Employees' Retirement Association

AGENDA

RETIREMENT BOARD MEETING

SECOND MONTHLY MEETING
May 22, 2019
9:00 a.m.

Retirement Board Conference Room
The Willows Office Park
1355 Willow Way, Suite 221
Concord, California

THE RETIREMENT BOARD MAY DISCUSS AND TAKE ACTION ON THE FOLLOWING:

1. Pledge of Allegiance.

2. Accept comments from the public.

3. Approve minutes from the April 24, 2019 meeting.

CLOSED SESSION

4. CONFERENCE WITH LABOR NEGOTIATOR
(Government Code Section 54957.6)

   Agency designated representative:
   Joe Wiley, CCCERA's Chief Negotiator

   Unrepresented Employee: Chief Executive Officer

OPEN SESSION

5. Presentation from Segal Consulting: Review of Actuarial Assumptions.

6. Presentation of Actuarial Audit Report by Cheiron.

7. Consider and take possible action to adopt the actuarial assumptions to be utilized in the December 31, 2018 actuarial valuation report.

8. Consider and take possible action to adopt the Declining Employer Payroll Actuarial Funding Policy.

9. Consider and take possible action to amend the Actuarial Funding Policy.

10. Review of total portfolio performance for period ending March 31, 2019.
    a. Presentation from Verus.
    b. Presentation from staff.

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The Retirement Board will provide reasonable accommodations for persons with disabilities planning to attend Board meetings who contact the Retirement Office at least 24 hours before a meeting.

11. Consider authorizing the attendance of Board:
    a. The Private Equity Exclusive, The Pension Bridge, July 22-23, 2019, Chicago, IL.
    b. 2019 Public Funds Forum, ValueEdge Advisors, September 3-5, 2019, Park City, UT.

12. Miscellaneous
    a. Staff Report
    b. Outside Professionals' Report
    c. Trustees' comments

The Retirement Board will provide reasonable accommodations for persons with disabilities planning to attend Board meetings who contact the Retirement Office at least 24 hours before a meeting.

Meeting Date
05/22/19
Agenda Item
#3

CONTRA COSTA COUNTY CCCERA Employees' Retirement Association

MINUTES

RETIREMENT BOARD MEETING MINUTES

REGULAR MEETING
April 24, 2019
9:00 a.m.

Retirement Board Conference Room
The Willows Office Park
1355 Willow Way, Suite 221
Concord, California

Present: Candace Andersen, Jerry Holcombe, Jay Kwon, Louie Kroll, David MacDonald, John Phillips, William Pigeon, Todd Smithey and Russell Watts

Absent: Scott Gordon and Jerry Telles

Staff: Gail Strohl, Chief Executive Officer; Christina Dunn, Deputy Chief Executive Officer; Timothy Price, Chief Investment Officer; Karen Levy, General Counsel; Wrally Dutkiewicz, Compliance Officer; Anne Sommers, Administrative/HR Manager; Henry Gudino, Accounting Manager; Tim Hoppe, Retirement Services Manager; and Colin Bishop, Member Services Manager

Outside Professional Support:	Representing:
Harvey Leiderman	Reed Smith LLP
David Plecha	Dimensional Fund Advisors
Ted Simpson	Dimensional Fund Advisors

1. Pledge of Allegiance

The Board, staff and audience joined in the *Pledge of Allegiance*.

2. Accept comments from the public

No member of the public offered comment.

3. Approval of Minutes

It was **M/S/C** to approve the minutes from the March 27, 2019 meeting. (Yes: Andersen, Holcombe, Kroll, Kwon, MacDonald, Phillips, Smithey and Watts)

MacDonald recused himself from Item 4 and was not present for subsequent discussion and voting.

CLOSED SESSION
The Board moved into closed session pursuant to Govt. Code Section 54956.9(d)(1).

The Board moved into open session.

4. There was no reportable action related to Govt. Code Section 54956.9(d)(1).

5. <u>Review of Report on Liquidity Sub-Portfolio</u>

Price reviewed the Liquidity Sub-Portfolio report.

Pigeon was present for subsequent discussion and voting.

<u>Dimensional Fund Advisors</u> - David Plecha and Ted Simpson

Simpson provided an update on the firm, their upcoming events and reviewed the senior executive team.

Plecha reviewed their investment philosophy, expected returns and credit spreads. He also gave an overview of CCCERA's portfolio.

6. <u>Consider and take possible action to amend the Investment Policy Statement</u>

Price recommended revisions to the Investment Policy Statement.

It was **M/S/C** to amend the Investment Policy Statement as presented. (Yes: Andersen, Holcombe, Kroll, Kwon, MacDonald, Phillips, Pigeon, Smithey and Watts)

7. <u>Consider and take possible action to issue a Request for Proposal (RFP) for a Pension Administration System Consulting Firm</u>

It was **M/S/C** to issue a Request for Proposal (RFP) for a Pension Administration System Consulting Firm. (Yes: Andersen, Holcombe, Kroll, Kwon, MacDonald, Phillips, Pigeon, Smithey and Watts)

8. <u>Death During Active Membership – Non-Service Connected Disability and Optional Settlement 2 information</u>

Hoppe reviewed the background and historical data on the active death/non-service connected disability benefit.

9. <u>Discussion concerning new board room</u>

Strohl reported the move is currently on schedule. There was a discussion on the setup of the board room and the recording of board meetings.

Andersen and Pigeon were no longer present for subsequent discussion and voting.

10. <u>Consider authorizing the attendance of Board:</u>

a. There was no action taken on this item. Annual Institutional Symposium, Dimensional Fund Advisors, May 6-8, 2019, Charlotte, NC
b. There was no action taken on this item. 2019 Investor Conference & Dinner Reception, Angelo Gordon, May 15, 2019, New York, NY.
c. There was no action taken on this item. Annual Meeting & Dinner, DBL Investors, June 19, 2019, San Francisco, CA.
d. It was **M/S/C** to authorize the attendance of 4 Board members at the Public Pension Investment Management Program, SACRS, July 22-24, 2019, Berkeley, CA. (Yes: Holcombe, Kroll, Kwon, MacDonald, Phillips, Smithey and Watts)

11. Miscellaneous

(a) Staff Report –

Dunn reported Colin Bishop, the Member Services Manager, has accepted a position at the San Bernardino County Employees' Retirement Association.

(b) Outside Professionals' Report –

None

(c) Trustees' comments –

Kwon reported on The Pension Bridge Conference he recently attended.

It was **M/S/C** to adjourn the meeting. (Yes: Holcombe, Kroll, Kwon, MacDonald, Phillips, Smithey and Watts)

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Todd Smithey, Chairman	David MacDonald, Secretary

Segal Consulting

Contra Costa County Employees' Retirement Association

Actuarial Experience Study – Recommended Assumptions for December 31, 2018 Valuation

May 22, 2019

Paul Angelo, FSA, MAAA, FCA, EA

John Monroe, ASA, MAAA, EA

Segal Consulting, San Francisco

Meeting Date
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#5

5581108v3

Demographic Assumptions
Recommended

Mortality Rates

- New Pub-2010 tables on a benefit weighted basis
  - Used a nine-year period to capture more experience
  - Recommendations reflect credibility of data
- Continued use of generational mortality improvement
- MP-2018 mortality improvement scale

Retirement rates

- Change in structure to use both age and service for General Tier 1 and 3 Enhanced and Safety Tier A Enhanced
  - Used a six-year period to capture more experience
  - Later retirements with under 30 years of service
  - Earlier retirements with 30+ years of service
  - Overall later retirements are assumed for both General and Safety members

Demographic Assumptions
Recommended

- Termination rates
  - Increase in termination rates
  - Maintain current assumption that member will choose a refund or deferred benefit based on which option is more valuable
- Disability incidence rates
  - No change in rates for General Tier 1 and 4
  - Decrease for General Tier 3 and 5 and Safety
- Leave Cashouts
  - Overall decreases in assumed leave cashouts
- Service from unused sick leave conversion
  - Decreases in assumed sick leave conversion

Economic Assumptions

- Price Inflation (CPI)
  - Investment Return, Salary Increases, COLAs
- Salary Increases
  - Wage inflation (or payroll growth)
    - Includes price inflation plus “across the board” real wage growth
  - Merit and promotion: based on experience
- Investment Return (Investment Earnings)
  - Components include price inflation, real return, investment expenses
  - Generally based on passive returns
- Administrative Expenses
  - Explicit percent of pay loading
  - Adjusts in each valuation based on prior year actual expenses and payroll

Economic Assumptions
Recommended

	12/31/2015 Valuation		12/31/2018 Valuation	
	Investment Return	**Salary Growth**	**Investment Return**	**Salary Growth**
Price Inflation	2.75%	2.75%	2.75%	2.75%
Real Wage Growth	n/a	0.50%	n/a	0.50%
Net Real Return	4.25%*	n/a	4.25%*	n/a
Total	**7.00%**	**3.25%****	**7.00%**	**3.25%****

* Return is net of investment expenses

** Excludes merit and promotion salary increases

Price Inflation (CPI)

- Historical Consumer Price Index
  - Median 15-year moving average = 3.3%
  - Median 30-year moving average = 3.8%
  - Averages have been declining due to low inflation over past 20 years
- NASRA Survey
  - Median inflation assumption is 2.75%
- Social Security Intermediate Forecast = 2.6%
- Verus anticipates long-term inflation of 1.80%
  - Average inflation from survey of 7 consultants = 2.35%
- Market based inflation expectations = 1.96% (March 2019)
- Recommend maintaining assumption at 2.75%
  - Same as assumption adopted by Board in 2016
  - Segal recommendation for California public system clients since 2018
  - No change in assumed COLAs

Salary Increase Assumption

Three components:

- Price inflation: maintain at 2.75%
- "Across the Board" real wage growth: maintain at 0.50%
  - Department of Labor: Annual State and Local Government real productivity increase: 0.3% – 0.7% over 10 – 20 years
- Merit and Promotion: from experience study
  - Based on years of service
  - General: Currently 10.00% (0 – 1 years) to 0.75% (15+ years)
    - Decrease for General members with 15+ years
  - Safety: Currently 10.50% (0 – 1 years) to 0.75% (15+ years)
    - Increase for Safety members for most years of service categories

Payroll Growth Assumption

- Active member payroll based on wage inflation
  - Assume constant future active headcount
  - Used to project total payroll for UAAL amortization
- Include price inflation and “across the board” real wage growth
  - Price inflation: maintain at 2.75%
  - Real increases: maintain at 0.50%
  - Total is maintained at 3.25%

Setting the Investment Earnings Assumption

Four components:

- Inflation: consistent with salary increase and COLA assumption
- Real returns by asset class
  - Weighted by asset allocation
- Reduced by assumed investment expenses
- Reduced by “risk adjustment”
  - Margin for adverse deviation
  - Expressed as confidence level above 50%

CCCERA Earnings Assumption

Preview: Components of Investment Return Assumption

	Current	Recommended
Assumed Inflation	2.75%	2.75%
Portfolio Real Rate of Return	5.19%	5.51%
Assumed Expenses*	(0.64%)	(0.65%)
Risk Adjustment	(0.30%)	(0.61%)
Assumed Investment Return	7.00%	7.00%
Confidence level	54%	59%
Standard deviation	10.80%	10.30%

** Includes investment expenses*

Real Returns by Asset Class

- Use an average of 7 investment advisory firms retained by Segal public clients
  - Use results from Verus for asset categories unique to CCCERA
- Expected real return for CCCERA asset allocation is 5.51%
  - Increased from 5.19% in 2016 study
- Increase in real return is due to a combination of:
  - Changes in the target asset allocation (+0.27%)
  - Changes in real return assumptions in survey (+0.19%)
  - Interaction of these two changes (-0.14%)

CCCERA Real Rate of Return

Asset Class	Target Allocation	Real Return	Weighted Return
Large Cap US Equity	5.00%	5.44%	0.27%
Developed Int'l Equity	13.00%	6.54%	0.85%
Emerging Market Equity	11.00%	8.73%	0.96%
Short-Term Government/Credit	23.00%	0.84%	0.19%
US Treasury	3.00%	1.05%	0.03%
Private Equity	8.00%	9.27%	0.74%
Risk Diversifying	7.00%	3.53%	0.25%
Global Infrastructure	3.00%	7.90%	0.24%
Private Credit	12.00%	5.80%	0.70%
REIT	1.00%	6.80%	0.07%
Value Add Real Estate	5.00%	8.80%	0.44%
Opportunistic Real Estate	4.00%	12.00%	0.48%
Risk Parity	5.00%	5.80%	0.29%
Total	**100.00%**		**5.51%**

Investment Expenses

Investment Expenses as a Percentage of Actuarial Value of Assets

(All dollars in 000's)

Year Ending December 31	Actuarial Value of Assets (AVA)	Investment Expenses	Investment Expenses as a Percent of AVA%
2013	$5,497,194	$38,158	0.69
2014	5,922,449	41,600	0.70
2015	6,572,560	43,059	0.66
2016	7,151,936	46,328	0.65
2017	7,622,351	42,865	0.56
Five-Year Average			**0.65**
Current			**0.64**
Recommendation			**0.65**

- Based on this experience, we have increased the future investment expense component from 0.64% to 0.65%.

Risk Adjustment Model and Confidence Level

- Compares the Association's risk position over time
- Confidence level is a relative, not absolute measure
  - Can be reevaluated and reset for future comparisons
- Confidence level is based on standard deviation
  - Measure of volatility based on portfolio assumptions
- Results should be evaluated for reasonableness

Risk Adjustment Model and Confidence Level

- Most useful for comparing risk position over time
- Confidence level is based on standard deviation
  - Relative likelihood that actual average 15-year return will exceed investment return assumption on expected value basis

Year Ending December 31	Investment Return Assumption	Risk Adjustment	Confidence Level
2006 – 2008	7.80%	0.86%	60%
2009 – 2011	7.75%	0.41%	55%
2012 – 2014	7.25%	0.25%	53%
2015 – 2017	7.00%*	0.30%	54%
2018 (Recommended)	7.00%*	0.61%	59%

** These investment return assumptions are gross of administrative expenses.*

CCCERA Earnings Assumption

Components of Investment Return Assumption

	Current	Recommended
Assumed Inflation	2.75%	2.75%
Portfolio Real Rate of Return	5.19%	5.51%
Assumed Expenses*	(0.64%)	(0.65%)
Risk Adjustment	(0.30%)	(0.61%)
Assumed Investment Return	7.00%	7.00%
Confidence level	54%	59%
Standard deviation	10.80%	10.30%

** Includes investment expenses*

CCCERA Earnings Assumption

- Segal's model for review of earnings assumption
  - Uses forward looking expected arithmetic average returns
    - No surplus or asset shortfall on expected value basis
- Comparison with an alternative model in common use
  - Uses forward looking expected geometric average returns
    - No surplus or asset shortfall on a median value basis
    - Expected geometric returns are lower than expected arithmetic returns
  - However, under this model, earnings assumptions are <u>not</u> reduced for future investment expenses
    - Hence in practice no material difference between earnings assumptions set using this model versus using Segal's model
  - Segal ran CCCERA's asset allocation through this model
    - Using a national survey of capital market assumptions (Horizon)
      - » Stochastic simulation using 10,000 trial outcomes
    - 61% likelihood of achieving 7.00% using 20-year returns

CCCERA Earnings Assumption

- Comparison with other systems
  - National median is 7.50% but continues to trend down nationwide
    - National practice lags California!
  - 7.00% is becoming more common for California CERL systems
    - Ten California county systems (including CCCERA) now at 7.00%
      - One at 6.75%, but with 2.50% inflation component
  - CalPERS and CalSTRS both approved reduction to 7.00%
  - San Jose City at 6.75%, San Diego City at 6.50%

Anticipated Impact on Valuation Results

Modeled as of December 31, 2017 for illustration

Cost Impact of the Recommended Assumptions	
Impact on Employer	
Change due to demographic assumptions	-1.14%
Change due to economic assumptions	-0.08%
Total change in average employer rate	-1.22%
Total estimated change in annual dollar amount ($000s)	$(10,187)
Impact on Member	
Change due to demographic assumptions	0.00%
Change due to economic assumptions	0.00%
Total change in average member rate	0.00%
Total estimated change in annual dollar amount ($000s)	$146
Impact on UAAL and Funded Percentage	
Change in UAAL	Decrease of $83 million
Change in funded percentage	From 88.5% to 89.3%

Note: Even though there is no change in the average member rate as a percent of pay, there is an increase in estimated total member contributions in dollars. The increase in estimated contribution dollars is due to larger projected payroll under the recommended assumptions.

Anticipated Impact on Valuation Results

Modeled as of December 31, 2017 for illustration

Employer Contribution Rate Impact (% of Payroll)				
Cost Group	**Normal Cost**	**UAAL**	**Total**	**Estimated Dollar Amounts ($ in '000s)**
General				
Cost Group #1 – County and Small Districts (Tier 1 and 4)	-0.52%	-0.10%	-0.62%	$(154)
Cost Group #2 – County and Small Districts (Tier 3 and 5)	-0.36%	-0.06%	-0.42%	(2,547)
Cost Group #3 – Central Contra Costa Sanitary District	-0.66%	0.22%	-0.44%	(147)
Cost Group #4 – Contra Costa Housing Authority	-0.42%	0.00%	-0.42%	(24)
Cost Group #5 – Contra Costa County Fire Protection District	-0.42%	0.75%	0.33%	17
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	-0.55%	-0.02%	-0.57%	(5)
Safety				
Cost Group #7 – County (Tier A and D)	-0.94%	-3.78%	-4.72%	$(2,790)
Cost Group #8 – Contra Costa and East Fire Protection Districts	-0.79%	-4.85%	-5.64%	(1,941)
Cost Group #9 – County (Tier C and E)	-0.48%	-3.78%	-4.26%	(1,378)
Cost Group #10 – Moraga-Orinda Fire District	-0.72%	-4.30%	-5.02%	(356)
Cost Group #11 – San Ramon Valley Fire District	-0.50%	-3.35%	-3.85%	(780)
Cost Group #12 – Rodeo-Hercules Fire Protection District	-0.75%	-3.20%	-3.95%	(81)
All Cost Groups Combined	**-0.44%**	**-0.78%**	**-1.22%**	**$(10,187)**

Anticipated Impact on Valuation Results

Modeled as of December 31, 2017 for illustration

Member Contribution Rate Impact (% of Payroll)		
Cost Group	**Total**	**Estimated Dollar Amounts ($ in '000s)**
General		
Cost Group #1 – County and Small Districts (Tier 1 and 4)	-0.03%	$(8)
Cost Group #2 – County and Small Districts (Tier 3 and 5)	0.00%	56
Cost Group #3 – Central Contra Costa Sanitary District	-0.09%	(30)
Cost Group #4 – Contra Costa Housing Authority	-0.02%	(1)
Cost Group #5 – Contra Costa County Fire Protection District	-0.01%	(0)
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	0.06%	0
Safety		
Cost Group #7 – County (Tier A and D)	0.06%	$62
Cost Group #8 – Contra Costa and East Fire Protection Districts	0.05%	36
Cost Group #9 – County (Tier C and E)	-0.17%	(25)
Cost Group #10 – Moraga-Orinda Fire District	0.08%	9
Cost Group #11 – San Ramon Valley Fire District	0.15%	44
Cost Group #12 – Rodeo-Hercules Fire Protection District	0.10%	3
All Cost Groups Combined	**0.00%**	**$146**

Note: There are generally small increases in member rates for legacy (non-PEPRA) tiers and slightly larger decreases for PEPRA Tiers.

Anticipated Impact on Valuation Results

Modeled as of December 31, 2017 for illustration

- Among various demographic assumption changes
  - Mortality assumption has the most significant impact
    - Increase of roughly 1% of pay for General employers
    - Decrease of roughly 2% to 4% of pay for Safety employers
  - Followed by retirement assumption
- Only one economic assumption change
  - Merit and promotion component of the salary increase assumption is the only change

CCCERA Earnings Assumption
Including Sensitivity Test for 6.75% Assumption

Components of Investment Return Assumption

	Current	Recommended	Sensitivity Test
Assumed Inflation	2.75%	2.75%	2.75%
Portfolio Real Rate of Return	5.19%	5.51%	5.51%
Assumed Expenses*	(0.64%)	(0.65%)	(0.65%)
Risk Adjustment	(0.30%)	(0.61%)	(0.86%)
Assumed Investment Return	7.00%	7.00%	6.75%
Confidence level	54%	59%	62%
Standard deviation	10.80%	10.30%	10.30%

** Includes investment expenses*

Sensitivity Test for 6.75% Investment Return Assumption
Modeled as of December 31, 2017 for illustration

Note: This sensitivity test shows only the incremental impact of using a 6.75% investment return assumption.

Incremental Cost Impact of a 6.75% Investment Return Assumption	
Impact on Employer	
Change due to demographic assumptions	0.00%
Change due to economic assumptions	3.27%
Total change in average employer rate	3.27%
Total estimated change in annual dollar amount ($000s)	$28,268
Impact on Member	
Change due to demographic assumptions	0.00%
Change due to economic assumptions	0.71%
Total change in average member rate	0.71%
Total estimated change in annual dollar amount ($000s)	$6,056
Impact on UAAL and Funded Percentage	
Change in UAAL	Increase of $285 million
Change in funded percentage	Decrease of 2.9%

Sensitivity Test for 6.75% Investment Return Assumption

Modeled as of December 31, 2017 for illustration

Note: This sensitivity test shows only the incremental impact of using a 6.75% investment return assumption.

Employer Contribution Rate Impact (% of Payroll)				
Cost Group	Normal Cost	UAAL	Total	Estimated Dollar Amounts ($ in '000s)
General				
Cost Group #1 – County and Small Districts (Tier 1 and 4)	0.87%	1.68%	2.55%	$624
Cost Group #2 – County and Small Districts (Tier 3 and 5)	0.78%	1.70%	2.48%	15,613
Cost Group #3 – Central Contra Costa Sanitary District	0.91%	2.34%	3.25%	1,116
Cost Group #4 – Contra Costa Housing Authority	0.83%	2.25%	3.08%	172
Cost Group #5 – Contra Costa County Fire Protection District	0.83%	2.17%	3.00%	154
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	0.84%	0.73%	1.57%	13
Safety				
Cost Group #7 – County (Tier A and D)	1.73%	4.55%	6.28%	3,846
Cost Group #8 – Contra Costa and East Fire Protection Districts	1.73%	5.82%	7.55%	2,699
Cost Group #9 – County (Tier C and E)	1.19%	4.55%	5.74%	2,041
Cost Group #10 – Moraga-Orinda Fire District	1.70%	5.49%	7.19%	530
Cost Group #11 – San Ramon Valley Fire District	1.75%	4.45%	6.20%	1,339
Cost Group #12 – Rodeo-Hercules Fire Protection District	1.30%	4.14%	5.44%	119
All Cost Groups Combined	**0.94%**	**2.33%**	**3.27%**	**$28,268**

Sensitivity Test for 6.75% Investment Return Assumption

Modeled as of December 31, 2017 for illustration

Note: This sensitivity test shows only the incremental impact of using a 6.75% investment return assumption.

Member Contribution Rate Impact (% of Payroll)		
Cost Group	Total	Estimated Dollar Amounts ($ in '000s)
General		
Cost Group #1 – County and Small Districts (Tier 1 and 4)	0.67%	$164
Cost Group #2 – County and Small Districts (Tier 3 and 5)	0.61%	3,828
Cost Group #3 – Central Contra Costa Sanitary District	0.69%	237
Cost Group #4 – Contra Costa Housing Authority	0.66%	37
Cost Group #5 – Contra Costa County Fire Protection District	0.66%	34
Cost Group #6 – Small Districts (Non-Enhanced Tier 1 and 4)	0.65%	6
Safety		
Cost Group #7 – County (Tier A and D)	1.10%	673
Cost Group #8 – Contra Costa and East Fire Protection Districts	1.10%	394
Cost Group #9 – County (Tier C and E)	0.95%	338
Cost Group #10 – Moraga-Orinda Fire District	1.13%	83
Cost Group #11 – San Ramon Valley Fire District	1.11%	240
Cost Group #12 – Rodeo-Hercules Fire Protection District	1.02%	22
All Cost Groups Combined	**0.71%**	**$6,056**

Meeting Date
05/22/19
Agenda Item
#6

MEMORANDUM

Date: May 22, 2019

To: CCCERA Board of Retirement

From: Gail Strohl, Chief Executive Officer

Subject: Presentation of Actuarial Audit Report by Cheiron.

Background

At the December 12, 2018 Board meeting, the Board selected Cheiron to perform actuarial audit services, including an audit of the triennial experience and assumptions study prepared by Segal Consulting. Cheiron has concluded their audit of this study and will be presenting their report.

Recommendation

Presentation only. No action is necessary at this time.

1355 Willow Way Suite 221 Concord CA 94520 925.521.3960 FAX: 925.521.3969 *www.cccera.org*

Contra Costa County Employees' Retirement Association

CHEIRON
Classic Values, Innovative Advice

Audit of Experience Study
January 1, 2015 – December 31, 2017

May 22, 2019

Bill Hallmark, ASA, EA, FCA, MAAA
Anne Harper, FSA, EA, MAAA
Graham Schmidt, ASA, EA, FCA, MAAA

Meeting Date
05/22/19
Agenda Item
#6

Agenda

- Overview
- Economic Assumptions
- Demographic Assumptions
- Conclusions
- Appendix

Overview – Primary Conclusions

- **Assumptions proposed by Segal are reasonable**
- We matched the observed experience over the last three years within reasonable tolerances
  - Differences do not affect assumptions
- Observations on the report and the following assumptions
  - Inflation
  - Investment return
  - Retirement
  - Mortality
  - Disability

Overview – Process

- Economic Assumptions
  - Independent analysis
  - Methodology differs from Segal
  - Confirms that Segal's assumptions fall within a reasonable range
- Demographic Assumptions
  - Independent analysis of three years of experience
  - Many assumptions based on six or nine years of experience
  - Supplemented data for analysis with actual decrement counts and exposures for prior periods provided by Segal

Economic Assumptions

Inflation

Investment Return

Cost-of-Living Increases

Wage Inflation

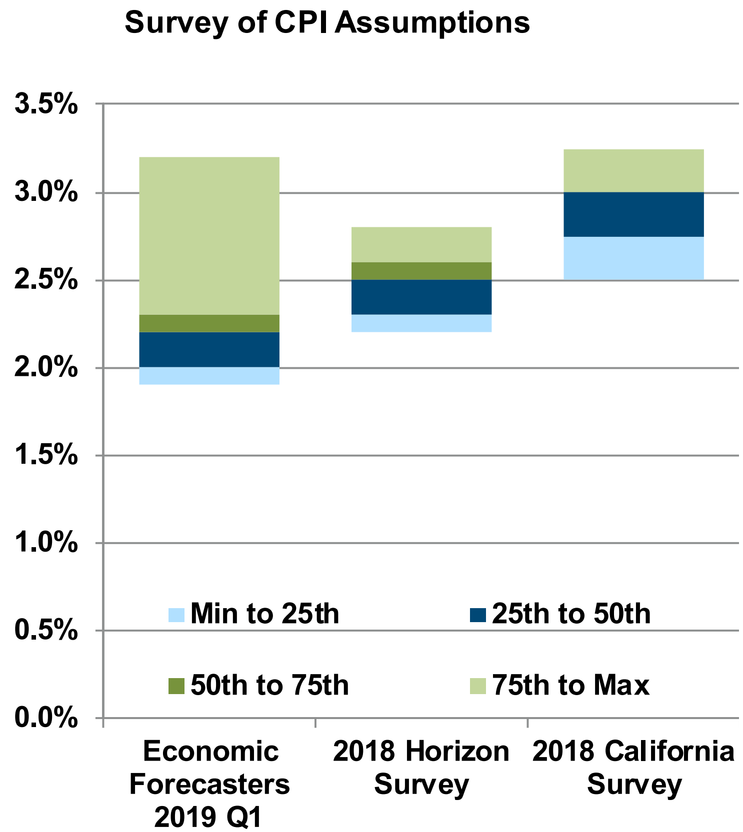
Merit Salary Increases

Active Member Payroll

Price Inflation

- Current assumption = 2.75%
- Segal proposed assumption = 2.75%
- Our independent analysis finds 2.75% to be at the high end of the reasonable range
- Segal cited the following data supporting a higher assumption
  - Moving historical averages
  - Assumptions used by other public plans

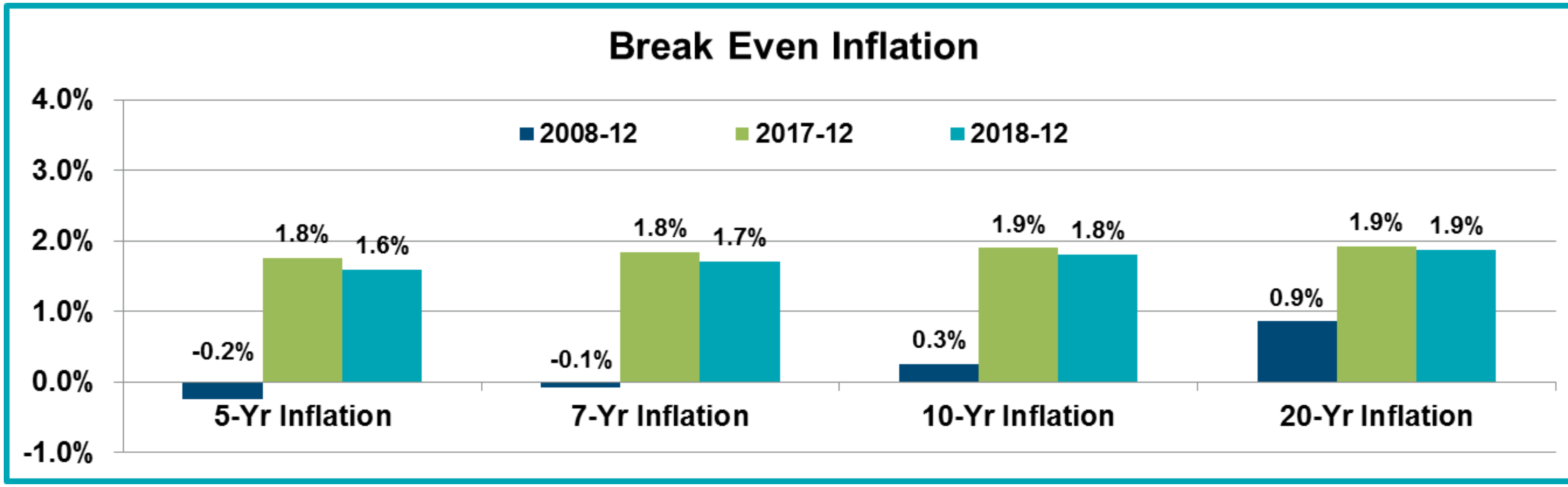
Price Inflation – Independent Analysis



	Economic Forecasters 2019 Q1	2018 Horizon Survey	2018 California Survey
Minimum	1.90%	2.20%	2.50%
25th Percentile	2.00%	2.30%	2.75%
50th Percentile	2.20%	2.50%	3.00%
75th Percentile	2.30%	2.60%	3.00%
Maximum	3.20%	2.80%	3.25%

- Federal Reserve informal target = 2.0%
- The Federal Reserve survey of professional economic forecasters shows 10-year forecasts
  - Range = 1.9% to 3.2%
  - Median = 2.2%
  - 75th percentile = 2.3%
- Horizon survey of over a 20-year forecasts
  - Range = 2.2% to 2.8%
  - Median = 2.5%
- California public pension plans
  - Range = 2.5% to 3.25%
  - Median = 3.0%

Price Inflation – Independent Analysis



- 20-year breakeven inflation (Yield on Treasury securities minus TIPS) is 1.9%
- Verus assumes 2.0% over 10 years and 1.8% over 30 years
- The current assumption of 2.75% is reasonable, but forward-looking market indicators are lower and most economic forecasts are lower

Investment Return

- 7.0% is current and Segal’s proposed assumption
- Our independent analysis also supports 7.0%
- Represents approximately the 50th percentile expected return
- Could reduce assumption to 6.75% to increase likelihood of achieving the return (55% confidence)
  - If so, reduce the inflation assumption by 25 basis points, as well, to 2.5%

Expected Distribution of Average Annual Passive Returns Verus' Capital Market Assumptions

	Time Horizon	
Percentile	**10 Years**	**30 Years**
95th	12.52%	10.11%
75th	9.27%	8.26%
60th	7.89%	7.47%
55th	7.47%	7.23%
50th	7.06%	6.99%
45th	6.66%	6.76%
40th	6.25%	6.52%
25th	4.91%	5.74%
5th	1.88%	3.97%

Other Economic Assumptions

- Cost-of-Living Increases – Proposed assumptions are reasonable
- Wage Inflation – Proposed assumption is reasonable
- Merit Salary Increases – Proposed assumptions are reasonable
- Active member payroll growth – Proposed assumption is reasonable

Demographic Assumptions

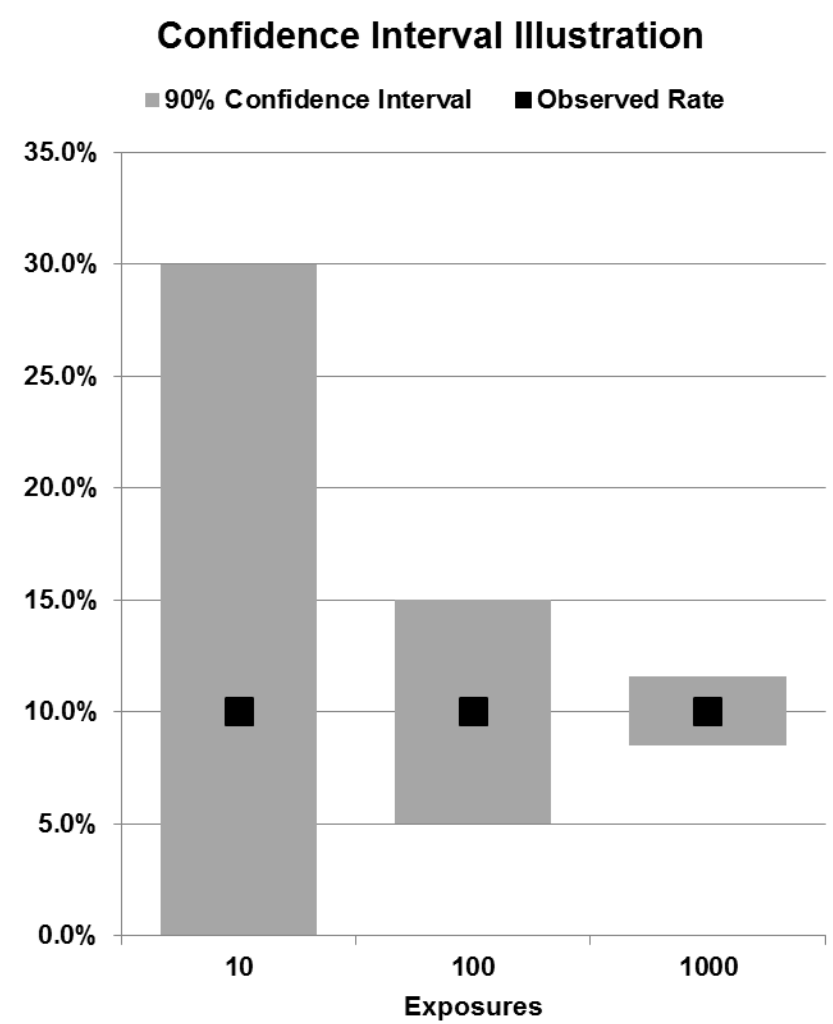
Retirement
Mortality
Disability
Termination
Leave Cash Outs
Unused Sick Leave

Reporting Key Statistics

- For each assumption studied, Segal typically reports:
  - Actual rate observed
  - Current assumed rate
  - Proposed assumed rate
- Other key statistics should also be reported to better enable the reader to assess the assumptions
  - Actual decrements
  - Actual exposures
  - Actual-to-expected ratio (A/E ratio)

Assessing Assumptions

- The number of actual decrements and exposures is critical in determining how much credibility to assign to the experience
  - 1 actual decrement out of 10 exposures implies that the rate is somewhere between 0% and 30%
  - 100 actual decrements out of 1000 exposures implies that the rate is somewhere between 8.5% and 11.5%



Assessing Assumptions

- A/E Ratios provide an assessment of the assumption across all ages or years of service
- Ideal ratio is 1.0 and proposed changes should generally move the ratio closer to 1.0
- Segal provides this information for the mortality assumptions, but not for the other demographic assumptions
- For example, the A/E Ratio for the retirement assumption for General Tier 3 Enhanced members with 30 or more years of service improves from:
  - 1.12 under the current assumption, to
  - 1.00 under Segal's proposed assumption

Retirement Assumptions

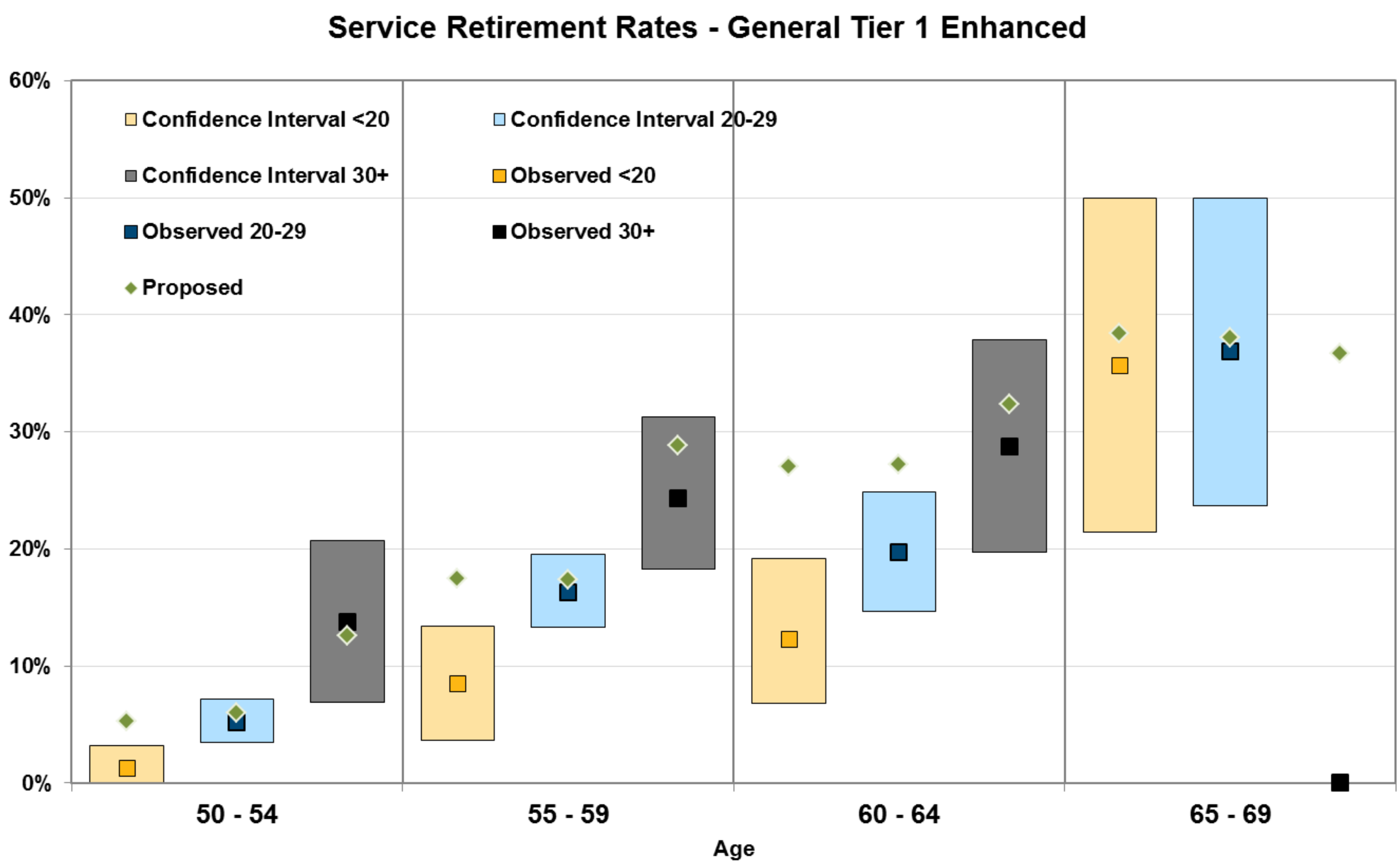
- Segal separated retirement assumptions for the primary tiers into two service groups
  - Less than 30 years of service
  - 30 or more years of service
- Results in a significant improvement in assumptions
- Data suggests three service groups would be better
  - Less than 20 years of service
  - 20 to 29 years of service
  - 30 or more years of service
- Pattern based on service is relatively consistent across tiers for which there is sufficient data
  - Pattern is also likely to persist for smaller tiers that do not have sufficient experience data for a full analysis
  - Consider applying service groups to all tiers

Retirement – Service Groupings

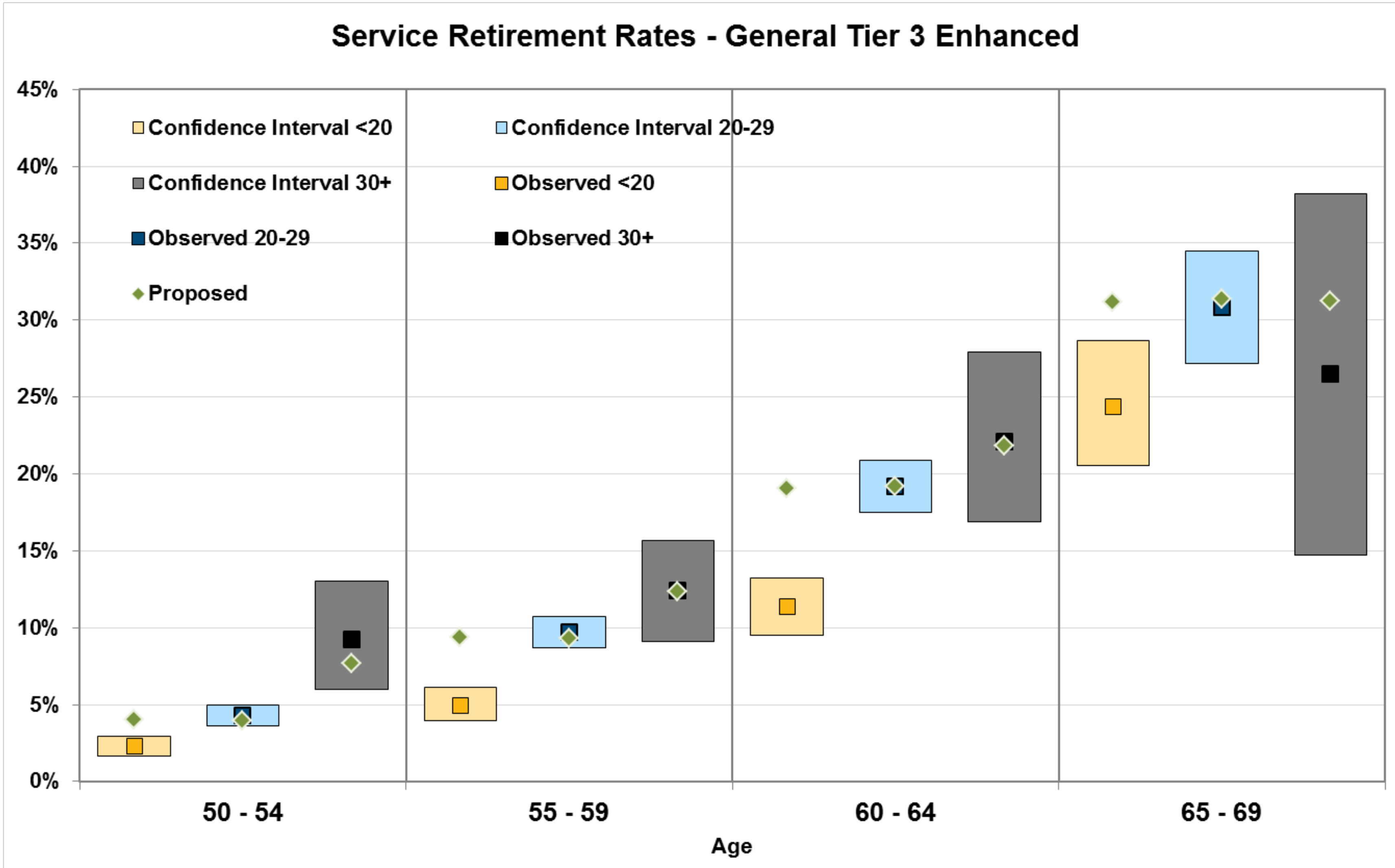
Retirement Assumption – Current Actual-to-Expected Ratios			
Service	General Tier 1 Enhanced	General Tier 3 Enhanced	Safety Tier A Enhanced
< 20	0.47	0.55	0.16
20 – 29	0.74	0.89	0.77
30 +	1.07	1.12	0.88

- There are three distinct service groupings for retirement rates
  - Members with less than 20 years of service have significantly lower rates of retirement
  - Members with more than 30 years of service have higher retirement rates
- Significance of difference between service groups varies by age and tier

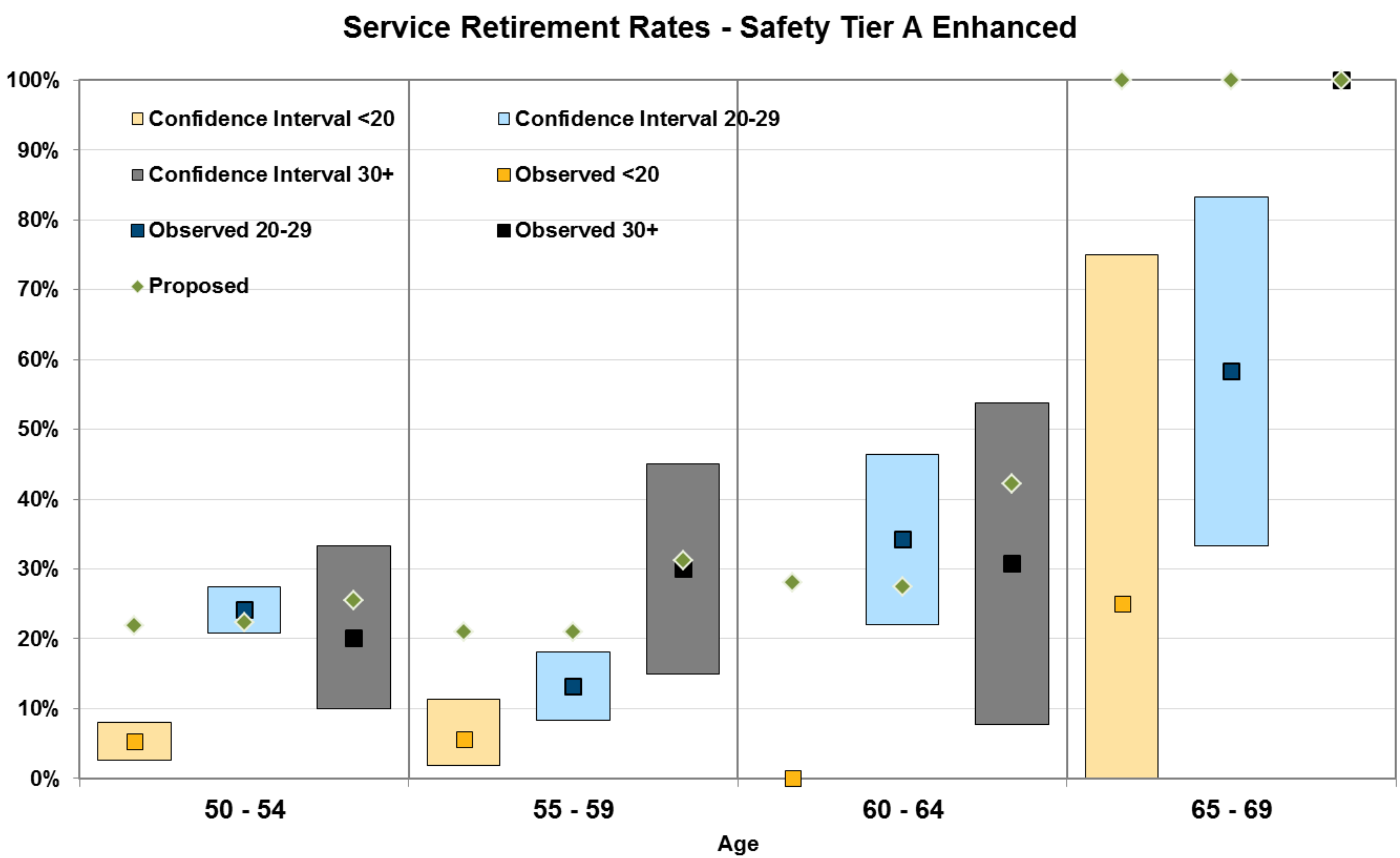
General Tier 1 Enhanced Retirement Rates



General Tier 3 Enhanced Retirement Rates



Safety Tier A Enhanced Retirement Rates



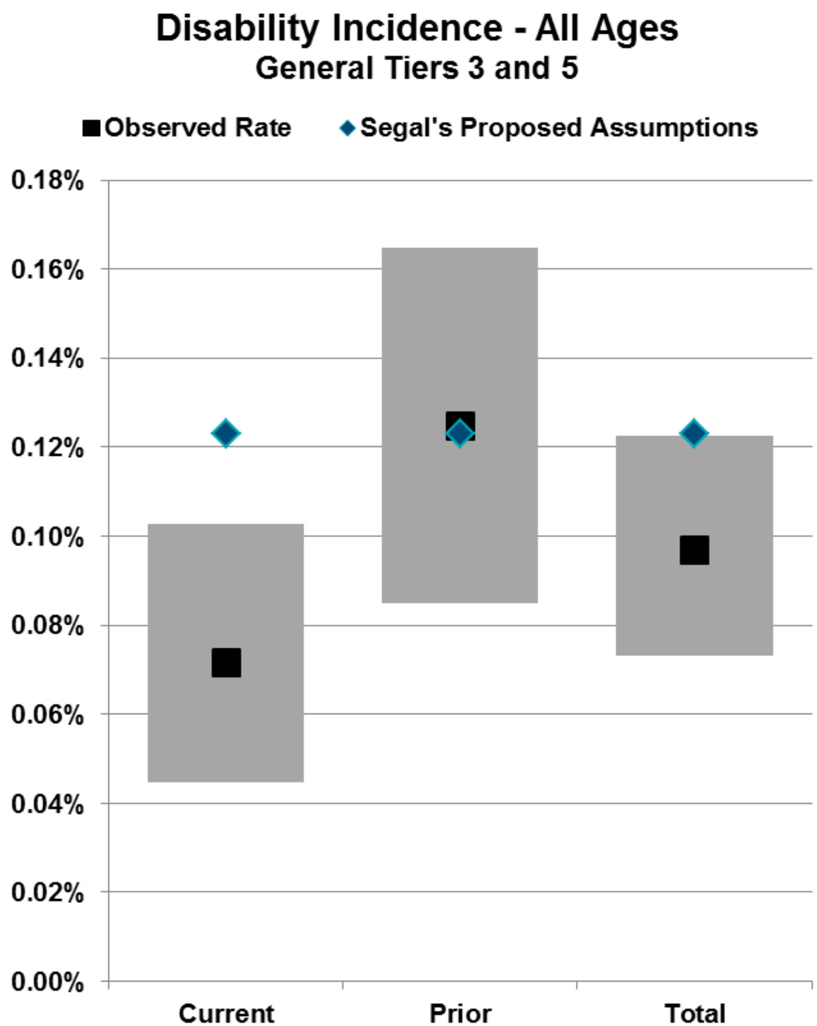
Mortality

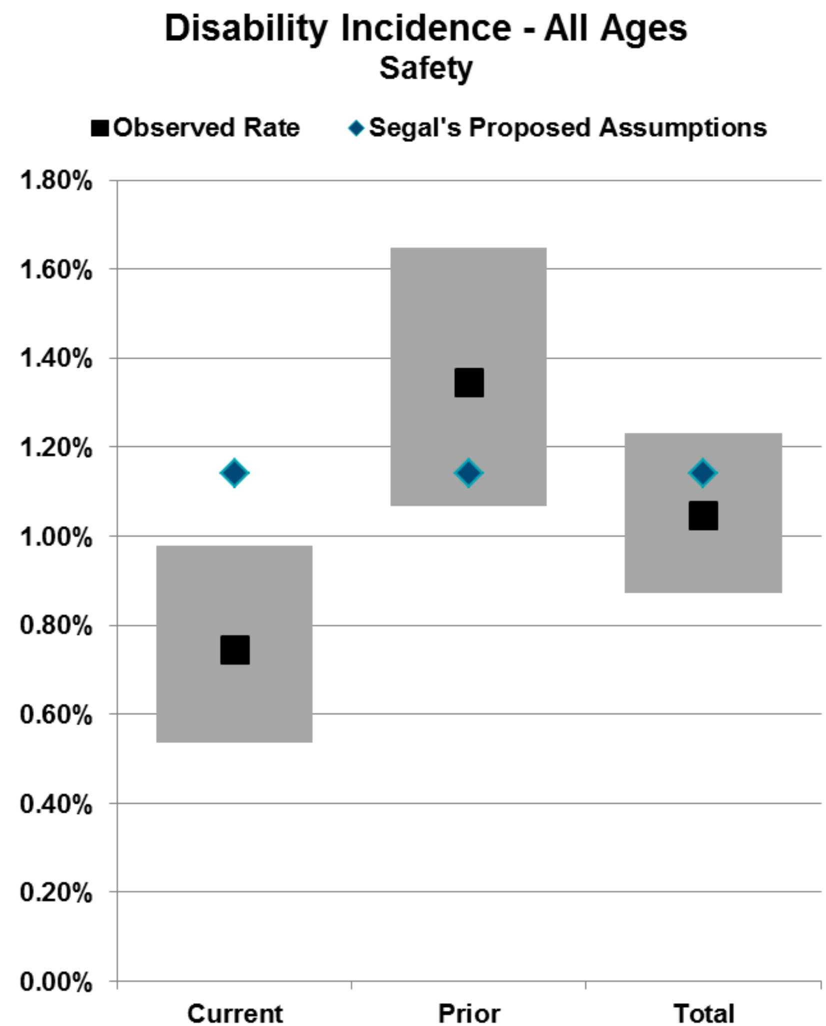
- Segal moved to a benefit-weighted analysis of mortality which is a best practice
- All of the base mortality table assumptions are reasonable
- The mortality projection scale is reasonable and applying it on a generational basis is a best practice

Disability Incidence

- Segal's analysis is based on 3 years of data
  - Only 55 disability retirements across all general and safety tiers during this period
  - Data shows significantly lower disability rates for General Tiers 3 and 5 and Safety than current or proposed assumptions
- Consider using 6 or more years of data instead of 3
  - Prior study data shows significantly higher disability rates than the current study
  - Combining more years of data provides a better indication of actual rates of disability unless there has been a change in the definition or administrative process for determining disabilities
  - May minimize the impact of timing delays with processing applications where actual disability retirements could be temporarily considered a service retirement or termination
- Segal's proposed assumptions are reasonable
  - Assumptions for General Tiers 3 and 5 are relatively high compared to the last 6 years of data, so the assumption should be monitored for potential reduction in the next experience study

Disability Incidence





Other Demographic Assumptions

- Termination Rates – Proposed assumptions are reasonable
- Leave Cash Out – Proposed assumptions are reasonable
- Unused Sick Leave – Proposed assumptions are reasonable

Conclusions

Key Conclusions

Assumptions proposed by Segal are reasonable

Potential Considerations

- Reducing price inflation assumption
- Splitting retirement assumptions into 3 service groups
  - Less than 20 years of service
  - 20 to 29 years of service
  - 30 or more years of service
- Using at least 6 years of data for analysis of all demographic assumptions, especially for disability retirements
- For each demographic assumption, including the following in the experience study report:
  - Number of actual decrements
  - Number of exposures
  - Actual-to-expected ratios

Appendix

Certification

- The purpose of this presentation is to review Segal's economic and demographic experience study for the Contra Costa County Employees' Retirement Association (CCCERA).

- In preparing our presentation, we relied on information (some oral and some written) supplied by CCCERA and by Segal. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

- This presentation and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this presentation. This presentation does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

- This presentation was prepared exclusively for CCCERA for the purpose described herein. Other users of this presentation are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

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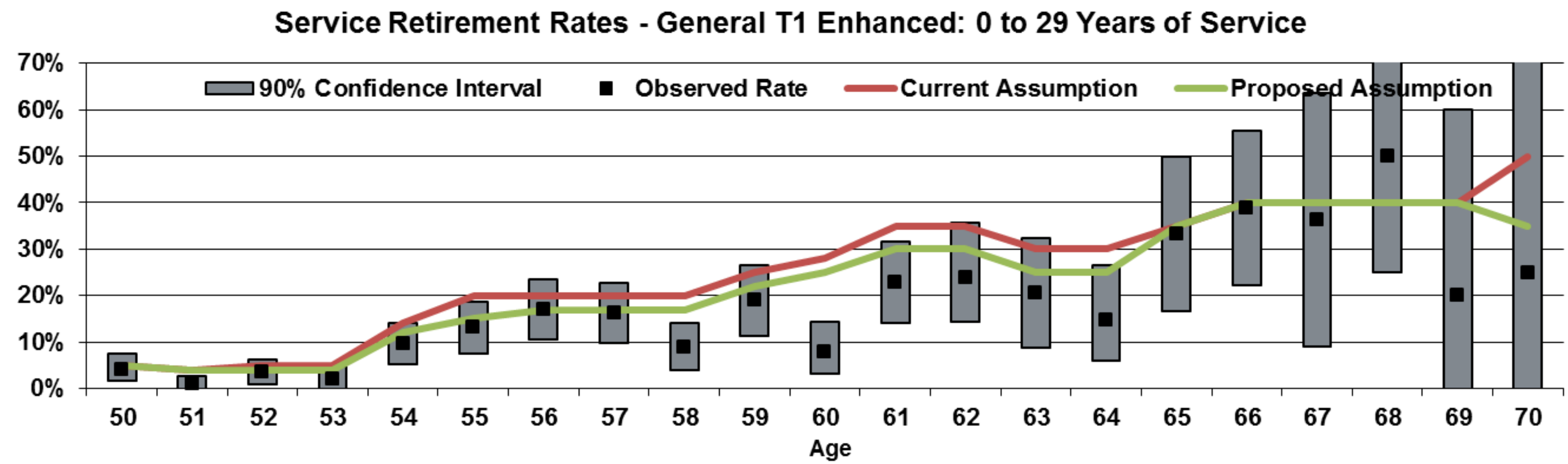
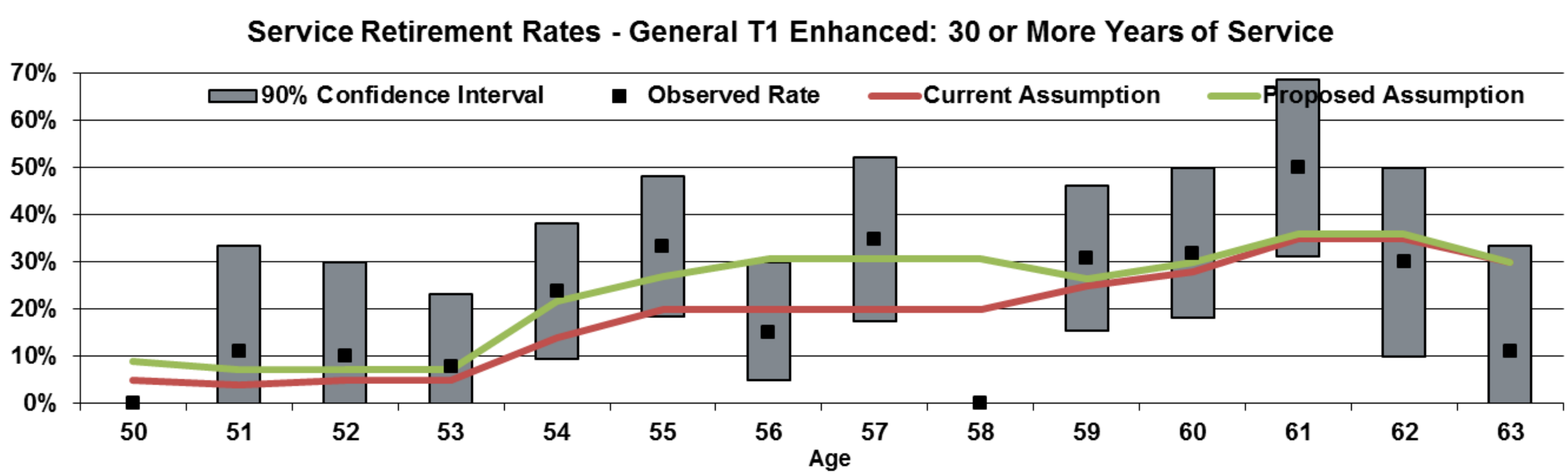
Consulting Actuary

Anne. D. Harper, FSA, EA, MAAA
Consulting Actuary

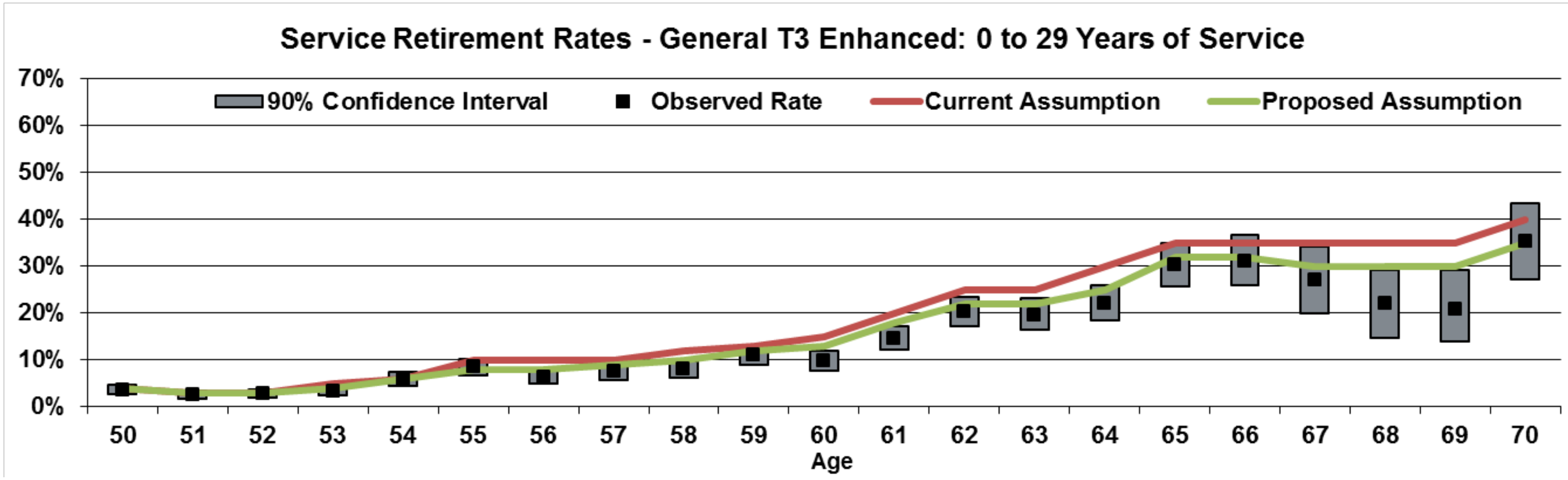
Graham A. Schmidt, ASA, EA, FCA, MAAA
Consulting Actuary

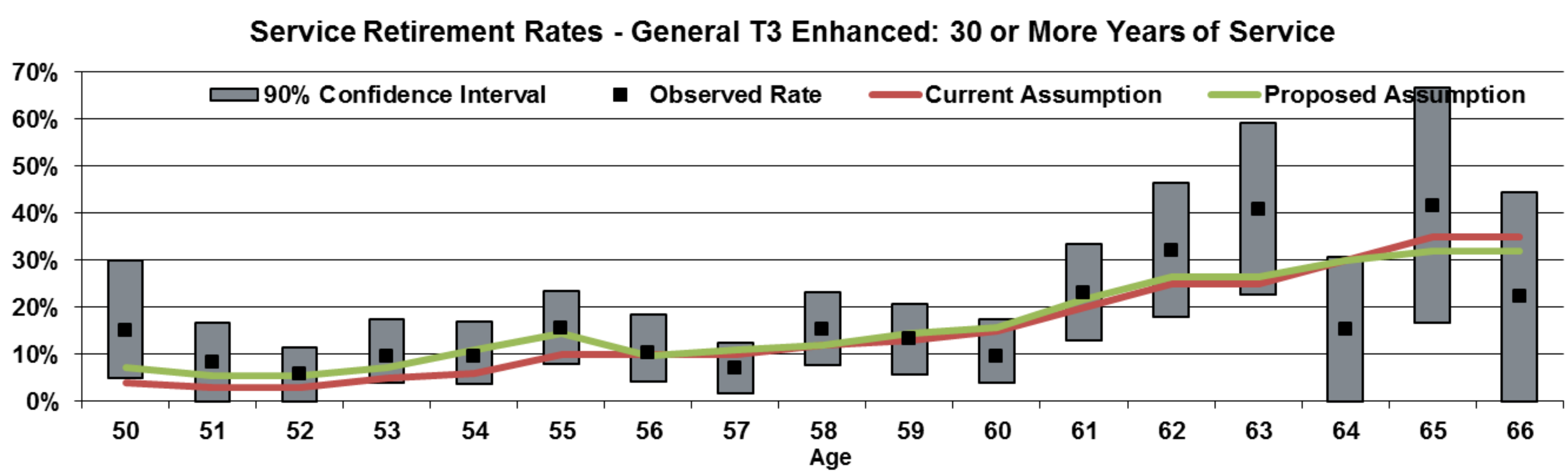
Appendix: Retirement – General Tier 1 Enhanced



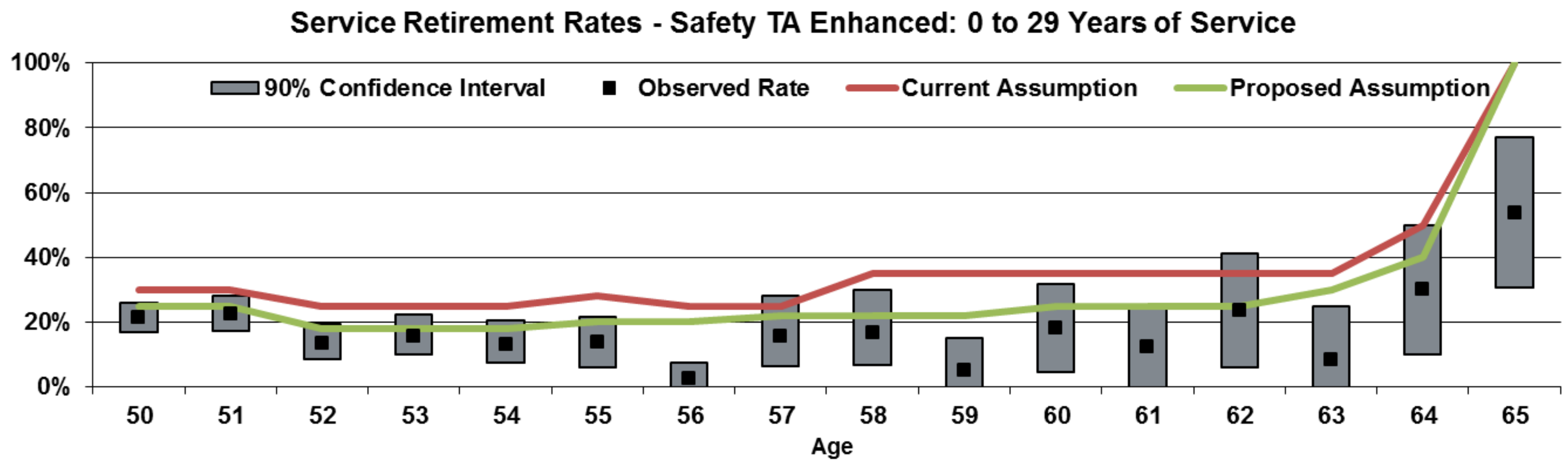


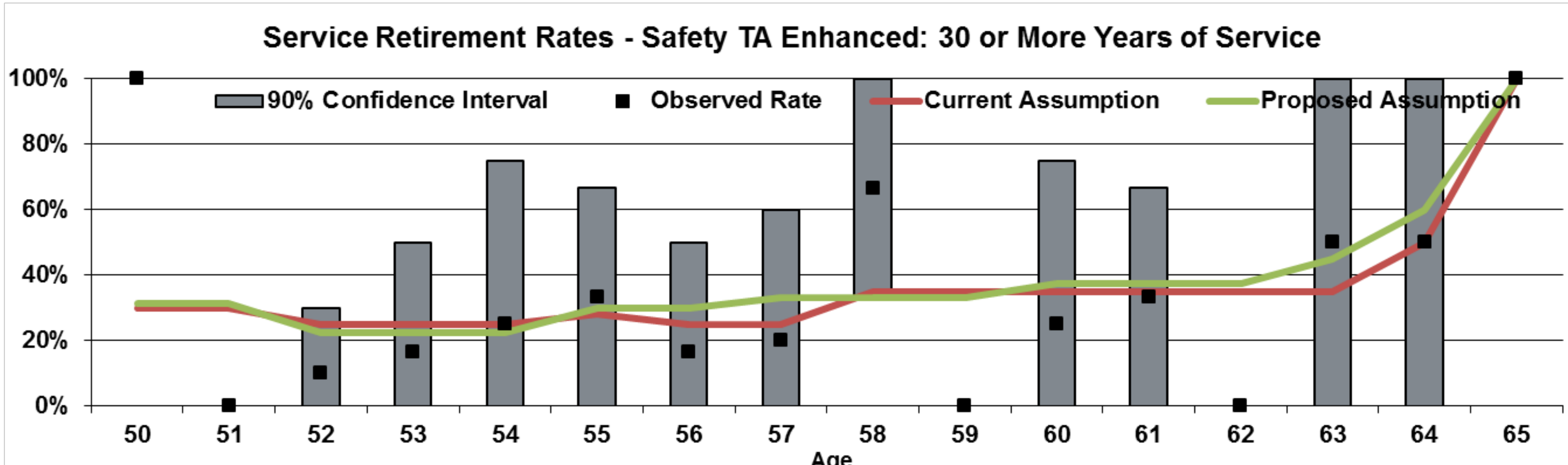
Appendix: Retirement – General Tier 3 Enhanced





