

## EAST BAY MUNICIPAL UTILITY DISTRICT

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DATE: September 21, 2017

MEMO TO: Members of the Retirement Board

THROUGH: Laura Brunson, Manager of Human Resources

FROM: Lisa Sorani, Manager of Employee Services *L.S.*

SUBJECT: Retirement Board Regular Meeting – September 21, 2017

A regular meeting of the Retirement Board will convene at 8:30 a.m. on Thursday, September 21, 2017 in the Training Resource Center (TRC1) of the Administration Building.

Enclosed are the agenda for the July September 21, 2017 meeting and the minutes for the July 20, 2017 regular meeting. The package also includes the following: **(1) ACTION** items: Select Asset-Liability Study Model, Select Actuarial Auditor based on RFP responses; **(2) INFORMATION** items: 2<sup>nd</sup> Quarter Performance Review as of June 30, 2017, Vulnerability of ERS to Marked Performance, Low Income Adjustments for Retired Members and Surviving Spouses; **(3) REPORTS FROM THE RETIREMENT BOARD.**

LS:eg

Enclosures

## **AGENDA**

### **EBMUD EMPLOYEES' RETIREMENT SYSTEM**

**September 21, 2017**

**Training Resource Center (TRC1) 8:30 a.m.**

#### **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.

#### **ANNOUNCEMENT OF CLOSED SESSION AGENDA:**

1. Personnel matters pursuant to Government Code Section 54957:

a. Application for Disability Retirement of Charles Williams (R.B. Resolution No. 6866)

#### **REGULAR BUSINESS MEETING: Upon completion of Closed Session**

**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 July 20, 2017
2. Ratifying and Approving Investment Transactions by Counselors for June 2017 and July 2017 (R.B. Resolution No. 6867)
3. Ratifying and Approving Short-Term Investment Transactions by Treasurer for June 2017 and July 2017 (R.B. Resolution No. 6868)
4. Approving Treasurer's Statement of Receipts and Disbursements for June 2017 and July 2017

#### **ACTION:**

5. Select Asset-Liability Study Model – S. Skoda
6. Select Actuarial Auditor based on RFP responses – S. Skoda

**INFORMATION:**

7. 2<sup>nd</sup> Quarter Performance Review as of June 30, 2017 – S. Skoda
8. Vulnerability of ERS to Market Performance – S. Skoda
9. Low Income Adjustments for Retired Members and Surviving Spouses – E. Grassetti

**REPORTS FROM THE RETIREMENT BOARD:**

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

**ITEMS TO BE CALENDARED:**

**MEETING ADJOURNMENT:**

*The next regular meeting of the Retirement Board will be held at 8:30 a.m. on Thursday, November 16, 2017.*

**2017 Retirement Board Meetings**

November 16, 2017

## **MINUTES OF THE RETIREMENT BOARD**

### **July 20, 2017**

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A regular meeting of the Retirement Board convened on Thursday, July 20, 2017 at 8:36 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, Lisa Ricketts and Marguerite Young.

The following staff members were present: Dari Barzel, Damien Charléty, Elizabeth Grassetti, Lourdes Matthew, Sophia Skoda, and Lisa Sorani.

### **PUBLIC COMMENT**

There was none.

### **ANNOUNCEMENT OF CLOSED SESSION AGENDA:**

1. Application for Disability Retirement of Philip Reed (R.B. Resolution No. 6861) – The Retirement Board in closed session approved the disability retirement of Philip Reed. Frank Mellon moved the resolution and Alex Coate seconded. The motion carried (5-0) by the following voice vote: AYES (Coate, Higashi, McGowan, Mellon, Young), NOES (none), ABSTAIN (none), ABSENT (none).

### **CONSENT CALENDAR**

1 - 4. **Consent Calendar** – A motion to move the consent calendar was made by Marguerite Young and seconded by Frank Mellon. The motion carried (5-0) by the following voice vote: AYES (Coate, Higashi, McGowan, Mellon, Young), NOES (none), ABSTAIN (none), ABSENT (none).

### **ACTION**

5. **Declaring the Results of the Election of the Employee Member of the Retirement Board (Resolution No. 6864)** – Doug Higashi was reelected to the Retirement Board for a two-year term beginning June 24, 2017. Alex Coate made the motion to ratify the results and Marguerite Young seconded the motion. The motion carried (5-0) by the following voice vote: AYES (Coate, Higashi, McGowan, Mellon, Young), NOES (none), ABSTAIN (none), ABSENT (none).

6. **Select Proxy Service Provider** – Sophia Skoda reviewed the process that was followed that led the Board to the proxy RFP process, and then discussed the three responses that were received and reviewed by Staff and PCA. Staff and PCA selected two finalists, Glass-Lewis and ISS. Sarah Bernstein from PCA then provided a comparison of the two finalists. She stated that

PCA preferred Glass Lewis which provided deeper research, had a platform which was easier to use and is owned by Canadian pension funds. Ms. Bernstein then recommended that the Public Fund Specialty Policy be selected as the proxy voting guideline but that the Retirement Board can re-evaluate this election in the future. She also said that Glass Lewis will allow some adjustments to the policy should the Retirement Board want to fine tune the policy. Marguerite Young moved the recommendation and Alex Coate seconded the motion. The motion carried (5-0) by the following voice vote: AYES (Coate, Higashi, McGowan, Mellon, Young), NOES (none), ABSTAIN (none), ABSENT (none).

**7. Declaring the interest rate on Member contributions for the period ending June 30, 2017**

Elizabeth Grassetti requested authorization to credit an interest rate of 3.625% to Member contributions effective June 30, 2017. The interest rate is determined to be the lesser of the assumed rate of return of 7.25% or the 5-year average rate of the return as of December 31, 2016 which was 10.6%. Doug Higashi moved the motion and Frank Mellon seconded the motion. The motion carried (5-0) by the following voice vote: AYES (Coate, Higashi, McGowan, Mellon, Young), NOES (none), ABSTAIN (none), ABSENT (none).

**INFORMATION**

**8. ERS Cash-Flow Projection** – Damien Charléty and Eric White presented information on the tipping point where the retirement system's pension payments to retirees are now exceeding the cash flow coming in from contributions. Over the past decade contributions had exceeded payments and \$18 million was deposited into retirement system assets. An inflection point occurred in fiscal year 2017, where for the first time staff needed to transfer funds from retirement system assets to LAIF to cover benefit payments. This cash flow imbalance will correct itself over the long term, but over the next ten years the imbalance is projected to grow up to about 2% of the fund's current assets. The retirement system will remain sound as assets are projected to grow even if the amounts needed are withdrawn.

**9. Application of Strategic Asset Classes** – Eric White from PCA discussed the strategic income class in light of the change in the plan's cash flow pattern. He explained that there will be a need for income from plan assets to supplement contributions in order to make monthly benefit payments. He then reviewed investment classes that could generate income including fixed income and REITs. Important considerations with an income class are that, while it is a more predictable source of return, returns will likely fall short of the assumed rate of return of the portfolio and the class will show little appreciation after withdrawals. The Plan does have some of these investments in its current portfolio, but will likely need to increase the allocation to this income class.

**10. Asset-Liability Study Assumptions** – Eric White from PCA reviewed the Asset-Liability assumptions that were provided in the materials. These assumptions will be used in the Asset-Liability Study.

11. **Covered Calls 3-Year Review** – Eric White from PCA reviewed the covered calls strategy, providing a brief overview, and then reviewing the strategy's performance. EBMUD's Covered Calls have returned 8.5% for the 3-year period, and 12.2% for the 1-year period, outperforming the benchmark since inception.

12. **Van Hulzen Presentation** – John Pearce and Stefan ten Brink from Van Hulzen Asset Management discussed their investment process and objectives. The goal of Van Hulzen is to provide a 6% to 8% yield while providing down-side protection and income generation. Their portfolio is composed of blue chip stocks to limit volatility and manage risks while providing less downside capture. They have had strong returns over the long term, in line with expectations. They also stated that Van Hulzen is committed to ESG.

**REPORTS FROM THE RETIREMENT BOARD:**

16. **Brief report on any course, workshop, or conference attended since the last Retirement Board meeting** – Tim McGowan attended the Pension Bridge conference. His takeaways included questions regarding implicit costs of the fund and how EBMUDERS' costs compare to other pension funds.

**ITEMS TO BE CALENDERED / UPCOMING ITEMS**

**ADJOURNMENT** – Frank Mellon moved to adjourn the meeting at 12:22 p.m. and Doug Higashi seconded the motion; the motion carried (4-0) by the following voice vote: AYES (Coate, Higashi, Mellon, and McGowan), NOES (none), ABSTAIN (none), ABSENT (Young).

\_\_\_\_\_  
President

ATTEST: \_\_\_\_\_  
Secretary

9/21/2017

## EAST BAY MUNICIPAL UTILITY DISTRICT

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DATE: August 28, 2017

MEMO TO: Members of the Retirement Board

FROM: Sophia D. Skoda, Director of Finance *OA=541 SDS*

SUBJECT: Investment Transactions by Retirement Fund Managers for June 2017 and July 2017

The attached Investment Transactions by Retirement Fund Managers report for the months of June 2017 and July 2017 is hereby submitted for Retirement Board approval.

Attachment

SDS:DSK:MH

# INVESTMENT TRANSACTIONS BY RETIREMENT FUND MANAGERS

June 2017

	PURCHASES	SALES	PORTFOLIO VALUE
<b>FIXED INCOME</b>			
Western Asset Management Co.-IG	\$979,344	\$0	\$66,660,947
Western Asset Management Co.-HI	\$0	\$0	\$33,890,968
Western Asset Management Co.-HY	\$0	\$0	\$31,159,018
C.S. McKee	\$7,716,657	\$6,041,092	\$140,236,475
<b>TOTAL</b>	<b>\$8,696,001</b>	<b>\$6,041,092</b>	<b>\$271,947,408</b>
<b>DOMESTIC EQUITY</b>			
Barrow Hanley	\$0	\$0	\$185,041,056
Opus Capital	\$4,281,341	\$4,209,276	\$36,903,237
Russell 1000 Growth Index Fund	\$0	\$0	\$280,628,685
Russell 2000 Growth Index Fund	\$0	\$0	\$29,571,277
INTECH	\$2,184,906	\$1,680,637	\$83,180,679
T. Rowe Price	\$3,763,632	\$6,645,590	\$84,552,138
<b>Total Domestic Equity</b>	<b>\$10,229,879</b>	<b>\$12,535,503</b>	<b>\$699,877,072</b>
<b>COVERED CALLS</b>			
Parametric (BXM)	\$2,691,663	\$2,267,275	\$113,787,649
Parametric (Delta-Shift)	\$1,300,497	\$724,710	\$118,692,814
Van Hulzen	\$39,437,050	\$39,160,236	\$104,574,728
<b>Total Covered Calls</b>	<b>\$43,429,210</b>	<b>\$42,152,221</b>	<b>\$337,055,191</b>
<b>INTERNATIONAL EQUITY</b>			
Franklin/Templeton	\$1,107,439	\$890,366	\$101,169,871
Fisher Investments	\$0	\$0	\$112,972,007
<b>Total International Equity</b>	<b>\$1,107,439</b>	<b>\$890,366</b>	<b>\$214,141,878</b>
<b>REAL ESTATE EQUITY</b>			
RREEF America II	\$0	\$0	\$34,674,374
CenterSquare	\$2,857,217	\$2,827,874	\$49,607,810
<b>Total Real Estate</b>	<b>\$2,857,217</b>	<b>\$2,827,874</b>	<b>\$84,282,184</b>
<b>TOTAL ALL FUND MANAGERS</b>	<b>\$66,319,746</b>	<b>\$64,447,056</b>	<b>\$1,607,303,733</b>

July 2017

	PURCHASES	SALES	PORTFOLIO VALUE
<b>FIXED INCOME</b>			
Western Asset Management Co.-IG	\$1,645,030	\$92,694	\$66,868,391
Western Asset Management Co.-HI	\$0	\$0	\$34,152,547
Western Asset Management Co.-HY	\$0	\$0	\$31,389,152
C.S. McKee	\$8,708,580	\$7,487,047	\$140,799,814
<b>TOTAL</b>	<b>\$10,353,610</b>	<b>\$7,579,740</b>	<b>\$273,209,904</b>
<b>DOMESTIC EQUITY</b>			
Barrow Hanley	\$3,636,425	\$3,634,024	\$185,074,270
Opus Capital	\$3,469,864	\$3,614,188	\$36,805,340
Russell 1000 Growth Index Fund	\$0	\$0	\$286,195,700
Russell 2000 Growth Index Fund	\$0	\$0	\$29,834,042
INTECH	\$7,082,649	\$6,922,491	\$85,421,176
T. Rowe Price	\$5,158,049	\$3,810,482	\$87,478,704
<b>Total Domestic Equity</b>	<b>\$19,346,987</b>	<b>\$17,981,184</b>	<b>\$710,809,233</b>
<b>COVERED CALLS</b>			
Parametric (BXM)	\$2,017,154	\$1,381,814	\$115,227,420
Parametric (Delta-Shift)	\$736,645	\$567,286	\$120,984,678
Van Hulzen	\$5,414,089	\$7,639,339	\$106,255,298
<b>Total Covered Calls</b>	<b>\$8,167,888</b>	<b>\$9,588,439</b>	<b>\$342,467,397</b>
<b>INTERNATIONAL EQUITY</b>			
Franklin/Templeton	\$2,163,710	\$2,456,063	\$104,481,870
Fisher Investments	\$546,341	\$0	\$116,448,104
<b>Total International Equity</b>	<b>\$2,710,051</b>	<b>\$2,456,063</b>	<b>\$220,929,974</b>
<b>REAL ESTATE EQUITY</b>			
RREEF America II	\$277,607	\$0	\$35,202,120
CenterSquare	\$2,907,597	\$2,982,898	\$50,365,114
<b>Total Real Estate</b>	<b>\$3,185,204</b>	<b>\$2,982,898</b>	<b>\$85,567,234</b>
<b>TOTAL ALL FUND MANAGERS</b>	<b>\$43,763,739</b>	<b>\$40,588,324</b>	<b>\$1,632,983,741</b>

Prepared By:

Matt Houck

Matt Houck, Accounting Technician

Date:

8-24-17



R.B. RESOLUTION NO. 6867

RATIFYING AND APPROVING INVESTMENT TRANSACTIONS BY THE COUNSELORS  
FOR MONTHS OF JUNE, 2017 AND JULY, 2017

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 June, 2017 and July, 2017, in accordance with the provisions of said rule and in securities designated as acceptable by Retirement Board Resolution No. 4975, as amended;

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

\_\_\_\_\_  
President

ATTEST:

\_\_\_\_\_  
Secretary


09/21/2017


**EAST BAY MUNICIPAL UTILITY DISTRICT**

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DATE: August 4, 2017

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 June 2017

The attached Short Term Investment Transactions report for the month of June 2017 is hereby submitted for Retirement Board approval.

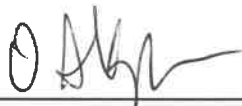
Attachment

SDS:DSK:MH

**EBMUD EMPLOYEES' RETIREMENT SYSTEM  
SHORT TERM INVESTMENT TRANSACTIONS  
CONSUMMATED BY THE TREASURER  
MONTH OF JUNE 2017**

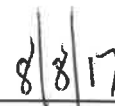
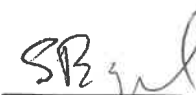
<u>COST/ FACE VALUE</u>	<u>DESCRIPTION</u>	<u>DATE OF PURCHASE</u>	<u>DATE OF SALE/MATURITY</u>	<u>YIELD (%)</u>
\$ 2,105,000.00	Local Agency Investment Fund	30-Jun-17		0.978
 <u>\$ 2,105,000.00</u>	Net Activity for Month			
 \$ 1,157,950.26	Beginning Balance			
<u>2,105,000.00</u>	Net Activity for Month			
<u>\$ 3,262,950.26</u>	Ending Balance			

SUBMITTED BY

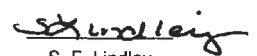


D. Scott Klein  
Controller

DATE

Semadar Barzel  
Treasury Manager



S. F. Lindley  
Acctg. Systems Supvr.  
prepared by MHouck

**EAST BAY MUNICIPAL UTILITY DISTRICT**

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DATE: August 24, 2017  
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 July 2017

The attached Short Term Investment Transactions report for the month of July 2017 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 JULY 2017**

<u>COST/ FACE VALUE</u>	<u>DESCRIPTION</u>	<u>DATE OF PURCHASE</u>	<u>DATE OF SALE/MATURITY</u>	<u>YIELD (%)</u>
\$ 10,167.40	Local Agency Investment Fund	14-Jul-17		1.051
3,519,000.00	Local Agency Investment Fund	14-Jul-17		1.051
3,488,000.00	Local Agency Investment Fund	27-Jul-17		1.051
<u>\$ 7,017,167.40</u>	Net Activity for Month			

\$ 3,262,950.26	Beginning Balance
<u>7,017,167.40</u>	Net Activity for Month
<u>\$ 10,280,117.66</u>	Ending Balance

SUBMITTED BY \_\_\_\_\_




D. Scott Klein  
Controller

DATE \_\_\_\_\_

8/28/17

  
Semadar Barzel  
Treasury Manager

  
S. F. Lindley  
Acctg. Systems Supvr.  
prepared by MHouck

R.B. RESOLUTION NO. 6868

RATIFYING AND APPROVING INVESTMENT TRANSACTIONS BY THE TREASURER  
FOR JUNE, 2017 AND JULY, 2017

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 June 2017, and July, 2017 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 June 2017, and July, 2017 are hereby ratified and approved.

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President

ATTEST:

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Secretary


09/21/2017


**EAST BAY MUNICIPAL UTILITY DISTRICT**

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DATE: August 4, 2017

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 June 2017

The attached Statement of Receipts and Disbursements report for the month of June 2017 is hereby submitted for Retirement Board approval.

Attachment

SDS:DSK:MH

**STATEMENT OF RECEIPTS AND DISBURSEMENTS  
EMPLOYEES' RETIREMENT FUND  
MONTH OF JUNE 2017**

CASH BALANCE at May 31, 2017 \$ 2,452,189.31

**Receipts**

Employees' Contributions	\$	1,842,703.35	
District Contributions		8,775,440.44	
LAIF Redemptions		0.00	
Refunds and Commission Recapture		<u>13,214.91</u>	
<b>TOTAL Receipts</b>			<b>10,631,358.70</b>

**Disbursements**

<b>Checks/Wires Issued:</b>			
Service Retirement Allowances	\$	7,435,175.64	
Disability Retirement Allowances		141,597.91	
Health Insurance Benefit		865,214.25	
Payments to Retiree's Resigned/Deceased		14,054.77	
LAIF Deposits		2,105,000.00	
Administrative Cost		<u>182,381.24</u>	
<b>TOTAL Disbursements</b>			<b><u>(10,743,423.81)</u></b>

CASH BALANCE at June 30, 2017 \$ 2,340,124.20

LAIF 3,262,950.26

LAIF and Cash Balance at June 30, 2017 \$ 5,603,074.46

**Domestic Equity**

Barrow Hanley	\$	185,041,056.36	
Russell 1000 Index Fund		280,628,684.77	
Russell 2000 Growth Index Fund		29,571,276.99	
Opus		36,903,237.33	
Intech		83,180,678.86	
T. Rowe Price		<u>84,552,138.04</u>	
<b>Subtotal Domestic Equity</b>		<b>699,877,072.35</b>	

**Covered Calls**

Parametric (BXM)	\$	113,787,649.21	
Parametric (Delta-Shift)		118,692,813.97	
Van Hulzen		<u>104,574,727.76</u>	
<b>Subtotal Covered Calls</b>		<b>337,055,190.94</b>	

**International Equity**

Franklin Templeton	\$	101,169,870.82	
Fisher Investments		<u>112,972,007.36</u>	
<b>Subtotal International Equity</b>		<b>214,141,878.18</b>	

**Real Estate**

RREEF America REIT II	\$	34,674,374.00	
Center Square		<u>49,607,809.59</u>	
<b>Subtotal Real Estate</b>		<b>84,282,183.59</b>	

**Fixed Income**

CS Mckee	\$	140,236,474.58	
Western Asset Mgt Co-Short Term Inv Grade		66,660,947.07	
Western Asset Mgt Co-Short Term High Income		33,890,968.40	
Western Asset Mgt Co-Short Term High Yield		<u>31,159,018.36</u>	
<b>Subtotal Fixed Income</b>		<b>271,947,408.41</b>	

Total for Domestic and International Equities 1,607,303,733.47

MARKET VALUE of ASSETS at June 30, 2017 \$ 1,612,906,807.93

Respectfully submitted,



D. Scott Klein  
Controller



Semadar Barzel  
Treasury Mgr.



S. F. Lindley  
Acctg Sys Supvr.  
prepared by mhouch





## EAST BAY MUNICIPAL UTILITY DISTRICT

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DATE: August 24, 2017

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 July 2017

The attached Statement of Receipts and Disbursements report for the month of July 2017 is hereby submitted for Retirement Board approval.

Attachment

SDS:DSK:MH

**STATEMENT OF RECEIPTS AND DISBURSEMENTS  
EMPLOYEES' RETIREMENT FUND  
MONTH OF JULY 2017**

CASH BALANCE at June 30, 2017 \$ 2,340,124.20

**Receipts**

Employees' Contributions	\$	1,222,653.40	
District Contributions		5,816,784.89	
LAIF Redemptions		0.00	
Refunds and Commission Recapture		<u>28,291.57</u>	
<b>TOTAL Receipts</b>			<b>7,067,729.86</b>

**Disbursements**

<b>Checks/Wires Issued:</b>			
Service Retirement Allowances	\$	7,713,428.86	
Disability Retirement Allowances		141,597.91	
Health Insurance Benefit		866,598.08	
Payments to Retiree's Resigned/Deceased		108,168.51	
LAIF Deposits		7,007,000.00	
Administrative Cost		<u>102,671.97</u>	
<b>TOTAL Disbursements</b>			<b>(15,939,465.33)</b>

CASH BALANCE at July 31, 2017 \$ (6,531,611.27)

LAIF 10,280,117.66

LAIF and Cash Balance at July 31, 2017 \$ 3,748,506.39

**Domestic Equity**

Barrow Hanley	\$	185,074,270.05	
Russell 1000 Index Fund		286,195,700.01	
Russell 2000 Growth Index Fund		29,834,042.30	
Opus		36,805,339.91	
Intech		85,421,176.20	
T. Rowe Price		<u>87,478,704.21</u>	
<b>Subtotal Domestic Equity</b>			<b>710,809,232.68</b>

**Covered Calls**

Parametric (BXM)	\$	115,227,419.99	
Parametric (Delta-Shift)		120,984,678.27	
Van Hulzen		<u>106,255,298.39</u>	
<b>Subtotal Covered Calls</b>			<b>342,467,396.65</b>

**International Equity**

Franklin Templeton	\$	104,481,869.75	
Fisher Investments		<u>116,448,103.95</u>	
<b>Subtotal International Equity</b>			<b>220,929,973.70</b>

**Real Estate**

RREEF America REIT II	\$	35,202,120.00	
Center Square		<u>50,365,113.73</u>	
<b>Subtotal Real Estate</b>			<b>85,567,233.73</b>

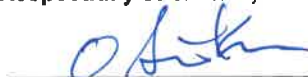
**Fixed Income**

CS Mckee	\$	140,799,814.17	
Western Asset Mgt Co-Short Term Inv Grade		66,868,391.21	
Western Asset Mgt Co-Short Term High Income		34,152,546.86	
Western Asset Mgt Co-Short Term High Yield		<u>31,389,151.94</u>	
<b>Subtotal Fixed Income</b>			<b>273,209,904.18</b>

Total for Domestic and International Equities 1,632,983,740.94

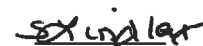
MARKET VALUE of ASSETS at July 31, 2017 \$ 1,636,732,247.33

Respectfully submitted,



D. Scott Klein  
Controller

  
Semadar Barzel  
Treasury Mgr.


  
S. F. Lindley  
Acctg Sys Supvr.  
prepared by mhauk

## **EAST BAY MUNICIPAL UTILITY DISTRICT**

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DATE: September 16, 2017

MEMO TO: Members of the Retirement Board

FROM: Sophia D. Skoda, Director of Finance 

SUBJECT: Select Asset-Liability Study Model

The Board is being asked to select a model to be used in evaluating the East Bay Municipal Utility District Employees' Retirement System (ERS) asset allocation. In accordance with the ERS Statement of Investment Policy and Procedures, the study is to be performed at least every five years; the most recent study was completed in 2013. Pension Consulting Alliance (PCA) will present the three options listed below for evaluating the ERS's asset allocation:

1. Asset Allocation Review
2. Integrated Simulation Approach
3. Multi-Dimensional Asset/Liability Study

PCA will discuss the difference among these options in terms of policy compliance, complexity, scope, utility, and cost. The Board selected the second option in 2013, and both PCA and staff recommend it for the upcoming study as well.

SDS:DB

Attachment

# ASSET/LIABILITY MODELING OPTIONS

EBMUD Employees' Retirement System

September 2017



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# Asset/Liability Modeling Overview

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- The asset/liability process sets the foundation for the long-term management structure of the investment portfolio
- Key aspect of study: the Board defining risk and then determining its tolerance for that risk
- Tolerance for plan risk plays a huge role in selection of policy mix for Plan assets
- Typically conducted every 3-to-5 years, or when plan changes warrant a review of investment activities
- EBMUDERS completed its last asset/liability study in 2013
- 90+% of a portfolio's total risk is attributable to the policy portfolio

# Key Reasons for Conducting Asset/Liability Study

---

- A change in trustees' tolerance for certain plan risks
  - Plans mature along a continuum
  - Plans' tolerance for certain risks evolve along that continuum
- A dramatic change in the investment markets
  - Not attempting to time market
  - Adjusting to large fundamental changes in the capital markets
- Maintaining an ongoing, documented, prudent level of due diligence of a Plan's long-term investment strategy

# Asset/Liability Modeling Review

---

- Since the 2013 A/L study, the global investment markets have been generally positive and supportive of risk assets
- As of Segal's 6/30/2016 valuation, EBMUDERS had a UAAL of approximately \$640 million resulting in a 68% funded ratio
- Significant changes have occurred in the EBMUDERS' portfolio
  - Inclusion of Covered Calls and Non-Core Fixed Income
- Decrease in the Plan's actuarial assumed rate
  - Lowered from 8.0% to 7.25%
- Plan entered a net distribution phase
  - Distribution is greater than contribution
  - Projected to be roughly \$10 million in FY17
  - Spread between distributions and contributions is expected to grow
- Elevated capital market valuations will likely weigh on future returns

# Various Approaches to Conducting A/L Study

## Summary Characteristics of Various A/L Approaches

Features	A/L Project Type		
	Asset Allocation Review	Integrated Simulation Approach	Multi-Dimensional Risk Factor Approach
Explicit recognition of Plan-oriented risk tolerance	No	One-dimensional	Multiple risk dimensions
Reality-based investment return projections	Limited, M-V based	Yes	Yes
Recognition of Plan liabilities	Minimal, actuarial rate	Full recognition, subject to actuary	Full, complete recognition
Board input	Select asset portfolio expected return and volatility level	Establish key plan-wide risk concern; establish risk threshold; examine tradeoffs with various portfolio options; select portfolio	Establish multiple plan-wide risk concerns/dimension; prioritize such concerns; examine tradeoffs associated with various portfolio options
Timeline	2-3 months	2-4 months	4-6 months
Incremental Costs	None	\$25,000 - \$35,000	\$100,000 - \$125,000



# Portfolio Strategy and Construction – PCA's Asset/Liability Modeling Approaches

---

## Option 1: **Asset Allocation Review**

- Utilizes PCA's updated capital market assumptions
- Examines only asset side of a System's balance sheet
- Sole focus is investment return/risk tradeoff
- May not capture potentially dramatic (2008-like) market outcomes
- Project timeline: typically 2-3 months

# Portfolio Strategy and Construction – PCA's Asset/Liability Modeling Approaches

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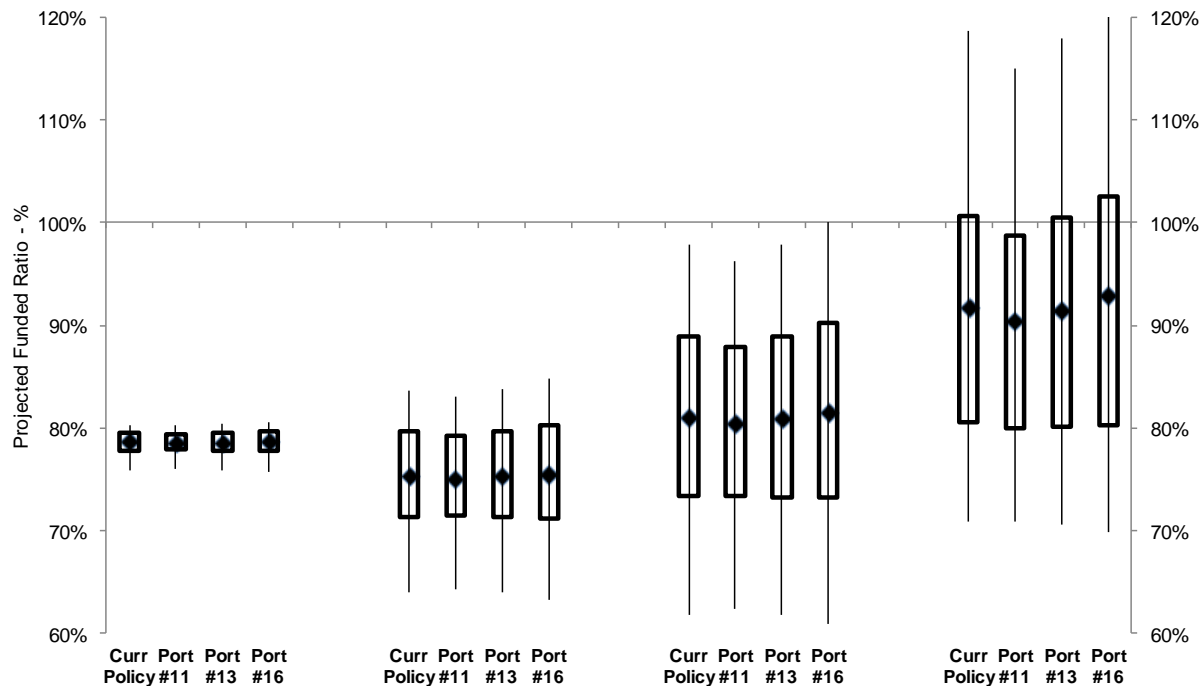
## Option 2: **Integrated Simulation Approach**

- Utilizes PCA's updated capital market assumptions
- Incorporates projection data from most recent actuarial valuation
- Places most emphasis on investment return volatility as a proxy for overall plan risk but also examines key financial outcomes
- Project timeline: typically 2-4 months

# Portfolio Strategy and Construction – PCA's Asset/Liability Modeling Approaches

## Sample Option 2 Output

### FUNDING RATIOS



	Portfolio	Average	Highest		Lowest	
			25th Pct	5th Pct	95th Pct	75th Pct
1 Year	Curr Policy	79%	80%	80%	76%	78%
	Port #11	79%	79%	80%	76%	78%
	Port #13	79%	80%	80%	76%	78%
	Port #16	79%	80%	81%	76%	78%
3 Years	Curr Policy	75%	80%	84%	64%	71%
	Port #11	75%	79%	83%	64%	71%
	Port #13	75%	80%	84%	64%	71%
	Port #16	76%	80%	85%	63%	71%
5 Years	Curr Policy	81%	89%	98%	62%	73%
	Port #11	81%	88%	96%	62%	73%
	Port #13	81%	89%	98%	62%	73%
	Port #16	82%	90%	100%	61%	73%
10 Years	Curr Policy	92%	101%	119%	71%	81%
	Port #11	91%	99%	115%	71%	80%
	Port #13	92%	101%	118%	71%	80%
	Port #16	93%	103%	122%	70%	80%

# Portfolio Strategy and Construction – PCA's Asset/Liability Modeling Approaches

---

## Option 3: **Multi-Dimensional A/L Study**

- Undertaken particularly if a Board desires to re-examine its tolerance for overall plan risk
- Encapsulates multiple risk dimensions (funding, costs, overall plan liquidity, solvency, etc.)
- Project timeline: typically 4-6 months
- Independent verification of current actuarial practices

# Portfolio Strategy and Construction – PCA's Asset/Liability Modeling Approaches

---

## Option 3: **Multi-Dimensional A/L Study**

- Key feature: Intuitive risk assessment metrics
- Cheiron's model engine uses a large number of simulations to analyze potential outcomes
  - Monte-Carlo
  - Resampling techniques (using samplings from history)
  - Deterministic
- Interactive ability to assess decisions
  - PCA/Cheiron has capability to allow the Board to stress test in a seminar setting
  - This phase of the process is dynamic and helpful for developing consensus views of risk tolerance
  - The Board retains significant authority over the policy portfolio selection process

## Portfolio Strategy and Construction – PCA's Asset/Liability Modeling Approaches

---

### Option 3: Multi-Dimensional A/L Study

- **The key feature is the process**, not the outcome
- While the process is customized, iterative, and **consensus-seeking**, the policy outcome can be similar to other approaches/methodologies
- The Board's rationale for establishing investment policy is **explicit, deliberate, and transparent**
- The Board's rationale for an long-term policy is **plan-risk-driven, not market-trend-driven**
- Any modeling process is, at most, a tool for decision-making that requires additional qualitative and subjective considerations

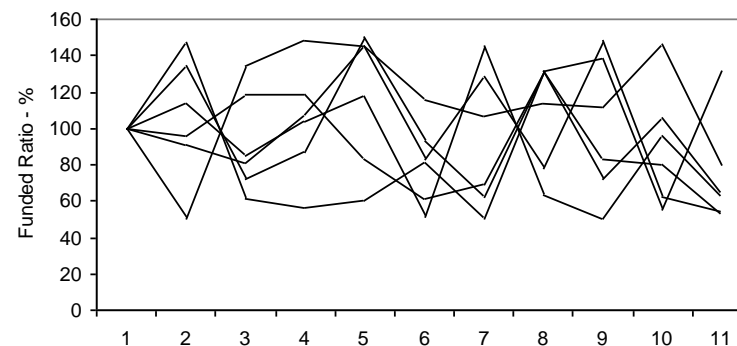
# Portfolio Strategy and Construction – PCA's Asset-Liability Modeling Approaches

## Option 3: Multi-Dimensional A/L Study

The PCA/Cheiron asset-liability modeling process:

### MODEL & DISCUSS

1. Present simulated projections *first*, to give trustees an awareness of future risks



↓ leads to...

### MEASURE: QUANTIFY GOALS & CONCERNS

2. Have trustees prioritize/emphasize their concerns about such risks

Decision Factors:

1	2	3	4	5
Achieve the Highest Average Funded Ratio, Years 2 - 22	Avoid Funded Ratio Lower Than 66%, Years 2 - 22	Seek Lowest Average Employer Cost, Years 2 - 22	Minimize Cost Volatility, Years 2 - 22	Minimize Cash Flow Stress, Years 2 - 22

Funding Management Oriented	50%	20%	15%	15%	0%
Cost/Downside Mgmt. Oriented	10%	25%	15%	50%	0%
Cash Flow Oriented	20%	10%	10%	10%	50%
Equal Risk Weighting Oriented	20%	20%	20%	20%	20%

↓ which results in...

3. Identify the investment portfolio that should best address those concerns (with no "pre-selection")

	U.S. Equity	Non U.S. Equity	Fixed Inc.	SCERS RE	Alternatives	Real Return
<b>Best</b>	35.0%	20.0%	20.0%	10.0%	10.0%	5.0%
<b>Current Policy</b>	41.0%	17.0%	28.0%	9.0%	5.0%	0.0%

## Risk Tolerance Profiles from Various Recent AL Studies

	CalSTRS (2012)	VRS (2012)	WSIB (2012)	KPERS (2011)	Hawaii ERS (2010)	WSIB (2009)	CalSTRS (2009)
<b>Improve Funding</b>	53%	8%		75%	40%		44%
<b>Avoid Low Funding</b>		8%		25%			15% (57%)
<b>Minimize Funding Volatility</b>			6%		25%	4%	
<b>Seek Low Cost</b>		12%			15%		16%
<b>Avoid Cost Spike</b>		2%					10% (Over 35%)
<b>Minimize Cost Volatility</b>			7%		15%	9%	
<b>Meet Actuarial Rate</b>							
<b>Maximize Return</b>		32%	69%			65%	
<b>Minimize Return Volatility</b>	47%	17%	7%			10%	
<b>Minimize PAYGO Prob.</b>							15%
<b>Minimize Cash Flow Stress</b>		20%	11%		5%	12%	



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## **EAST BAY MUNICIPAL UTILITY DISTRICT**

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DATE: September 7, 2017

MEMO TO: Retirement Board

FROM: Sophia D. Skoda, Director of Finance *SDS*

SUBJECT: Select Actuarial Auditor

### **RECOMMENDATION**

Authorize selection of Bartel Associates, LLC as Actuarial Auditor to conduct a full-scope (level one) audit of the Retirement System's most recent experience study, actuarial valuation and review of the pension plan, and health insurance benefit valuation review of contribution rates and funding status.

