) is paid to retirees with at least five years of full-time service to reimburse employee-paid medical expenses. Members who joined the Retirement System after July 1, 1996 are subject to a vesting schedule based on increments of five years of full-time service to receive 25% percent of the HIB (5 yrs = 25%, 10 yrs = 50%, 15 yrs = 75%, 20 yrs = 100%). The HIB allowance became a vested benefit effective July 1, 1999 with the current $450/$550 effective on July 1, 2004.

The HIB funding ratio was 33.0% as of the June 30, 2019 actuarial valuation.

Retirement Rule C-17 requires the Retirement Board to annually review the HIB. For the annual review, staff surveyed comparable public agencies for details regarding their respective retirement health benefits (Attachment 1). The survey focuses on costs to the retiree rather than the liability associated with providing retiree medical benefits.

SURVEY RESULTS

Staff conducted this survey in late 2019. A total of 10 agencies either responded, or staff was able to gather the data from their website. In the survey, agencies are asked to provide the maximum dollar amounts that the agency paid for retiree health benefits. This year we asked for the pricing for the two most popular plans for both over and under 65 and if there were any vesting changes since the last survey. Some retirees receive less than the maximum amount due to the agencies vesting periods, benefit tiers, and coverage levels. Generally, the highest premiums are for early retirees with family coverage. Premiums are reduced as dependents age out of medical plans and retirees become eligible for Medicare.

The survey does not address plan design (co-pays, deductibles, etc.) as these differ greatly from agency to agency.

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This year’s survey asked for (1) Changes in vesting, (2) and pricing for health plans.

Highlighted survey changes:

- For the four agencies experiencing increases the average increase was 4.43% or $46.38.
- Six agencies experienced no increase in maximum dollar amount of employer paid medical.
- The largest percentage increase was 6.15% or $128.66.

Attachment

LS:kg

AGENCY HEALTH INSURANCE BENEFITS SURVEY 2020

AGENCY	Maximum Dollar Amount of Employer Paid Retiree Medical Benefits(excluding dental, vision, long-term care or Medicare B/D)	Vesting Changes Y/N	Agency pay for dental, vision, long-term care, or Medicare B/D	Current Medical Funding Ratio	Most Popular Health Plans
AC Transit	Up to $691/mo. (under age 65) Up to $335/mo. (65 and over)	No	7/1/2019-6/30/2020 Rates: Vision Single: ER $15.20; EE $0.00 Double: ER $15.20 EE $6.92 Family: ER $15.20 EE $24.40 Dental: Single ER $78.88; EE $58.88 Double: ER $159.86 EE $139.86 Family: ER $277.74 EE $ 257.74	31%	Kaiser Retiree HMO Retiree = $1,259.24 Retiree +1 = $2,518.46 Kaiser Senior Advantage (with Medicare) Single = ER $401.66; EE $361.66 Double = ER $803.32; EE $723.32
Alameda County Employees' Retirement Association (ACERA)	Up to $578.65/mo. for retirees with 20+ years of service. For Medicare Eligible who enter into Medicare exchange plans, up to $443.28/mo. for retirees with 20+years. See www.acera.org/post/monthly-medical-allowance-mma for more information.	No Requirements for health benefits remain asl: 0-9 years = no benefit 10-14 years = $289.33 15-19 years = $433.99 20+ years = $578.65 These benefits are not "vested" though. They are non-vested (non-guaranteed benefits). See www.acera.org/post/monthly-medical-allowance-mma for more information.	Dental: up to $42.04 mo; Vision up to $4.24 mo.; Medicare Part B reimbursement $144.60 /mo. See page 28 of www.acera.org/enrollment-guide and https://www.acera.org/mbrp for more info.	87.6% More info at https://www.acera.org/srbr	Kaiser HMO Retiree – $785.44 Retiree-+1 – $1,570.88 Kaiser Senior Advantage (Retiree – $411.54 Retiree+1 both with Medicare – $823.08 Retiree +1 only one with Medicare – $1,196.98