Appendix: Retirement – Safety Tier A Enhanced

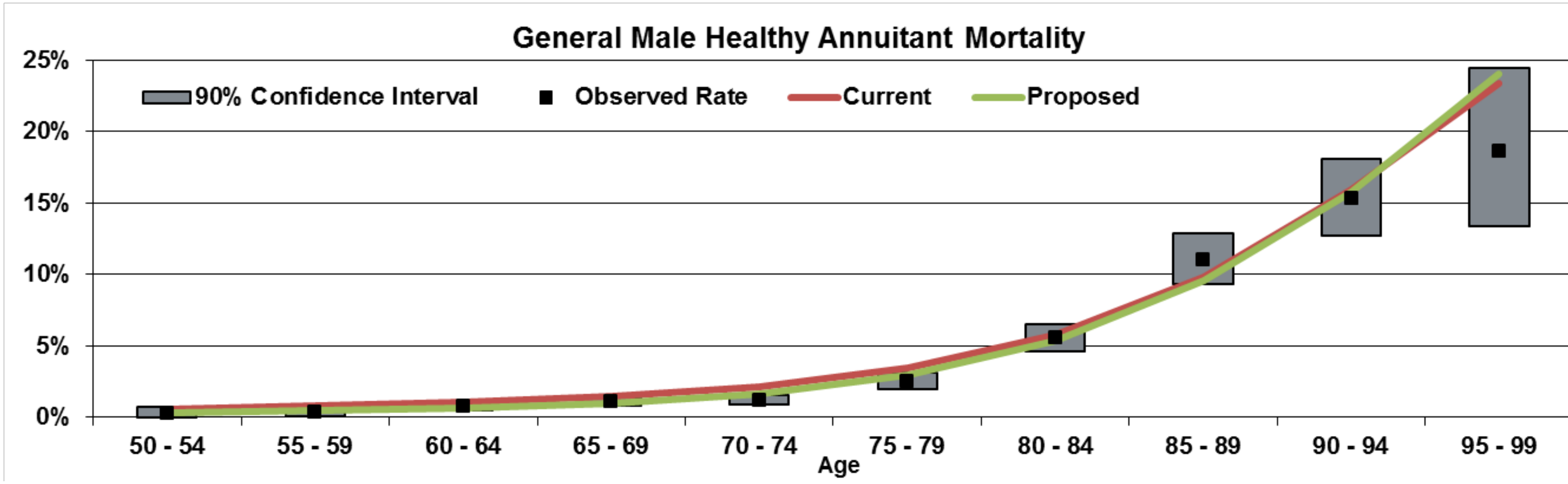


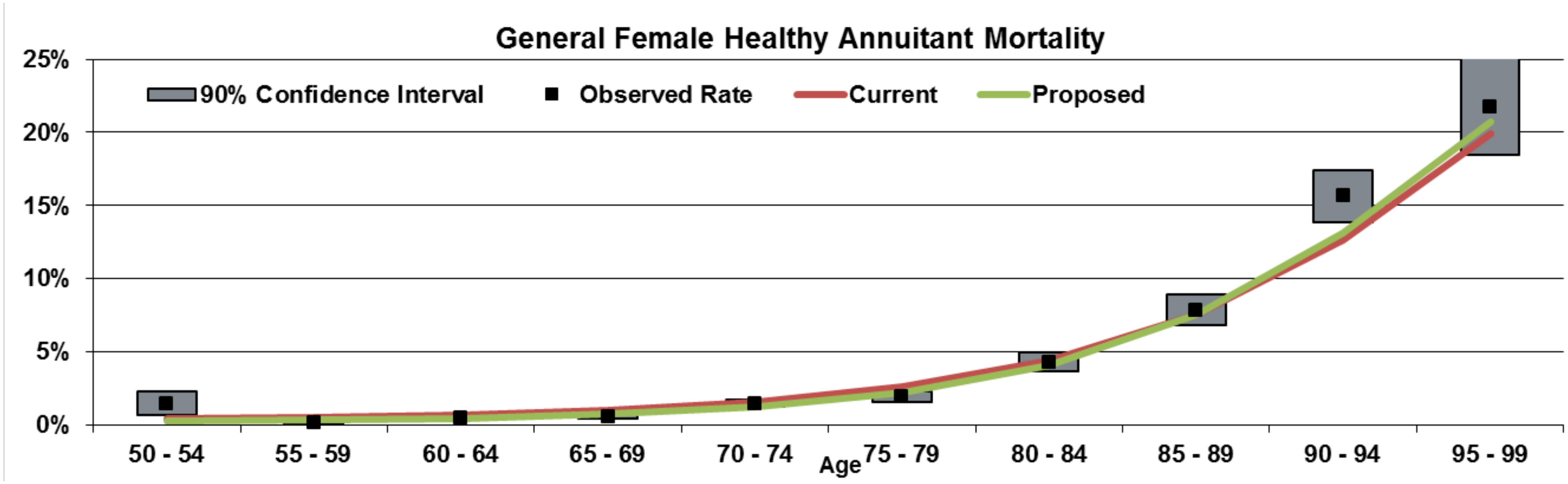


Appendix: Retirement – Other

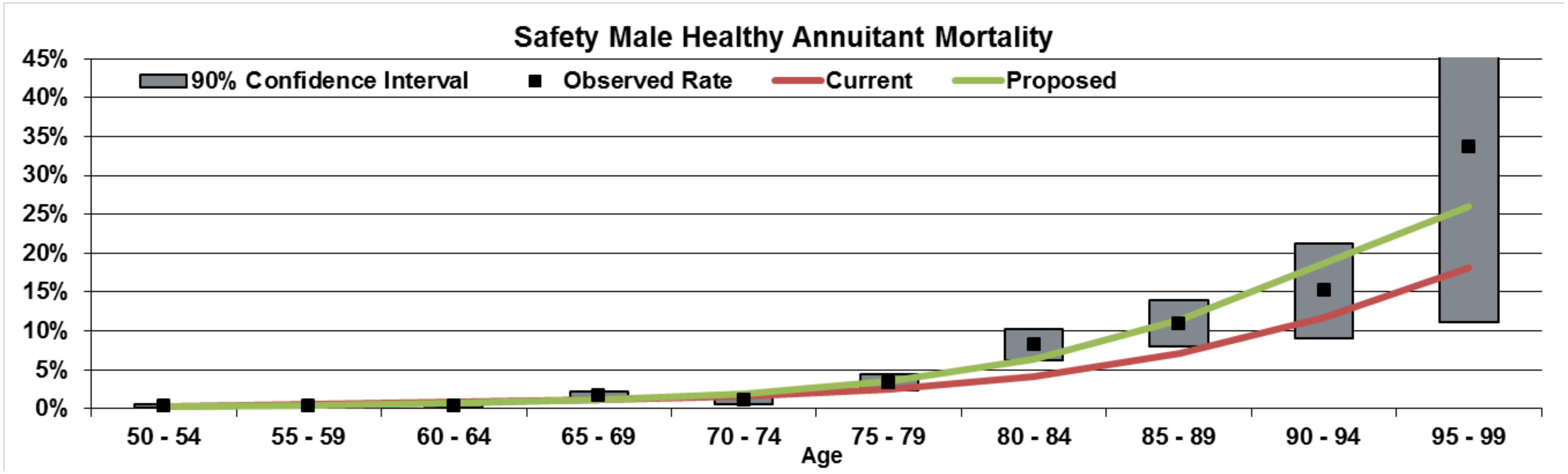
- Other Tiers
  - Proposed assumptions are reasonable
  - Consider applying similar adjustments based on service
- Deferred vested – Proposed assumptions are reasonable
- Reciprocity – Proposed assumptions are reasonable
- Family composition – Proposed assumptions are reasonable

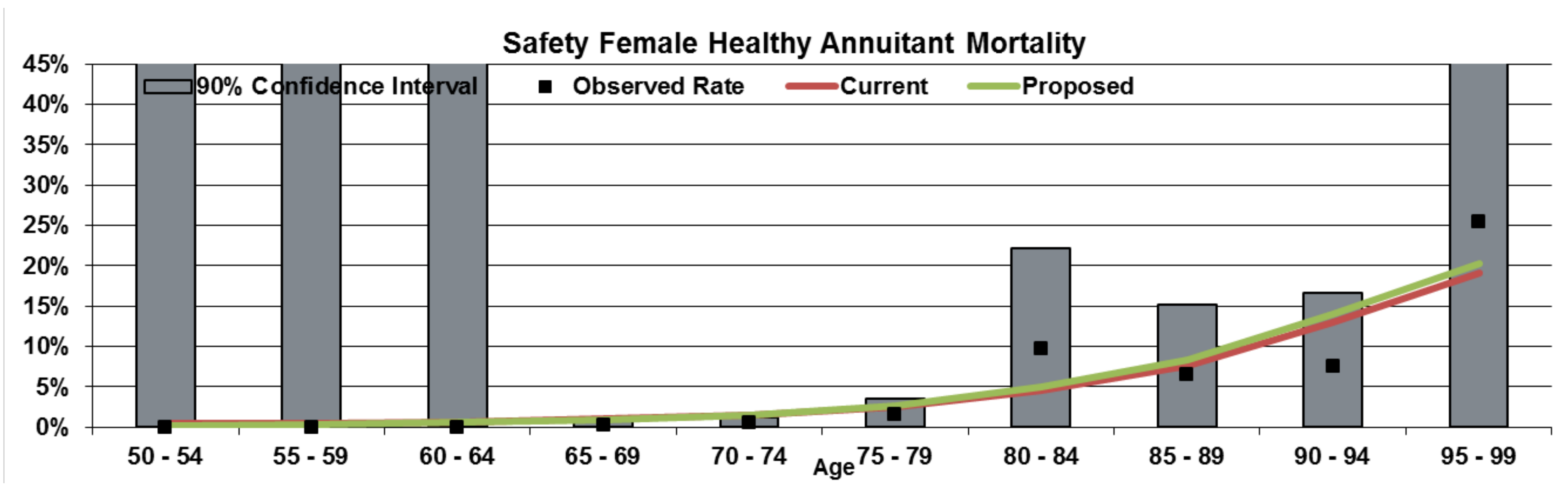
Appendix: Mortality – General Retirees



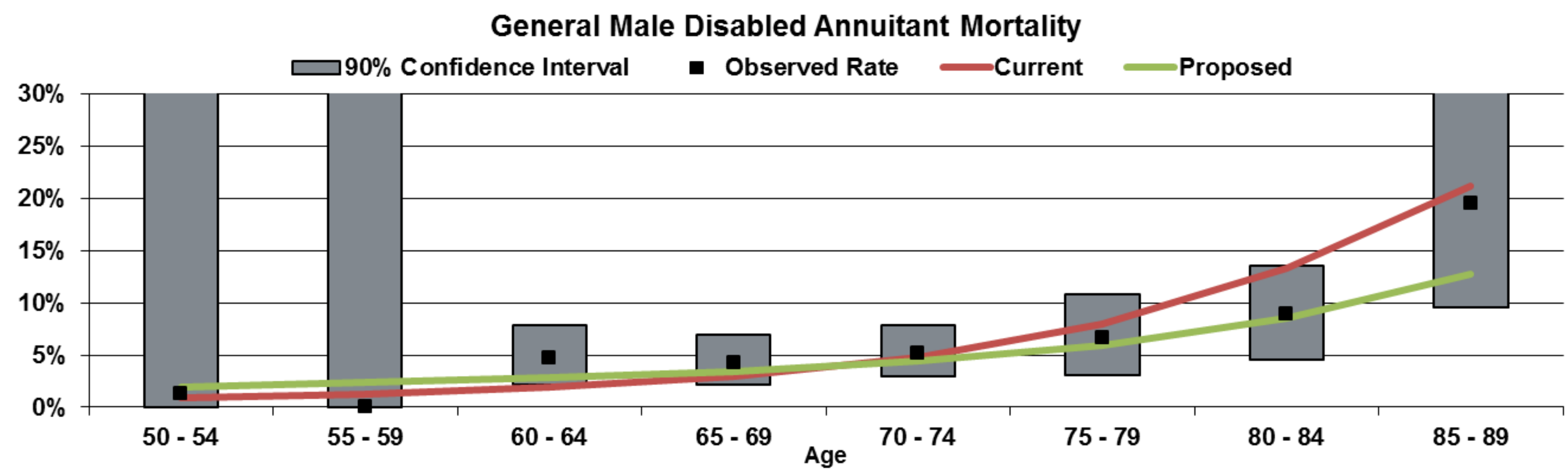


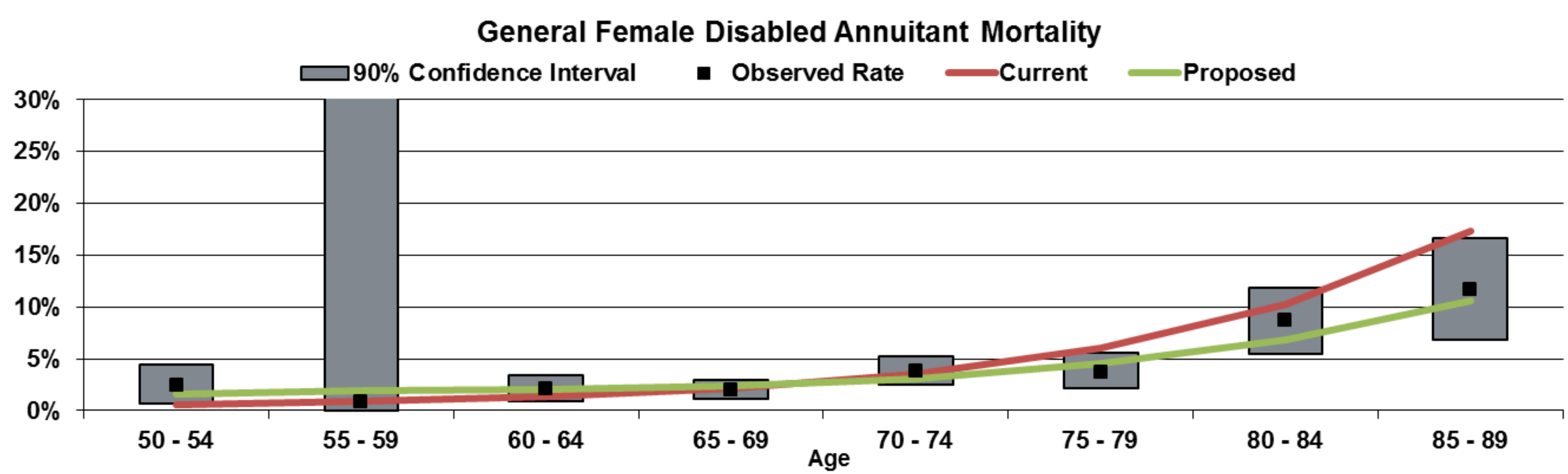
Appendix: Mortality – Safety Retirees



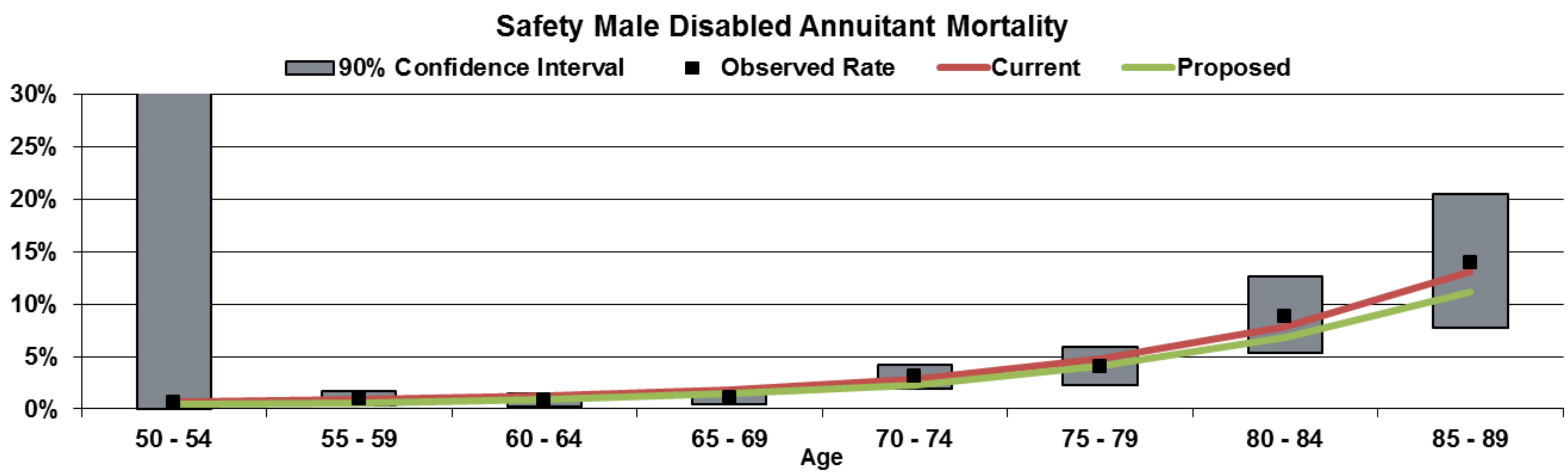


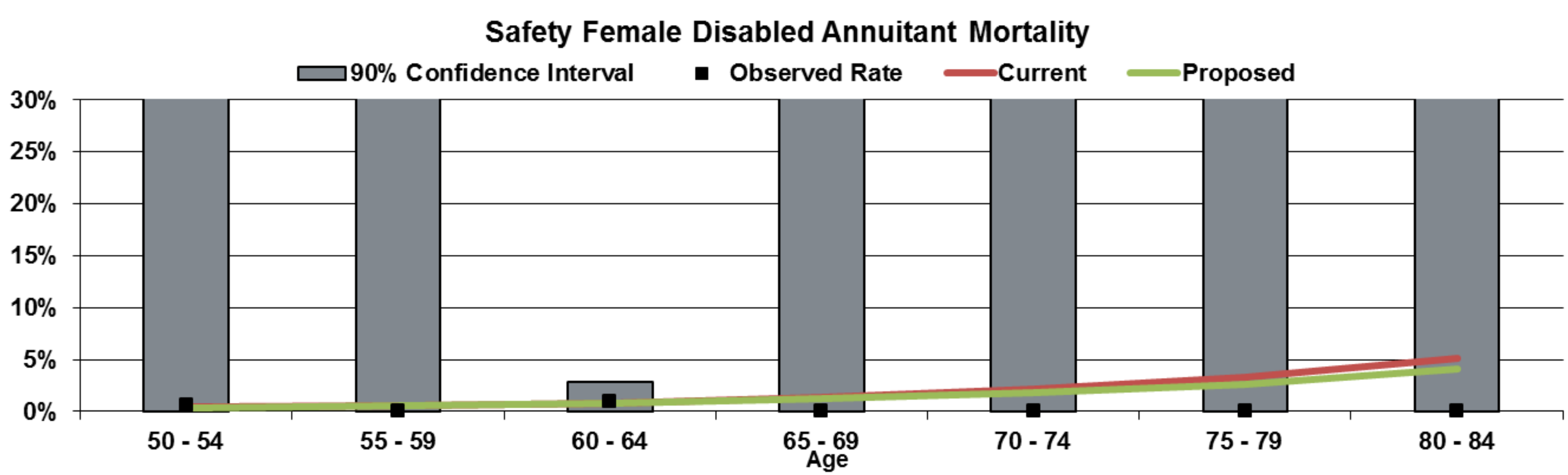
Appendix: Mortality – General Disabled





Appendix: Mortality – Safety Disabled





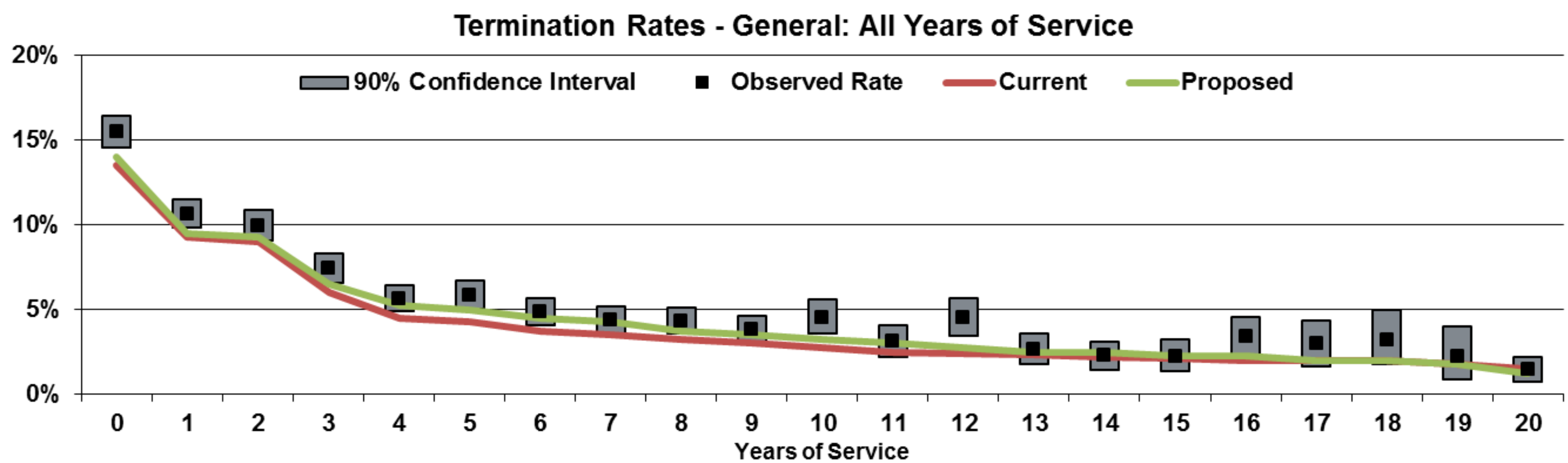
Appendix: Mortality – Contingent Survivors

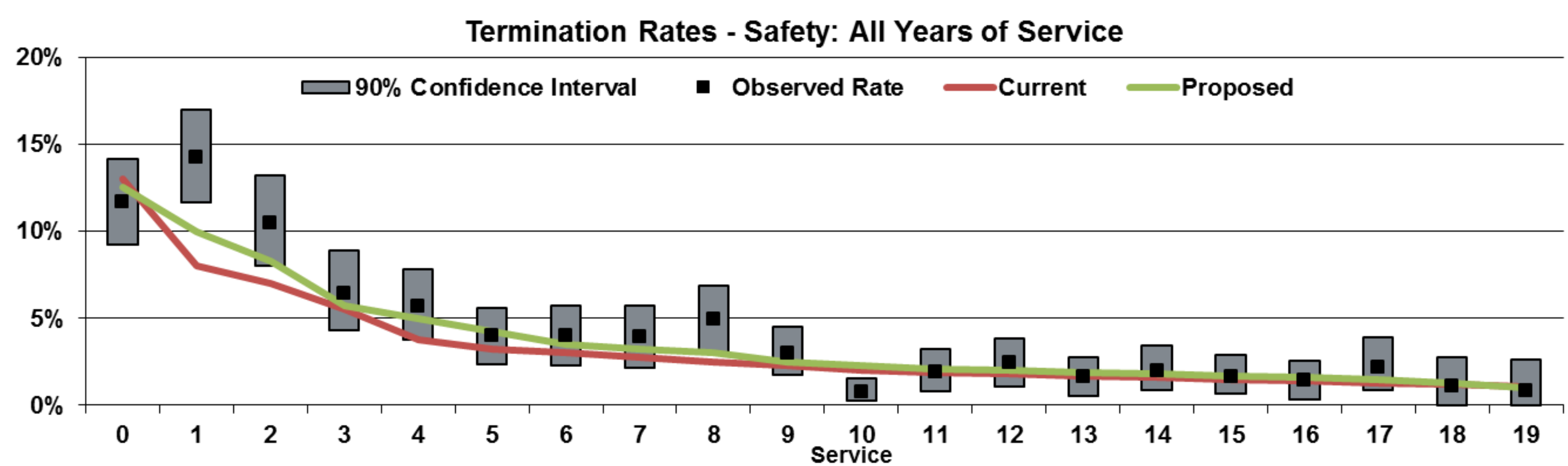
- Segal proposed using the Pub-2010 Contingent Survivors Table for all beneficiaries
- Table is based on beneficiary mortality experience after the retiree has died and shows higher rates of mortality than for general retirees
- SOA describes two practical approaches to beneficiary mortality before and after retiree dies
  - Use general retiree mortality if you believe the higher contingent survivor mortality represents the grieving widow(er) effect
  - Use contingent survivor mortality if you believe the higher mortality rates are “due to a number of factors correlated with beneficiary status, apart from a grieving widow(er) effect.”
- Use of the higher contingent survivor mortality rates makes joint and survivor annuities marginally less expensive

Appendix: Mortality – Optional Forms

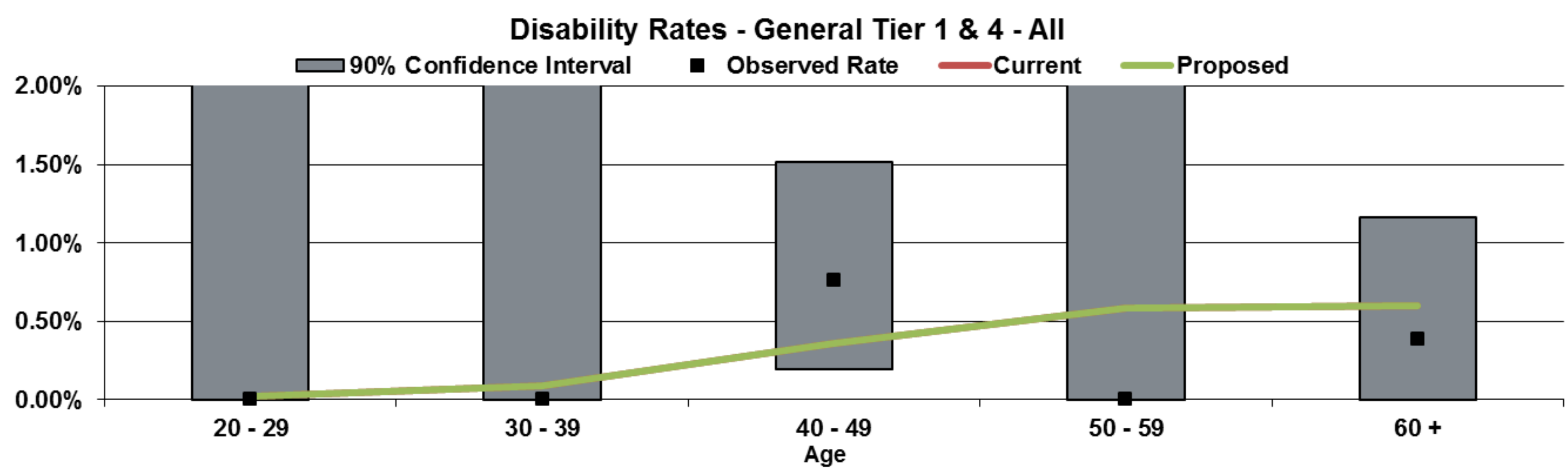
- Due to the complexity of generational tables, Segal has proposed using a static mortality table projected 20 years as the basis for Optional Form Factors
  - Appropriate projection period depends on the ages of the member and beneficiary
- We have generally taken a different approach
  - Fully generational tables – effectively a different static table for each year of birth
  - Conversion factors are based on age attained in a specific year
- Example
  - Conversion factors to be used for 2019 – 2021
  - Mortality tables based on attained age in 2020 – the central year for which the factors are used
  - Mortality for factor at member’s age 60 is the mortality table for a member who attains age 60 in 2020 (born in 1960)
  - Mortality for factor at beneficiary’s age 55 is the mortality table for a beneficiary who attains age 55 in 2020 (born in 1965)

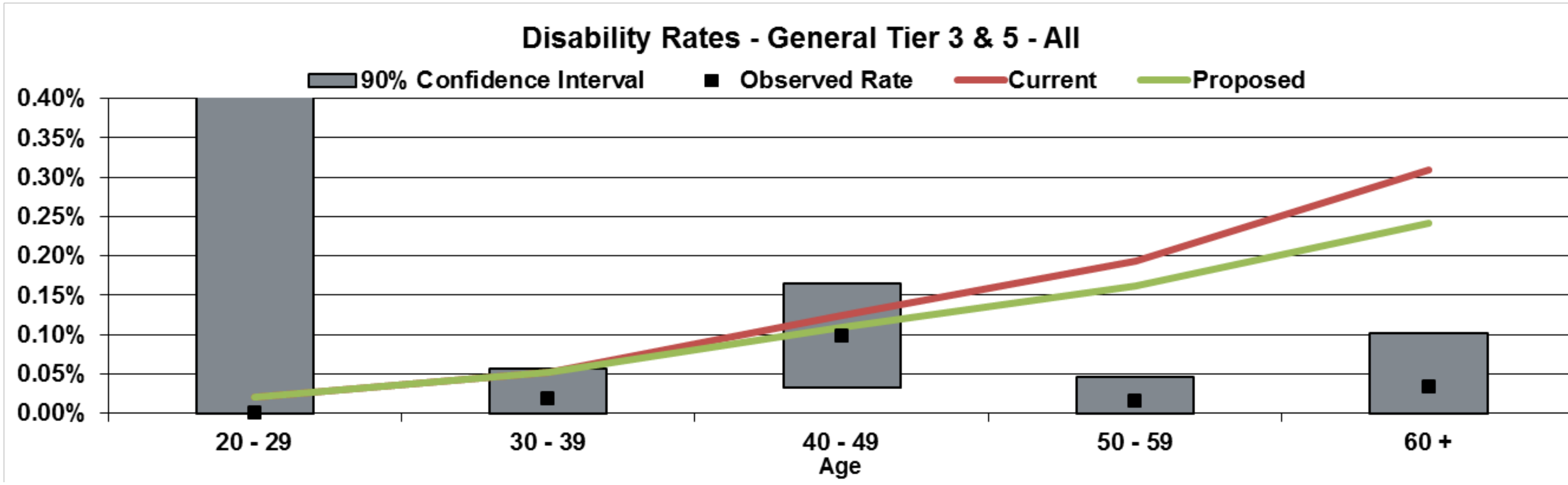
Appendix: Termination Rates



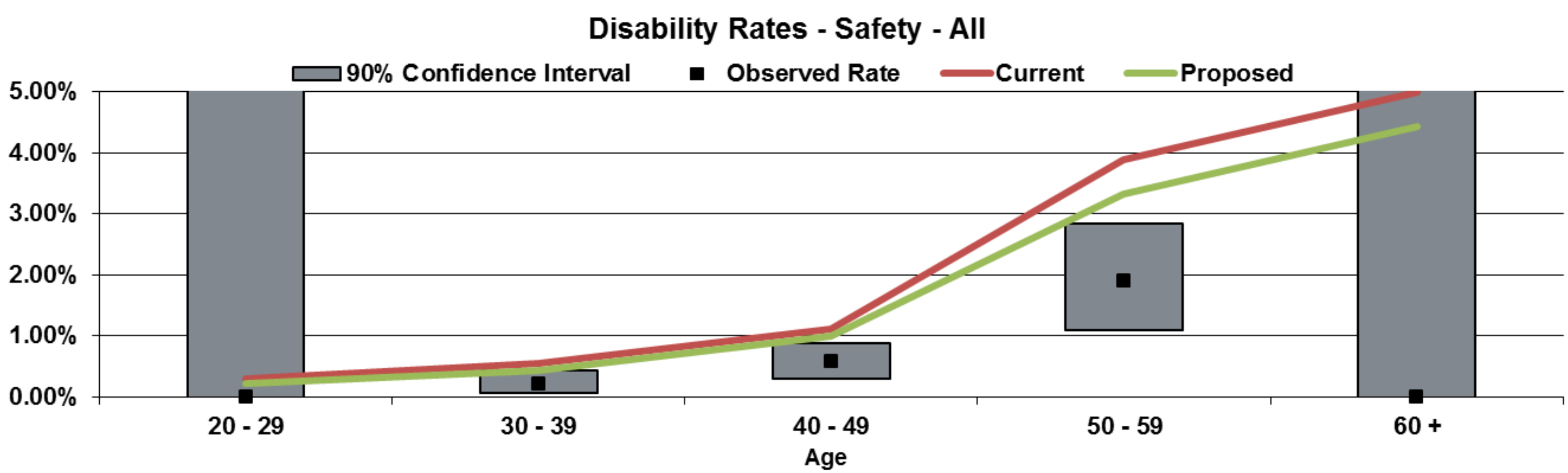


Appendix: Disability Retirement Rates





Appendix: Disability Retirement Rates



Meeting Date
05/22/19
Agenda Item
#7

MEMORANDUM

Date: May 22, 2019

To: CCCERA Board of Retirement

From: Gail Strohl, Chief Executive Officer

Subject: Consider and take possible action to adopt the actuarial assumptions to be utilized in the December 31, 2018 actuarial valuation report.

Background

At the May 1, 2019 Board meeting, Segal Consulting presented an actuarial experience study which encompassed a review of demographic and economic actuarial assumptions, utilizing census data from January 1, 2015 to December 31, 2017. This study provided the proposed actuarial assumptions to be used in the December 31, 2018 actuarial valuation. The last experience study covered the time period of January 1, 2012 to December 31, 2014. At the May 1, 2019 meeting, there was a request for additional information which is being presented today.

Recommendation

Consider and take possible action to adopt the actuarial assumptions to be utilized in the December 31, 2018 actuarial valuation report.

Meeting Date
05/22/19
Agenda Item
#8 & #9

MEMORANDUM

Date: May 22, 2019

To: CCCERA Board of Retirement

From: Gail Strohl, Chief Executive Officer

Subject: Consider and take possible action to adopt the Declining Employer Payroll Actuarial Funding Policy; Consider and take possible action to amend the Actuarial Funding Policy.

Background

The Declining Employer Payroll Actuarial Funding Policy provides procedures and guidelines for CCCERA to follow if a participating employer in CCCERA whose CCCERA-covered payroll is declining, or is expected to decline, materially over time. CCCERA is not currently aware of any such employer at this time. In light of establishing this policy, it is prudent to slightly amend the current Actuarial Funding Policy.

Recommendation

Consider and take possible action to:

1. Adopt the Declining Employer Payroll Actuarial Funding Policy; and
2. Amend the Actuarial Funding Policy.

Meeting Date
05/22/19
Agenda Item
#8

Segal Consulting

Contra Costa County Employees' Retirement Association

Declining Employer Payroll Actuarial Funding Policy

May 22, 2019

Paul Angelo, FSA

John Monroe, ASA

Segal Consulting

San Francisco

5581520v2

Current CCCERA Policy for <u>Terminating</u> Employers

- Employer stops contracting with CCCERA to provide future benefit accruals <u>for current and new</u> employees
  - CCCERA retains liability for past service only – active and inactive
- Two alternatives for calculating termination liability
  - Use ongoing valuation assumptions
    - » Employer pays off any unfunded liability in installments (15 years)
    - » Employer remains responsible for future actuarial experience
    - » Installments are recalculated every three years, after experience study
  - Use market based assumptions
    - » Liability based on a market based “risk free” earnings assumption
    - » Substantially greater liability than under ongoing valuation assumptions
    - » Calculated one-time at termination only, no reassessment
    - » Employer pays as a lump sum or in installments (up to 15 years)

Declining Employer Payroll

- Different situation calling for new policy
  - Ongoing employer stops contracting with CCCERA for <u>new</u> employees
  - Current employees continue to accrue future service
- Other potential examples could include:
  - Districts continuing to contract with CCCERA for current employees but not hiring new employees
  - Districts with payroll declining for other reasons
- Policy issue: How to allocate Unfunded Actuarial Accrued Liability (UAAL) and payments to fund UAAL?
  - Issue arises because UAAL payments are usually based on payroll
- CCCERA is not aware of any currently declining employers
  - Policy has been created to be proactive

Declining Employer Payroll

- For ongoing employers, UAAL payments in actuarial valuation spread over future payroll, assuming constant active count
  - Total payroll assumed to grow at 3.25% (proposed assumption)
    - UAAL payments also structured to increase at 3.25%
  - In effect, UAAL payments allocated in proportion to “open” payroll
    - Including pay for future actives assumed to replace current actives
- For employer with declining active headcount, payroll used to assess UAAL contributions reduces over time
  - No longer meets 3.25% payroll growth assumption used to develop level percentage of UAAL contribution rate for CCCERA as a whole
  - Employer’s UAAL payments decline with payroll
    - Eventually employer will have no active members or payroll, and so will make no UAAL payments
- New policy meant to ensure that these employers will continue to pay their fair share of the UAAL

Declining Employer Payroll

- Proposed CCCERA declining employer payroll actuarial funding policy includes:
  - How to identify such employers <u>in the future</u> (“triggering event”)
    - Employer stops contracting with CCCERA for new employees, or
    - Payroll decreasing and not expected to recover
  - How to re-allocate UAAL and calculate UAAL payments after triggering event
    - Using some basis other than payroll
- Other 1937 Act County retirement systems have adopted declining employer payroll policies to address these situations
  - Orange, Kern and Alameda

Declining Employer Payroll – Triggering Events

- What "triggering events" should CCCERA consider as identifying a Declining Employer Payroll situation?
  - Employer ceases to enroll new hires in CCCERA
  - Employer experiences a material and expected long-lasting reduction in CCCERA-covered payroll
    - May be sudden or more gradual (over a period of years)
    - Necessarily more subjective than ceasing to enroll future hires
- CCCERA works with actuary to obtain information related to employer (active member and payroll history)
  - Information to Board to determine if triggering event has occurred
- If a triggering event occurs then generally:
  - Go back to last actuarial valuation date
  - Allocate assets and liabilities to employer
  - Segregate assets and liabilities into a new cost group

CCCERA Declining Employer Payroll Policy

- Once triggering event occurs, two independent policy decisions:
  - How to allocate UAAL
    - By payroll (current) or by Actuarial Accrued Liability (AAL)
    - Policy recommendation is to allocate UAAL based on AAL
      - » In effect, assets are allocated to the employer so that all employers in the cost group have the same funded ratio
  - How to structure UAAL payments
    - As percent of actual payroll that is assumed to increase (current)
    - As a series of increasing but fixed dollar amounts
    - As a series of level fixed dollar amounts
      - » Recommendation – level fixed dollar payments over 18 year layers
      - » UAAL payment as a percent of payroll will increase over time as employer's payroll decreases

CCCERA Declining Employer Payroll Policy

- Total employer contribution still determined annually in each actuarial valuation
  - Employer must be expected to continue as a financially viable entity
- Employer will still have new UAAL amortization layers
  - Due to gains / losses and assumption changes
  - Based only on this employer’s experience
  - New UAAL layers are amortized as level fixed dollar payments instead of increasing percent-of-payroll payments

CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
BOARD OF RETIREMENT

DECLINING EMPLOYER PAYROLL ACTUARIAL FUNDING POLICY

I. PURPOSE

A participating employer in the Contra Costa County Employees' Retirement Association (CCCERA) may experience an actual or expected material decline in the payroll attributable to its CCCERA's active members (CCCERA-covered payroll). The Declining Employer Payroll Actuarial Funding Policy is intended to establish guidelines by which CCCERA intends to assure that such employer will continue to satisfy its obligation to timely pay all unfunded actuarial accrued liability (UAAL) attributable to the employer's active, retired and deferred employees and their beneficiaries by reason of their prior and future service as CCCERA's members.

II. BACKGROUND

Under CCCERA's practice in place prior to the adoption of this Policy, CCCERA generally determined employers' contribution obligations for UAAL by applying a contribution rate determined by CCCERA's actuary to the employer's CCCERA-covered payroll (the percentage-of-payroll methodology). For employers whose payrolls are generally consistent with CCCERA's actuarial assumptions regarding payroll growth, the percentage-of-payroll methodology continues to be appropriate.

However, for employers whose CCCERA-covered payroll is declining, or is expected to decline, materially over time, the Board of Retirement has determined that the percentage-of-payroll methodology is not the appropriate means of collecting employer contributions owed to CCCERA. The objectives of this Declining Employer Payroll Policy are to (i) ensure equitable and adequate funding of UAAL in cases involving employers with declining payrolls, (ii) approve procedures for identifying employers who should be subject to this Policy, and (iii) approve a different methodology for determining any UAAL attributable to such employers and setting the amount and schedule of the contributions needed to fund such UAAL.

This policy does *not* change the methodology regarding how contributions for "normal cost" are determined for participating employers.

Generally, the objectives of this Policy also are to ensure compliance with County Employees Retirement Law of 1937 (California Government Code sections 31450 et seq., as amended) the Public Employees' Pension Reform Act of 2013 (Gov't. Code sections 7522-7522.74) and other applicable provisions of law. Pursuant to Gov't. Code sections 7522.52, 31453, 31453.5, 31581, 31582, 31584, 31585, 31586, 31611 and other applicable provisions of law, a participating employer remains liable, and must make the required appropriations and transfers, to CCCERA for the participating employer's share of liabilities attributable to its officers and employees who are and may be entitled to receive retirement, disability and related benefits from CCCERA.

It is the Board of Retirement's intent to allow an employer covered by this Policy to satisfy its funding obligation in a manner which provides the employer reasonable flexibility; however, primary consideration will be given to ensuring the adequacy of the assets attributable to the employer to satisfy the employer's funding obligations. This will generally require redetermination of the funding obligations of the employer for several years.

III. PROCEDURES AND GUIDELINES

Absent any exigent circumstances and unless expressly approved by the Board of Retirement at a duly-noticed public meeting, the procedures and guidelines for implementing this Policy are set forth below.

A. Commencement of Coverage – Triggering Events

This Policy covers only those employers for whom the Board determines, based on a recommendation from CCCERA's Chief Executive Officer (CEO), that a *triggering event* as described in this section III.A. has occurred *and* who are not excluded from coverage under this Policy as described in section III.B. below. The fact that a triggering event may have occurred in the past does not prevent CCCERA from applying this policy to that employer. The Board hereby directs the CEO to work with CCCERA's actuary to obtain the information (e.g., CCCERA-covered payroll history) needed for the Board to make determinations regarding triggering events. The CEO is further directed to report to the Board, at least annually, regarding these activities.

As provided in Section IV.3. of the Board's Regulations:

> Whenever the employer's reportable payroll drops to a level which is lower than 70% of its payroll during the same period in the preceding year, the Board may investigate the cause. Whenever the employer's reportable payroll drops to a level which is lower than 50% of its payroll during the same period in the preceding year, the Board shall investigate the cause. If the Board determines that the cause is other than temporary it shall *determine the amount of contributions due from the employer to continue paying its share of any unfunded liability* [emphasis added]. This amount shall then be due from the employer in addition to any contributions made on the reduced payroll.

One of the purposes of this policy is to provide a basis for applying this provision of the Board's Regulations.

(i) *Triggering event resulting from ceasing to enroll new hires.* This provision applies in the event that a CCCERA participating employer ceases to enroll new hires with CCCERA but, for a period of time, continues to have at least some previously-enrolled employees maintaining their status as active CCCERA members. The employer's CCCERA-covered payroll will eventually diminish to zero as their active employees retire or otherwise terminate employment. Examples of employers in this category may include an employer that is acquired by another entity that is not a CCCERA participating employer, or a CCCERA employer that is taken over by a state agency whose employees are covered by another pension system such as CalPERS. There may be other examples as well.

(ii) *Triggering event resulting from a material and expected long-lasting reduction in CCCERA-covered payroll.* This provision applies in the event that a CCCERA participating employer experiences a material reduction in their CCCERA-covered payroll, but nevertheless continue to enroll their new hires with CCCERA. The reduction may be sudden (e.g., due to a discrete event such as a partial loss of funding, or partial outsourcing), or it may be more gradual, over a period of years, and may not be tied to a discreet event. Generally, the Board would determine that this type of triggering event has occurred only if the Board expects that the reduction in employers' CCCERA-covered payroll is expected to be permanent, long-lasting or for an indefinite period of time that is greater than a cycle that the employer may typically experience, or a cycle similarly experienced by the other employers, if any, in the same CCCERA cost group.

Generally, a situation described in the Board's Regulations above would likely constitute a triggering event under this subsection. However, this subsection also applies to reductions in CCCERA-covered payroll that occur more gradually over time.

B. Exclusions from Coverage; Terminations of Coverage

This policy does not cover any other situation, including, without limitation, an employer going out of business by reason of dissolution, loss of funding, consolidation or merger (unless there is a surviving financially-viable entity that is acceptable to the Board that will make the ongoing payments under the Policy). This Policy also does not cover a "withdrawing employer" who ceases to provide CCCERA membership for *all* of the employer's active CCCERA members (i.e., as of a date certain, withdraws both new hires and existing actives from membership with CCCERA). Such withdrawing employer is covered under a separate policy, the CCCERA Employer Termination Policy.

The Board of Retirement also recognizes that participating employers covered by this Policy will have UAAL funding obligations for several years. Therefore, if concerns arise during that period of time regarding the employer's ongoing existence as a financially-viable entity, the Board may remove the employer from coverage under this Policy and/or take any other measures that may be available and necessary to ensure the actuarial soundness of CCCERA including, without limitation, assessing the projected entire amount of the employer's UAAL (as recommended by the fund's actuary and approved by the Board) using a lower discount rate and payable in a single sum immediately due.

C. Procedures

The CEO or the CEO's designee will work with CCCERA's actuary and CCCERA's participating employers to obtain the information (e.g., CCCERA-covered payroll history, financial reports) needed for the Board to make determinations regarding triggering events and exclusions from, or terminations of, coverage and report to the Board, at least annually, regarding these activities.

Upon a recommendation from the CEO and notice to the affected participating employer, the Board will make a determination at a duly-noticed public meeting regarding (i) whether a triggering event has occurred for the employer, (ii) whether the employer should be excluded from coverage under this Policy, and (iii) for those employers that the Board has previously determined to be covered under the Policy, whether their coverage should be terminated under section III.B.

above. Employers may be required to provide CCCERA with updated employee census and payroll data and financial reports. See Gov't Code section 31543.

If the Board determines that a triggering event has occurred and the employer is not excluded from coverage under the Policy, then, solely for purposes of determining the covered employer's UAAL contribution obligation, CCCERA will segregate on its books all assets and liabilities attributable to the employer (to the extent not already segregated under de-pooling), based upon the recommendation of CCCERA's actuary, and shall maintain such separate accounting for the employer until all of the participating employer's obligations to CCCERA have been fully satisfied. The employer will be placed in its own cost group for purposes of determining employer and employee contributions. Consistent with section 2 above, the employer's Normal Cost will continue to be based on the active members of the covered employer.

CCCERA's actuary will determine, and certify to the Board of Retirement, the covered employer's funding obligation for its initial UAAL, which obligation shall be pro-rata based not on payroll, but rather based on the employer's actuarial accrued liability (AAL) including inactives and deferred members. The Board will generally require the employer's contributions to be paid in level, fixed-dollar amounts over a period not to exceed eighteen (18) years, beginning on July 1 of the calendar year immediately after the year in which the triggering event occurs. In appropriate circumstances, the Board may determine, consistent with its fiduciaries duties, it is appropriate to collect the necessary contributions in a different manner.

The actuary will use the actuarial valuation performed for CCCERA as of the end of the calendar year immediately prior to the calendar year in which the triggering event occurs (and based on all of CCCERA's then current actuarial assumptions and methodologies) to determine the initial AAL of the covered employer. The initial valuation value of assets (VVA), a smoothed value, will be determined using a pro-rata allocation based on the ratio of the employer's initial AAL to the AAL of all employers in the same cost group. As a result of this methodology, the initial UAAL (i.e., the initial AAL minus the initial VVA) will also be allocated pro-rata based on the covered employer's AAL in proportion to that of the other employers in the same cost group. Later values of the VVA (i.e., those used in the future valuations described below) shall be determined by rolling forward the initial VVA, adding contributions, deducting benefit payments, and crediting earnings at the actual smoothed (VVA) earnings rate on total CCCERA assets.

Annually, after the determination of the covered employer's initial funding obligation, as part of the regular annual actuarial valuation of the plan, CCCERA's actuary will measure any change in the UAAL of the participating employer due to the actuarial experience or changes in actuarial assumptions. In addition to the amortized payments for the covered employer's initial UAAL funding obligation determined as of the initial valuation, the employer will be liable for, and must contribute to CCCERA, any such new UAAL determined as of subsequent valuations, based upon an amortization schedule recommended by the actuary and adopted by the Board of Retirement. CCCERA will hold any negative UAAL (Surplus) to be applied against any future UAAL of the covered employer.

If any Surplus remains after the covered employer has satisfied *all* of its UAAL obligations (Final Surplus), CCCERA will distribute the Final Surplus in accordance with the terms of applicable law.

IV. POLICY REVIEW

The Board of Retirement will review this Policy at least every three (3) years to ensure that it remains relevant and appropriate.

V. HISTORY

Adopted: [date]

Amended: [date]

CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

ACTUARIAL FUNDING POLICY

INTRODUCTION:

The purpose of this Actuarial Funding Policy is to record the funding objectives and policies set by the Board of Retirement (Board) for the Contra Costa County Employees' Retirement Association (CCCERA). The Board establishes this Actuarial Funding Policy to help ensure the systematic funding of future benefit payments for members of CCCERA. In addition, this document records certain guidelines established by the Board to assist in administering CCCERA in a consistent and efficient manner.

This Actuarial Funding Policy supersedes any previous Actuarial Funding Policies. It is a working document and may be modified as the Board deems necessary.

GOALS OF ACTUARIAL FUNDING POLICY:

1. To determine future contributions that, together with current plan assets, are expected to be sufficient to provide for all benefits provided by CCCERA;

2. To seek reasonable and equitable allocation of the cost of benefits over time including the goal that annual contributions should, to the extent reasonably possible, maintain a close relationship to both the expected cost of each year of service and to variations around that expected cost;

3. To manage and control future contribution volatility to the extent reasonably possible, consistent with other policy goals; and,

4. To support the general public policy goals of accountability and transparency by being clear as to both intent and effect, allowing for an assessment of whether, how and when the plan sponsors will meet the funding requirements of the plan.

FUNDING REQUIREMENT AND POLICY COMPONENTS:

CCCERA's annual funding requirement is comprised of a payment of the Normal Cost and a payment on the Unfunded Actuarial Accrued Liability (UAAL). The Normal Cost and the amount of payment on UAAL are determined by the following three components of this funding policy:

I. Actuarial Cost Method: Allocates the total present value of future benefits to each year (Normal Cost), including all past years (Actuarial Accrued Liability or AAL);

II. Asset Smoothing Method: Spreads the recognition of investment gains or losses over a period of time for the purposes of determining the Actuarial Value of Assets used in the actuarial valuation process. This reduces the effect of short-term market volatility while still tracking the overall movement of the market value of plan assets; and,

III. Amortization Policy: Determines the length of time and the structure of the increase or decrease in contributions required to systemically (1) fund any Unfunded Actuarial Accrued Liability or UAAL, or (2) recognize any surplus, i.e., any assets in excess of the AAL.

I. Actuarial Cost Method:

The Entry Age method shall be applied to the projected benefits in determining the Normal Cost and the AAL. The Normal Cost shall be determined as a level percent of payroll on an individual basis for each active member.

II. Asset Smoothing Method:

The investment gains or losses of each valuation period, as a result of comparing the actual market return to the expected market return, shall be recognized in level amounts over 5 years in calculating the Actuarial Value of Assets.

This policy anticipates that future circumstances may warrant adjustments to change the pattern of the recognition of the net deferred investment gains or losses after a period of significant market change followed by a period of market correction, upon receiving an analysis from CCCERA's actuary. Such adjustments would be appropriate when the net deferred investment gains or losses are relatively small (i.e., the actuarial and market values are very close together), but the recognition of that net deferred amount is markedly non-level. Any such adjustment would be made subject to the following conditions:

- The net deferred investment gains or losses are unchanged as of the date of the adjustment; and,

- The period over which the net deferred investment gains and losses are fully recognized is unchanged as of the date of the adjustment.

III. Amortization Policy:

- The UAAL (i.e., the difference between the AAL and the Valuation Value of Assets) as of December 31, 2012 shall continue to be amortized over separate amortization layers based on the valuations during which each separate layer was previously established.

- Any new UAAL as a result of actuarial gains or losses identified in the annual valuation as of December 31 will be amortized over a period of 18 years.

- Any new UAAL as a result of change in actuarial assumptions or methods will be amortized over a period of 18 years.

- Unless the Board adopts an alternative amortization period after receiving an actuarial analysis[1]:

  a. with the exception noted in b., below, the increase in UAAL as a result of any plan amendments will be amortized over a period of 10 years;

  b. the entire increase in UAAL resulting from a temporary retirement incentive will be funded in full upon adoption of the incentive. If the increase in UAAL is due to the impact of benefits resulting from additional service permitted in Section 31641.04 of the 1937 CERL (Golden Handshake), the entire increase in UAAL will be funded in full upon adoption of the Golden Handshake.

- UAAL shall be amortized over "closed" amortization periods so that the amortization period for each layer decreases by one year with each actuarial valuation.

- UAAL shall be amortized as a level percentage of payroll so that the amortization amount in each year during the amortization period shall be expected to be a level percentage of covered payroll, taking into consideration the current assumption for general payroll increase.

- If an overfunding or "surplus" exists (i.e., the Valuation Value of Assets exceeds the AAL, so that the total of all UAAL amortization layers become negative), any prior UAAL amortization layers will be considered fully amortized, and any subsequent UAAL will be amortized as the first of a new series of amortization layers, using the above amortization periods.

  If the surplus exceeds 20% of the AAL per Section 7522.52 of the Government Code, then the amount of such surplus in excess of 20% of the AAL (and any subsequent surpluses in excess of that amount) will be amortized over an "open" amortization period of 30 years, but only if the other conditions of Section 7522.52 have also been met. If those conditions are not met, then the surplus will not be amortized and the full Normal Cost will be contributed.

- These amortization policy components will generally apply separately to each of CCCERA's UAAL cost groups with the exception that the conditions of Section 7522.52 apply to the total plan.

OTHER POLICY CONSIDERATIONS:

<u>Adjustment for 18-Month Delay in Rate Implementation</u>

[1] In particular, the Board may want to incorporate into the amortization period demographic matching specific to the plan amendment. This could entail using the remaining active future service for plan changes that affect actives. For plan changes that affect retirees, this could entail using the remaining life expectancy for retirees or the period over which the increased cash flow to retirees is expected to be paid.

In order to allow employers to more accurately budget for pension contributions and other practical considerations, the contribution rates determined in each valuation (as of December 31) will apply to the 12-month period beginning 18 months after the valuation date. Any shortfall or excess contributions as a result of the implementation lag will be amortized as part of CCCERA's UAAL in the following valuation.

Implementation of Contribution Rate Change Due to Plan Amendment

Any change in contribution rate requirement that results from a plan amendment is generally implemented on the effective date of the plan amendment or as soon as administratively feasible.

Cost Sharing Arrangements

Starting with the December 31, 2009 Actuarial Valuation, the Board took action to depool CCCERA's assets, liabilities and Normal Cost by employer when determining employer contribution rates. The Board action included a review of experience back to December 31, 2002. This did not involve recalculation of any employer rates prior to December 31, 2009. However, it did involve establishing the depooled assets so as to reflect the separate experience of the employers in each individual cost group from December 31, 2002 through December 31, 2009. In addition, the Board took action to discontinue certain cost sharing adjustments for both member and employer contribution rates for General Tier 1 and Safety Tier A.

Even under the depooling structure, there are a few remaining cost sharing arrangements. Here is a summary of the ongoing cost sharing arrangements:

- Smaller employers (less than 50 active members) were pooled with the applicable County tier. Safety members from the East Contra Costa Fire Protection District were pooled with Safety members of the Contra Costa County Fire Protection District.

- Due to a statutory requirement, the Superior Court is pooled with the County regardless of how many members the Court has.

- UAAL costs are pooled between Cost Group 1 and Cost Group 2 which represent General County and Small Districts for Tiers 1 and 3. UAAL costs are also pooled for Cost Groups 7 and 9 which are Safety County Tiers A and C.

  This was done because Cost Group 1 and Cost Group 7 had active members but were generally closed to new members. If the UAAL for these two cost groups is not pooled with another cost group that is open to new active members then the UAAL rate for these generally closed cost groups would increase substantially in future years. This is due to the fact that the UAAL for CCCERA is amortized as a level percent of payroll and the payroll growth for the generally closed cost group would be less than the payroll growth assumption. This will help stabilize the employer contribution rates for the mostly closed Cost Group 1 and Cost Group 7. Normal Cost rates for those cost groups are not pooled.

  There are some substantial differences between the Safety Tier A Enhanced and Safety Tier C Enhanced benefits, such as the period over which final average salaries are determined and the COLA. However, since the County is the only employer in these two cost groups, they will be the only employer affected by this particular pooling.

Employer/Member Cost Sharing

The Cost Impact of Leave Cashouts

CCCERA's Basic and COLA member rates for members with membership dates before January 1, 2013 are increased to anticipate leave cashouts in the final year of employment using the same leave cashout assumptions adopted by the Board for the actuarial valuation for projecting benefit payments.

The Cost Impact of Service from Unused Sick Leave Conversion

Pursuant to Government Code Section 31641.01, for members with membership dates before January 1, 2013, the cost of this benefit will be charged only to employers and will not affect member contribution rates.

Employer/Member cost sharing arrangements are subject to modification under Government Code Section 31631.5, and any such modifications would be incorporated into the determination of the employer and member contribution rates.

Additional Employer UAAL Payments

Absent any specific action by the Board, any additional employer payments towards the UAAL (including those from Pension Obligation Bonds (POBs) will be accepted by CCCERA in exchange for a corresponding reduction in the employer's UAAL contribution rate over period(s) and in a manner consistent with that employer's outstanding UAAL amortization layers and payments.

The outstanding balance of the additional UAAL payment is tracked separately in a manner consistent with the procedure used to track the UAAL amortization layers. It will be credited with earnings at CCCERA's investment return assumption in effect at each valuation date and reduced by the dollar amount of the annual reduction in the employer's UAAL contributions due to the prepayment.

Unless otherwise directed by the Board, the dollar amount of the annual reduction in the employer's UAAL contributions due to the additional UAAL payment will be based on amortizing (as a level percentage of payroll) the outstanding balance of the additional UAAL payment amount over the same period as used for actuarial gains and losses, using CCCERA's investment return and payroll growth assumptions in effect at each valuation date.

The reduction in the UAAL contribution rate will then equal the dollar amount of reduction in the employer's UAAL contributions divided by the employer's expected payroll for the year following the valuation date. Rate reductions will apply starting on July 1 following receipt of the payment. The additional UAAL payment amount will be discounted back to the valuation date for which the contribution rates from that valuation become effective on that July 1.

The separate tracking of the outstanding balance applies only to employers that are in a cost group with more than one employer. For employers that are in their own cost group, the additional UAAL payment amount is directly added to the assets of their cost group. Separate tracking of the outstanding balance of the additional UAAL payment is not needed in this situation as the additional UAAL payment will automatically reduce the employer's UAAL contributions.

<u>Employers with Declining Covered Payrolls</u>

Refer to the Declining Employer Payroll Actuarial Funding Policy for more information.

POLICY REVIEW

The Board of Retirement will review this Policy at least every three (3) years to ensure that it remains relevant and appropriate.

HISTORY

Adopted: 2/26/2014

Amended: 8/13/2014, _____/2019

GLOSSARY OF FUNDING POLICY TERMS:

- **Present Value of Benefits (PVB) or total cost**: the "value" at a particular point in time of all projected future benefit payments for current plan members. The "future benefit payments" and the "value" of those payments are determined using actuarial assumptions as to future events. Examples of these assumptions are estimates of retirement patterns, salary increases, investment returns, etc. Another way to think of the PVB is that if the plan has assets equal to the PVB and all actuarial assumptions are met, then no future contributions would be needed to provide all future service benefits for all members, including future service and salary increases for active members.

- **Actuarial Cost Method:** allocates a portion of the total cost (PVB) to each year of service, both past service and future service.

- **Normal Cost (NC):** the cost allocated under the Actuarial Cost Method to each year of active member service.

- **Entry Age Actuarial Cost Method:** A funding method that calculates the Normal Cost as a level percentage of pay over the expected working lifetime of the plan's members.

- **Actuarial Accrued Liability (AAL)**: the value at a particular point in time of all past Normal Costs. This is the amount of assets the plan would have today if the current plan provisions, actuarial assumptions and participant data had always been in effect, contributions equal to the Normal Cost had been made and all actuarial assumptions came true. Note that for inactive members the AAL equals the entire PVB.

- **Market Value of Assets:** the fair value of assets of the plan as reported in the plan's audited financial statements.

- **Actuarial Value of Assets (AVA) or smoothed value:** a market-related value of the plan assets for determining contribution requirements. The AVA tracks the market value of assets over time, smoothes out short term fluctuations in market values and produces a smoother pattern of UAALs and contributions than would result from using market value.

- **Valuation Value of Assets (VVA):** the value of assets used in the actuarial valuation to determine contribution rate requirements. It is equal to the Actuarial Value of Assets reduced by the value of any non-valuation reserves.

- **Unfunded Actuarial Accrued Liability (UAAL):** the positive difference, if any, between the AAL and the VVA.

- **Surplus:** the positive difference, if any, between the VVA and the AAL.

- **Actuarial Value Funded Ratio:** the ratio of the VVA to the AAL.

- **Market Value Funded Ratio:** the ratio of the MVA to the AAL.

- **Actuarial Gains and Losses:** changes in UAAL or surplus due to actual experience different from what is assumed in the actuarial valuation. For example, if during a given year the assets earn more than the investment return assumption, the amount of earnings above the assumption will cause an unexpected reduction in UAAL, or "actuarial gain" as of the next valuation. These include contribution gains and losses that result from actual contributions made being greater or less than the level determined under the policy.

- **Valuation Date:** December 31 of every year.

Meeting Date
05/22/19
Agenda Item
#9

CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

ACTUARIAL FUNDING POLICY

~~Adopted: 2/26/2014~~
~~Amended: 8/13/2014~~

INTRODUCTION:

The purpose of this Actuarial Funding Policy is to record the funding objectives and policies set by the Board of Retirement (Board) for the Contra Costa County Employees' Retirement Association (CCCERA). The Board establishes this Actuarial Funding Policy to help ensure the systematic funding of future benefit payments for members of CCCERA. In addition, this document records certain guidelines established by the Board to assist in administering CCCERA in a consistent and efficient manner.

This Actuarial Funding Policy supersedes any previous Actuarial Funding Policies. It is a working document and may be modified as the Board deems necessary.

GOALS OF ACTUARIAL FUNDING POLICY:

1. To determine future contributions that, together with current plan assets, are expected to be sufficient to provide for all benefits provided by CCCERA;

2. To seek reasonable and equitable allocation of the cost of benefits over time including the goal that annual contributions should, to the extent reasonably possible, maintain a close relationship to both the expected cost of each year of service and to variations around that expected cost;

3. To manage and control future contribution volatility to the extent reasonably possible, consistent with other policy goals; and,

4. To support the general public policy goals of accountability and transparency by being clear as to both intent and effect, allowing for an assessment of whether, how and when the plan sponsors will meet the funding requirements of the plan.

FUNDING REQUIREMENT AND POLICY COMPONENTS:

CCCERA's annual funding requirement is comprised of a payment of the Normal Cost and a payment on the Unfunded Actuarial Accrued Liability (UAAL). The Normal Cost and the amount of payment on UAAL are determined by the following three components of this funding policy:

I. Actuarial Cost Method: Allocates the total present value of future benefits to each year (Normal Cost), including all past years (Actuarial Accrued Liability or AAL);

II. Asset Smoothing Method: Spreads the recognition of investment gains or losses over a period of time for the purposes of determining the Actuarial Value of Assets used in the actuarial valuation process. This reduces the effect of short-term market volatility while still tracking the overall movement of the market value of plan assets; and,

III. Amortization Policy: Determines the length of time and the structure of the increase or decrease in contributions required to systemically (1) fund any Unfunded Actuarial Accrued Liability or UAAL, or (2) recognize any surplus, i.e., any assets in excess of the AAL.

I. Actuarial Cost Method:

The Entry Age method shall be applied to the projected benefits in determining the Normal Cost and the AAL. The Normal Cost shall be determined as a level percent of payroll on an individual basis for each active member.

II. Asset Smoothing Method:

The investment gains or losses of each valuation period, as a result of comparing the actual market return to the expected market return, shall be recognized in level amounts over 5 years in calculating the Actuarial Value of Assets.

This policy anticipates that future circumstances may warrant adjustments to change the pattern of the recognition of the net deferred investment gains or losses after a period of significant market change followed by a period of market correction, upon receiving an analysis from CCCERA's actuary. Such adjustments would be appropriate when the net deferred investment gains or losses are relatively small (i.e., the actuarial and market values are very close together), but the recognition of that net deferred amount is markedly non-level. Any such adjustment would be made subject to the ~~and the~~ following conditions ~~are met~~:

- The net deferred investment gains or losses are unchanged as of the date of the adjustment; and,
- The period over which the net deferred investment gains and losses are fully recognized is unchanged as of the date of the adjustment.

III. Amortization Policy:

- The UAAL (i.e., the difference between the AAL and the Valuation Value of Assets) as of December 31, 2012 shall continue to be amortized over separate amortization layers based on the valuations during which each separate layer was previously established.
- Any new UAAL as a result of actuarial gains or losses identified in the annual valuation as of December 31 will be amortized over a period of 18 years.
- Any new UAAL as a result of change in actuarial assumptions or methods will be amortized over a period of 18 years.

- Unless the Board adopts an alternative amortization period after receiving an actuarial analysis[1]:

  a. with the exception noted in b., below, the increase in UAAL as a result of any plan amendments will be amortized over a period of 10 years;

  b. the entire increase in UAAL resulting from a temporary retirement incentive will be funded in full upon adoption of the incentive. If the increase in UAAL is due to the impact of benefits resulting from additional service permitted in Section 31641.04 of the 1937 CERL (Golden Handshake), the entire increase in UAAL will be funded in full upon adoption of the Golden Handshake.

- UAAL shall be amortized over "closed" amortization periods so that the amortization period for each layer decreases by one year with each actuarial valuation.

- UAAL shall be amortized as a level percentage of payroll so that the amortization amount in each year during the amortization period shall be expected to be a level percentage of covered payroll, taking into consideration the current assumption for general payroll increase.

- If an overfunding or "surplus" exists (i.e., the Valuation Value of Assets exceeds the AAL, so that the total of all UAAL amortization layers become negative), ~~-~~any prior UAAL amortization layers will be considered fully amortized, and any subsequent UAAL will be amortized as the first of a new series of amortization layers, using the above amortization periods.

  If the surplus exceeds 20% of the AAL per Section 7522.52 of the Government Code, then the amount of such surplus in excess of 20% of the AAL (and any subsequent surpluses in excess of that amount) will be amortized over an "open" amortization period of 30 years, but only if the other conditions of Section 7522.52 have also been met. If those conditions are not met, then the surplus will not be amortized and the full Normal Cost will be contributed.

- These amortization policy components will generally apply separately to each of CCCERA's UAAL cost groups with the exception that the conditions of Section 7522.5~~3~~2 apply to the total plan.

OTHER POLICY CONSIDERATIONS:

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[1] In particular, the Board may want to incorporate into the amortization period demographic matching specific to the plan amendment. This could entail using the remaining active future service for plan changes that affect actives. For plan changes that affect retirees, this could entail using the remaining life expectancy for retirees or the period over which the increased cash flow to retirees is expected to be paid.

Adjustment for 18-Month Delay in Rate Implementation

In order to allow employers to more accurately budget for pension contributions and other practical considerations, the contribution rates determined in each valuation (as of December 31) will apply to the 12-month period beginning 18 months after the valuation date. Any shortfall or excess contributions as a result of the implementation lag will be amortized as part of CCCERA's UAAL in the following valuation.

Implementation of Contribution Rate Change Due to Plan Amendment

Any change in contribution rate requirement that results from a plan amendment is generally implemented on the effective date of the plan amendment or as soon as administratively feasible.

Cost Sharing Arrangements

Starting with the December 31, 2009 Actuarial Valuation, the Board took action to depool CCCERA's assets, liabilities and Normal Cost by employer when determining employer contribution rates. The Board action included a review of experience back to December 31, 2002. This did not involve recalculation of any employer rates prior to December 31, 2009. However, it did involve establishing the depooled assets so as to reflect the separate experience of the employers in each individual cost group from December 31, 2002 through December 31, 2009. In addition, the Board took action to discontinue certain cost sharing adjustments for both member and employer contribution rates for General Tier 1 and Safety Tier A.

Even under the depooling structure, there are a few remaining cost sharing arrangements. Here is a summary of the ongoing cost sharing arrangements:

- Smaller employers (less than 50 active members) were pooled with the applicable County tier. Safety members from the East Contra Costa Fire Protection District were pooled with Safety members of the Contra Costa County Fire Protection District.

- Due to a statutory requirement, the Superior Court is pooled with the County regardless of how many members the Court has.

- UAAL costs are pooled between Cost Group 1 and Cost Group 2 which represent General County and Small Districts for Tiers 1 and 3. UAAL costs are also pooled for Cost Groups 7 and 9 which are Safety County Tiers A and C.