### **DISCUSSION**

The purpose of an actuarial audit is to review the work of a retirement plan's consulting actuary. The Government Finance Officers Association (GFOA) recommends that actuarial audits be conducted at least once every five years. There are three levels of actuarial audits as described by the GFOA:

- In a level one, or full-scope, actuarial audit, the reviewing actuary fully replicates the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the plan's consulting actuary. In addition, the reviewing actuary examines the consulting actuary's methods and assumptions for reasonableness and internal consistency.
- In a level two actuarial audit, the reviewing actuary does not fully replicate the consulting actuary's valuation, but instead uses a sampling of the plan's participant data to test the results of the valuation. The reviewing actuary also examines the consulting actuary's methods and assumptions for reasonableness and internal consistency.
- In a level three actuarial audit, the reviewing actuary examines the consulting actuary's methods and assumptions for reasonableness and internal consistency, but does not perform actuarial calculations.

As the Retirement System has not conducted an actuarial audit within the suggested timeframe, staff recommends that the Retirement Board select an actuarial auditor to conduct a level one audit.

Staff sent out a Request for Proposal (RFP) for Actuarial Auditor and received two responses, one from Bartel Associates, LLC and one from Milliman, Inc. Both firms are well qualified to perform the actuarial audit. Staff recommends Bartel Associates because:

- their proposal is more responsive;
- their fees are substantially lower; and
- their recommendations are extremely strong.

Bartel Associates is a small firm, established in 2003, specializing exclusively in providing public agencies with actuarial consulting services. The firm is located in San Mateo, California and has 18 professionals including four actuaries qualified to serve as Senior Auditors and seven actuaries qualified to serve as Supporting Auditors. The Bartel professionals who would be responsible for the System's audit are all experienced and highly qualified. Bartel offered to conduct any of the three potential actuarial audit levels and provided clear descriptions of each of the options including advantages and disadvantages, timeline, and fees. Bartel estimated that their staff would spend approximately 246 hours on a level one audit, and if they begin on October 2<sup>nd</sup>, they would complete the project by November 16, 2017. Bartel's references were extremely strong, with contacts describing them as "exceptional" and "phenomenal." They were said to be easy to work with, responsive, kept to their timeline, and presented their results clearly and understandably.

Milliman is a large firm serving corporate, governmental and financial services organizations. Actuarial consulting is their core business, their practice areas also include employee benefits and investment consulting; health; life and financial services; and property and casualty consulting services. The firm is staffed by approximately 3,500 employees of whom 1,600 are actuaries and consultants. The firm has 60 offices worldwide, and the Retirement System would be served by professionals from its home office in Seattle, Washington. The Milliman professionals who would be responsible for the System's audit are all experienced and highly qualified. Milliman only proposed to provide a level one audit. Its responses with respect to this audit level were sound. Milliman estimated that their staff would spend approximately 250 hours on the level one audit, and if they begin on October 2<sup>nd</sup>, they would complete the project by March 1, 2018. Milliman's references reported that they were good to work with and did well when making presentations.

The two firms' fees are summarized below:

	<b>Bartel</b>	<b>Milliman</b>
Audit Level Fees	Level one - \$49,920 Level two - \$31,150 Level three - \$14,010	Level one - \$60,000 Level two - n/a Level three - n/a
Hourly Fees	Vice President - \$270 Asst. Vice President - \$240 Associate Actuary - \$190 Actuarial Analysts - \$140	Peer Review Actuary - \$450 Senior and Supporting Auditors - \$440 Support Actuary - \$330 Actuarial Analysts - \$180 to \$240 Support Staff - \$80-\$150
In-Person Meetings	1 with System Staff: no charge 1 presentation to Board of Directors: no charge Additional: time plus preparation (est. \$1,000)	1 with System Staff: no charge 1 presentation to Board of Directors: no charge Additional meetings: \$2,500 per meeting



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# Q2 2017

## East Bay Municipal Utility District Quarterly Report

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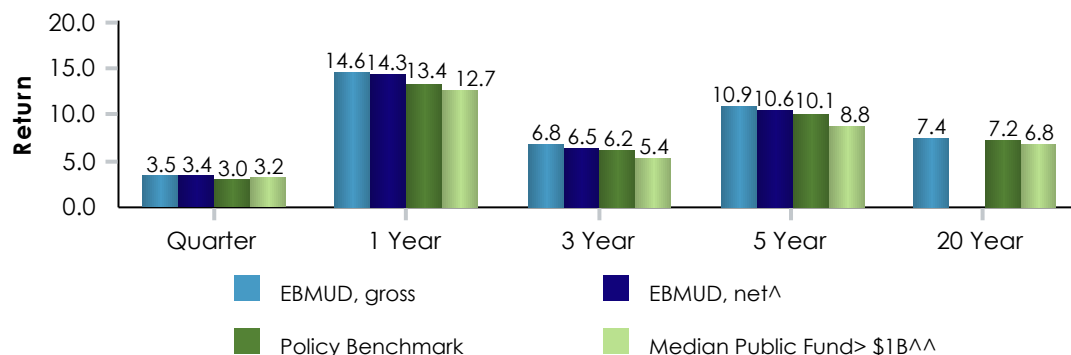
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	EBMUD Policy Benchmark Composition
	Definition of Benchmarks
	Risk Metric Description

## Performance and Market Values As of June 30, 2017

### Investment Performance



### Portfolio Valuation (000's)

	Quarter	1 Year
EBMUD Total Plan		
Beginning Market Value	1,557,484	1,405,980
Net Contributions	-716	2,340
Fees/Expenses	-1,109	-4,175
Gain/Loss	54,776	206,255
Ending Market Value	1,610,435	1,610,435

### Asset Class Performance (gross of fees)

	Quarter	1 Year	3 Year	5 Year	10 Year	20 Year
EBMUD Total Plan	3.5	14.6	6.8	10.9	6.1	7.4
<i>Policy Benchmark<sup>^^^</sup></i>	<i>3.0</i>	<i>13.4</i>	<i>6.2</i>	<i>10.1</i>	<i>5.8</i>	<i>7.2</i>
Domestic Equity	4.0	20.0	9.6	14.7	7.2	7.7
<i>Russell 3000*</i>	<i>3.0</i>	<i>18.5</i>	<i>9.1</i>	<i>14.6</i>	<i>7.3</i>	<i>8.3</i>
International Equity	7.4	25.2	1.9	8.9	2.5	6.5
<i>MSCI ACWI x US (blend)**</i>	<i>6.0</i>	<i>21.0</i>	<i>1.3</i>	<i>7.7</i>	<i>1.6</i>	<i>4.7</i>
Covered Calls	2.7	12.8	8.0	-	-	-
<i>CBOE BXM</i>	<i>3.1</i>	<i>12.1</i>	<i>6.5</i>	<i>-</i>	<i>-</i>	<i>-</i>
Fixed Income	1.1	2.4	2.0	2.4	4.6	5.6
<i>Fixed Income benchmark (blend)***</i>	<i>1.1</i>	<i>2.3</i>	<i>2.5</i>	<i>2.4</i>	<i>4.6</i>	<i>5.3</i>
Real Estate	1.2	1.8	10.4	11.2	5.4	-
<i>NCREIF/NAREIT (blend)****</i>	<i>0.8</i>	<i>2.1</i>	<i>9.5</i>	<i>10.2</i>	<i>6.9</i>	<i>-</i>
Cash	0.3	0.6	0.4	0.4	1.2	2.8
<i>Citigroup 3 Month T-Bill Index</i>	<i>0.2</i>	<i>0.5</i>	<i>0.2</i>	<i>0.1</i>	<i>0.5</i>	<i>2.1</i>

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

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

<sup>^^^</sup>Policy Benchmark consists of 40% Russell 3000 (blend), 15% MSCI ACWIxU.S. (blend), 20% CBOE BXM, 10% BC Aggregate, 5% BC 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), and 2.5% FTSE NAREIT Equity REITs index 4/1/14-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.

\*\*\*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-present; 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.

## Investment Market Risk Metrics

### Takeaways

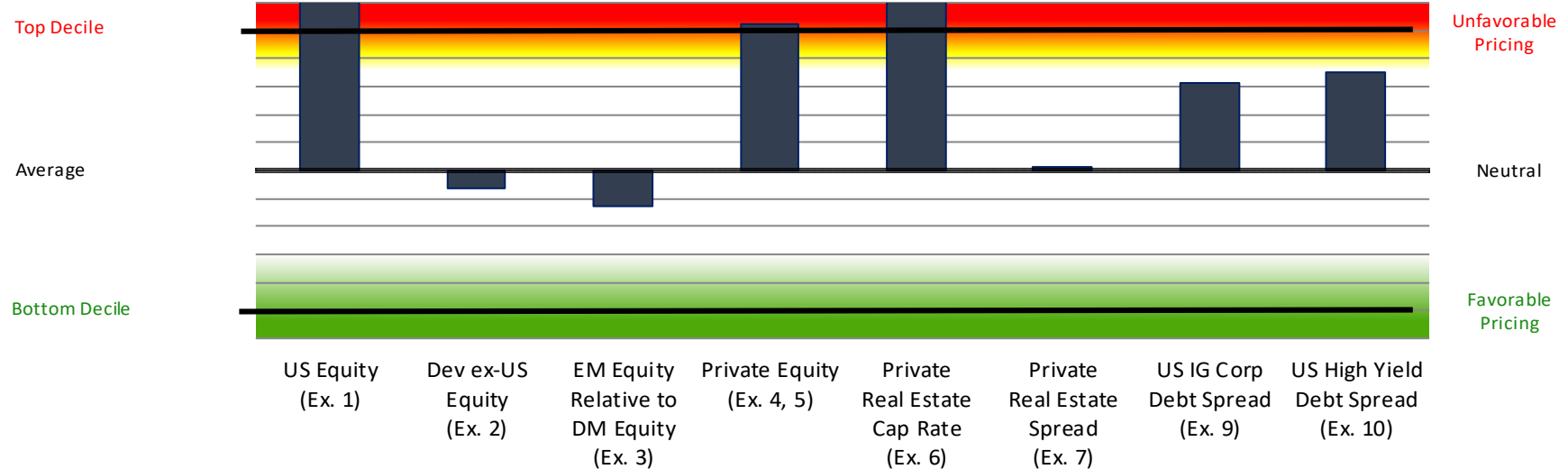
- Throughout the second quarter, both economic and financial market volatility remained subdued.
- U.S. public equity valuations (based on normalized price/earnings ratios) remain at levels only surpassed in the late 1990's tech bubble.
- Non-U.S. developed and emerging market equity valuations remain modestly cheap relative to their own histories and relative to U.S. levels.
- Credit spreads remain tight (risk seeking) in both U.S. investment grade and high yield markets.
- The yield curve flattened (short-term rates increased and long-term rates fell) in anticipation of further rate increases by the Federal Reserve.
- Inflation indicators remain well behaved; commodity prices are near decade lows and breakeven inflation levels remain stable.
- Equity volatility levels remain near bottom decile levels.
- PCA's sentiment indicator remains positive. The sentiment indicator remains solidly **green**.

---

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

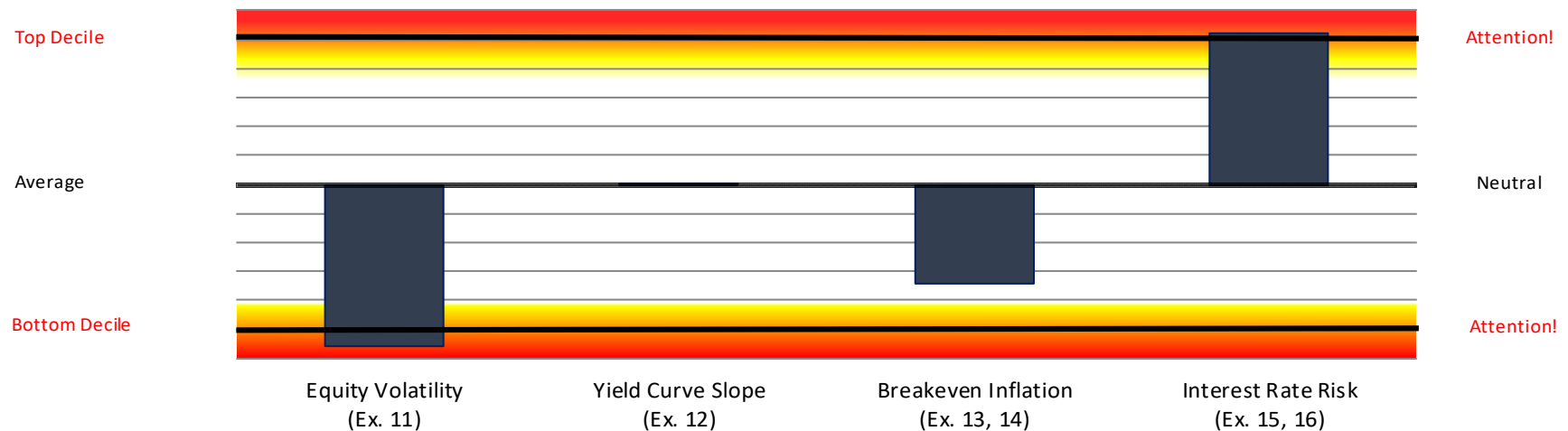
## Valuation Metrics versus Historical Range

### A Measure of Risk



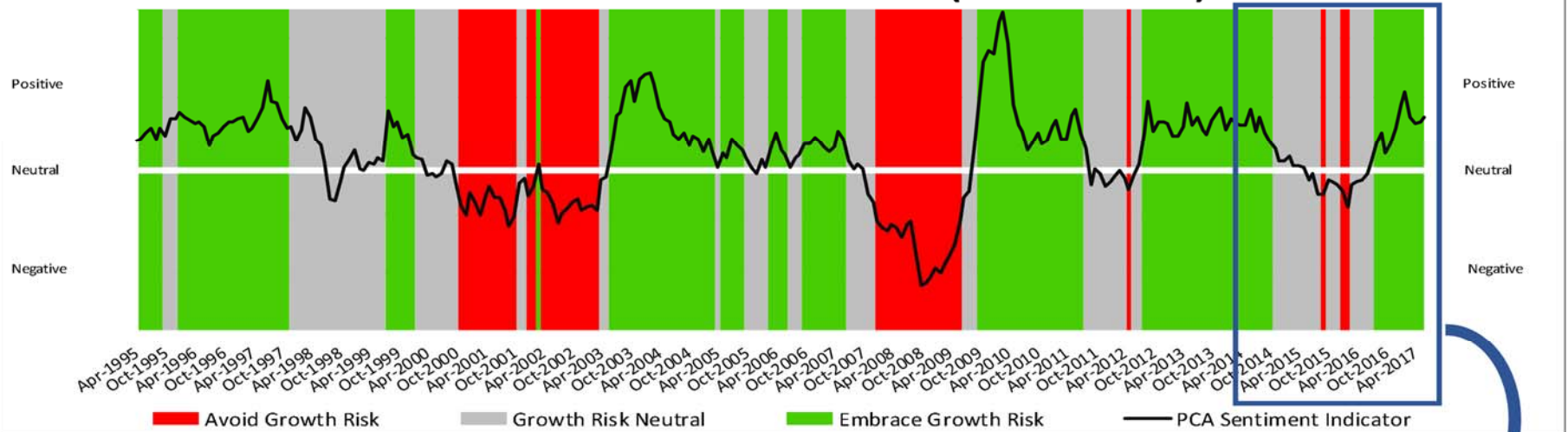
## Other Important Metrics within their Historical Ranges

### Pay Attention to Extreme Readings

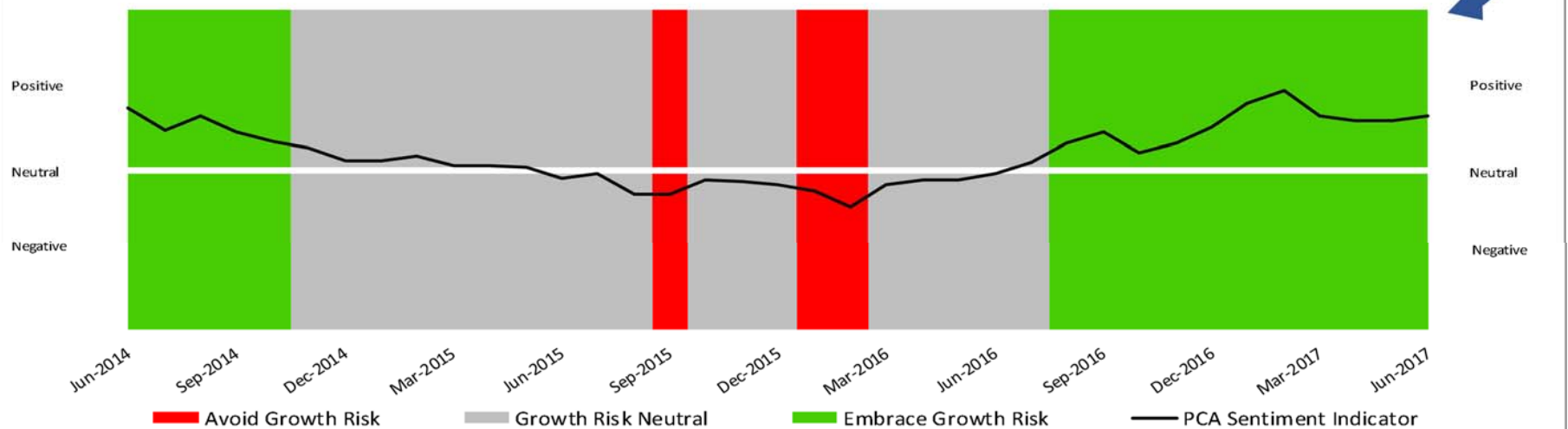




## PCA Market Sentiment Indicator (1995-Present)



## PCA Market Sentiment Indicator - Most Recent 3-Year Period



### Information Behind Current Sentiment Reading

Bond Spread Momentum Trailing-Twelve Months

Equity Return Momentum Trailing-Twelve Months

Positive

Positive

Agree



### Growth Risk Visibility (Current Overall Sentiment)

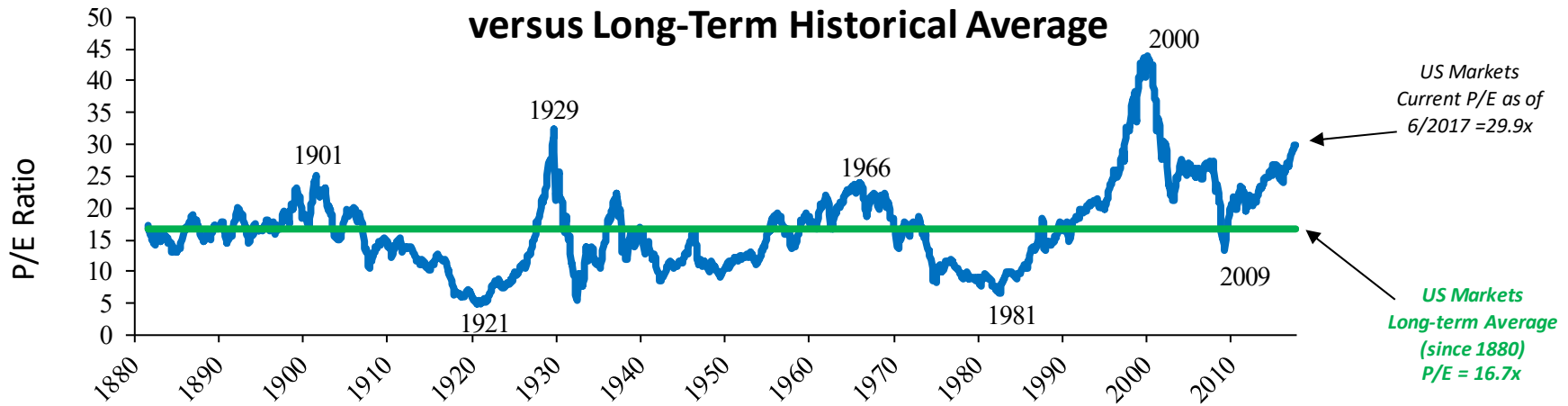
Positive



## Developed Public Equity Markets

Exhibit 1

### U.S. Equity Market P/E Ratio<sup>1</sup> versus Long-Term Historical Average

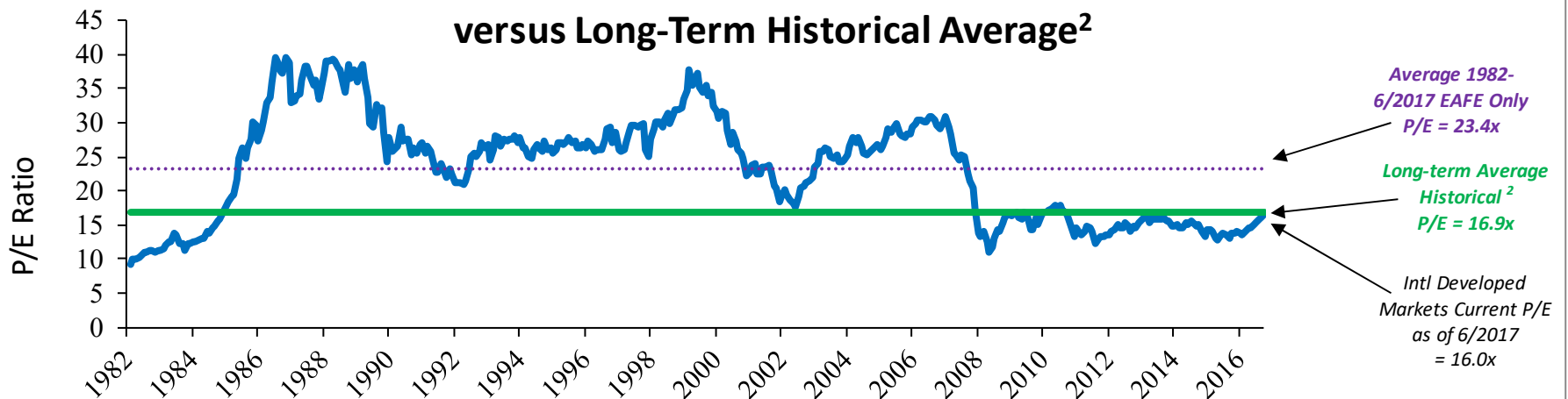


<sup>1</sup> P/E ratio is a Shiller P/E-10 based on 10 year real S&P 500 earnings over S&P 500 index level.

(Please note different time scales)

Exhibit 2

### Developed ex-U.S. Equity Market P/E Ratio<sup>1</sup> versus Long-Term Historical Average<sup>2</sup>



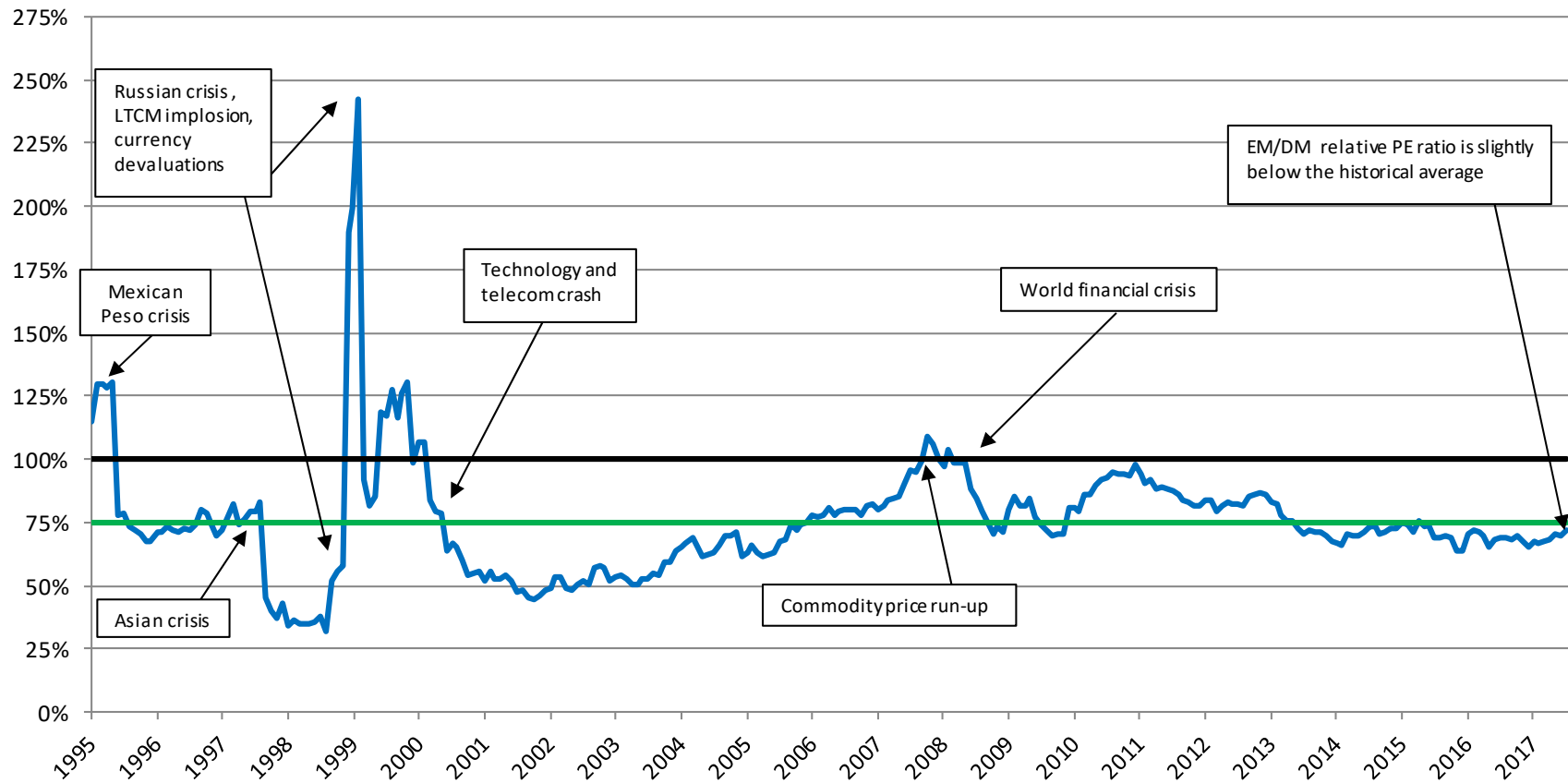
<sup>1</sup> P/E ratio is a Shiller P/E-10 based on 10 year real MSCI EAFE earnings over EAFE index level.

<sup>2</sup> To calculate the LT historical average, from 1881 to 1982 U.S. data is used as developed market proxy. From 1982 to present, actual developed ex-US market data (MSCI EAFE) is used.

## Emerging Markets Public Equity Markets

Exhibit 3

### Emerging Markets PE / Developed Markets PE (100% = Parity between PE Ratios)



Source: Bloomberg, MSCI World, MSCI EMF

— EM/DM PE

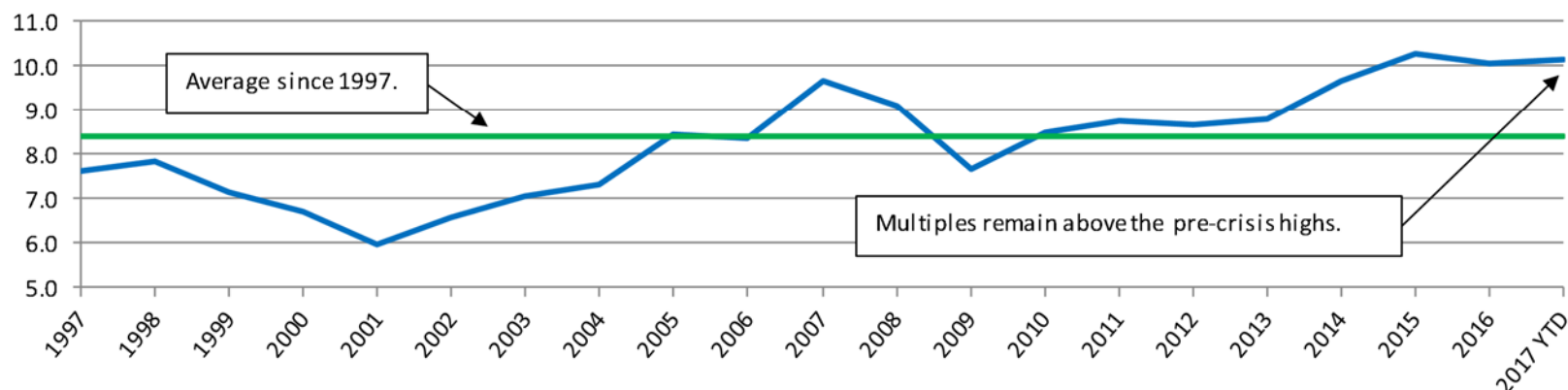
— Average EM/DM PE

— Parity

## U.S. Private Equity Markets

Exhibit 4

### Price to EBITDA Multiples Paid in LBOs

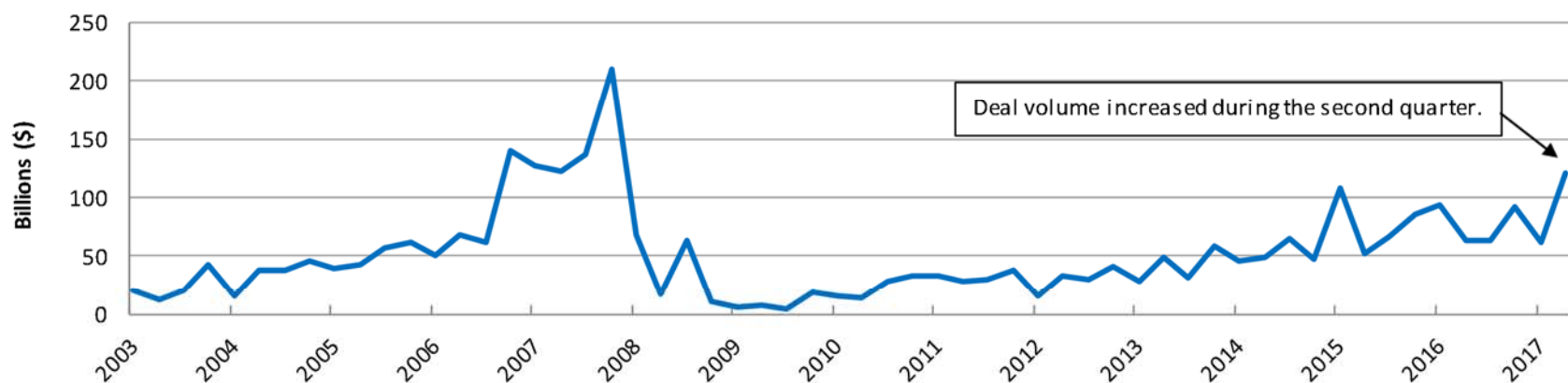


Source: S&P LCD study

(Please note different time scales)

Exhibit 5

### Disclosed U.S. Quarterly Deal Volume\*



Source: Thomson Reuters Buyouts

\* quarterly total deal size (both equity and debt)

## Private Real Estate Markets

Exhibit 6

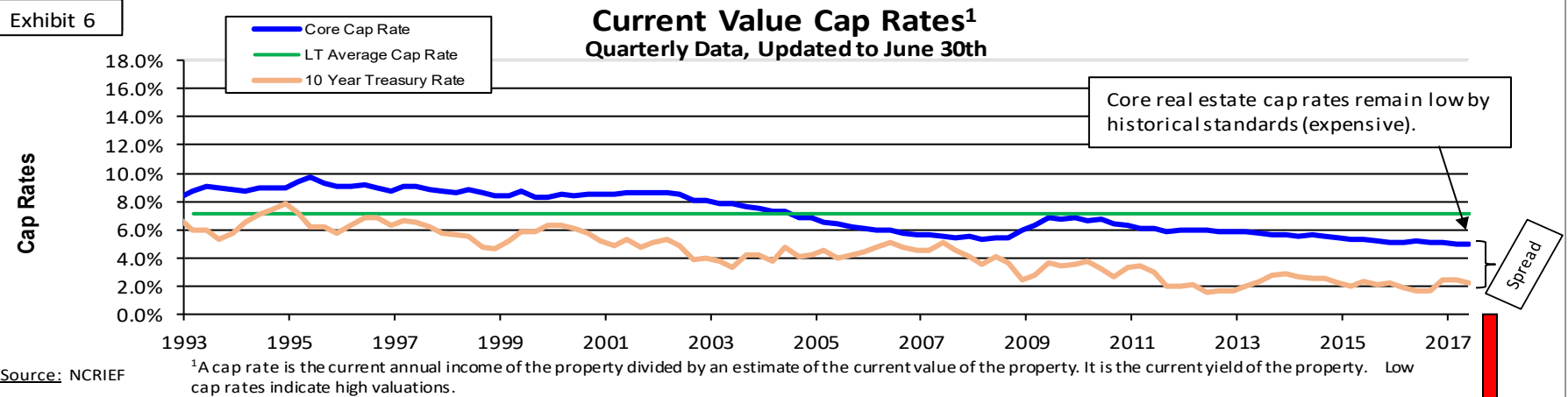


Exhibit 7

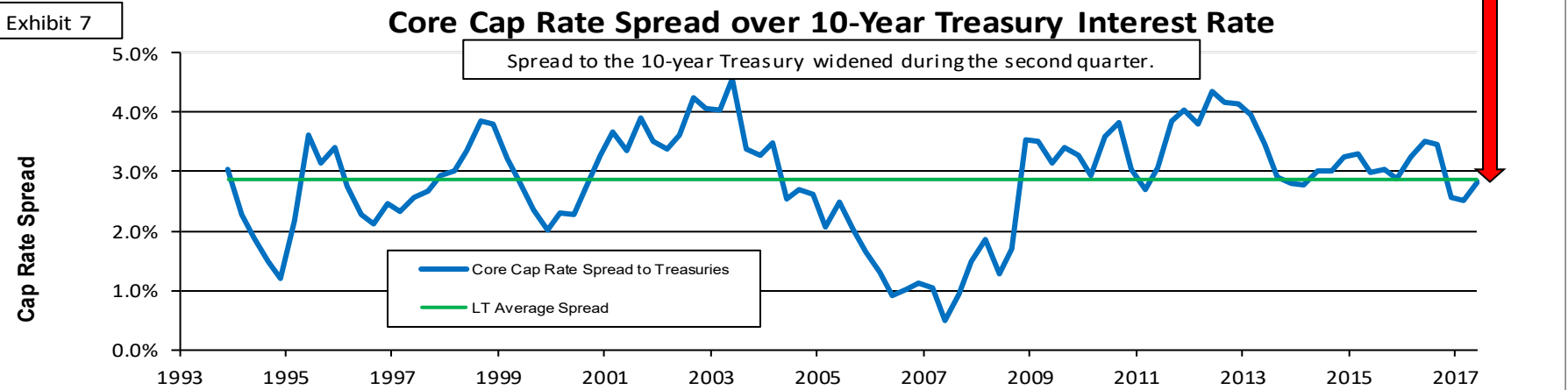
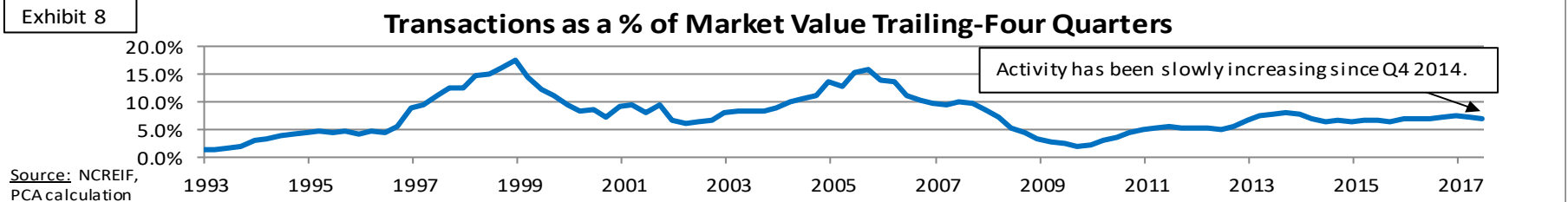


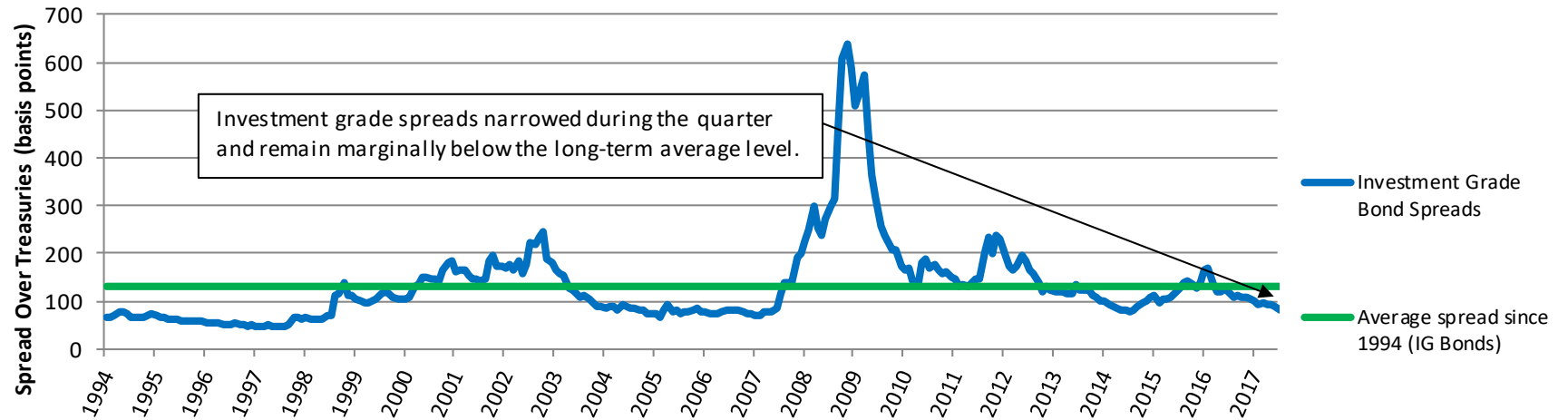
Exhibit 8



## Credit Markets U.S. Fixed Income

Exhibit 9

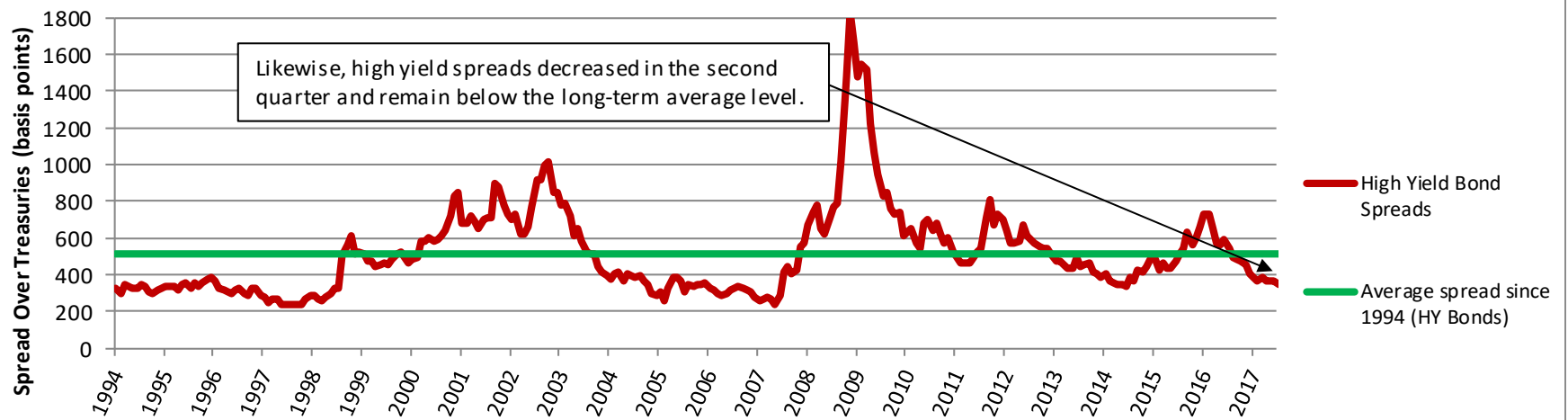
### Investment Grade Corporate Bond Spreads



Source: LehmanLive: Barclays Capital US Corporate Investment Grade Index Intermediate Component.