AGENCY HEALTH INSURANCE BENEFITS SURVEY 2020

AGENCY	Maximum Dollar Amount of Employer Paid Retiree Medical Benefits(excluding dental, vision, long-term care or Medicare B/D)	Vesting Changes Y/N	Agency pay for dental, vision, long-term care, or Medicare B/D	Current Medical Funding Ratio	Most Popular Health Plans
Contra Costa County Employees Retirement Association (CCCERA)	Up to $854.46/ mo. for single; Up to $2,221.59/mo. for family.	Non-represented job classes: Hired by CCC or CCCERA on or after 1/1/2009, 15 years of service of which 5 of those must be as an active employee of CCCERA w no monthly premium subsidy paid by CCCERA for any health or dental plan after they separate. However, may retain continuous coverage provided i) receive a monthly retirement allowance within 120 days of separation ii) pays difference between PEHMCA min contribution and premium cost of dental plan. Hired by 1/1/2007 to 12/31/2008, 15 years of service required; 5 years of which must be as an active employee of CCCERA. Represented job classes: As of 1/1/2010; 5 years of service may retain continuous coverage provided i) receive a monthly retirement allowance within 120 days of separation ii) pays difference between PEHMCA min contribution and premium cost of dental plan.	Dental; Up to $48.15/mo. for Single; Up to $176.48/ mo. For family. Vision; Up to $8.61/mo. for single; Up to $8.61/mo. For family.	67%	Kaiser HMO Up to $763.28/mo. for single; Up to $1,984.54/mo. for family. Health Net SmartCare Up to $854.46/mo. for single; Up to $2,221.59/mo. for family.

AGENCY HEALTH INSURANCE BENEFITS SURVEY 2020

AGENCY	Maximum Dollar Amount of Employer Paid Retiree Medical Benefits(excluding dental, vision, long-term care or Medicare B/D)	Vesting Changes Y/N	Agency pay for dental, vision, long-term care, or Medicare B/D	Current Medical Funding Ratio	Most Popular Health Plans
Contra Costa Water District	Effective January 1, 2020 the amount is $2,344.03 which is the highest family rate of the three core plans (CalPERS medical) designated by the District for fully paid retiree medical benefits.	For fully paid benefits: • Hired before 9/1/2011: no minimum CCWD vesting period, but had to vest either 5 or 10 years in the retirement plan depending on employee group. • Hired on or after 9/1/2011 through 12/31/2015: 5 years CCWD service required. • Hired on or after 1/1/2016: 10 years CCWD service required. For partially paid benefits, a percentage of the PEMHCA minimum, the employee needs only to be eligible to retire with reciprocity if applicable.	No	70.6%	Kaiser HMO PERS Choice PPO HealthNet Smartcare HMO
DSRSD	<u>Tier 1 – Retirees Not Subject to Vesting Formula:</u> Up to $2,028.00/mo. for family Up to $1,560/mo. for double Up to $780/mo. for single <u>Tier 2 – Retirees Subject to Vesting Formula:</u> Amount based on CalPERS 100/90 formula, employees percentage based on vesting schedule	No	Employees hired prior to 7/1/14 received retiree dental coverage paid 100% by the District. There is no retiree dental coverage for employees hired after 7/1/14. There is no retiree vision	Yes – Tier 1 increases annually at same rate as active employee rate; Tier 2	Kaiser HMO Single – $768.49 Retiree +1 – $1,536.98 Family – $1,998.07