  This was done because Cost Group 1 and Cost Group 7 had active members but were generally closed to new members. If the UAAL for these two cost groups is not pooled with another cost group that is open to new active members then the UAAL rate for these generally closed cost groups would increase substantially in future years. This is due to the fact that the UAAL for CCCERA is amortized as a level percent of payroll and the payroll growth for the generally closed cost group would be less than the payroll growth assumption ~~(currently 4.00%)~~. This will help stabilize the employer contribution rates for the mostly closed Cost Group 1 and Cost Group 7. Normal Cost rates for those cost groups are not pooled.

There are some substantial differences between the Safety Tier A Enhanced and Safety Tier C Enhanced benefits, such as the period over which final average salaries are determined and the COLA. However, since the County is the only employer in these two cost groups, they will be the only employer affected by this particular pooling.

Employer/Member Cost Sharing

The Cost Impact of Leave Cashouts

CCCERA's Basic and COLA member rates for members with membership dates before January 1, 2013 are increased to anticipate leave cashouts in the final year of employment using the same leave cashout assumptions adopted by the Board for the actuarial valuation for projecting benefit payments.

The Cost Impact of Service from Unused Sick Leave Conversion

Pursuant to Government Code Section 31641.01, for members with membership dates before January 1, 2013, the cost of this benefit will be charged only to employers and will not affect member contribution rates.

Employer/Member cost sharing arrangements are subject to modification under Government Code Section 31631.5, and any such modifications would be incorporated into the determination of the employer and member contribution rates.

Additional Employer UAAL Payments

Absent any specific action by the Board, any additional employer payments towards the UAAL (including those from Pension Obligation Bonds (POBs) will be accepted by CCCERA in exchange for a corresponding reduction in the employer's UAAL contribution rate over period(s) and in a manner consistent with that employer's outstanding UAAL amortization layers and payments.

The outstanding balance of the additional UAAL payment is tracked separately in a manner consistent with the procedure used to track the UAAL amortization layers. It will be credited with earnings at CCCERA's investment return assumption in effect at each valuation date and reduced by the dollar amount of the annual reduction in the employer's UAAL contributions due to the prepayment.

Unless otherwise directed by the Board, the dollar amount of the annual reduction in the employer's UAAL contributions due to the additional UAAL payment will be based on amortizing (as a level percentage of payroll) the outstanding balance of the additional UAAL payment amount over the same period as used for actuarial gains and losses, using CCCERA's investment return and payroll growth assumptions in effect at each valuation date.

The reduction in the UAAL contribution rate will then equal the dollar amount of reduction in the employer's UAAL contributions divided by the employer's expected payroll for the year following the valuation date. Rate reductions will apply starting on July 1 following receipt of the payment. The additional UAAL payment amount will be discounted back to the valuation date for which the contribution rates from that valuation become effective on that July 1.

The separate tracking of the outstanding balance applies only to employers that are in a cost group with more than one employer. For employers that are in their own cost group, the additional UAAL payment amount is directly added to the assets of their cost group. Separate tracking of the outstanding balance of the additional UAAL payment is not needed in this situation as the additional UAAL payment will automatically reduce the employer's UAAL contributions.

Employers with Declining Covered Payrolls

Refer to the Declining Employer Payroll Actuarial Funding Policy for more information.

POLICY REVIEW

The Board of Retirement will review this Policy at least every three (3) years to ensure that it remains relevant and appropriate.

HISTORY

Adopted: 2/26/2014

Amended: 8/13/2014, _____/2019

GLOSSARY OF FUNDING POLICY TERMS:

- **Present Value of Benefits (PVB) or total cost**: the "value" at a particular point in time of all projected future benefit payments for current plan members. The "future benefit payments" and the "value" of those payments are determined using actuarial assumptions as to future events. Examples of these assumptions are estimates of retirement patterns, salary increases, investment returns, etc. Another way to think of the PVB is that if the plan has assets equal to the PVB and all actuarial assumptions are met, then no future contributions would be needed to provide all future service benefits for all members, including future service and salary increases for active members.

- **Actuarial Cost Method:** allocates a portion of the total cost (PVB) to each year of service, both past service and future service.

- **Normal Cost (NC):** the cost allocated under the Actuarial Cost Method to each year of active member service.

- **Entry Age Actuarial Cost Method:** A funding method that calculates the Normal Cost as a level percentage of pay over the expected working lifetime of the plan's members.

- **Actuarial Accrued Liability (AAL)**: the value at a particular point in time of all past Normal Costs. This is the amount of assets the plan would have today if the current plan provisions, actuarial assumptions and participant data had always been in effect, contributions equal to the Normal Cost had been made and all actuarial assumptions came true. Note that for inactive members the AAL equals the entire PVB.

- **Market Value of Assets:** the fair value of assets of the plan as reported in the plan's audited financial statements.

- **Actuarial Value of Assets (AVA) or smoothed value:** a market-related value of the plan assets for determining contribution requirements. The AVA tracks the market value of assets over time, smoothes out short term fluctuations in market values and produces a smoother pattern of UAALs and contributions than would result from using market value.

- **Valuation Value of Assets (VVA):** the value of assets used in the actuarial valuation to determine contribution rate requirements. It is equal to the Actuarial Value of Assets reduced by the value of any non-valuation reserves.

- **Unfunded Actuarial Accrued Liability (UAAL):** the positive difference, if any, between the AAL and the VVA.

- **Surplus:** the positive difference, if any, between the VVA and the AAL.

- **Actuarial Value Funded Ratio:** the ratio of the VVA to the AAL.

- **Market Value Funded Ratio:** the ratio of the MVA to the AAL.

- **Actuarial Gains and Losses:** changes in UAAL or surplus due to actual experience different from what is assumed in the actuarial valuation. For example, if during a given year the assets earn more than the investment return assumption, the amount of earnings above the assumption will cause an unexpected reduction in UAAL, or "actuarial gain" as of the next valuation. These include contribution gains and losses that result from actual contributions made being greater or less than the level determined under the policy.

- **Valuation Date:** December 31 of every year.

Verus

PERSPECTIVES THAT DRIVE ENTERPRISE SUCCESS

PERIOD ENDING: MARCH 31, 2019

Investment Performance Review for

Contra Costa County Employees' Retirement Association

Meeting Date
05/22/19
Agenda Item
#10a.

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Verus
PERSPECTIVES
THAT DRIVE
ENTERPRISE
SUCCESS
2ND QUARTER 2019
Investment Landscape

Recent Verus research

Visit: https://www.verusinvestments.com/insights/

Sound thinking

FOUR RULES OF OUTSOURCING

The choice to use the services of an Outsourced Chief Investment Officer (OCIO) provider is one of the most significant decisions that a board is likely to make. This piece is focused on the four most important rules that Verus believes investors should understand, and OCIO providers should deliver upon.

Annual outlooks

CAPITAL MARKET ASSUMPTIONS

Verus held the first Capital Market Assumptions Webinar. On the call, we discussed:

- How market shifts of 2018 have affected our long-term outlook
- Why the current environment continues to indicate modest long-term performance across most asset classes
- The important differences between shorter-term and longer-term forecasting exercises

ACTIVE MANAGEMENT ENVIRONMENT

Our work on active management addresses some shortfalls of the traditional analysis, which uses the median product to describe the active management universe as a whole. These improvements and insights have allowed us to better understand product behavior and may allow for more informed selection in the future.

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1st quarter summary

THE ECONOMIC CLIMATE

— Real GDP growth continued at 3.0% YoY - on pace with the third quarter (2.2% quarterly annualized rate). Forecasts for 2019 U.S. growth have weakened. The U.S. economy is expected to grow at a 2.4% pace in 2019, according to the Survey of Professional Forecasters, while the Federal Reserve expects 2.1% growth this year. ***p. 8***

— In March, negotiations resumed between U.S. and Chinese trade delegations. The dialogue was viewed as constructive, and optimism picked up for a trade resolution being reached in the near-to-intermediate future. The two sides have yet to agree on a formal timeline. ***p. 16***

PORTFOLIO IMPACTS

— The Federal Open Market Committee reiterated its "patient" approach to policy, leaving rates unchanged, helping to push asset prices upward. Chairman Powell announced that starting in May the balance sheet runoff would slow from $50 to $30 billion a month, and would end in September. ***p. 19***

— Risk assets exhibited strong performance over the quarter. U.S. equities delivered the greatest gains (S&P 500 +13.6%, MSCI ACWI +12.2%), reversing U.S. underperformance in Q4 2018 (S&P 500 -13.5%, MSCI ACWI -12.8%). This was followed by riskier credit with high single-digit returns, and safer credit and government bonds with low single-digit returns. ***p. 46***

THE INVESTMENT CLIMATE

— The first quarter was nearly a mirror image of 2018 Q4, as many assets retraced losses of the prior quarter. ***p. 38***

— Declining long-term Treasury yields following the Fed meeting in March briefly caused the yield curve to invert, meaning that short-term yields (3-month) were higher than long-term yields (10-year). Investors have expressed concerns that this may signal a near term recession. We believe these concerns are overblown. ***p. 21***

— The House of Commons in the British Parliament briefly took control of their government's legislative agenda, but failed to reach a majority vote on a path forward. On April 10th, British Prime Minister Theresa May and the European Council agreed to extend the Brexit deadline from April 12th to October 31st. ***p. 17***

ASSET ALLOCATION ISSUES

— All major asset classes delivered positive performance in Q1, a refreshing change of pace from broad-based losses experienced in 2018. ***p. 46***

— Economic conditions around the world have exhibited a weakening trend, leading to the question of whether a turn in the economic cycle is near. The first quarter was more mixed with strength in places, easing some concern. We remain watchful of this weakening trend, but believe the economy and market may have more room to run. ***p. 17***

A neutral risk stance may be appropriate in today's environment

What drove the market in Q1?

“Central banks take to stage as dovish outlooks spread”

MARKET EXPECTATIONS FOR 1-YEAR CHANGE IN FED FUNDS RATE (BPS)

Oct	Nov	Dec	Jan	Feb	Mar
62	48	10	-10	-5	-31

Article Source: Bloomberg, February 16th, 2019

“Slowing earnings growth, gloomy forecasts add to stock market’s woes”

S&P 500 INDEX 12-MONTH FORWARD EPS ESTIMATE ($)

Oct	Nov	Dec	Jan	Feb	Mar
175	175	174	171	171	172

Article Source: Wall Street Journal, January 13th, 2019

“Part of the yield curve inverts as 3-month yield tops 10-year rate”

10-YEAR MINUS 3-MONTH TREASURY YIELD SPREAD (BPS)

Oct	Nov	Dec	Jan	Feb	Mar
82	65	33	25	28	2

Article Source: CNBC, March 22nd, 2019

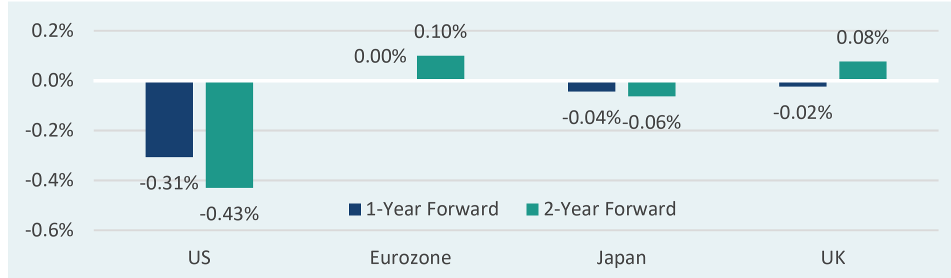
“World markets hit 2019 high amid trade war optimism”

NUMBER OF GOOGLE NEWS ARTICLES WITH ‘TRADE OPTIMISM’ IN TITLE

Oct	Nov	Dec	Jan	Feb	Mar
5	24	31	92	116	96

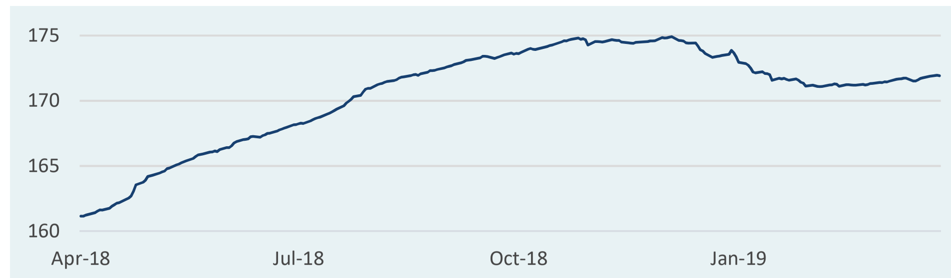
Article Source: The Guardian, February 18th, 2019

MARKET EXPECTATIONS FOR CHANGES IN SHORT-TERM RATES



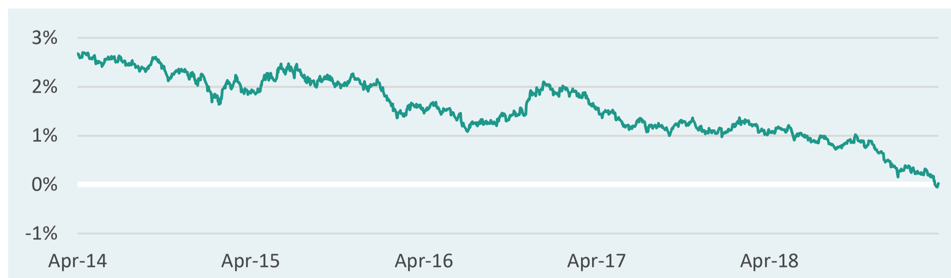
Source: Bloomberg, as of 4/2/19

S&P 500 INDEX 12-MONTH FORWARD EPS ESTIMATE



Source: Bloomberg, as of 3/31/19

10-YEAR MINUS 3-MONTH TREASURY YIELD SPREAD



Source: Bloomberg, as of 3/31/19

Economic environment

U.S. economics summary

— Real GDP growth continued at 3.0% YoY, on pace with the third quarter (2.2% on a quarterly annualized rate).

— Forecasts for 2019 U.S. growth have weakened. The U.S. economy is expected to grow at a 2.4% pace in 2019, according to the Survey of Professional Forecasters, while the Federal Reserve expects 2.1% growth this year.

— In March, negotiations resumed between U.S. and Chinese trade delegations. The dialogue was viewed as constructive, and optimism picked up for a formal trade resolution being reached in the near future.

— U.S. inflation remained near the 2.0% Fed target. After dipping to 1.5% YoY in February, headline inflation recovered to 1.9% in March, resulting in no change over the quarter.

— Average hourly earnings grew 3.2% YoY in March, missing expectations of 3.3%. A slight tick up in the average non-farm private workweek from 34.4 to 34.5 hours likely contributed to the cooler wage data.

— The labor market remained strong in Q1. U-3 unemployment fell to 3.8% from 3.9% in December, though the labor force participation rate weakened from 63.1% to 63.0% during the period.

— The Federal Open Market Committee reiterated its "patient" approach to policy, leaving rates unchanged. Expectations for 2019 GDP growth and rate hikes were cut, and markets rallied. Chairman Powell announced that starting in May the balance sheet runoff would slow from $50 billion per month to $30 billion, and would end in September.

	Most Recent	**12 Months Prior**
GDP *(YoY)*	3.0% *12/31/18*	2.5% *12/31/17*
Inflation *(CPI YoY, Core)*	2.0% *3/31/19*	2.1% *3/31/18*
Expected Inflation *(5yr-5yr forward)*	2.0% *3/31/19*	2.2% *3/31/18*
Fed Funds Target Range	2.25 – 2.50% *3/31/19*	1.50 – 1.75% *3/31/18*
10 Year Rate	2.4% *3/31/19*	2.7% *3/31/18*
U-3 Unemployment	3.8% *3/31/19*	4.0% *3/31/18*
U-6 Unemployment	7.3% *3/31/19*	7.9% *3/31/18*

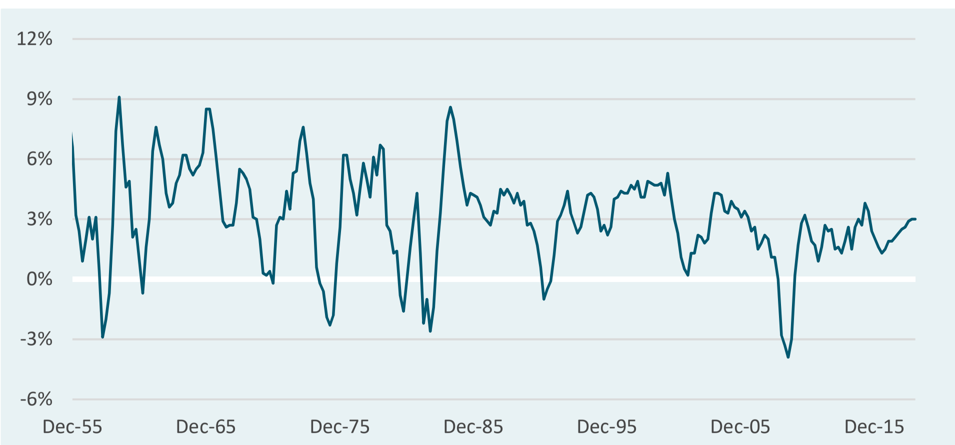
GDP growth

Real GDP growth continued at 3.0% YoY, on pace with growth in the third quarter (2.2% on a quarterly annualized rate). Consumption was the greatest contributor to real GDP growth.

The U.S. economy faces multiple headwinds, including the broad impacts of slowing global growth, fading of 2018 fiscal stimulus, and a tight labor market which constrains further upside from employment gains. While the U.S. is in a strong position relative to other developed nations, the economy is expected to grow at a 2.4% pace in 2019 according to a survey of professional forecasters. The Federal Reserve expects 2.1% growth this year.

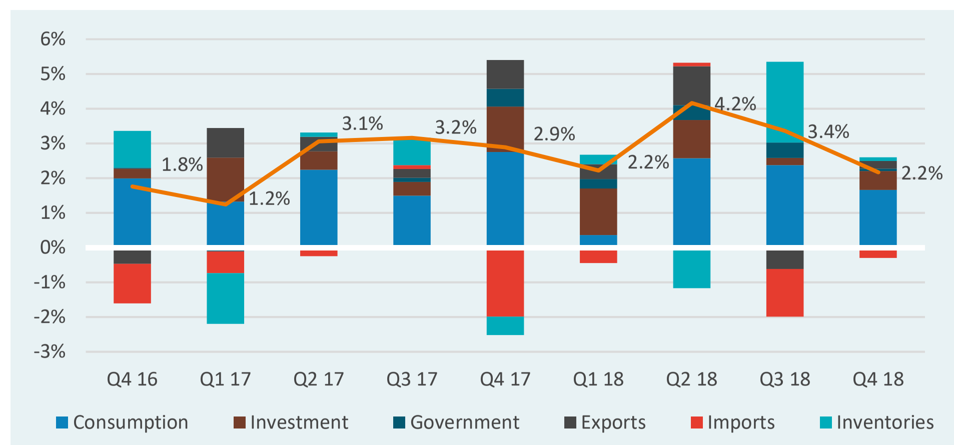
The Trump administration appears to have succeeded in reaching its 3% U.S. growth target during 2018. The Tax Cuts & Jobs Act helped stimulate the economy in the form of reduced taxes for individuals, which increased after-tax incomes and greatly reduced corporate tax burdens. These changes likely had positive impacts on worker wages and spurred recent capital investment.

U.S. REAL GDP GROWTH (YOY)



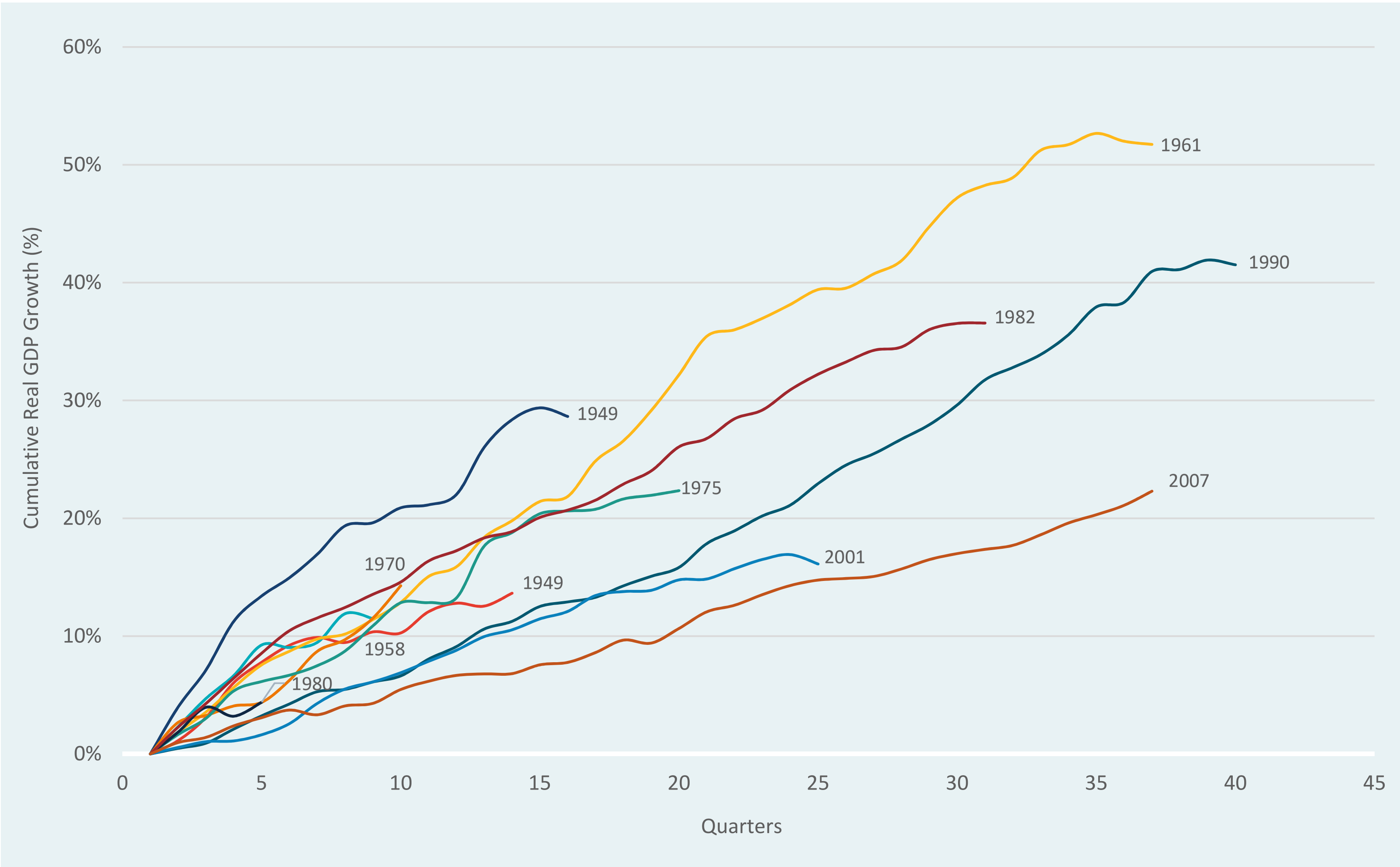
Source: Bloomberg, as of 12/31/18

U.S. GDP GROWTH ATTRIBUTION



Source: BEA, annualized quarterly rate, as of 12/31/18

A long but moderate expansion



The current economic cycle is just three quarters shy of matching the longest expansion on record

Source: FRED, Verus, as of 12/31/18 – each expansion is labeled with the starting year of expansion

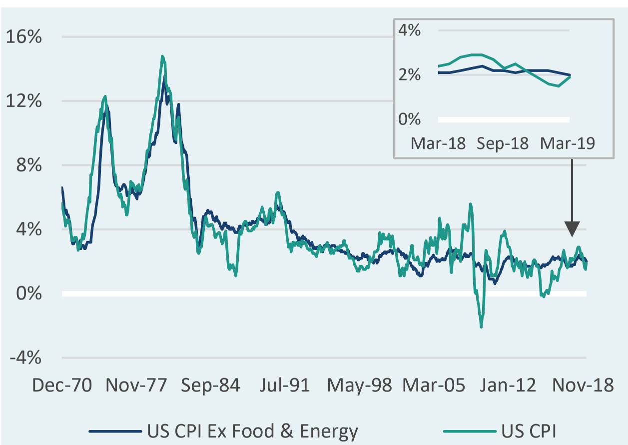
Inflation

U.S. inflation remained near the Federal Reserve's 2.0% target. After dipping to 1.5% YoY in February, headline CPI recovered to 1.9% in March, unchanged over the quarter. Core CPI, which removes the impact of energy and food prices, continued to ease, falling to 2.0% YoY at quarter-end. Moderate inflation around 2% has helped justify the Fed's recent pause in monetary tightening and has allowed for a patient approach. A material shift in either direction might place Fed officials in a difficult position, and should be watched closely.

Inflation in services was the sole contributor to the year-over-year growth in CPI as goods prices were unchanged during the period. Within services, shelter prices (+3.4% YoY) continued to be the main driver of inflation.

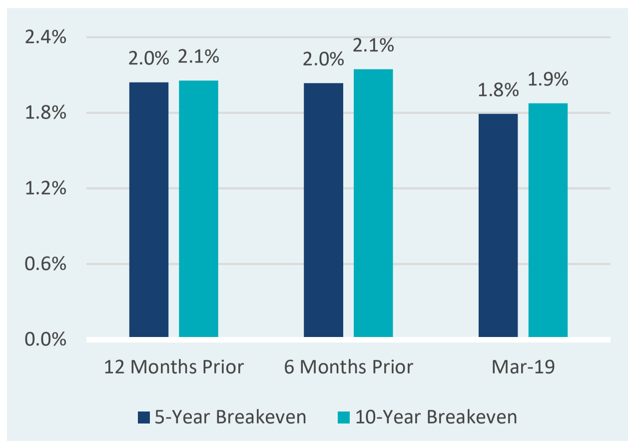
Market participants' expectations for future inflation recovered from depressed levels after falling sharply last quarter. The 10-year TIPS breakeven inflation rate rose 22 bps to 1.93%. Meanwhile, consumers' view of future inflation moderated from 2.7% to 2.5% as indicated by the University of Michigan survey.

U.S. CPI (YOY)



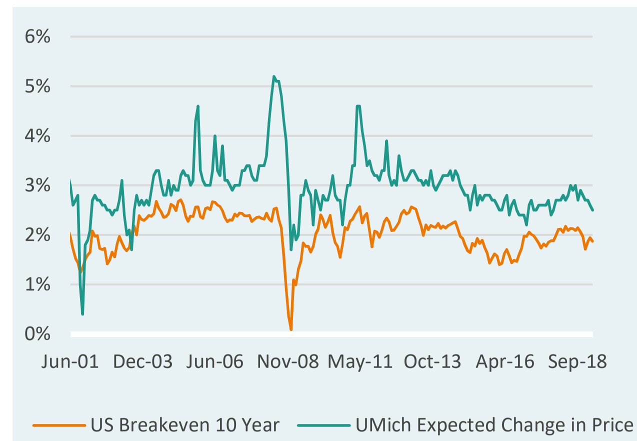
Source: Bloomberg, as of 3/31/19

BREAKEVEN INFLATION RATES



Source: FRED, as of 3/31/19

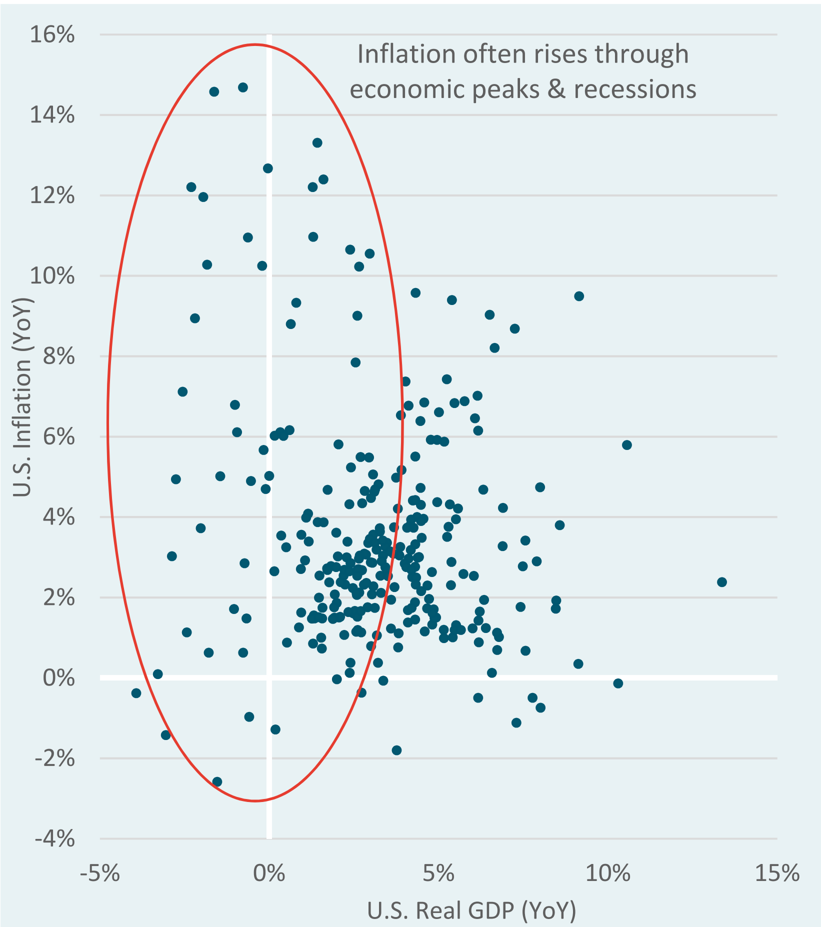
INFLATION EXPECTATIONS

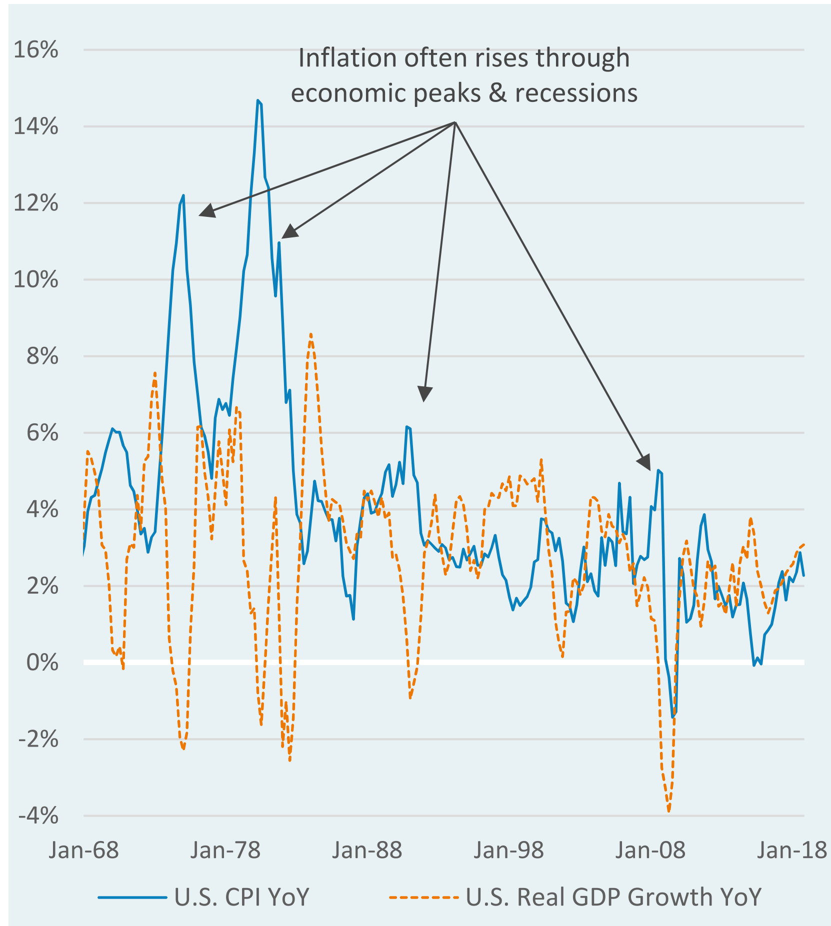


Source: Bloomberg, as of 3/31/19

Relationship – inflation & growth

Inflation risk has been more acute during late cycle & recession





History suggests inflation risks are still present at the later stage of the economic cycle

Source: FRED, Verus

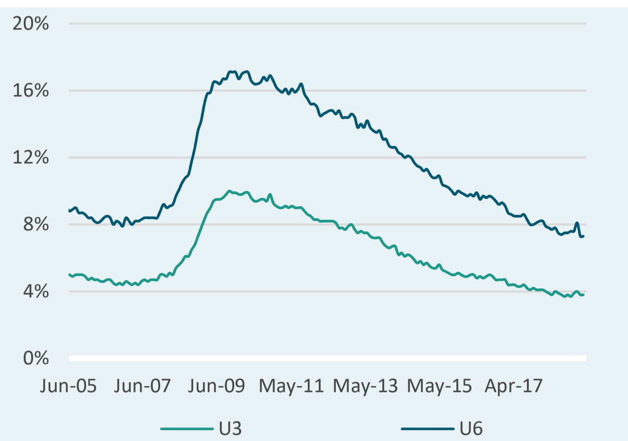
Labor market

Although there was some month-to-month volatility in job growth during the quarter, net additions to non-farm payrolls averaged 180,000 per month. Meanwhile, the U-3 unemployment rate fell slightly from 3.9% to 3.8%, just above the cycle low of 3.7%. The U-6 unemployment rate, which includes underemployed and discouraged workers, fell to a cycle low of 7.3%. The spread between the U-6 and U-3 unemployment rates compressed from 3.7% to 3.5%, the smallest difference since 2006. The decline in underemployed and discouraged workers indicates a further tightening of the labor market.

Wages continued to grow at a modest pace, but not fast enough to warrant concern over corporate margin deterioration or a flow through to general price inflation. In March, average hourly earnings rose 3.2% from 12 months ago.

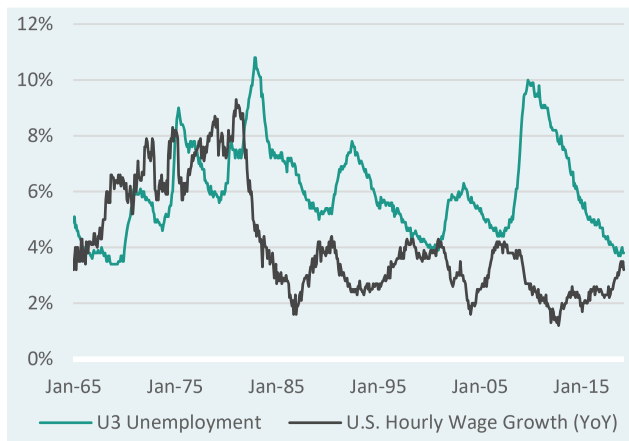
Given the relatively few number of unemployed persons and high percentage of companies reporting that jobs are hard to fill, we believe it may be difficult for job growth to continue at its recent strong rate.

UNEMPLOYMENT RATE



Source: FRED, as of 3/31/19

LONG-TERM EMPLOYMENT & WAGE GROWTH



Source: Bloomberg, as 3/31/19

NFIB: JOBS HARD TO FILL (3-MONTH AVG)

Source: NFIB, as of 3/31/19, net % of small businesses reporting that open positions are hard to fill

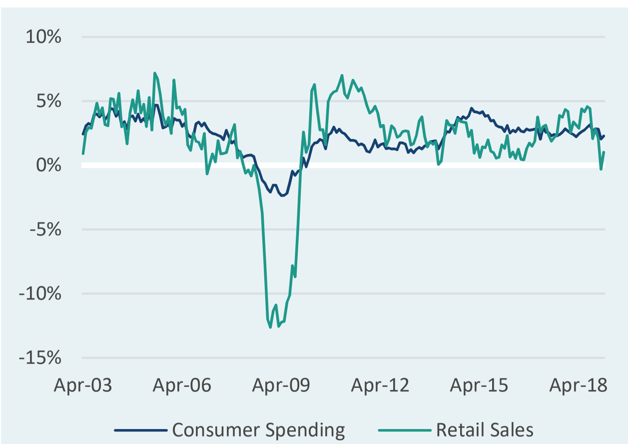
The consumer

February retail sales grew 2.2% year-over-year, rebounding from a sharp slowdown in the fourth quarter. Real consumer spending continued along at a modest 1.8% pace from the previous year.

Further labor market strength, wage gains, and low interest rates would likely provide support for spending. Consumer behavior remains conservative relative to past cycles, as indicated by broad spending and borrowing patterns. While consumer credit growth has been fairly muted, other specific spending areas such as auto sales were very strong in recent years – perhaps as consumers played catch-up from restrained purchases during the global financial crisis.

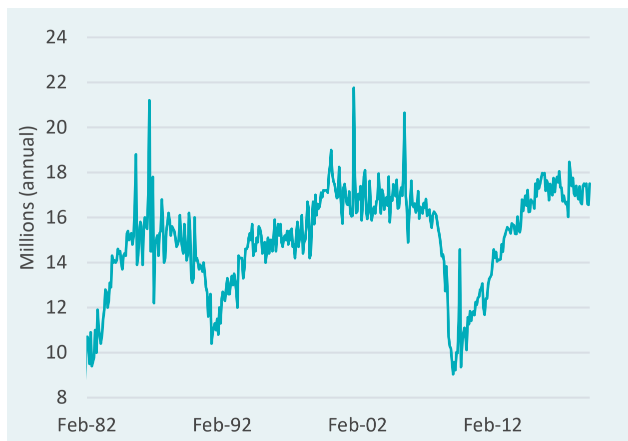
In 2018, there were rising concerns that higher interest rates would squeeze budgets and lead to a slowdown in spending and business activity. These fears have subsided as interest rates have fallen back to previous levels and the Federal Reserve is not expected to raise rates in the near future.

REAL CONSUMER SPENDING & RETAIL SALES GROWTH (YOY)



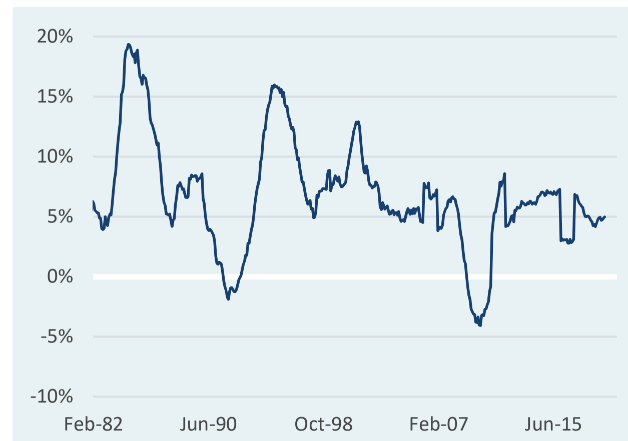
Source: Bloomberg, as of 1/31/19

AUTO SALES



Source: FRED, as of 3/31/19

CONSUMER CREDIT OUTSTANDING (YOY)



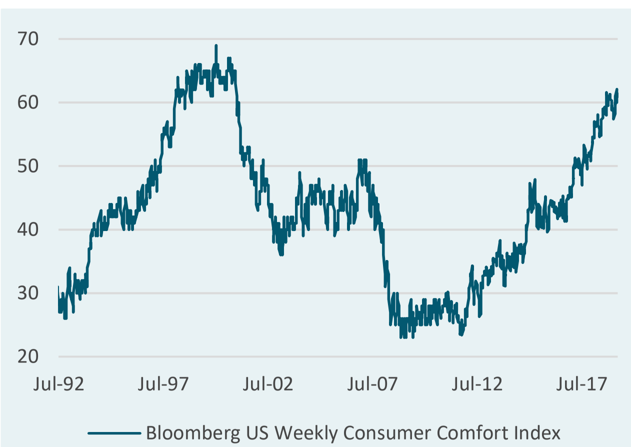
Source: Federal Reserve, as of 2/28/19

Sentiment

Consumer sentiment indicators fell sharply in January before rebounding in February and March. The fall in sentiment early in the year was driven by more muted consumer expectations of future growth, influenced by the sell-off in global equity markets and the extended U.S. government shutdown. However, the University of Michigan Consumer Sentiment Index finished the quarter at 98.4, slightly above its December reading and the Bloomberg Consumer Comfort Index was at a cycle high.

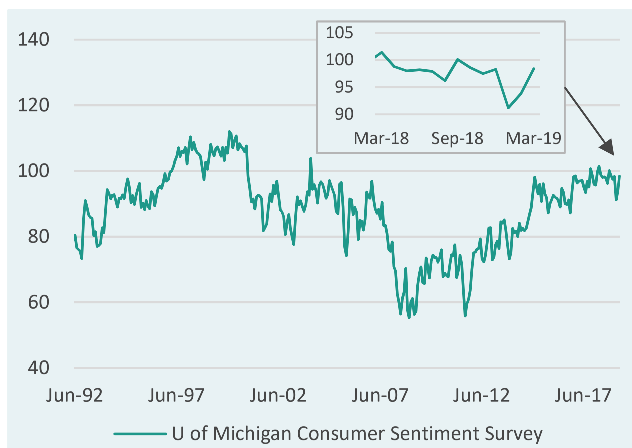
Small business sentiment continued to trend lower from historically strong levels. The NFIB Small Business Optimism Index dipped from 104.4 in December to 101.8 in March. The March reading of 101.8 ranked in the 79th percentile based on 45 years of history. Small business owners' expectations of future economic conditions moderated further in the first quarter. A net 11% of small businesses expected the economy to improve, down from 16% at the end of last year and 50% at the end of 2016.

CONSUMER COMFORT INDEX



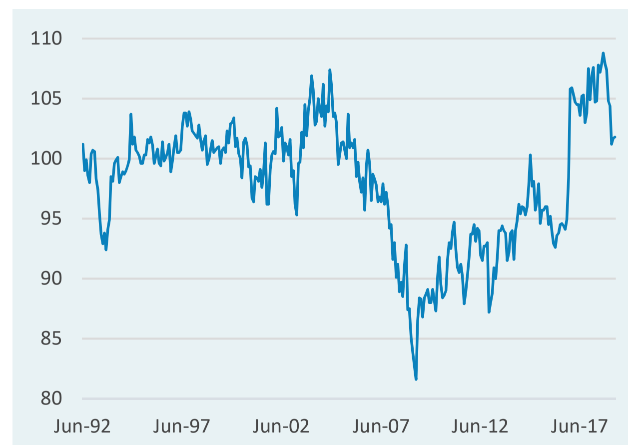
Source: Bloomberg, as of 3/24/19 (see Appendix)

CONSUMER SENTIMENT



Source: University of Michigan, as of 3/31/19 (see Appendix)

NFIB SMALL BUSINESS OPTIMISM INDEX



Source: NFIB, as of 3/31/19 (see Appendix)

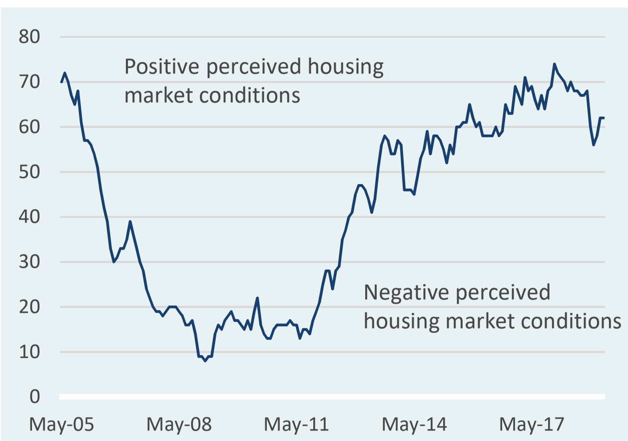
Housing

The U.S. housing market remains strong, though higher prices have dampened affordability and led to less demand. Rising interest rates in the fourth quarter generated fear of a housing slowdown, as borrowing costs have a large impact on home purchase activity. However, a reversal of monetary policy from expected tightening to expected neutrality (or easing) has placed downward pressure on the 30-year fixed mortgage rate. Given the importance of borrowing costs on housing demand, the move from 4.95% borrowing rates (peak reached in Q4) to 4.05% at the end of Q1 should ease concerns of a slowdown and bolster buying activity.

The National Association of Homebuilders (NAHB) Housing Market Index, based on a monthly survey of NAHB members designed to take the pulse of the single-family housing market, improved from 56 to 62 – above the neutral level of 50.

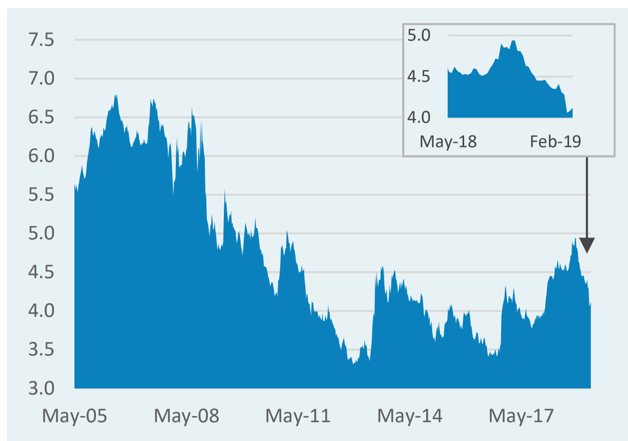
Home prices have faltered a bit, with the median U.S. home sales price falling -6.1% year-over-year in Q4. As is often the case, home price trends can vary significantly from city to city, which makes annual summary statistics difficult to interpret on a local level.

NAHB HOUSING MARKET INDEX



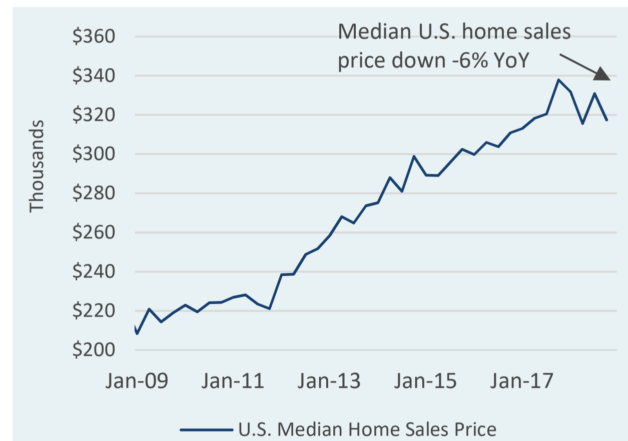
Source: Bloomberg, NAHB, as of 3/31/19 (see appendix)

30-YEAR FIXED MORTGAGE RATE



Source: FRED, as of 3/31/19

MEDIAN U.S. HOME SALES PRICE



Source: FRED, as of 12/31/18

International economics summary

— Global growth expectations for the next two years were revised materially lower in Q1. The OECD's global GDP growth forecast for 2019 and 2020 fell from 3.5% to 3.3%, and from 3.5% to 3.4%, respectively.

— In March, negotiations resumed between high-level U.S. and Chinese trade delegations. The dialogue was viewed as constructive, and optimism picked up for some sort of formal trade resolution being reached in the near-to-intermediate future, although the two sides have yet to agree on a formal timeline.

— The German Manufacturing PMI fell from 47.6 to 44.1 in March, falling further into the contractionary territory below 50. New orders and export sales data came in weaker than expected which contributed to a more pessimistic outlook for German manufacturing activity.

— The House of Commons in the British Parliament briefly took control of their government's legislative agenda, but failed to reach a majority vote on a path forward. On April 10th, British Prime Minister Theresa May and the European Council agreed to extend the Brexit deadline from April 12th to October 31st.

— The spread between the JP Morgan Global Services and Manufacturing PMIs rose to 3.1 in March. Last March, the spread was at 0.0, indicating that over the past year the outlook for global manufacturing activity has weakened relative to the outlook for global services activity. Typically, services activity is more resilient to a worsening economic backdrop.

Area	GDP (Real, YoY)	Inflation (CPI, YoY)	Unemployment
United States	3.0% *12/31/18*	1.5% *2/28/19*	3.8% *3/31/19*
Eurozone	1.1% *12/31/18*	1.4% *3/31/19*	7.8% *2/28/19*
Japan	0.3% *12/31/18*	0.2% *2/28/19*	2.3% *2/28/19*
BRICS Nations	5.8% *12/31/18*	2.4% *3/31/19*	5.3% *12/31/18*
Brazil	1.1% *12/31/18*	3.9% *2/28/19*	12.2% *3/31/19*
Russia	2.7% *12/31/18*	5.3% *3/31/19*	4.9% *2/28/19*
India	7.2% *12/31/18*	2.6% *2/28/19*	8.5% *12/31/17*
China	6.4% *12/31/18*	1.5% *2/28/19*	3.8% *12/31/18*

International economics

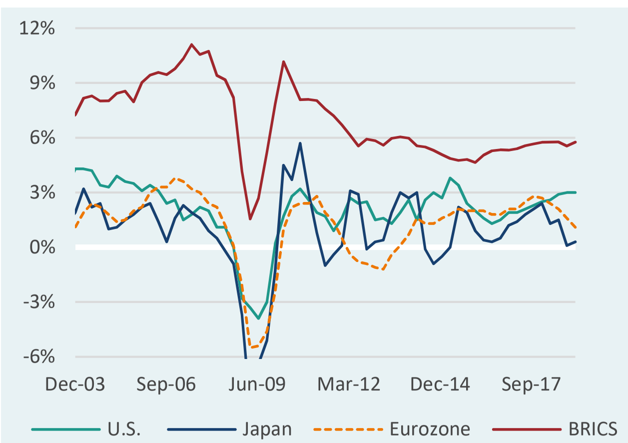
Global economic growth trended lower over the past quarter. Most of the world experienced a deceleration in inflation, while labor markets showed moderate improvement. Global central banks took a more dovish stance in response to these conditions, which contributed to a sharp decline in global sovereign yields in March.

Real GDP in the Eurozone decelerated in Q4 from 1.6% to 1.1% YoY as the region continued to show weakness. Uncertainty surrounding Brexit, and the dependence of European economies on China likely factored into the regional outlook. Additionally, Europe faces significant structural issues which are important to monitor, though perhaps not immediate in nature. As the ECB begins to discuss a tiered, sub-zero interest rate regime, the inability of EU members to pursue their own fiscal and monetary policies could prolong economic slowdowns and undermine subsequent recoveries.

Following the failure of the House of Commons in British Parliament to agree on a Brexit strategy through "indicative votes", Prime Minister Theresa May negotiated an extension of the Brexit deadline from April 12th to October 31st.

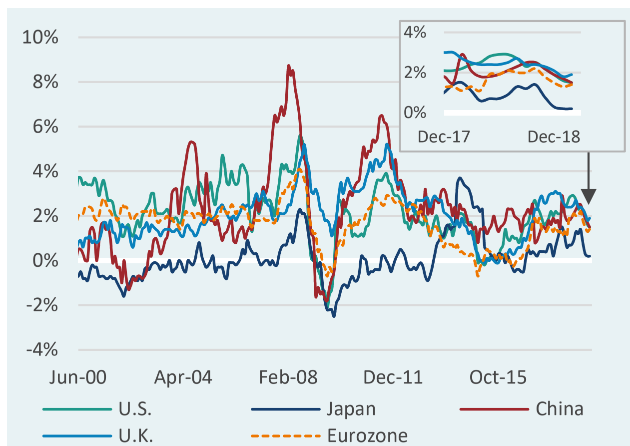
Global growth forecasts were revised lower

REAL GDP GROWTH (YOY)



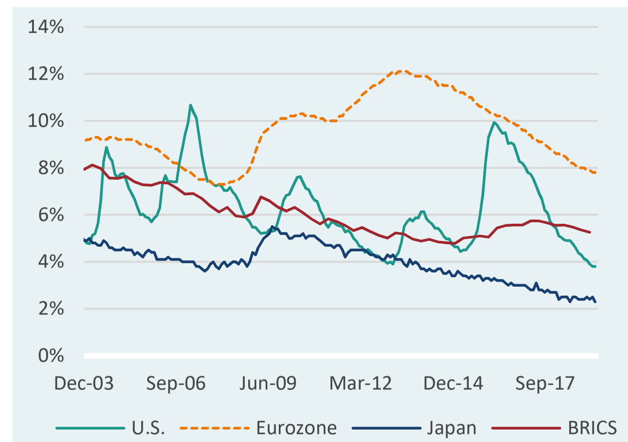
Source: Bloomberg, as of 12/31/18

INFLATION (CPI YOY)



Source: Bloomberg, as of 2/28/19

UNEMPLOYMENT RATE



Source: Bloomberg, as of 2/28/19 or most recent release

Fixed income rates & credit

Interest rate environment

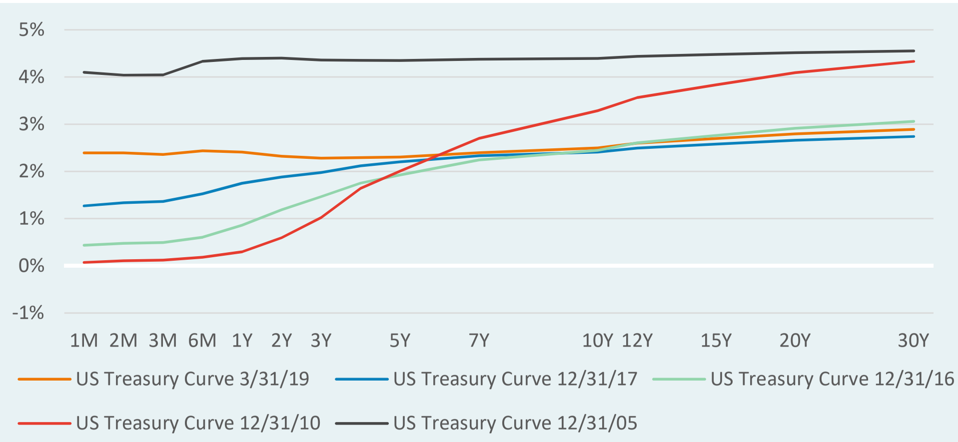
- The Federal Reserve held the fed funds rate unchanged over the quarter, and communicated a much more dovish stance on monetary policy amid slower growth expectations and stable inflation near 2%.
- Fed officials lowered their collective expectations for rate hikes in 2019 from two to zero, and announced that the balance sheet unwind would conclude in September, much earlier than previously anticipated.
- More dovish expectations for monetary policy and concerns over economic growth likely helped push long-term Treasury yields lower. The 10-year yield fell 28 bps to just above 2.4%.
- Falling long-term yields and stable short-term yields led to a brief inversion of the Treasury curve between the 10-year and 3-month yields.
- While widely considered a bearish signal for the economy and risk markets, the timing between curve inversion and bearish economic and market environments has varied widely. Additionally, Fed asset purchases of long-term Treasuries has artificially lowered yields and muddied the information conveyed by the yield curve.
- The ECB also pivoted to a more dovish stance as officials announced that deposit rates will be on hold through at least the end of the year.
- The 10-year German bund yield dipped back into negative territory for the first time since late 2016.
- Emerging market local bonds offer attractive yields relative to developed markets, even after adjusting for inflation. The JPM GBI-EM Index yielded 7% at the end of March.

Area	Short Term (3M)	10-Year
United States	2.39%	2.41%
Germany	(0.53%)	(0.07%)
France	(0.54%)	0.32%
Spain	(0.40%)	1.10%
Italy	(0.20%)	2.49%
Greece	0.87%	3.73%
U.K.	0.80%	1.00%
Japan	(0.17%)	0.08%
Australia	1.68%	1.77%
China	2.08%	3.07%
Brazil	6.31%	8.97%
Russia	7.35%	8.41%

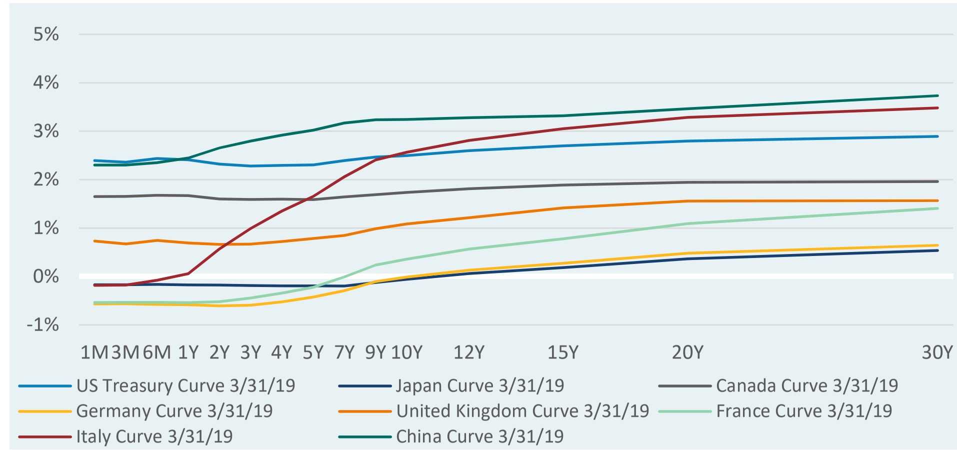
Source: Bloomberg, as of 3/31/19

Yield environment

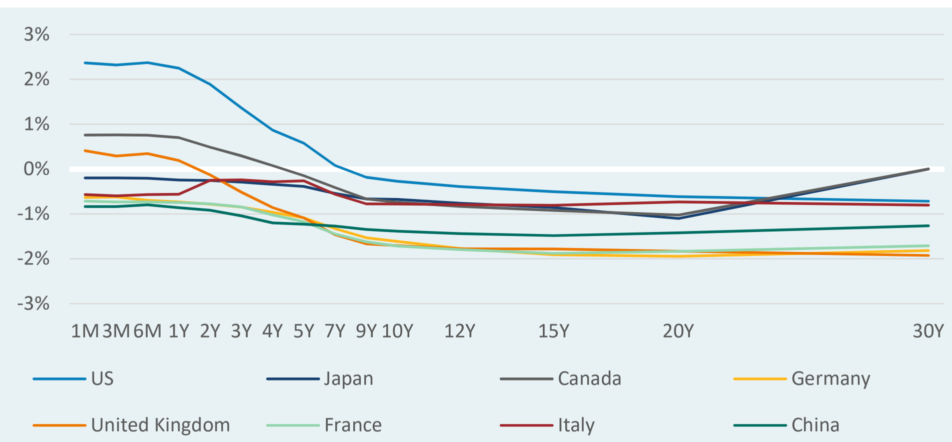
U.S. YIELD CURVE



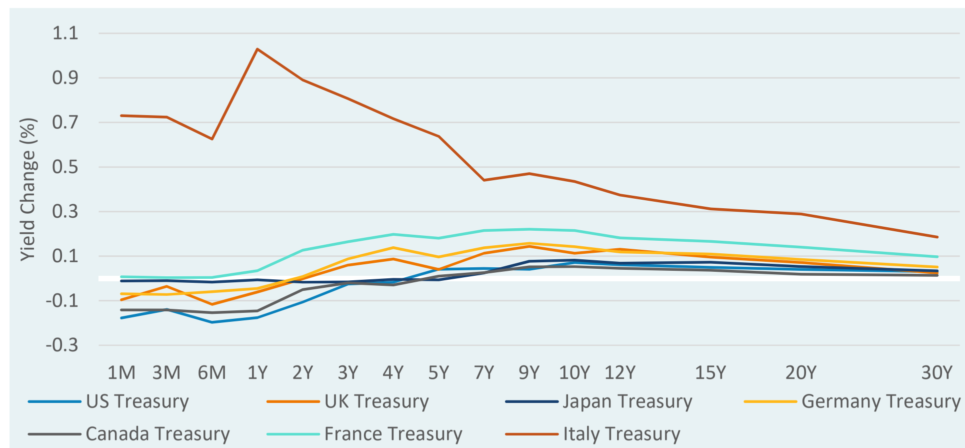
GLOBAL GOVERNMENT YIELD CURVES



YIELD CURVE CHANGES OVER LAST FIVE YEARS



IMPLIED CHANGES OVER NEXT YEAR



Source: Bloomberg, as of 3/31/19

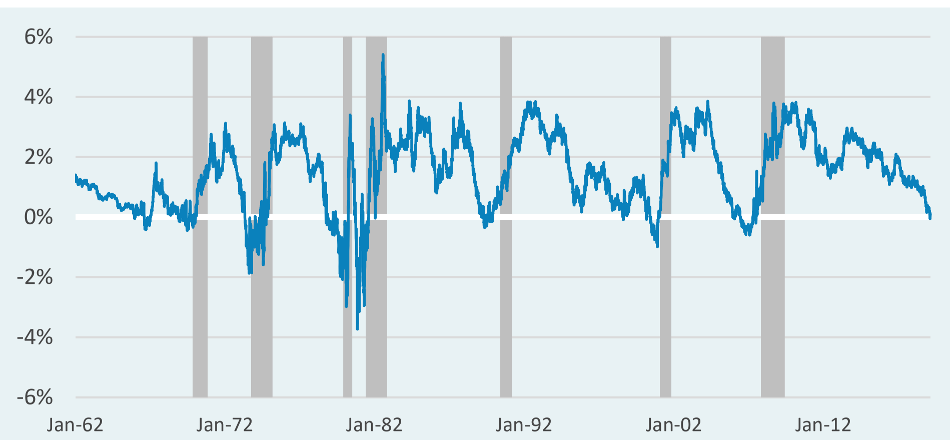
Yield curve inversion

The drop in long-term Treasury yields following the Fed meeting in March briefly caused the yield curve to invert, meaning that short-term yields (3-month) were higher than long-term yields (10-year). Investors have widely considered yield curve inversion as a sign that the economic cycle is coming to an end. At a high level, the shape of the yield curve tells investors something about what the market is expecting. All else equal, when the curve is steep, markets are expecting a positive growth environment and when the curve is flat or inverted, markets are expecting a negative growth environment.

While we have previously noted that the wide range of timing between curve inversion and recession has made the signal less useful, it is also important to note that the Fed's purchases of Treasuries has artificially lowered long-term yields. Therefore, Fed policy has obscured the market's expectation of future growth that is embedded in the shape of the yield curve. Although we are always wary of "this time is different" arguments, we believe that the recent yield curve inversion is not signaling an imminent recession.

The information conveyed by the shape of the yield curve has been obscured by Fed asset purchases

10-YEAR MINUS 3-MONTH TREASURY YIELD CURVE



Source: Bloomberg, as of 3/31/19, recessions are shaded with the dates defined by NBER

TIME FROM CURVE INVERSION TO THE NEXT RECESSION

Start of Curve Inversion	Beginning of Next Recession	Months From Inversion to Recession
Jan-66	Dec-69	23
Dec-68	Dec-69	12
Jun-73	Nov-73	5
Nov-78	Jan-80	14
Oct-80	Jul-81	9
Mar-89	Jul-90	15
Jul-00	Mar-01	8
Jan-06	Dec-07	23
Average		**13.6**

Source: Bloomberg, recession dates defined by NBER

Eurozone monetary policy

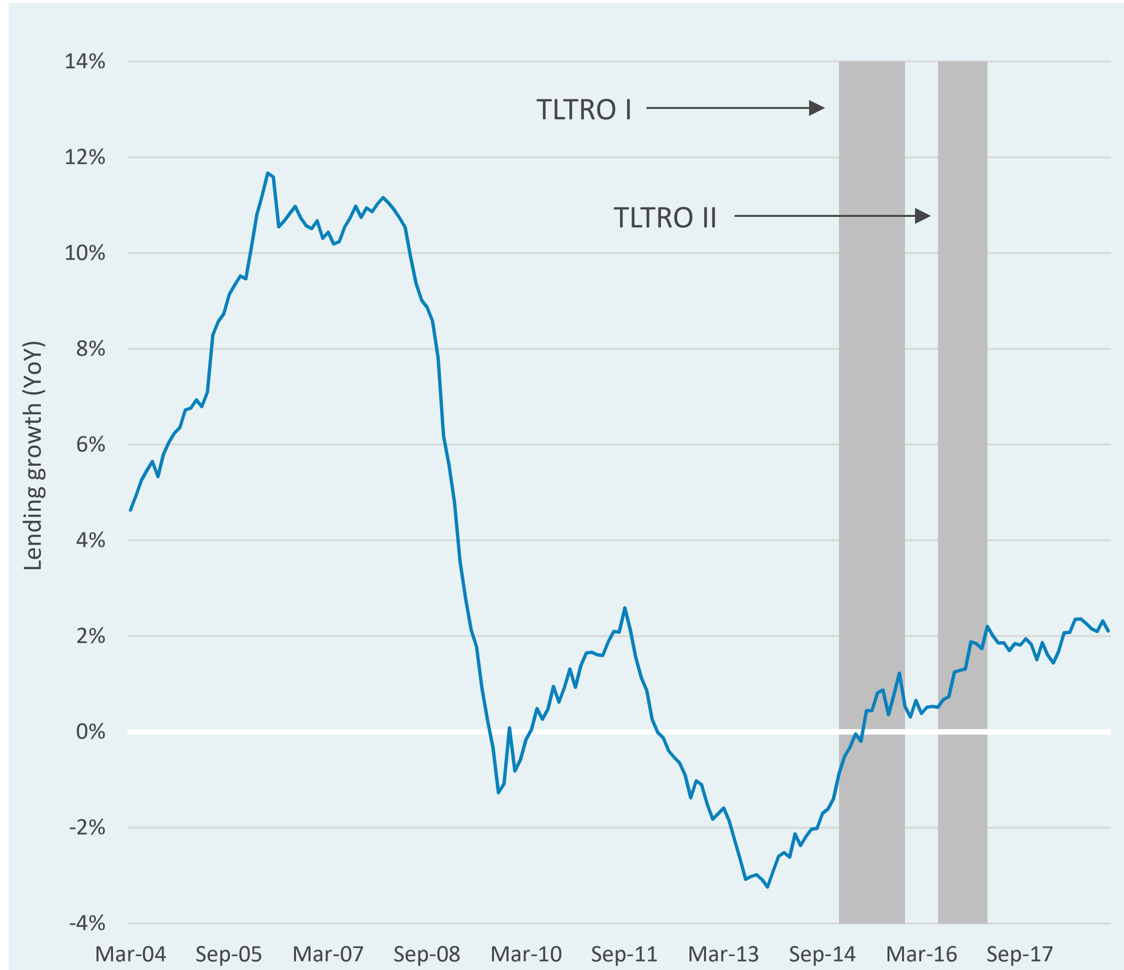
— The European Central Bank (ECB) followed the Fed by pivoting to a more dovish monetary policy stance amid expectations of slower economic growth and muted inflation. ECB officials' latest growth forecasts show they expect only 1.1% real GDP growth in 2019.

— To counteract a potential growth slowdown, the ECB announced a third round of targeted long-term refinancing operations (TLTRO) and that it will keep deposit rates on hold through at least the end of the year. In the TLTRO program, the ECB gives out cheap short-term financing to banks with incentives for them to lend this money out to corporations and households.

— A total of €739 billion were lent out in the first two rounds of TLTROs, which helped lead to a modest pick up in bank lending growth. While this round of TLTROs may lead to banks rolling over previous loans, it is not likely to result in a significant increase in lending as the Eurozone already has ample liquidity and credit demand remains weak.

— Despite these recent steps, the ECB has limited ability to effectively ease. This puts the region at risk of a self-reinforcing downturn if conditions were to worsen, particularly since countries also have little room to provide fiscal stimulus.

EUROZONE BANK LENDING TO HOUSEHOLDS & CORPORATES



Source: Bloomberg, as of 1/31/19

Credit environment

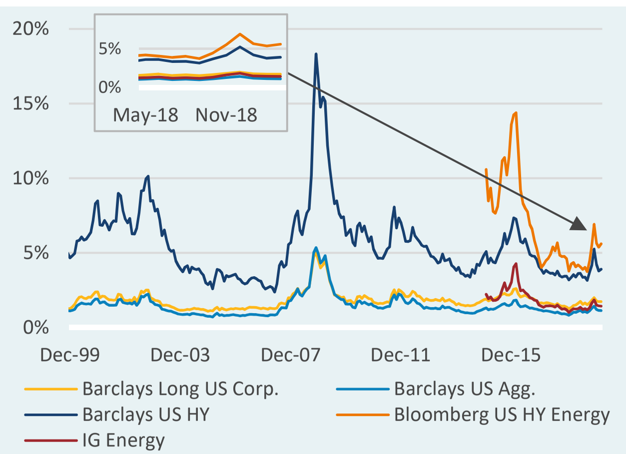
High yield bond yields fell in March, impacted by the Fed's pause in the hiking cycle. Anticipation of an easier policy, which could potentially lengthen the credit cycle, has strengthened sentiment for risk assets. BB-rated bonds outperformed both CCC- and B-rated bonds in March. High yield bonds returned 7.3% YTD which is the strongest start to a calendar year on record for the asset class since 2003.

Leveraged loan prices declined during March as the asset class deals with outflows and a pause in the Fed's hiking cycle. The outflows have exceeded $30 billion over the past two quarters which represents 20% of assets under management, according to J.P. Morgan. Leveraged loans have returned 3.8% YTD, underperforming both high yield and investment grade bonds.

Based on concerns over late-cycle behavior in credit markets, we do not believe investors are being adequately compensated for credit risk. Late-cycle volatility tends to coincide with a jump in credit spreads and steep credit losses. An underweight to U.S. investment grade, high yield credit, and bank loans may be warranted. Within credit, higher quality and more liquid assets appear most attractive.