Exhibit 10

### High Yield Corporate Bond Spreads

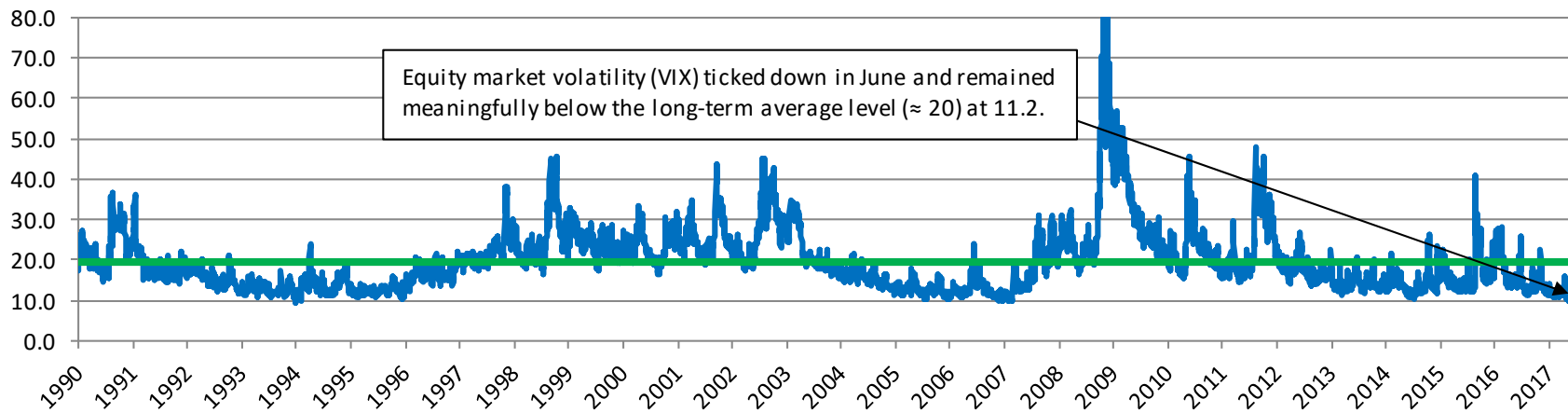


Source: LehmanLive: Barclays Capital U.S. Corporate High Yield Index.

## Other Market Metrics

Exhibit 11

### VIX - a measure of equity market fear / uncertainty

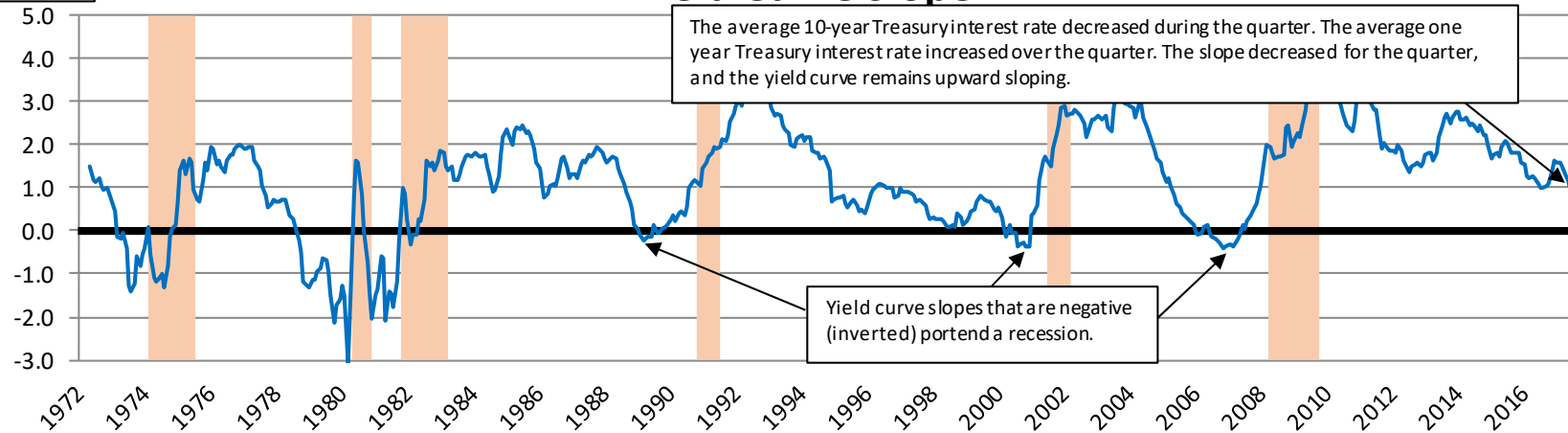


Source: <http://www.cboe.com/micro/vix/historical.aspx>

(Please note different time scales)

Exhibit 12

### Yield Curve Slope

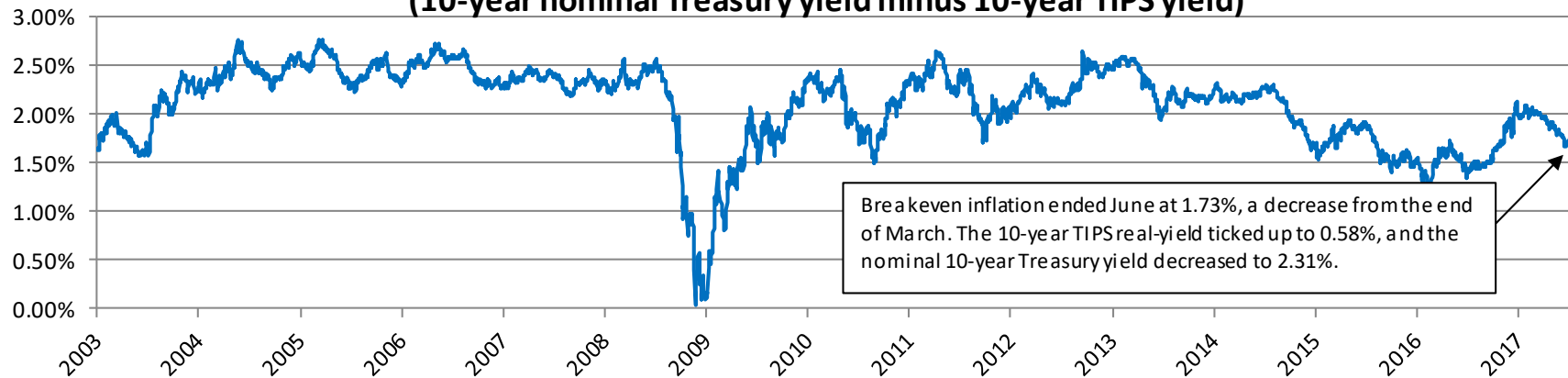


Source: [www.ustreas.gov](http://www.ustreas.gov) (10-year treasury yield minus 1-year treasury yield)

## Measures of Inflation Expectations

Exhibit 13

### 10-Year Breakeven Inflation (10-year nominal Treasury yield minus 10-year TIPS yield)

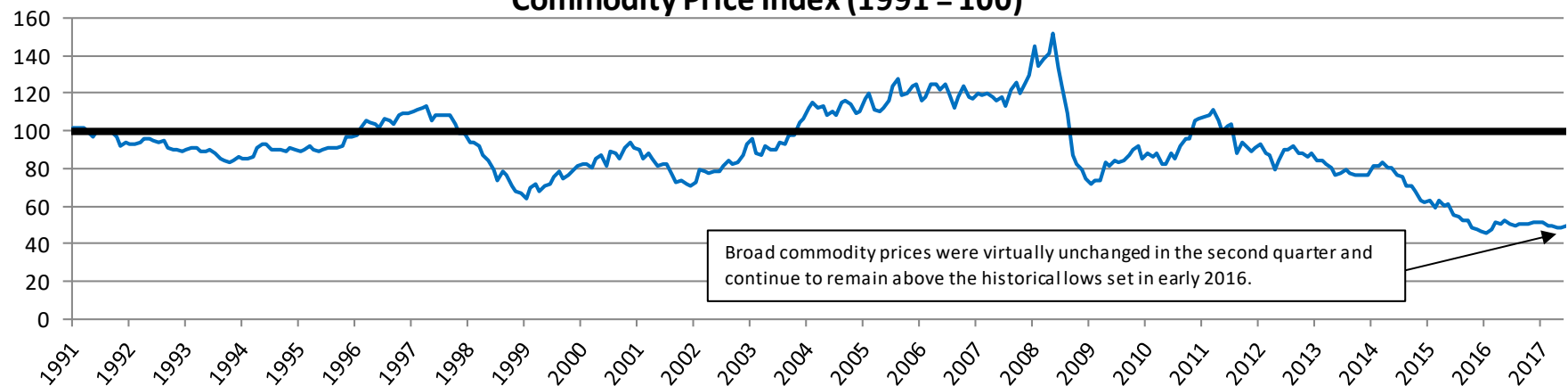


Source: [www.ustreas.gov](http://www.ustreas.gov)

(Please note different time scales)

Exhibit 14

### Inflation Adjusted Bloomberg Commodity Price Index (1991 = 100)



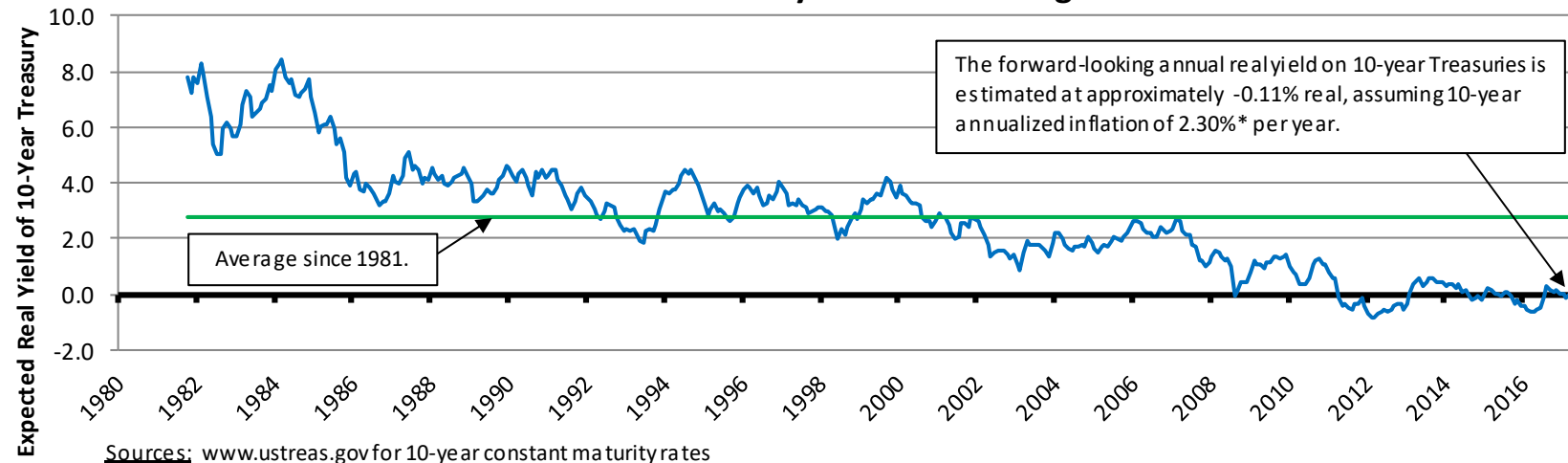
Source: Bloomberg Commodity Index, St. Louis Fed for US CPI all urban consumers.



## Measures of U.S. Treasury Interest Rate Risk

Exhibit 15

### Estimate of 10-Year Treasury Forward-Looking Real Yield

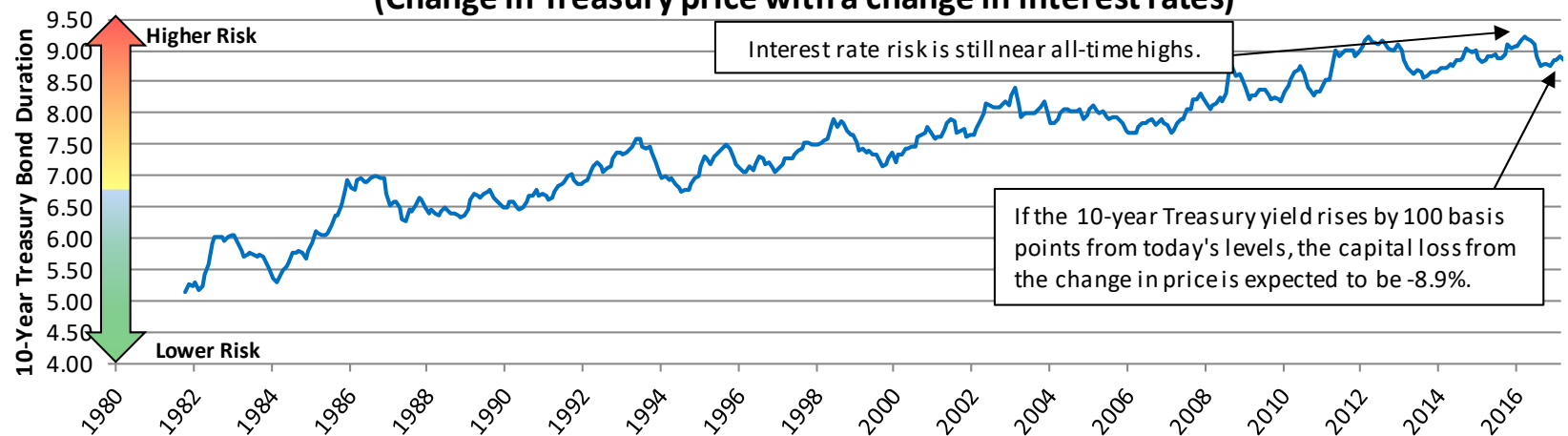


Sources: [www.ustreas.gov](http://www.ustreas.gov) for 10-year constant maturity rates

\*Federal Reserve Bank of Philadelphia survey of professional forecasts for inflation estimates

Exhibit 16

### 10-Year Treasury Duration (Change in Treasury price with a change in interest rates)



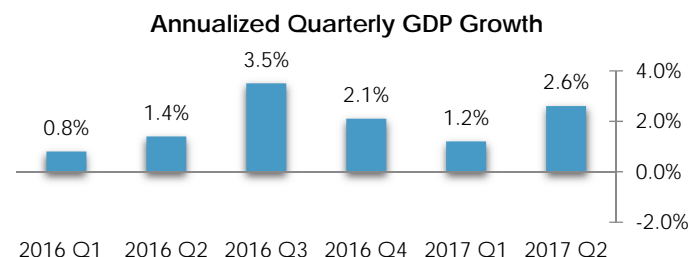
Source: [www.ustreas.gov](http://www.ustreas.gov) for 10-year constant maturity rates, calculation of duration

## ECONOMIC & MARKET OVERVIEW – 2Q 2017

**Overview:** US GDP growth increased by 2.6% in the second quarter of 2017. GDP growth during the quarter was driven mostly by increases in consumer spending, business investment, exports, and federal government spending. The unemployment rate decreased to 4.4% in the second quarter. The seasonally adjusted Consumer Price Index for All Urban Consumers increased by 0.1% on an annualized basis during the quarter. Commodities continued to decrease during the quarter and are negative over the trailing 1-year period at (14.8%). Global equity returns were positive for the quarter at 4.5% (MSCI ACWI). The US dollar depreciated against the Euro and the Pound but appreciated against the Yen. Bond markets produced positive returns over the quarter as the BC Universal increased by 1.5%.

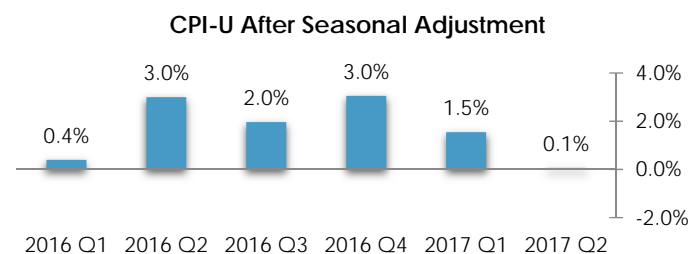
### Economic Growth

- Real GDP increased at an annualized rate of 2.6 percent in the second quarter of 2017.
- Real GDP growth was driven by increases in consumer spending, business investment, exports, and federal government spending.
- GDP growth gains were partially offset during the quarter by declines in housing investment, inventory investment, and state and local government spending.



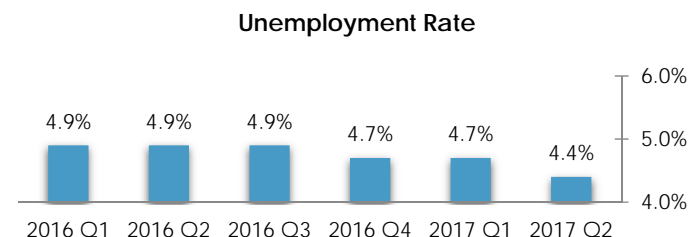
### Inflation

- The Consumer Price Index for All Urban Consumers (CPI-U) increased 0.1 percent in the quarter on an annualized basis after seasonal adjustment.
- Quarterly percentage changes may be adjusted between data publications due to periodic updates in seasonal factors.
- Core CPI-U increased by 1.0 percent for the quarter on an annualized basis after seasonal adjustment.
- Over the last 12 months, core CPI-U increased 1.7 percent after seasonal adjustment.



### Unemployment

- The US economy gained approximately 581,000 jobs in the quarter.
- The unemployment rate decreased to 4.4% at quarter end.
- The majority of jobs gained occurred in private service providing, professional and business services, and health care and social assistance. The primary contributors to jobs lost were in information, nondurable goods, and motor and vehicles parts.

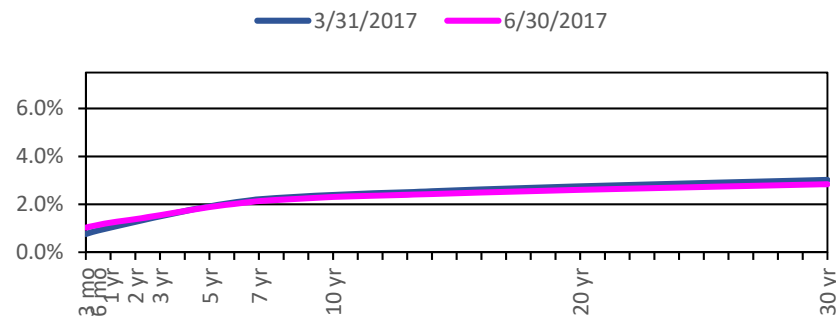


## ECONOMIC & MARKET OVERVIEW – 2Q 2017

### Interest Rates & US Dollar

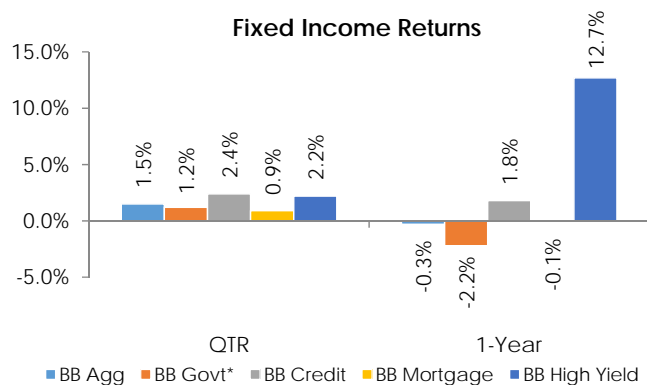
- The yield curve flattened over the quarter, with long-term rates generally falling and short-term rates generally rising.
- The Federal Reserve federal funds rate rose to between 1.00 percent and 1.25 percent.
- The markets appear to remain susceptible to central banks' policy shifts, as evidenced by their reaction to the ECB's tapering comments during the last week of the quarter.
- The US dollar depreciated against the Euro and the Pound by 7.3% and 3.8%, respectively, while appreciating against the Yen by 0.9%.

### Treasury Yield Curve Changes



### Fixed Income

- US bonds provided moderate returns over the quarter with Credit producing the strongest return at 2.4%.
- Over the trailing 1-year period, High Yield materially outperformed all other sectors producing a 12.7% return. Government trailed all other bond sectors with a return of minus (2.2%) over the period.



\*US Treasuries and Agencies

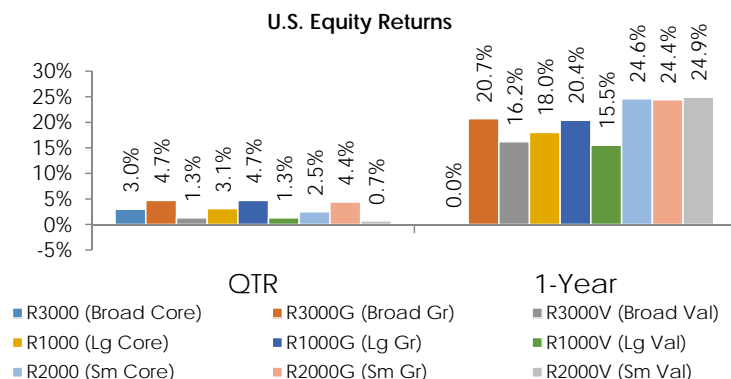
US Fixed Income Sector Performance (BB Aggregate Index)			
Sector	Weight	QTR	1 Year
Governments*	40.7%	1.2%	-1.9%
Agencies	3.5 %	0.9%	0.2%
Inv. Grade Credit	25.3%	2.5%	2.3%
MBS	28.1%	0.6%	0.5%
ABS	0.6%	0.6%	0.6%
CMBS	1.8%	1.3%	-0.3%

\*US Treasuries and Government Related

## ECONOMIC & MARKET OVERVIEW – 2Q 2017

### US Equities

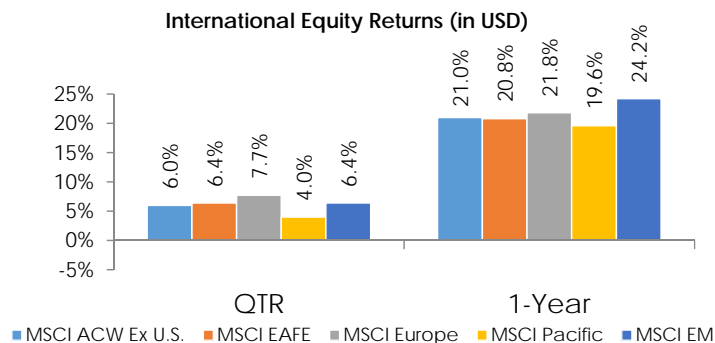
- During the quarter, growth stocks dominated value stocks across the market cap spectrum. In terms of market capitalization, large cap stocks outperformed small cap stocks. Large cap and broad growth stocks returned this quarter's strongest return with 4.7% each, and small cap value provided the weakest result with 0.7%.
- During the trailing 1-year period, US equities provided positive double-digit returns, with the top performer, small cap value, returning 24.9%. Conversely, large cap value trailed all other market caps and styles with a return of 15.5%.



US Equity Sector Performance (Russell 3000 Index)			
Sector	Weight	QTR	1 Year
Financial Services	21.2%	3.9%	27.6%
Technology	18.2%	3.7%	34.8%
Consumer Disc.	13.8%	3.0%	17.3%
Health Care	13.9%	7.3%	14.6%
Producer Durables	10.9%	4.5%	23.2%
Consumer Staples	7.2%	1.0%	23.1%
Energy	5.6%	-7.4%	-4.7%
Utilities	5.3%	1.3%	-2.0%
Materials & Proc.	3.9%	2.5%	20.8%

### International Equities

- International equities performed well over the quarter as each region provided positive returns. The best performer was Europe with a return of 7.7%. The Pacific trailed all other regions with a return of 4.0%.
- Over the trailing 1-year period, international equities provided double digit returns across the board. Emerging Markets led all other regions with a return of 24.2%, while the Pacific underperformed all other regions with a return of 19.6%.



International Equity Region Performance (in USD) (MSCI ACW Index ex US)			
Sector	Weight	QTR	1 Year
Europe Ex. UK	32.2%	8.9%	25.3%
Emerging Markets	23.9%	6.4%	24.2%
Japan	16.4%	5.2%	19.6%
United Kingdom	12.4%	4.7%	13.4%
Pacific Ex. Japan	8.5%	1.6%	19.6%
Canada	6.7%	0.8%	12.5%

## ECONOMIC & MARKET OVERVIEW – 2Q 2017

### Market Summary – Long-term Performance\*

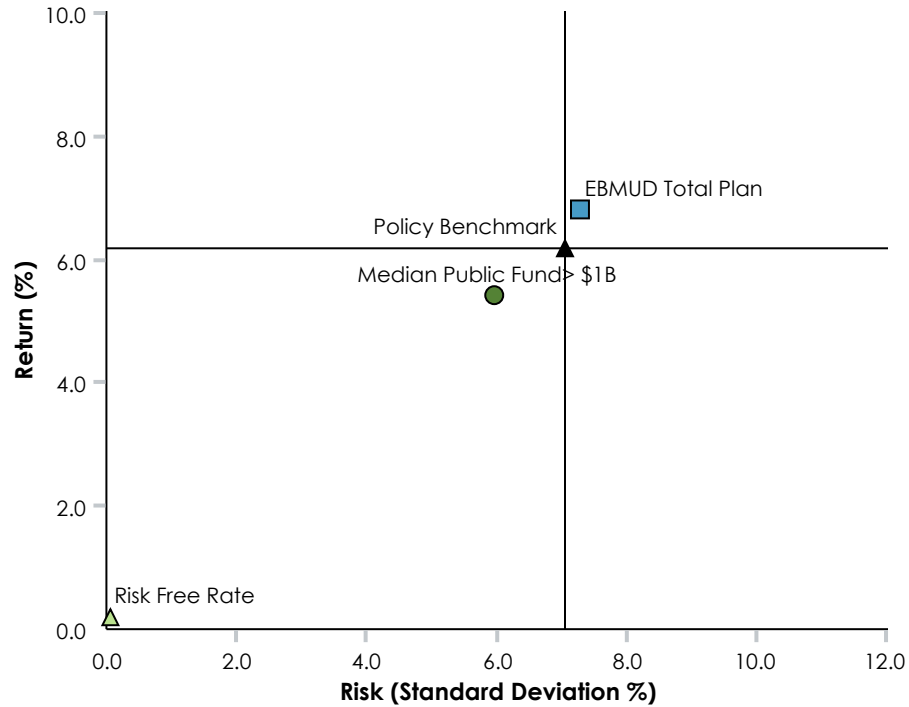
Indexes	Month	Quarter	1 Year	3 Years	5 Years	10 Years	20 Years
<b>Global Equity</b>							
MSCI AC World Index	0.5%	4.5%	19.4%	5.4%	11.1%	4.3%	5.9%
<b>Domestic Equity</b>							
S&P 500	0.6%	3.1%	17.9%	9.6%	14.6%	7.2%	7.2%
Russell 3000	0.9%	3.0%	18.5%	9.1%	14.6%	7.3%	7.4%
Russell 3000 Growth	0.0%	4.7%	20.7%	10.8%	15.2%	8.8%	6.6%
Russell 3000 Value	1.8%	1.3%	16.2%	7.3%	13.9%	5.6%	7.8%
Russell 1000	0.7%	3.1%	18.0%	9.3%	14.7%	7.3%	7.4%
Russell 1000 Growth	-0.3%	4.7%	20.4%	11.1%	15.3%	8.9%	6.6%
Russell 1000 Value	1.6%	1.3%	15.5%	7.4%	13.9%	5.6%	7.7%
Russell 2000	3.5%	2.5%	24.6%	7.4%	13.7%	6.9%	8.0%
Russell 2000 Growth	3.4%	4.4%	24.4%	7.6%	14.0%	7.8%	6.5%
Russell 2000 Value	3.5%	0.7%	24.9%	7.0%	13.4%	5.9%	9.0%
Russell Microcap	5.2%	3.8%	27.6%	6.7%	13.7%	5.5%	---
CBOE BXM Index	0.4%	3.1%	12.1%	6.5%	7.7%	4.6%	6.7%
<b>International Equity</b>							
MSCI AC World Index ex USA	0.4%	6.0%	21.0%	1.3%	7.7%	1.6%	5.0%
MSCI EAFE	-0.1%	6.4%	20.8%	1.6%	9.2%	1.5%	4.7%
MSCI Pacific	-1.1%	7.7%	21.8%	0.3%	9.4%	1.2%	5.9%
MSCI Europe	1.4%	4.0%	19.6%	4.3%	8.8%	2.2%	2.8%
MSCI EM (Emerging Markets)	1.1%	6.4%	24.2%	1.4%	4.3%	2.2%	5.8%
<b>Fixed Income</b>							
BB Universal	-0.1%	1.5%	0.9%	2.8%	2.7%	4.7%	5.4%
Global Agg. - Hedged	-0.3%	1.0%	-0.4%	3.3%	3.3%	4.5%	5.2%
BB Aggregate Bond	-0.1%	1.4%	-0.3%	2.5%	2.2%	4.5%	5.2%
BB Government	-0.2%	1.2%	-2.2%	2.0%	1.3%	3.9%	4.9%
BB Credit Bond	0.3%	2.4%	1.8%	3.4%	3.7%	5.6%	6.0%
BB Mortgage Backed Securities	-0.4%	0.9%	-0.1%	2.2%	2.0%	4.3%	5.1%
BB High Yield	0.1%	2.2%	12.7%	4.5%	6.9%	7.7%	7.0%
BB WGIL All Maturities - Hedged	-1.4%	-0.4%	1.9%	4.2%	3.0%	5.1%	---
Emerging Markets Debt	-0.2%	1.8%	5.6%	4.5%	5.3%	7.1%	8.5%
<b>Real Estate</b>							
NCREIF*	0.6%	1.7%	7.9%	11.3%	11.8%	5.3%	9.2%
FTSE NAREIT All Equity Index	2.0%	2.4%	1.4%	8.9%	10.0%	6.0%	9.1%
<b>Commodity Index</b>							
Bloomberg Commodity Index	-0.2%	-3.0%	-6.5%	-14.8%	-9.3%	-6.5%	0.2%

\* Performance is annualized for periods greater than one year.

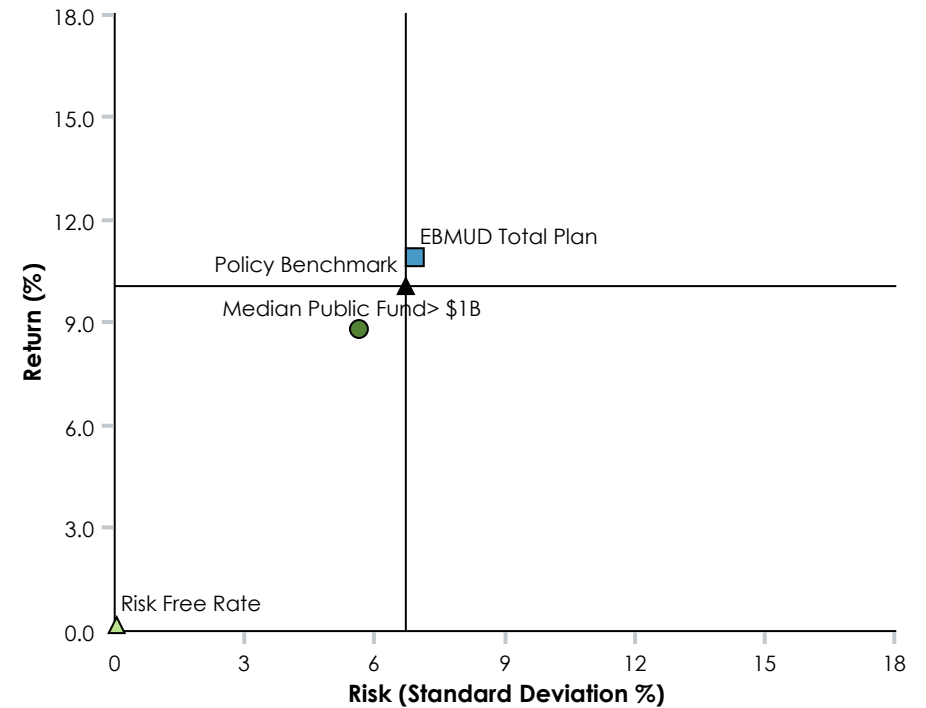
## EBMUD Portfolio Review

Gross Investment Performance As of June 30, 2017

Total Fund Risk/Return Analysis - Latest 3 Years



Total Fund Risk/Return Analysis - Latest 5 Years

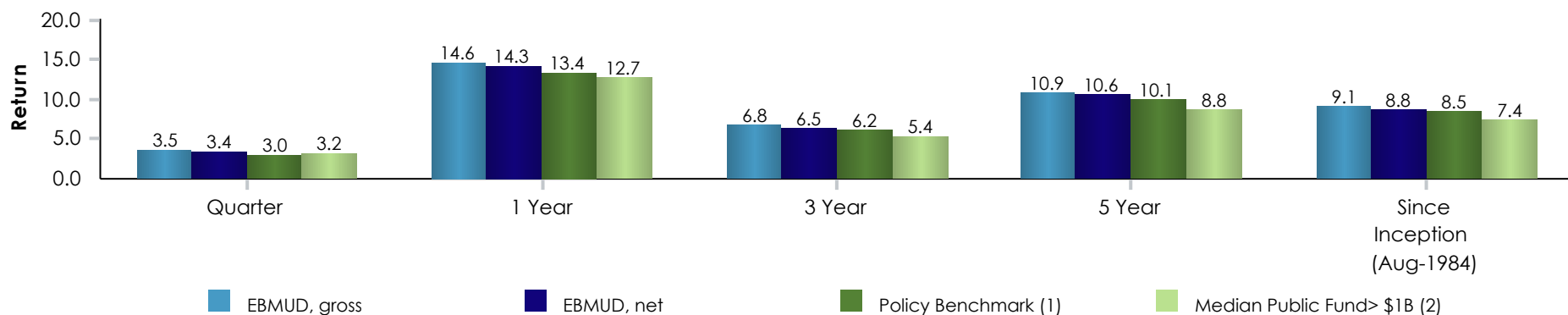


	3 Years Return	3 Years Standard Deviation	3 Years Sharpe Ratio	5 Years Return	5 Years Standard Deviation	5 Years Sharpe Ratio
EBMUD Total Plan	6.8	7.3	0.9	10.9	6.9	1.5
<i>Policy Benchmark</i>	<i>6.2</i>	<i>7.1</i>	<i>0.9</i>	<i>10.1</i>	<i>6.7</i>	<i>1.4</i>
Median Public Fund > \$1B Median	5.4	6.0	0.9	8.8	5.7	1.5

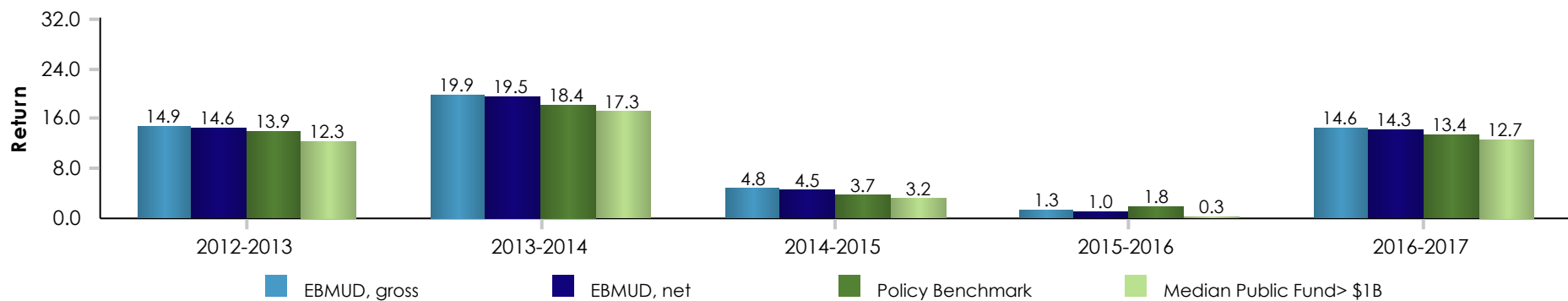
## EBMUD Portfolio Relative Performance Results

As of June 30, 2017

### Trailing Period Performance (annualized)



### 12-month Performance- As of June 30, 2017



(1) Policy Benchmark consists of 40% Russell 3000 (blend), 15% MSCI ACWIxU.S. (blend), 20% CBOE BXM, 10% BC Aggregate, 5% BC 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), and 2.5% FTSE NAREIT Equity REITs index 4/1/14-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 June 30, 2017

	Asset Allocation (\$000)	Asset Allocation (%)	Target Allocation* (%)	Variance (%)	Minimum Allocation*** (%)	Maximum Allocation*** (%)
EBMUD Total Plan	1,610,435	100.0	100.0	0.0	-	-
Domestic Equity	699,993	43.5	40.0	3.5	35.0	45.0
International Equity	214,164	13.3	15.0	-1.7	12.0	18.0
Core Fixed Income	140,236	8.7	10.0	-1.3	7.0	13.0
Non-Core Fixed Income	131,711	8.2	10.0	-1.8	8.0	12.0
Covered Calls	337,055	20.9	20.0	0.9	16.0	24.0
Real Estate**	84,013	5.2	5.0	0.2	3.0	7.0
Cash	3,263	0.2	0.0	0.2	0.0	0.0

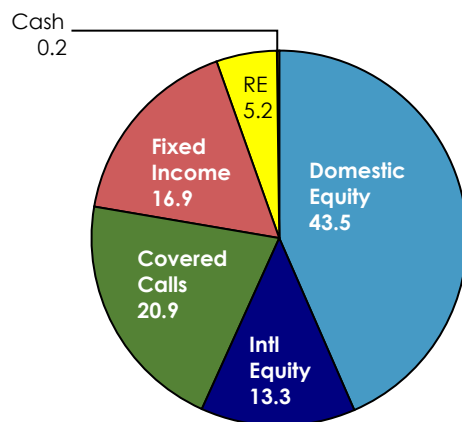
\*Policy target allocations elected by the Board in September 2013, which took effect March 2014 upon the funding of the new Covered Calls asset class and Non-Core Bonds allocation within Total Fixed Income.