AGENCY HEALTH INSURANCE BENEFITS SURVEY 2020

AGENCY	Maximum Dollar Amount of Employer Paid Retiree Medical Benefits(excluding dental, vision, long-term care or Medicare B/D)	Vesting Changes Y/N	Agency pay for dental, vision, long-term care, or Medicare B/D	Current Medical Funding Ratio	Most Popular Health Plans
	(50%-100% depending on years of service), and enrollment level.		coverage. The District does not pay Medicare Part B or D premiums. Long-term care is a voluntary benefit paid 100% by the employee, offered through CalPERS.	increases annually based on Tier 2	
EBMUD	Up to $450/mo. for single; Up to $550/mo. for double.	No	Dental, vision, and other eligible premium expenses are eligible for reimbursement up to $450/mo. and $550/mo. maximum.	33.0%	Kaiser HMO Retiree – $711.72 Retiree-+1 – $1,423.44 Kaiser Senior Advantage Retiree – $350.55 Retiree+1 – $1,062.27 Retiree +1 >65 – $701.10 Blue Cross Retiree – $1,027.38 Retiree-+1 – $2,054.75 Blue Cross Medicare Coordinated Retiree – $571.39 Retiree-+1 – $1,598.77 Retiree +1 >65 – $1,142.78
Marin County Employees' Retirement Association(MCERA)	5 years of service; Plan I: Hired before 10/1/1987 up to $1,260.75./mo.; Plan II: Hired after 10/1/1987 and prior to 10/1/1993 receive up to $2,275/year; Plan III: Hired after 10/1/1993 and before 1/2008 receives $737.75/mo. Plan IV: Hired on or after 1/2008 receives $150 per year of service up	No.	Plan I; Dental premiums paid by the county. All remaining plans, agency does not pay. Employee is eligible to be covered by the Benefit Plan subsidy they may receive from the County.	N/A	Kaiser HMO Retiree $772.35 Retiree +1 $1,544.70 Kaiser Senior Advantage Retiree $276.19 Retiree +1 $586.19 Anthem Blue Cross PPO Retiree $782.20 Retiree +1 $1,564.40 United Healthcare PPO Medicare

AGENCY HEALTH INSURANCE BENEFITS SURVEY 2020

AGENCY	Maximum Dollar Amount of Employer Paid Retiree Medical Benefits(excluding dental, vision, long-term care or Medicare B/D)	Vesting Changes Y/N	Agency pay for dental, vision, long-term care, or Medicare B/D	Current Medical Funding Ratio	Most Popular Health Plans
	to $3,000 annual maximum benefit.				Retiree $439.67 Retiree +1 $879.34
Marin Municipal Water	Up to $868.98/mo. for single; Up to $1,737.96/mo. for retiree +1	5 years	Dental up to $2,000 per year for retiree until age 65.	N/A	Kaiser Retiree - $768.49 Retiree +1 - $1,536.98 Kaiser Senior Adv. Retiree - $339.43 Retiree +1 - $678.86
Sacramento County Employees' Retirement System (SCERS)	$0. There is no medical subsidy offset provided by the County for retiree medical.	No	No, $0 During active employment, employees receive a County contribution of $650/yr. to a post-employment Health Reimbursement Account. Funds may be used for qualified dental and vision expenses as well as retiree medical premiums.	N/A	Kaiser HMO Retiree $784.88 Retiree +1 $1,569.75 Sutter HMO Retiree $760.16 Retiree +1 1,490.43 Kaiser Gold Retiree $327.75 Retiree +1 $655.49 United Healthcare NPPO Retiree $399.44 Retiree +1 $798.88
Santa Clara County Retiree Benefits	Non-Executives: Up to 100% of Kaiser single rate of $725.68/mo. If over 65, reimbursement for medical up to Kaiser Under 65 rate. Executives: Up to 100% of lowest cost plan.	Group health coverage eligibility: Employees hired prior to August 12, 1996, with at least 5 years of service and retire from CalPERS directly from the County.	No	N/A	Kaiser HMO Retiree = $725.68 Retiree + 1 = $1,451.36 Health Net POS Retiree = 1,371.78 Retiree + 1 = $1,983.51

AGENCY HEALTH INSURANCE BENEFITS SURVEY 2020

AGENCY	Maximum Dollar Amount of Employer Paid Retiree Medical Benefits(excluding dental, vision, long-term care or Medicare B/D)	Vesting Changes Y/N	Agency pay for dental, vision, long-term care, or Medicare B/D	Current Medical Funding Ratio	Most Popular Health Plans
	Under 65 = Kaiser single rate of $725.68/ mo. Over 65 = Kaiser single rate of $402.12/mo.	Employees hired on or after August 12, 1996 and on or before June 18, 2006, with at least 8 years of service and retire from CalPERS directly from the County. Employees hired on or after June 19, 2006 and mostly on or before September 29, 2013, with at least 10 years of service and retire from CalPERS directly from the County. For a majority of the employees hired beginning in August 2013 (mostly on and after September 30, 2013), the eligibility requirements were increased to a minimum of 15 years of service and retire from CalPERS directly from the County			Kaiser Senior Advantage Retiree = $405.65 Retiree + 1 = $811.30 Health Net Seniority Plus - Medicare Retiree = $669.76 Retiree + 1 = $1,399.52

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: March 19, 2020

MEMO TO: Members of the Retirement Board

THROUGH: Lisa Sorani, Manager of HR Employee Services L.S.