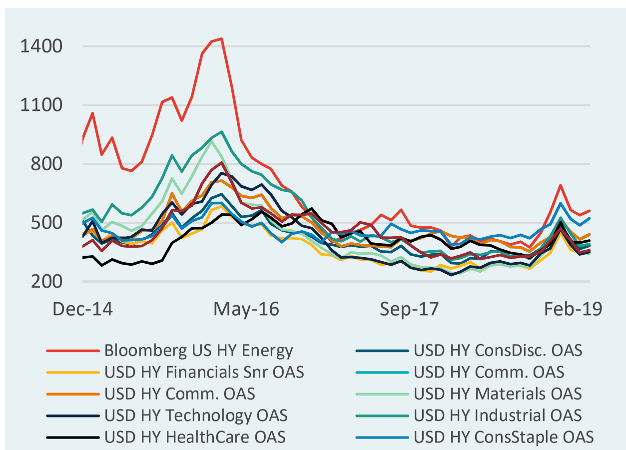
Credit spreads widened due to concerns over slowing global growth and broader risk-off behavior

SPREADS



Source: Barclays, Bloomberg, as of 3/31/19

HIGH YIELD SECTOR SPREADS (BPS)



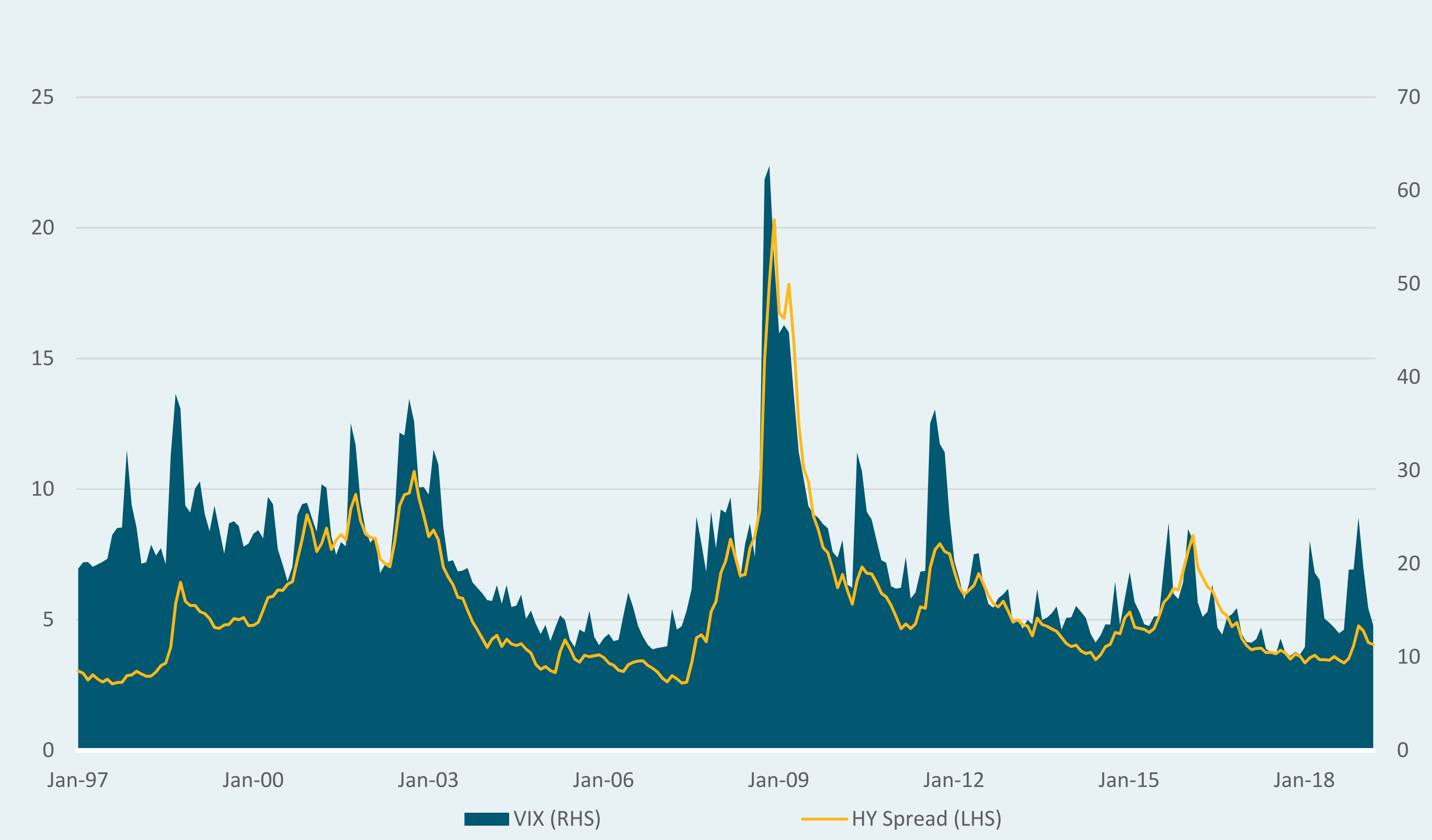
Source: Bloomberg, as of 3/31/19

	Credit Spread (OAS)	
Market	**3/31/19**	**3/31/18**
Long U.S. Corp	1.7%	1.5%
U.S. Agg Corp	1.2%	1.1%
U.S. High Yield	3.9%	3.5%
U.S. Bank Loans*	4.4%	3.9%

Source: Barclays, Credit Suisse, Bloomberg, as of 3/31/19
**Discount margin (4-year life)*

Credit is sensitive to equity volatility

HIGH YIELD BOND SPREADS & VOLATILITY



When volatility rises, higher risk credit typically experiences losses

Source: Cboe, FRED, as of 3/31/19

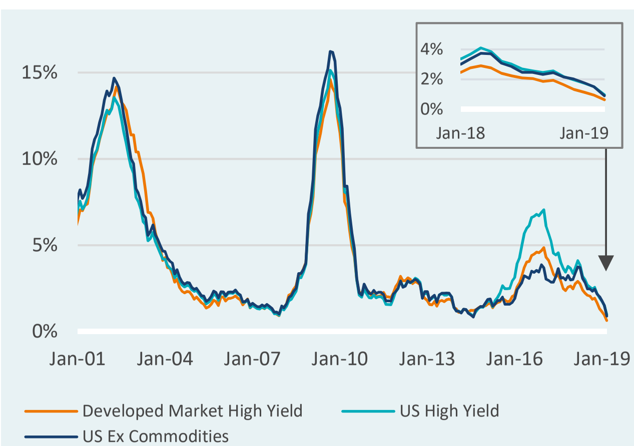
Default & issuance

Default activity has been low and stable in the U.S. credit market, despite volatility in spreads. The par-weighted default rate declined to 0.9% and remains below its long-term average range of 3.0-3.5%. For loans, the par-weighted default rate at the end of March was 1.0%, its lowest level since April 2012 (0.8%), according to data from JPMorgan. Sectors that have been more prone to defaults include: consumer, retail, telecom, and automotive. The 2018 loan par-weighted default rate was 1.6%.

Senior loan and high yield markets have essentially recovered from a wave of defaults seen in 2015-2016 that were generated from the energy and metals/mining sectors. High yield bond recovery rates have improved significantly since that time.

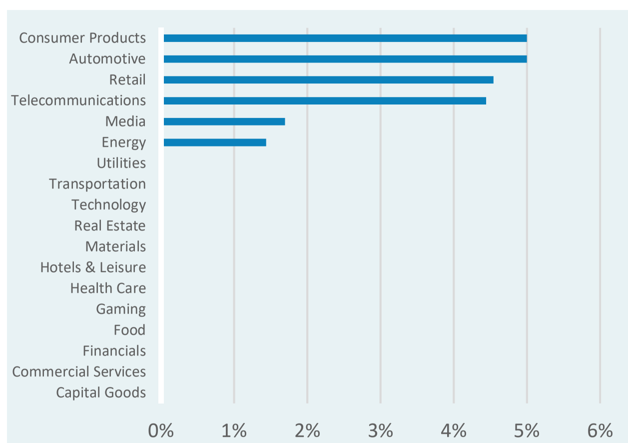
Gross high yield issue activity increased in March to the highest level seen since March of 2018. Loan market issuance is significantly behind last year's pace, likely influenced by a lower demand for floating rate securities now that the Fed has paused monetary tightening.

HY DEFAULT RATE (ROLLING 1-YEAR)



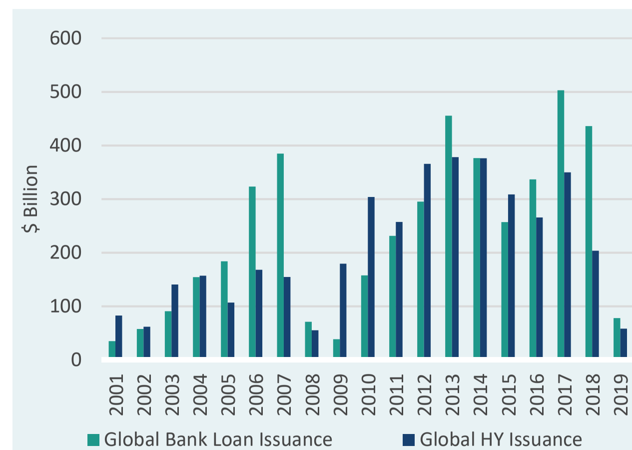
Source: BofA Merrill Lynch, as of 3/31/19

U.S. HY SECTOR DEFAULTS (LAST 12 MONTHS)



Source: BofA Merrill Lynch, as of 3/31/19 – par weighted

GLOBAL ISSUANCE ($ BILLIONS)



Source: Bloomberg, BofA Merrill Lynch, as of 3/31/19

Private credit

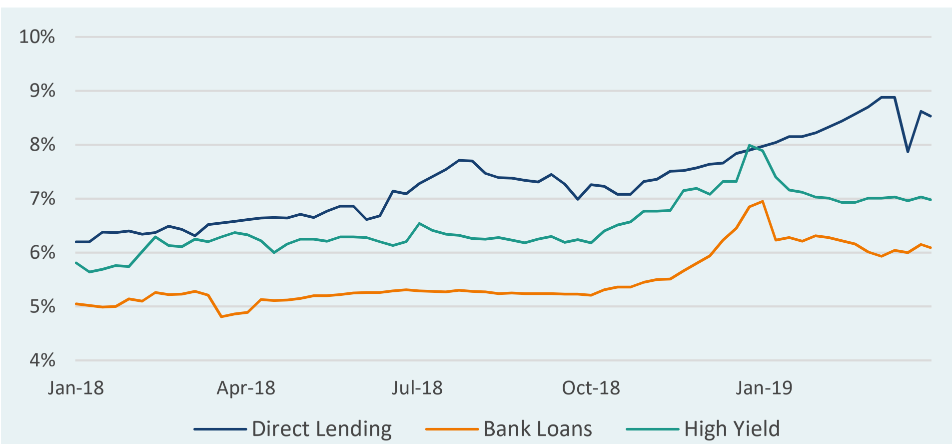
Fundraising in the private credit market slowed through year-end 2018. A total of 163 funds closed on $110 billion during the year, which was down from 189 funds and $129 billion in 2017. Direct lending, mezzanine, and distressed debt were the most active strategies, raising $45 billion, $31 billion, and $21 billion, respectively. Even with slower fundraising, dry powder in private credit is at record levels. Private debt dry powder at the end of 2018 was $280 billion, which beat the 2017 record of $246 billion.

Yields for loans made by direct lending funds finished March at 8.5%. While yields have been aided by slightly higher LIBOR rates, which grew from 2.3% to 2.6% year-to-date, spreads increased from 4.3% to 5.9% year-to-date.

Credit spreads expanded in the first quarter, along with the debt multiples for borrowers. Borrowers now average debt totaling 5.9x EBITDA at the end of March, a 0.4x increase from one year prior.

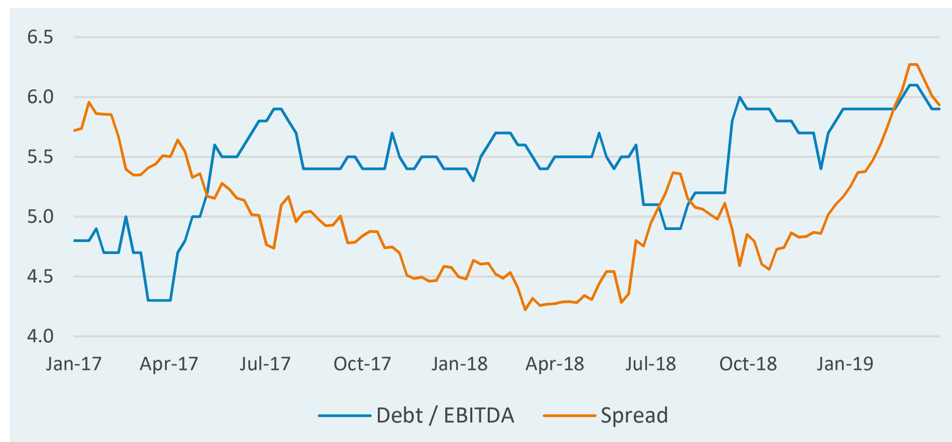
Fundraising slowed in private credit last year

YIELDS FOR DIRECT LENDING, BANK LOANS & HIGH YIELD



Source: The Lead Left, Middle Market, EBITDA < $50MM; S&P LSTA US Leveraged Loan Index; ICE BofAML US High Yield Master II, as of 3/31/19

DIRECT LENDING LEVERAGE MULTIPLES (DEBT / EBITDA) & SPREAD



Source: The Lead Left, Middle Market Credit Stats, as of 3/31/19

Equity

Equity environment

- U.S. equities experienced a 13.6% total return (S&P 500 Index) in Q1, nearly a mirror image of Q4 2018. The first quarter has indeed been one of the strongest quarters recently, but was simply a bounce back in lost performance from the prior quarter. At the end of March, the S&P 500 price index was just 3.2% below its high watermark that was reached in September.
- Currency movement had little impact on unhedged international equity over the quarter, though currencies on a 1-year basis have had a substantially negative effect. An unhedged investment in international developed equities (MSCI EAFE) lost 8.9% of portfolio value due to currency movement.
- First quarter earnings growth for S&P 500 companies is expected to be negative for the first time since Q2 2016. If corporate earnings expectations continue to be downgraded, this will likely hold back markets around the world. The greatest determinant of medium and long-term equity performance is typically the underlying trend of corporate earnings.
- The risk-on quarter drove small cap equities forward. The Russell 2000 Index posted a 14.6% return, compared to the 13.8% return of the Russell 1000 Index.
- Value equities underperformed growth equities over the quarter (Russell 1000 Value +11.7%, Russell 1000 Growth +16.0%). Performance over the quarter reversed value's gains from Q4 2018.
- After spiking in the fourth quarter, U.S. equity volatility returned to muted levels.

	QTD TOTAL RETURN		1 YEAR TOTAL RETURN	
	(unhedged)	(hedged)	(unhedged)	(hedged)
US Large Cap (Russell 1000)	13.8%		8.7%	
US Small Cap (Russell 2000)	14.6%		2.1%	
US Large Value (Russell 1000 Value)	11.7%		4.9%	
US Large Growth (Russell 1000 Growth)	16.0%		12.3%	
International Large (MSCI EAFE)	10.0%	11.3%	(3.7%)	5.2%
Eurozone (Euro Stoxx 50)	10.6%	12.9%	(6.3%)	5.8%
U.K. (FTSE 100)	9.5%	10.1%	(0.2%)	9.6%
Japan (NIKKEI 225)	6.8%	7.6%	(3.4%)	2.9%
Emerging Markets (MSCI Emerging Markets)	9.9%	9.8%	(7.4%)	(2.1%)

Source: Russell Investments, MSCI, STOXX, FTSE, Nikkei, as of 3/31/19

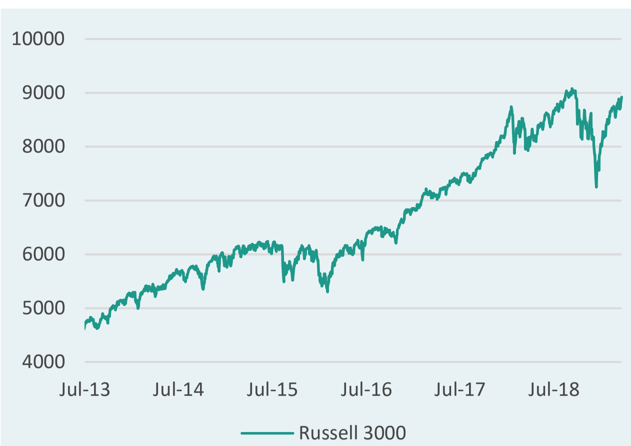
Domestic equity

U.S. equities experienced a 13.6% total return (S&P 500 Index) in the first quarter, rebounding from the sharp sell-off in the prior quarter. At the end of March, the S&P 500 price index was just 3.2% below its high watermark that was reached in September. The bounce back in equity prices was driven by better than expected/feared Q1 corporate earnings, improving sentiment toward a U.S.-China trade deal, and the Fed's pivot to a more patient approach to monetary policy. The fall and subsequent rise in equities was primarily reflected in valuation changes. After dropping to a low of 13.6 in December, the forward 12-month P/E ratio on the S&P 500 finished the quarter at 16.7, essentially unchanged over the past six months.

Now 10 years removed from the bottom of the financial crisis, it is worth noting that U.S. equities have experienced one of their best decades of performance ever. The S&P 500 had a compound price return of 14.2% per year, and over 75% of this was due to profit margin and valuation expansion. With both of these measures at above average levels, we do not think that it is reasonable to expect this level of performance to continue moving forward.

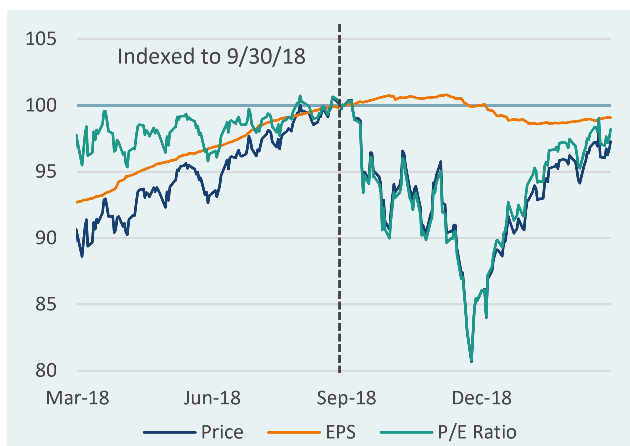
We maintain a neutral view on U.S. equities

U.S. EQUITIES



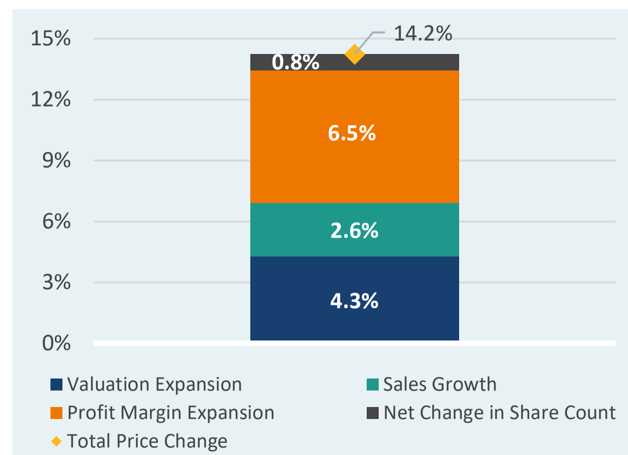
Source: Russell Investments, as of 3/31/19

S&P 500 PRICE MOVEMENT ATTRIBUTION



Source: Bloomberg, as of 3/31/19

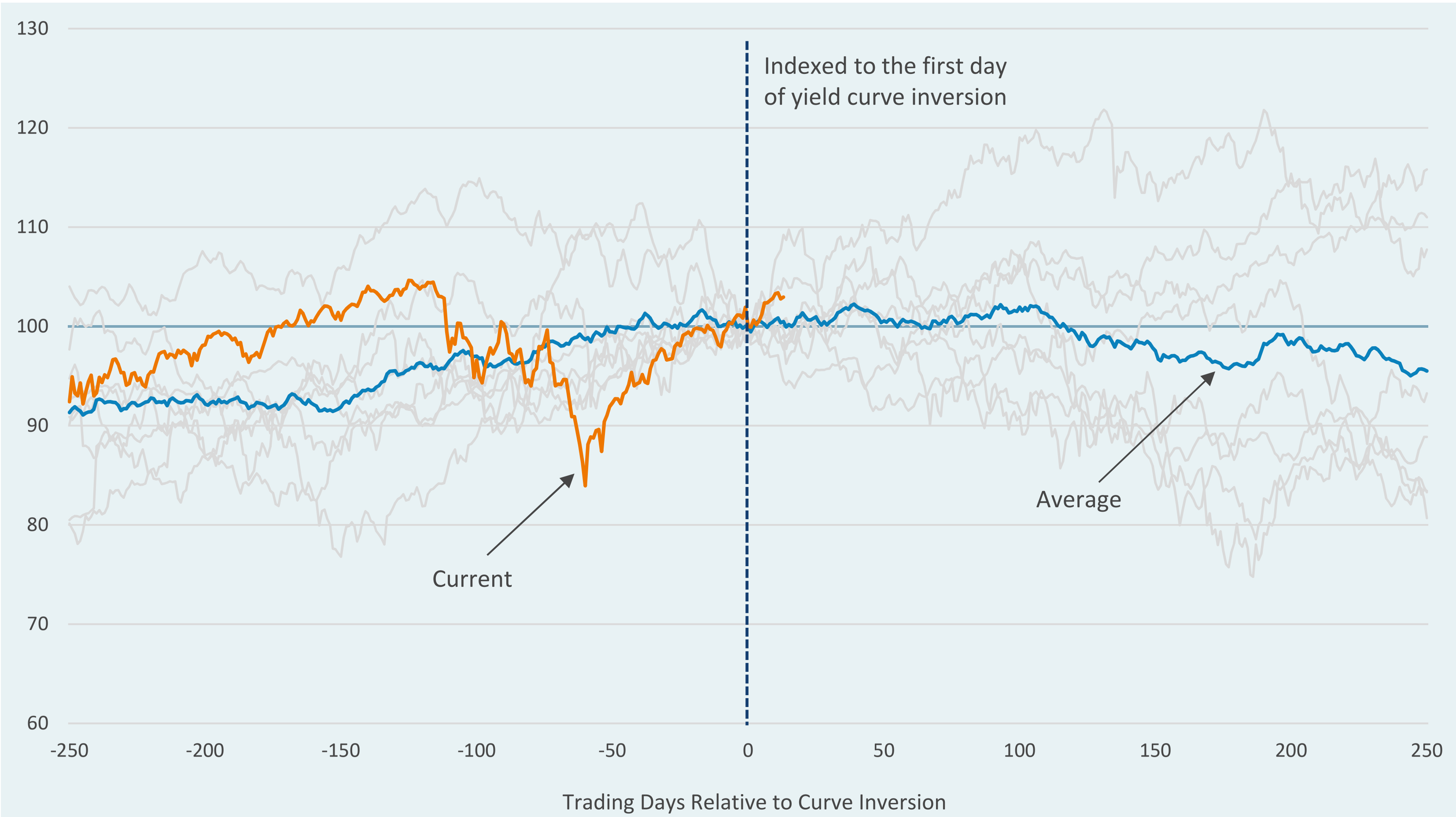
S&P 500 10-YR PRICE RETURN ATTRIBUTION



Source: Verus, Bloomberg, as of 3/31/19

Equity markets and yield curve inversions

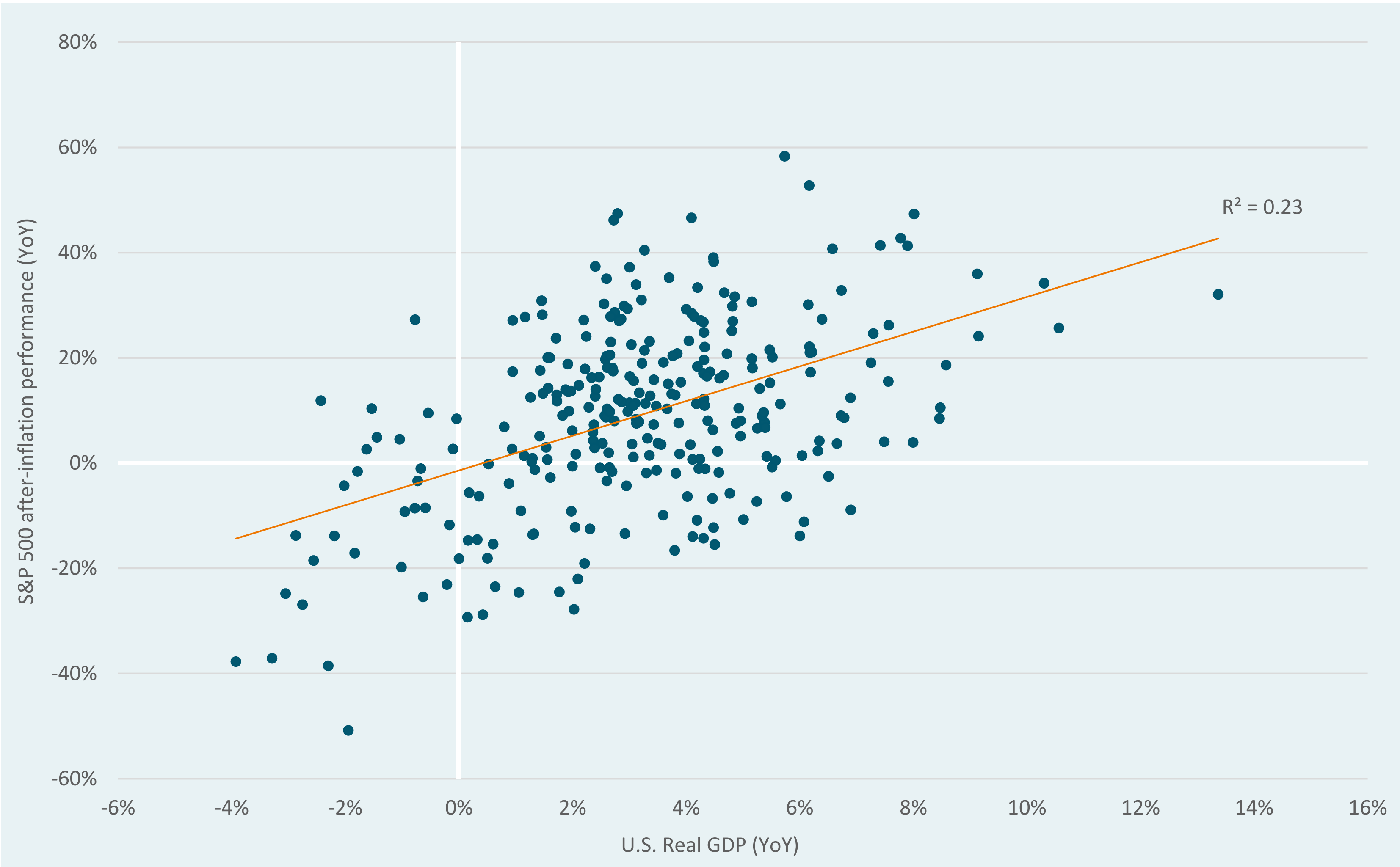
EQUITY PERFORMANCE AROUND CURVE INVERSIONS



Equity performance has varied widely following yield curve inversion

Source: Bloomberg, Verus, as of 3/31/19 – equities are represented by the S&P 500 Index and the yield curve is defined as the difference between the 10-year and 3-month Treasury yield; see page 23 for the dates of yield curve inversion

U.S. equity & the economic cycle



A material short-term relationship exists between equity performance and economic growth

An investor's views on the economy cycle should therefore impact equity positioning

Source: Standard & Poor's, data since 1948

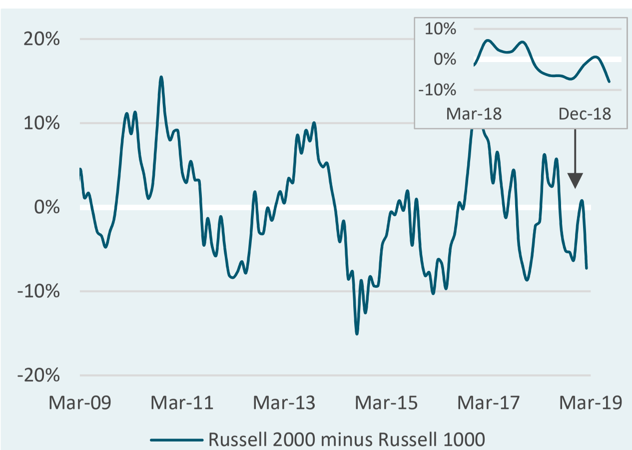
Domestic equity size & style

Small cap equities (Russell 2000 +14.6%) slightly outperformed large cap equities (Russell 1000 +14.0%) during the quarter. Meanwhile, growth stocks outperformed value stocks by a wide margin (Russell 1000 Growth +16.1% vs. Russell 1000 Value +11.9%).

The impact of sector performance on the value premium was more nuanced in Q1, as Materials (+10.3%) and Financials (+8.6%) underperformed the overall index (S&P 500 +13.6%), but Energy (+16.4%) outperformed. Information Technology, the top performing sector, continued to deliver outsized returns (+19.9%).

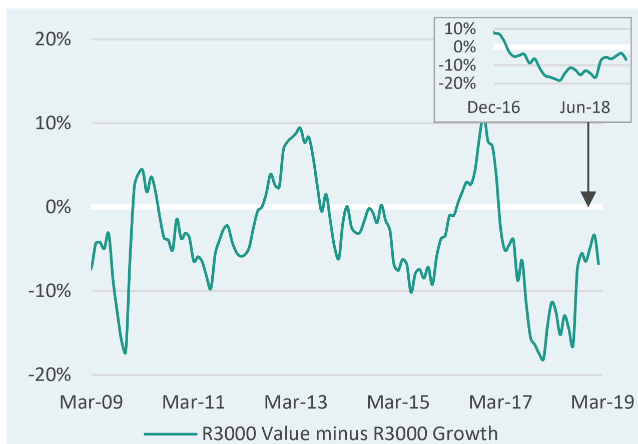
Both the small cap premium and value premium have struggled to deliver positive risk premiums over the past 10 years. It can be difficult to endure longer periods of factor underperformance, but similar to the equity premium in general, these periods do exist and investors should expect this on occasion.

SMALL CAP VS LARGE CAP (YOY)



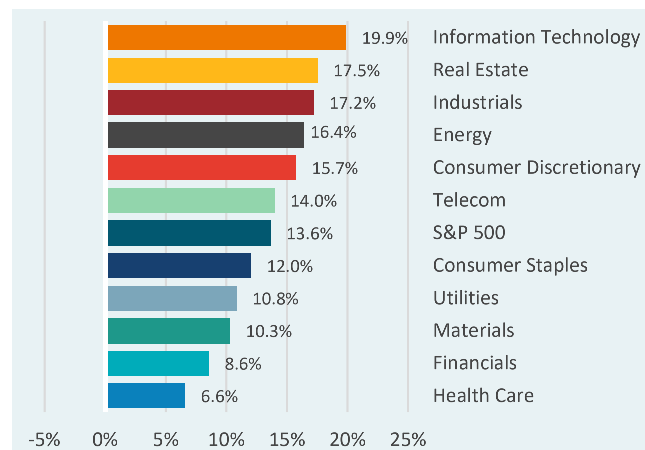
Source: FTSE, as of 3/31/19

VALUE VS GROWTH (YOY)



Source: FTSE, as of 3/31/19

Q1 S&P 500 SECTOR RETURNS



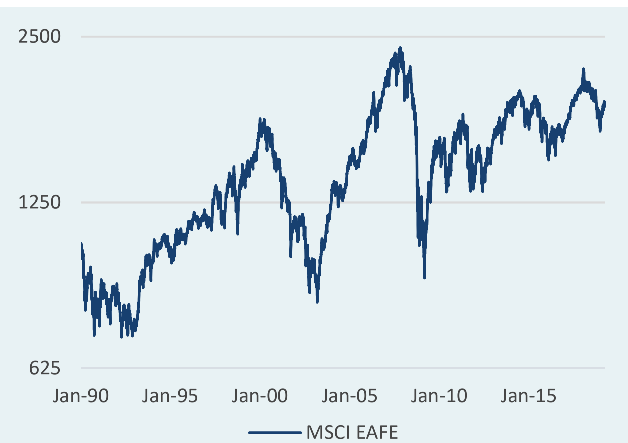
Source: Morningstar, as of 3/31/19

International developed equity

Like U.S. equities, international developed equities erased most of the losses they suffered in the prior quarter. After posting a return of -12.5% in Q4, the MSCI EAFE Index returned +10.2% in Q1. Currency losses were a mild detractor from unhedged U.S. dollar performance. On a currency hedged basis, EAFE equities returned 11.3%. From a country perspective, Swiss, French and UK equities outperformed, while Japanese and German equities lagged the overall index. While most markets are back near record highs, German equities (MSCI Germany) finished the quarter 17% below the previous high watermark. Underperformance in German equities has likely been influenced by a greater sensitivity to global growth and trade as well as concerns over a slowing domestic economy.

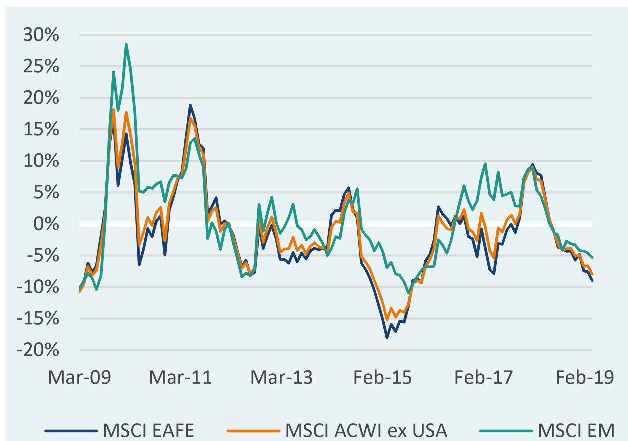
International developed equity markets are still cheap on both an absolute and relative basis at 13.3x forward earnings, but we believe there are good reasons for this pricing in certain markets. Within equity allocations, we are pessimistic on EAFE equities primarily due to a negative view on the Eurozone. We believe slowing economic growth, rising political risks, and the lacking ability of the ECB to meaningfully ease policy presents material headwinds to equity performance.

INTERNATIONAL DEVELOPED EQUITIES



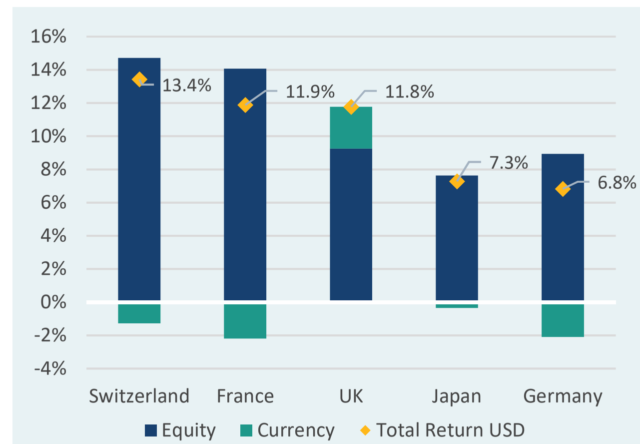
Source: MSCI, as of 3/31/19

EFFECT OF CURRENCY (1-YEAR ROLLING)



Source: MSCI, as of 3/31/19

Q1 COUNTRY PERFORMANCE



Source: MSCI, largest five country exposures shown above

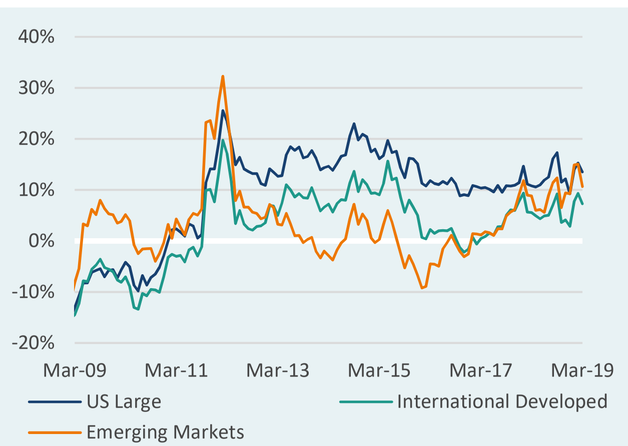
Emerging market equity

Emerging market equity performance was in-line with international developed markets in the first quarter, while U.S. equities outperformed. Currencies in these markets continued to show stability (MSCI EM +9.9%, MSCI EM Hedged +9.8%). Business sentiment across emerging market economies indicates expanding conditions, and fears of a sharp China slowdown have subsided. Moderating conditions may bolster emerging market returns throughout the year.

Equity multiples rebounded in the first quarter and are near the long-term average. The divide between domestic and emerging equities remains wide.

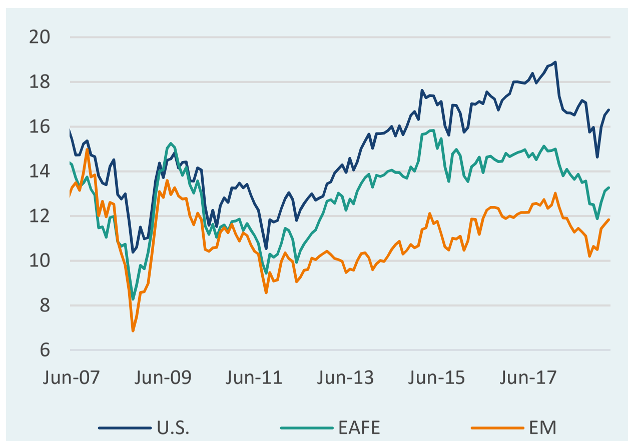
Decelerating global growth and rising probability of recession do present unique risks to emerging markets, as these markets typically exhibit a higher beta during market downside and upside moves. However, emerging markets can also deliver robust performance in times of moderate growth and easy monetary policy when investors seek growth and higher yields.

EQUITY PERFORMANCE (3-YR ROLLING)



Source: Standard & Poor's, MSCI, as of 3/31/19

FORWARD P/E



Source: MSCI, as of 3/31/19

PURCHASING MANGERS' INDEX (PMI)

	18-Dec	19-Jan	19-Feb	19-Mar
Manufacturing				
Global	51.4	50.8	50.6	50.6
Developed	52.3	51.8	50.4	50.0
US	54.3	56.6	54.2	55.3
EM	50.3	49.5	50.6	51.0
Services				
Global	53.0	52.6	53.3	53.7
Developed	52.8	52.5	53.7	53.7
US	58.0	56.7	59.7	56.1
EM	53.6	52.9	52.1	53.6

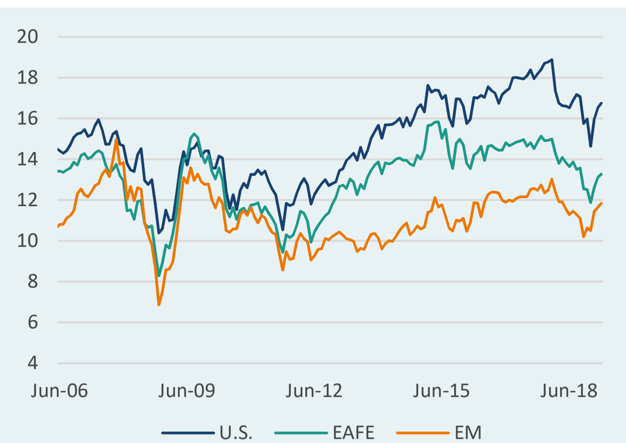
Source: Markit, Institute for Supply Management (ISM)

Equity valuations

The fall and subsequent rise in global equity prices was primarily driven by changes in valuations. The recovery in Q1 brought most broad equity market valuations back to September 2018 levels, but below recent cycle highs. In the U.S., equities commanded a forward P/E multiple of 16.7x after hitting a multi-year low in December at 14.6x. International equity valuations also recovered, but are still cheap on a relative basis, particularly when compared to the U.S. At the end of March, the MSCI EAFE and EM Indexes had forward P/E multiples of 13.3x and 11.8x, respectively. U.S. equities currently trade at a 25% forward premium to EAFE equities, which is the largest gap over the past 15 years. While we believe there are reasons that EAFE equity markets command cheap valuations, particularly in Europe, it is worth noting that barring a significant change in the earnings environment, these markets should have a strong valuation support.

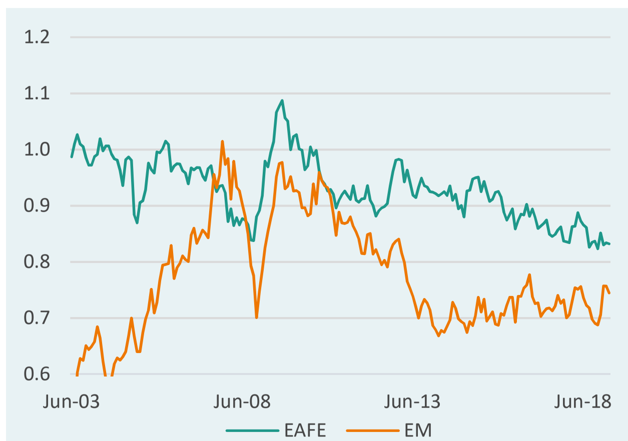
Over the long-term, valuations have had a material relationship with forward equity returns. Given this relationship, we are wary of extrapolating out the recent strong outperformance in U.S. equities.

FORWARD P/E RATIOS



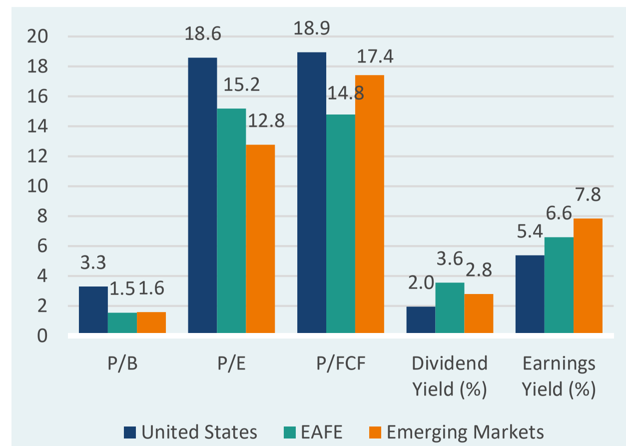
Source: MSCI, as of 3/31/19

P/E MULTIPLES RELATIVE TO U.S. EQUITIES



Source: Verus, MSCI, as of 3/31/19

VALUATION METRICS (3-MONTH AVERAGE)



Source: Bloomberg, MSCI as of 3/31/19 - trailing P/E

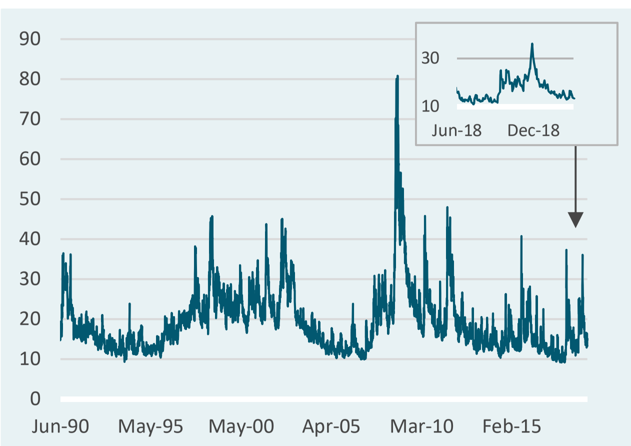
Equity volatility

Equity volatility spiked in the fourth quarter of 2018 but returned to low levels in Q1. The VIX Index ended March at 13.7, which ranked in the 26th percentile dating back to 1990 (volatility was this low 26% of the time). Low volatility is somewhat normal during later stages of the market cycle as the economy expands and business conditions hold steady. However, some investors have questioned the lack of price movement, given seemingly heightened geopolitical and economic risks present around the world today.

One-year volatility picked up after a tumultuous fourth quarter. U.S. markets have shown higher volatility than international markets for the first time since 2008, with a trailing 1 year volatility of 16%.

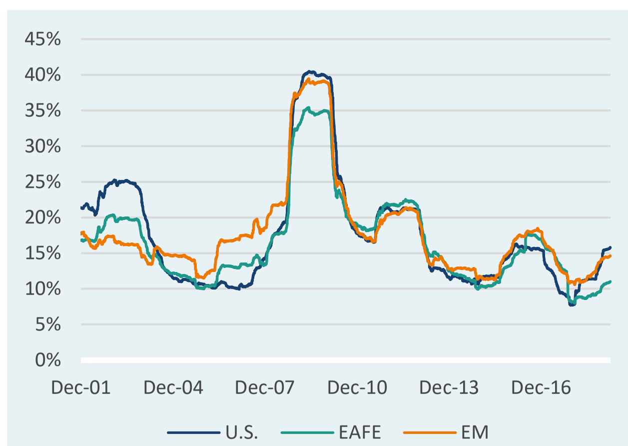
Equity performance around the world in Q1 was nearly a mirror image of 2018 Q4. The first quarter has indeed been one of the strongest quarters of recent decades, but this was mostly a bounceback in lost performance from the prior quarter.

U.S. IMPLIED VOLATILITY (VIX)



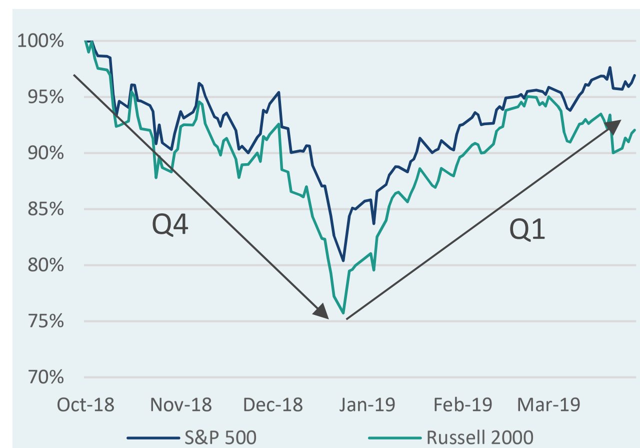
Source: CBOE, as of 3/31/19

REALIZED 1-YEAR ROLLING VOLATILITY



Source: Bloomberg, as of 3/31/19

2019 Q1 PERFORMANCE BOUNCE BACK



Source: Bloomberg, as of 3/31/19

Private equity

Venture capital fundraising and deal volumes continued to set records. $55 billion of venture capital was raised in the U.S. in 2018, an increase of 63% over the previous year. Similarly, the amount of venture deals were up 58%. Venture deal volume in 2018 of $131 billion exceeded the record of $82 billion that was set in 2017.

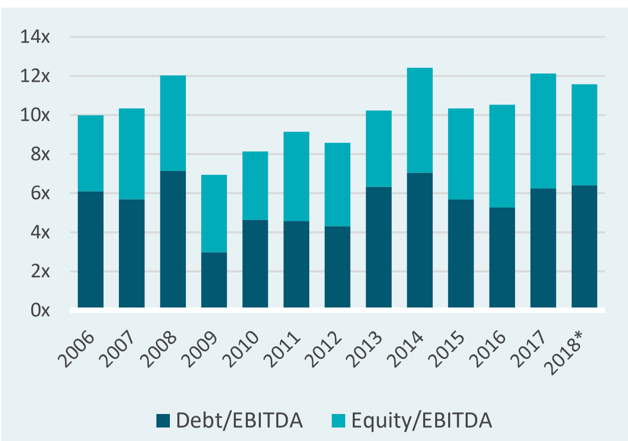
Buyout activity continued to increase in 2018. Through the fourth quarter, buyouts were up 29% and 5% when measured by dollar value and number of transactions, respectively. The size of the average buyout, $155 million, increased from $133 million in 2017. Unlike deal flow, fund capital raising has slowed from the peaks of 2017. Only 186 buyout funds representing $166 billion closed in 2018, down from 235 funds representing a record $225 billion in 2017.

Buyout multiples decreased slightly from 2017. Average EV/EBITDA was 11.6x through December 31, 2018 (down from 11.9x in 2017) with debt multiples averaging 6.2x through the fourth quarter. Debt as a percentage of transaction value hovered around 54%.

Balancing high deal multiples and a growing number of deals against a slowdown in fundraising, we advocate selectivity in fund investments.

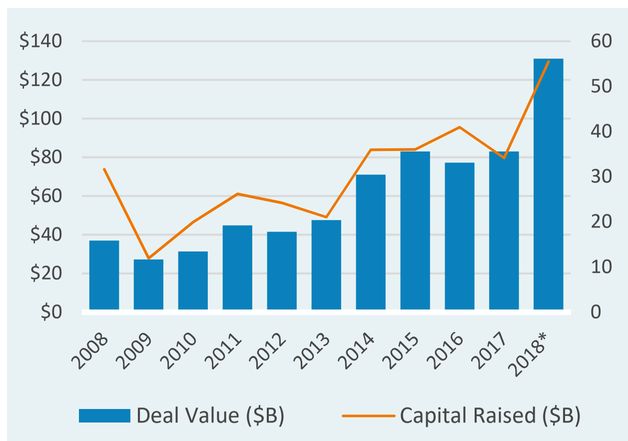
Deals increased in buyouts and venture; multiples are steady; buyout fundraising has slowed

TRANSACTION MULTIPLES



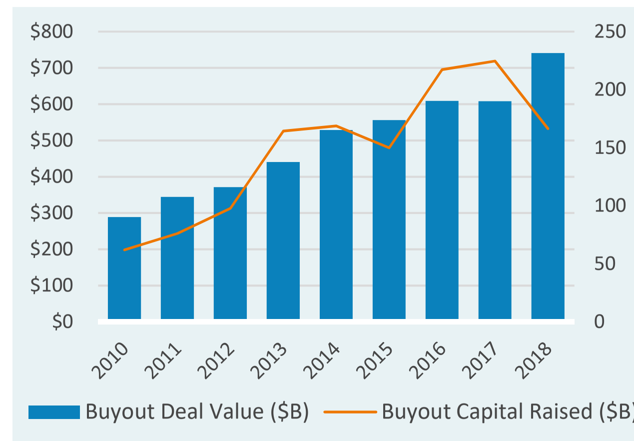
Source: PitchBook, as of 12/31/18
**2018 figures are estimates and are subject to change*

VENTURE DEAL VOLUME & FUNDRAISING



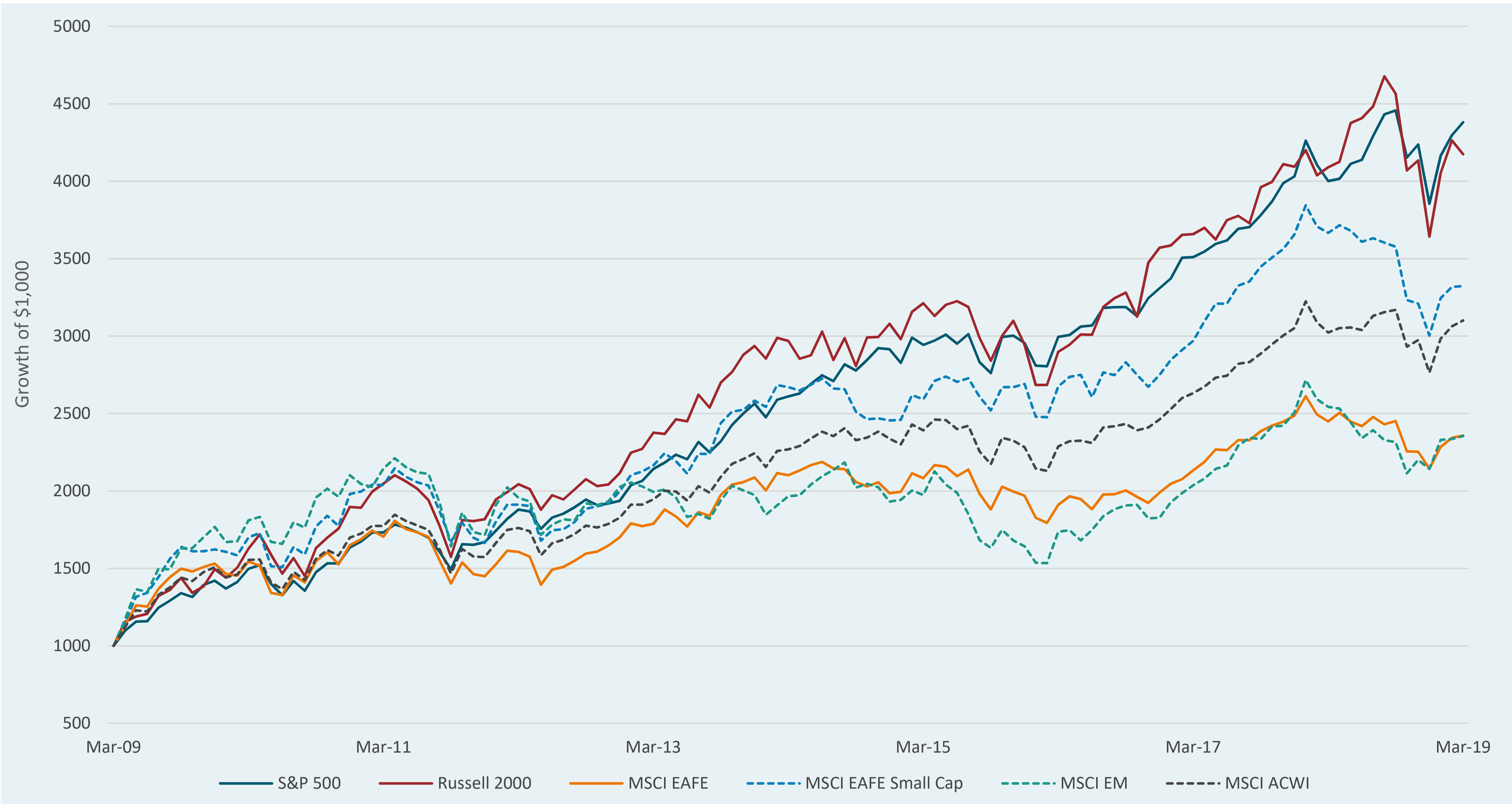
Source: PitchBook , as of 12/31/18

BUYOUTS DEAL VOLUME & CAPITAL RAISED



Source: PitchBook , as of 12/31/18

Long-term equity performance



Source: Morningstar, as of 3/31/19

Other assets

Currency

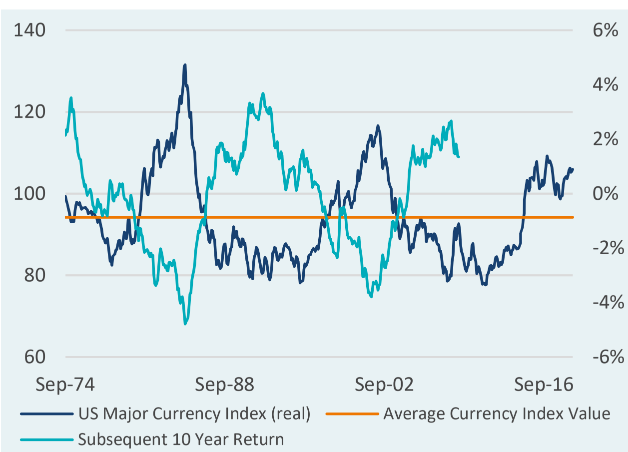
The U.S. dollar failed to gain traction in either direction during the first quarter, and remained near cycle highs. The Major Trade Weighted U.S. Dollar Index fell 0.3% over the period, but was 12.5% above its long-term average dating back to 1974 at the end of March. Expectations for a more accommodative Fed and weaker relative U.S. economic growth (from strong levels in 2018) has led many investors to call for U.S. dollar depreciation, but this has not occurred thus far. This may in part be because other developed central banks have followed the Fed's lead in moving away from monetary tightening.

Emerging market currencies were relatively stable versus the dollar for a second consecutive quarter. The JPMorgan Emerging Market Currency Index gained 0.4%. EM currencies have yet to stage a major comeback after falling more than 15% in the middle of last year.

Despite some high-profile Brexit related volatility in the British pound, the global FX market has been relatively quiet. The trailing 1-year volatility of the Bloomberg Dollar Spot Index was 5.2% at the end of the quarter, the lowest level since 2014.

The U.S. dollar remained near a cycle high

U.S. DOLLAR TRADE WEIGHTED INDEX



Source: Federal Reserve, Verus, as of 3/31/19

JPM EMERGING MARKET CURRENCY INDEX

Source: Bloomberg, JPMorgan, as of 3/31/19

BLOOMBERG DOLLAR SPOT INDEX VOLATILITY

Source: Bloomberg, as of 3/31/19, trailing 12-month vol shown

Hedge funds

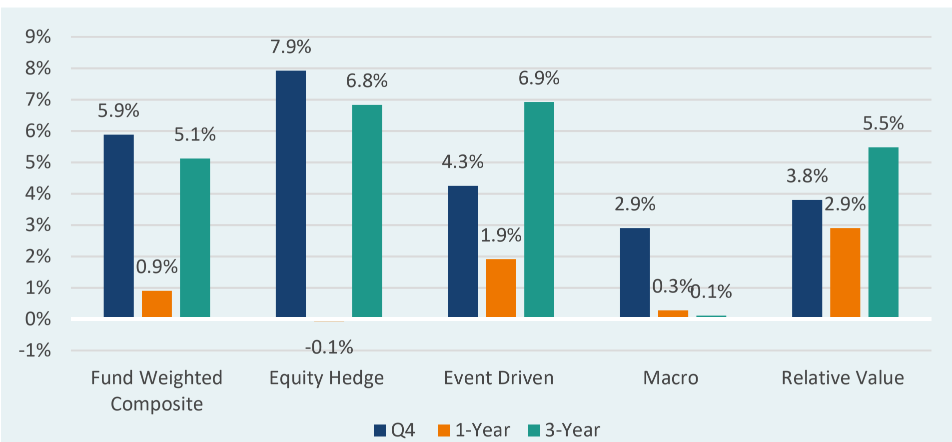
Hedge funds consistently advanced alongside the broad markets and enjoyed the best first calendar quarter result since 2006 (Hedge Fund Weighted Composite (FWC) +5.9% in 2019Q1; +0.9% trailing 12-months). While gains were broad based across strategy types, funds with greater equity market sensitivity earned the highest results. Within the equity hedge strategy set, funds with higher beta exposure rallied strongly.

According to Hedge Fund Research, growth-oriented managers (+9.3%) narrowly outperformed value-oriented (9%) peers. Healthcare focused funds (+13.2%) also stood out as winners. Activists (+8.3%) largely rebounded from a dismal Q4 last year.

For managers trading fixed income securities, funds focused on convertible arbitrage (+5.5%) and credit arbitrage (+5.1%) fared well as those markets bounced back this quarter. Asset backed (+1.7%) and fixed income multi-strategy managers (+2%) posted more muted gains.

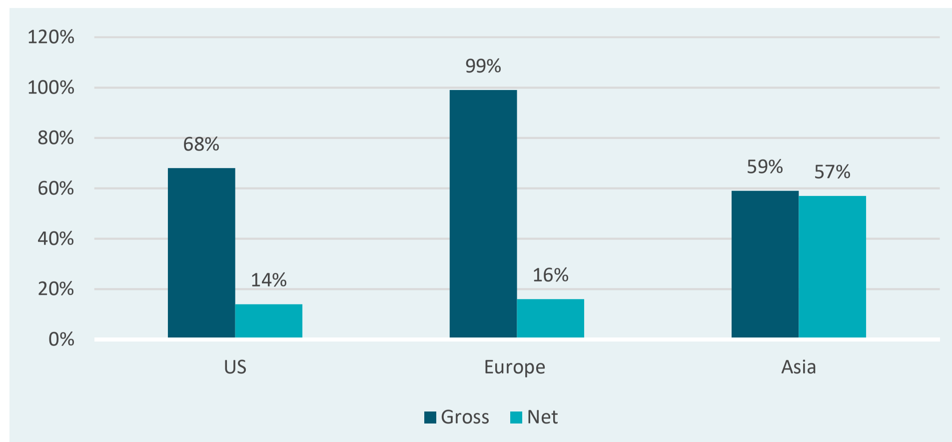
Hedge funds responded to the Q4 sell-off last year by cutting gross and net exposure levels to relatively low levels by year end. Gross leverage has since largely rebounded while net exposure, with the exception of Asia, remains below pre-sell off levels.

HFRI HEDGE FUND STYLE PERFORMANCE



Source: HFRI, as of 3/31/19

HEDGE FUND LEVERAGE LEVELS BY REGION



Source: Morgan Stanley, as of 3/31/19

Appendix

Periodic table of returns

BEST

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	YTD	5-Year	10-Year
Small Cap Growth	38.7	66.4	31.8	14.0	25.9	56.3	26.0	34.5	32.6	39.8	5.2	79.0	29.1	14.3	18.6	43.3	13.5	13.3	31.7	37.3	6.7	17.1	13.5	17.5
Large Cap Growth	27.0	43.1	22.8	8.4	10.3	48.5	22.2	21.4	26.9	16.2	1.4	37.2	26.9	7.8	18.1	38.8	13.2	5.7	21.3	30.2	1.9	16.1	10.6	16.5
Small Cap Equity	20.3	33.2	12.2	7.3	6.7	47.3	20.7	20.1	23.5	15.8	-6.5	34.5	24.5	2.6	17.9	34.5	13.0	0.9	17.3	25.0	0.0	14.6	8.7	16.0
Large Cap Equity	19.3	27.3	11.6	3.3	1.6	46.0	18.3	14.0	22.2	11.8	-21.4	32.5	19.2	1.5	17.5	33.5	11.8	0.6	12.1	22.2	-1.5	14.0	8.4	15.4
Large Cap Value	16.2	26.5	7.0	2.8	1.0	39.2	16.5	7.5	18.4	11.6	-25.9	28.4	16.8	0.4	16.4	33.1	6.0	0.0	11.8	21.7	-3.5	11.9	7.7	14.5
Small Cap Value	15.6	24.3	6.0	2.5	-5.9	30.0	14.5	7.1	16.6	10.9	-28.9	27.2	16.7	0.1	16.3	32.5	5.6	-0.4	11.3	17.1	-4.8	11.9	7.1	14.1
International Equity	8.7	21.3	4.1	-2.4	-6.0	29.9	14.3	6.3	15.5	10.3	-33.8	23.3	16.1	-2.1	15.3	23.3	4.9	-0.8	11.2	14.6	-6.0	10.0	5.6	9.0
Emerging Markets Equity	4.9	20.9	-3.0	-5.6	-11.4	29.7	12.9	5.3	15.1	7.0	-35.6	20.6	15.5	-2.9	14.6	12.1	4.2	-1.4	8.0	13.7	-8.3	9.9	4.4	8.9
60/40 Global Portfolio	1.2	13.2	-7.3	-9.1	-15.5	25.2	11.4	4.7	13.3	7.0	-36.8	19.7	13.1	-4.2	11.5	11.0	3.4	-2.5	7.1	7.8	-9.3	8.1	3.7	8.5
Commodities	-2.5	11.4	-7.8	-9.2	-15.7	23.9	9.1	4.6	10.4	5.8	-37.6	18.9	10.2	-5.5	10.5	9.0	2.8	-3.8	5.7	7.7	-11.0	6.3	2.7	8.3
Hedge Funds of Funds	-5.1	7.3	-14.0	-12.4	-20.5	11.6	6.9	4.6	9.1	4.4	-38.4	11.5	8.2	-5.7	4.8	0.1	0.0	-4.4	2.6	7.0	-11.2	5.0	2.3	3.8
US Bonds	-6.5	4.8	-22.4	-19.5	-21.7	9.0	6.3	4.2	4.8	-0.2	-38.5	5.9	6.5	-11.7	4.2	-2.0	-1.8	-7.5	1.0	3.5	-12.9	2.9	2.3	3.6
Cash	-25.3	-0.8	-22.4	-20.4	-27.9	4.1	4.3	3.2	4.3	-1.6	-43.1	0.2	5.7	-13.3	0.1	-2.3	-4.5	-14.9	0.5	1.7	-13.8	0.6	0.8	0.4
Real Estate	-27.0	-1.5	-30.6	-21.2	-30.3	1.0	1.4	2.4	2.1	-9.8	-53.2	-16.9	0.1	-18.2	-1.1	-9.5	-17.0	-24.7	0.3	0.9	-14.6	0.0	-8.9	-2.6

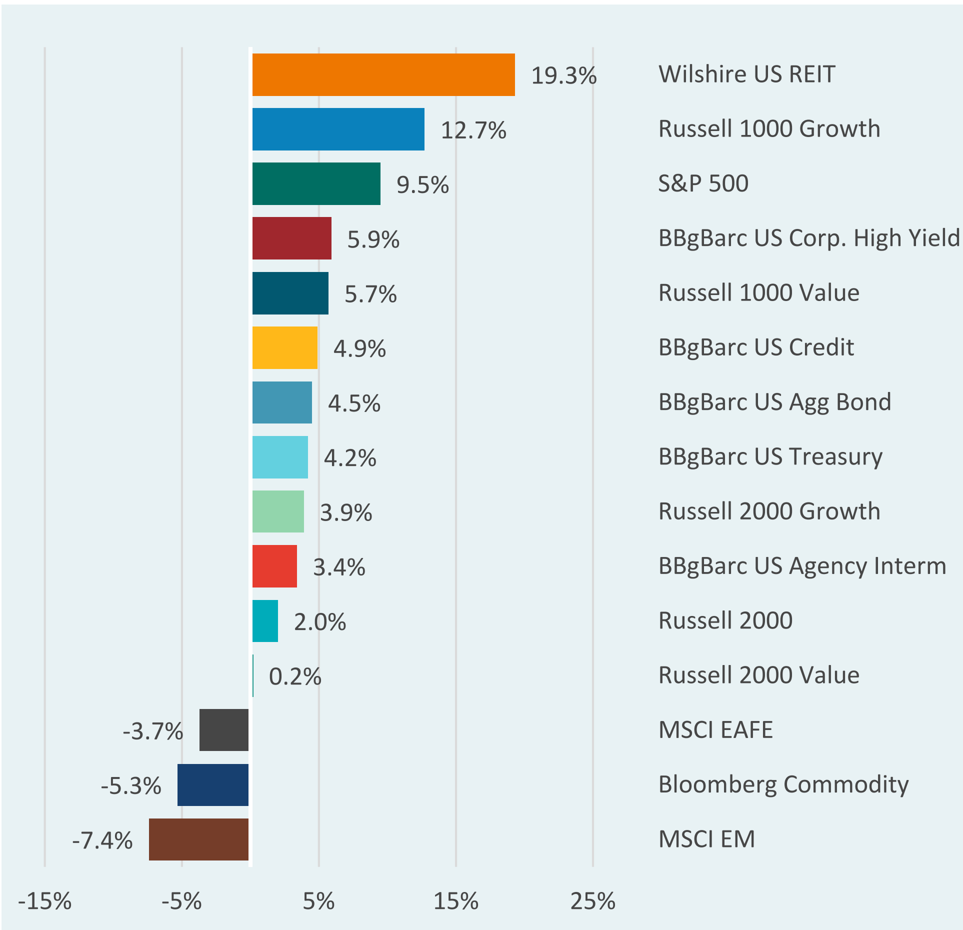
WORST

- Large Cap Equity
- Large Cap Value
- Large Cap Growth
- Small Cap Equity
- Small Cap Value
- Small Cap Growth
- International Equity
- Emerging Markets Equity
- US Bonds
- Cash
- Commodities
- Real Estate
- Hedge Funds of Funds
- 60% MSCI ACWI/40% BBgBarc Global Bond

Source Data: Morningstar, Inc., Hedge Fund Research, Inc. (HFR), National Council of Real Estate Investment Fiduciaries (NCREIF). Indices used: Russell 1000, Russell 1000 Value, Russell 1000 Growth, Russell 2000, Russell 2000 Value, Russell 2000 Growth, MSCI EAFE, MSCI EM, BBgBarc US Aggregate, T-Bill 90 Day, Bloomberg Commodity, NCREIF Property, HFRI FOF, MSCI ACWI, BBgBarc Global Bond. NCREIF Property Index performance data as of 12/31/18.