\*\*RREEF performance results and allocation are lagged one-quarter.

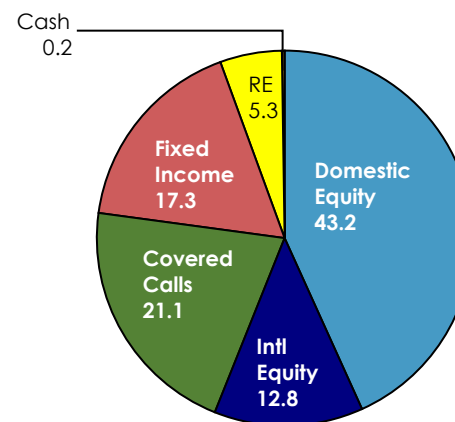
\*\*\*Policy rebalancing ranges shown are for non-turbulent market periods. The Plan also has established rebalancing ranges to be in effect during turbulent market periods.

### Actual Asset Allocation Comparison

June 30, 2017 : \$1,610,435,485



March 31, 2017 : \$1,557,484,391





## Manager Performance - Gross of Fees

As of June 30, 2017

### Domestic Equity

Manager - Style	Market Value (\$000)	Quarter	1 Year	3 Year	5 Year
<b>Large Cap Core</b>					
Northern Trust Co. - Passive	280,629	3.1	18.1	9.3	14.7
<i>Russell 1000 Index</i>		<i>3.1</i>	<i>18.0</i>	<i>9.3</i>	<i>14.7</i>
<b>Large Cap Growth</b>					
Intech - Active*	83,181	5.9	18.0	12.0	15.5
T.Rowe Price - Active	84,668	7.7	29.9	13.2	17.1
<i>Russell 1000 Growth Index</i>		<i>4.7</i>	<i>20.4</i>	<i>11.1</i>	<i>15.3</i>
<b>Large Cap Value</b>					
Barrow Hanley - Active	185,041	3.3	18.2	8.0	13.7
<i>Russell 1000 Value Index</i>		<i>1.3</i>	<i>15.5</i>	<i>7.4</i>	<i>13.9</i>
<b>Small Cap Growth</b>					
Northern Trust Co. - Passive	29,571	4.4	24.8	8.0	14.3
<i>Russell 2000 Growth Index</i>		<i>4.4</i>	<i>24.4</i>	<i>7.6</i>	<i>14.0</i>
<b>Small Cap Value</b>					
Opus - Active**	36,903	1.7	23.5	7.2	12.9
<i>Russell 2000 Value Index</i>		<i>0.7</i>	<i>24.9</i>	<i>7.0</i>	<i>13.4</i>

\*On watch since 12/2014

\*\*On watch since 12/2012

- During the latest three-month period ending June 30, 2017, all six of EBMUD's Domestic Equity managers either matched or outperformed their respective benchmarks.
- Both of EBMUD's passive Domestic Equity mandates performed in-line with their respective benchmarks.
- Several of EBMUD's active Domestic Equity managers produced material outperformance/underperformance relative to their respective benchmarks over various trailing periods ending 6/30/2017. The following address the drivers of these excess results.
  - Intech, one of EBMUD's large cap growth managers, **outperformed** the Russell 1000 Growth Index over the recent quarter by 1.2% as the strategy benefitted from favorable security selection, notably within Health Care and Consumer Discretionary. An overweight to select mid-cap technology stocks that posted strong results also contributed to results. Over the 1-year period the portfolio **trailed** the benchmark by (2.4%). The portfolio's underperformance is a demonstration of "negative trending," which, according to Intech, occurs when the proportion of the overweighted stocks with a positive relative return is below that of the underweights.
  - T. Rowe Price, EBMUD's other large cap growth manager, **exceeded** the Russell 1000 Growth Index over the latest quarter, 1-, 3-, and 5-year periods by 3.0%, 9.5%, 2.1%, and 1.8%, respectively. Stock selection drove relative outperformance over each period. Selection in Information Technology was notably positive for the recent quarter, while Consumer Discretionary and Industrials led 1-year results. Over the 3- and 5-year periods, stock selection in Information Technology and Consumer Discretionary were both strong contributors.
  - Barrow Hanley, EBMUD's large cap value manager, **outperformed** the Russell 1000 Value Index by 2.0% and 2.7% over the quarter and 1-year period, respectively. Stock selection in Energy and an underweight to Health Care contributed to results for the quarter. Relative outperformance for the 1-year period was driven by stock selection in Financials and Energy, a lack of exposure to Real Estate, and an underweight to Utilities.
  - Opus, EBMUD's active small cap value manager, **outperformed** the Russell 2000 Value Index over the quarter by 1.0% as sector allocation decisions drove results. Over the 1-year period the portfolio **trailed** the benchmark by (1.4%) namely due to weak stock selection in Financials.

## Manager Performance - Gross of Fees

As of June 30, 2017

### International Equity

Manager - Style	Market Value (\$000)	Quarter	1 Year	3 Year	5 Year
Fisher Investments - Active	112,994	8.9	26.5	4.2	9.4
Franklin Templeton - Active*	101,170	5.8	23.7	-0.4	8.3
MSCI ACWI x US (blend)**		6.0	21.0	1.3	7.7

- During the latest three-month period ending June 30, 2017, one of EBMUD's two International Equity managers outperformed the MSCI ACWI x U.S. (blend) Index.
- Both International Equity managers produced material outperformance/underperformance relative to their respective benchmarks over various time periods ending 6/30/2017. The following addresses the drivers of these excess returns.
  - Fisher **outperformed** the MSCI ACWI x U.S. (blend) Index over the recent quarter, 1-, 3-, and 5-year periods by 2.9%, 5.5%, 2.9%, and 1.7%, respectively. Selection within Banks and Chinese Information Technology were the largest contributors to relative results for the quarter. Over the longer time periods, performance was driven by an overweight to and selection within Information Technology. An underweight to and selection within Energy additionally contributed to 3-year results, and an underweight to and selection within Canada helped 5-year results.
  - The Franklin Templeton account **exceeded** the MSCI ACWI x U.S. (blend) Index over the 1-year period by 2.7% as stock selection in Financials, Materials, and Information Technology benefitted results. Underweights to Consumer Staples and Utilities also contributed. Over the 3-year period the portfolio **trailed** the benchmark by (1.7%) largely due to stock selection in Utilities. Stock selection in Consumer Staples, Information Technology, and Industrials further weighed negatively on results.

\*Franklin Templeton's historical returns are reported net of fees (inception - 6/30/2011). The Franklin Templeton institutional mutual fund account was liquidated in June 2011 and moved to a transition account, which later funded the Franklin Templeton new separate account in the same month. The Q2 2011 return is an aggregate of the institution mutual fund account, Franklin transient account, and new separate account.

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

## Manager Performance - Gross of Fees

As of June 30, 2017

### Covered Calls

Manager - Style	Market Value (\$000)	Quarter	1 Year	3 Year	5 Year
Parametric BXM	113,788	2.9	12.7	8.6	-
Parametric Delta Shift	118,693	3.3	16.8	9.9	-
Van Hulzen	104,575	1.9	8.7	5.3	-
<b>CBOE BXM</b>		<b>3.1</b>	<b>12.1</b>	<b>6.5</b>	<b>-</b>

- Over the latest quarter ending June 30, 2017, one of EBMUD's three Covered Calls mandates exceeded the CBOE BXM Index.
  - The Parametric BXM strategy **outperformed** the CBOE BXM Index over the 3-year period by 2.1%. Outperformance can be attributed to the strategy diversifying option expiration dates to reduce path dependency versus the passive index. The long-term spread between implied and realized volatilities remain attractive.
  - Parametric Delta Shift strategy **exceeded** the benchmark over the 1- and 3-year periods by 4.7% and 3.4%, respectively. The options portion of the portfolio contributed to second quarter results. The Delta Shift strategy utilizes a systematic rules-based approach that seeks to mitigate risk. The strategy performs best in down, flat, moderately trending or range bound equity markets.
  - Van Hulzen, **trailed** the CBOE BXM Index over the latest quarter, 1- and 3-year periods by (1.2%), (3.4%), and (1.2%), respectively. For the quarter, the volatility index (VIX) was down 10%; this index is a key determinant of the level of option premium received when writing call options. Note, since the creation of the index in the nineties, the index has only closed below 10.0 on 14 days - a total of six of those days occurred over the recent quarter. The covered call strategy thrives in higher volatility environments as it makes the total return performance less dependent on price appreciation.

## Manager Performance - Gross of Fees

As of June 30, 2017

### Total Fixed Income

Manager - Style	Market Value (\$000)	Quarter	1 Year	3 Year	5 Year
<b>Core Fixed Income</b>					
CS McKee - Active	140,236	1.5	0.1	2.9	2.6
<i>Bloomberg Barclays U.S. Aggregate Index</i>		1.4	-0.3	2.5	2.2
<b>Non- Core Fixed Income</b>					
Western Asset - Short Duration - Active	66,661	0.6	1.1	1.3	-
<i>Bloomberg Barclays 1-3 Year Gov/Credit Index</i>		0.3	0.3	1.0	-
Western Asset - Short-Term HY - Active*	31,159	1.5	11.2	-0.7	-
<i>Bloomberg Barclays US High Yield 1-5 Yr Cash Pay 2%</i>		1.8	12.0	3.8	-
Western Asset - Bank Loans - Active**	33,891	0.5	7.0	2.3	-
<i>S&amp;P/LSTA Performing Loans Index</i>		0.8	7.7	3.9	-

\*On watch since 4/2016

\*\* On watch since 4/2016

- Over the latest three-month period ending June 30, 2017, two of EBMUD's four Fixed Income mandates outperformed their respective benchmarks.
- Two of EBMUD's Fixed Income managers produced material underperformance relative to their respective benchmarks over various trailing time periods ending 6/30/2017. The following items address the primary detractors to these excess returns:
  - The WAMCO Bank Loans portfolio **underperformed** the S&P/LSTA Performing Loans Index over the 3-year period by (1.6%). Sub-sector allocation, particularly an overweight to Energy, was a significant detractor. Additionally, issue selection had a negative impact on performance largely due to positions in select holdings.
  - The WAMCO Short-Term High Yield portfolio **underperformed** the Bloomberg BC 1-5 Year U.S. High Yield Cash Pay Index by (4.5%) over the 3-year period. Note, the composite portfolio is not measured against a benchmark and accounts that comprise the composite are measured on an absolute basis. The portfolio's positioning in the Energy sub-sector and issue selection in select holdings detracted from results.

## Manager Performance - Gross of Fees

As of June 30, 2017

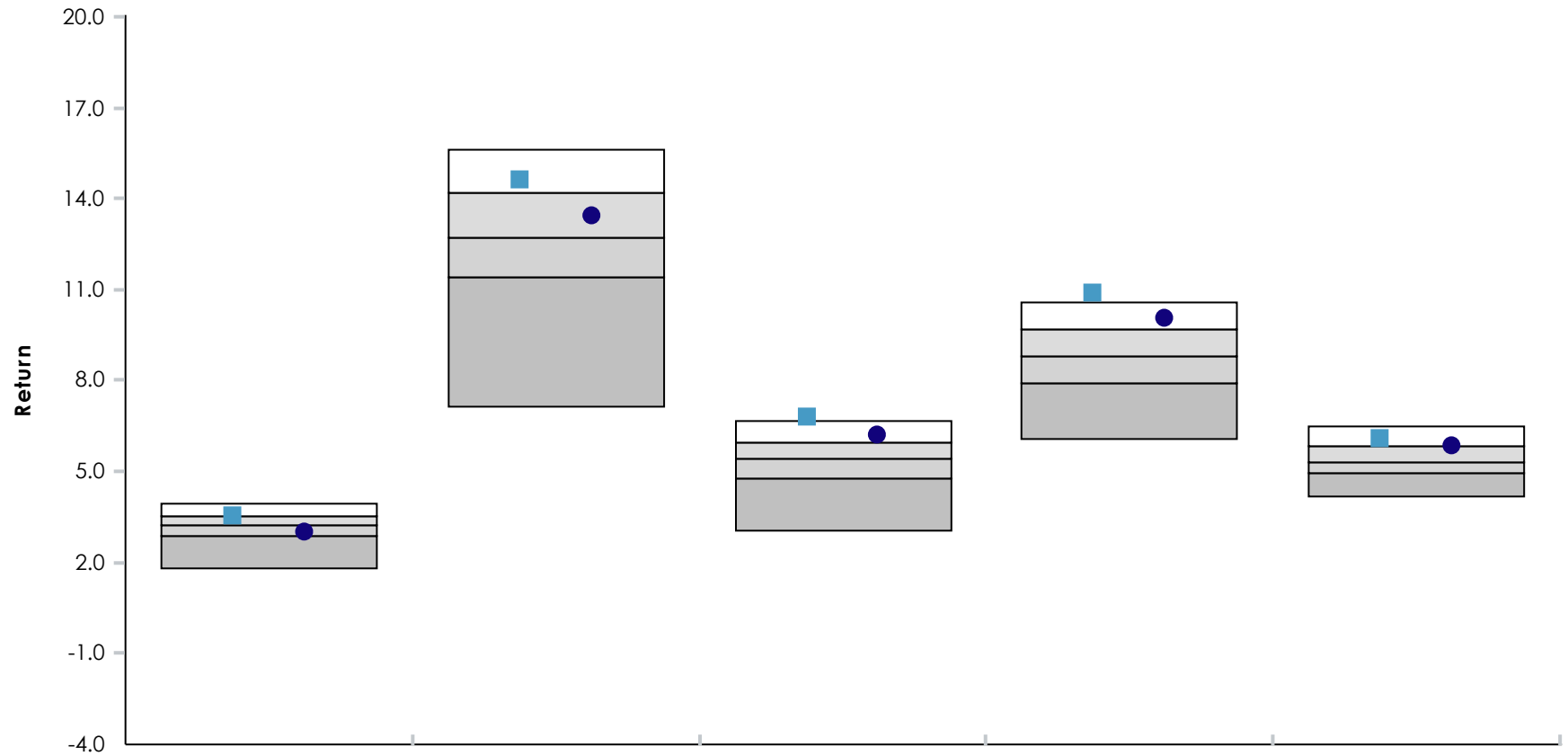
### Real Estate

Manager - Style	Market Value (\$000)	Quarter	1 Year	3 Year	5 Year
RREEF America II (Lag)*	34,405	1.5	8.6	12.4	12.9
<i>NCREIF NPI (Lag)*</i>		<i>0.0</i>	<i>5.6</i>	<i>10.0</i>	<i>10.4</i>
CenterSquare	49,608	1.1	-2.4	9.5	10.5
<i>FTSE NAREIT Equity REIT Index</i>		<i>1.5</i>	<i>-1.7</i>	<i>8.4</i>	<i>9.5</i>

\*Results are lagged one quarter.

- East Bay's Real Estate manager, RREEF II, **outperformed** its benchmark, the NCREIF Property Index, during each period measured. During the lagged quarter, RREEF America REIT II operations generated an income return of 1.0% before fees, decreasing slightly from the previous quarter. Same store net operating income for the 1-year period increased by 5% from the prior year. Occupancy at the end of the quarter was 91 percent overall.
- CenterSquare, East Bay's REIT manager, **trailed** the FTSE NAREIT Equity REITs Index return over the short-term periods but **exceeded** its benchmark over the extended time periods measured. From a sector performance perspective, Industrials performed the best over the recent quarter, in addition to Data Centers, Residential, and Healthcare. The Retail sector was the worst performing sector for the period.

**Plan Sponsor Peer Group Analysis**  
As of June 30, 2017



	1 Quarter	1 Year	3 Years	5 Years	10 Years
EBMUD Total Plan	3.5 (30)	14.6 (15)	6.8 (3)	10.9 (1)	6.1 (15)
Policy Benchmark	3.0 (66)	13.4 (34)	6.2 (16)	10.1 (14)	5.8 (29)
5th Percentile	3.9	15.6	6.7	10.6	6.5
1st Quartile	3.5	14.2	5.9	9.7	5.8
Median	3.2	12.7	5.4	8.8	5.3
3rd Quartile	2.8	11.4	4.8	7.9	4.9
95th Percentile	1.8	7.1	3.0	6.1	4.2

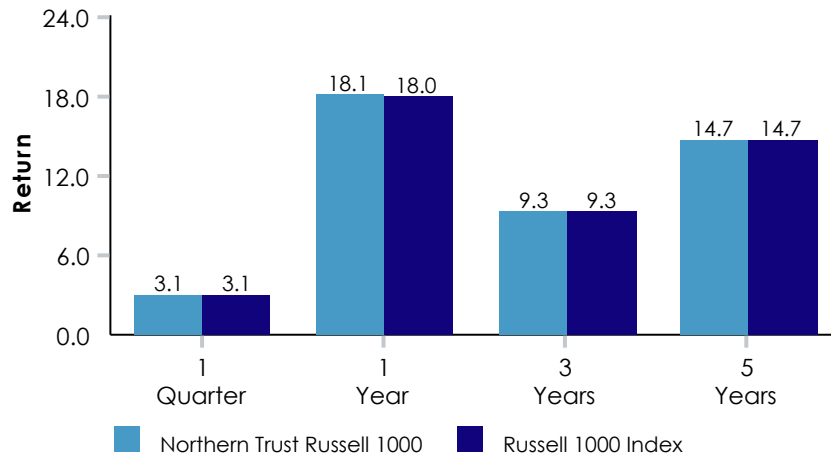
Parenteses contain percentile rankings.  
Calculation based on monthly periodicity.

## Northern Trust Russell 1000 - gross of fees

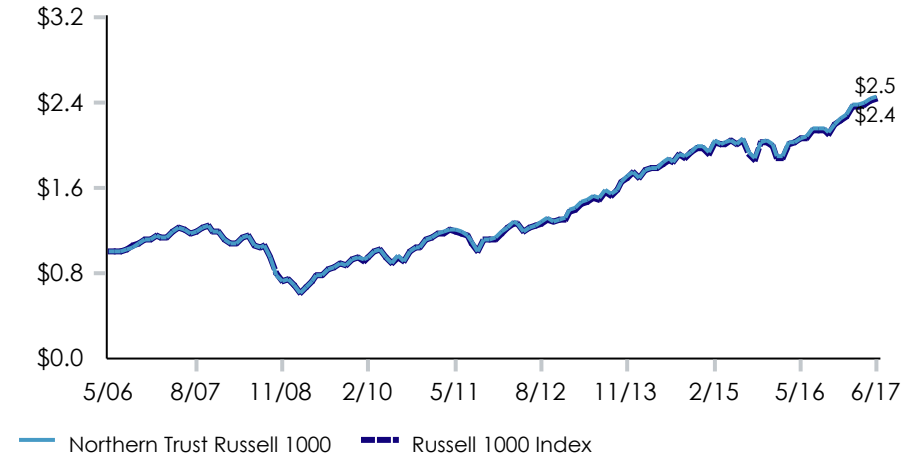
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Northern Trust Russell 1000	0.05	1.00	0.47	0.56	0.13	1.00	100.22	99.94	06/01/2006
Russell 1000 Index	0.00	1.00	-	0.56	0.00	1.00	100.00	100.00	06/01/2006

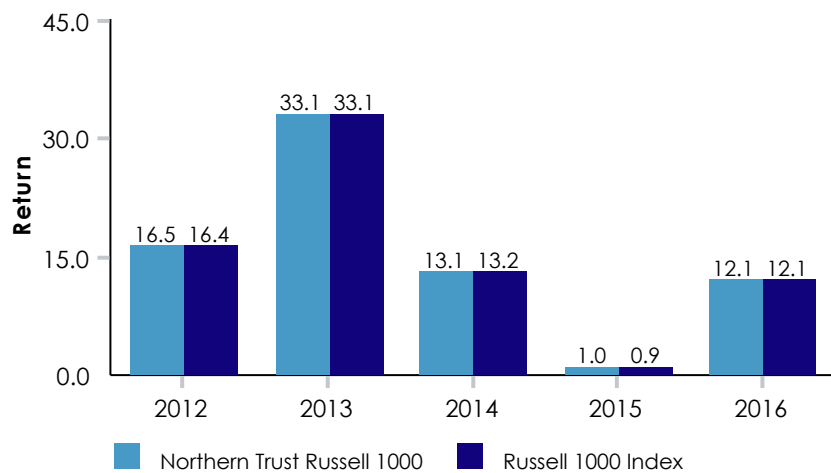
### Trailing Period Performance



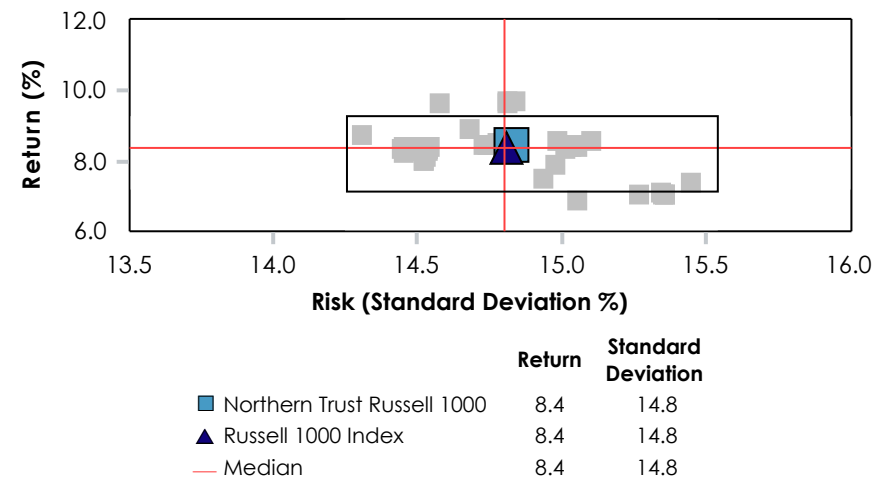
### Growth of \$1 - Since Inception



### Calendar Year Performance



### Risk/Return - Since Inception

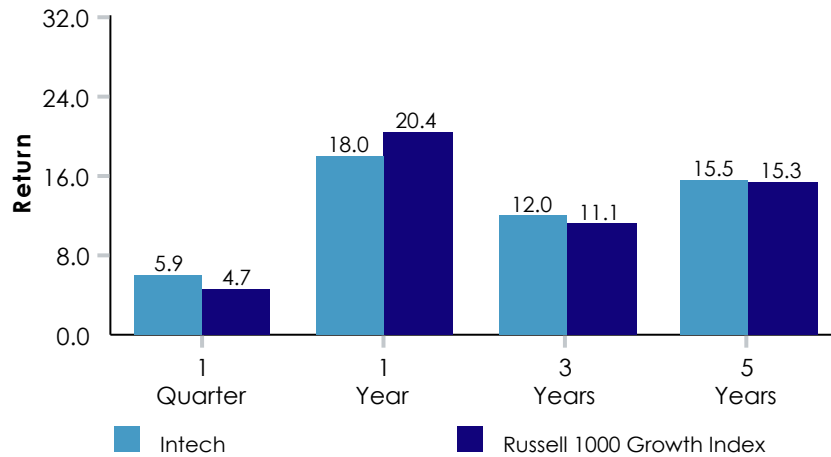


## Intech - gross of fees

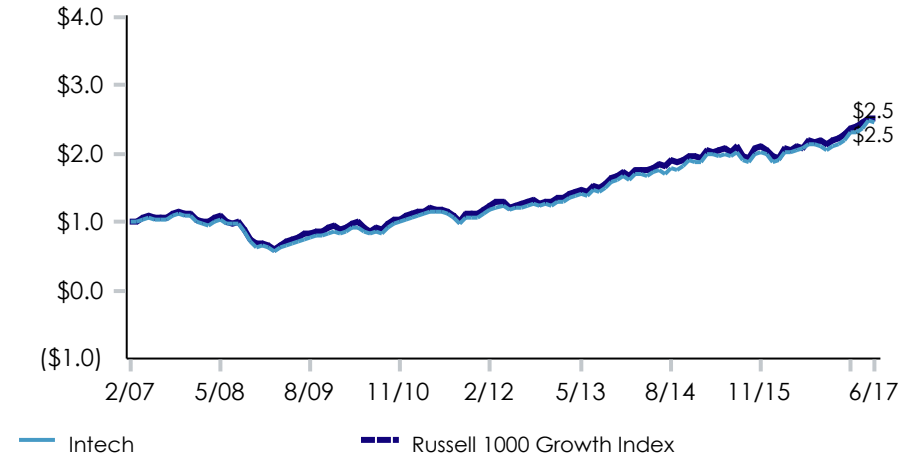
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Intech	0.08	0.97	-0.08	0.61	2.95	0.96	97.17	96.87	03/01/2007
Russell 1000 Growth Index	0.00	1.00	-	0.62	0.00	1.00	100.00	100.00	03/01/2007

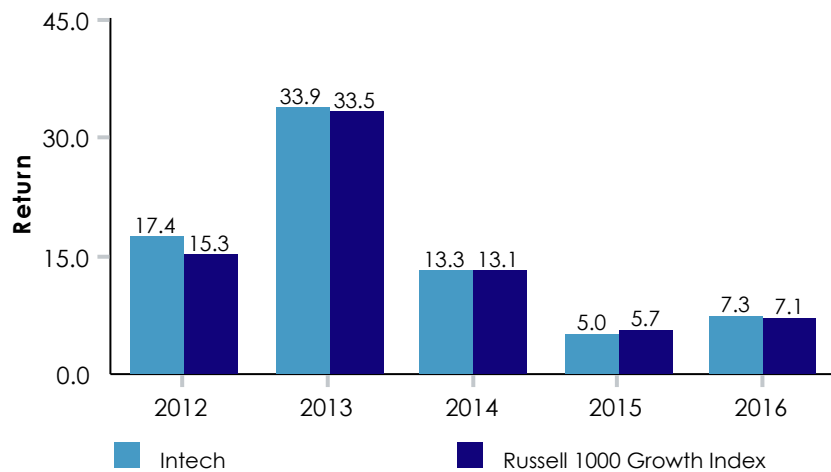
### Trailing Period Performance



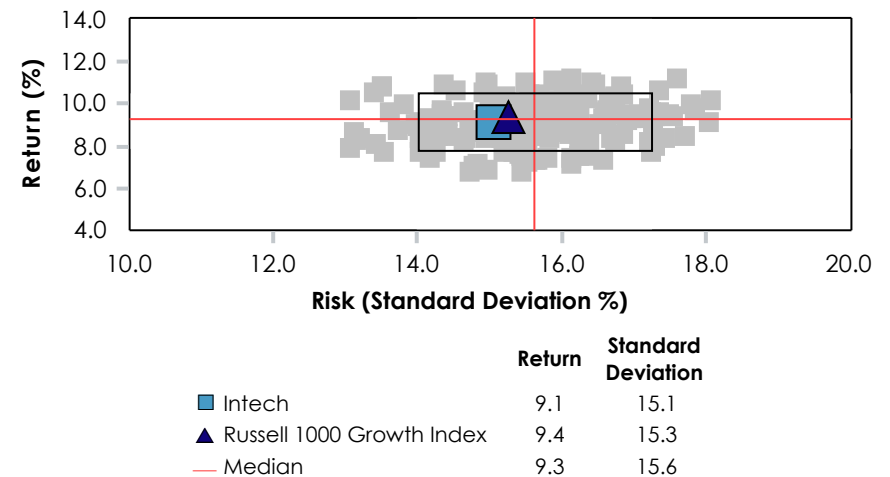
### Growth of \$1 - Since Inception



### Calendar Year Performance



### Risk/Return - Since Inception



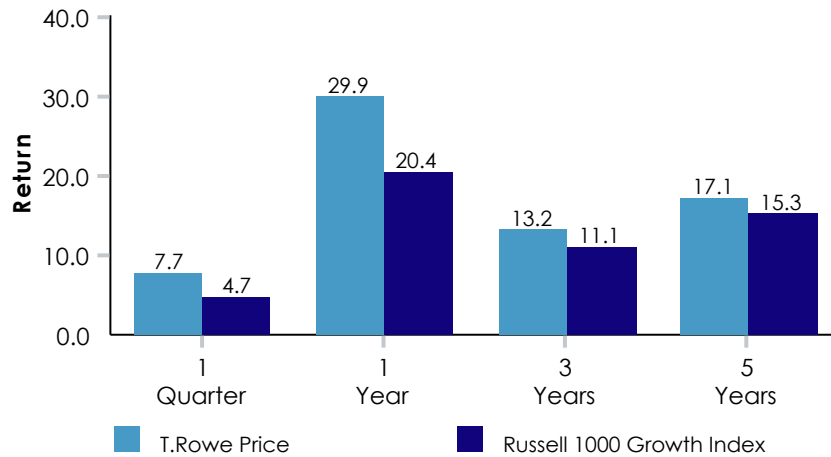


## T.Rowe Price - gross of fees

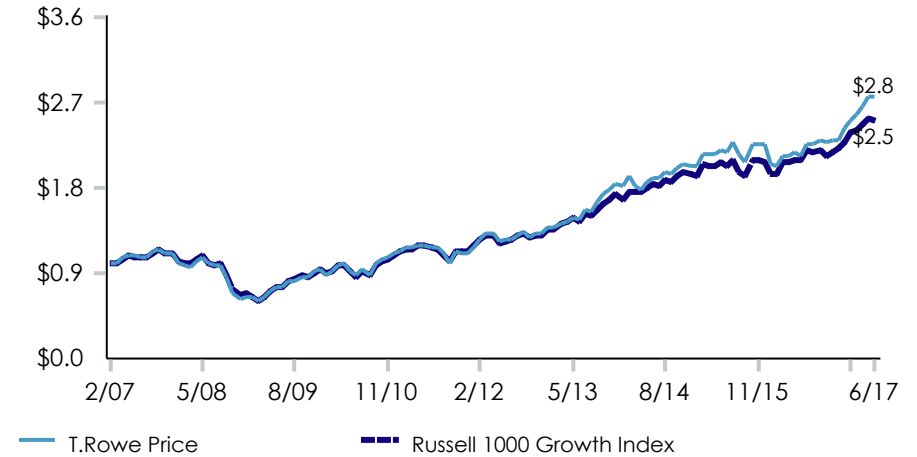
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
T.Rowe Price	0.51	1.06	0.30	0.64	3.69	0.95	106.89	104.18	03/01/2007
Russell 1000 Growth Index	0.00	1.00	-	0.62	0.00	1.00	100.00	100.00	03/01/2007

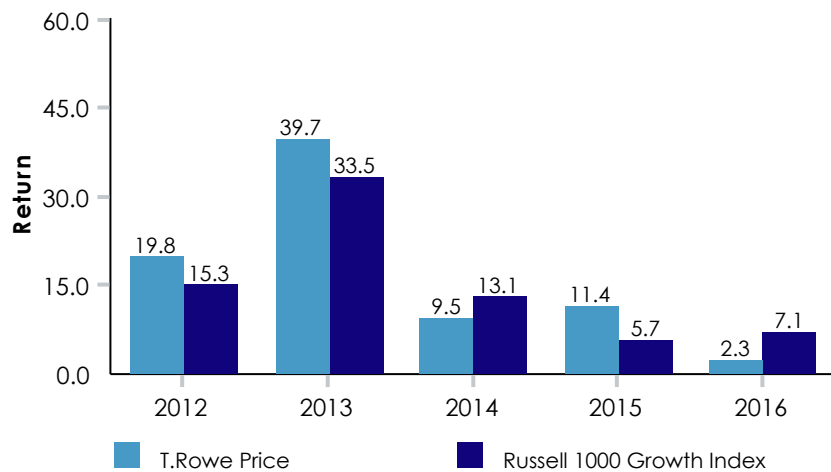
### Trailing Period Performance



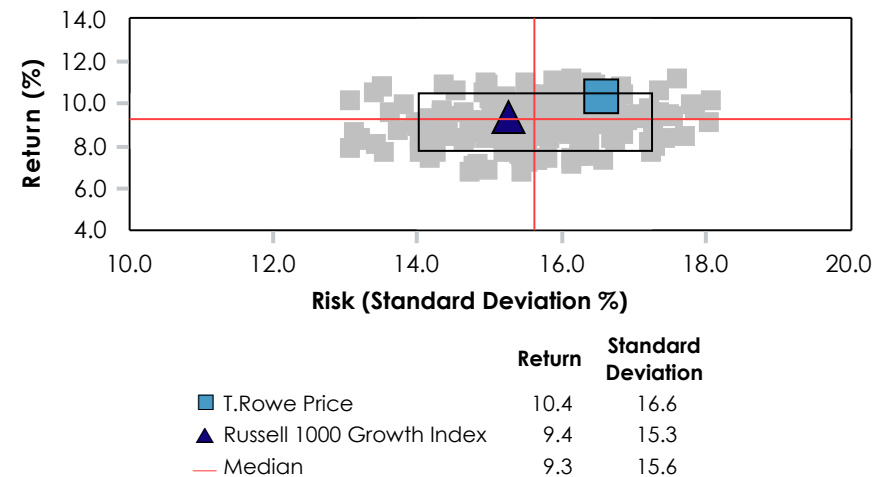
### Growth of \$1 - Since Inception



### Calendar Year Performance



### Risk/Return - Since Inception

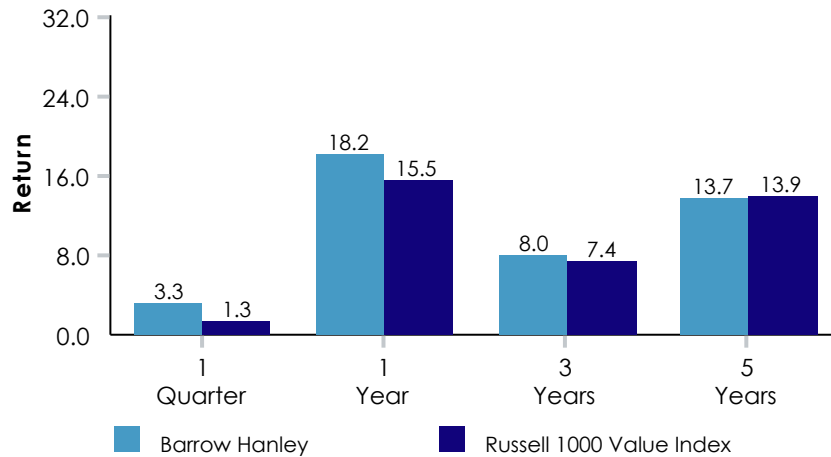


## Barrow Hanley - gross of fees

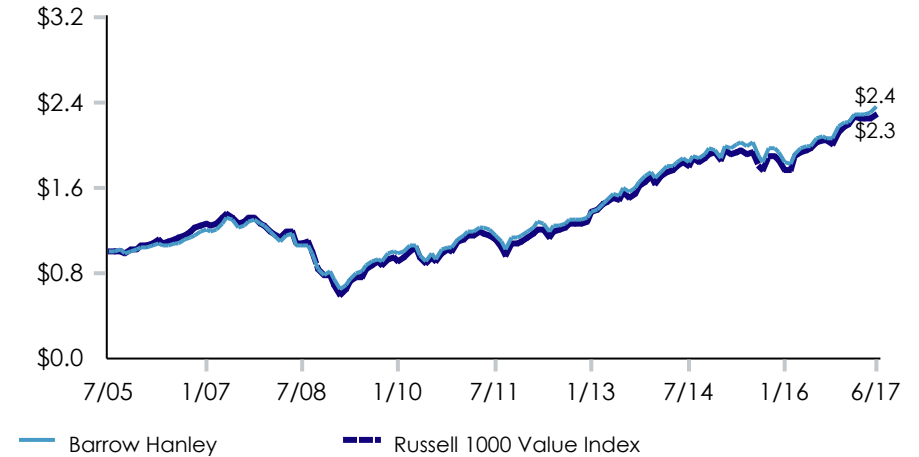
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Barrow Hanley	0.72	0.93	0.06	0.50	3.26	0.95	96.04	92.82	08/01/2005
Russell 1000 Value Index	0.00	1.00	-	0.46	0.00	1.00	100.00	100.00	08/01/2005