FROM: Wade Love, Senior Human Resources Analyst W.L

SUBJECT: Review of EBMUD Retirement System Upgrade Initiative

BACKGROUND

EBMUD has undertaken a project to replace the Human Resources Information Systems (HRIS), the scope of which includes core Human Resources (HR) systems, Payroll, Benefits, and the Retirement System. The project also includes replacement of the District's electronic timekeeping system (ETS). The new systems are expected to leverage current technology and support industry standard processes that will provide staff with the ability to rapidly respond to changing business requirements to remain in legal and regulatory compliance. Currently, this project is supported by two full time business analysts, two business analyst consultants, a Project Manager, and Product Owner. This report is an update on the new Retirement system portion of the project.

DISCUSSION

Currently, the District does not have a Retirement system. Some data collection and tracking for retirement administration data was built into custom tables when the current PeopleSoft HRIS was implemented. A few work processes were also created to update information in that system such as posting interest to member accounts and processing the retiree COLA and COLA bank data. A separate system was built by outside actuarial consultants to calculate final retirement applications and provide retirement estimates. All other administrative processes are handled manually by staff.

In order to review alternatives and develop on a roadmap for development of a Retirement system, the project team engaged in the following activities:

a) Attended a Retirement systems technology conference sponsored by the Public Retirement System Information Systems Management (PRISM) organization, which showcased most of the current Retirement system technology products and included presentations by other public agencies about their Retirement system upgrade projects.

b) Conducted a vendor-outreach exercise in the form of a Request for Information (RFI) which resulted in demonstrations from three Human Capital Management (HCM) systems and one Retirement system, and
c) Held in-depth discussions with peer agencies for their experiences with planning and implementing a Retirement solution.

These activities have assisted the team in learning how other public pension systems of comparable size and scale have approached their challenges in implementing a modern Retirement system. The key points taken from the activities above are:

a) The complexity of administering a Retirement system appears to be best addressed by use of a commercial off-the-shelf solution created by a vendor specializing in Retirement solutions;
b) The largest providers of HCM solutions to the market do not include support for retirement processes and functionalities, reflecting that defined benefit pensions are not common;
c) A critical success factor, consistently cited by peer agencies, was a thorough review and analysis of their current retirement business processes completed before they considered potential technology solutions.

The work to identify and implement an information systems solution for Retirement administration is taking place in four phases:

a) Readiness/Feasibility Study
    - This phase included creation of a charter and scope document along with a risk and impact evaluation. A readiness study was conducted to help identify areas requiring preparation work.
b) Business Process Review (BPR) and Analysis
    - Currently ongoing, this includes performing a thorough evaluation and documentation of current process and work flows. The goal of this phase is to capture and develop a comprehensive list of requirements for the new Retirement system.
c) Request for Proposal (RFP)
    - Once the requirements are fully gathered, an RFP will be published soliciting responses from Retirement system vendors. Based on the evaluation of the responses, a final solution will be selected.
d) Implementation
    - This phase marks the implementation of the selected vendor solution. Along with change management efforts, the organization adopts the new system into practice.

The BPR for Retirement functions is currently ongoing. The goal of this phase is to deliver a though analysis of current processes and gather requirements for the projected future systems. Currently this effort is estimated at 37% of completion. This includes classification of all

Retirement processes, performing an analysis of those processes and developing process flow and functional specification documentations.

At this time the estimated Timelines the phases noted above are as follows: (subject to priority changes):

a) Completion of BPR phase and publishing of the RFP: July 2020
b) Vendor finalization (including selection and contract negotiation): December 2020
c) Start of Implementation of new solution: January 2021

Staff will continue to periodically report on the progress of this project.

WL:ls