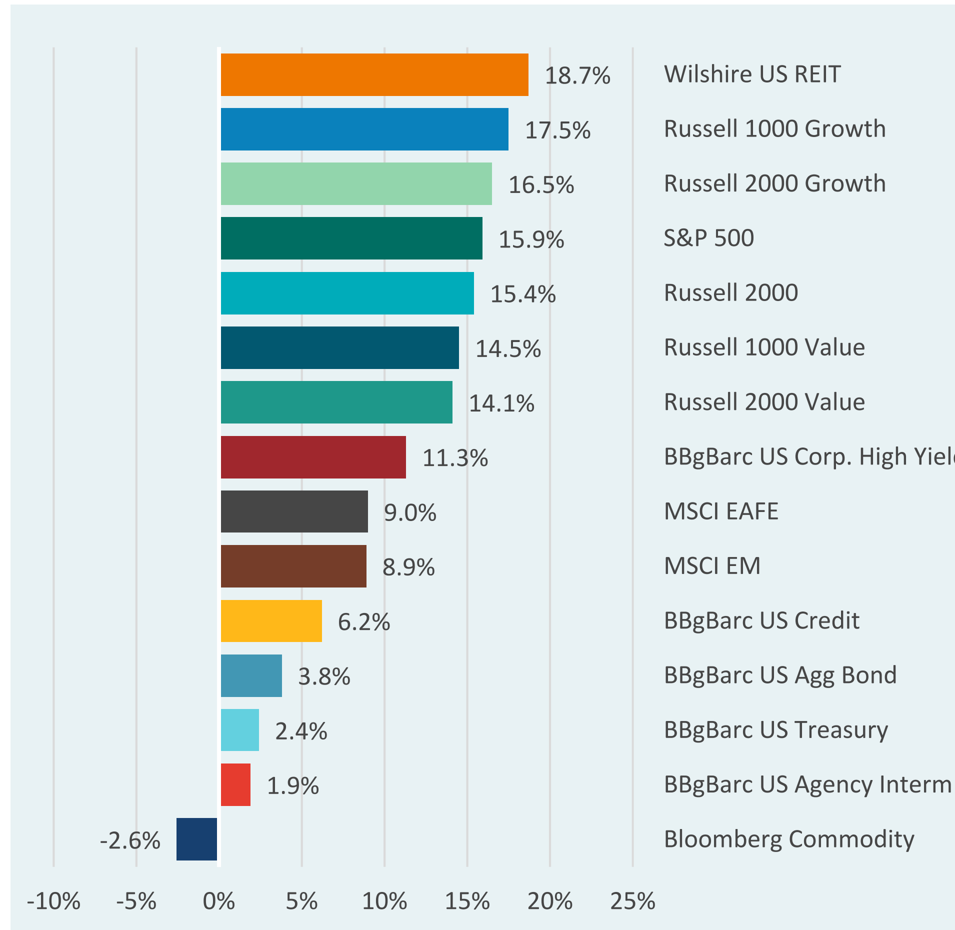
Major asset class returns

ONE YEAR ENDING MARCH



Source: Morningstar, as of 3/31/19

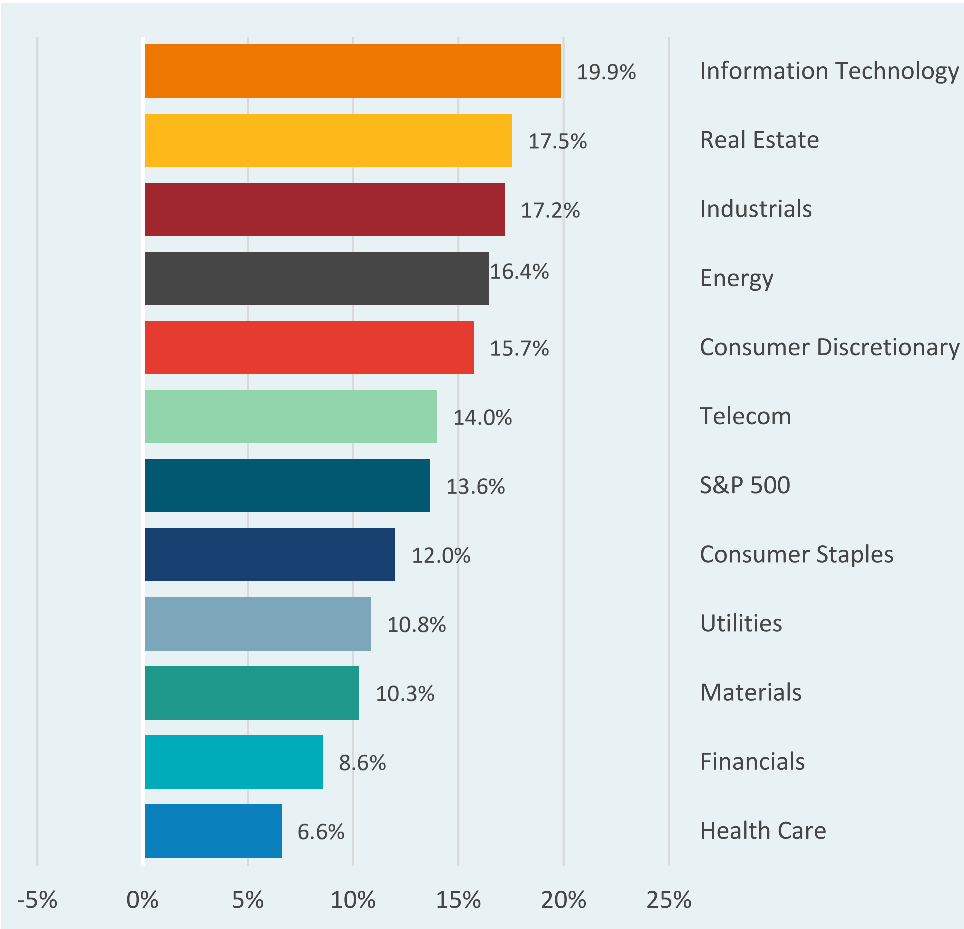
TEN YEARS ENDING MARCH



Source: Morningstar, as of 3/31/19

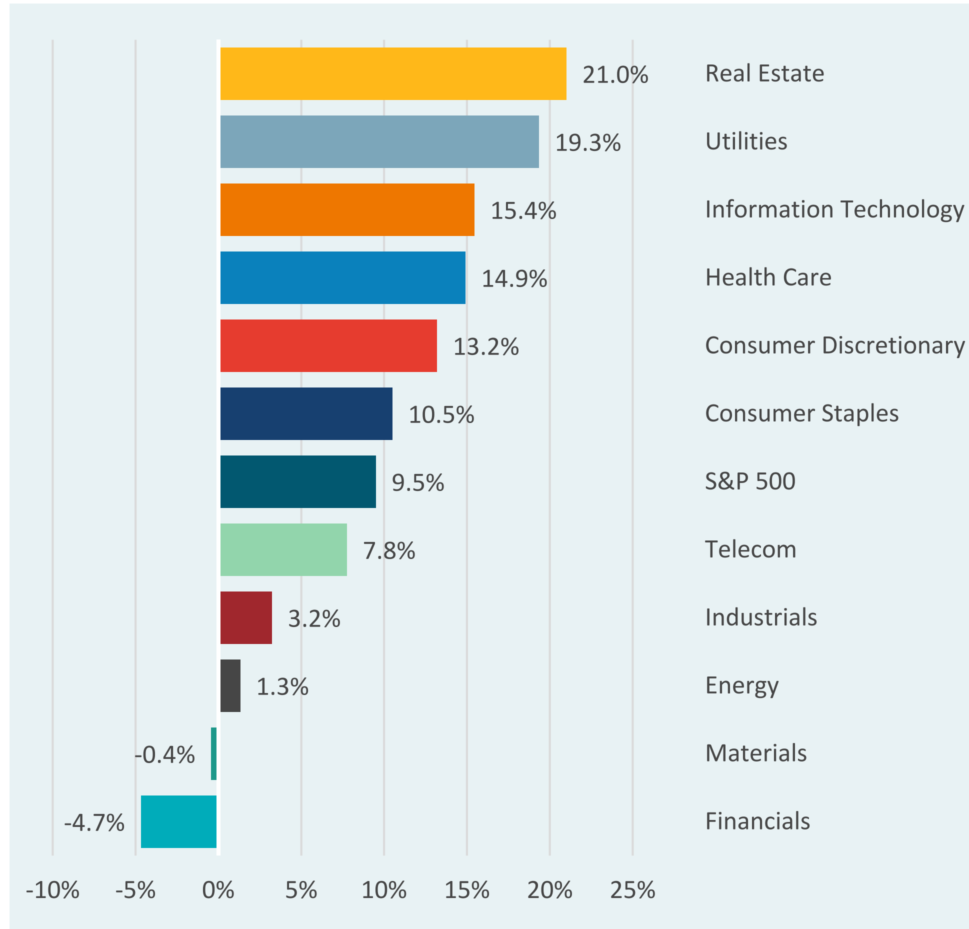
S&P 500 sector returns

QTD



Source: Morningstar, as of 3/31/19

ONE YEAR ENDING MARCH



Source: Morningstar, as of 3/31/19

Detailed index returns

DOMESTIC EQUITY

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
Core Index							
S&P 500	1.9	13.6	13.6	9.5	13.5	10.9	15.9
S&P 500 Equal Weighted	0.9	14.9	14.9	7.2	12.0	9.5	17.8
DJ Industrial Average	0.2	11.8	11.8	10.1	16.4	12.2	16.0
Russell Top 200	2.1	13.1	13.1	10.4	14.2	11.4	15.7
Russell 1000	1.7	14.0	14.0	9.3	13.5	10.6	16.0
Russell 2000	(2.1)	14.6	14.6	2.0	12.9	7.1	15.4
Russell 3000	1.5	14.0	14.0	8.8	13.5	10.4	16.0
Russell Mid Cap	0.9	16.5	16.5	6.5	11.8	8.8	16.9
Style Index							
Russell 1000 Growth	2.8	16.1	16.1	12.7	16.5	13.5	17.5
Russell 1000 Value	0.6	11.9	11.9	5.7	10.5	7.7	14.5
Russell 2000 Growth	(1.4)	17.1	17.1	3.9	14.9	8.4	16.5
Russell 2000 Value	(2.9)	11.9	11.9	0.2	10.9	5.6	14.1

INTERNATIONAL EQUITY

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
Broad Index							
MSCI ACWI	1.3	12.2	12.2	2.6	10.7	6.5	12.0
MSCI ACWI ex US	0.6	10.3	10.3	(4.2)	8.1	2.6	8.8
MSCI EAFE	0.6	10.0	10.0	(3.7)	7.3	2.3	9.0
MSCI EM	0.8	9.9	9.9	(7.4)	10.7	3.7	8.9
MSCI EAFE Small Cap	0.2	10.7	10.7	(9.4)	7.5	4.5	12.8
Style Index							
MSCI EAFE Growth	1.8	12.0	12.0	(1.3)	7.6	3.9	9.7
MSCI EAFE Value	(0.5)	7.9	7.9	(6.1)	6.9	0.7	8.1
Regional Index							
MSCI UK	1.1	11.9	11.9	(0.1)	6.3	0.7	9.3
MSCI Japan	0.6	6.7	6.7	(7.8)	8.1	5.6	8.0
MSCI Euro	0.0	9.8	9.8	(7.8)	6.5	0.6	7.5
MSCI EM Asia	1.8	11.1	11.1	(6.8)	11.8	6.2	10.8
MSCI EM Latin American	(2.5)	7.9	7.9	(6.7)	11.1	(0.3)	5.3

FIXED INCOME

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
Broad Index							
BBgBarc US TIPS	1.8	3.2	3.2	2.7	1.7	1.9	3.4
BBgBarc US Treasury Bills	0.2	0.6	0.6	2.2	1.2	0.8	0.5
BBgBarc US Agg Bond	1.9	2.9	2.9	4.5	2.0	2.7	3.8
Duration							
BBgBarc US Treasury 1-3 Yr	0.6	1.0	1.0	2.7	1.0	1.0	1.0
BBgBarc US Treasury Long	5.3	4.7	4.7	6.2	1.5	5.4	5.1
BBgBarc US Treasury	1.9	2.1	2.1	4.2	1.0	2.2	2.4
Issuer							
BBgBarc US MBS	1.5	2.2	2.2	4.4	1.8	2.6	3.1
BBgBarc US Corp. High Yield	0.9	7.3	7.3	5.9	8.6	4.7	11.3
BBgBarc US Agency Interm	0.9	1.4	1.4	3.4	1.2	1.6	1.9
BBgBarc US Credit	2.4	4.9	4.9	4.9	3.5	3.6	6.2

OTHER

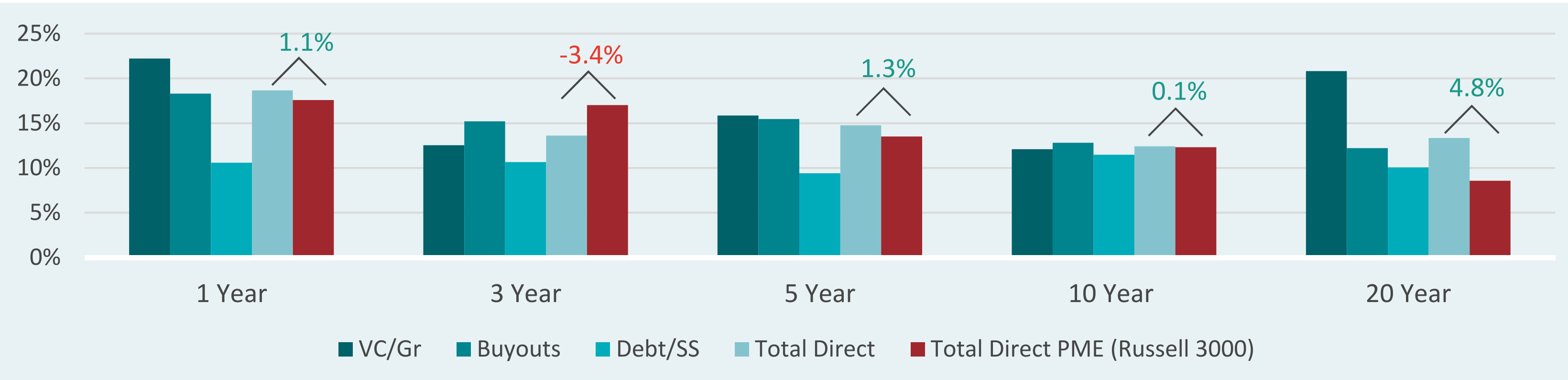
	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
Index							
Bloomberg Commodity	(0.2)	6.3	6.3	(5.3)	2.2	(8.9)	(2.6)
Wilshire US REIT	3.2	16.0	16.0	19.3	5.5	9.0	18.7
CS Leveraged Loans	(0.1)	3.8	3.8	3.3	5.9	3.8	8.0
Alerian MLP	3.8	17.4	17.4	16.8	5.9	(4.2)	11.1
Regional Index							
JPM EMBI Global Div	1.4	7.0	7.0	4.2	5.8	5.4	8.5
JPM GBI-EM Global Div	(1.3)	2.9	2.9	(7.6)	3.3	(0.8)	4.4
Hedge Funds							
HFRI Composite	1.0	5.9	5.9	0.9	5.1	3.1	5.5
HFRI FOF Composite	1.3	5.0	5.0	0.5	4.1	2.3	3.6
Currency (Spot)							
Euro	(1.4)	(1.8)	(1.8)	(8.7)	(0.5)	(4.0)	(1.7)
Pound	(2.0)	2.3	2.3	(7.1)	(3.2)	(4.8)	(0.9)
Yen	0.6	(0.9)	(0.9)	(3.9)	0.5	(1.4)	(1.1)

Source: Morningstar, HFR, as of 3/31/19

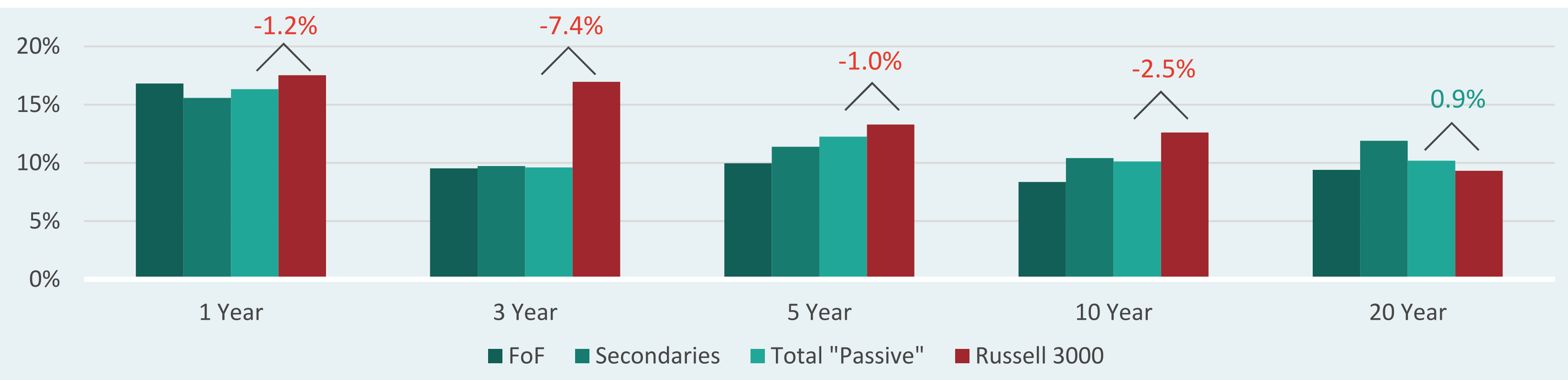
Private equity vs. public performance

As of 9/30/2018

PUBLIC MARKET EQUIVALENT (PME) ANALYSIS - DIRECT PRIVATE EQUITY



PUBLIC MARKET EQUIVALENT (PME) ANALYSIS – "PASSIVE" PRIVATE EQUITY



Public market equivalent (PME) analysis shows that direct private equity has outperformed public equity over most periods

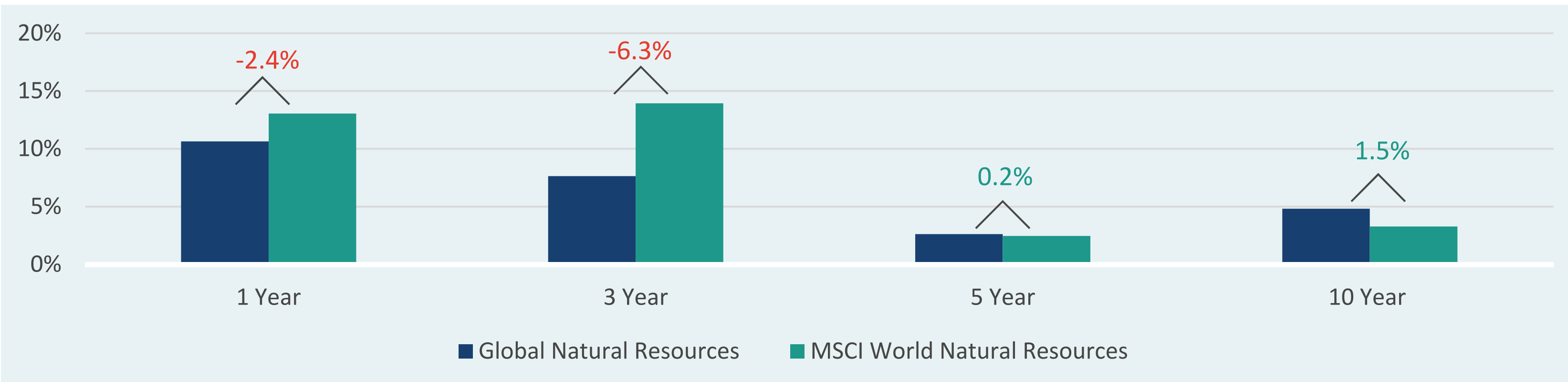
Fund-of-fund & secondary private equity investments have lagged public equities

Sources: Thomson Reuters Cambridge Universe's PME Module: U.S. Private Equity Funds sub asset classes as of September 30, 2018. Public Market Equivalent returns resulted from "Total Passive" and Total Direct's identical cash flows invested into and distributed from respective traditional asset comparable.

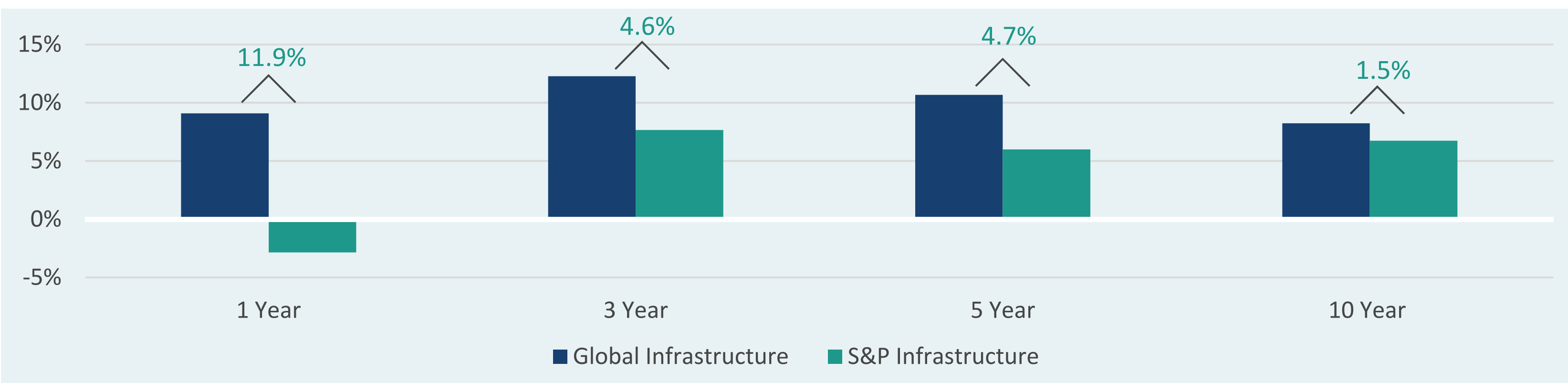
Private vs. liquid real assets performance

As of 9/30/2018

PUBLIC MARKET EQUIVALENT (PME) ANALYSIS - GLOBAL NATURAL RESOURCES FUNDS



PUBLIC MARKET EQUIVALENT (PME) ANALYSIS - GLOBAL INFRASTRUCTURE FUNDS



Public market equivalent (PME) analysis shows that private infrastructure has recently underperformed publicly listed infrastructure

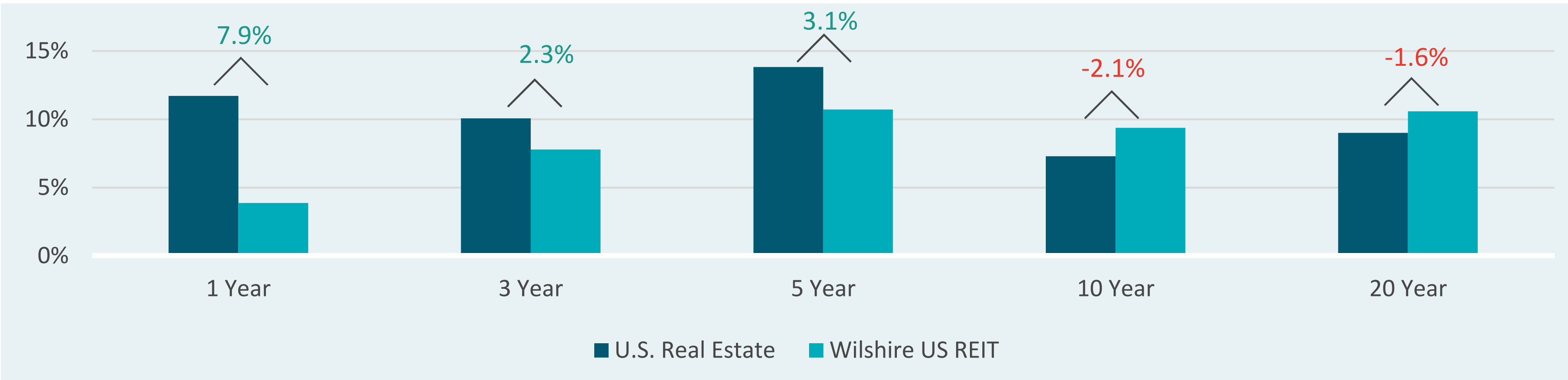
Private infrastructure has materially outperformed publicly listed infrastructure

Sources: Thomson Reuters C|A PME: Global Natural Resources (vintage 1996 and later, inception of MSCI ACWI Energy benchmark) and Global Infrastructure (vintage 2002 and later, inception of S&P Infrastructure benchmark) universes as of September 30, 2018. Public Market Equivalent returns resulted from identical cash flows invested into and distributed from respective liquid real assets universes.

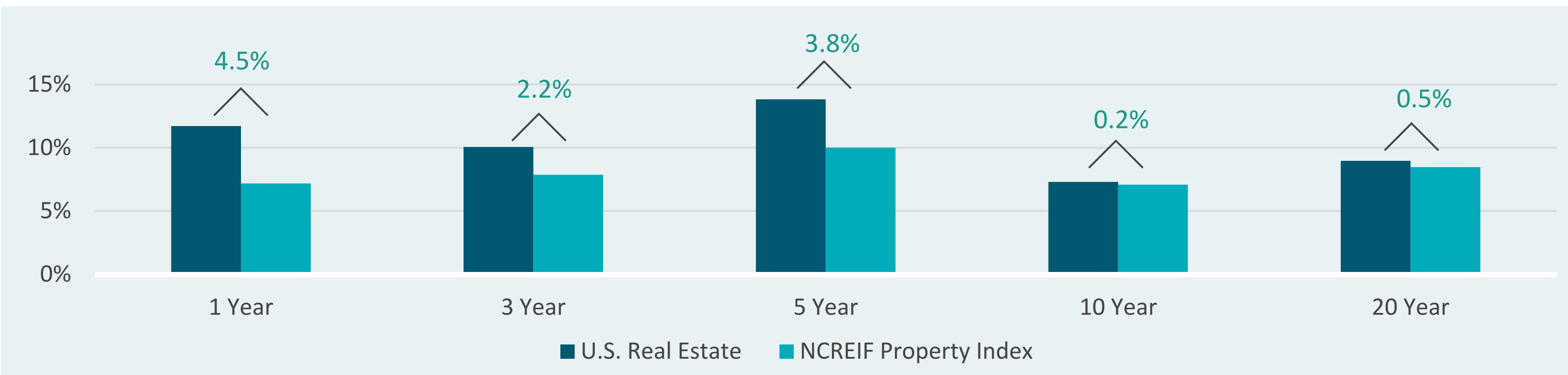
Private vs. liquid & core real estate performance

As of 9/30/2018

PUBLIC MARKET EQUIVALENT (PME) ANALYSIS - U.S PRIVATE REAL ESTATE VS. LIQUID UNIVERSE



PUBLIC MARKET EQUIVALENT (PME) ANALYSIS - U.S. PRIVATE REAL ESTATE FUNDS VS. CORE FUNDS



Public market equivalent (PME) analysis shows that U.S. private R.E. has underperformed liquid real estate over the long-term

U.S. private R.E. has outperformed the NCREIF Property Index over each time period

Sources: Thomson Reuters C|A PME: Global and U.S. Real Estate universes as of September 30, 2018. Public Market Equivalent returns resulted from identical cash flows invested into and distributed from respective liquid real estate universes.

Definitions

Bloomberg US Weekly Consumer Comfort Index *- tracks the public's economic attitudes each week, providing a high-frequency read on consumer sentiment. The index, based on cell and landline telephone interviews with a random, representative national sample of U.S. adults, tracks Americans' ratings of the national economy, their personal finances and the buying climate on a weekly basis, with views of the economy's direction measured separately each month. (www.langerresearch.com)*

University of Michigan Consumer Sentiment Index *- A survey of consumer attitudes concerning both the present situation as well as expectations regarding economic conditions conducted by the University of Michigan. For the preliminary release approximately three hundred consumers are surveyed while five hundred are interviewed for the final figure. The level of consumer sentiment is related to the strength of consumer spending. (www.Bloomberg.com)*

NFIB Small Business Outlook *- Small Business Economic Trends (SBET) is a monthly assessment of the U.S. small-business economy and its near-term prospects. Its data are collected through mail surveys to random samples of the National Federal of Independent Business (NFIB) membership. The survey contains three broad question types: recent performance, near-term forecasts, and demographics. The topics addressed include: outlook, sales, earnings, employment, employee compensation, investment, inventories, credit conditions, and single most important problem. (http://www.nfib-sbet.org/about/)*

NAHB Housing Market Index – *the housing market index is a weighted average of separate diffusion induces for three key single-family indices: market conditions for the sale of new homes at the present time, market conditions for the sale of new homes in the next six months, and the traffic of prospective buyers of new homes. The first two series are rated on a scale of Good, Fair, and Poor and the last is rated on a scale of High/Very High, Average, and Low/Very Low. A diffusion index is calculated for each series by applying the formula "(Good-Poor + 100)/2" to the present and future sales series and "(High/Very High-Low/Very Low + 100)/2" to the traffic series. Each resulting index is then seasonally adjusted and weighted to produce the HMI. Based on this calculation, the HMI can range between 0 and 100.*

Notices & disclosures

Contra Costa County Employees' Retirement Association

Investment Performance Review

Period Ending: March 31, 2019

Verus

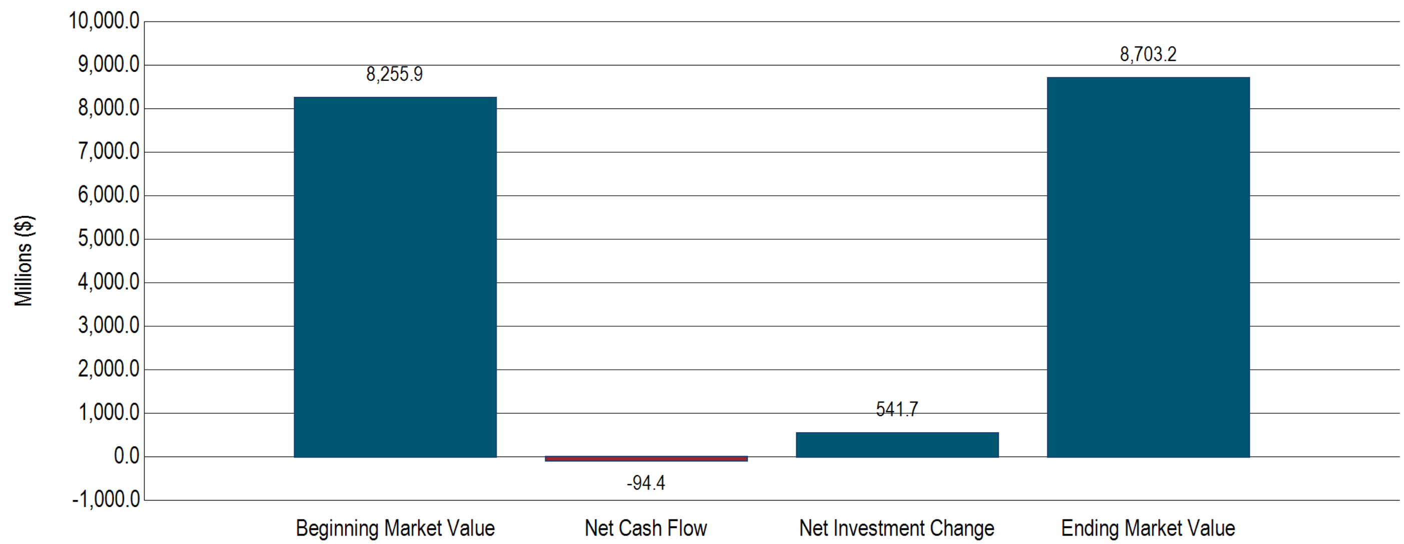
VERUSINVESTMENTS.COM

SEATTLE 206-622-3700
LOS ANGELES 310-297-1777
SAN FRANCISCO 415-362-3484

Portfolio Reconciliation

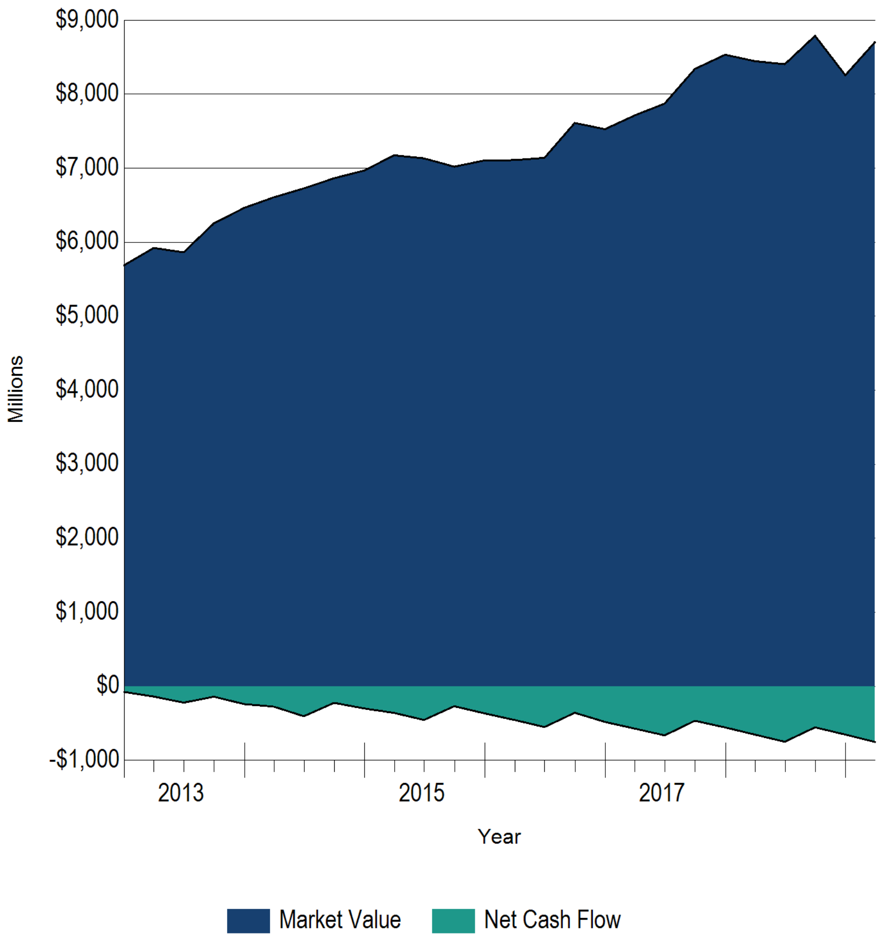
	Last Three Months	Year-To-Date
Beginning Market Value	$8,255,873,307	$8,255,873,307
Net Cash Flow	-$94,428,769	-$94,428,769
Net Investment Change	$541,706,043	$541,706,043
Ending Market Value	$8,703,150,580	$8,703,150,580

Change in Market Value
Last Three Months

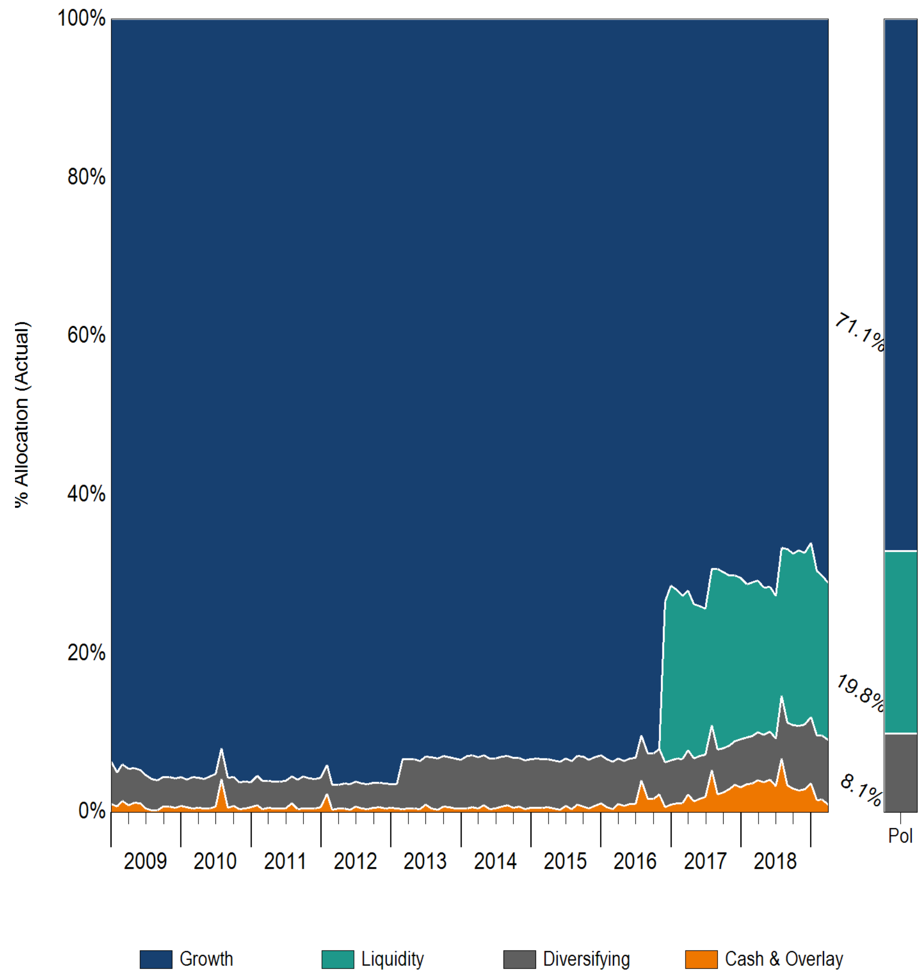


Contributions and withdrawals may include intra-account transfers between managers/funds.

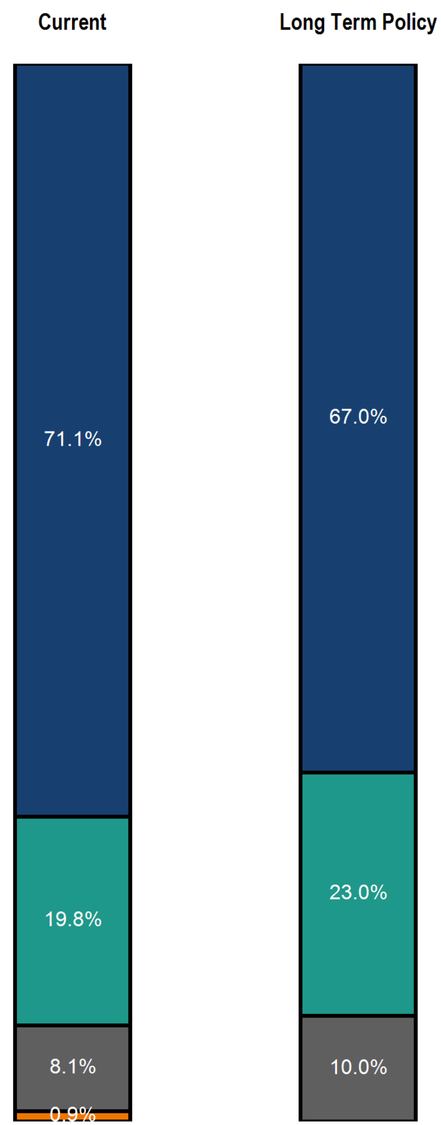
Market Value History
Cumulative Cash Flows



Asset Allocation History



Policy reflects FFP 4-Yr allocations approved in March 2018.



Allocation vs. Long Term Target

	Current Balance	Current Allocation	Long Term Target	Difference
Growth	$6,192,023,062	71.1%	67.0%	$360,912,173
Liquidity	$1,721,560,470	19.8%	23.0%	-$280,164,163
Diversifying	$707,538,680	8.1%	10.0%	-$162,776,378
Cash & Overlay	$82,028,368	0.9%	--	$82,028,368
Total	**$8,703,150,580**	**100.0%**	**100.0%**	

Allocation vs. Current Targets

	Current Balance	Current Allocation	Current Target	Difference
Growth	$6,192,023,062	71.1%	69.0%	$186,849,162
Liquidity	$1,721,560,470	19.8%	23.0%	-$280,164,163
Diversifying	$707,538,680	8.1%	8.0%	$11,286,634
Cash & Overlay	$82,028,368	0.9%	--	$82,028,368
Total	**$8,703,150,580**	**100.0%**	**100.0%**	

Long Term Targets reflect FFP 4-Yr allocations approved in March 2018.
Current Targets reflect Phase 3 Targets approved in June 2018.

Executive Summary (Net of Fees)

Period Ending: March 31, 2019

	% of Portfolio	QTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2018	2017	2016	2015	2014
Total Fund	**100.0**	**6.5**	**3.6**	**7.6**	**6.3**	**10.6**	**-2.7**	**13.9**	**6.9**	**2.1**	**7.7**
Policy Index		*4.7*	*3.3*	*7.8*	*6.5*	*--*	*-0.9*	*13.7*	*8.9*	*0.6*	*9.0*
Growth	**71.1**	**8.3**	**3.9**	**9.5**	**7.5**	**--**	**-3.9**	**18.7**	**7.6**	**2.3**	**8.1**
Custom Growth Benchmark		*6.2*	*3.3*	*10.0*	*7.7*	*--*	*-2.1*	*19.3*	*10.1*	*0.3*	*8.4*
Diversifying	**8.1**	**2.5**	**1.0**	**1.7**	**0.3**	**2.3**	**-2.3**	**2.6**	**0.8**	**-1.8**	**1.7**
Custom Diversifying Benchmark		*2.3*	*3.6*	*3.3*	*3.6*	*4.3*	*1.4*	*4.7*	*4.1*	*2.5*	*5.4*
Liquidity	**19.8**	**1.7**	**3.7**	**--**	**--**	**--**	**1.7**	**1.4**	**--**	**--**	**--**
BBgBarc US Govt/Credit 1-3 Yr. TR		*1.2*	*3.0*	*--*	*--*	*--*	*1.6*	*0.8*	*--*	*--*	*--*

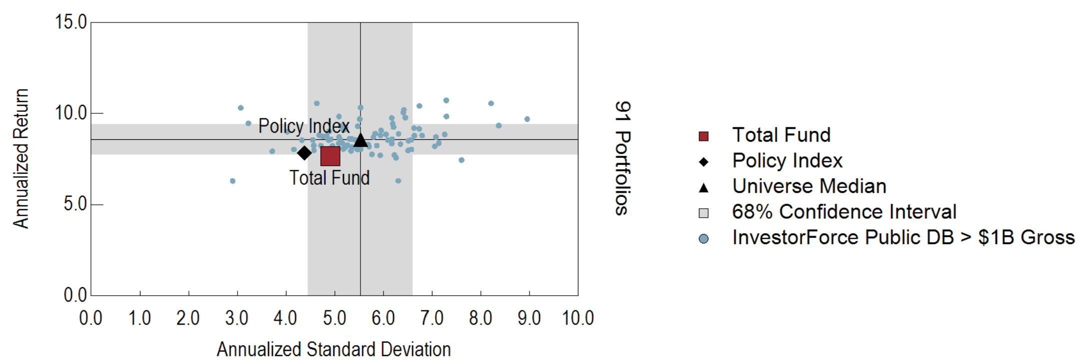
**Correlation between the Growth and Diversifying composites is .48, .32 and .33 over the previous 1, 3 and 5 year periods respectively.*

Policy Index (7/1/2018-Present): 11% Russell 3000, 19% MSCI ACWI ex-US (Gross), 11% MSCI ACWI (Net), 23% BBgBarc 1-3 Yr Gov/Credit, 3.5% BBgBarc US Aggregate, 2% BBgBarc Global Aggregate, 4% ICE BofAML High Yield Master II +2%, 2% ICE BofAML High Yield Master II, 1% Wilshire REIT, 1.8% NCREIF Property Index, 7.2% NCREIF ODCE Index, 2.0% CPI +4%, 10% S&P 500 +4%(Lagged), 2.5% HFRI EH Equity Market Neutral. Policy Index (10/1/2017-6/30/2018): 16.3% Russell 3000, 18.8% MSCI ACWI ex-US (Gross), 8.6% MSCI ACWI (Net), 25% BBgBarc 1-3 Yr Gov/Credit, 3.5% BBgBarc US Aggregate, 1.9% ICE BofAML High Yield Master II +2%, 4.3% ICE BofAML High Yield Master II, 1% Wilshire REIT, 1.6% NCREIF Property Index, 6.4% NCREIF ODCE Index, 2.5% CPI +4%, 10.1% S&P 500 +4%(Lagged). Policy Index (1/1/2017-9/30/2017): 22.9% Russell 3000, 11% MSCI ACWI ex-US (Gross), 10.9% MSCI ACWI (Net), 22.4% BBgBarc 1-3 Yr Gov/Credit, 3.2% BBgBarc US Aggregate, 1.7% ICE BofAML High Yield Master II +2%, 5.1% ICE BofAML High Yield Master II, 1% Wilshire REIT, 1.7% NCREIF Property Index, 6.8% NCREIF ODCE Index, 3.6% CPI +4%, 8.1% S&P 500 +4%(Lagged), 1.6% 90-day T-Bills. Policy Index (4/1/2012-12/31/16): 27.7% Russell 3000, 10.6% MSCI ACWI ex-US (Gross), 12.3% MSCI ACWI (Net), 19.6% BBgBarc U.S. Aggregate, 5% ICE BofAML High Yield Master II, 4% BBgBarc Global Aggregate, 5.4% Wilshire REIT, 6.75% NCREIF Property Index, 1.35% FTSE/EPRA NAREIT Developed exUS, 6.8% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills. Policy Index (4/1/2011-3/31/2012): 31% Russell 3000, 10.4% MSCI EAFE (Gross), 9.6% MSCI ACWI (Net), 25% BBgBarc U.S. Aggregate, 3% ICE BofAML High Yield Master II, 4% BBgBarc Global Aggregate, 8.4% Wilshire REIT, 3.1% NCREIF Property Index, 5% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills. Policy Index (4/1/2010-3/31/2011): 35.6% Russell 3000, 10.4% MSCI EAFE (Gross), 5% MSCI ACWI (Net), 25% BBgBarc U.S. Aggregate, 3% ICE BofAML High Yield Master II, 4% BBgBarc Global Aggregate, 8.4% Wilshire REIT, 3.1% NCREIF Property Index, 5% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills. Policy Index (7/1/2009-3/31/2010): 40.6% Russell 3000, 10.4% MSCI EAFE (Gross), 25% BBgBarc U.S. Aggregate, 3% ICE BofAML High Yield Master II, 4% BBgBarc Global Aggregate, 8.4% Wilshire REIT, 3.1% NCREIF Property Index, 5% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills.

3 Years

	Anlzd Return	Ann Excess BM Return	Anlzd Standard Deviation	Anlzd Alpha	Beta	Tracking Error	R-Squared	Sharpe Ratio	Information Ratio	Up Mkt Capture Ratio	Down Mkt Capture Ratio
Total Fund	7.64%	-0.20%	4.91%	-0.72%	1.07	1.56%	0.90	1.31	-0.13	101.62%	110.41%

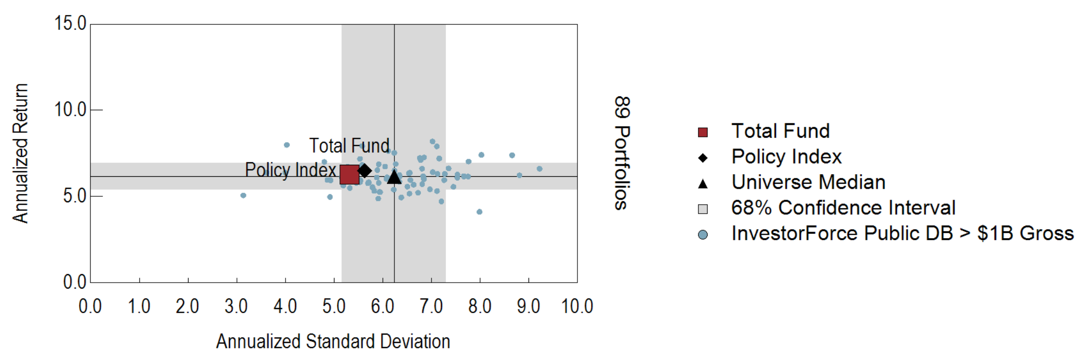
Risk vs. Return



5 Years

	Anlzd Return	Ann Excess BM Return	Anlzd Standard Deviation	Anlzd Alpha	Beta	Tracking Error	R-Squared	Sharpe Ratio	Information Ratio	Up Mkt Capture Ratio	Down Mkt Capture Ratio
Total Fund	6.26%	-0.24%	5.32%	0.42%	0.90	1.74%	0.90	1.03	-0.14	90.23%	88.24%

Risk vs. Return



Total Fund
Performance Summary (Gross of Fees) — Period Ending: March 31, 2019

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2018	2017	2016	2015	2014
Total Fund	**8,703,150,580**	**100.0**	**6.6**	**3.9**	**8.0**	**6.7**	**11.2**	**-2.5**	**14.2**	**7.4**	**2.7**	**8.4**
Policy Index			*4.7*	*3.3*	*7.8*	*6.5*	--	*-0.9*	*13.7*	*8.9*	*0.6*	*9.0*
InvestorForce Public DB > $1B Gross Rank			*79*	*37*	*87*	*22*	*14*	*25*	*83*	*74*	*5*	*6*
Total Fund ex Overlay & Cash	**8,621,122,212**	**99.1**	**6.4**	**4.1**	**8.1**	**6.8**	**11.2**	**-2.1**	**14.1**	**7.4**	**2.7**	**8.4**
Policy Index			*4.7*	*3.3*	*7.8*	*6.5*	--	*-0.9*	*13.7*	*8.9*	*0.6*	*9.0*
InvestorForce Public DB > $1B Gross Rank			*82*	*31*	*80*	*21*	*13*	*20*	*84*	*74*	*5*	*6*
Growth	**6,192,023,062**	**71.1**	**8.4**	**4.2**	**9.9**	**8.0**	**--**	**-3.6**	**19.1**	**8.1**	**3.0**	**8.8**
Custom Growth Benchmark			*6.2*	*3.3*	*10.0*	*7.7*	--	*-2.1*	*19.3*	*10.1*	*0.3*	*8.4*
Total Domestic Equity	**1,042,049,087**	**12.0**	**13.2**	**6.1**	**13.4**	**9.9**	**16.3**	**-7.2**	**23.9**	**11.5**	**1.1**	**11.4**
Russell 3000			*14.0*	*8.8*	*13.5*	*10.4*	*16.0*	*-5.2*	*21.1*	*12.7*	*0.5*	*12.6*
InvestorForce Public DB US Eq Gross Rank			*91*	*86*	*40*	*51*	*21*	*78*	*6*	*77*	*21*	*50*
BlackRock Russell 1000 Index	130,255,255	1.5	14.0	9.3	--	--	--	-4.8	--	--	--	--
Russell 1000			*14.0*	*9.3*	--	--	--	*-4.8*	--	--	--	--
eV US Large Cap Equity Gross Rank			*36*	*40*	--	--	--	*47*	--	--	--	--
Jackson Square Partners	267,467,206	3.1	11.9	8.0	13.0	10.3	16.6	-2.0	29.3	-4.4	6.1	13.9
Russell 1000 Growth			*16.1*	*12.7*	*16.5*	*13.5*	*17.5*	*-1.5*	*30.2*	*7.1*	*5.7*	*13.0*
eV US Large Cap Growth Equity Gross Rank			*95*	*85*	*89*	*87*	*60*	*59*	*47*	*98*	*37*	*31*
Boston Partners	259,192,532	3.0	9.6	1.6	11.4	7.6	15.2	-8.7	20.1	15.1	-3.9	12.0
Russell 1000 Value			*11.9*	*5.7*	*10.5*	*7.7*	*14.5*	*-8.3*	*13.7*	*17.3*	*-3.8*	*13.5*
eV US Large Cap Value Equity Gross Rank			*93*	*77*	*39*	*63*	*39*	*55*	*23*	*50*	*65*	*55*
Emerald Advisers	214,991,467	2.5	21.3	10.8	18.1	10.8	19.2	-10.1	28.8	10.1	4.1	7.3
Russell 2000 Growth			*17.1*	*3.9*	*14.9*	*8.4*	*16.5*	*-9.3*	*22.2*	*11.3*	*-1.4*	*5.6*
eV US Small Cap Growth Equity Gross Rank			*23*	*46*	*47*	*36*	*27*	*85*	*26*	*54*	*19*	*21*
Ceredex	170,142,627	2.0	11.4	2.5	9.7	6.9	--	-11.3	11.4	29.8	-4.4	3.3
Russell 2000 Value			*11.9*	*0.2*	*10.9*	*5.6*	--	*-12.9*	*7.8*	*31.7*	*-7.5*	*4.2*
eV US Small Cap Value Equity Gross Rank			*79*	*22*	*51*	*33*	--	*25*	*48*	*32*	*52*	*74*

Individual closed end funds are not shown in performance summary table. AQR Global Risk Premium funded 1/18/2019. PanAgora Risk Parity funded 3/15/2019. Effective 1/01/2017, only traditional asset class (public equity, public fixed income, REITs) investment management fees will be included in the gross of fee return calculation. Effective 7/1/2018, Private Credit and Private Equity data provided by StepStone Group.

Performance Summary (Gross of Fees)

Period Ending: March 31, 2019

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2018	2017	2016	2015	2014
Total International Equity	**1,599,619,955**	**18.4**	**10.9**	**-5.4**	**6.5**	**3.7**	**8.6**	**-14.3**	**25.5**	**1.2**	**-1.2**	**0.3**
MSCI ACWI ex USA Gross			*10.4*	*-3.7*	*8.6*	*3.0*	*9.3*	*-13.8*	*27.8*	*5.0*	*-5.3*	*-3.4*
MSCI EAFE Gross			*10.1*	*-3.2*	*7.8*	*2.8*	*9.5*	*-13.4*	*25.6*	*1.5*	*-0.4*	*-4.5*
InvestorForce Public DB ex-US Eq Gross Rank			*35*	*53*	*94*	*33*	*78*	*44*	*90*	*89*	*28*	*5*
International Equity	**924,309,392**	**10.6**	**11.7**	**-2.8**	**7.0**	**3.9**	**8.8**	**-13.6**	**25.3**	**1.2**	**-1.2**	**0.3**
MSCI ACWI ex USA Gross			*10.4*	*-3.7*	*8.6*	*3.0*	*9.3*	*-13.8*	*27.8*	*5.0*	*-5.3*	*-3.4*
InvestorForce Public DB ex-US Eq Gross Rank			*17*	*13*	*87*	*23*	*75*	*21*	*93*	*89*	*28*	*5*
Pyrford	454,787,198	5.2	9.5	0.3	5.9	--	--	-10.1	19.8	3.4	-2.9	--
MSCI ACWI ex USA Value			*8.3*	*-5.4*	*7.7*	--	--	*-14.0*	*22.7*	*8.9*	*-10.1*	--
eV ACWI ex-US Value Equity Gross Rank			*35*	*1*	*68*	--	--	*5*	*84*	*74*	*59*	--
William Blair	469,522,194	5.4	13.9	-5.6	8.0	4.0	--	-16.8	30.9	-1.4	0.5	-1.2
MSCI ACWI ex USA Growth			*12.3*	*-3.0*	*8.4*	*4.0*	--	*-14.4*	*32.0*	*0.1*	*-1.3*	*-2.6*
eV ACWI ex-US Growth Equity Gross Rank			*43*	*60*	*77*	*77*	--	*69*	*81*	*55*	*69*	*37*
Emerging Markets Equity	**675,310,563**	**7.8**	**10.0**	**-8.8**	**--**	**--**	**--**	**-15.3**	**--**	**--**	**--**	**--**
MSCI Emerging Markets			*9.9*	*-7.4*	--	--	--	*-14.6*	--	--	--	--
InvestorForce Public DB Emg Mkt Eq Gross Rank			*44*	*60*	--	--	--	*51*	--	--	--	--
PIMCO RAE Emerging Markets	343,874,286	4.0	6.3	-9.7	--	--	--	-12.3	--	--	--	--
MSCI Emerging Markets			*9.9*	*-7.4*	--	--	--	*-14.6*	--	--	--	--
eV Emg Mkts Equity Gross Rank			*96*	*75*	--	--	--	*19*	--	--	--	--
TT Emerging Markets	331,436,277	3.8	14.0	-7.9	--	--	--	-18.4	--	--	--	--
MSCI Emerging Markets			*9.9*	*-7.4*	--	--	--	*-14.6*	--	--	--	--
eV Emg Mkts Equity Gross Rank			*12*	*52*	--	--	--	*83*	--	--	--	--
Total Global Equity	**729,010,474**	**8.4**	**13.3**	**3.4**	**11.5**	**8.2**	**10.5**	**-7.8**	**23.7**	**7.6**	**2.2**	**5.2**
MSCI ACWI			*12.2*	*2.6*	*10.7*	*6.5*	*12.0*	*-9.4*	*24.0*	*7.9*	*-2.4*	*4.2*
InvestorForce Public DB Glbl Eq Gross Rank			*3*	*49*	*30*	*43*	*13*	*60*	*79*	*40*	*16*	*41*
Artisan Partners	364,329,832	4.2	16.6	4.0	14.8	11.3	--	-7.9	32.9	5.6	9.2	3.9
MSCI ACWI			*12.2*	*2.6*	*10.7*	*6.5*	--	*-9.4*	*24.0*	*7.9*	*-2.4*	*4.2*
eV All Global Equity Gross Rank			*9*	*43*	*11*	*8*	--	*40*	*11*	*61*	*4*	*56*
First Eagle	364,525,432	4.2	10.0	2.9	8.0	5.8	--	-7.6	15.1	11.7	0.2	4.5
MSCI ACWI			*12.2*	*2.6*	*10.7*	*6.5*	--	*-9.4*	*24.0*	*7.9*	*-2.4*	*4.2*
eV All Global Equity Gross Rank			*85*	*52*	*81*	*73*	--	*38*	*89*	*19*	*49*	*51*

Individual closed end funds are not shown in performance summary table. AQR Global Risk Premium funded 1/18/2019. PanAgora Risk Parity funded 3/15/2019. Effective 1/01/2017, only traditional asset class (public equity, public fixed income, REITs) investment management fees will be included in the gross of fee return calculation. Effective 7/1/2018, Private Credit and Private Equity data provided by StepStone Group.

Performance Summary (Gross of Fees)

Period Ending: March 31, 2019

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2018	2017	2016	2015	2014
Private Credit	**332,187,982**	**3.8**	**-0.4**	**4.6**	**8.5**	**10.3**	**16.2**	**8.3**	**10.4**	**8.2**	**12.9**	**15.4**
ICE BofAML High Yield Master II +2%			*7.9*	*8.1*	*10.9*	*6.8*	*13.4*	*-0.3*	*9.6*	*19.8*	*-2.7*	*4.5*
Total High Yield	**350,887,176**	**4.0**	**8.4**	**6.3**	**7.8**	**4.0**	**10.0**	**-3.2**	**6.5**	**14.3**	**-3.5**	**1.2**
ICE BofAML High Yield Master II			*7.4*	*5.9*	*8.7*	*4.7*	*11.2*	*-2.3*	*7.5*	*17.5*	*-4.6*	*2.5*
eV US High Yield Fixed Inc Gross Rank			*2*	*25*	*53*	*77*	*64*	*88*	*74*	*47*	*68*	*83*
Allianz Global Investors	350,887,176	4.0	8.4	6.3	7.8	4.0	10.0	-3.2	6.5	14.3	-3.5	1.2
ICE BofAML High Yield Master II			*7.4*	*5.9*	*8.7*	*4.7*	*11.2*	*-2.3*	*7.5*	*17.5*	*-4.6*	*2.5*
eV US High Yield Fixed Inc Gross Rank			*2*	*25*	*53*	*77*	*64*	*88*	*74*	*47*	*68*	*83*
Total Real Estate	**758,503,763**	**8.7**	**4.3**	**9.9**	**8.8**	**10.8**	**14.6**	**7.4**	**11.1**	**5.5**	**13.5**	**20.6**
Real Estate Benchmark			*3.1*	*8.8*	*6.6*	*9.0*	*11.4*	*6.7*	*7.1*	*6.7*	*8.3*	*18.8*
NCREIF-ODCE			*1.4*	*7.5*	*8.0*	*10.2*	*8.7*	*8.3*	*7.6*	*8.8*	*15.0*	*12.5*
NCREIF Property Index			*1.8*	*6.8*	*7.1*	*9.1*	*8.5*	*6.7*	*7.0*	*8.0*	*13.3*	*11.8*
Adelante	73,518,175	0.8	17.5	19.4	6.5	9.8	19.1	-5.0	7.8	4.1	5.1	33.4
Wilshire REIT			*16.0*	*19.3*	*5.4*	*9.0*	*18.7*	*-4.8*	*4.2*	*7.2*	*4.2*	*31.8*
Private Equity	**962,522,748**	**11.1**	**1.5**	**13.5**	**10.8**	**11.3**	**11.8**	**12.1**	**11.9**	**9.4**	**11.6**	**17.3**
S&P 500 Index +4% (Lagged)			*-12.6*	*-0.5*	*13.6*	*12.8*	*17.6*	*22.6*	*23.3*	*20.0*	*3.4*	*24.5*
Risk Parity	**417,241,877**	**4.8**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
60% MSCI ACWI Net/40% BBgBarc Global Aggregate			--	--	--	--	--	--	--	--	--	--
AQR Global Risk Premium-EL	213,625,425	2.5	--	--	--	--	--	--	--	--	--	--
60% MSCI ACWI Net/40% BBgBarc Global Aggregate			--	--	--	--	--	--	--	--	--	--
PanAgora Risk Parity Multi Asset	203,616,452	2.3	--	--	--	--	--	--	--	--	--	--
60% MSCI ACWI Net/40% BBgBarc Global Aggregate			--	--	--	--	--	--	--	--	--	--

Individual closed end funds are not shown in performance summary table. AQR Global Risk Premium funded 1/18/2019. PanAgora Risk Parity funded 3/15/2019. Effective 1/01/2017, only traditional asset class (public equity, public fixed income, REITs) investment management fees will be included in the gross of fee return calculation. Effective 7/1/2018, Private Credit and Private Equity data provided by StepStone Group.

Performance Summary (Gross of Fees)

Period Ending: March 31, 2019

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2018	2017	2016	2015	2014
Diversifying	**707,538,680**	**8.1**	**2.5**	**1.2**	**2.1**	**0.7**	**2.7**	**-2.0**	**2.8**	**1.3**	**-1.4**	**2.2**
Custom Diversifying Benchmark			*2.3*	*3.6*	*3.3*	*3.6*	*4.3*	*1.4*	*4.7*	*4.1*	*2.5*	*5.4*
Diversifying Fixed Income	**507,921,464**	**5.8**	**3.2**	**2.2**	**1.4**	**2.6**	**3.6**	**-1.7**	**2.8**	**2.8**	**1.6**	**6.6**
eV US Core Fixed Inc Gross Rank			*56*	*99*	*99*	*96*	*95*	*99*	*96*	*72*	*15*	*25*
AFL-CIO	324,590,940	3.7	2.8	4.6	2.2	3.1	3.9	0.6	3.6	2.4	1.6	6.6
BBgBarc US Aggregate TR			*2.9*	*4.5*	*2.0*	*2.7*	*3.8*	*0.0*	*3.5*	*2.6*	*0.6*	*6.0*
eV US Core Fixed Inc Gross Rank			*88*	*61*	*81*	*45*	*89*	*16*	*76*	*87*	*15*	*25*
Wellington Real Total Return	183,330,524	2.1	4.0	-1.7	2.5	-1.8	--	-5.6	1.9	-0.1	-4.9	-2.5
CPI + 4%			*2.2*	*5.9*	*6.3*	*5.5*	--	*6.0*	*6.2*	*6.2*	*4.8*	*4.8*
Diversifying Equity	**199,617,216**	**2.3**	**0.8**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
Parametric Defensive Equity	199,617,216	2.3	0.8	--	--	--	--	--	--	--	--	--
91 Day T-Bill +4%			*1.6*	--	--	--	--	--	--	--	--	--
Liquidity	**1,721,560,470**	**19.8**	**1.7**	**3.8**	**--**	**--**	**--**	**1.8**	**1.5**	**--**	**--**	**--**
BBgBarc US Govt/Credit 1-3 Yr. TR			*1.2*	*3.0*	--	--	--	*1.6*	*0.8*	--	--	--
eV US Short Duration Fixed Inc Gross Rank			*25*	*19*	--	--	--	*24*	*50*	--	--	--
DFA Short Credit	375,055,643	4.3	2.0	4.0	--	--	--	1.2	1.9	--	--	--
ICE BofAML 1-5 Yrs US Corp & Govt TR			*1.6*	*3.6*	--	--	--	*1.4*	*1.3*	--	--	--
eV US Short Duration Fixed Inc Gross Rank			*11*	*8*	--	--	--	*93*	*26*	--	--	--
Insight Short Duration	811,554,864	9.3	1.5	3.4	--	--	--	1.7	1.5	--	--	--
BBgBarc US Govt/Credit 1-3 Yr. TR			*1.2*	*3.0*	--	--	--	*1.6*	*0.8*	--	--	--
eV US Short Duration Fixed Inc Gross Rank			*50*	*49*	--	--	--	*38*	*50*	--	--	--
Sit Short Duration	534,949,963	6.1	1.9	4.4	--	--	--	2.5	1.3	--	--	--
BBgBarc US Govt 1-3 Yr TR			*1.0*	*2.7*	--	--	--	*1.6*	*0.4*	--	--	--
eV US Short Duration Fixed Inc Gross Rank			*16*	*2*	--	--	--	*1*	*68*	--	--	--
Total Cash	**61,335,201**	**0.7**	**0.7**	**2.1**	**1.4**	**0.1**	**--**	**1.7**	**0.9**	**0.9**	**0.1**	**-3.0**
91 Day T-Bills			*0.6*	*2.1*	*1.2*	*0.8*	--	*1.9*	*0.9*	*0.3*	*0.0*	*0.0*
Cash	60,308,465	0.7	0.7	2.1	1.3	1.0	3.1	1.7	0.9	0.9	0.1	1.4
State Street Cash/Tax Reclaims	667,189	0.0	--	--	--	--	--	--	--	--	--	--
Northern Trust Transition	359,547	0.0	--	--	--	--	--	--	--	--	--	--

Individual closed end funds are not shown in performance summary table. AQR Global Risk Premium funded 1/18/2019. PanAgora Risk Parity funded 3/15/2019. Effective 3/1/2019 the custodian of record switched from State Street to Northern Trust. State Street Cash/Tax Reclaims reflects $214,780 in cash and $452,409 in potential tax reclaims at State Street after assets were transferred to Northern Trust. Effective 1/01/2017, only traditional asset class (public equity, public fixed income, REITs) investment management fees will be included in the gross of fee return calculation. Effective 7/1/2018, Private Credit and Private Equity data provided by StepStone Group.

Total Fund
Performance Summary (Net of Fees)

Period Ending: March 31, 2019

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2018	2017	2016	2015	2014
Total Fund	**8,703,150,580**	**100.0**	**6.5**	**3.6**	**7.6**	**6.3**	**10.6**	**-2.7**	**13.9**	**6.9**	**2.1**	**7.7**
Policy Index			*4.7*	*3.3*	*7.8*	*6.5*	--	*-0.9*	*13.7*	*8.9*	*0.6*	*9.0*
Total Fund ex Overlay & Cash	**8,621,122,212**	**99.1**	**6.4**	**3.8**	**7.7**	**6.3**	**10.6**	**-2.4**	**13.8**	**6.9**	**2.1**	**7.7**
Policy Index			*4.7*	*3.3*	*7.8*	*6.5*	--	*-0.9*	*13.7*	*8.9*	*0.6*	*9.0*
Growth	**6,192,023,062**	**71.1**	**8.3**	**3.9**	**9.5**	**7.5**	**--**	**-3.9**	**18.7**	**7.6**	**2.3**	**8.1**
Custom Growth Benchmark			*6.2*	*3.3*	*10.0*	*7.7*	--	*-2.1*	*19.3*	*10.1*	*0.3*	*8.4*
Total Domestic Equity	**1,042,049,087**	**12.0**	**13.1**	**5.7**	**12.9**	**9.5**	**15.9**	**-7.6**	**23.5**	**11.1**	**0.6**	**11.0**
Russell 3000			*14.0*	*8.8*	*13.5*	*10.4*	*16.0*	*-5.2*	*21.1*	*12.7*	*0.5*	*12.6*
BlackRock Russell 1000 Index	130,255,255	1.5	14.0	9.3	--	--	--	-4.8	--	--	--	--
Russell 1000			*14.0*	*9.3*	--	--	--	*-4.8*	--	--	--	--
Jackson Square Partners	267,467,206	3.1	11.8	7.5	12.5	9.8	16.2	-2.4	28.7	-4.8	5.6	13.4
Russell 1000 Growth			*16.1*	*12.7*	*16.5*	*13.5*	*17.5*	*-1.5*	*30.2*	*7.1*	*5.7*	*13.0*
Boston Partners	259,192,532	3.0	9.5	1.3	11.1	7.3	14.8	-8.9	19.7	14.7	-4.2	11.6
Russell 1000 Value			*11.9*	*5.7*	*10.5*	*7.7*	*14.5*	*-8.3*	*13.7*	*17.3*	*-3.8*	*13.5*
Emerald Advisers	214,991,467	2.5	21.2	10.1	17.4	10.1	18.5	-10.7	28.0	9.4	3.5	6.6
Russell 2000 Growth			*17.1*	*3.9*	*14.9*	*8.4*	*16.5*	*-9.3*	*22.2*	*11.3*	*-1.4*	*5.6*
Ceredex	170,142,627	2.0	11.2	1.9	9.1	6.3	--	-11.8	10.7	29.1	-5.0	2.7
Russell 2000 Value			*11.9*	*0.2*	*10.9*	*5.6*	--	*-12.9*	*7.8*	*31.7*	*-7.5*	*4.2*
Total International Equity	**1,599,619,955**	**18.4**	**10.8**	**-5.9**	**6.0**	**3.2**	**8.2**	**-14.7**	**25.0**	**0.8**	**-1.6**	**0.0**
MSCI ACWI ex USA Gross			*10.4*	*-3.7*	*8.6*	*3.0*	*9.3*	*-13.8*	*27.8*	*5.0*	*-5.3*	*-3.4*
MSCI EAFE Gross			*10.1*	*-3.2*	*7.8*	*2.8*	*9.5*	*-13.4*	*25.6*	*1.5*	*-0.4*	*-4.5*
International Equity	**924,309,392**	**10.6**	**11.6**	**-3.2**	**6.5**	**3.5**	**8.4**	**-13.9**	**24.8**	**0.8**	**-1.6**	**0.0**
MSCI ACWI ex USA Gross			*10.4*	*-3.7*	*8.6*	*3.0*	*9.3*	*-13.8*	*27.8*	*5.0*	*-5.3*	*-3.4*
Pyrford	454,787,198	5.2	9.3	-0.1	5.5	--	--	-10.5	19.3	3.0	-3.3	--
MSCI ACWI ex USA Value			*8.3*	*-5.4*	*7.7*	--	--	*-14.0*	*22.7*	*8.9*	*-10.1*	--
William Blair	469,522,194	5.4	13.8	-6.0	7.6	3.6	--	-17.1	30.4	-1.8	0.0	-1.7
MSCI ACWI ex USA Growth			*12.3*	*-3.0*	*8.4*	*4.0*	--	*-14.4*	*32.0*	*0.1*	*-1.3*	*-2.6*
Emerging Markets Equity	**675,310,563**	**7.8**	**9.8**	**-9.3**	**--**	**--**	**--**	**-15.7**	**--**	**--**	**--**	**--**
MSCI Emerging Markets			*9.9*	*-7.4*	--	--	--	*-14.6*	--	--	--	--
PIMCO RAE Emerging Markets	343,874,286	4.0	6.2	-10.2	--	--	--	-12.6	--	--	--	--
MSCI Emerging Markets			*9.9*	*-7.4*	--	--	--	*-14.6*	--	--	--	--
TT Emerging Markets	331,436,277	3.8	13.9	-8.5	--	--	--	-18.9	--	--	--	--
MSCI Emerging Markets			*9.9*	*-7.4*	--	--	--	*-14.6*	--	--	--	--

Individual closed end funds are not shown in performance summary table. AQR Global Risk Premium funded 1/18/2019. PanAgora Risk Parity funded 3/15/2019. Effective 7/1/2018, Private Credit and Private Equity data provided by StepStone Group.