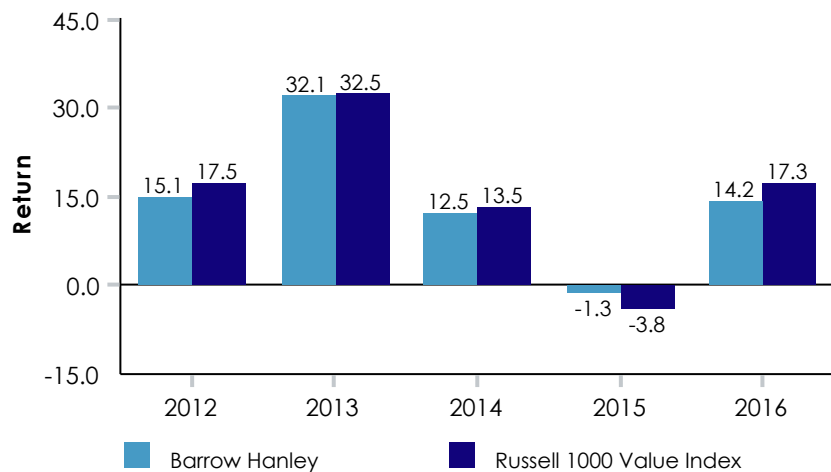
### Trailing Period Performance



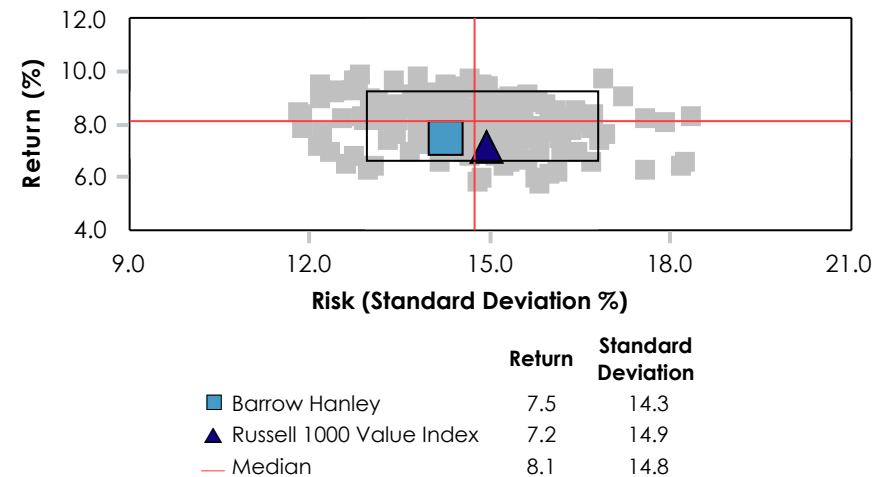
### Growth of \$1 - Since Inception



### Calendar Year Performance



### Risk/Return - Since Inception

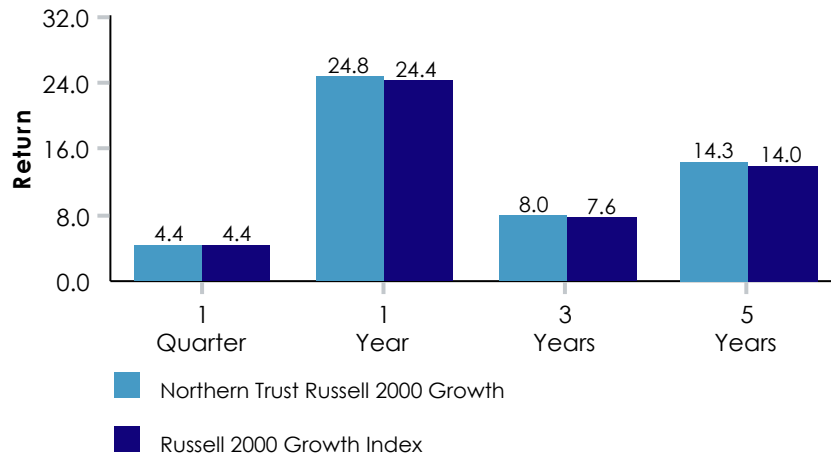


## Northern Trust Russell 2000 Growth - gross of fees

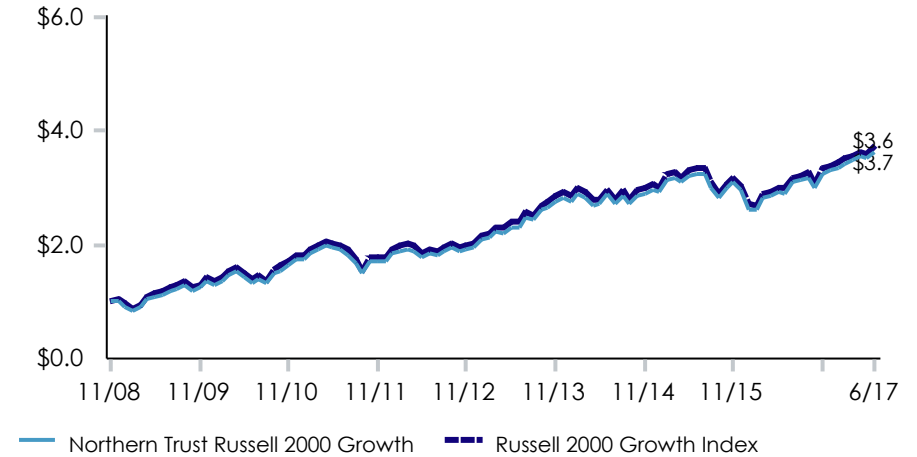
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Northern Trust Russell 2000 Growth	-0.15	0.99	-0.16	0.90	1.89	0.99	98.77	99.25	12/01/2008
Russell 2000 Growth Index	0.00	1.00	-	0.91	0.00	1.00	100.00	100.00	12/01/2008

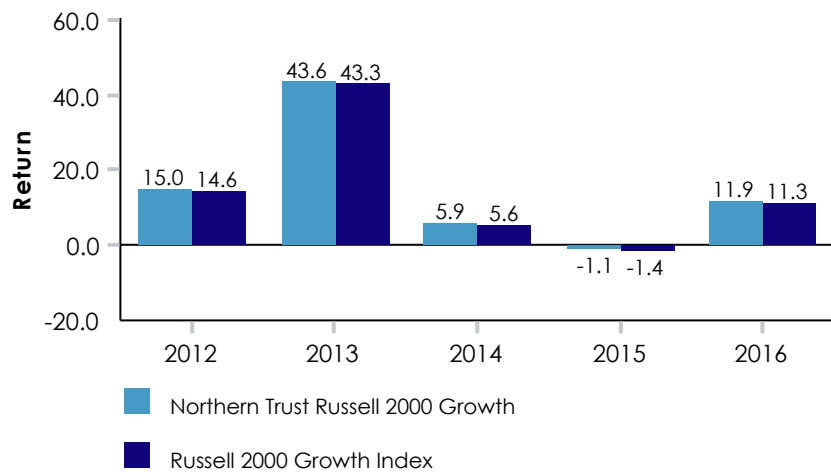
### Trailing Period Performance



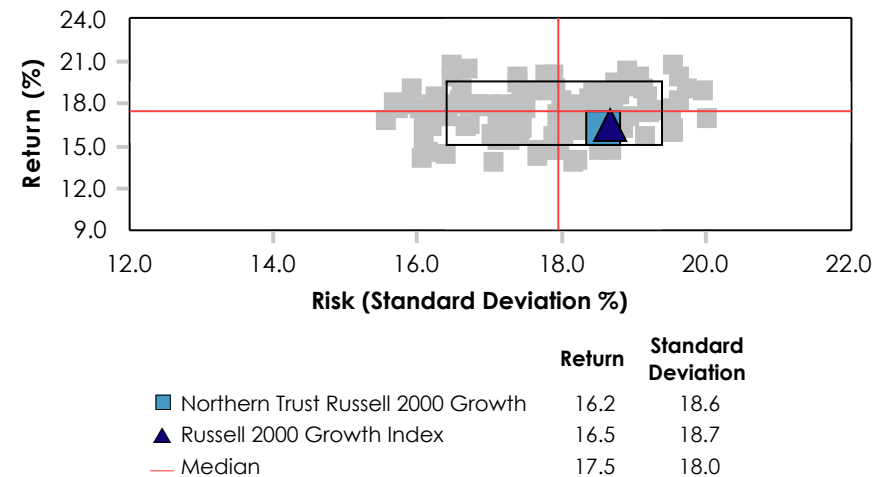
### Growth of \$1 - Since Inception



### Calendar Year Performance



### Risk/Return - Since Inception

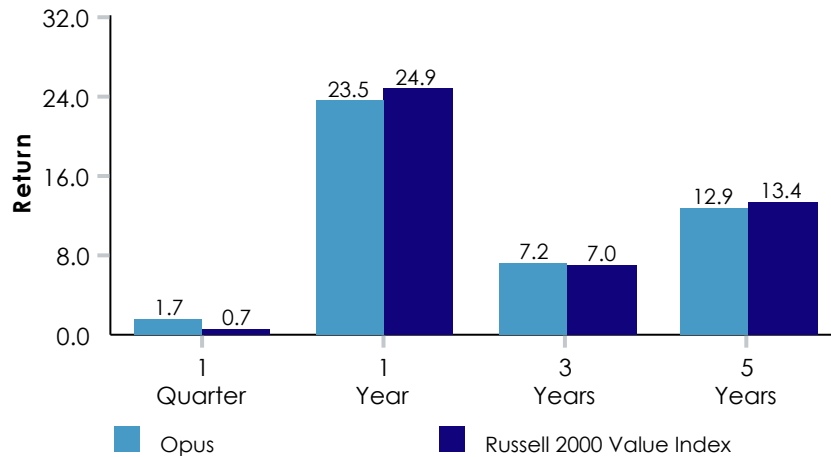


## Opus - gross of fees

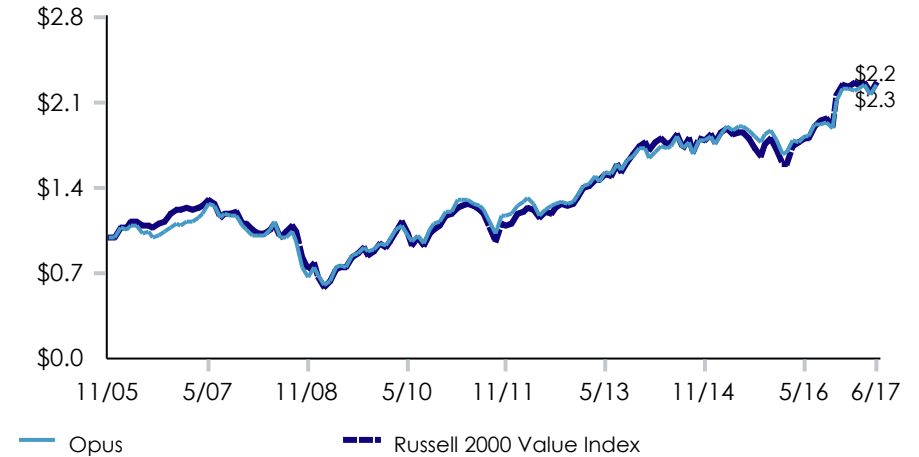
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Opus	0.54	0.92	-0.03	0.41	5.82	0.91	92.31	89.82	12/01/2005
Russell 2000 Value Index	0.00	1.00	-	0.41	0.00	1.00	100.00	100.00	12/01/2005

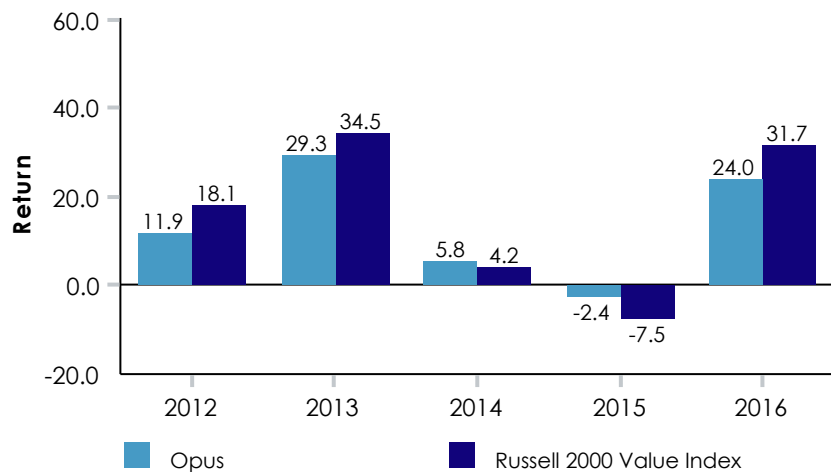
### Trailing Period Performance



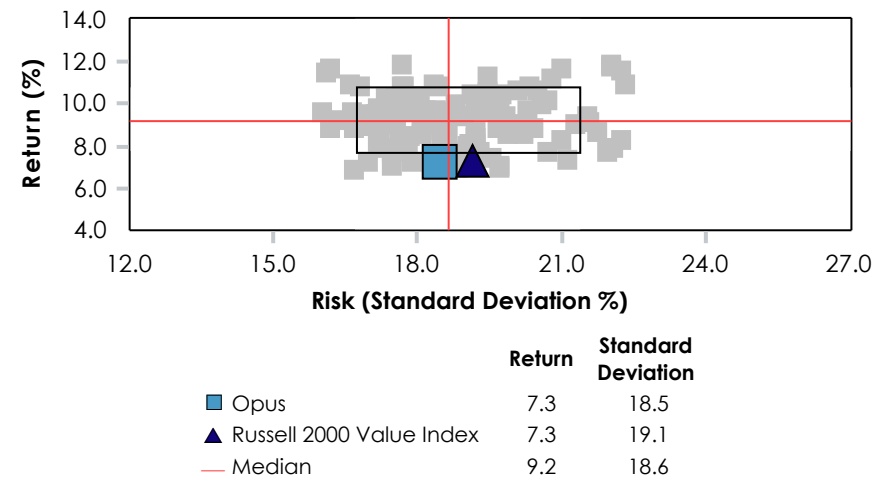
### Growth of \$1 - Since Inception



### Calendar Year Performance



### Risk/Return - Since Inception

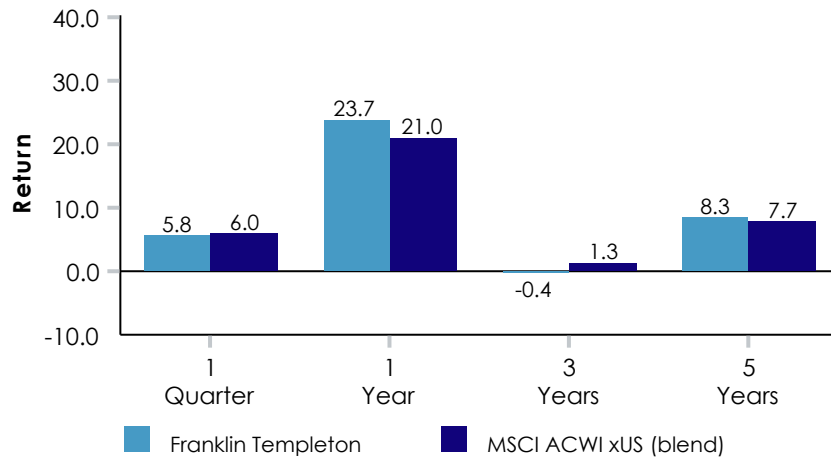


## Franklin Templeton - gross of fees

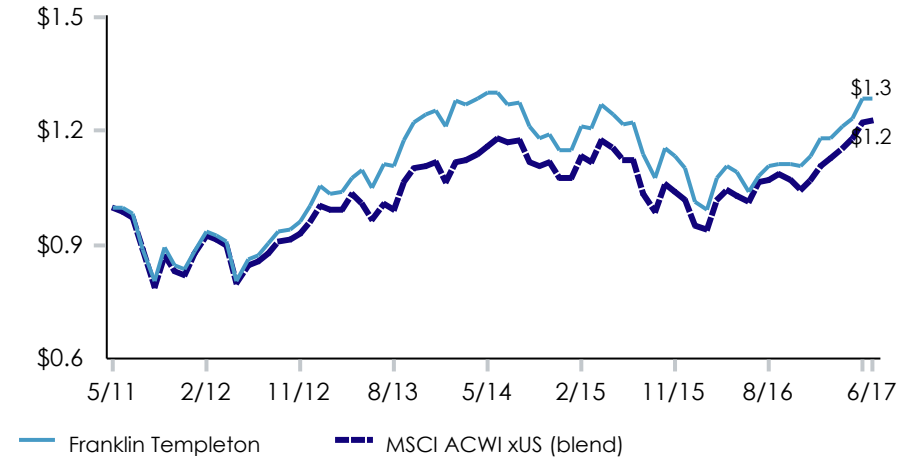
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Franklin Templeton	0.82	1.00	0.22	0.34	3.70	0.94	102.39	98.21	06/01/2011
MSCI ACWI xUS (blend)	0.00	1.00	-	0.30	0.00	1.00	100.00	100.00	06/01/2011

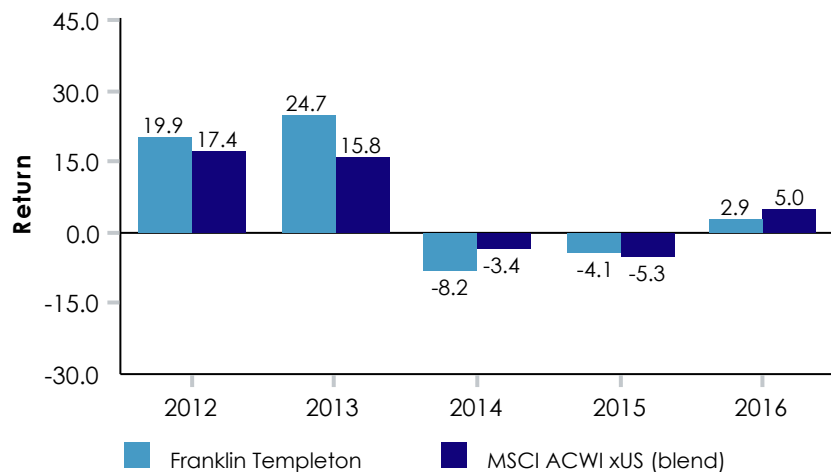
### Trailing Period Performance



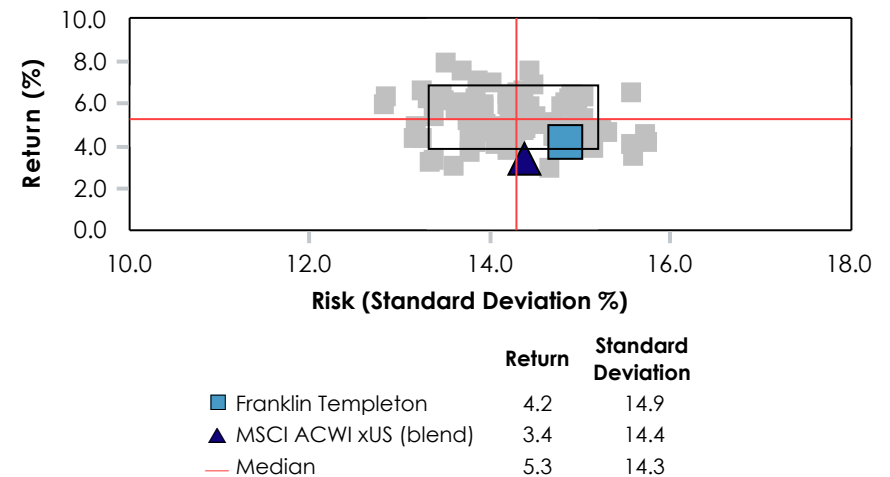
### Growth of \$1 - Since Inception



### Calendar Year Performance



### Risk/Return - Since Inception

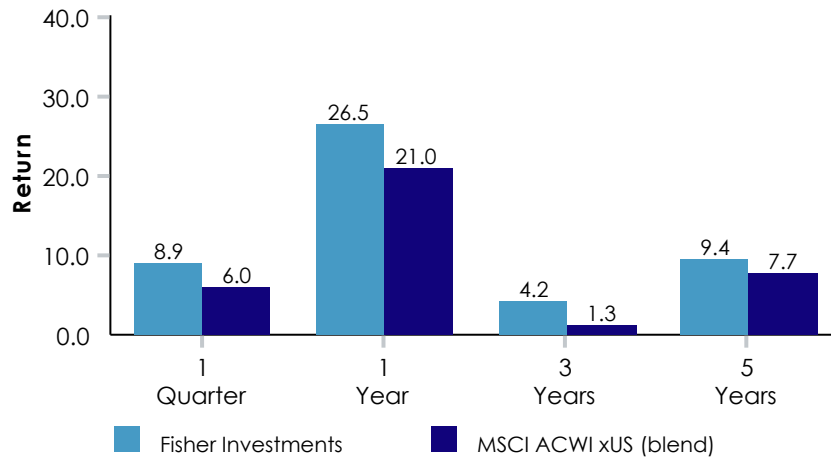


## Fisher Investments - gross of fees

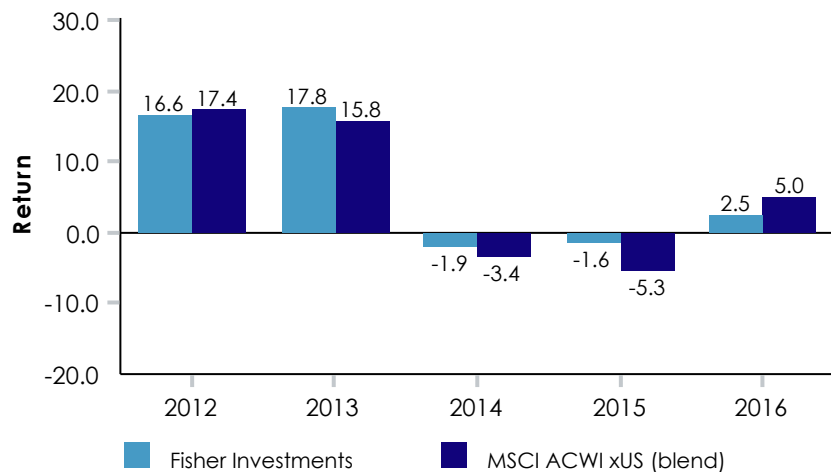
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Fisher Investments	0.67	1.13	0.40	0.40	4.10	0.97	113.37	109.92	03/01/2004
MSCI ACWI xUS (blend)	0.00	1.00	-	0.36	0.00	1.00	100.00	100.00	03/01/2004

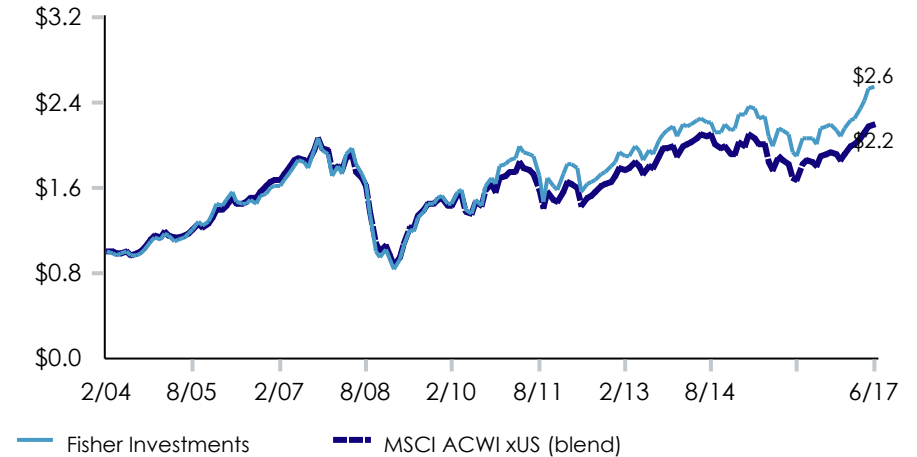
### Trailing Period Performance



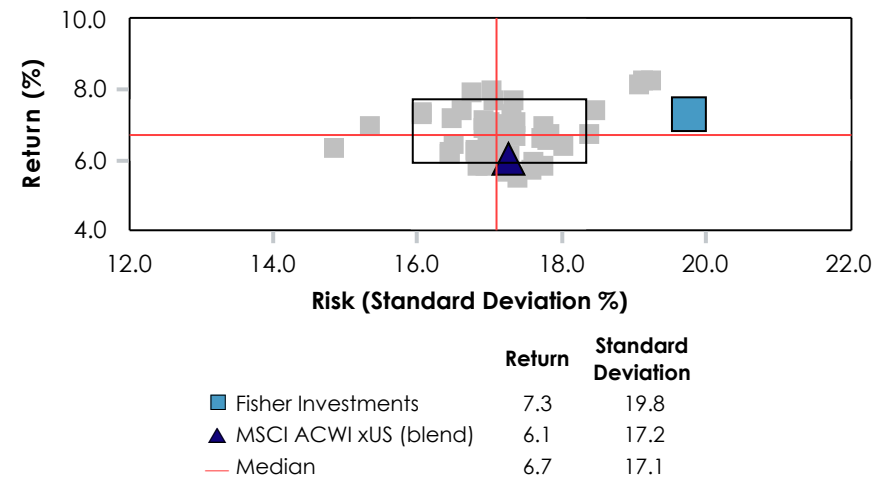
### Calendar Year Performance



### Growth of \$1 - Since Inception



### Risk/Return - Since Inception

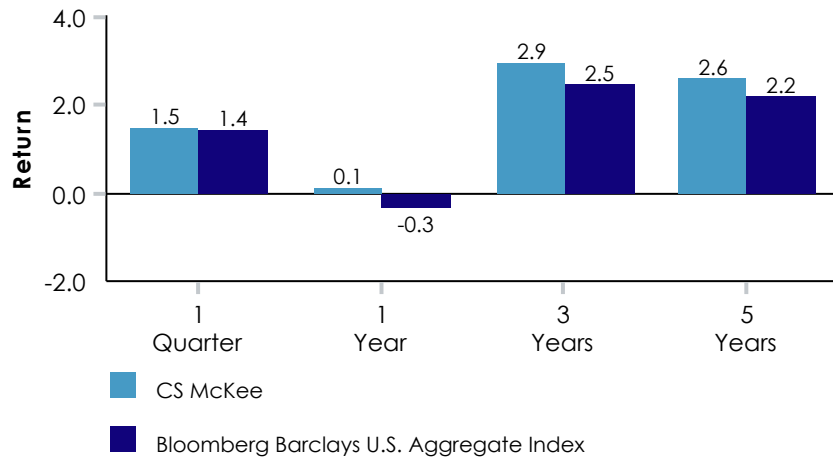


## CS McKee - gross of fees

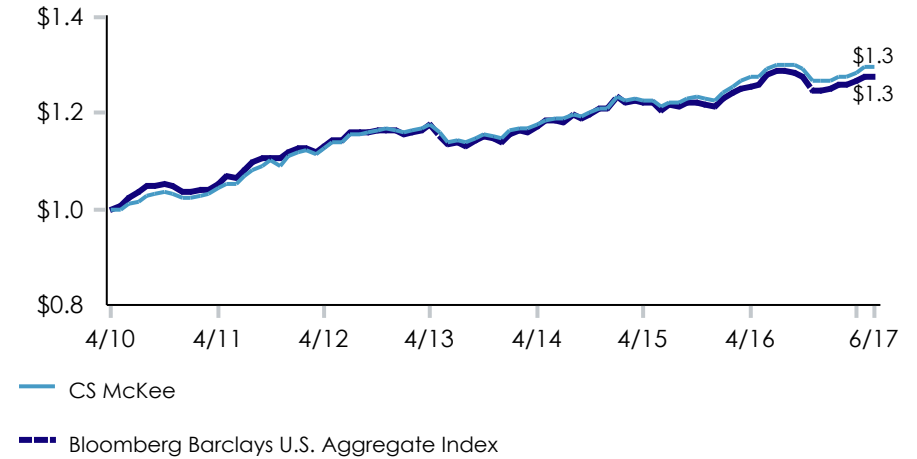
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
CS McKee	0.62	0.88	0.24	1.36	0.87	0.90	98.25	86.37	05/01/2010
Bloomberg Barclays U.S. Aggregate Index	0.00	1.00	-	1.19	0.00	1.00	100.00	100.00	05/01/2010

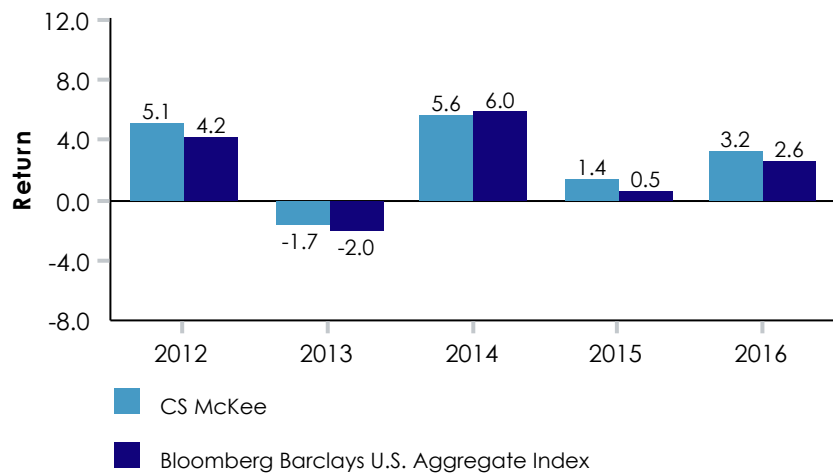
### Trailing Period Performance



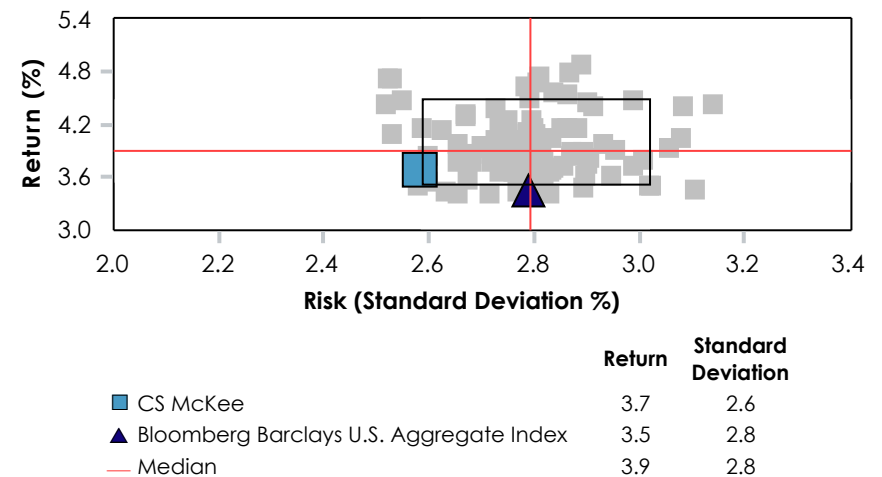
### Growth of \$1 - Since Inception



### Calendar Year Performance



### Risk/Return - Since Inception

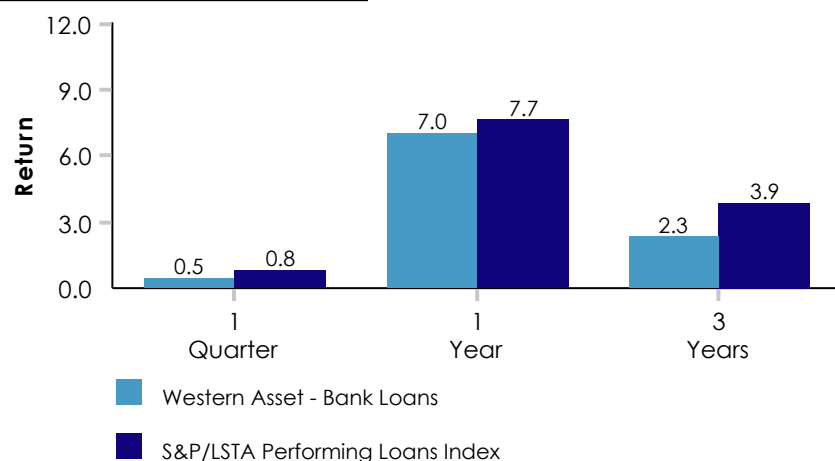


## Western Asset - Bank Loans - gross of fees

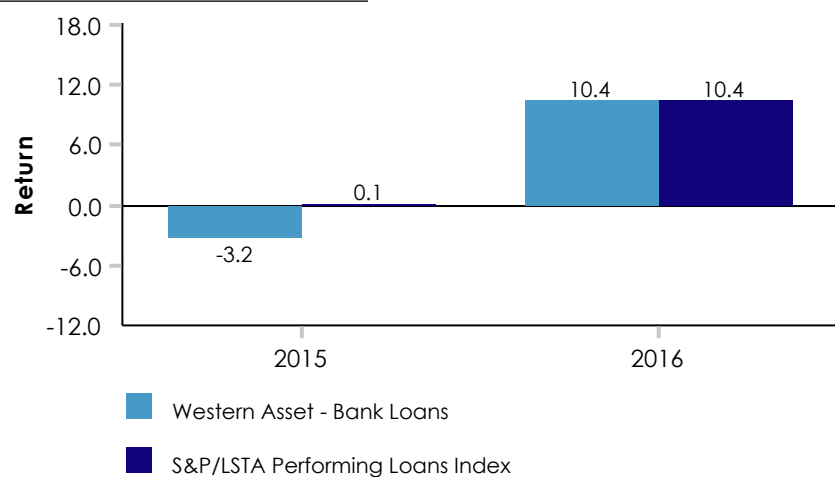
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Western Asset - Bank Loans	-2.16	1.20	-1.29	0.69	1.08	0.93	94.26	154.56	03/01/2014
S&P/LSTA Performing Loans Index	0.00	1.00	-	0.52	0.00	1.00	100.00	100.00	01/01/1999

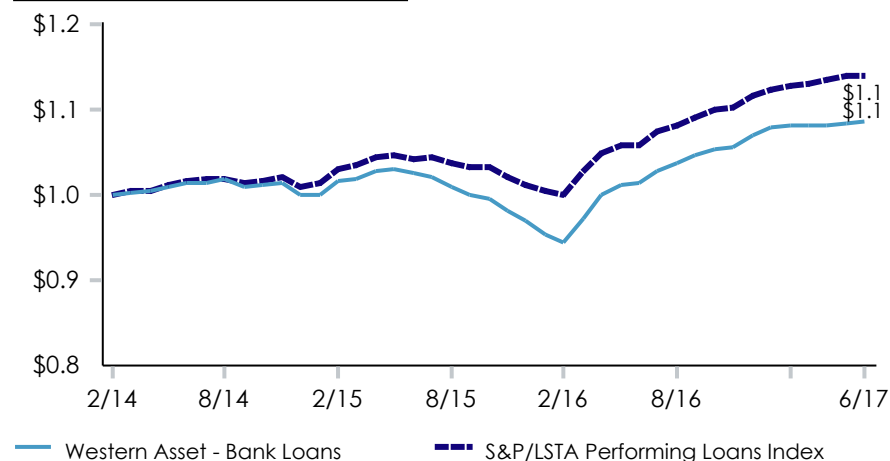
### Trailing Period Performance



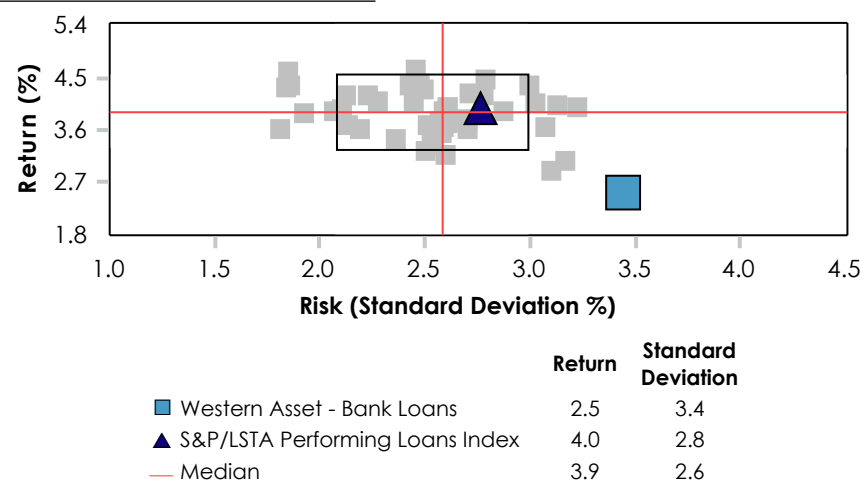
### Calendar Year Performance



### Growth of \$1 - Since Inception



### Risk/Return - Since Inception



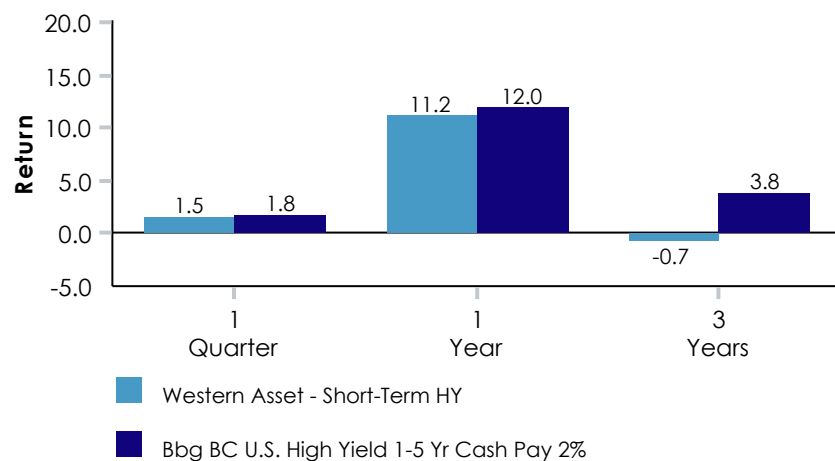


## Western Asset - Short-Term HY - gross of fees

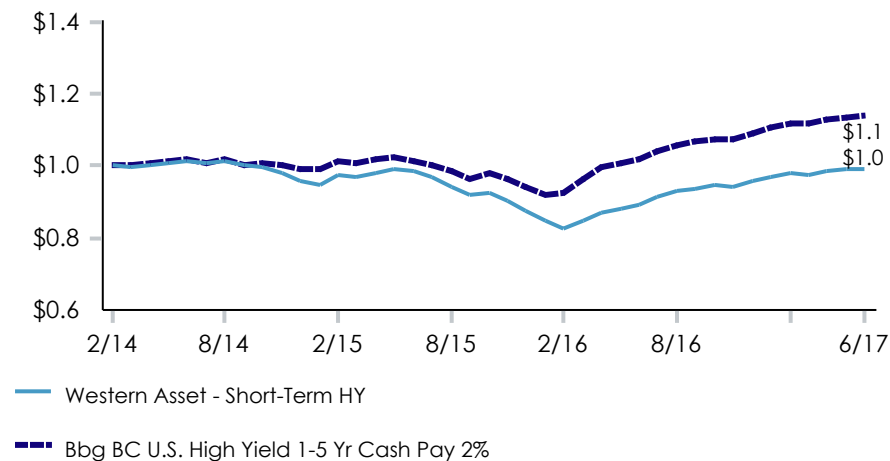
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Western Asset - Short-Term HY	-4.20	1.04	-1.84	-0.05	2.24	0.84	73.54	134.59	03/01/2014
Bbg BC U.S. High Yield 1-5 Yr Cash Pay 2%	0.00	1.00	-	0.82	0.00	1.00	100.00	100.00	01/01/1993

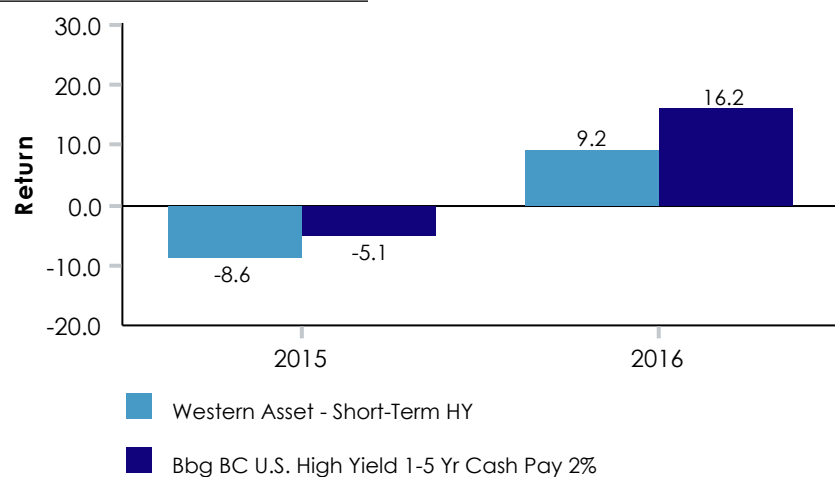
### Trailing Period Performance



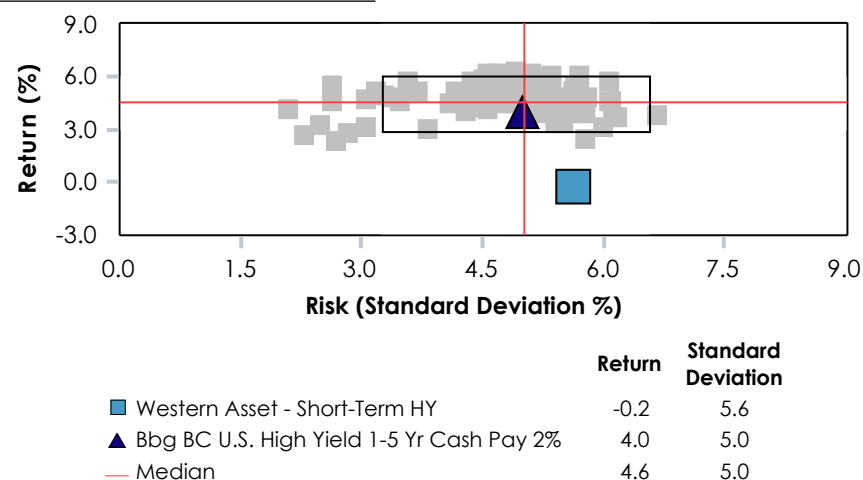
### Growth of \$1 - Since Inception



### Calendar Year Performance



### Risk/Return - Since Inception

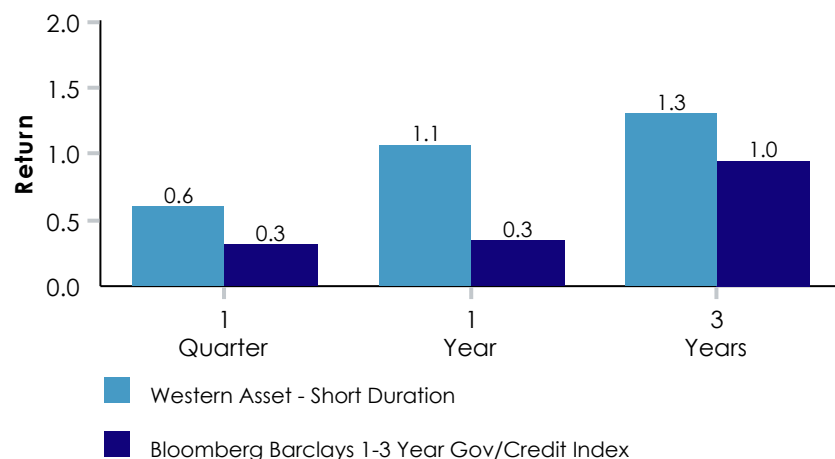


## Western Asset - Short Duration - gross of fees

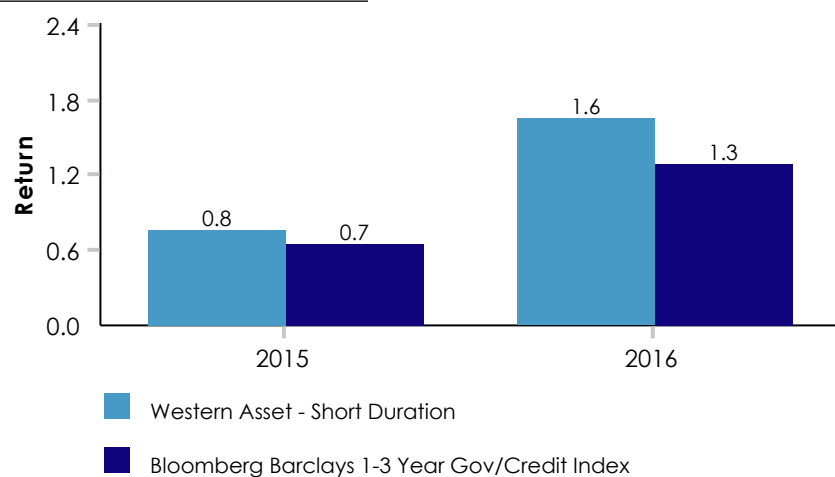
As of June 30, 2017

	Alpha	Beta	Information Ratio	Sharpe Ratio	Tracking Error	R-Squared	Up Market Capture	Down Market Capture	Inception Date
Western Asset - Short Duration	0.47	0.94	1.34	1.63	0.31	0.83	114.86	64.77	04/01/2014
Bloomberg Barclays 1-3 Year Gov/Credit Index	0.00	1.00	-	1.10	0.00	1.00	100.00	100.00	04/01/2014

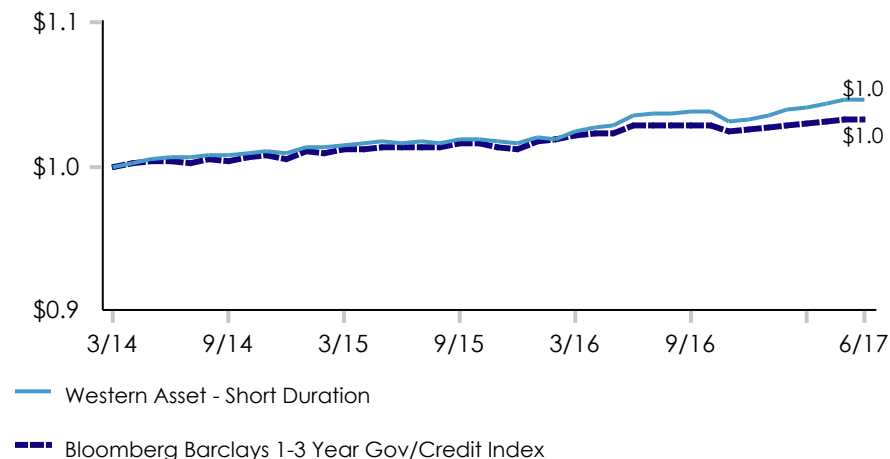
### Trailing Period Performance



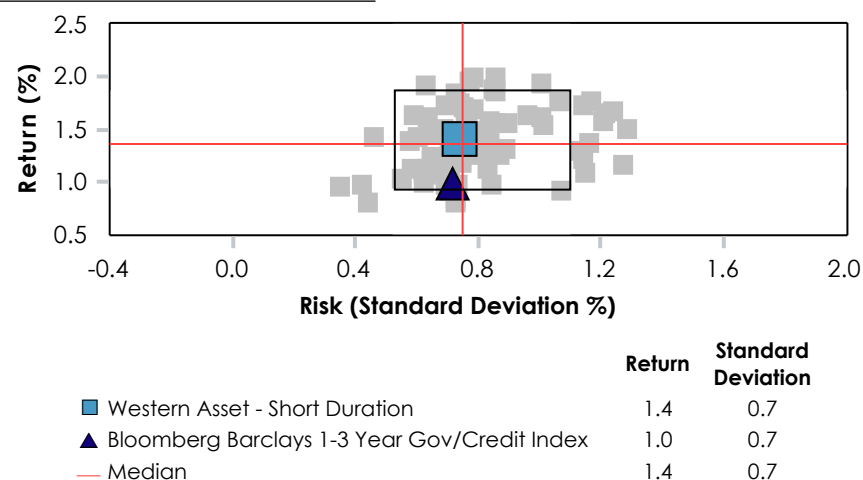
### Calendar Year Performance



### Growth of \$1 - Since Inception



### Risk/Return - Since Inception



## 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**
WAMCO-Short-Term HY	N/A	N/A	Placed on Watch (Mar-16)	Watch	04/01/2016	15	13.5
<i>BC 1-5Yr US HY Cash Pay</i>							14.6
WAMCO-Bank Loans	N/A	N/A	Placed on Watch (Mar-16)	Watch	04/01/2016	15	9.3
<i>S&amp;P/LSTA Perf. Loans</i>							8.5
Intech	Long-Term	9/30/2014	Placed on Watch (Nov-14)	Watch	12/01/2014	31	10.8
<i>Russell 1000 Growth</i>				---			9.9
Opus	Short-Term	9/30/2012	Placed on Watch (Nov-12), (Mar-14)	Watch	12/01/2012	55	13.0
<i>Russell 1000 Value</i>				---			13.6

\*Defined as: Short-Term (12 months), Medium-Term (36 months), Long-Term (60 months)

\*\*Annualized for periods greater than 12 months

- The Board placed the WAMCO Short-Term High Yield account and the WAMCO Bank Loans account on Watch at the March 2016 Board meeting due to performance concerns. Although the accounts had not breached the Manager Watch Criteria at the time, the accounts' continued benchmark and peer-relative underperformance since its funding in early 2014 raised concern.
  - The WAMCO Short-Term High Yield portfolio formally breached the short-term relative to benchmark Watch criteria as of the period ended March 2016. Since its Watch period began, the portfolio produced a 13.5% 15-month return, which underperformed the benchmark by (1.1%).
  - Since its Watch period began, the WAMCO Bank Loans account produced a 9.3% return, which outperformed the benchmark by 80 basis points.
- The Board placed Intech on Watch as of December 2014 due to performance concerns. Since its Watch period began, Intech produced a 10.8% 31-month return, which outperformed the benchmark by 90 basis points.
- The Board placed Opus on Watch as of December 2012 due to performance concerns. Since its Watch period began, Opus produced an 13.0% 55-month return, which underperformed the benchmark by (60) basis points.
- As of the end of the latest quarter, no new managers are recommended for Watch due to performance or material qualitative concerns (please refer to Sections 5 and 6).

## MANAGER WATCH SCREENS – Quantitative Compliance Monitoring per Watch Criteria

### 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 – R1000	Acceptable	Acceptable
Intech	Acceptable	Acceptable
T.Rowe Price	Acceptable	Acceptable
Barrow Hanley	Acceptable	Acceptable
Northern Trust – R2000G	Acceptable	Acceptable
Opus	Caution	Acceptable
Franklin Templeton	Acceptable	Acceptable
Fisher Investments	Acceptable	Acceptable
Parametric – BXM	Caution	Caution
Parametric – Delta Shift	Acceptable	Acceptable
Van Hulzen	Acceptable	Acceptable
CS McKee	Acceptable	Acceptable
WAMCO – Short Duration	Acceptable	Acceptable
WAMCO – Short-Term HY	Acceptable	Acceptable
WAMCO – Bank Loans	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	Tracking error > 0.30%	Tracking error > 0.25% 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.

# Northern R1000 - Domestic Equity: Large Cap Core

## Manager Performance

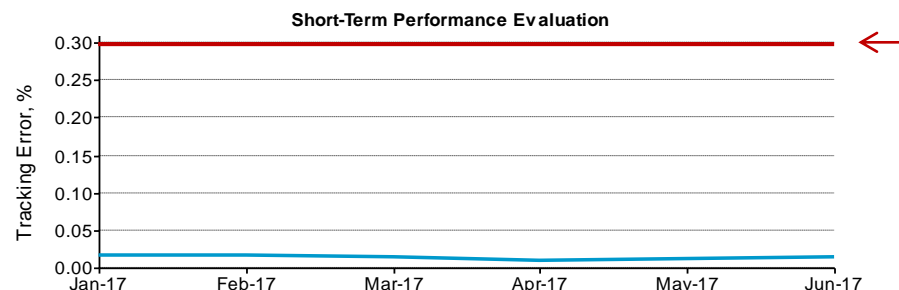
	Quarter	1 Year	3 Year	5 Year
Northern R1000	3.1	18.1	9.3	14.7
Russell 1000	3.1	18.0	9.3	14.7

Overall Status: **Acceptable**

### Short-Term Criteria (rolling 12-month periods)

Tracking error > 0.30% for 6 consecutive months

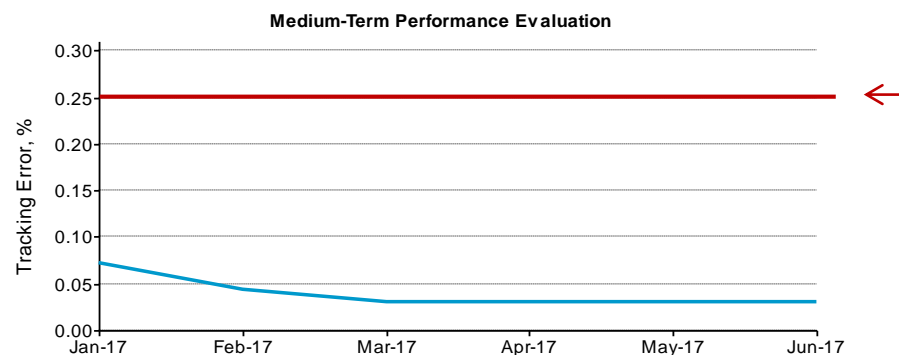
**Current Status: Acceptable**



### Medium-Term Criteria (rolling 36-month periods)

Tracking error > 0.25% for 6 consecutive months

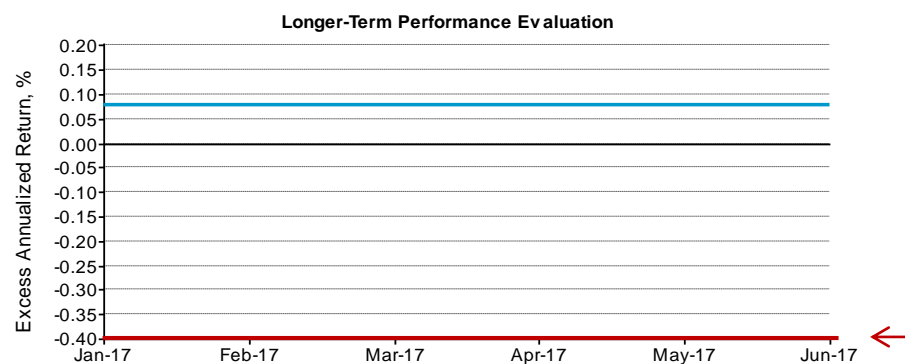
**Current Status: Acceptable**



### Long-Term Criteria (60+ months)

Fund annualized return < benchmark annualized return -0.40% for 6 consecutive months

**Current Status: Acceptable**



# Intech - Domestic Equity: Large Cap Growth

## Manager Performance

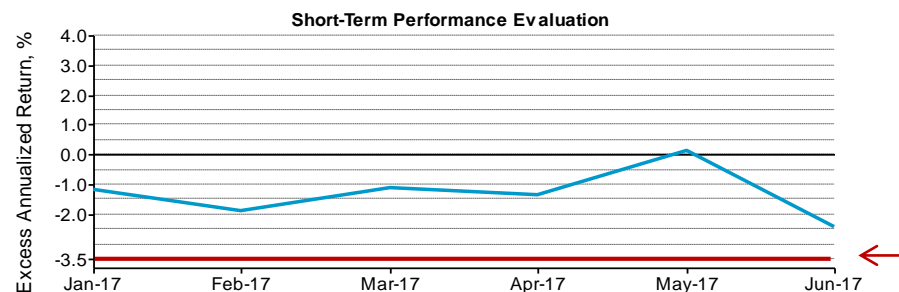
	3 Months	1 Year	3 Years	5 Years	Watch-31 Months
Intech	5.9	18.0	12.0	15.5	10.8
Russell 1000 Growth	4.7	20.4	11.1	15.3	9.9

Overall Status: **Acceptable**

### Short-Term Criteria (rolling 12-month periods)

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

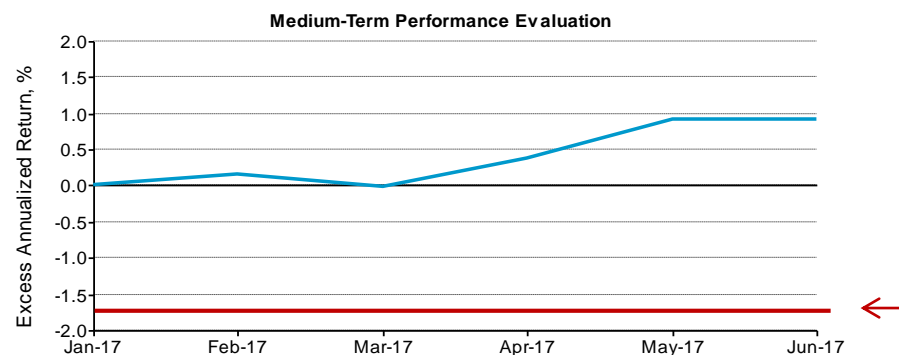
Current Status: **Acceptable**



### Medium-Term Criteria (rolling 36-month periods)

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

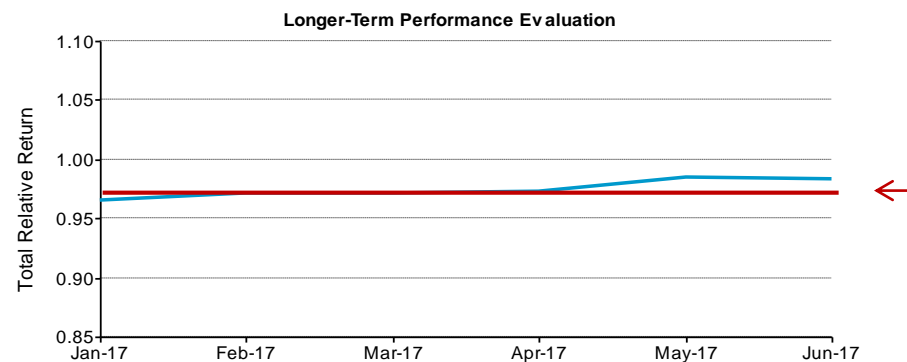
Current Status: **Acceptable**



### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: **Acceptable**



## T. Rowe Price - Domestic Equity: Large Cap Growth

### Manager Performance

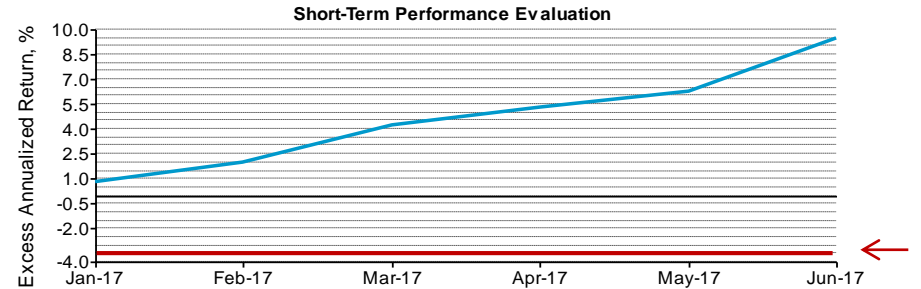
	Quarter	1 Year	3 Year	5 Year
T Rowe Price	7.7	29.9	13.2	17.1
Russell 1000 Growth	4.7	20.4	11.1	15.3

Overall Status: **Acceptable**

#### Short-Term Criteria (rolling 12-month periods)

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

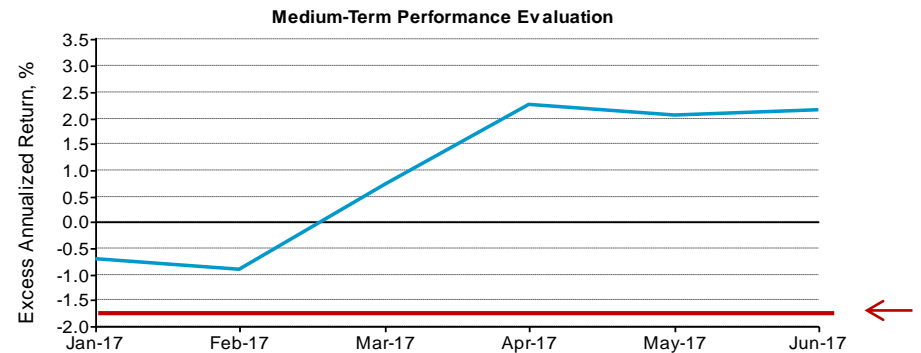
Current Status: **Acceptable**



#### Medium-Term Criteria (rolling 36-month periods)

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

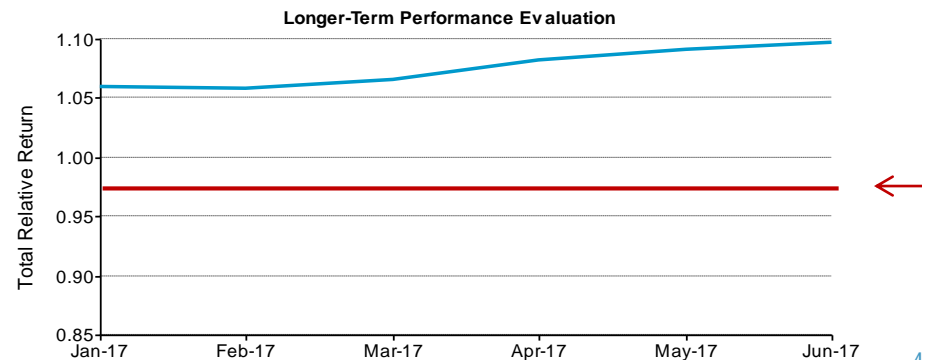
Current Status: **Acceptable**



#### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: **Acceptable**





# Barrow Hanley - Domestic Equity: Large Cap Value

## Manager Performance

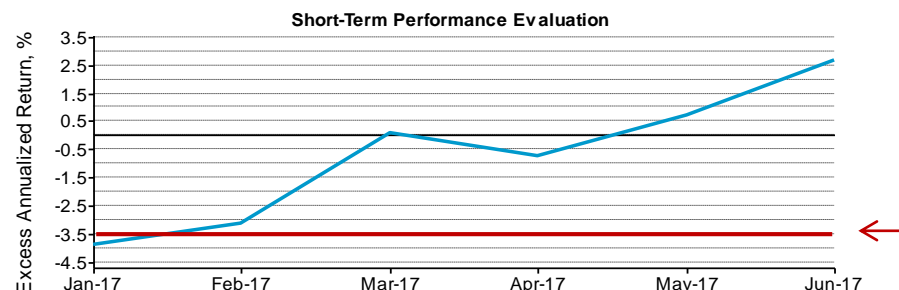
	Quarter	1 Year	3 Year	5 Year
Barrow	3.3	18.2	8.0	13.7
Russell 1000 Value	1.3	15.5	7.4	13.9

Overall Status: **Acceptable**

### Short-Term Criteria (rolling 12-month periods)

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

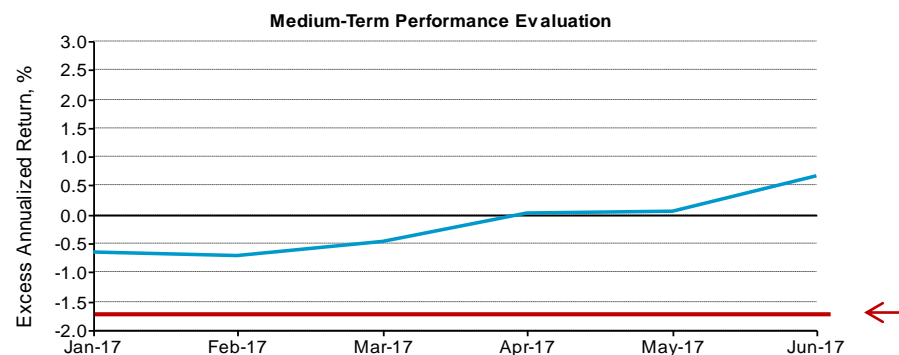
Current Status: **Acceptable**



### Medium-Term Criteria (rolling 36-month periods)

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

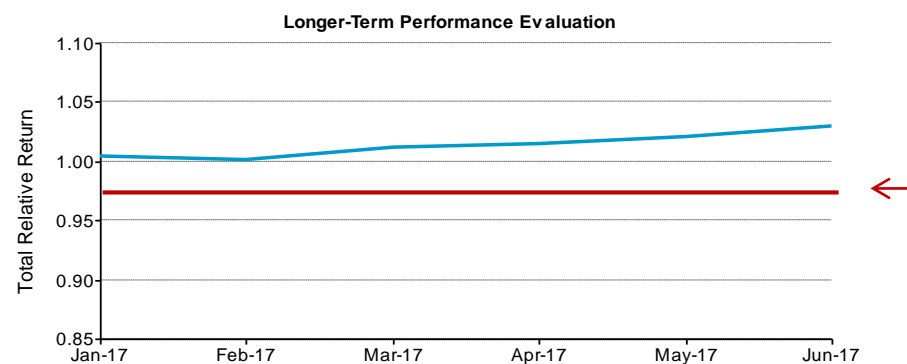
Current Status: **Acceptable**



### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: **Acceptable**



# Northern R2000 - Domestic Equity: Small Cap Growth

## Manager Performance

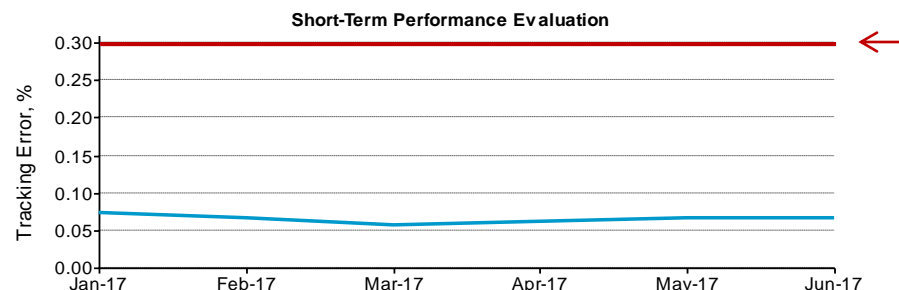
	Quarter	1 Year	3 Year	5 Year
Northern R2000	4.4	24.8	8.0	14.3
Russell 2000 Growth	4.4	24.4	7.6	14.0

Overall Status: **Acceptable**

### Short-Term Criteria (rolling 12-month periods)

Tracking error > 0.30% for 6 consecutive months

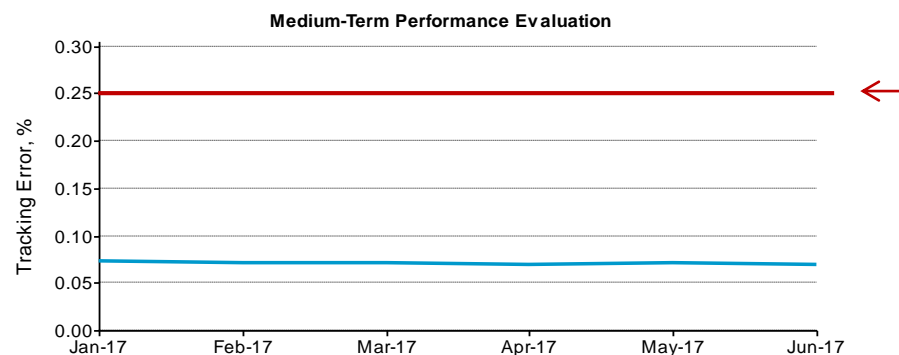
Current Status: **Acceptable**



### Medium-Term Criteria (rolling 36-month periods)

Tracking error > 0.25% for 6 consecutive months

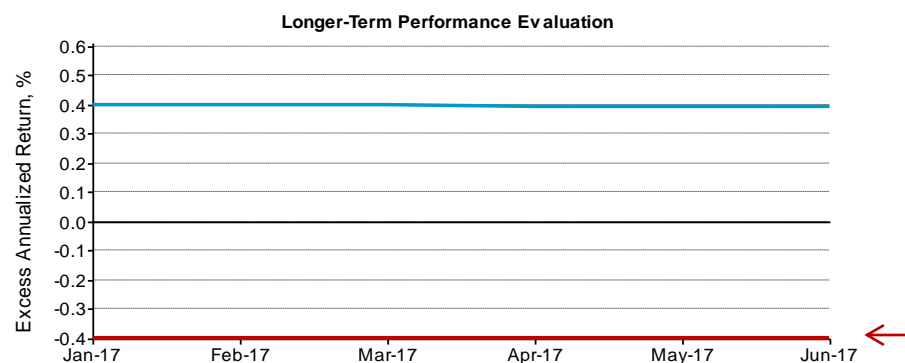
Current Status: **Acceptable**



### Long-Term Criteria (60+ months)

Fund annualized return < benchmark annualized return -0.40% for 6 consecutive months

Current Status: **Acceptable**



# Opus - Domestic Equity: Small Cap Value

## Manager Performance

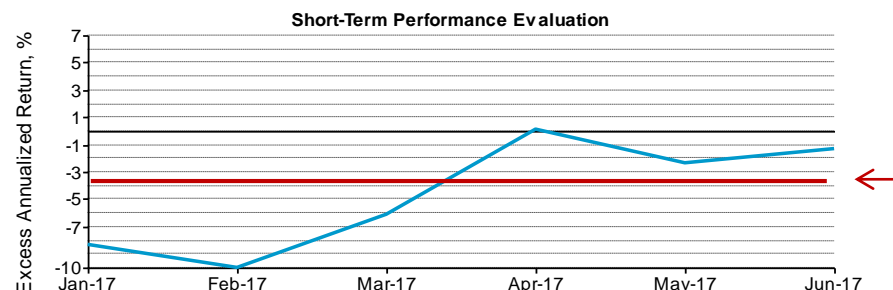
	3 Months	1 Year	3 Years	5 Years	Watch-55 Months
Opus	1.7	23.5	7.2	12.9	13.0
Russell 2000 Value	0.7	24.9	7.0	13.4	13.6