Performance Summary (Net of Fees)

Period Ending: March 31, 2019

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2018	2017	2016	2015	2014
Total Global Equity	**729,010,474**	**8.4**	**13.1**	**2.7**	**10.7**	**7.4**	**9.9**	**-8.5**	**22.8**	**6.9**	**1.6**	**4.5**
MSCI ACWI			*12.2*	*2.6*	*10.7*	*6.5*	*12.0*	*-9.4*	*24.0*	*7.9*	*-2.4*	*4.2*
Artisan Partners	364,329,832	4.2	16.4	3.3	14.0	10.4	--	-8.6	31.9	4.8	8.4	3.1
MSCI ACWI			*12.2*	*2.6*	*10.7*	*6.5*	--	*-9.4*	*24.0*	*7.9*	*-2.4*	*4.2*
First Eagle	364,525,432	4.2	9.8	2.1	7.2	5.0	--	-8.3	14.3	10.9	-0.6	3.7
MSCI ACWI			*12.2*	*2.6*	*10.7*	*6.5*	--	*-9.4*	*24.0*	*7.9*	*-2.4*	*4.2*
Private Credit	**332,187,982**	**3.8**	**-0.4**	**4.6**	**8.1**	**9.4**	**14.0**	**8.3**	**10.4**	**6.9**	**11.6**	**12.3**
ICE BofAML High Yield Master II +2%			*7.9*	*8.1*	*10.9*	*6.8*	*13.4*	*-0.3*	*9.6*	*19.8*	*-2.7*	*4.5*
Total High Yield	**350,887,176**	**4.0**	**8.3**	**5.9**	**7.4**	**3.6**	**9.7**	**-3.6**	**6.1**	**13.9**	**-3.9**	**0.8**
ICE BofAML High Yield Master II			*7.4*	*5.9*	*8.7*	*4.7*	*11.2*	*-2.3*	*7.5*	*17.5*	*-4.6*	*2.5*
Allianz Global Investors	350,887,176	4.0	8.3	5.9	7.4	3.6	9.5	-3.6	6.1	13.9	-3.9	0.8
ICE BofAML High Yield Master II			*7.4*	*5.9*	*8.7*	*4.7*	*11.2*	*-2.3*	*7.5*	*17.5*	*-4.6*	*2.5*
Total Real Estate	**758,503,763**	**8.7**	**4.3**	**9.8**	**8.6**	**10.3**	**13.7**	**7.4**	**11.0**	**4.8**	**12.4**	**19.1**
Real Estate Benchmark			*3.1*	*8.8*	*6.6*	*9.0*	*11.4*	*6.7*	*7.1*	*6.7*	*8.3*	*18.8*
NCREIF-ODCE			*1.4*	*7.5*	*8.0*	*10.2*	*8.7*	*8.3*	*7.6*	*8.8*	*15.0*	*12.5*
NCREIF Property Index			*1.8*	*6.8*	*7.1*	*9.1*	*8.5*	*6.7*	*7.0*	*8.0*	*13.3*	*11.8*
Adelante	73,518,175	0.8	17.4	18.8	5.9	9.2	18.6	-5.5	7.2	3.6	4.6	32.7
Wilshire REIT			*16.0*	*19.3*	*5.4*	*9.0*	*18.7*	*-4.8*	*4.2*	*7.2*	*4.2*	*31.8*
Private Equity	**962,522,748**	**11.1**	**1.5**	**13.5**	**10.7**	**10.5**	**10.1**	**12.1**	**11.9**	**8.9**	**9.9**	**15.2**
S&P 500 Index +4% (Lagged)			*-12.6*	*-0.5*	*13.6*	*12.8*	*17.6*	*22.6*	*23.3*	*20.0*	*3.4*	*24.5*
Risk Parity	**417,241,877**	**4.8**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
60% MSCI ACWI Net/40% BBgBarc Global Aggregate			--	--	--	--	--	--	--	--	--	--
AQR Global Risk Premium-EL	213,625,425	2.5	--	--	--	--	--	--	--	--	--	--
60% MSCI ACWI Net/40% BBgBarc Global Aggregate			--	--	--	--	--	--	--	--	--	--
PanAgora Risk Parity Multi Asset	203,616,452	2.3	--	--	--	--	--	--	--	--	--	--
60% MSCI ACWI Net/40% BBgBarc Global Aggregate			--	--	--	--	--	--	--	--	--	--

Individual closed end funds are not shown in performance summary table. AQR Global Risk Premium funded 1/18/2019. PanAgora Risk Parity funded 3/15/2019. Effective 7/1/2018, Private Credit and Private Equity data provided by StepStone Group.

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2018	2017	2016	2015	2014
Diversifying	**707,538,680**	**8.1**	**2.5**	**1.0**	**1.7**	**0.3**	**2.3**	**-2.3**	**2.6**	**0.8**	**-1.8**	**1.7**
Custom Diversifying Benchmark			*2.3*	*3.6*	*3.3*	*3.6*	*4.3*	*1.4*	*4.7*	*4.1*	*2.5*	*5.4*
Diversifying Fixed Income	**507,921,464**	**5.8**	**3.1**	**2.0**	**1.1**	**2.3**	**3.2**	**-2.0**	**2.6**	**2.3**	**1.1**	**6.1**
AFL-CIO	324,590,940	3.7	2.7	4.2	1.7	2.7	3.4	0.2	3.2	1.9	1.1	6.1
BBgBarc US Aggregate TR			*2.9*	*4.5*	*2.0*	*2.7*	*3.8*	*0.0*	*3.5*	*2.6*	*0.6*	*6.0*
Wellington Real Total Return	183,330,524	2.1	4.0	-1.7	2.3	-2.1	--	-5.6	1.9	-0.6	-5.4	-3.1
CPI + 4%			*2.2*	*5.9*	*6.3*	*5.5*	--	*6.0*	*6.2*	*6.2*	*4.8*	*4.8*
Diversifying Equity	**199,617,216**	**2.3**	**0.8**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
Parametric Defensive Equity	199,617,216	2.3	0.8	--	--	--	--	--	--	--	--	--
91 Day T-Bill +4%			*1.6*	--	--	--	--	--	--	--	--	--
Liquidity	**1,721,560,470**	**19.8**	**1.7**	**3.7**	**--**	**--**	**--**	**1.7**	**1.4**	**--**	**--**	**--**
BBgBarc US Govt/Credit 1-3 Yr. TR			*1.2*	*3.0*	--	--	--	*1.6*	*0.8*	--	--	--
DFA Short Credit	375,055,643	4.3	2.0	3.9	--	--	--	1.1	1.8	--	--	--
ICE BofAML 1-5 Yrs US Corp & Govt TR			*1.6*	*3.6*	--	--	--	*1.4*	*1.3*	--	--	--
Insight Short Duration	811,554,864	9.3	1.5	3.4	--	--	--	1.7	1.5	--	--	--
BBgBarc US Govt/Credit 1-3 Yr. TR			*1.2*	*3.0*	--	--	--	*1.6*	*0.8*	--	--	--
Sit Short Duration	534,949,963	6.1	1.9	4.3	--	--	--	2.3	1.1	--	--	--
BBgBarc US Govt 1-3 Yr TR			*1.0*	*2.7*	--	--	--	*1.6*	*0.4*	--	--	--
Total Cash	**61,335,201**	**0.7**	**0.7**	**2.1**	**1.4**	**0.1**	**--**	**1.7**	**0.9**	**0.9**	**0.1**	**-3.0**
91 Day T-Bills			*0.6*	*2.1*	*1.2*	*0.8*	--	*1.9*	*0.9*	*0.3*	*0.0*	*0.0*
Cash	60,308,465	0.7	0.7	2.1	1.3	1.0	2.9	1.7	0.9	0.9	0.1	1.4
State Street Cash/Tax Reclaims	667,189	0.0	--	--	--	--	--	--	--	--	--	--
Northern Trust Transition	359,547	0.0	--	--	--	--	--	--	--	--	--	--

Individual closed end funds are not shown in performance summary table. AQR Global Risk Premium funded 1/18/2019. PanAgora Risk Parity funded 3/15/2019. Effective 3/1/2019 the custodian of record switched from State Street to Northern Trust. State Street Cash/Tax Reclaims reflects $214,780 in cash and $452,409 in potential tax reclaims at State Street after assets were transferred to Northern Trust. Effective 7/1/2018, Private Credit and Private Equity data provided by StepStone Group.

Closing Date	Manager Name/Fund Name	Estimated Market Value as of 3/31/19[1]	StepStone Group Analysis (*) Total Commitment	% Called	Contributed Capital	Current Qtr. Change in Contributed Capital	Current Qtr. Change in Distributed Capital	Total Distributions	Remaining Commitment	Distrib./ Paid-In (DPI)[2]	Tot. Value/ Paid-In (TVPI)[3]	Latest Valuation
Private Credit												
8/31/2015	Angelo Gordon Energy Credit Opp.	$5,052,964	$16,500,000	114%	$18,750,000	$0	$701,250	$18,829,566	$2,319,783	*1.00*	*1.27*	*12/31/2018*
12/18/2017	Stepstone CC Opportunities Fund	$247,166,908	$650,000,000	39%	$250,275,660	$27,703,974	$0	$4,531,899	$404,248,804	*0.02*	*1.01*	*9/30/2018*
7/1/2006	Torchlight II	$1,145,418	$128,000,000	171%	$218,263,562	$25,270	$3,470,868	$207,716,693	$0	*0.95*	*0.96*	*3/31/2019*
12/12/2008	Torchlight III	$0	$75,000,000	112%	$83,825,058	$0	$0	$124,835,174	$0	*1.49*	*1.49*	*12/31/2018*
8/1/2012	Torchlight IV	$20,965,022	$60,000,000	141%	$84,578,688	$109,256	$2,983,869	$93,610,460	$0	*1.11*	*1.35*	*3/31/2019*
3/12/2015	Torchlight V	$57,857,670	$75,000,000	70%	$52,500,000	$7,500,000	$2,746,783	$7,486,557	$22,500,000	*0.14*	*1.24*	*12/31/2018*
	Total Private Credit	**$332,187,982**										
	% of Portfolio (Market Value)	*3.8%*										

*All Data provided by StepStone Group
[1]Latest valuation + capital calls - distributions
[2](DPI) is equal to (capital returned / capital called)
[3](TVPI) is equal to (market value + capital returned) / capital called

			Verus Internal Analysis									
Inception Date	Manager Name/Fund Name	Estimated Market Value as of 3/31/2019[3]	Total Commitment	Total % Called	Capital Called	Current Qtr. Capital Called	Current Qtr. Distributions	Total Distributions[5]	Remaining Commitment	Distrib./ Paid-In (DPI)[1]	Tot. Value/ Paid-In (TVPI)[2]	Latest Valuation
Real Estate												
1/23/2012	Angelo Gordon Realty Fund VIII	$25,163,270	$80,000,000	94%	$75,401,855	$0	$800,000	$96,167,757	$12,334,302	1.28	1.61	12/31/2018
12/8/2014	Angelo Gordon Realty Fund IX	$59,726,864	$65,000,000	86%	$55,575,000	$0	$0	$8,775,000	$12,122,500	0.16	1.23	12/31/2018
6/23/2005	DLJ RECP III	$21,349,088	$75,000,000	95%	$70,968,662	$0	$0	$72,565,242	$4,031,338	1.02	1.32	12/31/2018
2/11/2008	DLJ RECP IV	$93,647,227	$100,000,000	95%	$95,460,264	$0	$0	$67,629,710	$4,539,736	0.71	1.69	12/31/2018
7/1/2014	DLJ RECP V	$62,861,651	$75,000,000	119%	$89,111,208	$9,179,523	$0	$50,780,984	$15,764,044	0.57	1.28	12/31/2018
3/19/2019	DLJ RECP VI	$16,344,040	$50,000,000	33%	$16,344,040	$16,344,040	$0	$0	$33,655,960	0.00	1.00	---
6/17/1998	Hearthstone II[4]	$1,186	$25,000,000	80%	$19,932,386	$0	$0	$19,952,734	$2,520,348	1.00	1.00	12/31/2018
11/26/2007	Invesco Real Estate II	$425,482	$85,000,000	92%	$78,202,813	$0	$0	$100,620,489	$6,797,187	1.29	1.29	3/31/2019
6/30/2013	Invesco Real Estate III	$8,705,832	$35,000,000	93%	$32,386,423	$0	$3,054,723	$36,041,941	$2,613,577	1.11	1.38	3/31/2019
6/30/2014	Invesco Real Estate IV	$25,023,593	$35,000,000	85%	$29,808,739	$0	$2,811,512	$12,188,039	$5,191,261	0.41	1.25	3/31/2019
6/30/2013	Invesco Real Estate V	$10,129,046	$75,000,000	14%	$10,634,714	$10,634,714	$0	$0	$64,365,286	0.00	0.95	12/31/2018
7/16/2013	LaSalle Income & Growth VI	$28,322,599	$75,000,000	95%	$71,428,571	$0	$27,120	$78,332,171	$3,571,429	1.10	1.49	12/31/2018
2/28/2017	LaSalle Income & Growth VII	$57,476,021	$75,000,000	77%	$58,042,603	$3,817,741	$0	$12,113,858	$16,957,397	0.21	1.20	12/31/2018
7/3/2013	Long Wharf Fund IV	$10,870,744	$25,000,000	100%	$25,000,000	$0	$1,578,221	$25,064,115	$0	1.00	1.44	12/31/2018
9/30/2016	Long Wharf Fund V	$50,541,552	$50,000,000	100%	$50,000,000	$0	$571,233	$7,540,272	$0	0.15	1.16	12/31/2018
12/31/2011	Oaktree REOF V	$5,049,657	$50,000,000	100%	$50,000,000	$0	$0	$80,116,587	$25,750,000	1.60	1.70	3/31/2019
9/30/2013	Oaktree REOF VI	$36,361,998	$80,000,000	100%	$80,000,000	$0	$3,422,467	$77,100,872	$18,400,000	0.96	1.42	3/31/2019
4/1/2015	Oaktree REOF VII	$35,511,736	$65,000,000	47%	$30,745,000	$0	$0	$4,615,000	$38,870,000	0.15	1.31	3/31/2019
11/10/2013	Paulson Real Estate Fund II	$25,594,598	$20,000,000	97%	$19,345,623	$0	$878,850	$5,664,954	$654,377	0.29	1.62	12/31/2018
1/25/2012	Siguler Guff DREOF[6]	$34,279,108	$75,000,000	94%	$70,725,000	$1,350,000	$23,680	$89,729,348	$4,275,000	1.27	1.75	12/31/2018
8/31/2013	Siguler Guff DREOF II[6]	$52,497,455	$70,000,000	84%	$59,045,000	$1,925,000	$775,000	$30,383,106	$10,955,000	0.51	1.40	12/31/2018
1/27/2016	Siguler Guff DREOF II Co-Inv[6]	$25,102,841	$25,000,000	82%	$20,537,862	$0	$0	$972,301	$4,462,138	0.05	1.27	12/31/2018
	Total Closed End Real Estate	**$684,985,588**	$1,310,000,000	85%	$1,108,695,764	$43,251,018	$13,942,805	$876,354,481	$287,830,879	0.79	1.41	
	% of Portfolio (Market Value)	7.9%										

[1](DPI) is equal to (capital returned / capital called)
[2](TVPI) is equal to (market value + capital returned) / capital called
[3]Latest valuation + capital calls - distributions
[4]No further capital to be called
[5]Total distributions may include recallable distributions
[6]12/31/2018 valuation is based on a capital account estimate provided by the manager.

StepStone Group Analysis (*)

Closing Date	Manager Name/Fund Name	Estimated Market Value as of 3/31/19[1]	Total Commitment	Total % Called	Contributed Capital	Current Qtr. Change in Contributed Capital	Current Qtr. Change in Distributed Capital	Total Distributions	Remaining Commitment	Distrib./ Paid-In (DPI)[2]	Tot. Value/ Paid-In (TVPI)[3]	Latest Valuation
Private Equity & Venture Capital												
2/11/2004	Adams Street Partners	$146,394,890	$210,000,000	87%	$183,283,125	$1,500,000	$3,641,393	$136,761,448	$26,716,875	0.75	1.54	12/31/2018
12/31/2008	Adams Street Partners II	$8,387,565	$30,000,000	95%	$28,365,000	$0	$0	$39,234,007	$1,635,000	1.38	1.68	12/31/2018
12/31/2008	Adams Street Partners - Fund 5	$22,486,488	$40,000,000	77%	$30,611,900	$0	$0	$14,184,722	$9,388,100	0.46	1.20	12/31/2018
1/18/1996	Adams Street Partners - BPF	$1,944,353	$59,565,614	97%	$57,517,409	$0	$328,493	$102,566,990	$2,048,205	1.78	1.82	12/31/2018
3/31/2016	Adams Street Venture Innovation	$30,925,603	$75,000,000	39%	$28,912,500	$3,750,000	$0	$0	$46,087,500	0.00	1.07	12/31/2018
5/18/2018	AE Industrial Partners Fund II, LP	-$61,035	$35,000,000	0%	$0	$0	$0	$0	$35,000,000	-	-	12/31/2018
11/27/2013	Aether Real Assets III	$21,830,643	$25,000,000	85%	$21,237,673	$261,709	$1,218,486	$3,321,762	$5,585,822	0.16	1.18	9/30/2018
11/30/2013	Aether Real Assets III Surplus	$52,566,176	$50,000,000	95%	$47,252,294	$360,973	$3,868,893	$7,754,397	$5,442,210	0.16	1.28	9/30/2018
1/30/2016	Aether Real Assets IV	$30,325,423	$50,000,000	54%	$27,030,209	$1,840,944	$157,497	$1,687,478	$24,644,611	0.06	1.18	9/30/2018
11/26/2003	Bay Area Equity Fund I	$3,112,874	$10,000,000	100%	$10,000,000	$0	$686,776	$37,018,019	$0	3.70	4.01	12/31/2018
11/26/2003	Bay Area Equity Fund II	$10,928,292	$10,000,000	100%	$10,000,000	$0	$0	$2,026,313	$0	0.20	1.30	12/31/2018
1/16/2008	Carpenter Bancfund	$0	$30,000,000	98%	$29,314,657	$0	$0	$49,128,304	$0	1.68	1.68	9/30/2018
6/30/2013	Commonfund	$48,560,389	$50,000,000	87%	$43,324,995	$550,000	$0	$7,107,576	$6,675,005	0.16	1.28	9/30/2018
11/26/2003	EIF US Power Fund I	$0	$30,000,000	130%	$38,960,280	$0	$0	$64,468,378	$0	1.65	1.65	12/27/2018
7/15/2005	EIF US Power Fund II	$10,058,567	$50,000,000	130%	$65,029,556	$0	$10,162,530	$71,810,826	$1	1.10	1.26	9/30/2018
5/31/2007	EIF US Power Fund III	$22,371,720	$65,000,000	110%	$71,430,128	$0	$836,342	$72,613,115	$0	1.02	1.33	9/30/2018
8/31/2010	EIF US Power Fund IV	$45,822,897	$50,000,000	125%	$62,289,277	$2,663,689	$0	$25,225,856	$1,457,015	0.40	1.14	12/31/2018
11/28/2016	EIF US Power Fund V	$39,896,759	$50,000,000	89%	$44,311,703	$0	$12,500	$6,044,713	$9,878,568	0.14	1.04	12/31/2018
2/21/2019	Genstar Capital Partners IX, L.P.	$0	$50,000,000	0%	$0	$0	$0	$0	$50,000,000	-	-	-
2/12/2004	Nogales	$0	$15,000,000	120%	$18,026,408	$0	$0	$13,856,249	$0	0.77	0.77	12/22/2017
2/28/2010	Oaktree PIF 2009	$7,199,120	$40,000,000	87%	$34,816,108	$3,660	$1,599,506	$40,787,270	$6,308,961	1.17	1.38	12/31/2018
8/15/2013	Ocean Avenue Fund II	$29,190,818	$30,000,000	87%	$26,100,000	$900,000	$900,000	$10,940,744	$3,900,000	0.42	1.54	12/31/2018
4/15/2016	Ocean Avenue Fund III	$39,599,071	$50,000,000	66%	$33,000,000	$5,000,000	$500,000	$6,000,000	$17,000,000	0.18	1.38	12/31/2018
11/30/2007	Paladin III	$27,628,653	$25,000,000	132%	$33,058,868	$0	$0	$23,594,952	$654,627	0.71	1.55	12/31/2018
8/22/2011	Pathway 6	$37,077,862	$40,000,000	93%	$37,331,798	$400,951	$1,010,869	$19,689,412	$4,748,704	0.53	1.52	9/30/2018
7/10/2013	Pathway 7	$65,262,643	$70,000,000	89%	$62,513,255	$1,849,810	$2,622,047	$16,570,317	$10,060,049	0.27	1.31	9/30/2018
11/23/2015	Pathway 8	$39,020,947	$50,000,000	68%	$33,857,982	$1,774,259	$303,732	$3,962,372	$17,523,923	0.12	1.27	9/30/2018
1/19/1999	Pathway	$20,713,141	$125,000,000	100%	$124,584,452	$70,951	$1,432,618	$168,399,240	$11,151,176	1.35	1.52	9/30/2018
7/31/2009	Pathway 2008	$21,080,276	$30,000,000	96%	$28,758,434	$94,139	$951,312	$25,650,530	$3,521,080	0.89	1.62	9/30/2018
6/3/2014	Siguler Guff CCCERA Opportunities	$153,874,269	$200,000,000	71%	$141,405,741	$2,253,241	$0	$41,905,281	$68,181,254	0.30	1.38	12/31/2018
8/31/2013	Siguler Guff Secondary Opportunities	$6,031,997	$50,000,000	60%	$29,999,802	$0	$4,347,076	$42,638,494	$51,812,494	1.42	1.62	9/30/2018
5/18/2018	Siris Partners IV, L.P.	$4,694,447	$35,000,000	15%	$5,340,331	$5,340,331	$0	$0	$29,659,669	0.00	0.88	12/31/2018
12/8/2015	Wastewater Opportunity Fund	$15,597,901	$25,000,000	73%	$18,184,010	$1,808,053	$0	$2,031,922	$6,838,217	0.11	0.97	12/31/2018
	Total Private Equity and Venture Capital	**$962,522,748**	$1,754,565,614	81%	$1,425,847,894	$30,422,712	$34,580,069	$1,056,980,690	$455,919,065	0.74	1.42	
	% of Portfolio (Market Value)	*11.1%*										

* All Data provided by StepStone Group
[1]Latest valuation + capital calls - distributions
[2](DPI) is equal to (capital returned / capital called)
[3](TVPI) is equal to (market value + capital returned) / capital called

Private Credit	Inception	Fund Level (G)	CCCERA (G)	Fund Level (N)	CCCERA (N)	IRR Date
Angelo Gordon Energy Cred Opp.	09/24/2015	-	-		12.1%	12/31/2018
Stepstone CC Opportunities Fund[1]	02/02/2018	-	-	-	-	-
Torchlight II	07/01/2006	0.0%	0.2%	-1.2%	-1.0%	03/31/2019
Torchlight III	12/12/2008	18.3%	16.3%	13.7%	13.8%	06/30/2018
Torchlight IV	08/01/2012	13.5%	13.8%	10.5%	11.1%	03/31/2019
Torchlight V	03/12/2015	20.8%	20.8%	13.5%	13.4%	12/31/2018

Real Estate	Inception	Fund Level (G)	CCCERA (G)	Fund Level (N)	CCCERA (N)	IRR Date
Angelo Gordon VIII	01/23/2012	-	-	-	15.6%	12/31/2018
Angelo Gordon IX	12/08/2014	-	-	-	12.2%	12/31/2018
DLJ RECP III	06/23/2005	0.0%	0.0%	-2.0%	-2.0%	12/31/2018
DLJ RECP IV	02/11/2008	7.0%	7.0%	4.0%	5.0%	12/31/2018
DLJ RECP V	07/01/2014	26.0%	26.0%	15.0%	15.0%	12/31/2018
DLJ RECP VI[1]	03/19/2019	-	-	-	-	-
Hearthstone II	06/17/1998	-	30.1%	-	30.1%	12/31/2018
Invesco Fund III	06/30/2013	17.2%	-	13.6%	-	12/31/2018
Invesco Fund IV	06/30/2014	17.9%	-	13.1%	-	12/31/2018
Invesco Fund V[1]	02/20/2019	-	-	-	-	-
LaSalle Income & Growth VI	07/16/2013	15.4%	15.4%	12.8%	12.8%	12/31/2018
LaSalle Income & Growth VII	02/28/2017	14.6%	15.0%	11.8%	12.0%	12/31/2018
Long Wharf IV	07/03/2013	17.2%	17.3%	12.4%	12.4%	03/31/2019
Long Wharf V	09/30/2016	16.8%	18.7%	10.8%	11.9%	03/31/2019
Oaktree REOF V	12/31/2011	17.0%	-	12.5%	-	03/31/2019
Oaktree REOF VI	09/30/2013	14.8%	-	9.9%	-	03/31/2019
Oaktree REOF VII	04/01/2015	62.5%	-	34.8%	-	03/31/2019
Paulson	11/10/2013	14.6%	-	13.1%	-	12/31/2018
Siguler Guff I[4]	01/25/2012	14.8%	17.3%	13.2%	14.1%	12/31/2018
Siguler Guff II[4]	08/31/2013	13.6%	13.3%	12.2%	11.0%	12/31/2018
Siguler Guff DREOF II Co-Inv[4]	01/27/2016	17.0%	17.1%	15.9%	13.5%	12/31/2018

[1]Manager has yet to report IRR figure due to no capital invested or meaningful distributions.
[2]Fund level data includes CCCERA and all other fund investors.
[3]Net IRR calculated after deductions of management fees and carried interest to the General Partner.
[4]Manager has provided estimated IRR data since Q4 reporting has not been finalized.

Private Equity & Venture Capital	Closing Date	Fund Level (G)	CCCERA (G)	Fund Level (N)	CCCERA (N)	IRR Date
Adams Street Partners	2/11/2004	11.5%	12.6%	-	10.1%	*12/31/2018*
Adams Street Partners II	12/31/2008	16.6%	17.0%	-	14.5%	*12/31/2018*
Adams Street Partners - Fund 5	12/31/2008	8.9%	8.8%	-	6.4%	*12/31/2018*
Adams Street Partners Venture	1/18/1996	23.4%	23.3%	-	13.0%	*12/31/2018*
Adams Street Partners - BPF	3/31/2016	14.3%	14.3%	-	11.6%	*12/31/2018*
AE Industrial Partners Fund II, LP[1]	5/18/2018	-	-	-	-	-
Aether Real Assets III	11/27/2013	10.4%	-	7.6%	-	*9/30/2018*
Aether Real Assets III Surplus	11/30/2013	11.5%	-	9.8%	-	*9/30/2018*
Aether Real Assets IV	1/30/2016	23.5%	-	17.3%	-	*9/30/2018*
Bay Area Equity Fund I	11/26/2003	25.8%	25.8%	23.2%	23.2%	*12/31/2018*
Bay Area Equity Fund II	11/26/2003	5.4%	5.4%	4.5%	4.5%	*12/31/2018*
CommonFund	6/30/2013	-	-	-	10.3%	*9/30/2018*
EIF US Power Fund I	11/26/2003	33.5%	34.7%	28.5%	28.3%	*12/31/2018*
EIF US Power Fund II	7/15/2005	6.7%	6.2%	4.1%	3.6%	*12/31/2018*
EIF US Power Fund III	5/31/2007	7.4%	7.4%	5.0%	5.0%	*12/31/2018*
EIF US Power Fund IV	8/31/2010	9.3%	9.5%	5.3%	5.1%	*12/31/2018*
EIF US Power Fund V	11/28/2016	15.6%	14.0%	6.4%	5.5%	*12/31/2018*
Genstar Capital Partners IX, L.P.[1]	2/21/2019	-	-	-	-	-
Oaktree PIF 2009	2/28/2010	7.0%	-	6.9%	-	*3/31/2019*
Ocean Avenue Fund II	8/15/2013	-	-	15.9%	-	*12/31/2018*
Ocean Avenue Fund III	4/15/2016	-	-	35.9%	-	*12/31/2018*
Paladin III	11/30/2007	16.9%	-	9.2%	-	*12/31/2018*
Pathway 6	8/22/2011	15.7%	15.7%	13.0%	13.0%	*12/31/2018*
Pathway 7	7/10/2013	14.8%	14.8%	11.9%	11.9%	*9/30/2018*
Pathway 8	11/23/2015	20.5%	20.8%	18.2%	19.1%	*12/31/2018*
Pathway Private Equity Fund	1/19/1999	10.2%	10.2%	8.4%	8.4%	*12/31/2018*
Pathway Private Equity Fund 2008	7/31/2009	14.6%	14.6%	12.0%	12.0%	*12/31/2018*
Siguler Guff CCCERA Opportunities	6/3/2014	20.5%	21.1%	19.9%	17.8%	*12/31/2018*
Siguler Guff Secondary Opportunities	8/31/2013	55.7%	413.2%	50.0%	202.6%	*9/30/2018*
Siris Partners IV, L.P.[1]	5/18/2018	-	-	-	-	-
Wastewater Opportunity Fund	12/8/2015	8.7%	-	-1.5%	-	*12/31/2018*

[1]Manager has yet to report IRR figure due to no capital invested or meaningful distributions.
[2]Fund level data includes CCCERA and all other fund investors.
[3]Net IRR calculated after deductions of management fees and carried interest to the General Partner.

Performance Analysis - 3 Years (Net of Fees)

3 Years

	Anlzd Ret	Ann Excess BM Return	Anlzd Std Dev	Anlzd Alpha	Beta	Tracking Error	R-Squared	Sharpe Ratio	Info Ratio	Up Mkt Cap Ratio	Down Mkt Cap Ratio
Jackson Square Partners	12.55%	-3.99%	12.63%	-3.29%	0.96	4.83%	0.86	0.90	-0.82	87.06%	110.33%
Boston Partners	11.08%	0.63%	11.84%	-0.16%	1.08	3.18%	0.93	0.83	0.20	102.59%	97.96%
Emerald Advisers	17.37%	2.50%	17.56%	1.81%	1.05	4.33%	0.94	0.92	0.58	102.99%	90.14%
Ceredex	9.13%	-1.73%	14.16%	0.14%	0.83	5.47%	0.89	0.56	-0.32	81.26%	89.43%
Pyrford	5.47%	-2.26%	8.75%	0.13%	0.69	5.60%	0.74	0.48	-0.40	59.00%	66.04%
William Blair	7.58%	-0.84%	11.72%	-1.06%	1.03	2.88%	0.94	0.54	-0.29	95.67%	101.09%
Artisan Partners	13.99%	3.32%	12.56%	2.02%	1.12	5.76%	0.80	1.02	0.58	132.54%	114.19%
First Eagle	7.22%	-3.45%	7.44%	-0.32%	0.71	3.74%	0.90	0.81	-0.92	60.62%	67.23%
Allianz Global Investors	7.37%	-1.31%	4.44%	-0.64%	0.92	1.33%	0.92	1.38	-0.99	88.65%	106.17%
Adelante	5.93%	0.48%	13.08%	0.81%	0.94	1.92%	0.98	0.36	0.25	91.11%	90.44%
AFL-CIO	1.71%	-0.32%	2.63%	-0.02%	0.85	0.80%	0.93	0.18	-0.40	81.54%	81.92%
Wellington Real Total Return	2.32%	-3.96%	4.10%	-1.53%	0.61	4.08%	0.02	0.27	-0.97	44.99%	23,204.41%

Performance Analysis excludes closed end funds and those funds without 3 years of performance.

Performance Analysis - 5 Years (Net of Fees)

	5 Years										
	Anlzd Ret	Ann Excess BM Return	Anlzd Std Dev	Anlzd Alpha	Beta	Tracking Error	R-Squared	Sharpe Ratio	Info Ratio	Up Mkt Cap Ratio	Down Mkt Cap Ratio
Jackson Square Partners	9.84%	-3.66%	12.52%	-2.85%	0.94	4.90%	0.85	0.73	-0.75	84.13%	106.79%
Boston Partners	7.31%	-0.41%	12.28%	-1.00%	1.08	3.10%	0.94	0.53	-0.13	101.34%	103.72%
Emerald Advisers	10.13%	1.72%	18.33%	1.43%	1.03	5.03%	0.93	0.51	0.34	109.59%	99.34%
Ceredex	6.33%	0.74%	14.32%	1.58%	0.85	5.49%	0.88	0.39	0.13	84.67%	89.29%
William Blair	3.61%	-0.40%	11.78%	-0.26%	0.96	2.76%	0.95	0.24	-0.15	90.22%	95.93%
Artisan Partners	10.43%	3.98%	12.76%	3.66%	1.05	5.32%	0.83	0.76	0.75	123.78%	92.87%
First Eagle	4.97%	-1.48%	8.07%	0.55%	0.69	4.44%	0.88	0.52	-0.33	56.44%	67.12%
Allianz Global Investors	3.58%	-1.12%	5.26%	-0.84%	0.94	1.18%	0.95	0.54	-0.95	87.11%	100.75%
Adelante	9.23%	0.23%	14.02%	0.70%	0.95	1.81%	0.99	0.60	0.13	91.72%	93.88%
AFL-CIO	2.66%	-0.08%	2.57%	0.27%	0.87	0.74%	0.94	0.74	-0.11	87.42%	81.08%
Wellington Real Total Return	-2.12%	-7.65%	5.49%	-9.98%	1.42	5.32%	0.07	-0.52	-1.44	-11.89%	1,080.85%

Performance Analysis excludes closed end funds and those funds without 5 years of performance.

Investment Fund Fee Analysis

Period Ending: March 31, 2019

Name	Asset Class	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
BlackRock Russell 1000 Index	Growth	0.03% of Assets	$130,255,255	$39,077	0.03%
Jackson Square Partners	Growth	0.50% of First 100.0 Mil, 0.40% of Next 150.0 Mil, 0.35% Thereafter	$267,467,206	$1,161,135	0.43%
Boston Partners	Growth	0.50% of First 25.0 Mil, 0.30% Thereafter	$259,192,532	$827,578	0.32%
Emerald Advisers	Growth	0.75% of First 10.0 Mil, 0.60% Thereafter	$214,991,467	$1,304,949	0.61%
Ceredex	Growth	0.85% of First 10.0 Mil, 0.68% of Next 40.0 Mil, 0.51% Thereafter	$170,142,627	$969,727	0.57%
Pyrford	Growth	0.70% of First 50.0 Mil, 0.50% of Next 50.0 Mil, 0.35% Thereafter	$454,787,198	$1,841,755	0.40%
William Blair	Growth	0.80% of First 20.0 Mil, 0.60% of Next 30.0 Mil, 0.50% of Next 50.0 Mil, 0.45% of Next 50.0 Mil, 0.40% of Next 50.0 Mil, 0.30% Thereafter	$469,522,194	$1,823,567	0.39%
PIMCO RAE Emerging Markets	Growth	0.75% of First 50.0 Mil, 0.68% of Next 50.0 Mil, 0.50% of Next 100.0 Mil, 0.45% Thereafter	$343,874,286	$1,859,934	0.54%
TT Emerging Markets	Growth	0.70% of First 100.0 Mil, 0.65% of Next 100.0 Mil, 0.60% Thereafter	$331,436,277	$2,138,618	0.65%
Artisan Partners	Growth	0.75% of Assets	$364,329,832	$2,732,474	0.75%
First Eagle	Growth	0.75% of Assets	$364,525,432	$2,733,941	0.75%
Allianz Global Investors	Growth	0.50% of First 50.0 Mil, 0.40% of Next 50.0 Mil, 0.35% Thereafter	$350,887,176	$1,328,105	0.38%
AQR Global Risk Premium-EL	Growth	0.38% of Assets	$213,625,425	$811,777	0.38%

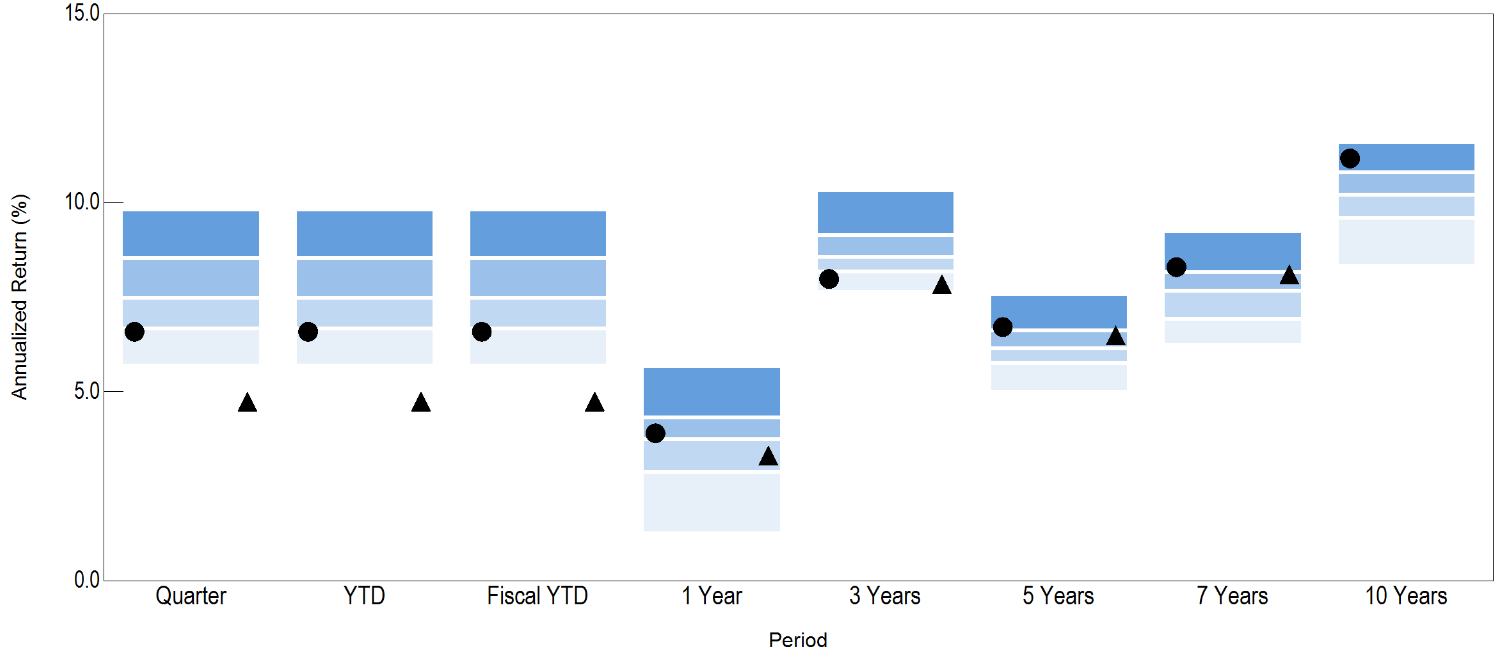
Mutual fund fees shown are sourced from Morningstar and are as of the most current prospectus.

Name	Asset Class	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
PanAgora Risk Parity Multi Asset	Growth	0.35% of Assets	$203,616,452	$712,658	0.35%
AFL-CIO	Diversifying	0.43% of Assets	$324,590,940	$1,395,741	0.43%
Wellington Real Total Return	Diversifying	0.35% of Assets	$183,330,524	$641,657	0.35%
Parametric Defensive Equity	Diversifying	0.42% of First 200.0 Mil, 0.39% Thereafter	$199,617,216	$838,392	0.42%
DFA Short Credit	Liquidity	0.20% of First 25.0 Mil, 0.10% Thereafter	$375,055,643	$400,056	0.11%
Insight Short Duration	Liquidity	0.06% of First 500.0 Mil, 0.05% of Next 500.0 Mil, 0.04% Thereafter	$811,554,864	$455,777	0.06%
Sit Short Duration	Liquidity	0.15% of Assets	$534,949,963	$802,425	0.15%

Mutual fund fees shown are sourced from Morningstar and are as of the most current prospectus.

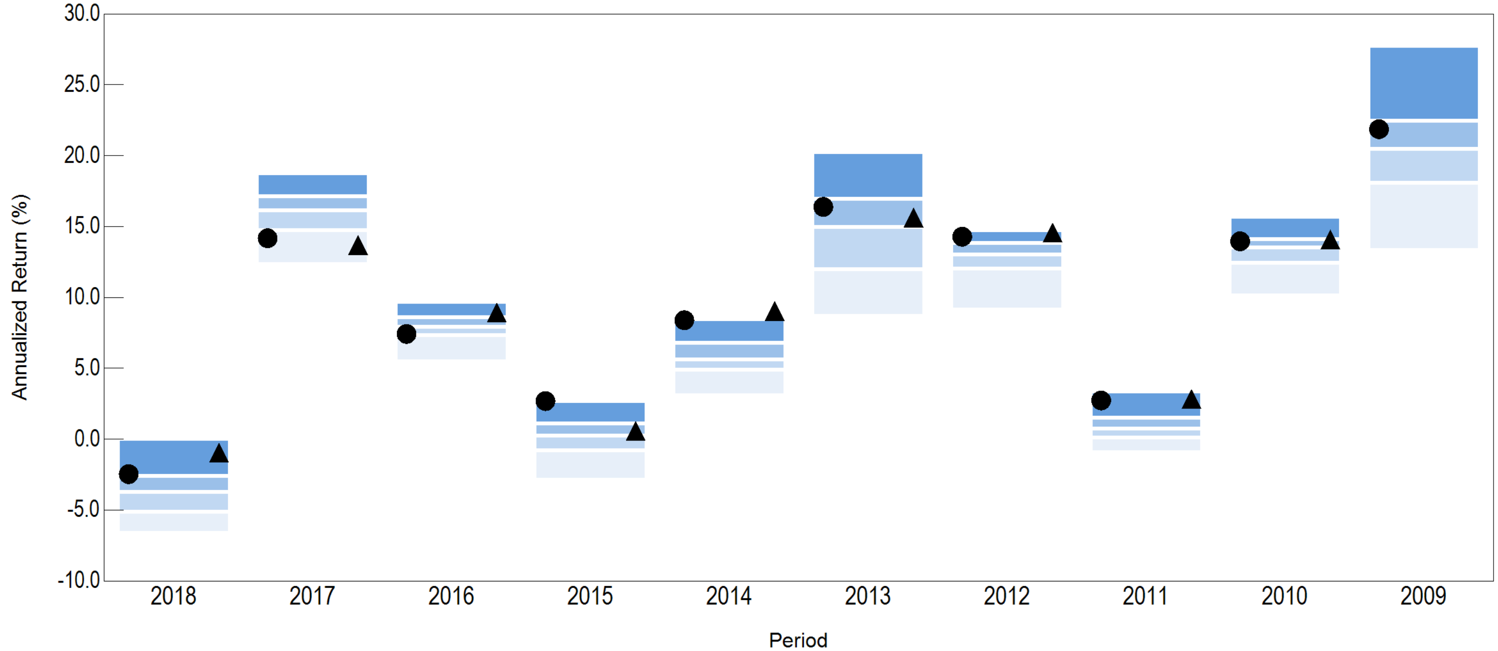
Total Fund
Peer Universe Comparison: Cumulative Performance (Gross of Fees) — Period Ending: March 31, 2019

Total Fund Cumulative Performance vs. InvestorForce Public DB > $1B Gross



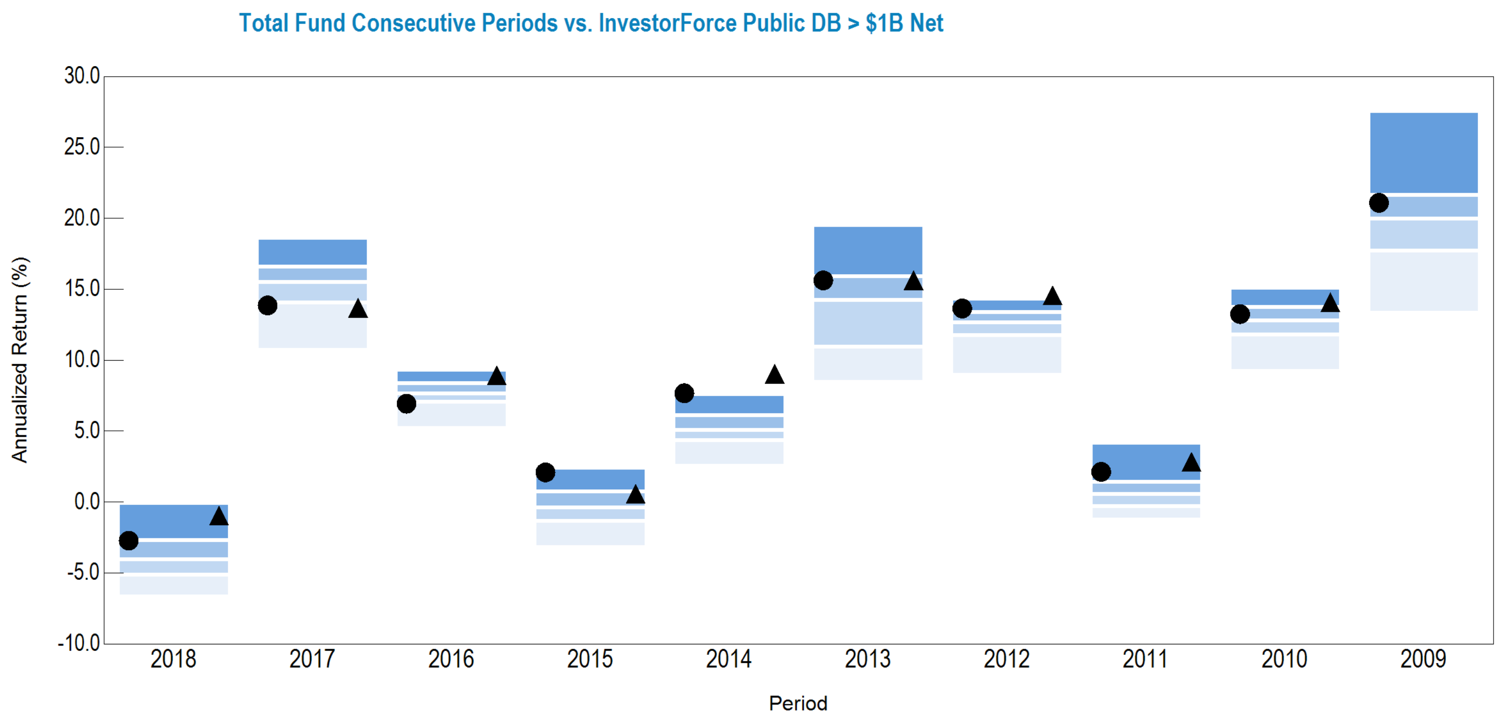
Return (Rank)	Quarter		YTD		Fiscal YTD		1 Year		3 Years		5 Years		7 Years		10 Years	
5th Percentile	9.8		9.8		9.8		5.7		10.3		7.6		9.2		11.6	
25th Percentile	8.5		8.5		8.5		4.3		9.2		6.6		8.2		10.8	
Median	7.5		7.5		7.5		3.7		8.6		6.2		7.7		10.2	
75th Percentile	6.7		6.7		6.7		2.9		8.2		5.8		6.9		9.6	
95th Percentile	5.7		5.7		5.7		1.3		7.6		5.0		6.3		8.3	
# of Portfolios	92		92		92		91		91		89		87		83	
● Total Fund	6.6	(79)	6.6	(79)	6.6	(79)	3.9	(37)	8.0	(87)	6.7	(22)	8.3	(20)	11.2	(14)
▲ Policy Index	4.7	(99)	4.7	(99)	4.7	(99)	3.3	(67)	7.8	(91)	6.5	(31)	8.1	(28)	--	(--)

Effective 1/01/2017, only traditional asset class (public equity, public fixed income, REITs) investment management fees will be included in the gross of fee return calculation.



	Return (Rank)																			
5th Percentile	0.0		18.8		9.7		2.7		8.5		20.2		14.7		3.3		15.7		27.7	
25th Percentile	-2.6		17.2		8.6		1.1		6.8		17.0		13.9		1.6		14.2		22.5	
Median	-3.7		16.2		8.0		0.3		5.7		15.0		13.0		0.8		13.5		20.5	
75th Percentile	-5.1		14.8		7.4		-0.7		4.9		12.0		12.1		0.1		12.5		18.1	
95th Percentile	-6.6		12.4		5.5		-2.8		3.1		8.7		9.2		-0.9		10.2		13.4	
# of Portfolios	71		98		92		98		79		67		74		68		66		66	
● **Total Fund**	-2.5	(25)	14.2	(83)	7.4	(74)	2.7	(5)	8.4	(6)	16.4	(33)	14.3	(13)	2.7	(9)	14.0	(29)	21.9	(34)
▲ **Policy Index**	-0.9	(8)	13.7	(89)	8.9	(15)	0.6	(40)	9.0	(2)	15.6	(43)	14.6	(8)	2.8	(9)	14.1	(27)	--	(--)

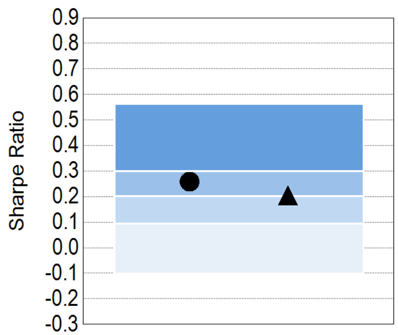
Effective 1/01/2017, only traditional asset class (public equity, public fixed income, REITs) investment management fees will be included in the gross of fee return calculation.

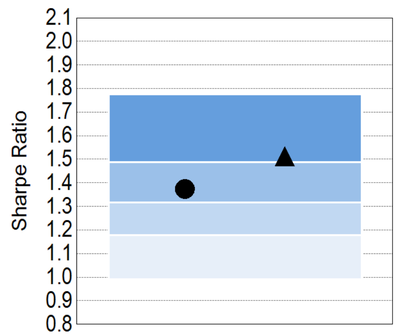


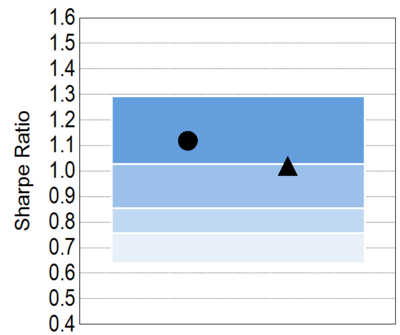
Return (Rank)	2018		2017		2016		2015		2014		2013		2012		2011		2010		2009	
5th Percentile	-0.1		18.6		9.3		2.4		7.6		19.5		14.3		4.2		15.1		27.5	
25th Percentile	-2.7		16.6		8.4		0.8		6.1		16.0		13.4		1.5		13.8		21.7	
Median	-4.0		15.6		7.7		-0.4		5.1		14.3		12.7		0.6		12.8		20.0	
75th Percentile	-5.1		14.1		7.1		-1.3		4.4		11.0		11.8		-0.3		11.8		17.7	
95th Percentile	-6.6		10.7		5.3		-3.2		2.6		8.5		9.0		-1.2		9.3		13.4	
# of Portfolios	63		61		62		57		55		48		44		42		41		40	
● Total Fund	-2.7	(27)	13.9	(81)	6.9	(78)	2.1	(12)	7.7	(5)	15.6	(33)	13.6	(21)	2.1	(12)	13.3	(34)	21.1	(33)
▲ Policy Index	-0.9	(8)	13.7	(85)	8.9	(13)	0.6	(29)	9.0	(2)	15.6	(33)	14.6	(1)	2.8	(11)	14.1	(15)	--	(--)

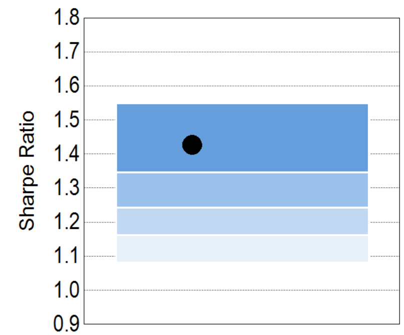
Total Fund
Sharpe Ratio Ranking (Gross of Fees)

Period Ending: March 31, 2019









	1 Year	3 Year	5 Year	10 Year
● Total Fund				
Value	0.3	1.4	1.1	1.4
Rank	32	41	10	10
▲ Policy Index				
Value	0.2	1.5	1.0	--
Rank	52	23	26	--
Universe				
5th %tile	0.6	1.8	1.3	1.5
25th %tile	0.3	1.5	1.0	1.3
Median	0.2	1.3	0.9	1.2
75th %tile	0.1	1.2	0.8	1.2
95th %tile	-0.1	1.0	0.6	1.1

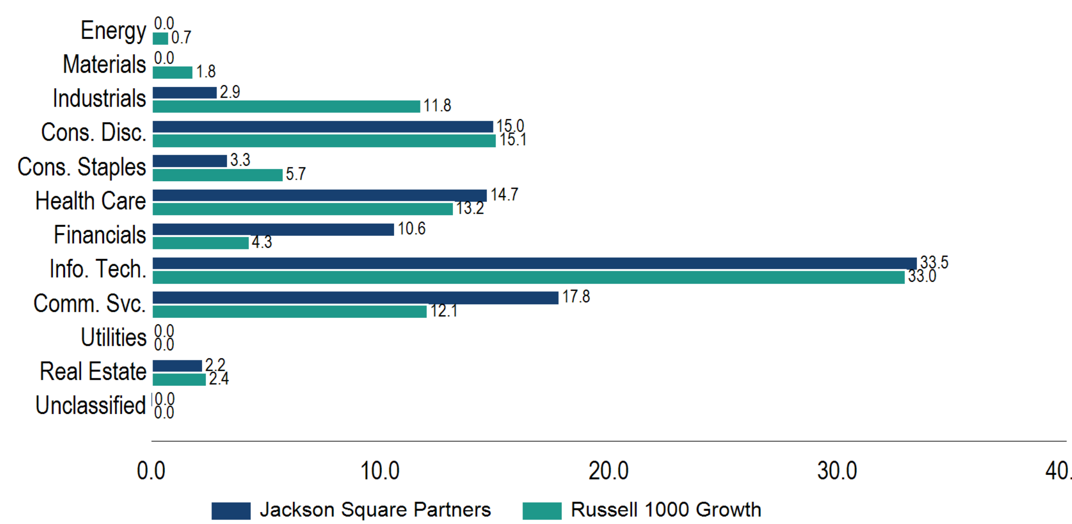
Domestic Equity Managers

Domestic equity large cap growth portfolio concentrated in companies with sustainable long-term growth characteristics. Primary personnel include Jeffrey Van Harte, Christopher Bonavico, Christopher Ericksen, and Daniel Prislin.

Characteristics

	Portfolio	Russell 1000 Growth
Number of Holdings	29	545
Weighted Avg. Market Cap. ($B)	169.68	262.28
Median Market Cap. ($B)	46.08	11.70
Price To Earnings	25.84	24.26
Price To Book	4.74	6.92
Price To Sales	2.87	2.84
Return on Equity (%)	22.10	38.85
Yield (%)	0.91	1.28
Beta	0.85	1.00

Sector Allocation (%) vs Russell 1000 Growth



Largest Holdings

	End Weight	Return
MICROSOFT	9.93	16.62
IQVIA HOLDINGS	6.16	23.83
KKR AND A	5.09	20.31
DOLLAR TREE	4.62	16.30
DOLLAR GENERAL	4.39	10.66
PAYPAL HOLDINGS	4.19	23.49
HASBRO	4.13	5.37
MASTERCARD	4.08	25.02
AUTODESK	4.06	21.16
VISA 'A'	3.95	18.59

Top Contributors

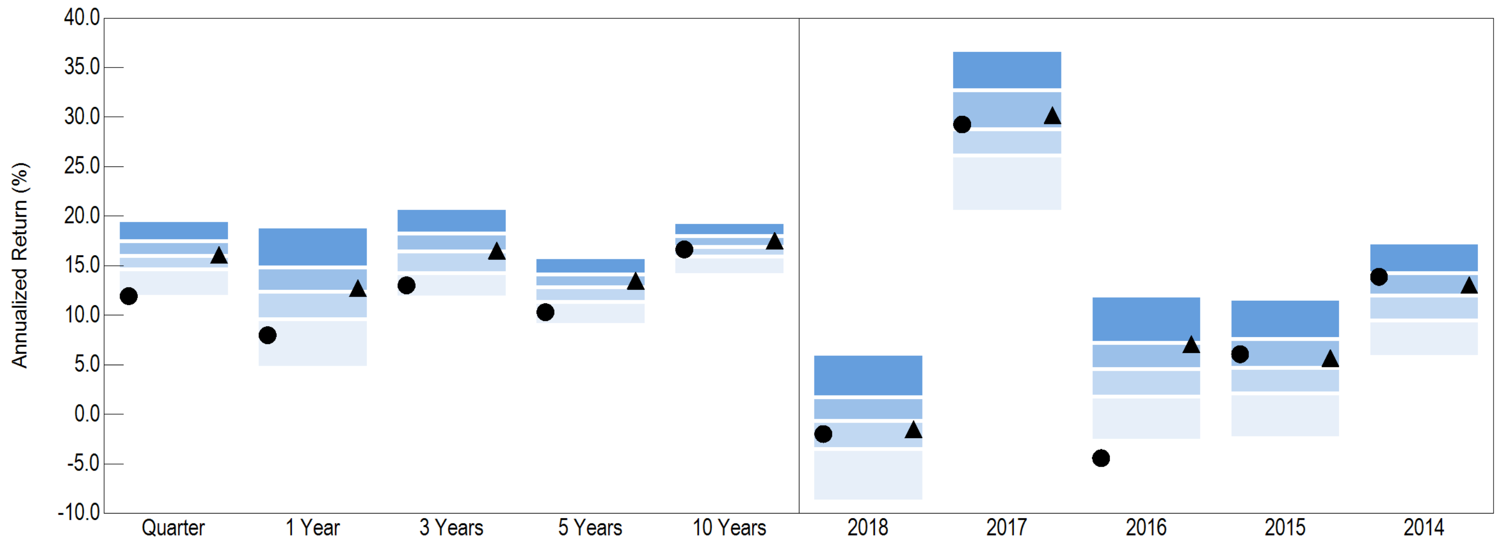
	Avg Wgt	Return	Contribution
MICROSOFT	9.07	16.62	1.51
ARISTA NETWORKS	2.85	49.25	1.41
IQVIA HOLDINGS	5.56	23.83	1.32
KKR AND A	4.68	20.31	0.95
MASTERCARD	3.57	25.02	0.89
PAYPAL HOLDINGS	3.78	23.49	0.89
AUTODESK	3.83	21.16	0.81
APPLIED MATS.	3.33	21.76	0.72
VISA 'A'	3.55	18.59	0.66
DOLLAR TREE	3.90	16.30	0.64

Bottom Contributors

	Avg Wgt	Return	Contribution
BIOGEN	3.84	-21.45	-0.82
CME GROUP	2.67	-12.13	-0.32
TAKE TWO INTACT.SFTW.	3.53	-8.33	-0.29
TRIPADVISOR 'A'	3.75	-4.62	-0.17
UNITEDHEALTH GROUP	3.92	-0.37	-0.01
INTERCONTINENTAL EX.	2.46	1.45	0.04
ILLUMINA	2.59	3.59	0.09
LIBERTY GLOBAL CL.A	0.61	16.78	0.10
CHARLES SCHWAB	3.38	3.34	0.11
ALPHABET 'C'	0.92	13.30	0.12

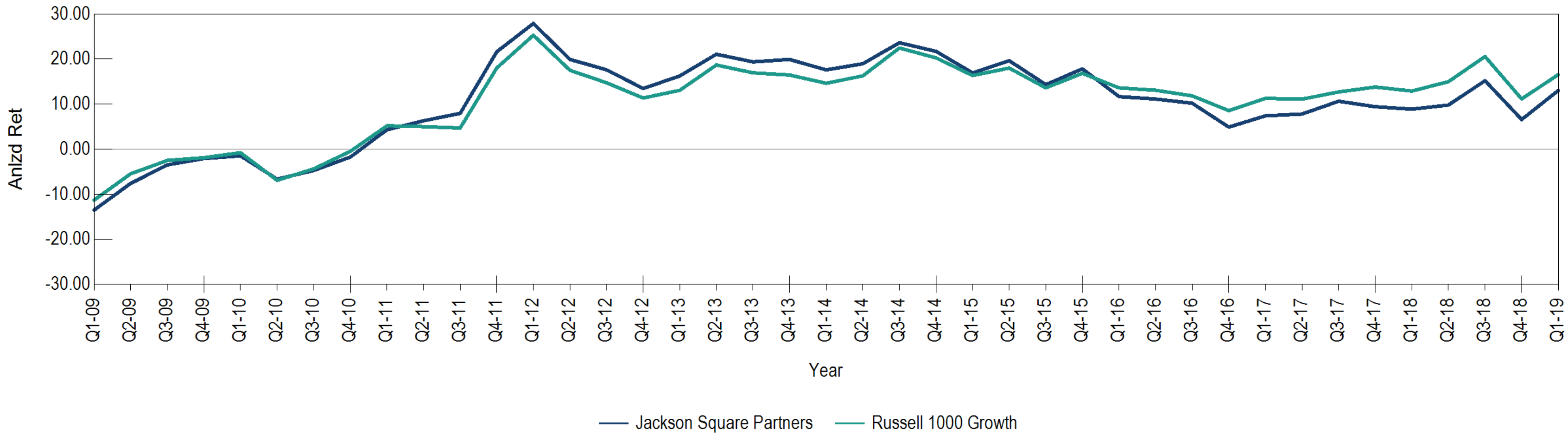
Unclassified sector allocation includes cash allocations.

Jackson Square Partners vs. eV US Large Cap Growth Equity Gross Universe

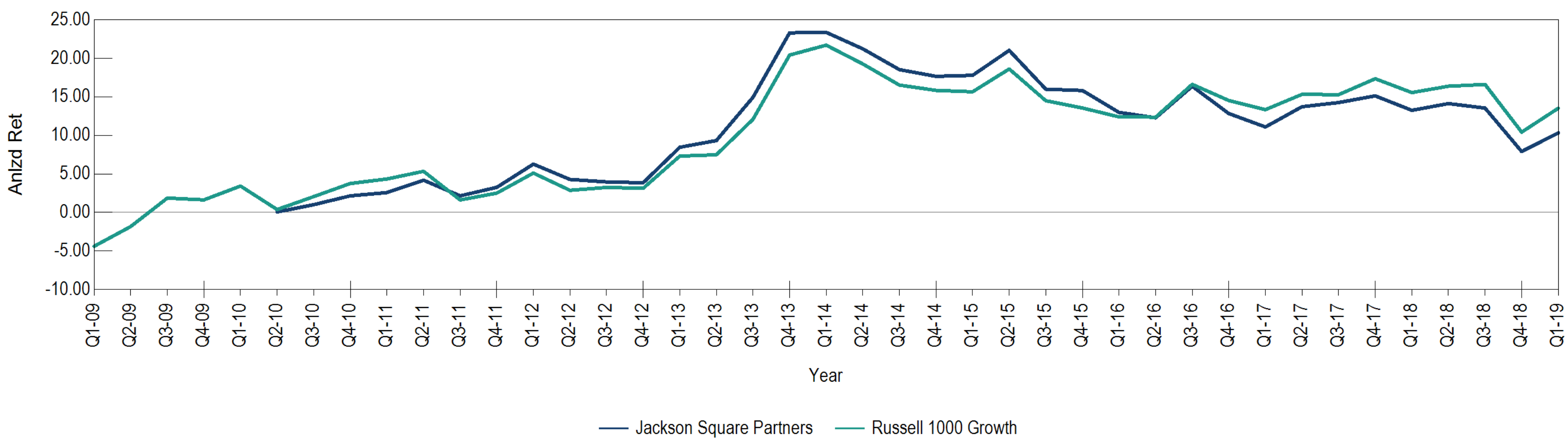


	Return (Rank)																			
5th Percentile	19.6		18.9		20.8		15.8		19.4		6.1		36.7		12.0		11.6		17.3	
25th Percentile	17.5		14.8		18.3		14.1		18.0		1.7		32.7		7.3		7.6		14.3	
Median	16.1		12.4		16.4		12.9		17.0		-0.6		28.8		4.6		4.7		12.0	
75th Percentile	14.6		9.6		14.3		11.4		16.0		-3.5		26.2		1.8		2.1		9.5	
95th Percentile	11.9		4.7		11.8		9.0		14.1		-8.8		20.5		-2.7		-2.4		5.8	
# of Portfolios	253		253		246		242		216		255		265		282		270		291	
● Jackson Square Partners	11.9	(95)	8.0	(85)	13.0	(89)	10.3	(87)	16.6	(60)	-2.0	(59)	29.3	(47)	-4.4	(98)	6.1	(37)	13.9	(31)
▲ Russell 1000 Growth	16.1	(49)	12.7	(47)	16.5	(49)	13.5	(38)	17.5	(34)	-1.5	(57)	30.2	(42)	7.1	(26)	5.7	(42)	13.0	(38)

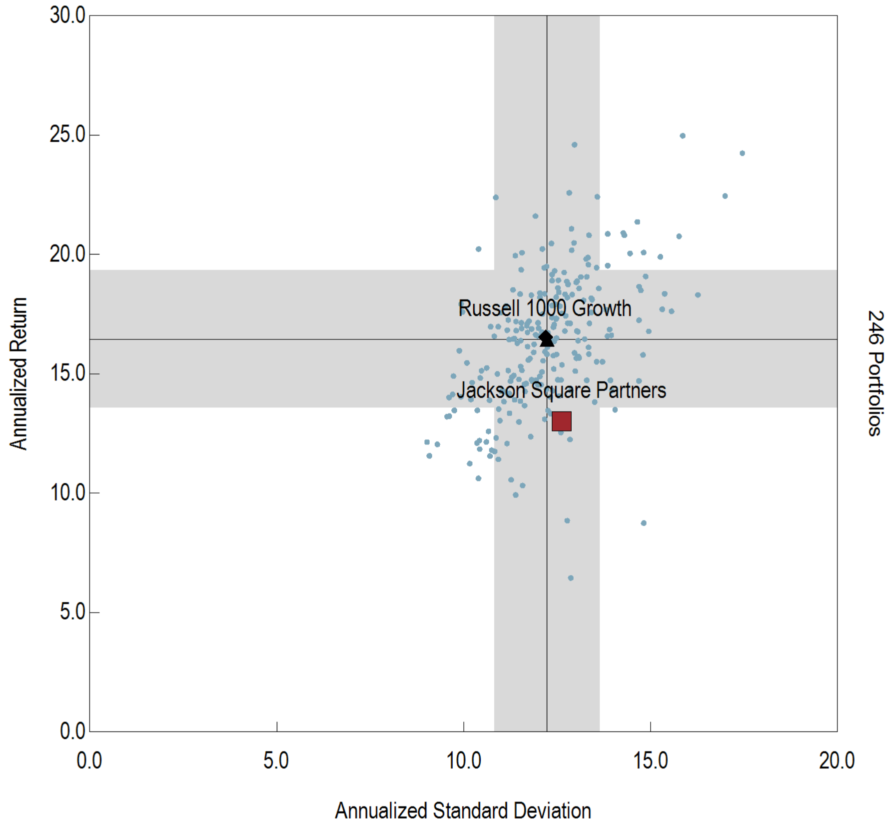
Rolling 3 Year Annualized Return (%)



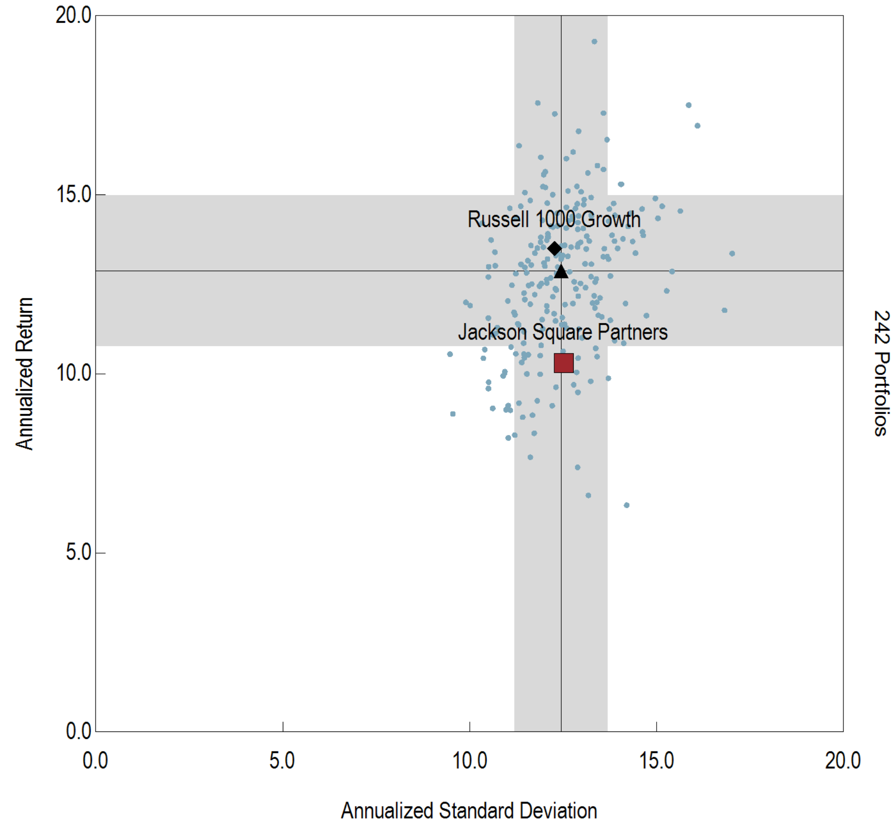
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Jackson Square Partners	13.0%	12.6%	0.9
Russell 1000 Growth	16.5%	12.2%	1.3
eV US Large Cap Growth Equity Gross Median	16.4%	12.2%	1.2

5 Years

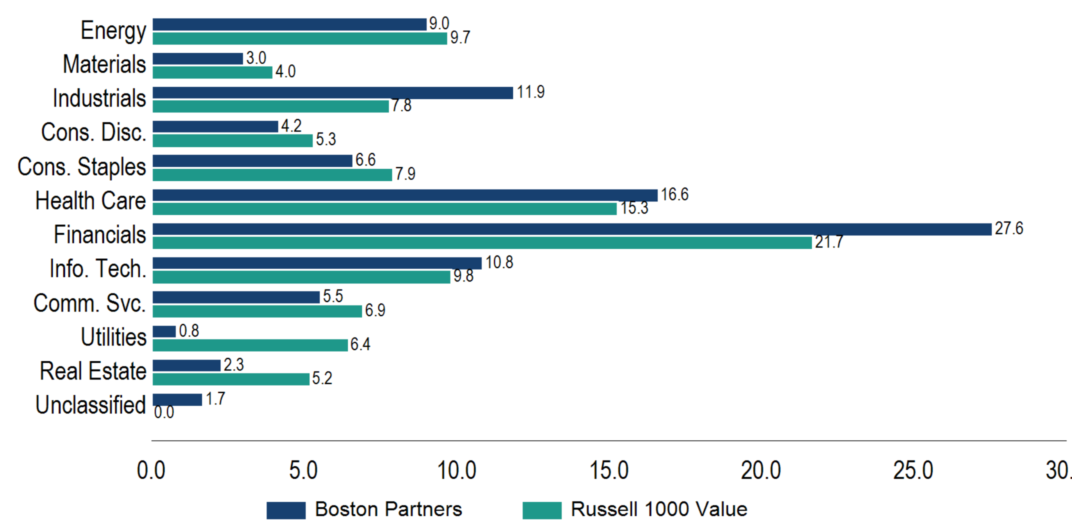
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Jackson Square Partners	10.3%	12.5%	0.8
Russell 1000 Growth	13.5%	12.3%	1.0
eV US Large Cap Growth Equity Gross Median	12.9%	12.4%	1.0

Domestic equity large cap value portfolio exhibiting low turnover in companies with low valuations relative to intrinsic value. Primary personnel include Mark Donovan and David Pyle.