Overall Status: **Acceptable**

### Short-Term Criteria (rolling 12-month periods)

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

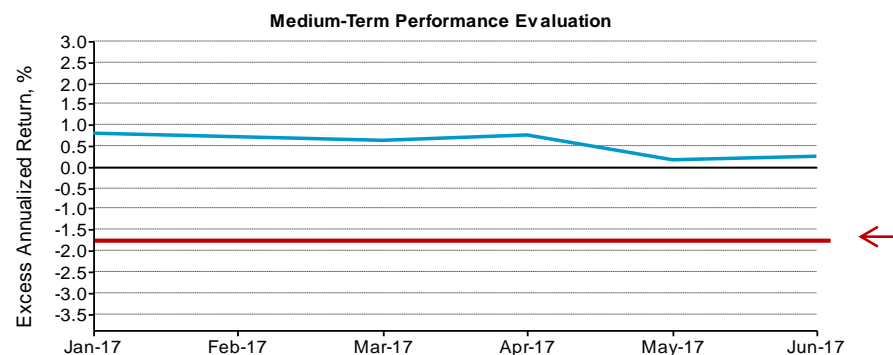
Current Status: **Acceptable**



### Medium-Term Criteria (rolling 36-month periods)

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

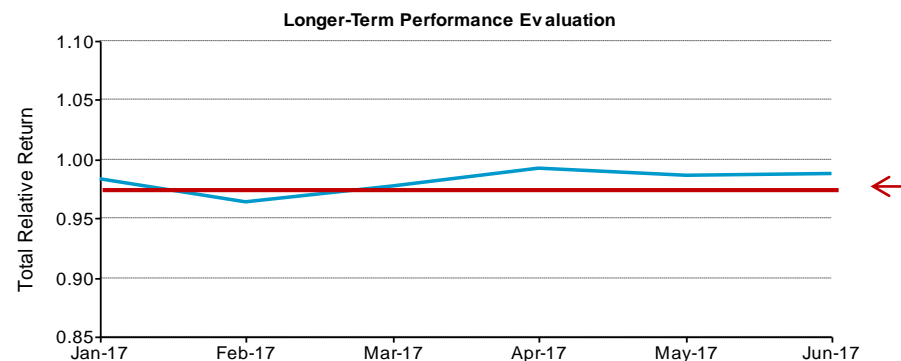
Current Status: **Acceptable**



### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: **Acceptable**



# Franklin Templeton - International Equity

## Manager Performance

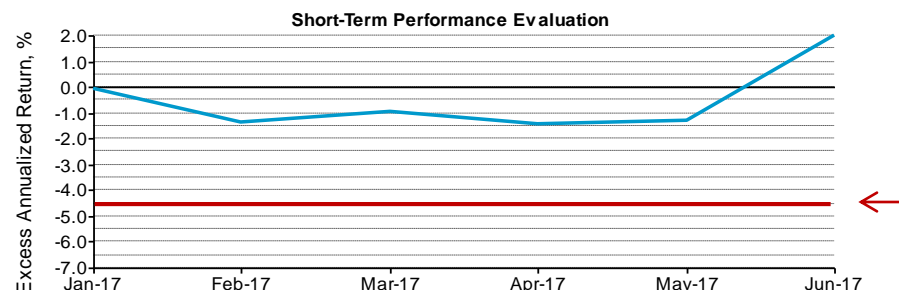
	Quarter	1 Year	3 Year	5 Year
Franklin Aggregate	5.8	23.7	-0.4	8.3
EBM UD MSCI ACWI ex US Blend	6.0	21.0	1.3	7.7

Overall Status: **Acceptable**

### Short-Term Criteria (rolling 12-month periods)

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

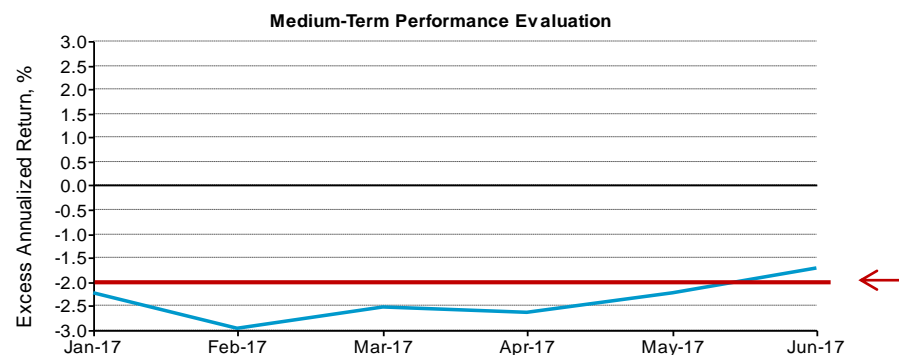
Current Status: **Acceptable**



### Medium-Term Criteria (rolling 36-month periods)

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

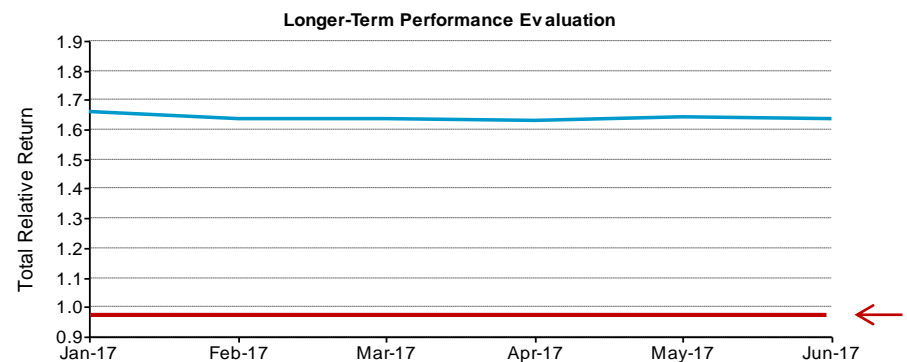
Current Status: **Acceptable**



### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: **Acceptable**



# Fisher - International Equity

## Manager Performance

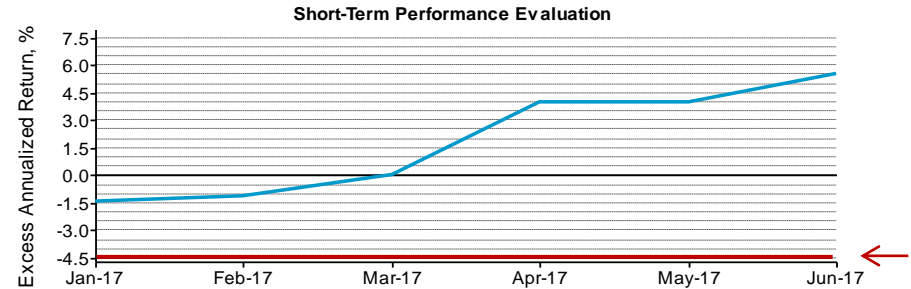
	Quarter	1 Year	3 Year	5 Year
Fisher	8.9	26.5	4.2	9.4
EBM UD MSCI ACWI ex US Blend	6.0	21.0	1.3	7.7

Overall Status: **Acceptable**

### Short-Term Criteria (rolling 12-month periods)

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

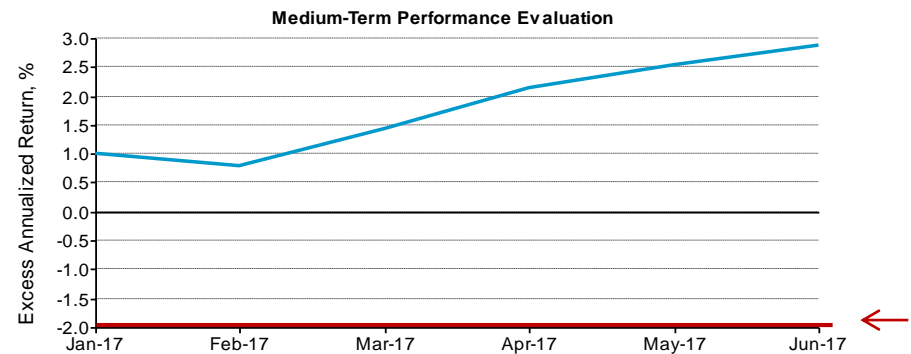
Current Status: **Acceptable**



### Medium-Term Criteria (rolling 36-month periods)

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

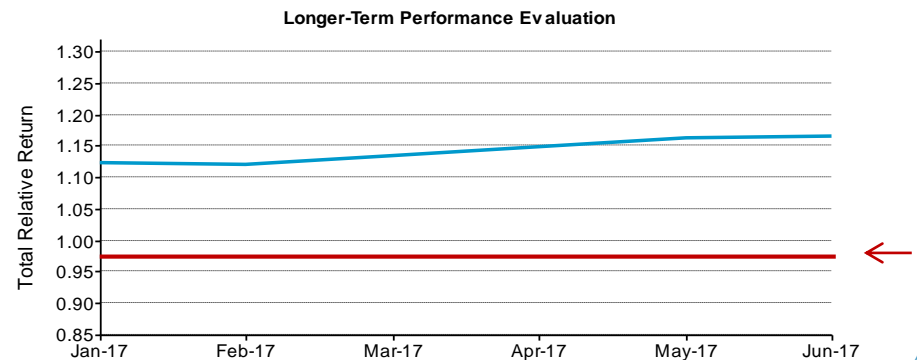
Current Status: **Acceptable**



### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: **Acceptable**



# Parametric - BXM - Covered Calls: Replication

## Manager Performance

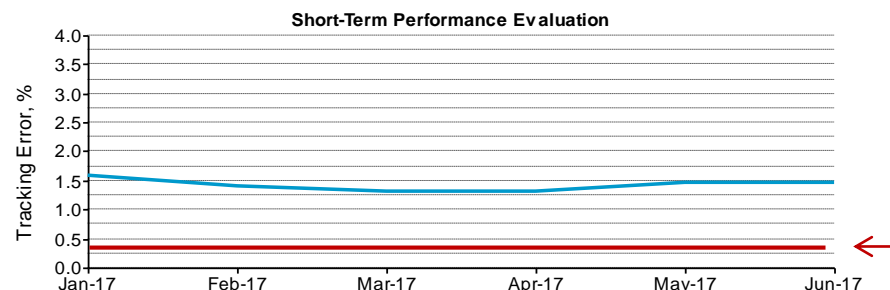
	Quarter	1 Year	3 Year	5 Year
Parametric BXM	2.9	12.7	8.6	NA
CBOE BXM Index	3.1	12.1	6.5	7.7

Overall Status: **Caution\***

### Short-Term Criteria (rolling 12-month periods)

Tracking error > 0.30% for 6 consecutive months

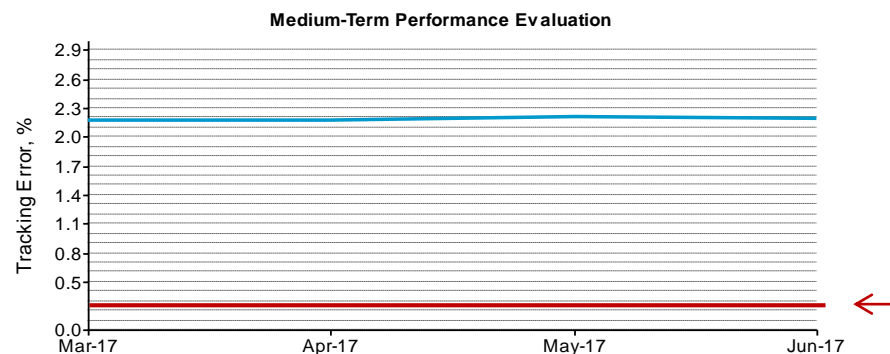
**Current Status: Caution\***



### Medium-Term Criteria (rolling 36-month periods)

Tracking error > 0.25% for 6 consecutive months

**Current Status: N/A (will take effect 3Q 2017)**



### Long-Term Criteria (60+ months)

Fund annualized return < benchmark annualized return -0.40% for 6 consecutive months

**Current Status: N/A (will take effect 3Q 2019)**

\*The Parametric BXM covered calls strategy breached the short-term relative to benchmark Watch Criteria. The strategy is currently monitored utilizing the covered calls replication (passive management) Watch Criteria. Since the strategy is not solely passively managed PCA believes the actively managed covered calls Watch Criteria would be more suitable for monitoring the fund. As such, PCA does not recommend Watch status for this strategy at this time.

## Parametric - Delta Shift - Covered Calls: Semi-Active

### Manager Performance

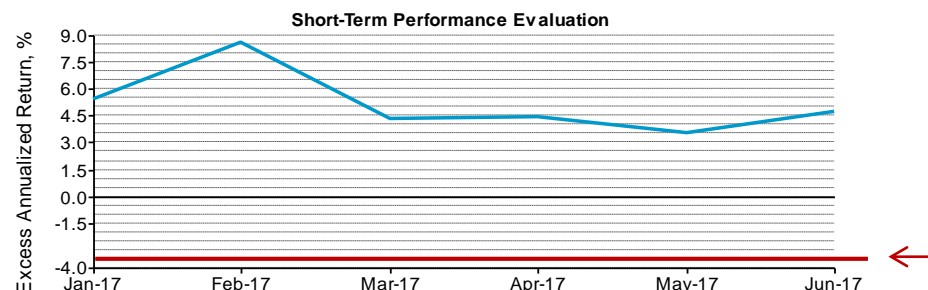
	Quarter	1 Year	3 Year	5 Year
Parametric Delta	3.3	16.8	9.9	NA
CBOE BXM Index	3.1	12.1	6.5	7.7

Overall Status: **Acceptable**

#### Short-Term Criteria (rolling 12-month periods)

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

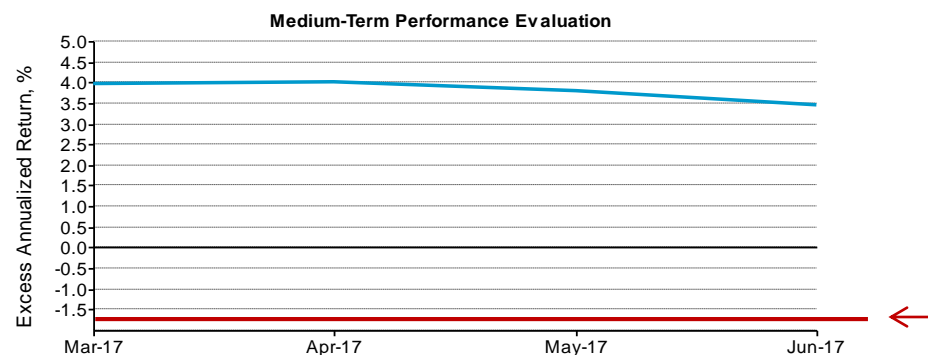
**Current Status: Acceptable**



#### Medium-Term Criteria (rolling 36-month periods)

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

**Current Status: N/A (will take effect 3Q 2017)**



#### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

**Current Status: N/A (will take effect 3Q 2019)**

## Van Hulzen - Covered Calls: Active

### Manager Performance

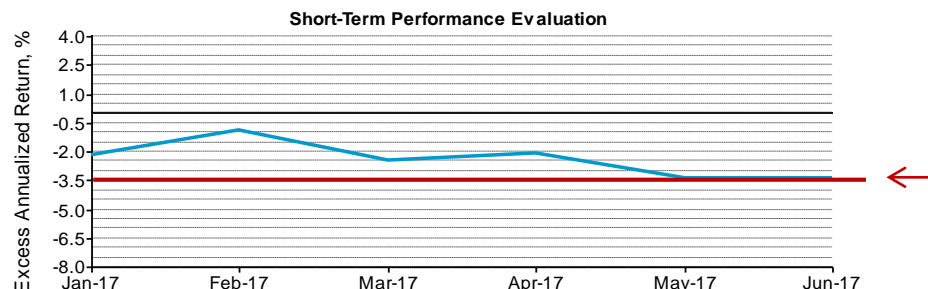
	Quarter	1 Year	3 Year	5 Year
Van Hulzen	1.9	8.7	5.3	NA
CBOE BXM Index	3.1	12.1	6.5	7.7

Overall Status: **Acceptable**

#### Short-Term Criteria (rolling 12-month periods)

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

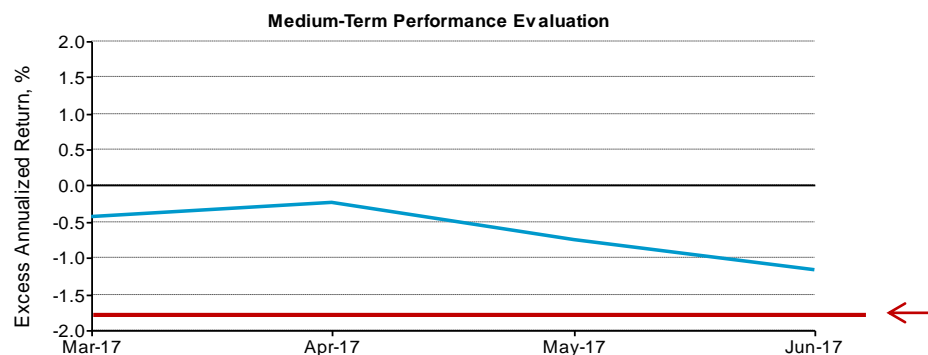
**Current Status: Acceptable**



#### Medium-Term Criteria (rolling 36-month periods)

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

**Current Status: N/A (will take effect 3Q 2017)**



#### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

**Current Status: N/A (will take effect 3Q 2019)**



# CS McKee - Fixed Income: Core

## Manager Performance

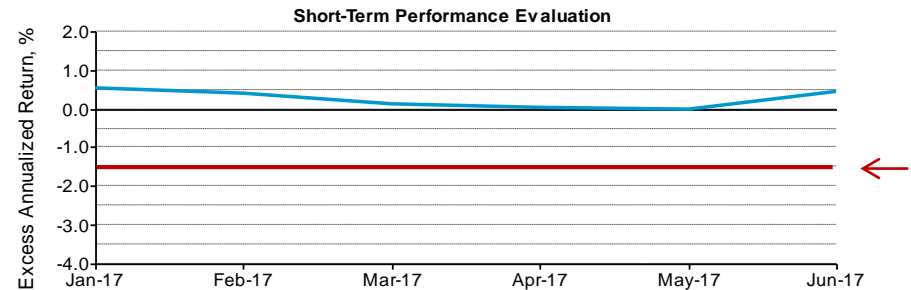
	Quarter	1 Year	3 Year	5 Year
CS McKEE	1.5	0.1	2.9	2.6
BC Aggregate Bond	1.4	-0.3	2.5	2.2

Overall Status: **Acceptable**

### Short-Term Criteria (rolling 12-month periods)

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

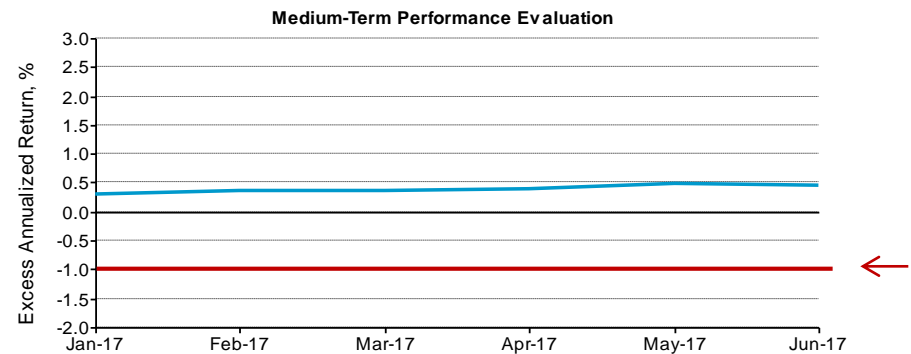
Current Status: **Acceptable**



### Medium-Term Criteria (rolling 36-month periods)

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

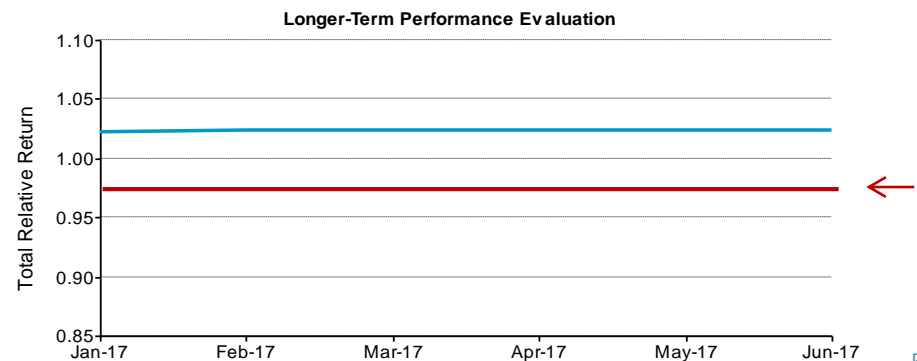
Current Status: **Acceptable**



### Long-Term Criteria (60+ months)

VRR < 0.98 for 6 consecutive months

Current Status: **Acceptable**



## WAMCO - Short Duration - Fixed Income: Non-Core

### Manager Performance

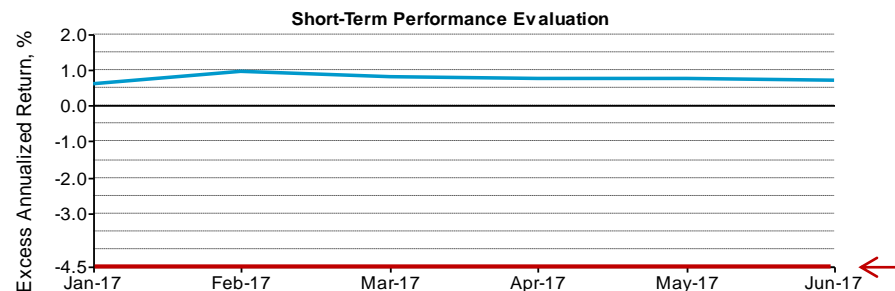
	Quarter	1 Year	3 Year	5 Year
WAMCO Short Dur	0.6	1.1	1.3	NA
Barclays 1-3 Yr Gov/Credit	0.3	0.4	1.0	0.9

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: N/A (will take effect 3Q 2017)**

#### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

**Current Status: N/A (will take effect 3Q 2019)**

# WAMCO - Short-Term High Yield - Fixed Income: Non-Core

## Manager Performance

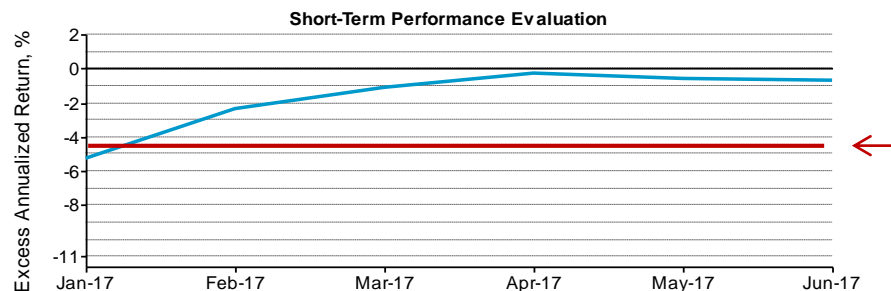
	Quarter	1 Year	3 Year	5 Year	Watch - 15 mon
WAMCO High Yield	1.5	11.2	-0.7	NA	13.5
Barclays US High Yield 1-5 Yr Cash Pay 2%	1.8	12.0	3.8	6.1	14.6

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: N/A (will take effect 3Q 2017)**

### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

**Current Status: N/A (will take effect 3Q 2019)**

## WAMCO - Bank Loans - Fixed Income: Non-Core

### Manager Performance

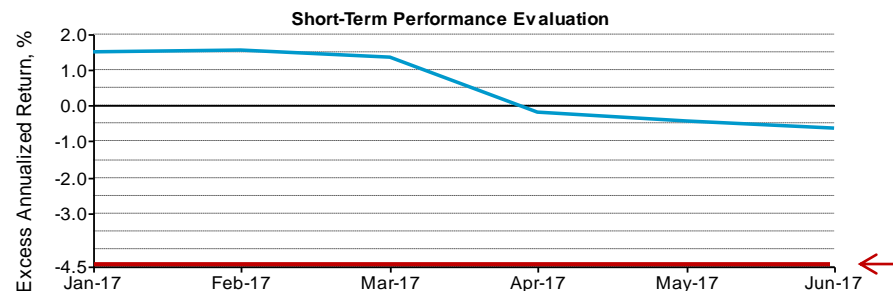
	Quarter	1 Year	3 Year	5 Year	Watch - 15 mon
WAMCO Bank Loans	0.5	7.0	2.3	NA	9.3
S&P/LSTA Performing Loans Index	0.8	7.7	3.9	4.9	8.5

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: N/A (will take effect 3Q 2017)**

#### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

**Current Status: N/A (will take effect 3Q 2019)**

# CenterSquare - Real Estate: Public REITs

## Manager Performance

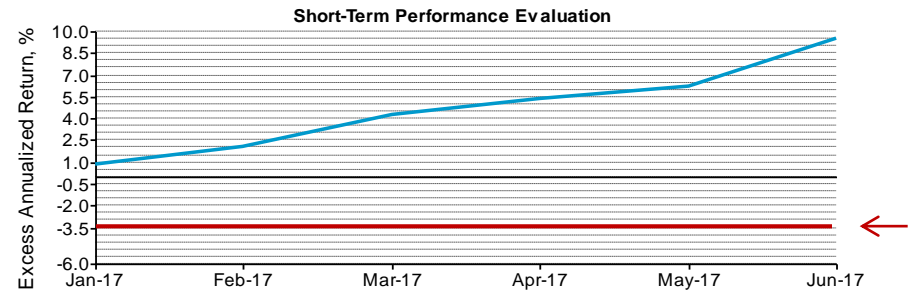
	Quarter	1 Year	3 Year	5 Year
CenterSquare	1.1	-2.3	9.5	10.5
FTSE NAREIT Equity REITS	1.5	-1.7	8.4	9.5

Overall Status: **Acceptable**

### Short-Term Criteria (rolling 12-month periods)

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

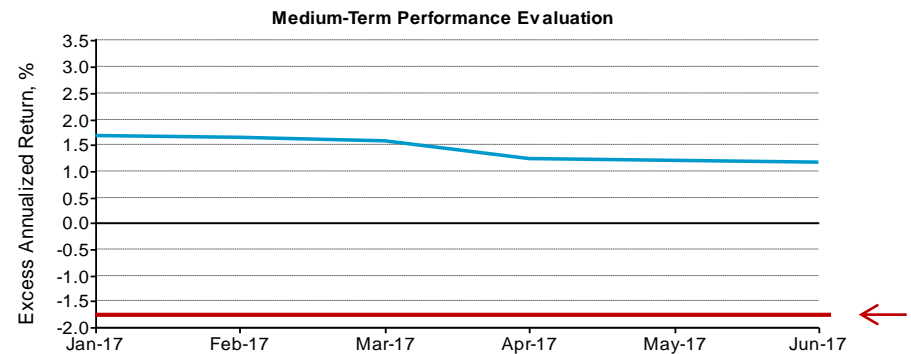
Current Status: **Acceptable**



### Medium-Term Criteria (rolling 36-month periods)

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

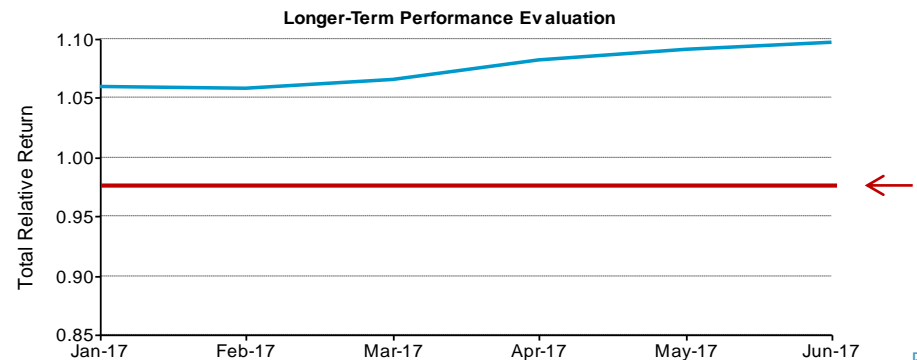
Current Status: **Acceptable**



### Long-Term Criteria (60+ months)

VRR < 0.97 for 6 consecutive months

Current Status: **Acceptable**



## MANAGER COMPLIANCE CERTIFICATION 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 CERTIFICATION 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 R1000	Domestic Equity – LCC	Yes	Yes	Yes*	No	No	Yes*	No	Yes	
Intech	Domestic Equity – LCG	Yes	Yes	Yes*	No	No	No	Yes*	Yes	
T. Rowe Price	Domestic Equity – LCG	Yes	Yes	Yes*	No	No	No	No	Yes	See below
Barrow Hanley	Domestic Equity – LCV	Yes	Yes	No	No	No	No	No	Yes	
Northern R2000G	Domestic Equity – SCG	Yes	Yes	Yes*	No	No	Yes*	No	Yes	
Opus	Domestic Equity – SCV	Yes	Yes	No	No	No	No	Yes*	Yes	
Franklin Templeton	International Equity	Yes	Yes	Yes*	No	No	Yes*	No	Yes	
Fisher	International Equity	Yes	Yes	No	No	Yes*	No	No	Yes	
Parametric	Covered Calls	Yes	Yes	No*	No	No	No	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	
WAMCO	Fixed Income – Short Dur.	Yes	Yes	No	No	Yes*	No	No	Yes	
WAMCO	Fixed Income – Short-term HY	Yes	Yes	No	No	Yes*	No	No	Yes	
WAMCO	Fixed Income – Bank Loans	Yes	Yes	No	No	Yes*	No	No	Yes	
RREEF	Real Estate	Yes	Yes	Yes*	No	No	No	No	Yes	
CenterSquare	Real Estate	Yes	Yes	No	No	No	Yes*	No	Yes	

\*see detailed manager response below

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

## **Northern Trust – R1000 and R2000 Growth**

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

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.

Routine regulatory exams of Northern Trust Investments, Inc. (NTI) occur regularly. Regulatory enforcement investigations or proceedings concerning NTI are far more rare but have occurred. The following matter falls into that category:

#### **PENDING REGULATORY INVESTIGATION RELATED TO NTI**

In February and June 2015, the Chicago Regional Office of the SEC Division of Enforcement sent document subpoenas to a number of investment advisors, including NTI or its affiliates, seeking information on the firms' policies for complying with SEC Rule 206(4)-5, the so-called "pay-to-play" rule concerning political donations by "covered associates" employed by investment advisors. In addition to general policy information, the requests sought information about the amount of business, if any, that the investment advisors did with various Illinois state pension funds and City of Chicago pension funds. They also inquired about campaign donations, if any, made by such covered associates to Illinois Governor Bruce Rauner or Chicago Mayor Rahm Emanuel. NTI responded to the subpoenas in 2015. It did not identify any prohibited contributions by its covered associates to Gov. Rauner or Mayor Emanuel.

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

Steve Farmer was appointed COO of NTI, succeeding Craig Carberry, who remains the Head of Legal for NTAM.



## Intech

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

INTECH is not currently involved in any litigation that would be considered material. However, in June 2011, INTECH was served with a complaint related to the leveraged buyout ("LBO") of Tribune Company ("Tribune") in 2007 (Deutsche Bank Trust Co. Americas, et al. v. Sowood Alpha Fund LP, et al., U.S. District Court, Southern District of New York). On December 8, 2008, one year after completion of the LBO, Tribune and certain of its subsidiaries filed for relief under Chapter 11 of the Bankruptcy Code in the Bankruptcy Court for the District of Delaware. INTECH believes it was improperly named in this lawsuit as it never owned the stock at issue.

INTECH intends to defend the action once the stay is lifted.

### **Question 7: Have there been any material changes 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.**

On May 30, 2017, INTECH's parent company JCG, and Henderson Global Investors, a London based global investment manager, merged. Together, they formed a new company known as Janus Henderson Investors. INTECH is an independently-managed subsidiary of Janus Henderson Investors.

There were no changes to the way INTECH is managed, its personnel or its investment process as a result of the merger. The strategic direction and day-to-day management of the firm continues to be determined and overseen by INTECH's six person executive committee, comprised solely of INTECH executive management. There are no changes to any reporting lines.

## **T. Rowe Price**

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

T. Rowe Price Associates, Inc., its subsidiaries, affiliates, officers, and employees (collectively the "Company") has not been involved as a defendant in any notable litigation matter relating to any business practice or relating to services rendered to the firm's clients, with the exceptions of the cases noted below.

At times, the Company may be a claimant or a plaintiff in various matters involving portfolio company investments. Additionally, from time to time in the normal course of business, the Company is named as a party to minor litigation matters involving the accounts of Price mutual fund shareholders, retirement plan participants, or of retail customers in the Company's brokerage unit. Often, the Company is named as a stakeholder. These minor litigation matters are not disclosed here.

*Tribune Company Bankruptcy Proceeding:* Several of the T. Rowe Price Funds, sub advised clients, and institutional clients are included in a class of defendants in connection with a fraudulent transfer lawsuit that the Unsecured Creditors Committee (the "Committee") of the Tribune Company filed in Delaware bankruptcy court. In addition, various T. Rowe Price entities and certain of the T. Rowe Price Funds, institutional clients, and sub advised clients were sued in a number of federal and state courts in various states in connection with receipt of proceeds from a leveraged buyout ("LBO") through which Tribune converted to a privately owned company in 2007. These lawsuits alleged constructive fraudulent transfer claims in an attempt to recover payments made to shareholders at the time of the LBO. The lawsuits did not allege that any of the T. Rowe Price defendants engaged in wrongful conduct. The lawsuits were consolidated by the Multidistrict Litigation Panel for purposes of all pretrial proceedings. On September 23, 2013, the court in the consolidated cases granted a motion to dismiss those cases. The judge ruled that the plaintiff investors may not pursue the constructive fraudulent transfer lawsuits against Tribune's former shareholders while the Litigation Trustee in the bankruptcy case also pursues his intentional fraudulent transfer claims against the same shareholders. The dismissal of the consolidated cases was appealed, and on March 29, 2016, the Second Circuit Court of Appeals affirmed the dismissal. The plaintiffs have filed a petition for a writ of certiorari with the Supreme Court. The Supreme Court removed the petition from its December 9, 2016, calendar, and the matter has not yet been rescheduled. On January 9, 2017, the district court granted the motion to dismiss the intentional fraudulent transfer case brought by the bankruptcy trustee.

On December 19, 2011, Sam Zell, through various entities, filed two lawsuits in Cook County, Illinois naming the other shareholder defendants as a means of preserving any rights of recovery the Zell entities may have against former shareholders related to the LBO in the event that the LBO is found to have been a fraudulent conveyance.

*Christopher Zoidis, et al. v. T. Rowe Price Associates, Inc.:* On April 27, 2016 a lawsuit was filed by Christopher Zoidis, et al. against T. Rowe Price Associates, Inc. in the United States District Court for the Northern District of California, alleging breach of fiduciary duty under Section 36(b) of the Investment Company Act of 1940. The Complaint was served on April 28, 2016, and T. Rowe is defending the case. On August 4, 2016, the court granted a motion to transfer the case to the District of Maryland. The Court denied the motion to dismiss on March 31, 2017. T. Rowe filed an answer to the complaint on April 17, 2017, and is in the discovery phase of the litigation.

*David G. Feinberg v. T Rowe Price Group, Inc., et al.* T. Rowe Price Group, Inc., two of its subsidiaries, current and former members of its management committee, and trustees of the T. Rowe Price U.S. Retirement Program are named as defendants in a lawsuit filed on February 14, 2017 in the United States District Court for the District of Maryland. The T. Rowe Price U.S. Retirement Program is a retirement plan offered to T. Rowe Price employees. The plaintiff is a former employee who alleges breaches of fiduciary duty under ERISA with regard to the retirement plan. The plaintiff is seeking certification of the complaint as a class action. T. Rowe believes the complaint is without merit and intends to vigorously defend the case. A motion to dismiss the case is pending.

**Additional Comments**

With regards to Questions 1 and 8, T. Rowe Price is in compliance with Exhibit A of the Investment Advisory Agreement between The East Bay Municipal Utility District and T. Rowe Price Associates, Inc. ("TRPA") dated February 21, 2007, which they generally believe complies with EBMUD's Statement of Investment Policy and Procedures.

## Opus

**Question 7: Have there been any material changes 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.**

Yes; Opus was terminated by a public client that was moving the funds to passive strategies. The account was roughly 15% of the Small Cap Value strategy.

## **Franklin Templeton**

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

This response is made on behalf of Templeton Investment Counsel, LLC (TIC) and is limited in scope to material, investment-management-related private litigation that has been pending at any time during the last five years ended June 30, 2017, in which TIC or any of its *advisory affiliates* has been named as a defendant. This response does not include employment-related litigation, litigation arising in the ordinary course of business, litigation in which TIC or any of its *advisory affiliates* may be a plaintiff, or any regulatory *proceedings*. (Italicized terms are as defined on U.S. Securities and Exchange Commission Form ADV.)

#### **Other Litigation Involving an TIC Advisory Affiliate**

In July 2016, a former employee filed a putative class action lawsuit against Franklin, the Franklin Templeton 401(k) Retirement Plan (Plan) Investment Committee, and unnamed Investment Committee members. The plaintiff asserts a claim for breach of fiduciary duty under the Employee Retirement Income Security Act, alleging that the defendants selected mutual funds sponsored and managed by the Franklin organization (the Funds) as investment options for the Plan when allegedly lower-cost and better performing non-proprietary investment vehicles were available. The plaintiff also claims that the total Plan costs, inclusive of investment management and administrative fees, are excessive. The plaintiff alleges that Plan losses exceed \$79.0 million and seeks, among other things, damages, disgorgement, rescission of the Plan's investments in the Funds, attorneys' fees and costs, and pre- and post-judgement interest. Franklin's motion to dismiss and motion for summary adjudication were denied on January 17, 2017. On July 26, 2017, the court certified a class of Plan participants. Franklin's management strongly believes that the claims made in the lawsuit are without merit and Franklin is continuing to defend against them vigorously. Discovery is continuing and, at this stage of the litigation, Franklin cannot currently predict the eventual outcome of the lawsuit or whether it will have a material negative impact on Franklin, however TIC is not named as a defendant in the lawsuit and as of June 30, 2017, the litigation is not reasonably expected to have a material adverse effect on TIC's financial condition or its ability to provide investment management services.

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

The following organizational changes have taken place within the Firm during the past quarter ending June 30, 2017.

- Stephen Dover was appointed Head of Equities, focusing on global oversight and administration of the company's equity investment business. The firm's various equity CIOs now report to Stephen, and he continues to oversee the Templeton Emerging Markets Group, Templeton Private Equity Partners, and the equity teams of Franklin Local Asset Management.
- Reflecting the importance of investment risk management, CEO and Chairman of the Board Greg Johnson, assumed direct oversight for the Performance Analysis and Investment Risk Group (PAIR). As the Head of PAIR, Kelsey Biggers began reporting directly to Greg Johnson.