Characteristics

	Portfolio	Russell 1000 Value
Number of Holdings	75	722
Weighted Avg. Market Cap. ($B)	148.36	119.91
Median Market Cap. ($B)	37.44	8.86
Price To Earnings	16.07	17.33
Price To Book	2.21	2.21
Price To Sales	1.46	1.53
Return on Equity (%)	16.23	14.19
Yield (%)	2.46	2.63
Beta	1.04	1.00

Sector Allocation (%) vs Russell 1000 Value



Largest Holdings

	End Weight	Return
JOHNSON & JOHNSON	4.67	9.04
CISCO SYSTEMS	4.48	25.60
BERKSHIRE HATHAWAY 'B'	4.25	-1.61
BANK OF AMERICA	3.49	12.55
COMCAST A	3.48	17.42
JP MORGAN CHASE & CO.	3.08	4.55
PROCTER & GAMBLE	3.05	14.09
CHEVRON	2.91	14.37
CITIGROUP	2.77	20.36
BOEING	2.41	18.87

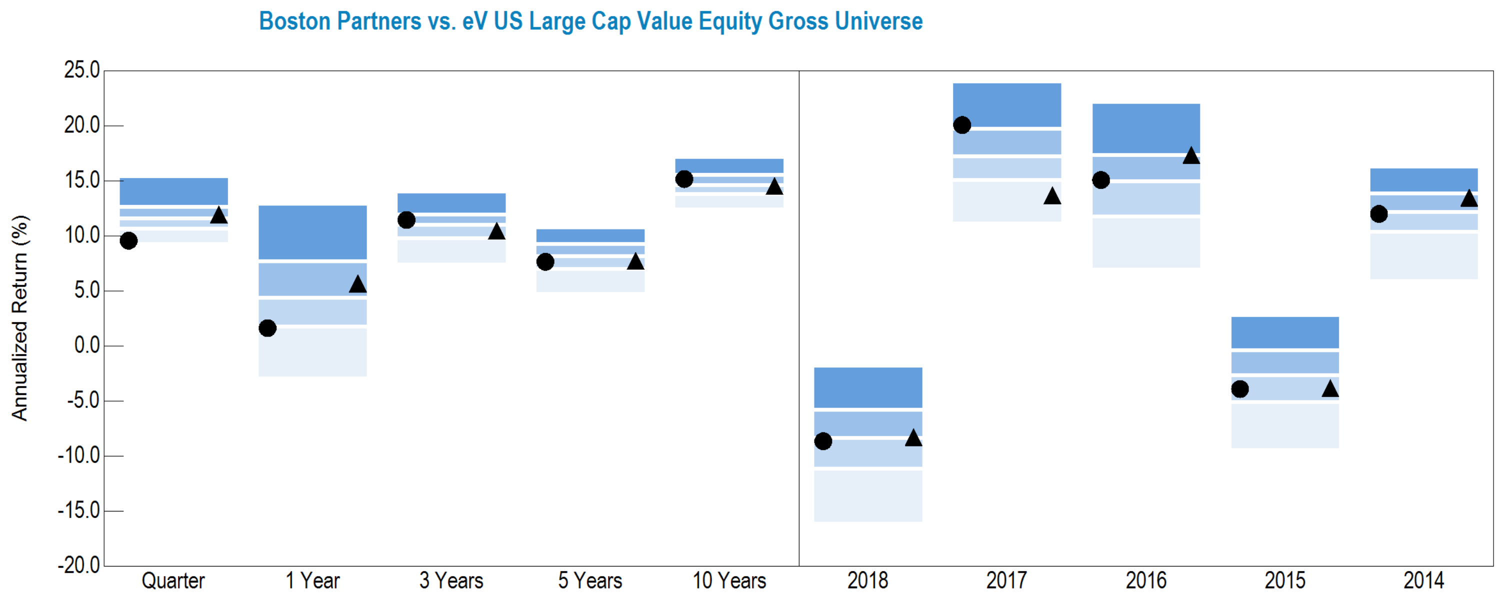
Top Contributors

	Avg Wgt	Return	Contribution
CISCO SYSTEMS	3.74	25.60	0.96
CITIGROUP	2.68	20.36	0.55
COMCAST A	3.11	17.42	0.54
BOEING	2.44	18.87	0.46
BANK OF AMERICA	3.25	12.55	0.41
UNITED TECHNOLOGIES	1.84	21.76	0.40
JOHNSON & JOHNSON	4.43	9.04	0.40
PROCTER & GAMBLE	2.80	14.09	0.39
CHEVRON	2.70	14.37	0.39
DXC TECHNOLOGY	1.40	21.31	0.30

Bottom Contributors

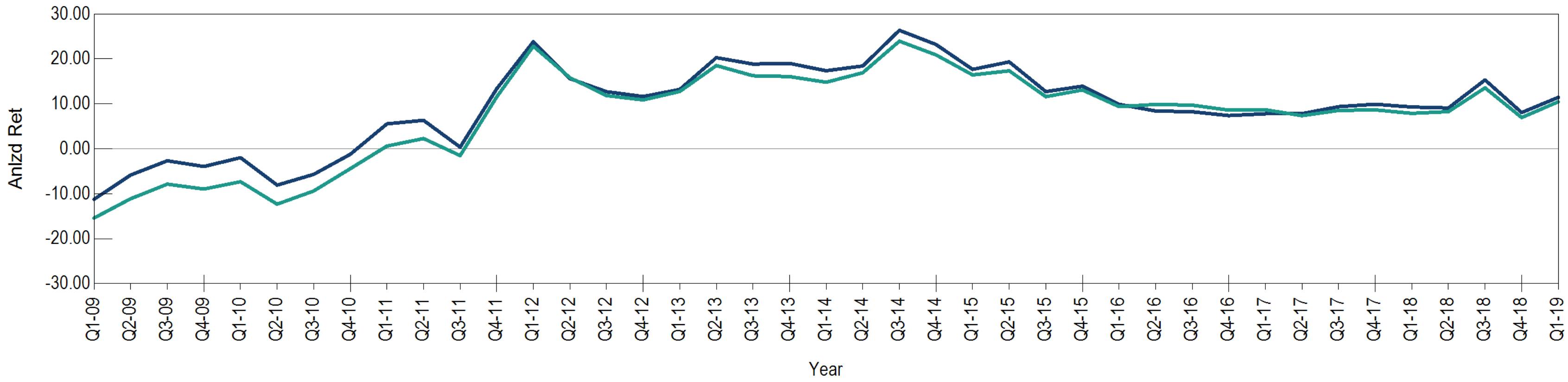
	Avg Wgt	Return	Contribution
CVS HEALTH	1.91	-17.06	-0.33
CIGNA	1.91	-15.30	-0.29
HP	1.66	-4.24	-0.07
BERKSHIRE HATHAWAY 'B'	4.31	-1.61	-0.07
WALGREENS BOOTS ALLIANCE	0.92	-6.84	-0.06
PFIZER	2.61	-1.88	-0.05
MOSAIC	0.49	-6.42	-0.03
CEMEX ADR 1:10	0.36	-3.73	-0.01
NORDSTROM	0.09	-3.98	0.00
UNITEDHEALTH GROUP	0.61	-0.37	0.00

Unclassified sector allocation includes cash allocations.

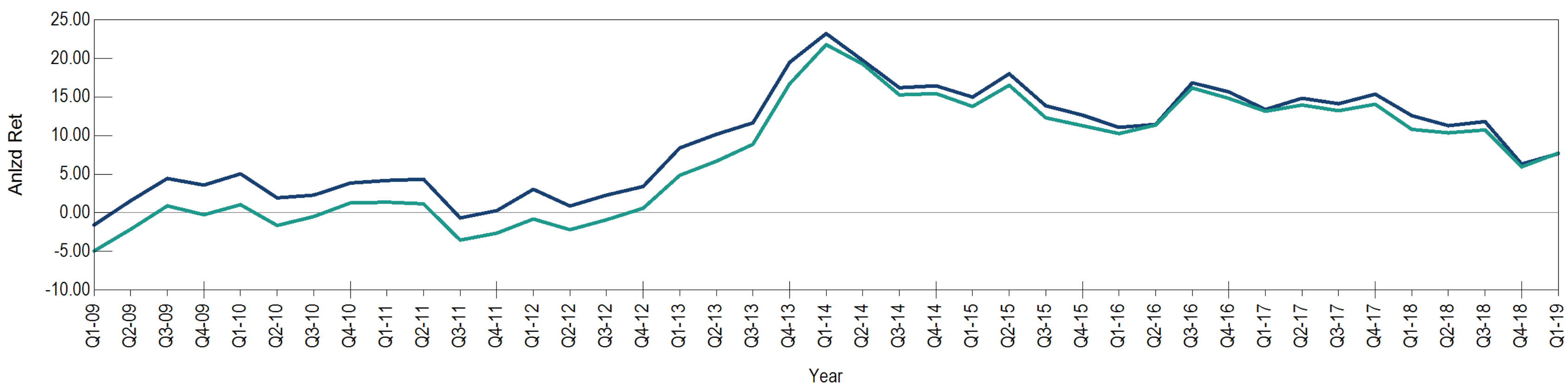


Return (Rank)	Quarter		1 Year		3 Years		5 Years		10 Years		2018		2017		2016		2015		2014	
5th Percentile	15.4		12.9		14.0		10.7		17.1		-1.8		24.0		22.1		2.8		16.3	
25th Percentile	12.7		7.7		11.9		9.3		15.5		-5.8		19.8		17.4		-0.4		13.9	
Median	11.6		4.4		11.0		8.2		14.7		-8.3		17.2		15.0		-2.6		12.2	
75th Percentile	10.7		1.8		9.8		7.0		13.8		-11.1		15.1		11.8		-5.1		10.4	
95th Percentile	9.3		-2.9		7.4		4.7		12.4		-16.1		11.2		7.0		-9.4		5.9	
# of Portfolios	337		337		335		326		274		336		342		346		312		307	
● Boston Partners	9.6	(93)	1.6	(77)	11.4	(39)	7.6	(63)	15.2	(39)	-8.7	(55)	20.1	(23)	15.1	(50)	-3.9	(65)	12.0	(55)
▲ Russell 1000 Value	11.9	(43)	5.7	(36)	10.5	(65)	7.7	(60)	14.5	(55)	-8.3	(50)	13.7	(87)	17.3	(26)	-3.8	(64)	13.5	(33)

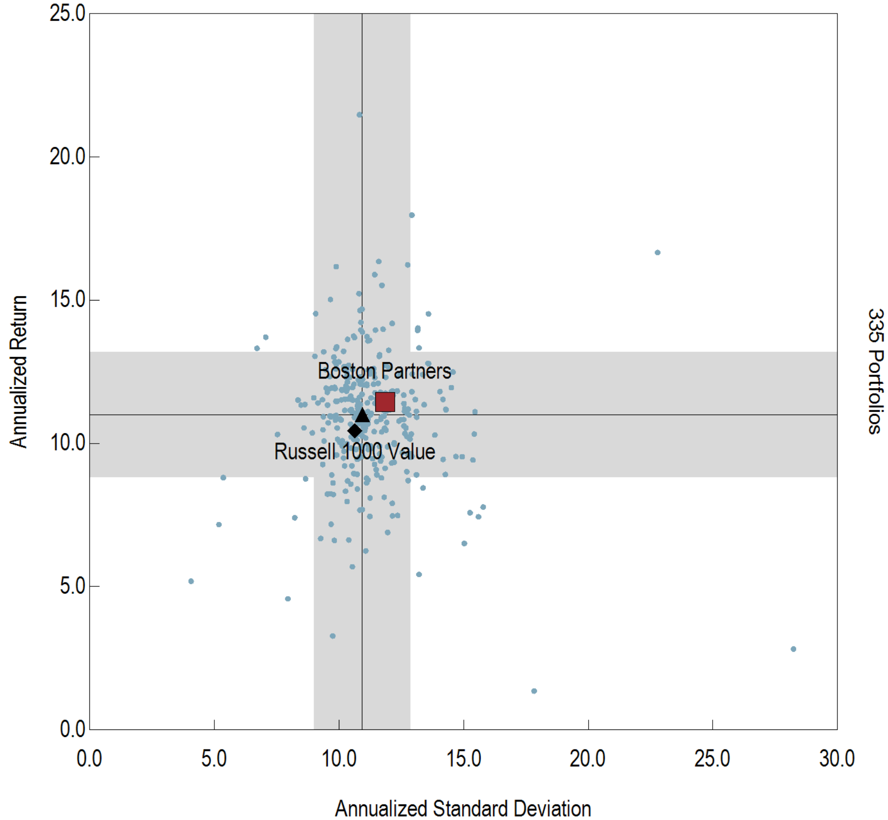
Rolling 3 Year Annualized Return (%)



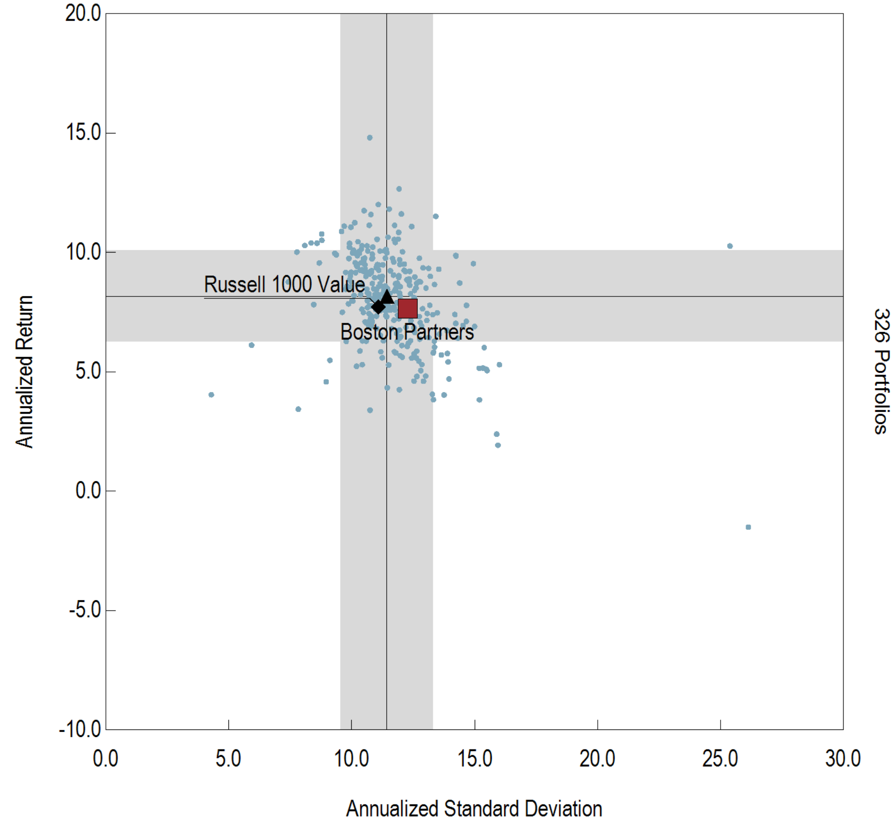
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Boston Partners	11.4%	11.8%	0.9
Russell 1000 Value	10.5%	10.6%	0.9
eV US Large Cap Value Equity Gross Median	11.0%	10.9%	0.9

5 Years

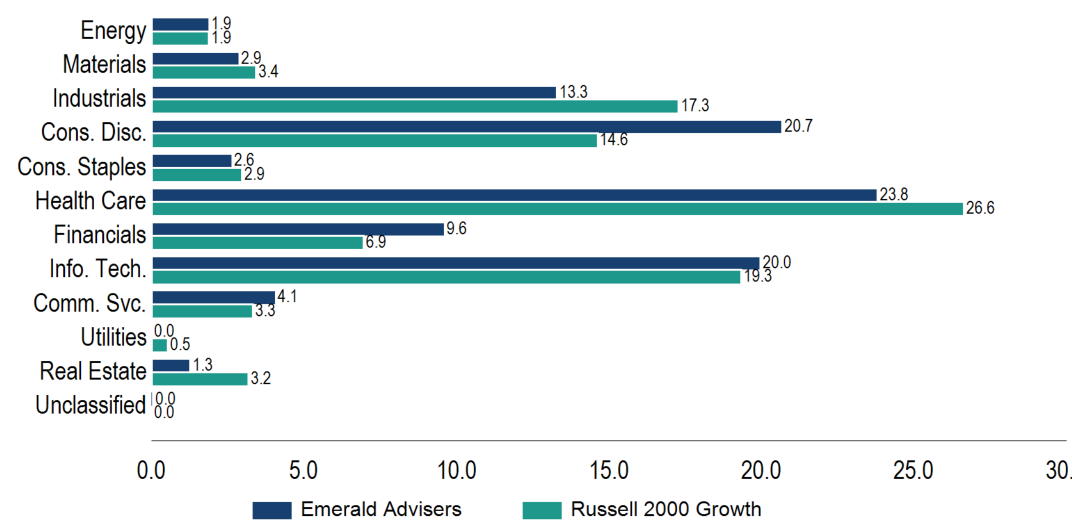
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Boston Partners	7.6%	12.3%	0.6
Russell 1000 Value	7.7%	11.1%	0.6
eV US Large Cap Value Equity Gross Median	8.2%	11.4%	0.6

Domestic equity small cap growth portfolio of companies with significantly high growth rates. Primary personnel include Kenneth Mertz, Joseph Garner, and Stacey Sears.

Characteristics

	Portfolio	Russell 2000 Growth
Number of Holdings	122	1,239
Weighted Avg. Market Cap. ($B)	2.96	2.62
Median Market Cap. ($B)	2.09	0.87
Price To Earnings	25.63	22.70
Price To Book	4.55	4.00
Price To Sales	2.30	1.53
Return on Equity (%)	-16.86	0.05
Yield (%)	0.51	0.70
Beta	1.11	1.00

Sector Allocation (%) vs Russell 2000 Growth



Largest Holdings

	End Weight	Return
CHEGG	3.02	34.13
PLANET FITNESS CL.A	2.34	28.16
FIVE BELOW	2.21	21.43
TANDEM DIABETES CARE	2.12	67.24
FORESCOUT TECHNOLOGIES	1.92	61.25
RAPID7	1.92	62.42
TREX	1.86	3.64
CIENA	1.78	10.12
LENDINGTREE	1.73	60.11
NEOGENOMICS	1.68	62.25

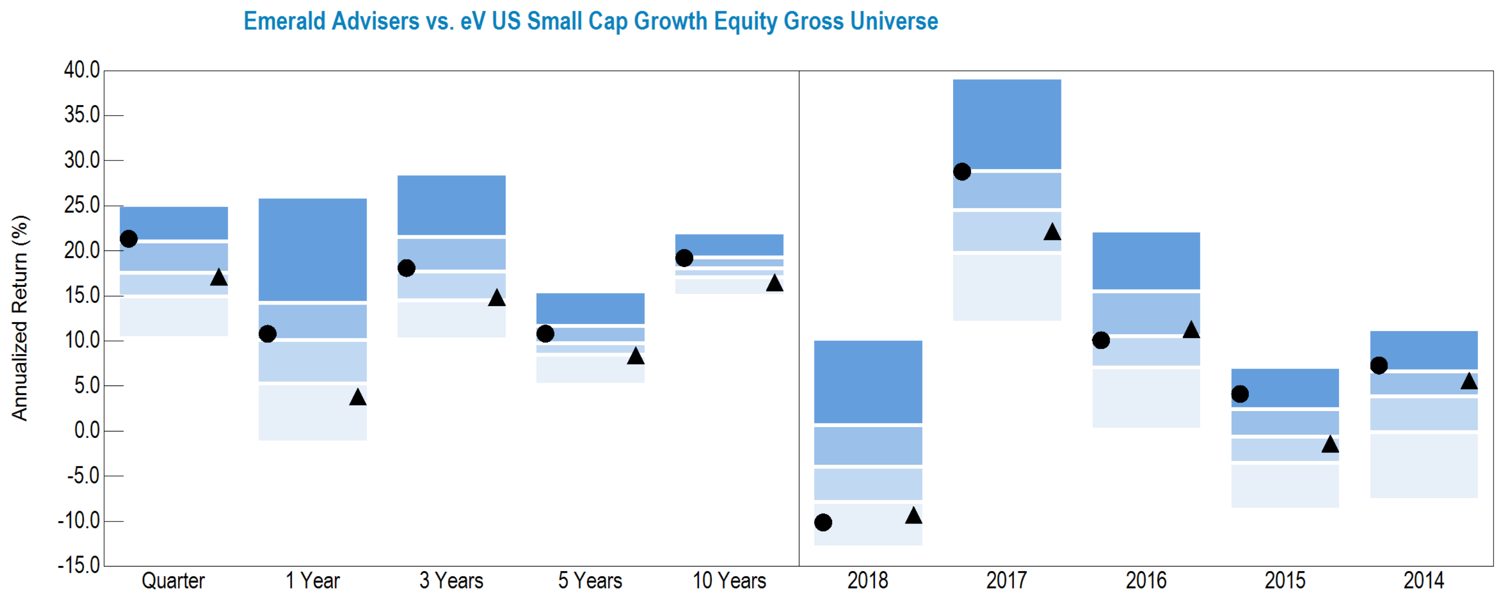
Top Contributors

	Avg Wgt	Return	Contribution
TANDEM DIABETES CARE	1.65	67.24	1.11
CHEGG	3.07	34.13	1.05
RAPID7	1.57	62.42	0.98
INSMED	0.80	121.57	0.97
FORESCOUT TECHNOLOGIES	1.52	61.25	0.93
NEOGENOMICS	1.44	62.25	0.89
LENDINGTREE	1.40	60.11	0.84
EPAM SYSTEMS	1.77	45.79	0.81
REATA PHARMS.CL.A	1.37	52.35	0.72
PROOFPOINT	1.35	44.89	0.60

Bottom Contributors

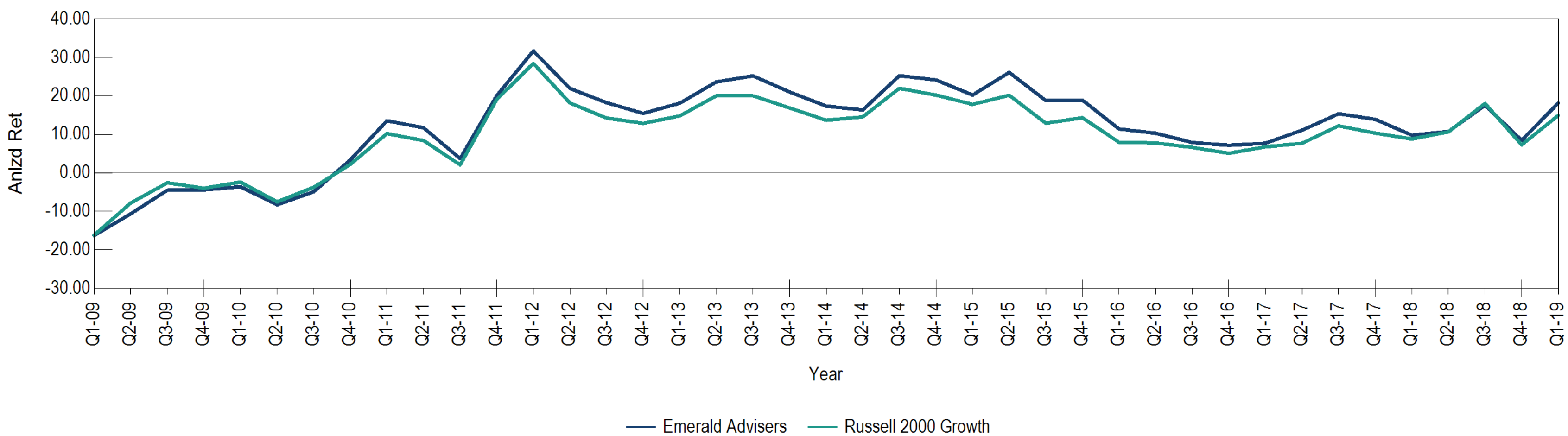
	Avg Wgt	Return	Contribution
GREEN DOT CLASS A	1.02	-23.73	-0.24
VOCERA COMMUNICATIONS	1.13	-19.62	-0.22
KARYOPHARM THERAPEUTICS	0.51	-37.67	-0.19
DYCOM INDS.	0.71	-14.99	-0.11
ATRICURE	0.71	-12.45	-0.09
HAEMONETICS	0.63	-12.56	-0.08
INOGEN	0.34	-23.19	-0.08
AIMMUNE THERAPEUTICS	0.94	-6.56	-0.06
ADAMAS PHARMACEUTICALS	0.35	-16.74	-0.06

Unclassified sector allocation includes cash allocations.

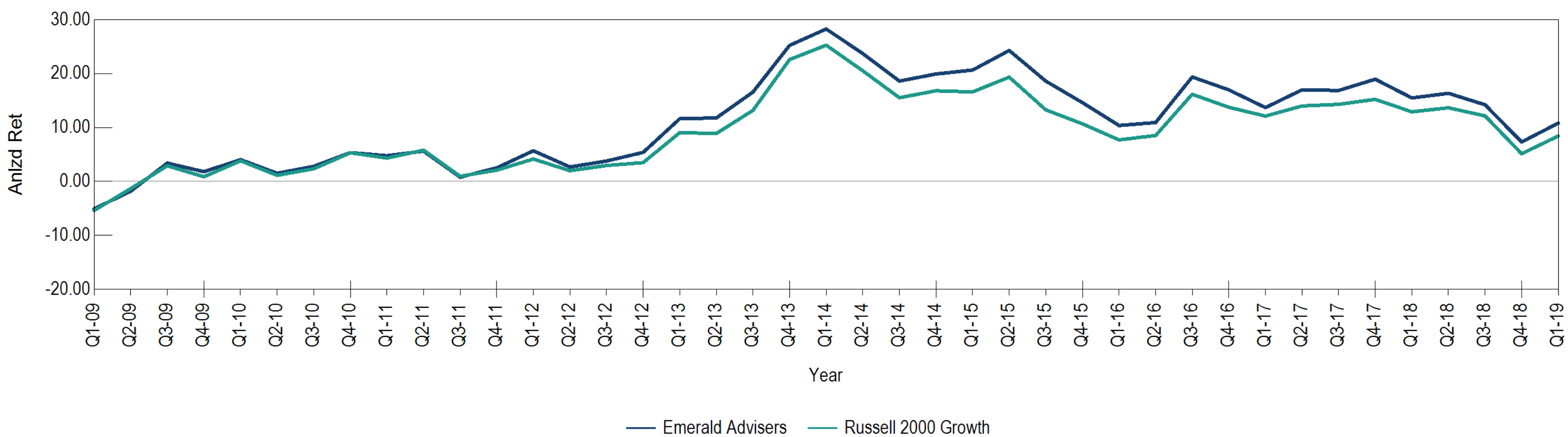


	Quarter		1 Year		3 Years		5 Years		10 Years		2018		2017		2016		2015		2014	
	Return (Rank)																			
5th Percentile	25.0		26.0		28.6		15.5		22.0		10.2		39.2		22.2		7.1		11.3	
25th Percentile	21.1		14.3		21.6		11.7		19.3		0.7		28.9		15.5		2.5		6.7	
Median	17.6		10.2		17.7		9.8		18.1		-3.9		24.6		10.6		-0.6		3.9	
75th Percentile	15.0		5.3		14.5		8.5		17.1		-7.9		19.8		7.1		-3.5		-0.1	
95th Percentile	10.3		-1.2		10.2		5.1		15.0		-12.8		12.1		0.2		-8.7		-7.6	
# of Portfolios	158		158		154		148		135		164		174		170		154		161	
● Emerald Advisers	21.3	(23)	10.8	(46)	18.1	(47)	10.8	(36)	19.2	(27)	-10.1	(85)	28.8	(26)	10.1	(54)	4.1	(19)	7.3	(21)
▲ Russell 2000 Growth	17.1	(56)	3.9	(82)	14.9	(75)	8.4	(77)	16.5	(83)	-9.3	(80)	22.2	(62)	11.3	(49)	-1.4	(59)	5.6	(32)

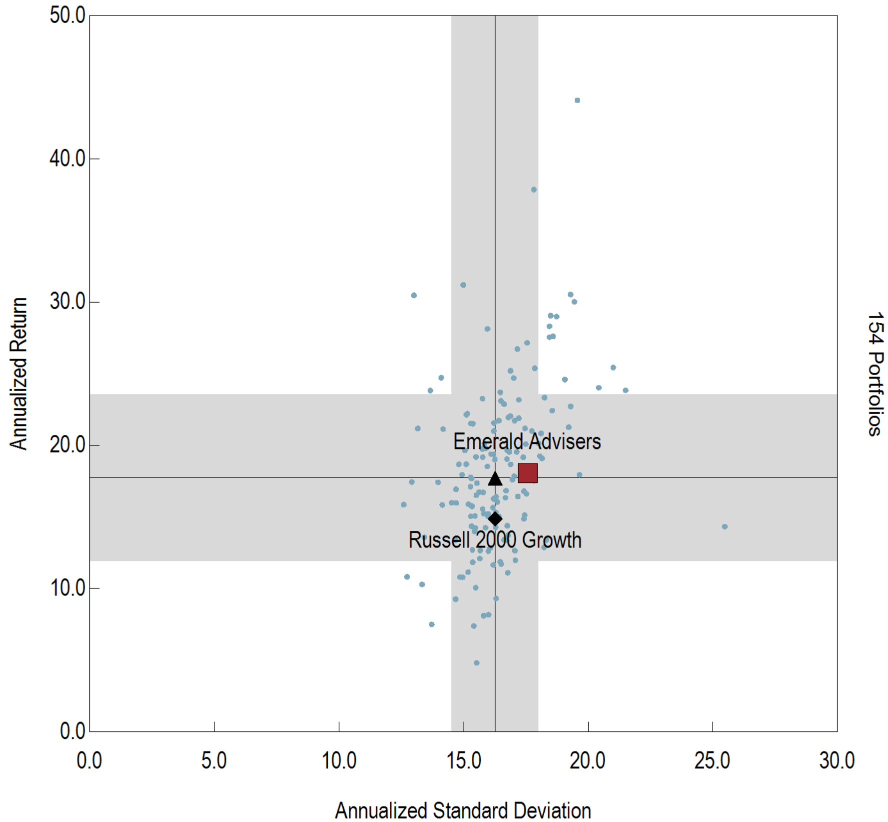
Rolling 3 Year Annualized Return (%)



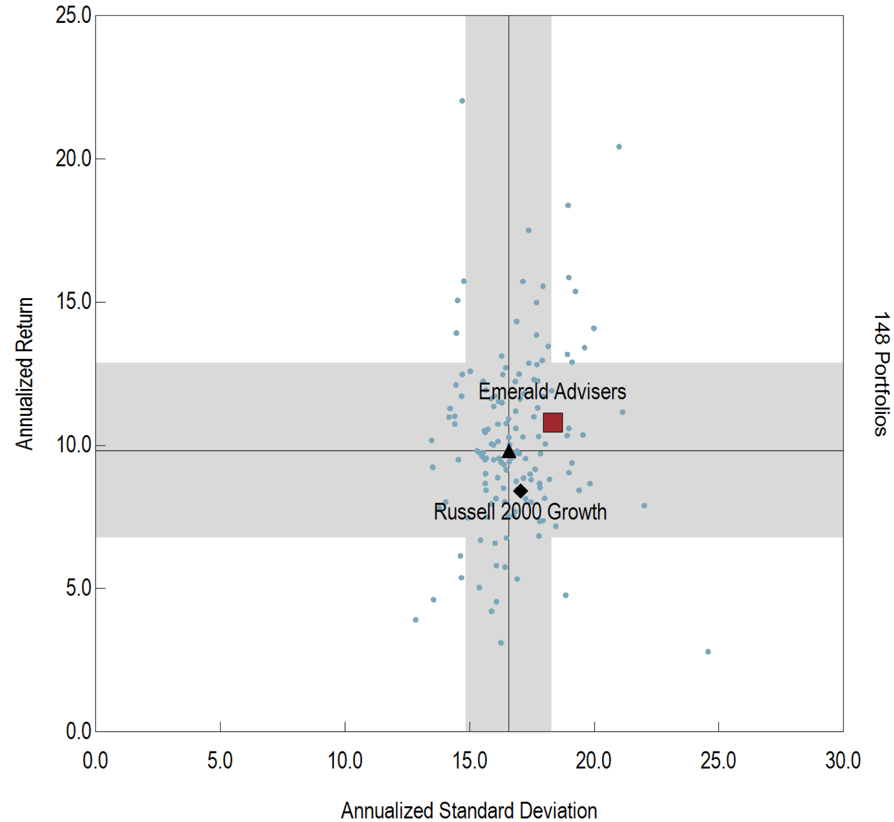
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Emerald Advisers	18.1%	17.6%	1.0
Russell 2000 Growth	14.9%	16.3%	0.8
eV US Small Cap Growth Equity Gross Median	17.7%	16.3%	1.0

5 Years

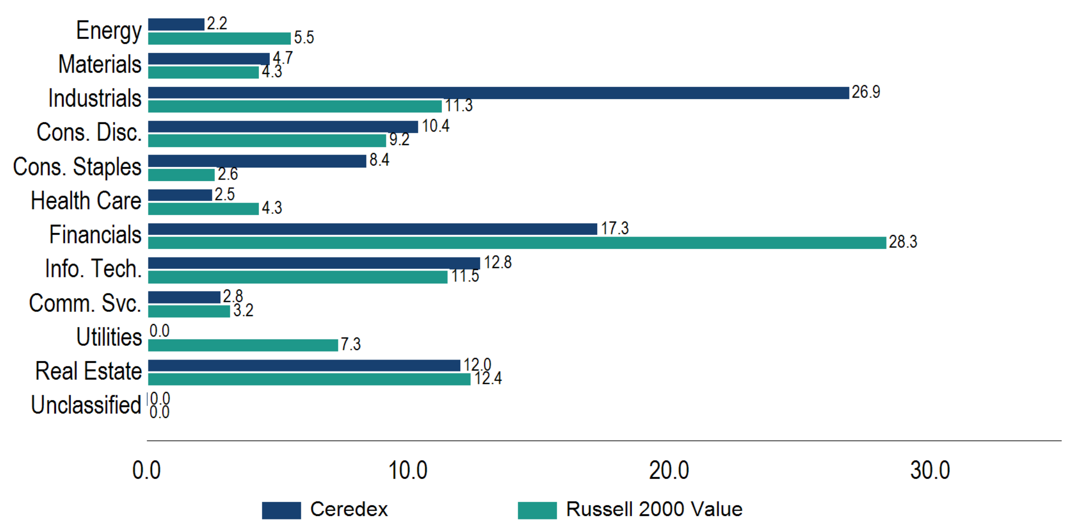
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Emerald Advisers	10.8%	18.3%	0.5
Russell 2000 Growth	8.4%	17.0%	0.4
eV US Small Cap Growth Equity Gross Median	9.8%	16.6%	0.6

Domestic equity small cap value portfolio of companies with dividend yields and low valuations. Primary personnel include Brett Barner and David Maynard.

Characteristics

	Portfolio	Russell 2000 Value
Number of Holdings	83	1,366
Weighted Avg. Market Cap. ($B)	2.52	2.06
Median Market Cap. ($B)	1.97	0.68
Price To Earnings	18.85	15.60
Price To Book	2.32	1.61
Price To Sales	1.05	0.92
Return on Equity (%)	17.39	6.04
Yield (%)	2.68	2.22
Beta	0.82	1.00

Sector Allocation (%) vs Russell 2000 Value



Largest Holdings

	End Weight	Return
POWER INTEGRATIONS	5.11	14.96
ENERGIZER HOLDINGS	4.27	0.16
KEMPER	4.25	15.06
B & G FOODS	3.77	-13.88
PHYSICIANS REALTY TST.	3.68	19.07
OUTFRONT MEDIA	3.39	31.22
EVERCORE A	3.01	27.86
CHILDRENS PLACE	2.78	7.98
TANGER FAC.OUTLET CNTRS.	2.71	5.35
HERMAN MILLER	2.35	16.92

Top Contributors

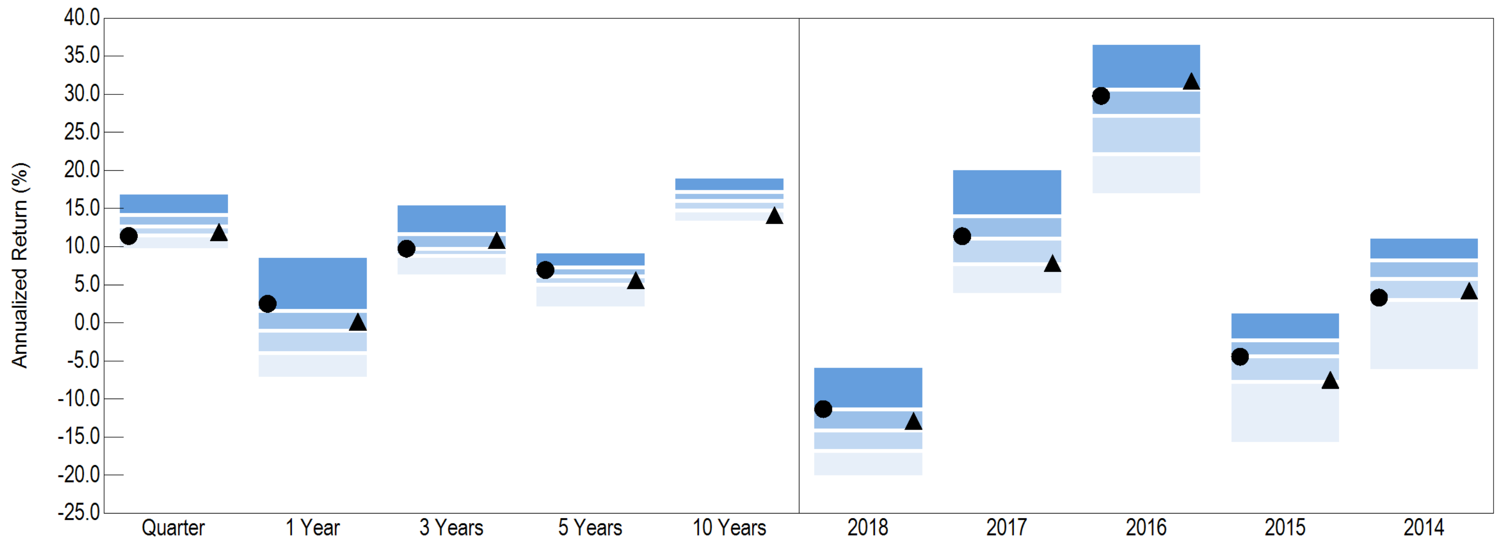
	Avg Wgt	Return	Contribution
OUTFRONT MEDIA	2.93	31.22	0.91
US SILICA HOLDINGS	1.09	71.22	0.78
EVERCORE A	2.78	27.86	0.77
POWER INTEGRATIONS	4.90	14.96	0.73
PHYSICIANS REALTY TST.	3.35	19.07	0.64
KEMPER	4.17	15.06	0.63
COVANTA HOLDING	1.87	30.85	0.58
HILL-ROM HOLDINGS	2.45	19.78	0.48
LITHIA MOTORS 'A'	2.00	21.92	0.44
TETRA TECH	2.76	15.35	0.42

Bottom Contributors

	Avg Wgt	Return	Contribution
B & G FOODS	4.09	-13.88	-0.57
GREENBRIER COS.	0.84	-18.00	-0.15
TUPPERWARE BRANDS	0.43	-18.14	-0.08
ENERSYS	0.35	-15.82	-0.06
HORACE MANN EDUCATORS	1.01	-5.26	-0.05
COHU	0.51	-7.92	-0.04
MATTHEWS INTL.'A'	0.46	-8.55	-0.04
COMTECH TELECOM.	0.71	-4.22	-0.03
HECLA MINING	0.49	-2.44	-0.01
RESIDEO TECHNOLOGIES	0.19	-6.13	-0.01

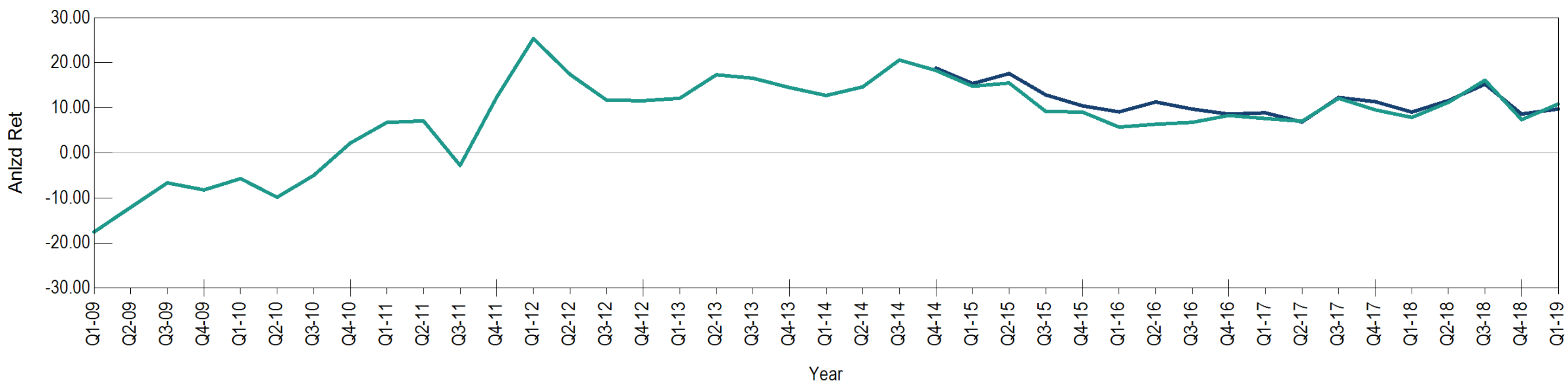
Unclassified sector allocation includes cash allocations.

Ceredex vs. eV US Small Cap Value Equity Gross Universe

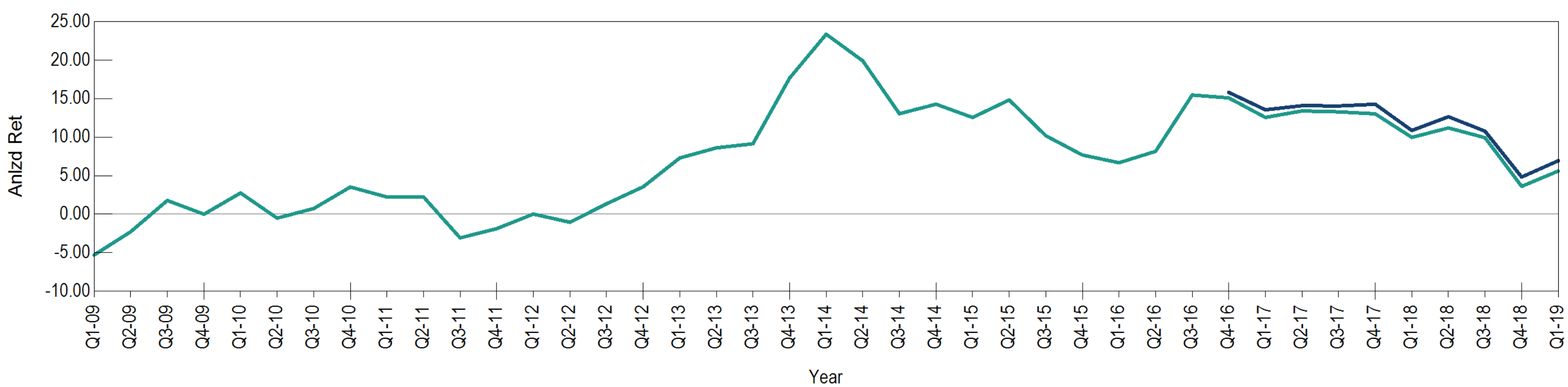


	Return (Rank)																			
5th Percentile	17.0		8.8		15.6		9.3		19.1		-5.7		20.2		36.7		1.5		11.2	
25th Percentile	14.2		1.6		11.7		7.3		17.2		-11.4		14.1		30.7		-2.2		8.2	
Median	12.7		-1.0		9.7		6.2		16.1		-14.0		11.1		27.2		-4.3		5.8	
75th Percentile	11.5		-3.9		8.8		5.1		14.8		-16.7		7.8		22.2		-7.7		3.1	
95th Percentile	9.6		-7.3		6.1		2.0		13.2		-20.2		3.7		16.8		-15.8		-6.3	
# of Portfolios	216		216		211		202		176		220		224		222		212		206	
● Ceredex	11.4	(79)	2.5	(22)	9.7	(51)	6.9	(33)	--	(--)	-11.3	(25)	11.4	(48)	29.8	(32)	-4.4	(52)	3.3	(74)
▲ Russell 2000 Value	11.9	(69)	0.2	(39)	10.9	(33)	5.6	(66)	14.1	(88)	-12.9	(39)	7.8	(75)	31.7	(17)	-7.5	(74)	4.2	(68)

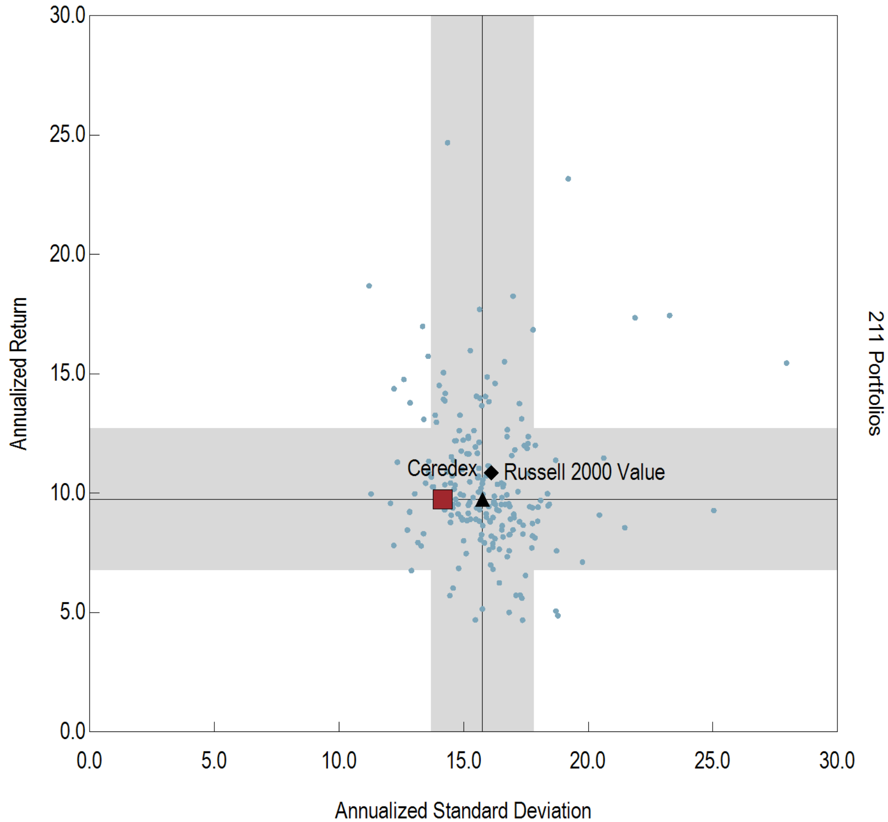
Rolling 3 Year Annualized Return (%)



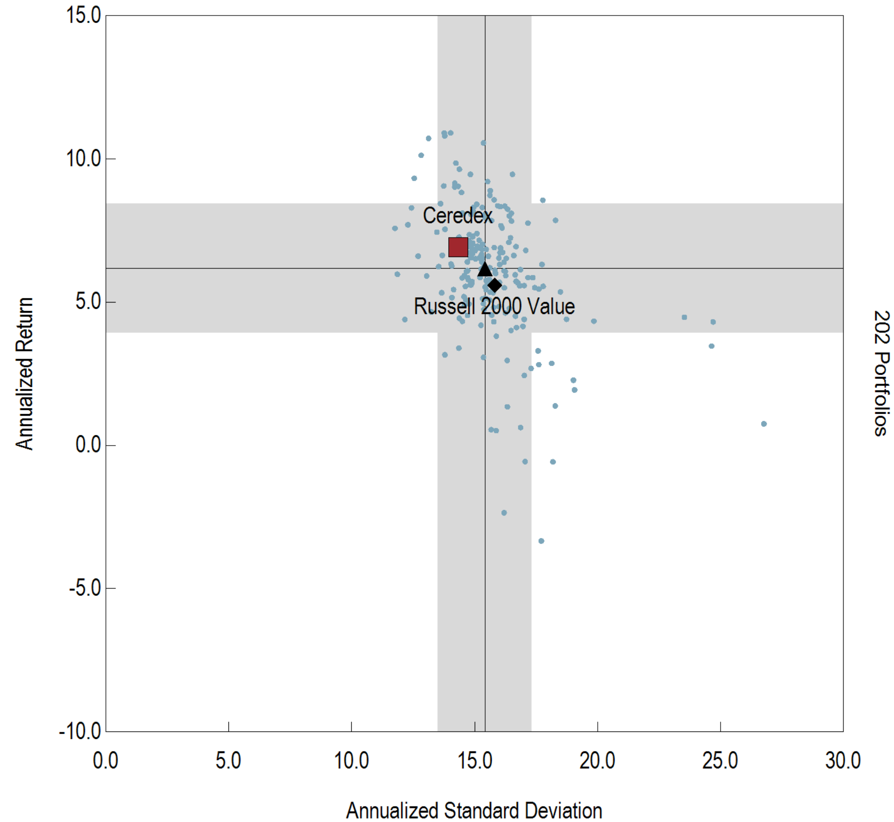
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Ceredex	9.7%	14.2%	0.6
Russell 2000 Value	10.9%	16.1%	0.6
eV US Small Cap Value Equity Gross Median	9.7%	15.8%	0.6

5 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Ceredex	6.9%	14.3%	0.4
Russell 2000 Value	5.6%	15.8%	0.3
eV US Small Cap Value Equity Gross Median	6.2%	15.4%	0.4

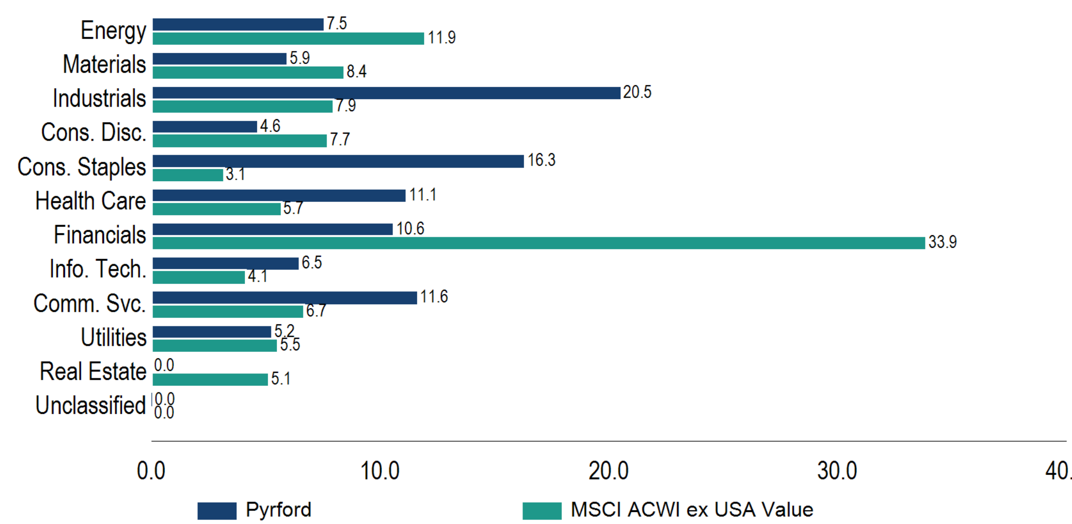
International Equity Managers

International equity value portfolio of non-US companies with low valuations at the country and stock level. Primary personnel include Tony Cousins, Daniel McDonagh, and Paul Simons.

Characteristics

	Portfolio	MSCI ACWI ex USA Value
Number of Holdings	74	1,280
Weighted Avg. Market Cap. ($B)	64.04	51.28
Median Market Cap. ($B)	23.02	7.15
Price To Earnings	17.53	11.62
Price To Book	2.46	1.62
Price To Sales	1.47	0.89
Return on Equity (%)	16.50	11.72
Yield (%)	3.83	4.40
Beta	0.80	1.00

Sector Allocation (%) vs MSCI ACWI ex USA Value



Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
Totals		
Developed	92.7%	73.9%
Emerging*	7.3%	26.1%
Cash	0.0%	
Top 10 Largest Countries		
Switzerland	14.7%	3.2%
United Kingdom	13.6%	15.6%
Australia	11.3%	4.8%
Japan	10.4%	16.2%
France	8.6%	7.0%
Germany	8.5%	5.6%
Hong Kong	5.2%	2.7%
Singapore	5.1%	0.9%
Sweden	4.9%	1.4%
Netherlands	4.6%	1.2%
Total-Top 10 Largest Countries	**87.0%**	**58.6%**

Top Contributors

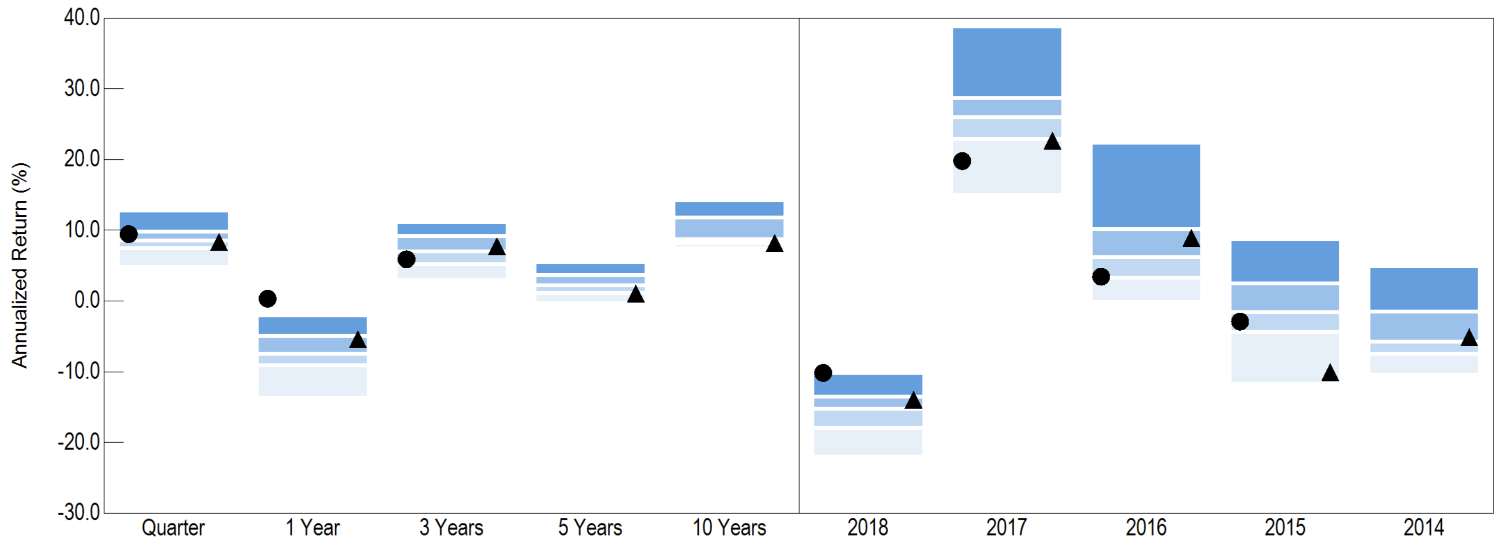
	Avg Wgt	Return	Contribution
NESTLE 'R'	3.49	17.72	0.62
ROCHE HOLDING	3.34	15.14	0.51
NOVARTIS 'R'	2.90	16.42	0.48
BRAMBLES	2.32	18.34	0.43
BRITISH AMERICAN TOBACCO	1.20	32.80	0.39
RIO TINTO	1.08	33.97	0.37
ESSITY B	1.90	17.77	0.34
QBE INSURANCE GROUP	1.30	25.72	0.33
LEGAL & GENERAL	1.46	21.93	0.32
BRENNTAG	1.63	18.46	0.30

Bottom Contributors

	Avg Wgt	Return	Contribution
BEZEQ ISRAELI TELECOMMUNICATION	1.18	-28.04	-0.33
KDDI	1.90	-8.04	-0.15
NIHON KOHDEN	1.67	-8.17	-0.14
VODAFONE GROUP	1.45	-6.45	-0.09
CHUNGHWA TELECOM	1.62	-3.36	-0.05
MALAYAN BANKING	2.04	-1.23	-0.03
POWER ASSETS HOLDINGS	1.27	-0.35	0.00
IMI	0.44	3.83	0.02
SUMITOMO RUBBER INDS.	1.35	1.26	0.02
GEA GROUP	1.00	2.05	0.02

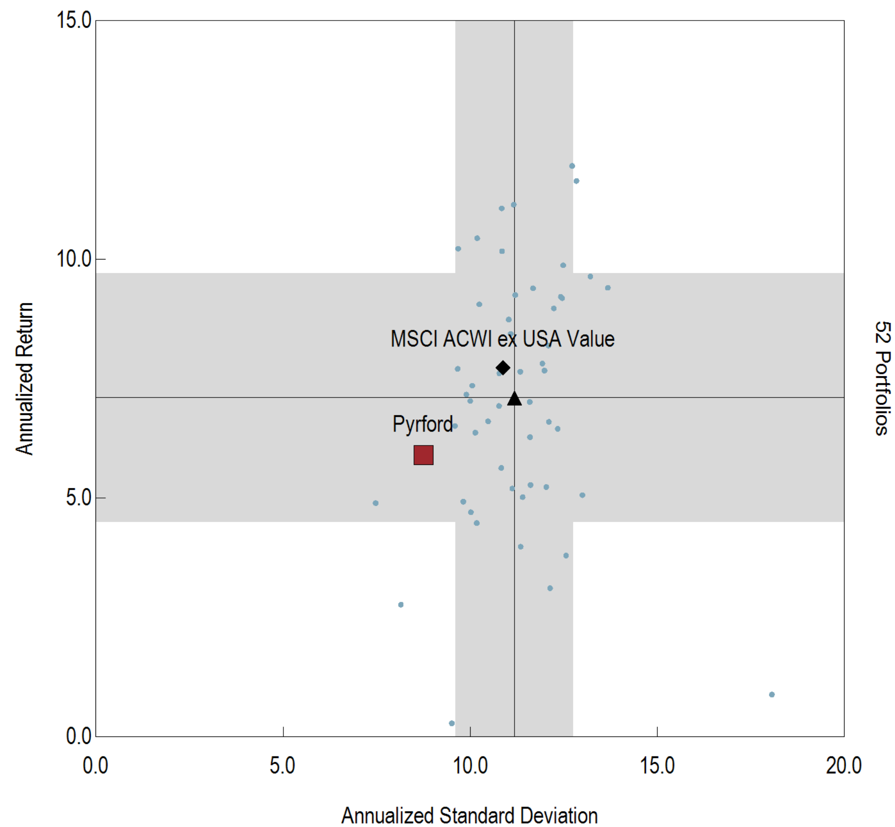
Unclassified sector allocation includes cash allocations.

Pyrford vs. eV ACWI ex-US Value Equity Gross Universe



Return (Rank)	Quarter		1 Year		3 Years		5 Years		10 Years		2018		2017		2016		2015		2014	
5th Percentile	12.8		-2.0		11.1		5.4		14.2		-10.2		38.8		22.3		8.7		4.9	
25th Percentile	9.9		-4.8		9.2		3.7		11.9		-13.4		28.8		10.2		2.5		-1.4	
Median	8.6		-7.4		7.1		2.3		8.8		-15.2		26.0		6.2		-1.6		-5.7	
75th Percentile	7.5		-9.0		5.2		1.2		8.3		-17.9		23.0		3.3		-4.3		-7.4	
95th Percentile	4.9		-13.7		3.0		-0.3		7.5		-21.9		15.0		-0.1		-11.6		-10.4	
# of Portfolios	53		53		52		44		27		54		56		55		45		37	
● Pyrford	9.5	(35)	0.3	(1)	5.9	(68)	--	(--)	--	(--)	-10.1	(5)	19.8	(84)	3.4	(74)	-2.9	(59)	--	(--)
▲ MSCI ACWI ex USA Value	8.3	(59)	-5.4	(34)	7.7	(39)	1.1	(77)	8.2	(80)	-14.0	(32)	22.7	(77)	8.9	(35)	-10.1	(93)	-5.1	(49)

3 Years



3 Years

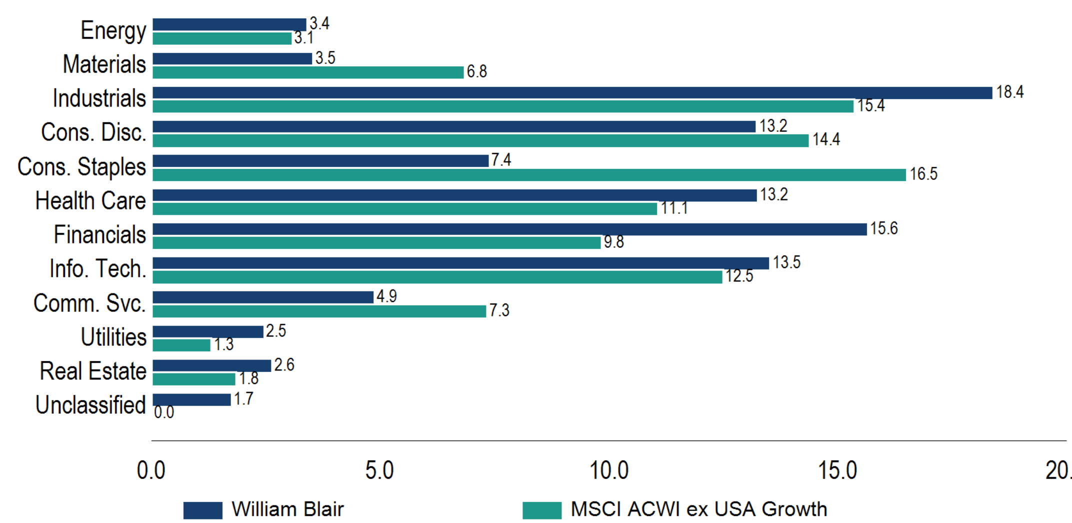
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Pyrford	5.9%	8.7%	0.5
MSCI ACWI ex USA Value	7.7%	10.9%	0.6
eV ACWI ex-US Value Equity Gross Median	7.1%	11.2%	0.6

International equity growth portfolio of non-US companies with high growth rates constructed from the security level. Primary personnel include Simon Fennell and Jeffrey Urbina.

Characteristics

	Portfolio	MSCI ACWI ex USA Growth
Number of Holdings	179	1,141
Weighted Avg. Market Cap. ($B)	66.32	77.14
Median Market Cap. ($B)	11.12	8.23
Price To Earnings	23.27	19.37
Price To Book	3.93	3.04
Price To Sales	2.25	1.71
Return on Equity (%)	22.15	19.48
Yield (%)	1.80	2.06
Beta	1.09	1.00

Sector Allocation (%) vs MSCI ACWI ex USA Growth



Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
Totals		
Developed	84.0%	74.2%
Emerging*	14.3%	25.8%
Top 10 Largest Countries		
United Kingdom	15.0%	7.6%
France	13.3%	8.1%
Japan	10.4%	16.1%
Canada	6.5%	6.8%
Switzerland	5.8%	8.7%
Hong Kong	5.7%	2.8%
China*	5.4%	8.5%
Germany	4.8%	5.9%
Australia	4.0%	4.5%
Netherlands	4.0%	3.6%
Total-Top 10 Largest Countries	**74.9%**	**72.4%**

Top Contributors

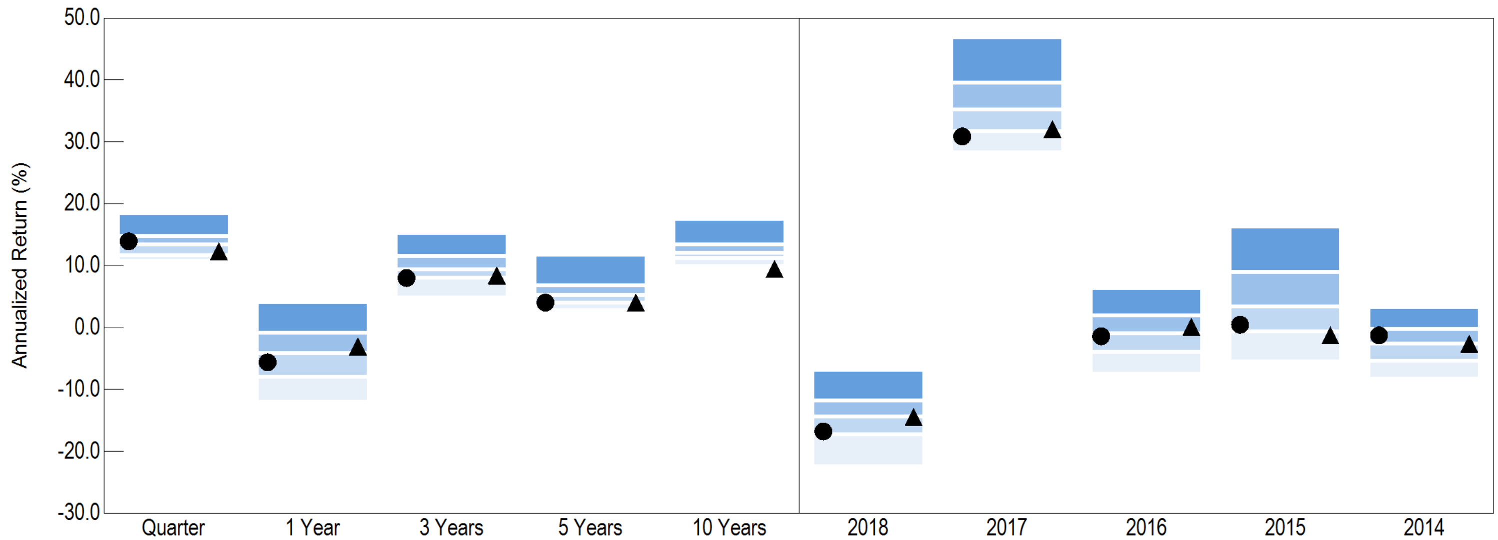
	Avg Wgt	Return	Contribution
ALIBABA GROUP HLDG.SPN. ADR 1:1	1.53	33.11	0.51
AIRBUS	1.31	37.93	0.50
AIA GROUP	2.04	19.91	0.41
PING AN INSURANCE (GROUP) OF CHINA 'H'	1.30	26.78	0.35
KEYENCE	1.32	22.97	0.30
NOVARTIS 'R'	1.76	16.42	0.29
NESTE	0.74	38.53	0.29
LONZA GROUP	1.41	20.01	0.28
BHP GROUP	1.35	20.77	0.28
CHINA MERCHANTS BANK 'H'	0.76	32.58	0.25

Bottom Contributors

	Avg Wgt	Return	Contribution
WIRECARD	0.64	-17.61	-0.11
MR PRICE GROUP	0.31	-23.20	-0.07
COSTA GROUP HOLDINGS	0.15	-29.43	-0.04
MARUTI SUZUKI INDIA	0.40	-9.92	-0.04
WELCIA HOLDINGS	0.16	-24.57	-0.04
ASTRA INTERNATIONAL	0.30	-10.07	-0.03
NMC HEALTH	0.17	-14.59	-0.03
MONOTARO	0.24	-10.25	-0.02
HINDUSTAN UNILEVER	0.40	-5.47	-0.02
TOPCON	0.19	-10.73	-0.02

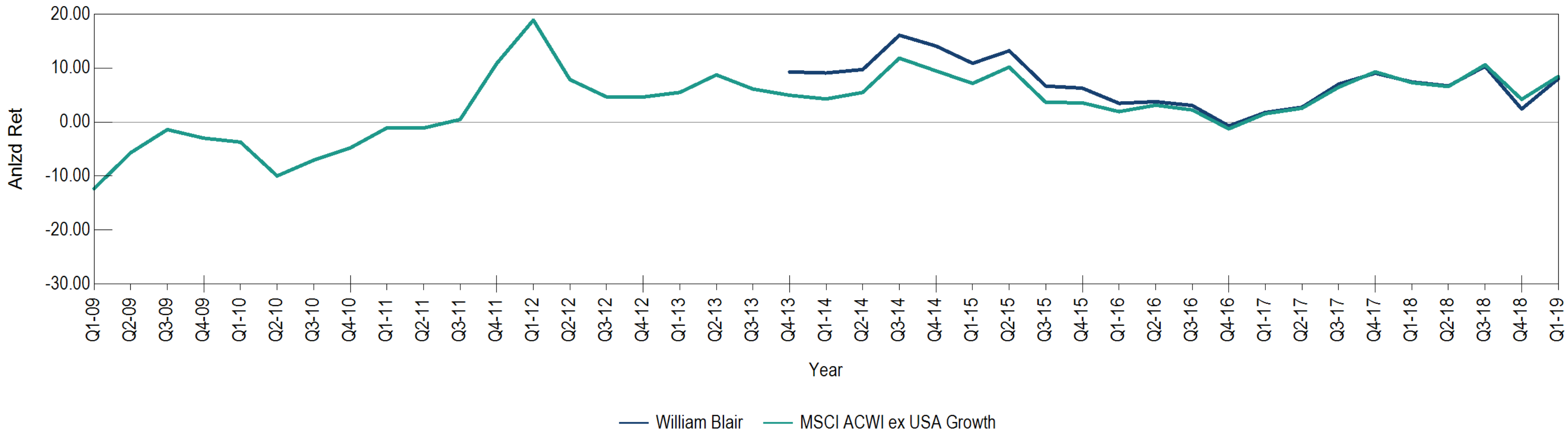
Unclassified sector allocation includes cash allocations.