## **Fisher**

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

Fisher Investments defines the investment team as the Investment Policy Committee (IPC). On April 1, 2017, Michael Hanson, a highly valued, senior-level employee of Fisher Investments (FI) was added to the Investment Policy Committee (IPC). Michael's addition is a natural evolution as FI grows and provides a deeper bench of seasoned IPC members for continuity in long-term succession planning. There have not been any additional material changes in personnel during the second quarter ending June 30, 2017.

The members of the IPC now include the founder of the firm, Ken Fisher (Executive Chairman, Co-Chief Investment Officer), Jeffery Silk (Vice Chairman, Co-Chief Investment Officer), William Glaser (Executive Vice President of Portfolio Management), Michael Hanson (Senior Vice President of Research), and Aaron Anderson (Senior Vice President of Research). Together the IPC now averages over 26 years of investment industry experience (as of June 30, 2017).

## **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 quarter, against Parametric or any affiliate of Parametric controlled by it. 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.

From time to time, Eaton Vance Corp., Parametric's ultimate parent company, and its subsidiaries or employees are and have been plaintiffs or defendants in various lawsuits that are incidental to their businesses and are or were handled in the ordinary course of business. We believe that these actions have not and will not have a material adverse effect on Parametric's ability to manage the accounts in question.

## **WAMCO**

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

Yes. During the second quarter of 2017, Western Asset hired no new investment professionals while losing three – Mr. Jean Pierre Gil (Head of Credit and Research in Sao Paolo), Mr. Ravi Sharma (Research Analyst in Pasadena), and Mr. Paul Shuttleworth (Head of Non-US Credit in London). None of the individuals noted above had direct oversight over the EBMUD's portfolios and their responsibilities were absorbed by their respective teams with no impact to the investment philosophy or strategy.



## **RREEF**

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

Although client properties are managed by third party property managers, RREEF America L.L.C. may from time to time be named as a party to litigation relating to property management. RREEF America L.L.C. may also from time to time be involved in litigation with third parties relating to commercial disputes or RREEF America L.L.C. client's properties. Such litigation may be currently pending. Please the firm's Form ADV for additional information. Please also refer to the Form ADV for RREEF America L.L.C. for additional information.

RREEF America L.L.C.'s parent company, Deutsche Bank A.G., is a large banking institution with substantial domestic operations and numerous domestic and foreign affiliates. As such, Deutsche Bank A.G. and/or its affiliates are occasionally party to litigation, investigations and other proceedings. On April 23, 2015, Deutsche Bank entered into a settlement with the U.S. Department of Justice and other U.S. and U.K. regulators regarding their investigations into anti-competitive and manipulative conduct with respect to the London Interbank Offered Rates (LIBOR) and other benchmark rates. As part of the settlement, Deutsche Bank A.G. entered into a deferred prosecution agreement and a U.K.-based affiliate, DB Group Services (UK) Ltd. ("DBGS") pleaded guilty to wire fraud for its conduct in relation to LIBOR. Deutsche Asset Management was not involved in this conduct in any way. Separately, on January 25, 2016, a South Korean Court found the firm's South Korean affiliate, Deutsche Securities Korea Co. ("DSK"), guilty on a theory of corporate criminal liability arising as a consequence of DSK's failure to properly monitor and supervise the spot/futures linked market manipulation activities of one of its traders.

Neither the firm nor Deutsche Asset Management was involved in either the LIBOR matter or the DSK matter in any way. However, absent regulatory relief, the sentencing of DBGS in connection with the LIBOR guilty plea, which sentencing has not taken place yet, and the DSK conviction, would disqualify the firm and certain of its affiliates from using the qualified professional asset manager ("QPAM") class exemption. Therefore, Deutsche Investment Management Americas Inc. ("DIMA") applied to the U.S. Department of Labor ("DOL") for a temporary also an individual QPAM exemption for itself and its asset management affiliates, including the firm, in connection with the DSK conviction, and also applied for permanent relief for itself and those affiliates in connection with both the LIBOR and the DSK matters. (The sentencing of DBGS has been delayed until such time as the DOL makes a final determination with regard to the permanent QPAM relief.)

Please note, RREEF America REIT II is considered a Real Estate Operating Company under ERISA. Therefore, the fund is not subject to ERISA or Section 4975 of the Code and does not require the QPAM exemption to manage its investments.

## **CenterSquare**

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

During the period, Andrew Nicholas, Global Co-Head of Real Estate Securities announced his retirement effective September 21, 2017. Dean Frankel has assumed the title of Global Head of Real Estate Securities.

## EBMUD PERFORMANCE – Net of Fees

Manager	Mandate	Estimated Annual Fee (bps)*
Northern Trust – R1000	Passive – Large Cap Core	3
Intech	Active – Large Cap Growth	5 bps + 12.5% on excess returns
T. Rowe Price	Active – Large Cap Growth	49
Barrow Hanley	Active – Large Cap Value	30
Northern Trust – R2000G	Passive – Small Cap Growth	8
Opus	Active – Small Cap Value	5 bps + 25% on excess returns
Franklin Templeton	Active – International Equity	57
Fisher	Active – International Equity	64
Parametric – BXM	Replication – Covered Calls	19
Parametric – Delta Shift	Semi-Active – Covered Calls	33
Van Hulzen	Active – Covered Calls	25
CS McKee	Active – Core Fixed Income	20
WAMCO – Short Duration	Active – Non-Core Fixed Income	16
WAMCO – Short-Term High Yield	Active – Non-Core Fixed Income	40
WAMCO – Bank Loans	Active – Non-Core Fixed Income	45
RREEF	Real Estate	95
CenterSquare	Real Estate	27.5 bps + 15% on excess returns

\*as of 6/30/2017

## Asset Class and Manager Performance (Net of Fees)<sup>^</sup>

As of June 30, 2017

Asset Class	Quarter	1 Year	3 Years	5 Years
EBMUD Total Plan	3.4	14.3	6.5	10.6
<i>Policy Benchmark<sup>^^</sup></i>	<i>3.0</i>	<i>13.4</i>	<i>6.2</i>	<i>10.1</i>
Domestic Equity	3.9	19.8	9.4	14.5
<i>Russell 3000*</i>	<i>3.0</i>	<i>18.5</i>	<i>9.1</i>	<i>14.6</i>
International Equity	7.3	24.4	1.3	8.2
<i>MSCI ACWI x US (blend)**</i>	<i>6.0</i>	<i>21.0</i>	<i>1.3</i>	<i>7.7</i>
Covered Calls	2.7	12.5	7.7	-
<i>CBOE BXM</i>	<i>3.1</i>	<i>12.1</i>	<i>6.5</i>	<i>-</i>
Fixed Income	1.1	2.1	1.8	2.2
<i>Fixed Income benchmark (blend)***</i>	<i>1.1</i>	<i>2.3</i>	<i>2.5</i>	<i>2.4</i>
Real Estate	1.1	1.3	9.7	10.7
<i>NCREIF/NAREIT (blend)****</i>	<i>0.8</i>	<i>2.1</i>	<i>9.5</i>	<i>10.2</i>
Cash	0.3	0.6	-	-
<i>Citigroup 3 Month T-Bill Index</i>	<i>0.2</i>	<i>0.5</i>	<i>-</i>	<i>-</i>

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

<sup>^^</sup> Policy Benchmark consists of 40% Russell 3000 (blend), 15% MSCI ACWIxU.S. (blend), 20% CBOE BXM, 10% BC Aggregate, 5% BC 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), and 2.5% FTSE NAREIT Equity REITs index 4/1/14-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

\*\*\*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-present; 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 June 30, 2017

Manager - Style	Mkt Value (\$'000)	1 Quarter	1 Year	3 Years	5 Years
<b>Domestic Equity</b>					
<b>Large Cap Core</b>					
Northern Trust Co. - Passive	280,629	3.1	18.0	9.3	14.7
<i>Russell 1000 Index</i>		<i>3.1</i>	<i>18.0</i>	<i>9.3</i>	<i>14.7</i>
<b>Large Cap Growth</b>					
Intech - Active*	83,181	5.9	17.9	11.9	15.3
T.Rowe Price - Active	84,668	7.6	29.3	12.7	16.6
<i>Russell 1000 Growth Index</i>		<i>4.7</i>	<i>20.4</i>	<i>11.1</i>	<i>15.3</i>
<b>Large Cap Value</b>					
Barrow Hanley - Active	185,041	3.2	17.8	7.7	13.4
<i>Russell 1000 Value Index</i>		<i>1.3</i>	<i>15.5</i>	<i>7.4</i>	<i>13.9</i>
<b>Small Cap Growth</b>					
Northern Trust Co. - Passive	29,571	4.4	24.7	7.9	14.3
<i>Russell 2000 Growth Index</i>		<i>4.4</i>	<i>24.4</i>	<i>7.6</i>	<i>14.0</i>
<b>Small Cap Value</b>					
Opus - Active**	36,903	1.7	23.5	7.2	12.6
<i>Russell 2000 Value Index</i>		<i>0.7</i>	<i>24.9</i>	<i>7.0</i>	<i>13.4</i>
<b>International Equity</b>					
Fisher Investments - Active	112,994	8.8	25.7	3.5	8.7
Franklin Templeton - Active***	101,170	5.6	23.0	-1.0	7.7
<i>MSCI ACWI xUS (blend)****</i>		<i>6.0</i>	<i>21.0</i>	<i>1.3</i>	<i>7.7</i>

\*On watch as of 12/2014

\*\*On watch as of 12/2012

\*\*\* Franklin Templeton's historical returns are reported net of fees (inception-6/30/2011). The Franklin Templeton institutional mutual fund account was liquidated in June 2011 and moved to a transition account which later funded the Franklin Templeton separate account in the same month. The Q2-2011 return is an aggregate of the institutional mutual fund account, Franklin transition account, and separate account.

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

## Manager Performance (Net of Fees)

As of June 30, 2017

Manager - Style	Mkt Value (\$000)	1 Quarter	1 Year	3 Years	5 Years
<b>Covered Calls</b>					
Parametric BXM - Replication	113,788	2.9	12.5	8.4	-
Parametric Delta Shift - Semi-active	118,693	3.2	16.4	9.6	-
Van Hulzen	104,575	1.9	8.4	5.1	-
<i>CBOE BXM</i>		<i>3.1</i>	<i>12.1</i>	<i>6.5</i>	<i>-</i>
<b>Real Estate</b>					
RREEF America II (Lag)*	34,405	1.2	7.6	11.4	11.8
<i>NCREIF NPI (Lag)*</i>		<i>0.0</i>	<i>5.6</i>	<i>10.0</i>	<i>10.4</i>
CenterSquare	49,608	1.0	-2.6	9.1	10.1
<i>FTSE NAREIT Equity REIT Index</i>		<i>1.5</i>	<i>-1.7</i>	<i>8.4</i>	<i>9.5</i>
<b>Total Fixed Income</b>					
<b>Core Fixed Income</b>					
CS McKee - Active	140,236	1.4	-0.1	2.7	2.4
<i>Bloomberg BC U.S. Aggregate Index</i>		<i>1.4</i>	<i>-0.3</i>	<i>2.5</i>	<i>2.2</i>
<b>Non-Core Fixed Income</b>					
Western Asset - Bank Loans** - Active	33,891	0.3	6.6	1.8	-
<i>S&amp;P/LSTA Performing Loans Index</i>		<i>0.8</i>	<i>7.7</i>	<i>3.9</i>	<i>-</i>
Western Asset - Short-Term HY*** - Active	31,159	1.4	10.8	-1.1	-
<i>Bloomberg BC US High Yield 1-5 Yr Cash Pay 2%</i>		<i>1.8</i>	<i>12.0</i>	<i>3.8</i>	<i>-</i>
Western Asset - Short Duration - Active	66,661	0.6	0.9	1.2	-
<i>Bloomberg BC 1-3 Year Gov/Credit Index</i>		<i>0.3</i>	<i>0.3</i>	<i>1.0</i>	<i>-</i>

\*Results are lagged one quarter.

\*\*On watch as of 4/2016

\*\*\*On watch as of 4/2016

## 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% BC Aggregate, 5% NCREIF (lagged)
10/1/2005 – 12/31/2006	50% Russell 3000, 20% MSCI EAFE ND, 25% BC Aggregate, 5% NCREIF (lagged)
1/1/2007 – 12/31/2007	50% Russell 3000, 20% MSCI ACWI x U.S. GD, 25% BC Aggregate, 5% NCREIF (lagged)
1/1/2008 – 10/31/2011	50% Russell 3000, 20% MSCI ACWI x U.S. GD, 25% BC Universal, 5% NCREIF (lagged)
11/1/2011 – 2/28/2014	50% Russell 3000, 20% MSCI ACWI x U.S. GD, 25% BC 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% BC Aggregate, 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
4/1/2014 – present	40% Russell 3000, 20% CBOE BXM, 15% MSCI ACWI x U.S. GD, 10% BC Aggregate, 5% BC 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



## DEFINITION OF BENCHMARKS

**BC 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.

**BC 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.

**BC 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.

**BC 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.

**BC 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).

**BC 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 countries 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 certainty of receiving their nominal cash flows. PCA estimates the expected annualized real yield by subtracting an estimate of expected 10 year inflation (produced by the Survey of Professional Forecasters as collected by the Federal Reserve Bank of Philadelphia), from the 10 year Treasury constant maturity interest rate.

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

### **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.

## RISK METRICS DESCRIPTION – PCA Market Sentiment Indicator

### What is the PCA Market Sentiment Indicator (PMSI)?

The PMSI is a measure meant to gauge the market's sentiment regarding economic growth risk. Growth risk cuts across most financial assets, and is the largest risk exposure that most portfolios bear. The PMSI takes into account the momentum<sup>17</sup> (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 PCA Market Sentiment Indicator (PMSI) graph?

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

### How is the PCA Market Sentiment Indicator (PMSI) Constructed?

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

1. Stock return momentum: Return momentum for the S&P 500 Equity Index (trailing 12-months)
2. Bond yield spread momentum: Momentum of bond yield spreads (excess of the measured bond yield over the identical duration U.S. Treasury bond yield) for corporate bonds (trailing 12-months) for both investment grade bonds (75% weight) and high yield bonds (25% weight). The scale of this measure is adjusted to match that of the stock return momentum measure.

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

1. If both stock return momentum and bond spread momentum are positive = GREEN (positive)
2. If one of the momentum indicators is positive, and the other negative = GRAY (inconclusive)
3. If both stock return momentum and bond spread momentum are negative = RED (negative)

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

There is strong evidence that time series momentum is significant and persistent.<sup>18</sup> In particular, across an extensive array of asset classes, the sign of the trailing 12-month return (positive or negative) is indicative of future returns (positive or negative) over the next 12 month period. The PMSI is constructed to measure this momentum in stocks and corporate bond spreads. A reading of green or red is agreement of both the equity and bond measures, indicating that it is likely that this trend (positive or negative) will continue over the next 12 months. When the measures disagree, the indicator turns gray. A gray reading does not necessarily mean a new trend is occurring, as the indicator may move back to green, or into the red from there. The level of the reading (black line) and the number of months at the red or green reading, gives the user additional information on which to form an opinion, and potentially take action.

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<sup>17</sup> Momentum is defined as the persistence of relative performance. There is a significant amount of academic evidence indicating that positive momentum (e.g., strong performing stocks over the recent past continue to post strong performance into the near future) exists over near-to-intermediate holding periods. See, for example, "Understanding Momentum," *Financial Analysts Journal*, Scowcroft, Sefton, March, 2005.

<sup>18</sup> "Time Series Momentum" Moskowitz, Ooi, Pedersen, August 2010 <http://pages.stern.nyu.edu/~lpederse/papers/TimeSeriesMomentum.pdf>



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**EAST BAY MUNICIPAL UTILITY DISTRICT**

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DATE: September 16, 2017

MEMO TO: Members of the Retirement Board

FROM: Sophia D. Skoda, Director of Finance 

SUBJECT: Vulnerability of Employee Retirement System to Market Performance

The EBMUD Employee Retirement System Board has requested an analysis of the impact that a major market downturn could potentially have on the Retirement System. Accordingly, Segal Consulting has performed an analysis modeling such a market decline. Segal based its analysis on the market value returns in the fiscal year prior to the Great Recession (FY2006-07), the recession itself (FY2007 through FY2009) and the subsequent years to date. Segal's report, attached, shows the resulting impact in each fiscal year on Aggregate Employer Contribution Rates, Unfunded Actuarial Accrued Liabilities, and Funded Ratios. Andy Yeung from Segal will be at the meeting to present the results.

SDS:DB

Attachment



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VIA EMAIL and USPS

September 13, 2017

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

**Re: Illustrations of Employer Contribution Rates, UAAL, and Funded Ratios,  
In a Hypothetical Market Downturn Scenario**

Dear Sophia:

We have been asked by your office to assist the Board in assessing the vulnerability of the Pension and Health Insurance Benefit (HIB) Plans if there were to be another major market downturn. We have provided for illustration purposes the District's projected employer contribution rates, unfunded actuarial accrued liabilities (UAAL), and funded ratios, for the Pension and HIB Plans, assuming a series of hypothetical market returns over the next 10 years.

The future hypothetical market value returns modeled in the study, as provided in the table below, are based on the Board's request to study the impact of a market downturn, followed by a rebound. For this study, EBMUD's staff has suggested that we use the System's market value returns covering the period from July 1, 2006 through June 30, 2016, as that 10-year period captured the contribution rate volatility associated with a downturn in fiscal years (FY) 2007-2008 and 2008-2009, and to some degree, a rebound that took place in FYs 2009-2010 and 2010-2011.

<b>Model FY (Actual)</b>	<b>Market Value Return</b>
2016-2017 (2006-2007)	18.95%
2017-2018 (2007-2008)	-8.40%
2018-2019 (2008-2009)	-20.47%
2019-2020 (2009-2010)	14.27%
2020-2021 (2010-2011)	24.85%
2021-2022 (2011-2012)	1.57%
2022-2023 (2012-2013)	13.91%
2023-2024 (2013-2014)	19.41%
2024-2025 (2014-2015)	4.37%
2025-2026 (2015-2016)	0.92%
<b>10-Year Average Return</b>	<b>6.05%</b>

To illustrate the effect on the employer contribution rates, UAAL, and funded ratios resulting from the actual fiscal year market value returns listed above, we have provided the historical results shown below.

	<b>Historical Aggregate Employer Contribution Rates Payable Fiscal Year<sup>1</sup></b>									
	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16
Employer Rate <sup>2</sup>	26.4%	28.3%	28.9%	32.2%	36.6%	37.7%	39.6%	43.7%	44.0%	42.8%

	<b>Historical Unfunded Actuarial Accrued Liabilities as of June 30 (\$ in millions)</b>									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
UAAL	\$371	\$429	\$546	\$566	\$578	\$624	\$639	\$637	\$608	\$659

	<b>Historical Funded Ratio as of June 30</b>									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Funded Ratio	69.2%	67.9%	61.4%	62.1%	62.6%	62.4%	63.5%	65.9%	69.0%	68.8%

## RESULTS

### Projected Aggregate Employer Contribution Rate

Based on the hypothetical market value returns as outlined on the prior page, the aggregate employer contribution rate<sup>1</sup> for both the Pension and the HIB Plans begins to deviate materially from the projected rate prepared using the current assumed 7.25% annual investment return beginning with FY 2020-2021, a result of the hypothetical -20.47% return during FY 2018-2019<sup>3</sup>. By FY 2026-2027, the difference between the hypothetical aggregate employer rate and the assumed rate is 46.6% versus 40.0%.

	<b>Aggregate Employer Contribution Rates Payable Fiscal Year</b>										
	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26	26-27
Hypothetical Market*	42.0%	41.6%	39.6%	39.6%	47.8%	49.1%	50.8%	53.6%	54.0%	50.1%	46.6%
Actuarial Assumption**	42.0%	41.6%	40.9%	40.6%	41.2%	41.5%	41.2%	40.9%	40.5%	40.3%	40.0%

\* Based on the hypothetical market value returns as outlined on page one.

\*\* Based on the current assumed market value return of 7.25% per annum.

<sup>1</sup> Payable at the end of each pay period.

<sup>2</sup> Aggregate employer contribution rates for FY 2006-2007 and 2007-2008 are from page 18 of the prior actuaries' June 30, 2005 and June 30, 2006 valuation reports dated January 6, 2006 and November 1, 2006, respectively.

<sup>3</sup> There is a one-year scheduled delay between the date of the valuations and the date of the contribution rate implementation. This is the reason why an unfavorable return during FY 2018-2019 did not result in a higher contribution rate until FY 2020-2021.

Note that the aggregate employer contribution rate as determined in the June 30, 2016 valuations is 42.0% for the Pension and HIB Plans, payable FY 2017-2018. However, in our projections, new members entering the System after the June 30, 2016 valuation date are expected to enter the 2013 Tier, which has a lower normal cost rate compared to the 1955/1980 Plan. The savings from this replacement (that is, the positive impact of increasing the proportionate number of PEPRA employees) is reflected in the aggregate employer contribution rate of 41.6% for FY 2017-2018.

#### Projected Unfunded Actuarial Accrued Liability

As shown in the table below, the UAAL under the hypothetical market value returns is \$613 million as of June 30, 2017, and is projected to reach \$683 million by June 30, 2026, as compared to \$647 million as of June 30, 2017 and \$563 million as of June 30, 2026, under the current 7.25% annual investment return assumption. For the assumed investment return scenario, all deferred asset gains and losses from the June 30, 2016 valuation are fully recognized by June 30, 2020, and the UAAL peaks at that point. Under the hypothetical scenario, the UAAL peaks three years later on June 30, 2023.

Unfunded Actuarial Accrued Liabilities as of June 30 (\$ in millions)										
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Hypothetical Market*	\$613	\$619	\$861	\$900	\$951	\$1,032	\$1,035	\$886	\$742	\$683
Actuarial Assumption**	647	646	670	683	673	658	640	618	593	563

\* Based on the hypothetical market value returns as outlined on page one.

\*\* Based on the current assumed market value return of 7.25% per annum.

#### Projected Funded Ratio

The funded ratio under the hypothetical market value returns is 72.2% as of June 30, 2017, and is projected to increase to 77.4% by June 30, 2026, as compared to 70.7% as of June 30, 2017 and 81.4% as of June 30, 2026, under the current 7.25% annual investment return assumption. Under the assumed investment return scenario, the funded ratio is increasing throughout the projection period, while under the hypothetical scenario, the funded ratio initially declines through June 30, 2022, and then increases over the remaining projection years, as shown in the table below.

Funded Ratio <sup>4</sup> as of June 30										
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Hypothetical Market*	72.2%	73.1%	64.0%	63.8%	63.1%	61.3%	62.4%	68.8%	74.7%	77.4%
Actuarial Assumption**	70.7%	71.9%	72.0%	72.5%	73.9%	75.3%	76.8%	78.3%	79.8%	81.4%

\* Based on the hypothetical market value returns as outlined on page one.

\*\* Based on the current assumed market value return of 7.25% per annum.

<sup>4</sup> The funded ratios are based on valuation value of assets (smoothed market values).

We have included as an attachment to this letter, three exhibits that graphically show the results discussed above.

#### **ASSUMPTIONS AND METHODS**

- After June 30, 2016, the total projected payroll for the District is assumed to grow by the aggregate payroll increase assumption of 3.50% per year. The difference between the total payroll growing at 3.50% per year and the closed group “shrinking” payroll is assumed to be made up by the payroll from open group new members hired after June 30, 2016.

The demographic profile of the active membership over the projected 10-year period is based on the assumption that as active members as of June 30, 2016 leave the workforce, they will be replaced by new hires entering the 2013 Tier. To illustrate the impact on projected contributions, we note that for the June 30, 2016 valuations, the recommended total normal cost rate for both the Pension and HIB Plans is 25.48% of payroll for the 1955/1980 Plan, and 18.55% of payroll for the 2013 Tier (payable FY 2017-2018). Based on the Plan’s level percent of pay funding method, over time, the combined 1955/1980 Plan and 2013 Tier normal cost rate will gradually shift towards the lower 2013 Tier normal cost rate. The enclosed projections reflect this shift in the normal cost rate over the projection period.

- Projected benefit payments are based on an open group projection from the June 30, 2016 valuations. New entrant benefit payments have been approximated based on the demographic makeup of recently hired active members from the June 30, 2016 valuations.
- The valuation value of assets for the System recognizes market value gains and losses over a five-year period, with a further adjustment, if necessary, to be within 30% of the market value. Our projections continue to follow the established smoothing and corridor limiting method for future hypothetical market value gains and losses.
- The projections reflect the 12-month delay in implementing the contribution rates determined as of the prior June 30 valuation date.
- Unless otherwise noted and detailed above, these projections use the same assumptions, methodology, and plan provisions from the June 30, 2016 actuarial funding valuations, and were projected forward using generally accepted actuarial methods.

#### **OTHER CONSIDERATIONS**

We emphasize that projections, by their nature, are not a guarantee of future results. The modeling projections are intended to serve as illustrations of future financial outcomes that are based on the information available to us at the time the modeling is undertaken and completed, and the agreed-upon assumptions and methodologies described herein. Emerging results may differ significantly if the actual experience proves to be different from these assumptions or if alternative methodologies are used. Actual experience may differ due to such variables as demographic experience, the economy, stock market performance, and the regulatory environment.

Ms. Sophia Skoda  
September 13, 2017  
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The undersigned is a member of the American Academy of Actuaries and is qualified to render the actuarial opinion contained herein.

Please let us know if you have any questions regarding this letter or the enclosures.

Sincerely,

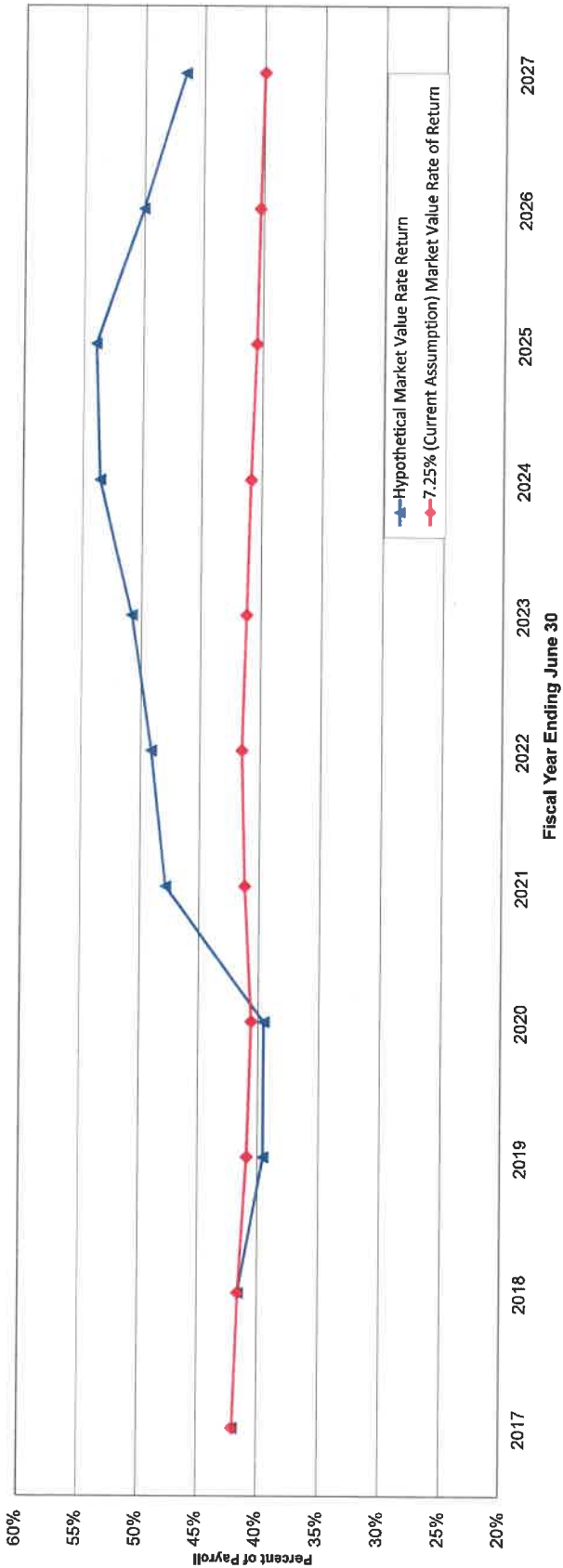
A handwritten signature in dark ink, appearing to read "Andy Yeung". The signature is written in a cursive, flowing style.

Andy Yeung

JRC/bbf  
Enclosures

cc: Dari Barzel  
Olivia Young  
Elizabeth Grassetti

**Exhibit 1: Projected Aggregate Employer Contribution Rates**  
(Assuming Contributions Payable at End of Each Pay Period)



Aggregate Employer Contribution Rates Payable Fiscal Year Ending											
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Hypothetical Rate of Return	42.0%	41.6%	39.6%	39.6%	47.8%	49.1%	50.8%	53.6%	54.0%	50.1%	46.6%
7.25% Rate of Return	42.0%	41.6%	40.9%	40.6%	41.2%	41.5%	41.2%	40.9%	40.5%	40.3%	40.0%

Exhibit 2: Projected UAAL

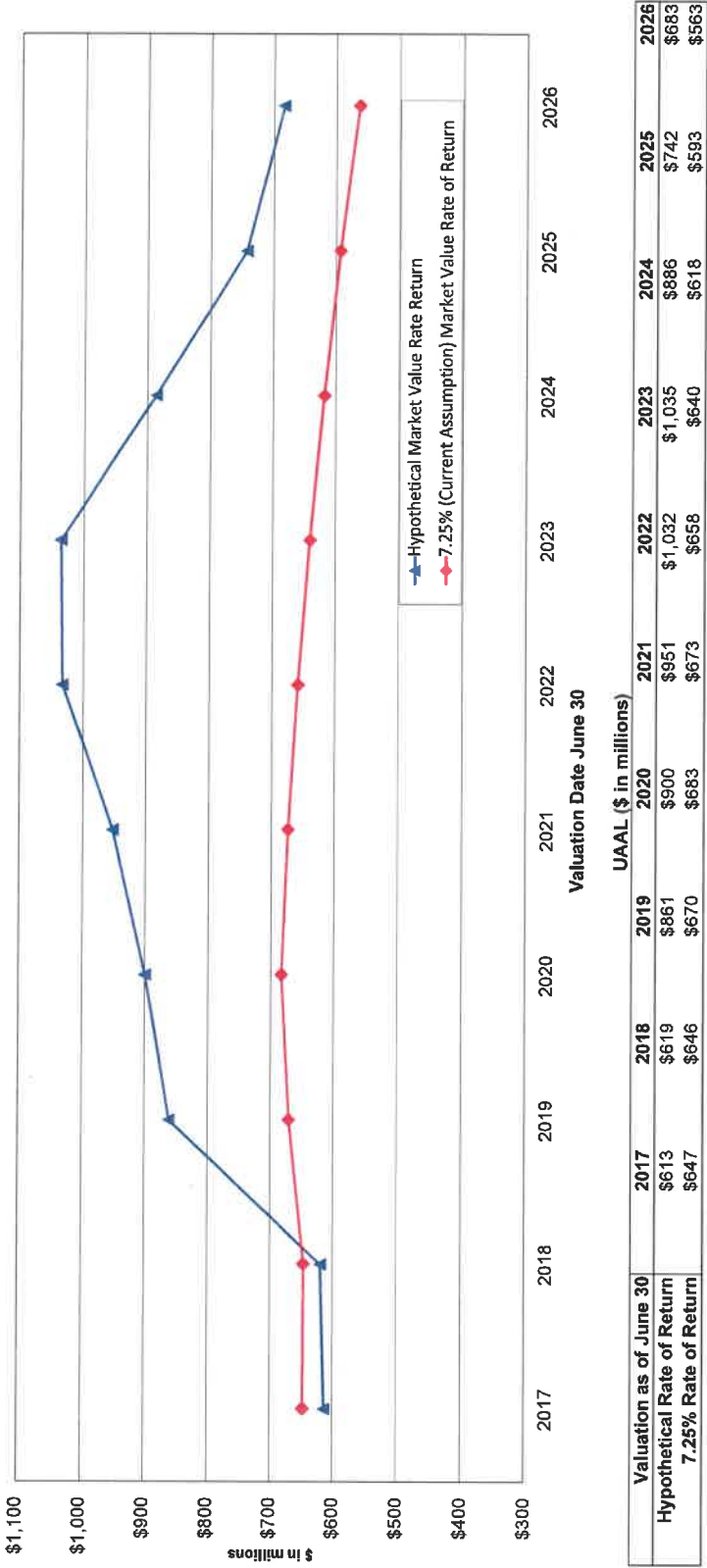
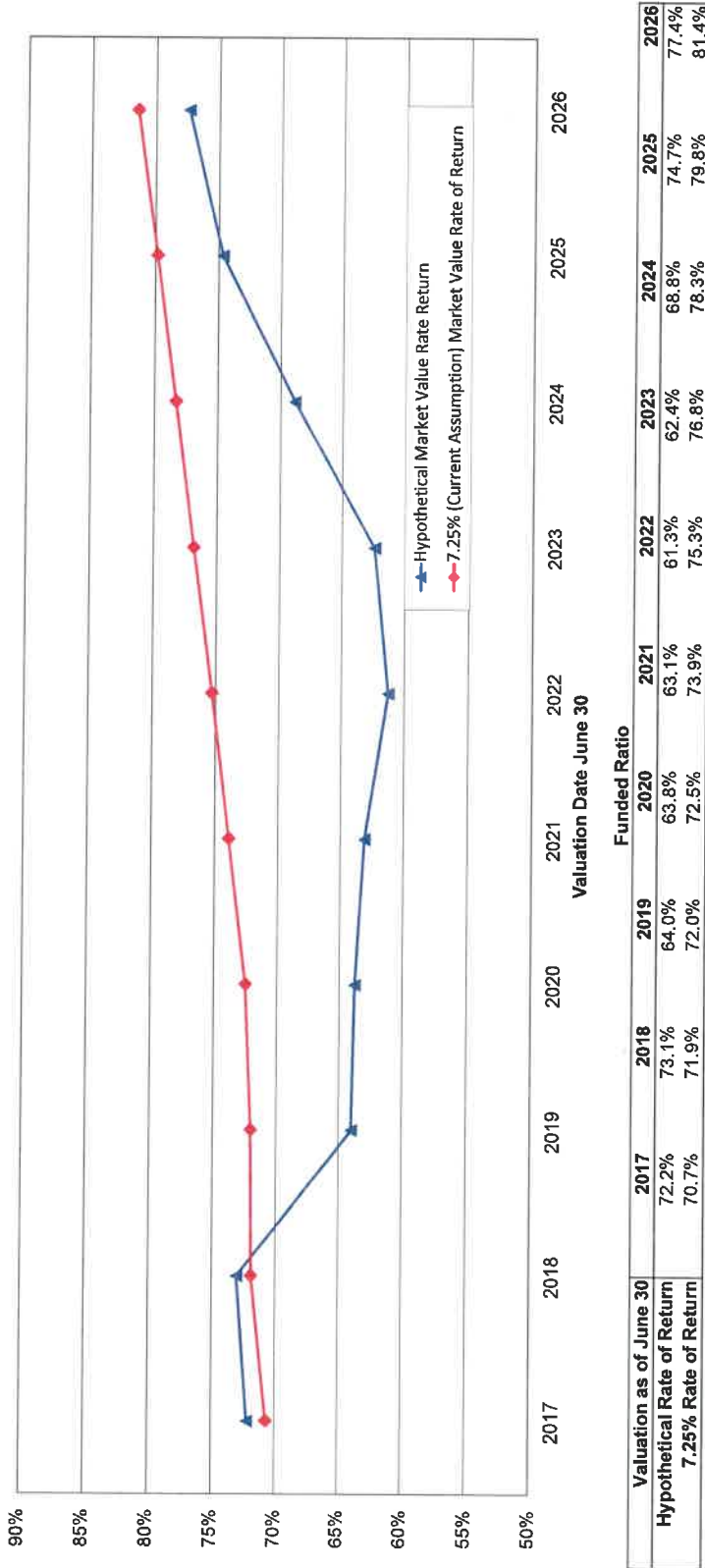




Exhibit 3: Projected Funded Ratio



## EAST BAY MUNICIPAL UTILITY DISTRICT

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DATE: September 21, 2017

MEMO TO: Members of the Retirement Board

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

FROM: Elizabeth Grassetti, Sr. Human Resources Analyst *EG*

SUBJECT: Low Income Adjustments for Retired Members and Surviving Spouses

### BACKGROUND

Section 35 of the Retirement Ordinance provides for a Low Income Adjustment for retirees or their surviving beneficiary. To qualify, the retiree must have retired with 20 or more years of service; be in receipt of a Social Security benefit; and the retiree (or spouse) must demonstrate that his or her total income from all sources is below 200% of the Federal Poverty level, and for surviving spouses, 150% of the Federal poverty level. Staff mailed flyers to 38 potentially eligible retirees and spouses. There were no responses from the mailing regarding the benefit.