William Blair vs. eV ACWI ex-US Growth Equity Gross Universe

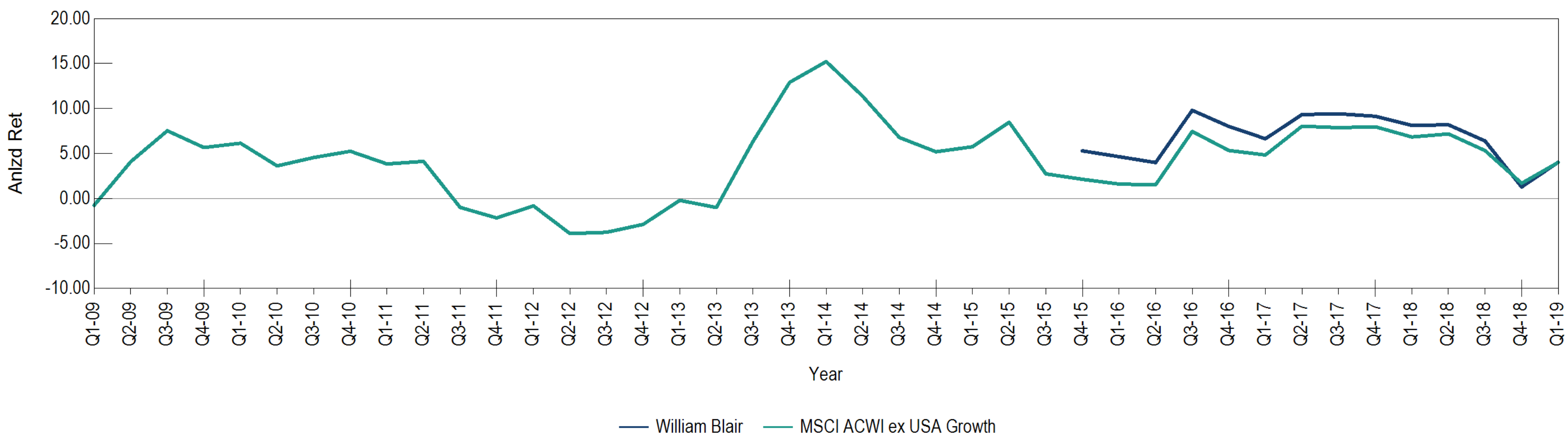


Return (Rank)	Quarter		1 Year		3 Years		5 Years		10 Years		2018		2017		2016		2015		2014	
5th Percentile	18.4		4.1		15.3		11.8		17.5		-6.8		46.8		6.3		16.3		3.2	
25th Percentile	14.8		-0.7		11.7		6.8		13.5		-11.7		39.6		2.0		9.0		-0.1	
Median	13.5		-4.0		9.5		5.3		12.1		-14.3		35.3		-0.9		3.5		-2.5	
75th Percentile	11.8		-7.9		8.2		4.1		11.4		-17.2		31.8		-3.9		-0.5		-5.3	
95th Percentile	10.8		-11.9		4.9		2.8		10.0		-22.3		28.3		-7.4		-5.4		-8.2	
# of Portfolios	84		84		82		73		54		82		94		90		70		50	
● William Blair	13.9	(43)	-5.6	(60)	8.0	(77)	4.0	(77)	--	(--)	-16.8	(69)	30.9	(81)	-1.4	(55)	0.5	(69)	-1.2	(37)
▲ MSCI ACWI ex USA Growth	12.3	(69)	-3.0	(41)	8.4	(72)	4.0	(78)	9.5	(98)	-14.4	(51)	32.0	(75)	0.1	(45)	-1.3	(83)	-2.6	(53)

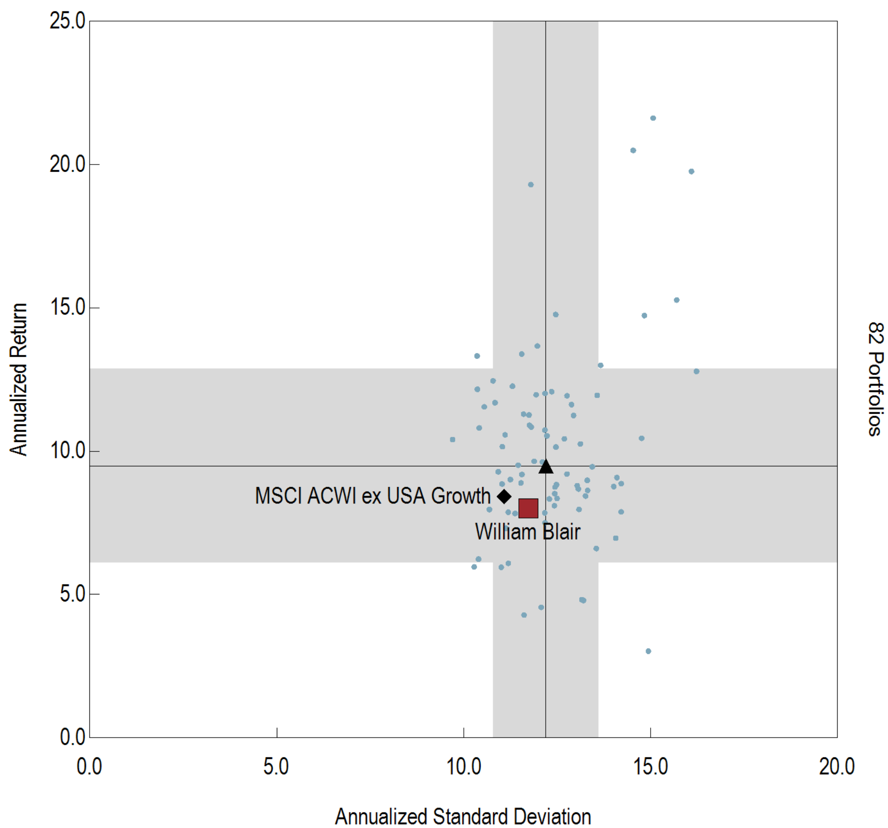
Rolling 3 Year Annualized Return (%)



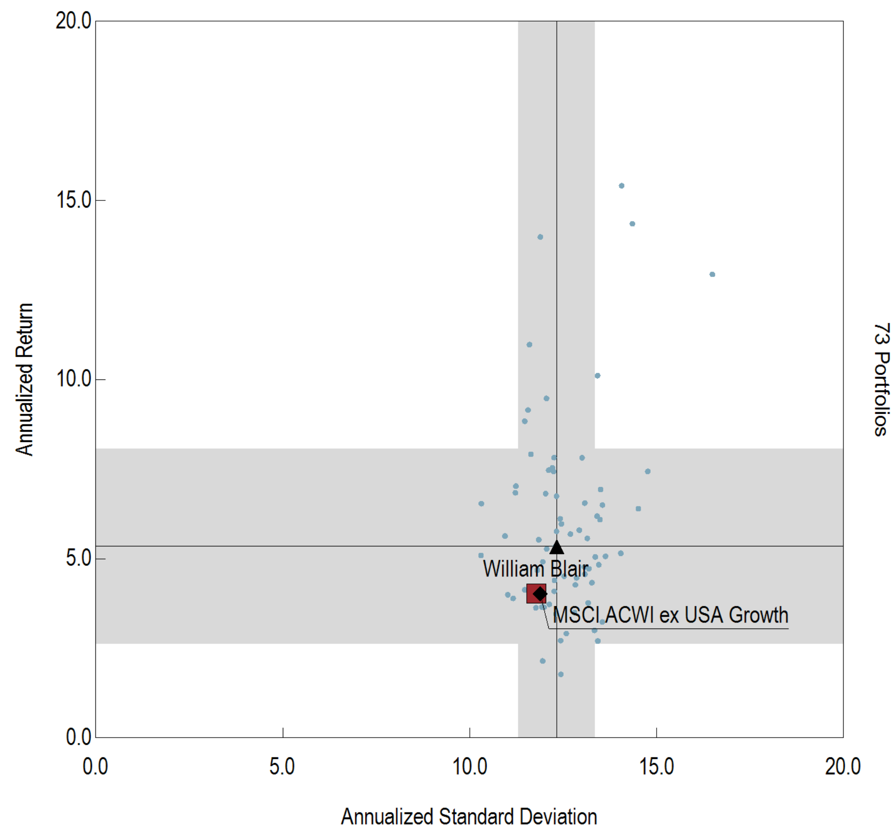
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
William Blair	8.0%	11.7%	0.6
MSCI ACWI ex USA Growth	8.4%	11.1%	0.6
eV ACWI ex-US Growth Equity Gross Median	9.5%	12.2%	0.7

5 Years

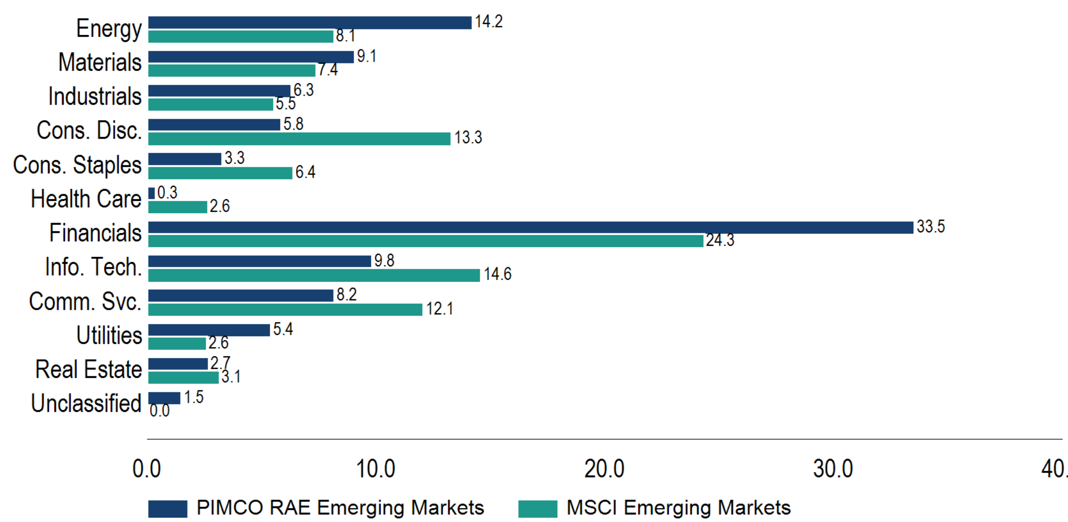
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
William Blair	4.0%	11.8%	0.3
MSCI ACWI ex USA Growth	4.0%	11.9%	0.3
eV ACWI ex-US Growth Equity Gross Median	5.3%	12.3%	0.4

The PIMCO RAE Emerging Markets seeks to invest 80% of its assets in investments that are economically tied to emerging market countries. The portfolio is sub-advised by Research Affiliates, LLC.

Characteristics

	Portfolio	MSCI Emerging Markets
Number of Holdings	562	1,133
Weighted Avg. Market Cap. ($B)	37.93	84.88
Median Market Cap. ($B)	3.59	5.81
Price To Earnings	8.63	13.30
Price To Book	1.58	2.41
Price To Sales	0.52	1.25
Return on Equity (%)	10.95	17.82
Yield (%)	3.94	2.68
Beta		1.00

Sector Allocation (%) vs MSCI Emerging Markets



Country Allocation

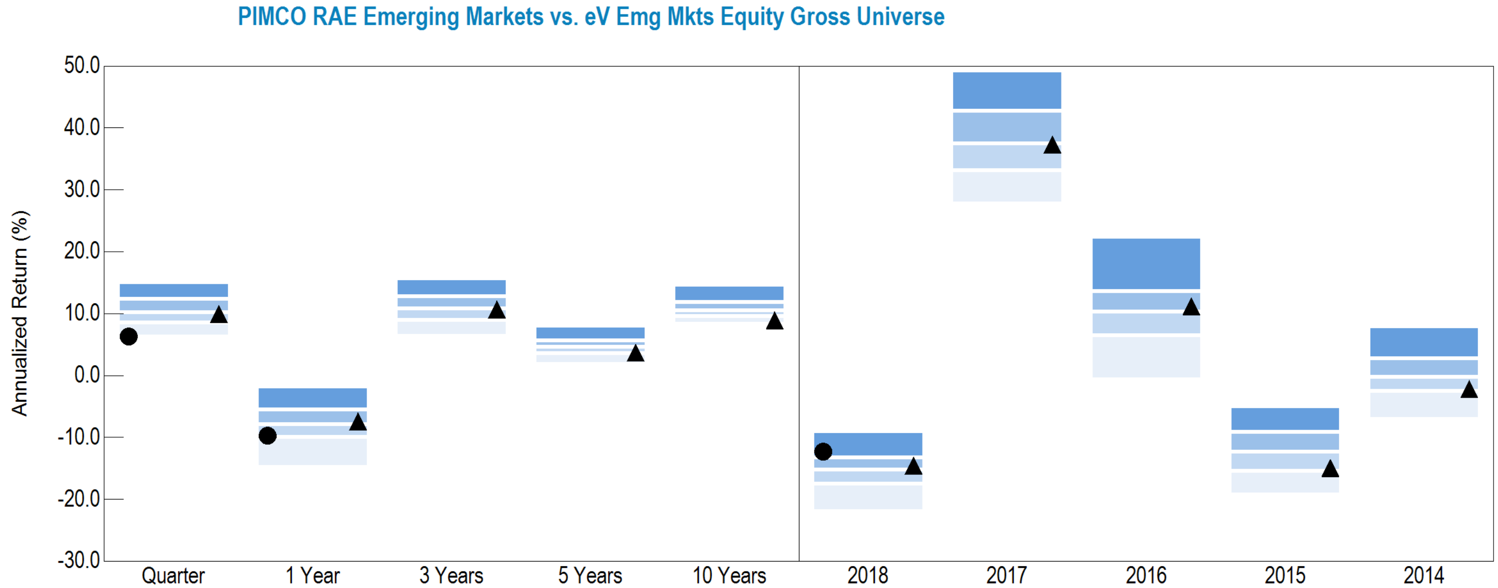
	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
Totals		
Developed	10.2%	0.0%
Emerging*	88.4%	100.0%
Top 10 Largest Countries		
China*	21.0%	32.8%
Korea*	18.5%	13.1%
Russia*	9.9%	3.8%
Taiwan*	9.8%	11.4%
Hong Kong	9.8%	0.0%
Brazil*	5.8%	7.1%
South Africa*	4.7%	5.8%
India*	4.7%	9.2%
Turkey*	3.0%	0.6%
Thailand*	2.8%	2.4%
Total-Top 10 Largest Countries	**90.0%**	**86.2%**

	End Weight	Return	Contribution
PJSC LUKOIL SPON (LON) ADR	2.08	25.35	0.53
SAMSUNG ELECTRONICS	3.05	13.41	0.41
CNOOC	1.30	21.17	0.27
LENOVO GROUP	0.74	33.11	0.25
IMPALA PLATINUM	0.30	65.89	0.20
PETROLEO BRASILEIRO ADR 1:2	0.84	22.37	0.19
PING AN INSURANCE (GROUP) OF CHINA 'H'	0.67	26.78	0.18
JBS ON	0.43	36.80	0.16
CHINA CON.BANK 'H'	3.96	3.91	0.15
CHINA MERCHANTS BANK 'H'	0.46	32.58	0.15

Bottom Contributors

	End Weight	Return	Contribution
KOREA ELECTRIC POWER	1.16	-11.20	-0.13
RELIANCE COMMUNICATIONS	0.14	-70.96	-0.10
KT ADR 2:1	0.71	-12.52	-0.09
CHINA RESOURCES POWER	0.38	-21.85	-0.08
LOTTE SHOPPING	0.34	-17.07	-0.06
LG UPLUS	0.40	-13.95	-0.06
TURKIYE HALK BANKASI	0.37	-14.42	-0.05
SK TELECOM SPN.ADR 9:1	0.62	-8.62	-0.05
DOOSAN HVY.INDS.AND CON.	0.16	-23.01	-0.04
KB FINANCIAL GROUP	0.31	-11.53	-0.04

Unclassified sector allocation includes cash allocations.



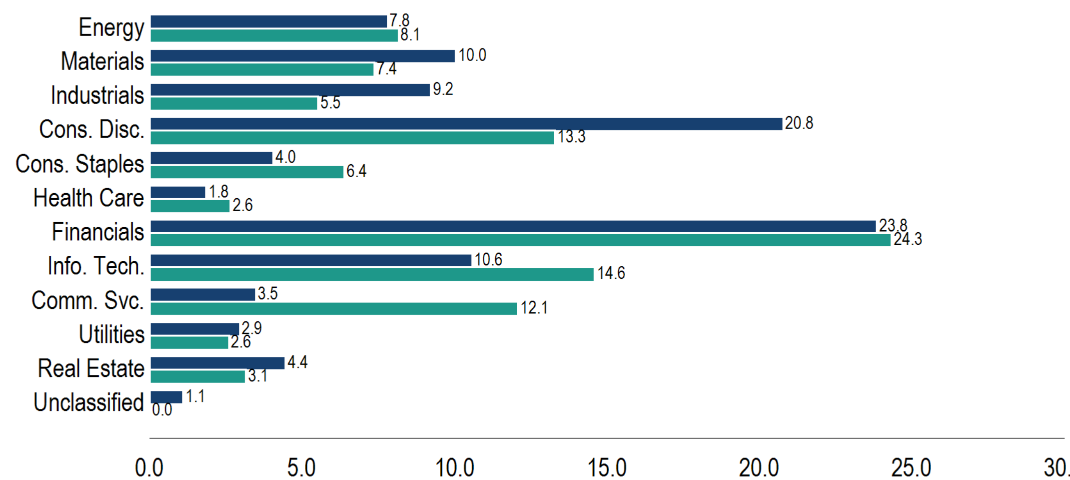
Return (Rank)	Quarter		1 Year		3 Years		5 Years		10 Years		2018		2017		2016		2015		2014	
5th Percentile	15.1		-1.8		15.6		8.0		14.7		-9.0		49.2		22.4		-5.0		8.0	
25th Percentile	12.5		-5.4		12.9		5.7		11.9		-13.2		42.8		13.7		-9.0		2.9	
Median	10.3		-7.7		10.9		4.7		10.6		-15.2		37.6		10.4		-12.2		-0.1	
75th Percentile	8.6		-9.8		9.1		3.6		9.7		-17.4		33.2		6.6		-15.3		-2.4	
95th Percentile	6.4		-14.7		6.5		1.9		8.5		-21.8		27.8		-0.6		-19.2		-7.0	
# of Portfolios	361		360		337		297		150		355		343		337		273		251	
● PIMCO RAE Emerging Markets	6.3	(96)	-9.7	(75)	--	(--)	--	(--)	--	(--)	-12.3	(19)	--	(--)	--	(--)	--	(--)	--	(--)
▲ MSCI Emerging Markets	9.9	(56)	-7.4	(46)	10.7	(54)	3.7	(74)	8.9	(91)	-14.6	(43)	37.3	(53)	11.2	(45)	-14.9	(70)	-2.2	(74)

The Emerging Markets Unconstrained strategy aims to outperform its benchmark, MSCI Emerging Markets Index by 5% per annum over a three-year rolling period. It targets high returns and long term capital growth by investing in a focused portfolio of primarily equity and equity-related securities traded in the Emerging Markets.

Characteristics

	Portfolio	MSCI Emerging Markets
Number of Holdings	78	1,133
Weighted Avg. Market Cap. ($B)	59.79	84.88
Median Market Cap. ($B)	10.24	5.81
Price To Earnings	11.86	13.30
Price To Book	2.40	2.41
Price To Sales	1.42	1.25
Return on Equity (%)	21.31	17.82
Yield (%)	2.37	2.68
Beta		1.00

Sector Allocation (%) vs MSCI Emerging Markets



Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
Totals		
Developed	19.4%	0.0%
Emerging*	81.2%	100.0%
Frontier**	1.8%	0.0%
Top 10 Largest Countries		
China*	21.7%	32.8%
India*	15.8%	9.2%
Korea*	11.6%	13.1%
Hong Kong	10.8%	0.0%
South Africa*	10.1%	5.8%
Brazil*	9.2%	7.1%
Russia*	6.1%	3.8%
United Kingdom	4.1%	0.0%
United States	2.1%	0.0%
Malaysia*	1.6%	2.2%
Total-Top 10 Largest Countries	**93.0%**	**74.1%**

Top Contributors

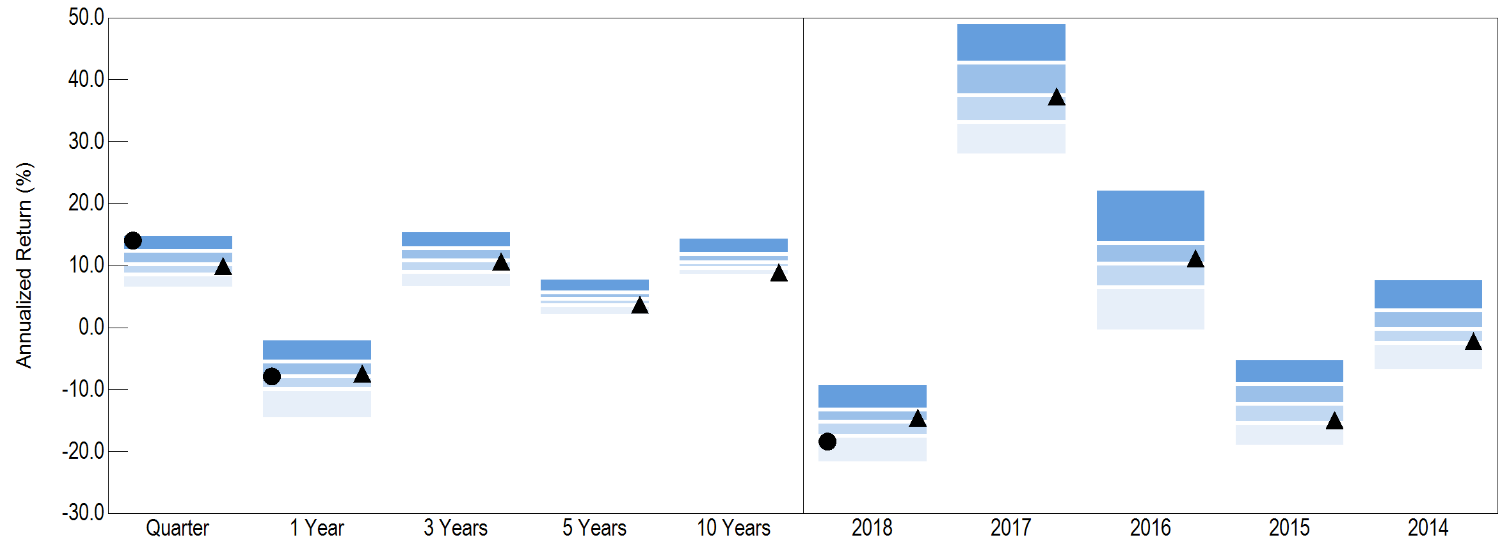
	End Weight	Return	Contribution
ALIBABA GROUP HLDG.SPN. ADR 1:1	5.82	33.11	1.93
NASPERS	6.25	18.52	1.16
WULIANGYE YIBIN 'A'	1.00	90.76	0.91
CNOOC	2.72	21.17	0.58
CHINA PACIFIC INSURANCE (GROUP) 'H'	2.68	21.18	0.57
HCL TECHNOLOGIES	3.72	13.86	0.52
LEXINFINTECH HDG. ADR 1:2	1.10	44.83	0.49
PETROLEO BRASILEIRO PN	2.11	23.21	0.49
OCI	1.34	35.12	0.47
FIRST QUANTUM MRLS.	1.13	40.30	0.46

Bottom Contributors

	End Weight	Return	Contribution
TURK HAVA YOLLARI	1.09	-24.42	-0.27
FUTURE RETAIL	1.40	-8.87	-0.12
PAMPA ENERGIA	0.60	-11.12	-0.07
HANA FINANCIAL GROUP	2.74	-1.29	-0.04
DP WORLD	1.31	-2.60	-0.03
MEDICLINIC INTERNATIONAL	1.01	-3.30	-0.03
BB SEGURIDADE ON	1.67	-1.93	-0.03
ARVIND	0.49	-6.28	-0.03
SIAM COML. BANK FB	1.07	-1.91	-0.02
CHINA GAS HOLDINGS	1.87	-1.03	-0.02

Unclassified sector allocation includes cash allocations.

TT Emerging Markets vs. eV Emg Mkts Equity Gross Universe



Return (Rank)	Quarter		1 Year		3 Years		5 Years		10 Years		2018		2017		2016		2015		2014	
5th Percentile	15.1		-1.8		15.6		8.0		14.7		-9.0		49.2		22.4		-5.0		8.0	
25th Percentile	12.5		-5.4		12.9		5.7		11.9		-13.2		42.8		13.7		-9.0		2.9	
Median	10.3		-7.7		10.9		4.7		10.6		-15.2		37.6		10.4		-12.2		-0.1	
75th Percentile	8.6		-9.8		9.1		3.6		9.7		-17.4		33.2		6.6		-15.3		-2.4	
95th Percentile	6.4		-14.7		6.5		1.9		8.5		-21.8		27.8		-0.6		-19.2		-7.0	
# of Portfolios	361		360		337		297		150		355		343		337		273		251	
● TT Emerging Markets	14.0	(12)	-7.9	(52)	--	(--)	--	(--)	--	(--)	-18.4	(83)	--	(--)	--	(--)	--	(--)	--	(--)
▲ MSCI Emerging Markets	9.9	(56)	-7.4	(46)	10.7	(54)	3.7	(74)	8.9	(91)	-14.6	(43)	37.3	(53)	11.2	(45)	-14.9	(70)	-2.2	(74)

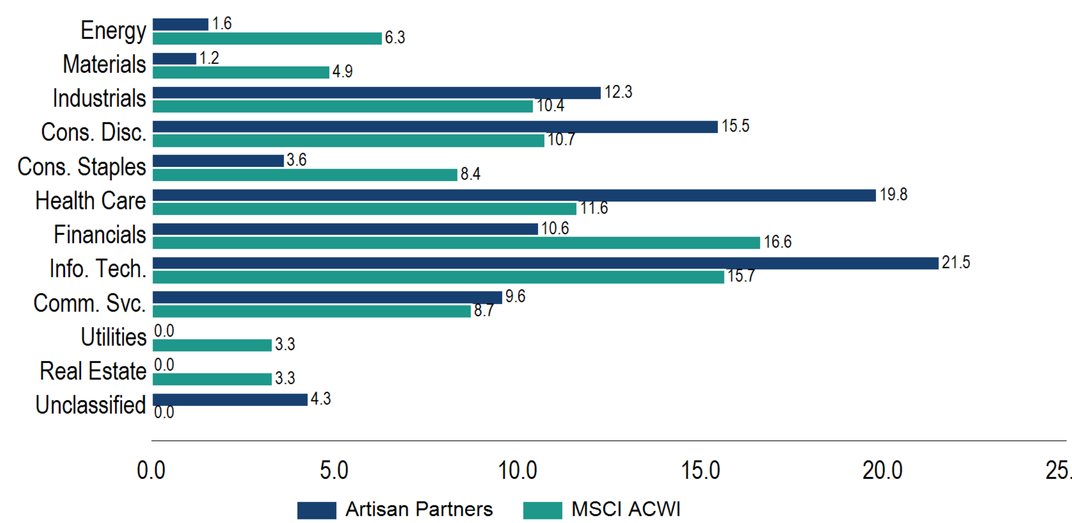
Global Equity Managers

Global equity portfolio of companies that is benchmark agnostic with accelerating profit cycles and a focus on capital allocation. Primary personnel include James Hamel, Craigh Cepukenas, and Matthew Kamm.

Characteristics

	Portfolio	MSCI ACWI
Number of Holdings	46	2,768
Weighted Avg. Market Cap. ($B)	106.47	140.13
Median Market Cap. ($B)	28.07	9.41
Price To Earnings	31.44	17.12
Price To Book	4.60	2.82
Price To Sales	2.96	1.54
Return on Equity (%)	22.24	20.08
Yield (%)	0.96	2.53
Beta	1.27	1.00

Sector Allocation (%) vs MSCI ACWI



Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
Totals		
Developed	93.2%	88.3%
Emerging*	2.5%	11.7%
Top 10 Largest Countries		
United States	54.7%	55.1%
United Kingdom	9.2%	5.2%
Hong Kong	8.1%	1.2%
Switzerland	5.3%	2.7%
Cash	4.3%	0.0%
Denmark	4.1%	0.5%
Japan	3.0%	7.3%
India*	2.5%	1.1%
Germany	1.6%	2.6%
France	1.6%	3.4%
Total-Top 10 Largest Countries	**94.6%**	**79.0%**

Top Contributors

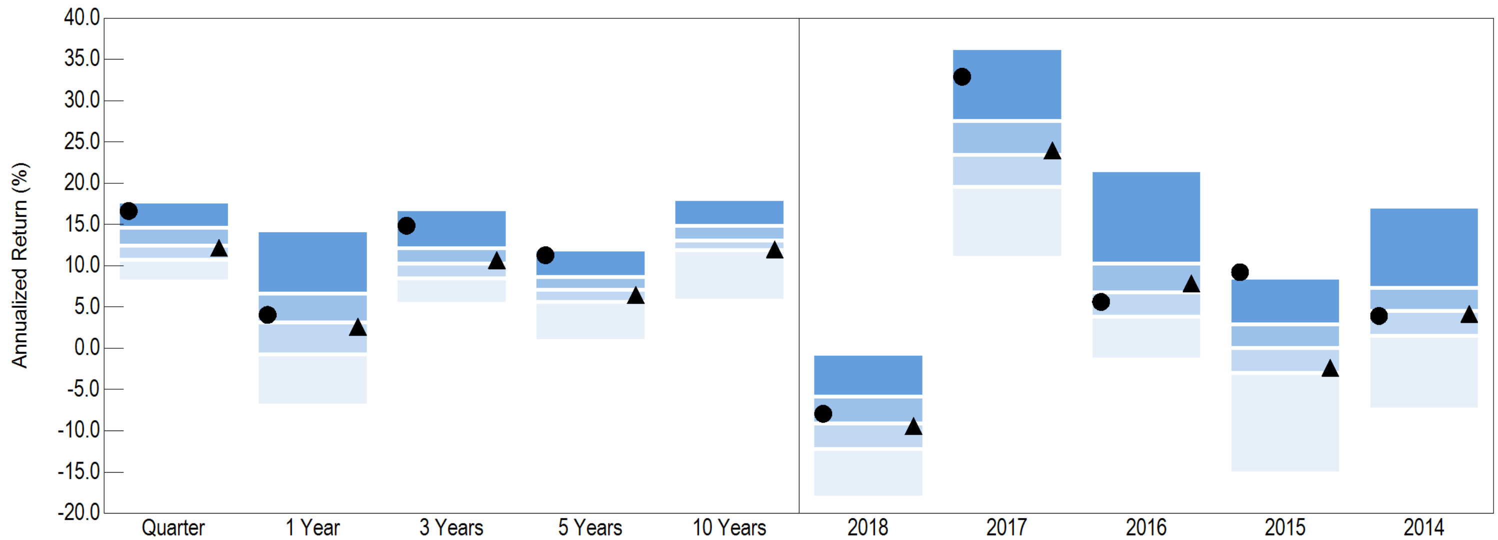
	Avg Wgt	Return	Contribution
WORLDPAY A	2.11	48.50	1.02
VISA 'A'	5.50	18.59	1.02
TECHTRONIC INDS.	3.55	26.47	0.94
IHS MARKIT	6.98	13.36	0.93
FEVERTREE DRINKS	1.77	40.46	0.71
APTIV	2.14	29.47	0.63
ATLASSIAN 'A'	2.25	26.31	0.59
PROGRESSIVE OHIO	2.46	24.06	0.59
TEMENOS N	2.32	23.25	0.54
PAGSEGURO DIGITAL A	0.89	59.37	0.53

Bottom Contributors

	Avg Wgt	Return	Contribution
ACTIVISION BLIZZARD	1.53	-1.44	-0.02
BOOKING HOLDINGS	1.44	1.31	0.02
ING GROEP	0.19	12.57	0.02
TREASURY WINE ESTATES	1.89	2.95	0.06
VESTAS WINDSYSTEMS	0.48	11.73	0.06
UMICORE	1.01	11.55	0.12
TIFFANY & CO	0.48	31.84	0.15
DAIFUKU	1.04	14.83	0.15
AMAZON.COM	0.84	18.56	0.16
GENMAB	2.51	6.23	0.16

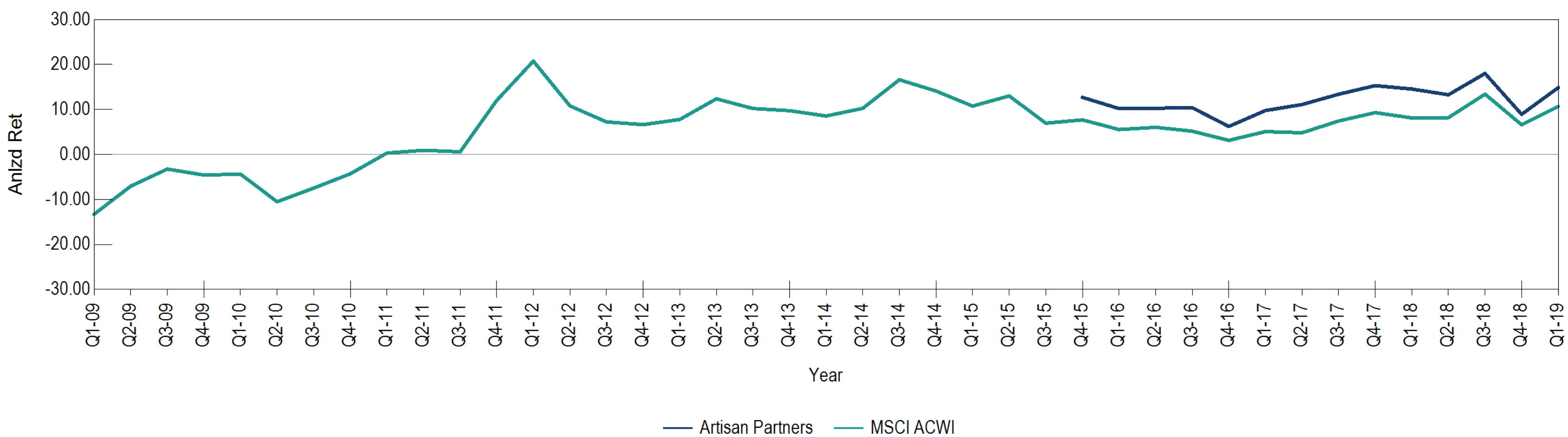
Unclassified sector allocation includes cash allocations.

Artisan Partners vs. eV All Global Equity Gross Universe

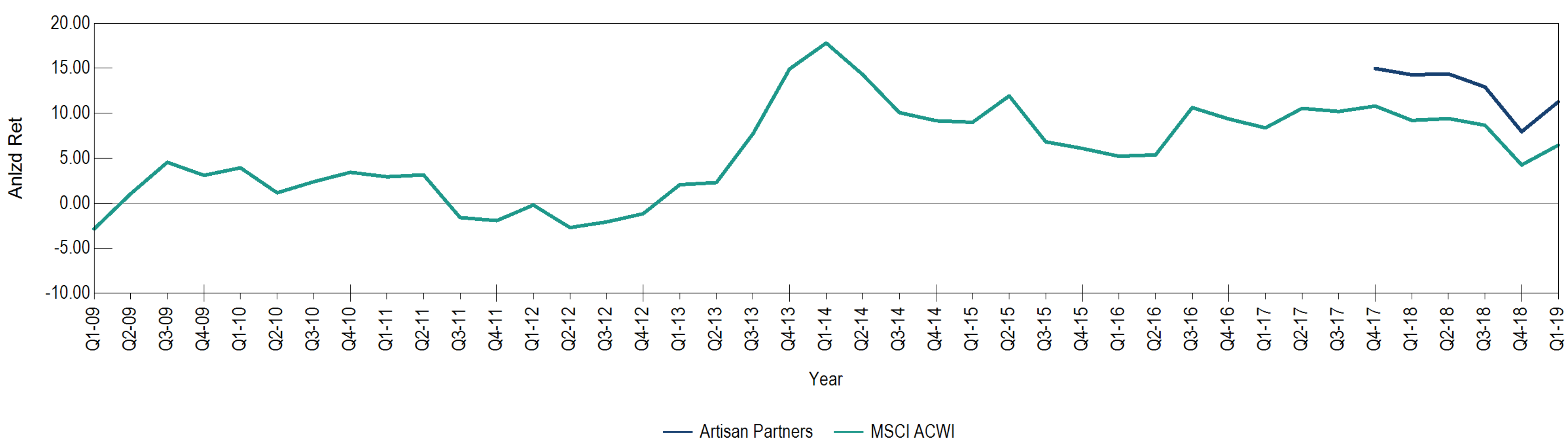


	Quarter		1 Year		3 Years		5 Years		10 Years		2018		2017		2016		2015		2014	
	Return (Rank)																			
5th Percentile	17.8		14.3		16.8		11.9		18.0		-0.7		36.3		21.5		8.5		17.1	
25th Percentile	14.6		6.7		12.1		8.7		14.8		-5.8		27.6		10.3		3.0		7.4	
Median	12.5		3.1		10.3		7.1		13.1		-9.1		23.5		6.8		0.1		4.6	
75th Percentile	10.8		-0.7		8.5		5.6		11.9		-12.2		19.6		3.9		-2.9		1.5	
95th Percentile	8.2		-6.9		5.4		0.9		5.8		-18.1		11.0		-1.4		-15.1		-7.4	
# of Portfolios	936		936		870		757		496		920		880		842		692		609	
● Artisan Partners	16.6	(9)	4.0	(43)	14.8	(11)	11.3	(8)	--	(--)	-7.9	(40)	32.9	(11)	5.6	(61)	9.2	(4)	3.9	(56)
▲ MSCI ACWI	12.2	(56)	2.6	(54)	10.7	(45)	6.5	(64)	12.0	(75)	-9.4	(53)	24.0	(47)	7.9	(42)	-2.4	(73)	4.2	(54)

Rolling 3 Year Annualized Return (%)



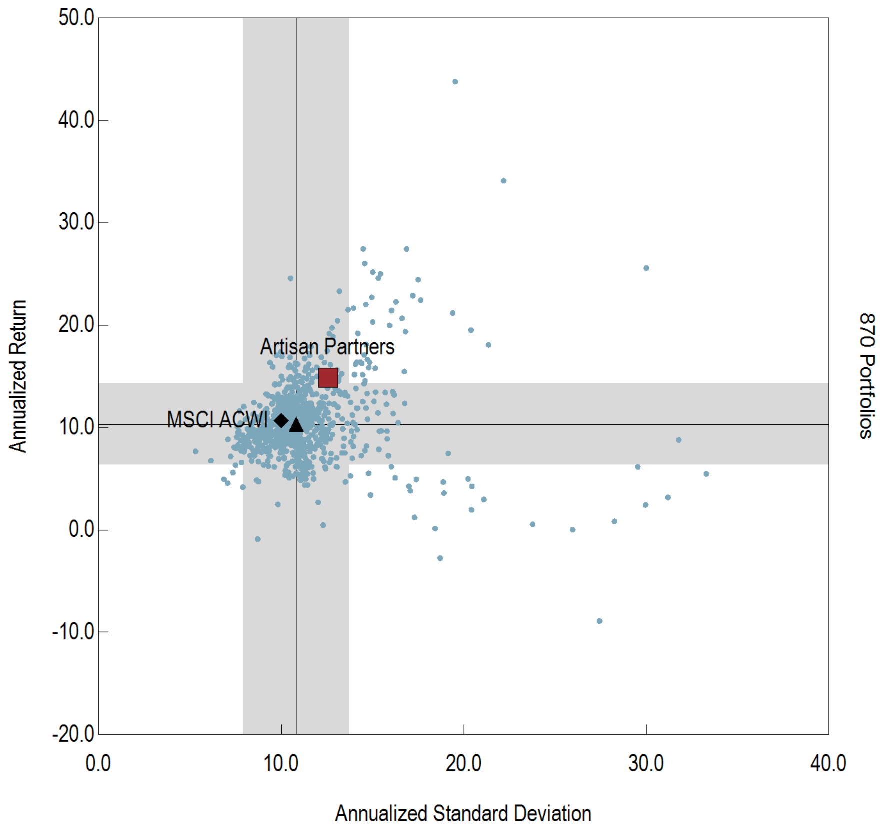
Rolling 5 Year Annualized Return (%)



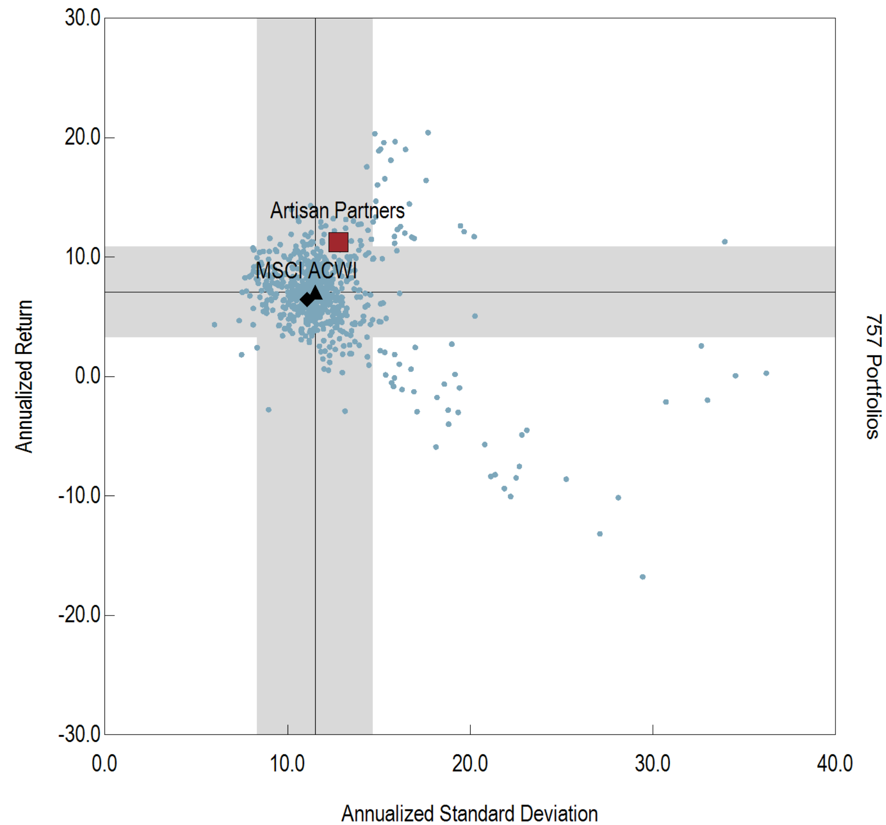
Artisan Partners
Risk vs. Return 3 & 5 Year (Gross of Fees)

Period Ending: March 31, 2019

3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Artisan Partners	14.8%	12.6%	1.1
MSCI ACWI	10.7%	10.0%	0.9
eV All Global Equity Gross Median	10.3%	10.8%	0.9

5 Years

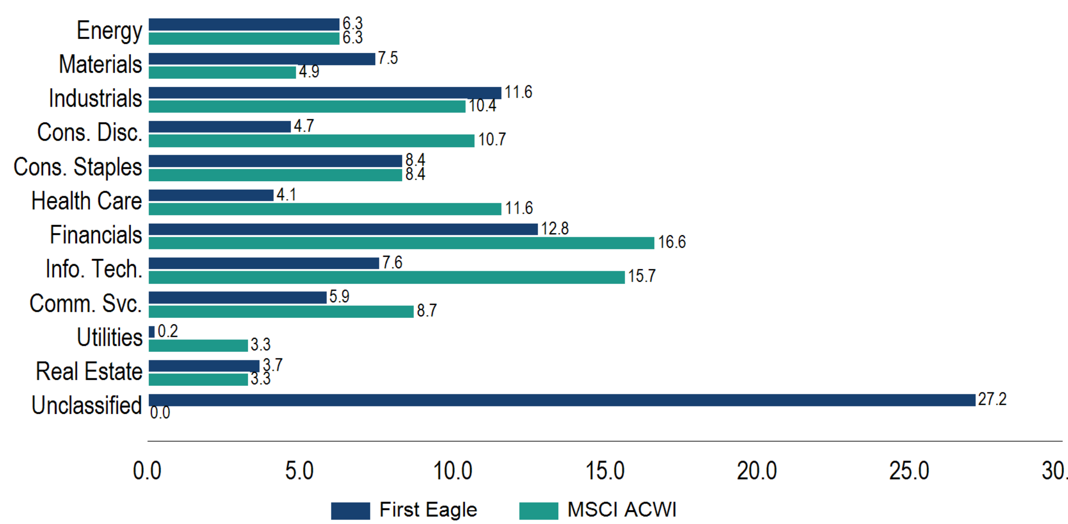
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Artisan Partners	11.3%	12.8%	0.8
MSCI ACWI	6.5%	11.1%	0.5
eV All Global Equity Gross Median	7.1%	11.5%	0.6

Global equity portfolio that is benchmark agnostic comprised of companies with low valuations. Primary personnel include Matt McLennan and Kimball Brooker.

Characteristics

	Portfolio	MSCI ACWI
Number of Holdings	135	2,768
Weighted Avg. Market Cap. ($B)	70.78	140.13
Median Market Cap. ($B)	17.97	9.41
Price To Earnings	16.78	17.12
Price To Book	2.26	2.82
Price To Sales	1.46	1.54
Return on Equity (%)	14.47	20.08
Yield (%)	2.39	2.53
Beta	0.70	1.00

Sector Allocation (%) vs MSCI ACWI



Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
Totals		
Developed	78.3%	88.3%
Emerging*	3.6%	11.7%
Cash	18.1%	
Top 10 Largest Countries		
United States	44.5%	55.1%
Cash	18.1%	0.0%
Japan	11.1%	7.3%
United Kingdom	5.8%	5.2%
France	5.4%	3.4%
Canada	3.0%	3.1%
Switzerland	2.2%	2.7%
Korea*	1.9%	1.5%
Hong Kong	1.3%	1.2%
Singapore	1.3%	0.4%
Total-Top 10 Largest Countries	**94.7%**	**79.8%**

Top Contributors

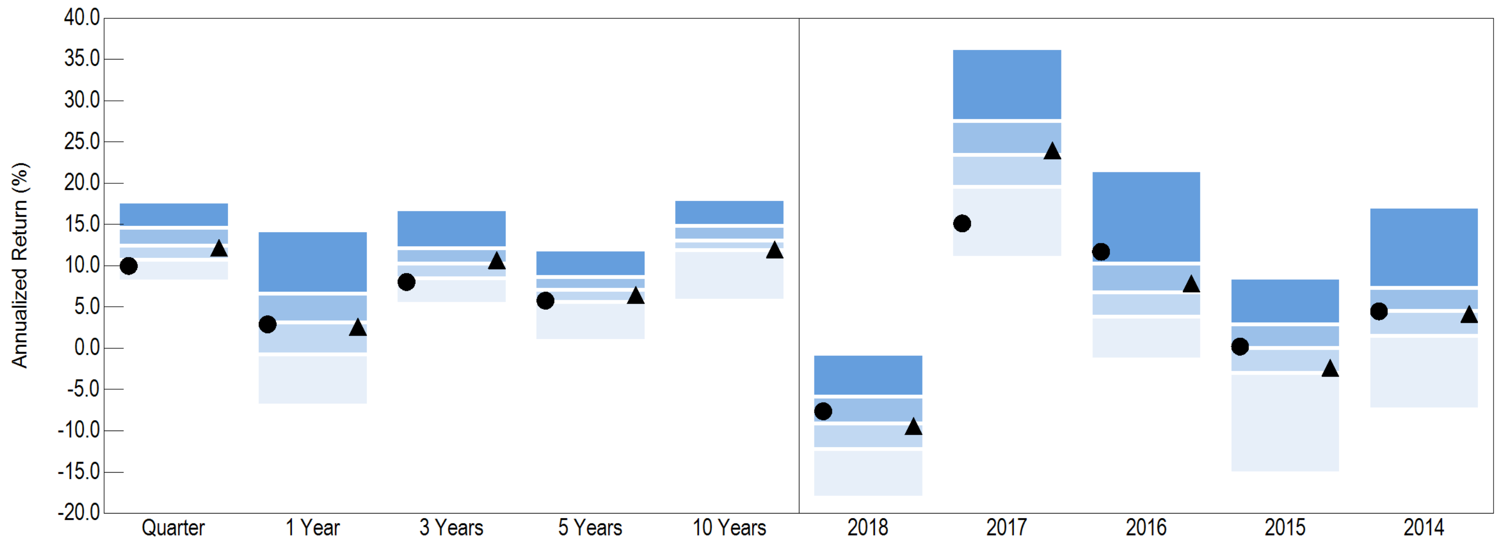
	Avg Wgt	Return	Contribution
ORACLE	2.28	19.43	0.44
BRITISH AMERICAN TOBACCO	1.33	32.80	0.44
PHILIP MORRIS INTL.	1.14	34.11	0.39
SCHLUMBERGER	1.72	22.13	0.38
EXXON MOBIL	1.54	19.81	0.30
COMCAST A	1.72	17.42	0.30
WEYERHAEUSER	1.35	22.14	0.30
UNION PACIFIC	0.93	21.59	0.20
LLOYDS BANKING GROUP	0.87	22.62	0.20
NESTLE 'R'	1.05	17.72	0.19

Bottom Contributors

	End Weight	Return	Contribution
KDDI	1.30	-8.04	-0.10
JARDINE MATHESON HDG.	0.91	-8.61	-0.08
VISTA OUTDOOR	0.05	-29.43	-0.01
H&R BLOCK	0.23	-4.67	-0.01
BT GROUP	0.25	-4.20	-0.01
BERKSHIRE HATHAWAY 'B'	0.51	-1.61	-0.01
ALLEGHANY	0.47	-1.75	-0.01
LOTTE	0.07	-7.86	-0.01
WPP	0.19	-2.01	0.00
ORKLA	0.16	-2.17	0.00

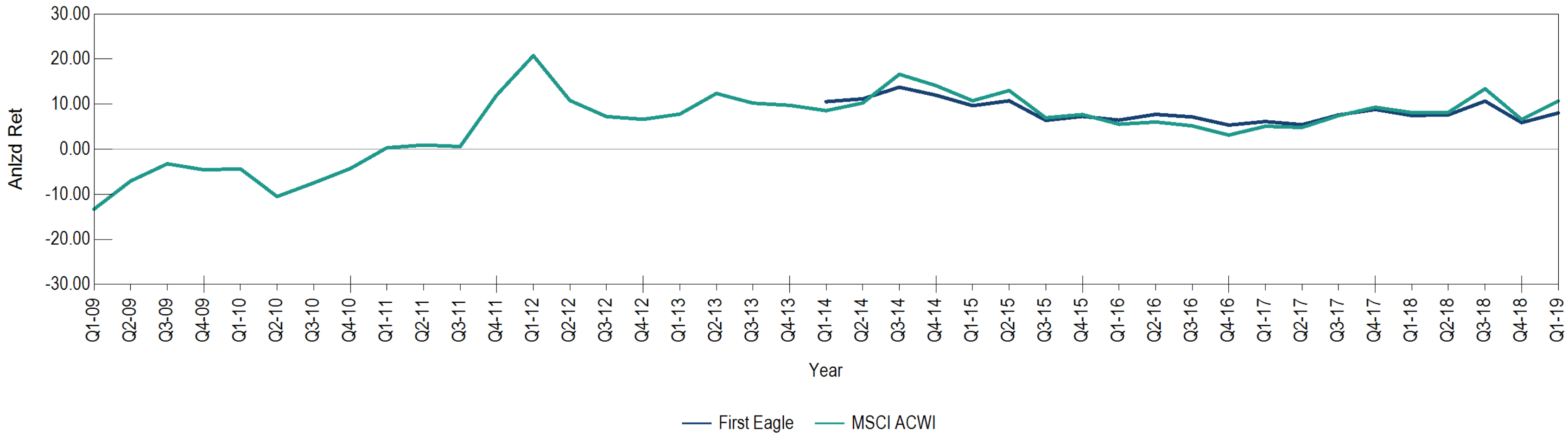
Unclassified sector allocation includes cash allocations and Gold allocations (8.4% as of 3/31/2019).

First Eagle vs. eV All Global Equity Gross Universe

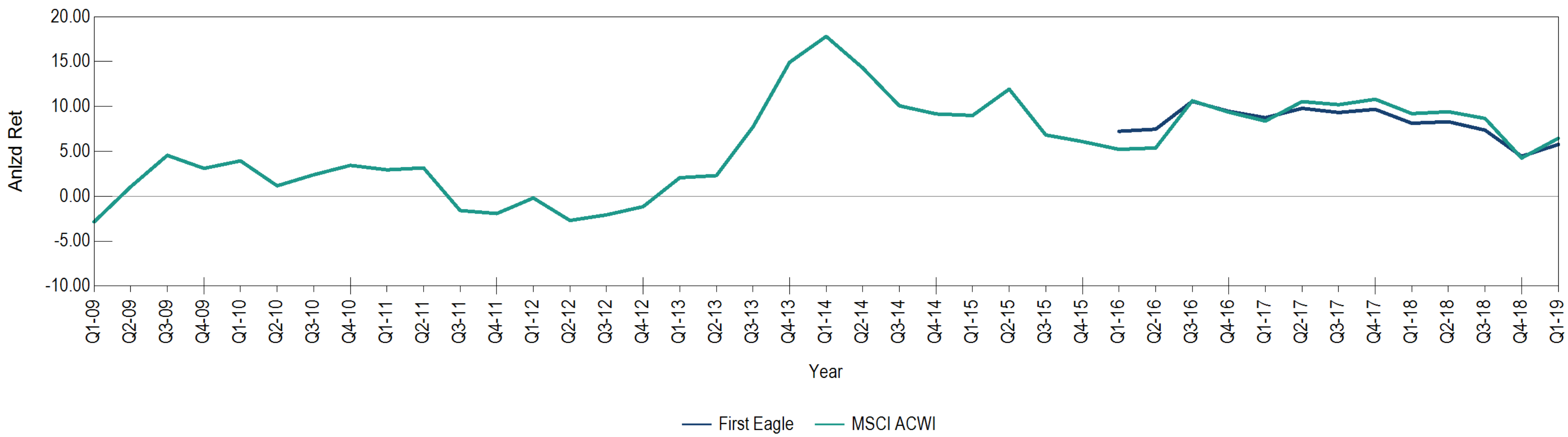


	Quarter		1 Year		3 Years		5 Years		10 Years		2018		2017		2016		2015		2014	
	Return (Rank)																			
5th Percentile	17.8		14.3		16.8		11.9		18.0		-0.7		36.3		21.5		8.5		17.1	
25th Percentile	14.6		6.7		12.1		8.7		14.8		-5.8		27.6		10.3		3.0		7.4	
Median	12.5		3.1		10.3		7.1		13.1		-9.1		23.5		6.8		0.1		4.6	
75th Percentile	10.8		-0.7		8.5		5.6		11.9		-12.2		19.6		3.9		-2.9		1.5	
95th Percentile	8.2		-6.9		5.4		0.9		5.8		-18.1		11.0		-1.4		-15.1		-7.4	
# of Portfolios	936		936		870		757		496		920		880		842		692		609	
● First Eagle	10.0	(85)	2.9	(52)	8.0	(81)	5.8	(73)	--	(--)	-7.6	(38)	15.1	(89)	11.7	(19)	0.2	(49)	4.5	(51)
▲ MSCI ACWI	12.2	(56)	2.6	(54)	10.7	(45)	6.5	(64)	12.0	(75)	-9.4	(53)	24.0	(47)	7.9	(42)	-2.4	(73)	4.2	(54)

Rolling 3 Year Annualized Return (%)



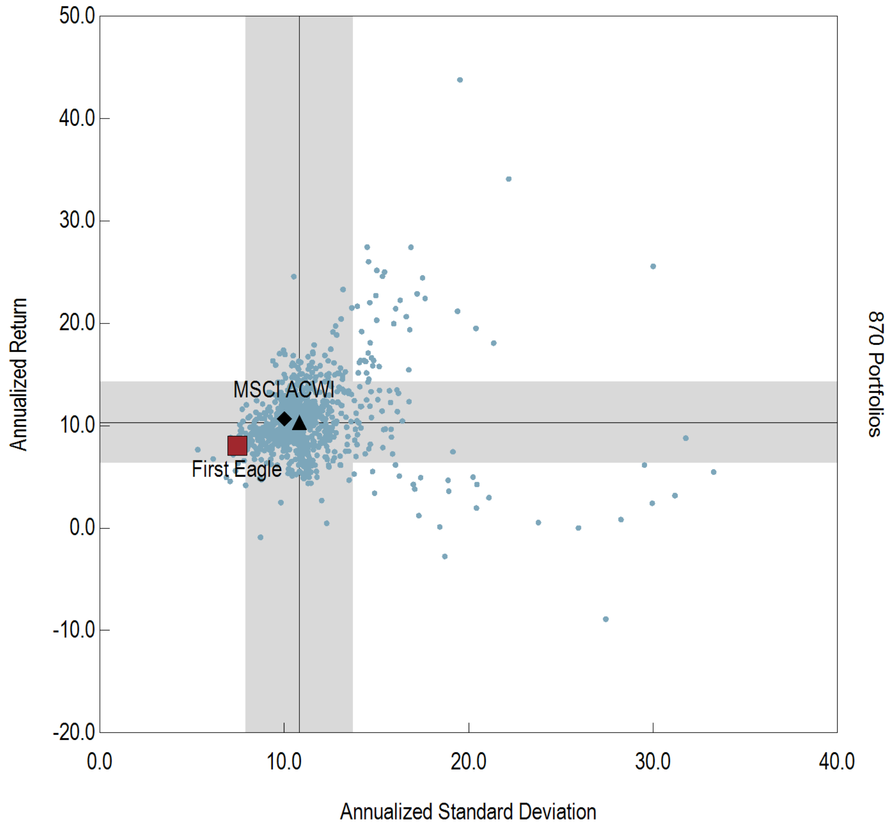
Rolling 5 Year Annualized Return (%)



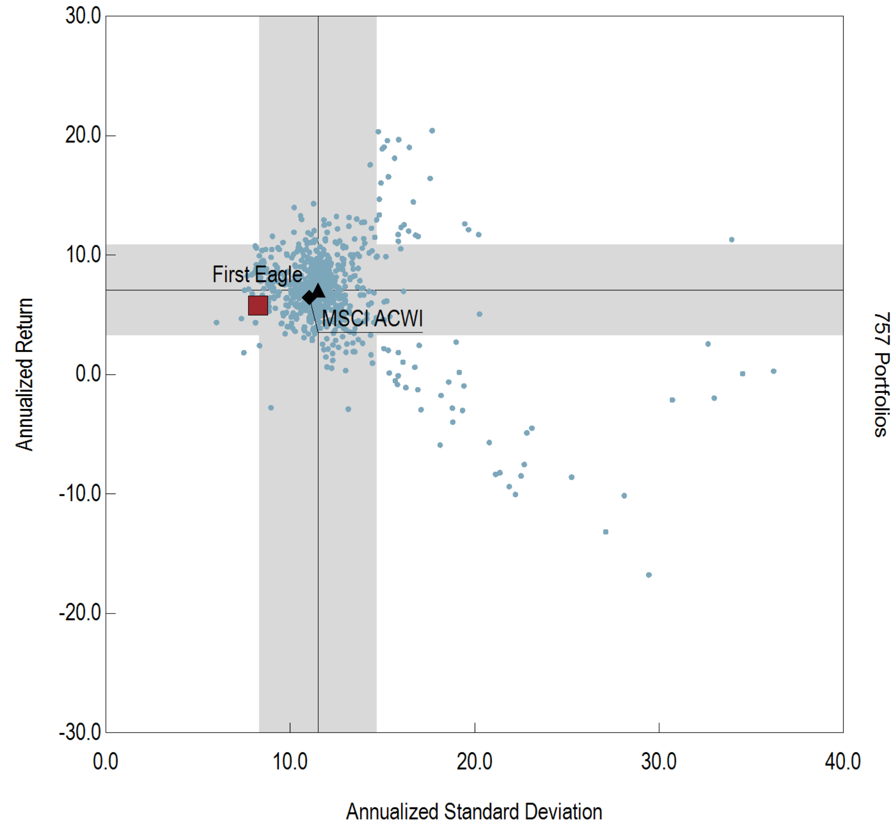
First Eagle
Risk vs. Return 3 & 5 Year (Gross of Fees)

Period Ending: March 31, 2019

3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
First Eagle	8.0%	7.4%	0.9
MSCI ACWI	10.7%	10.0%	0.9
eV All Global Equity Gross Median	10.3%	10.8%	0.9

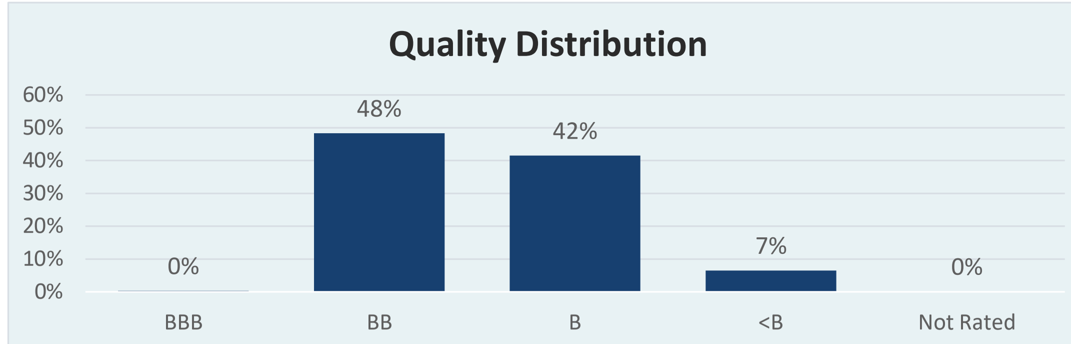
5 Years

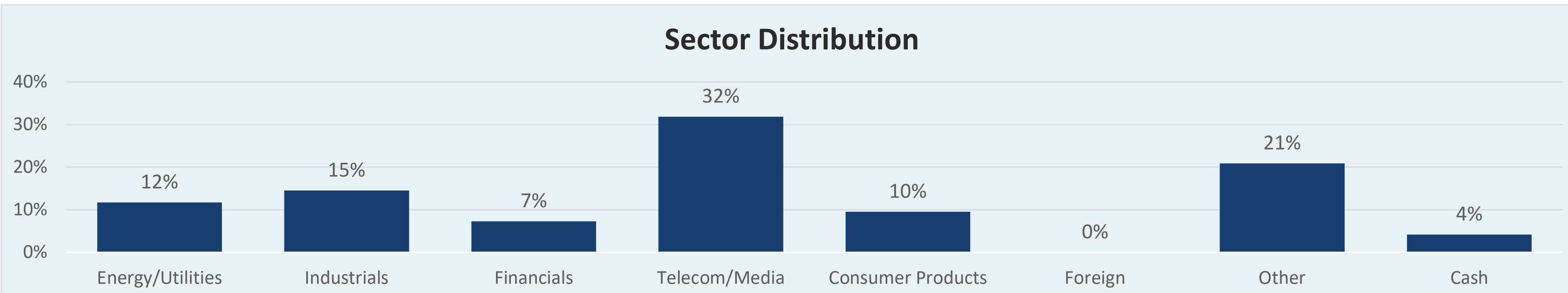
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
First Eagle	5.8%	8.1%	0.6
MSCI ACWI	6.5%	11.1%	0.5
eV All Global Equity Gross Median	7.1%	11.5%	0.6

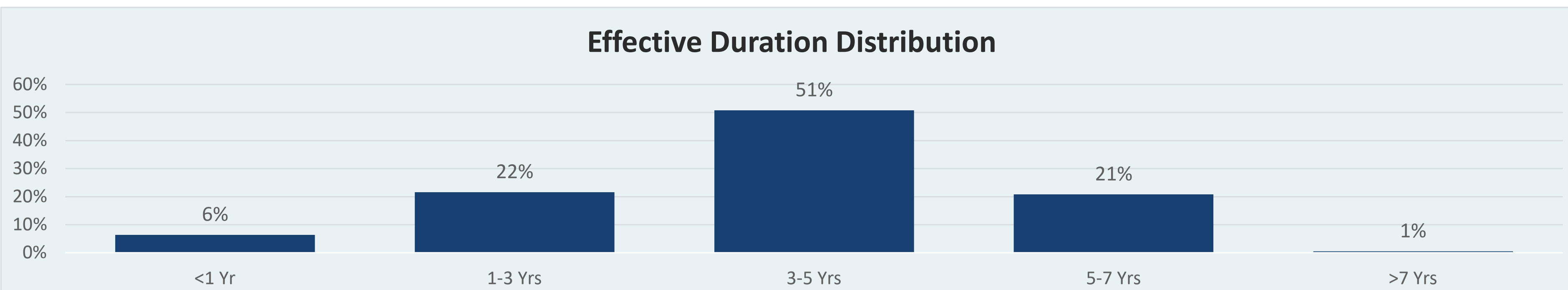
High Yield Managers

Domestic high yield fixed income portfolio with a focus on security selection. Primary personnel include Douglas Forsyth, Justin Kass, William Stickney, and Michael Yee.

	Allianz	ICE BofAML HY Master II
Effective Duration	3.80	3.70
Yield to Maturity	6.10	6.70
Average Quality	B1	B1
Average Coupon	6.4%	6.4%

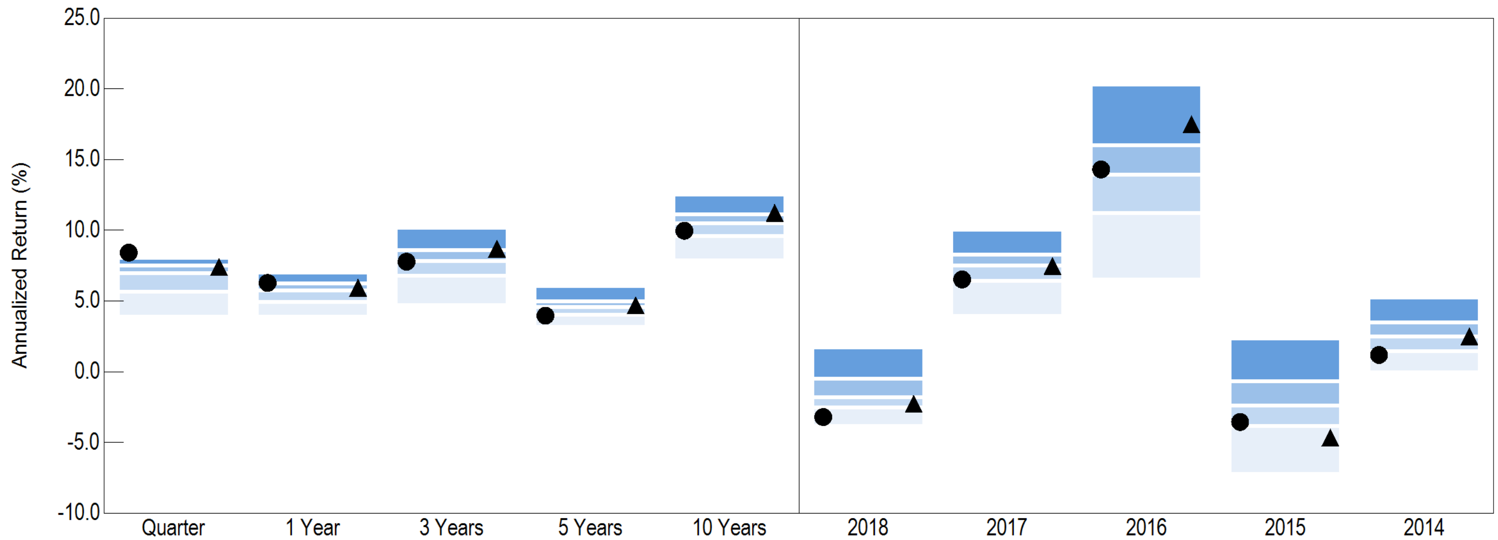






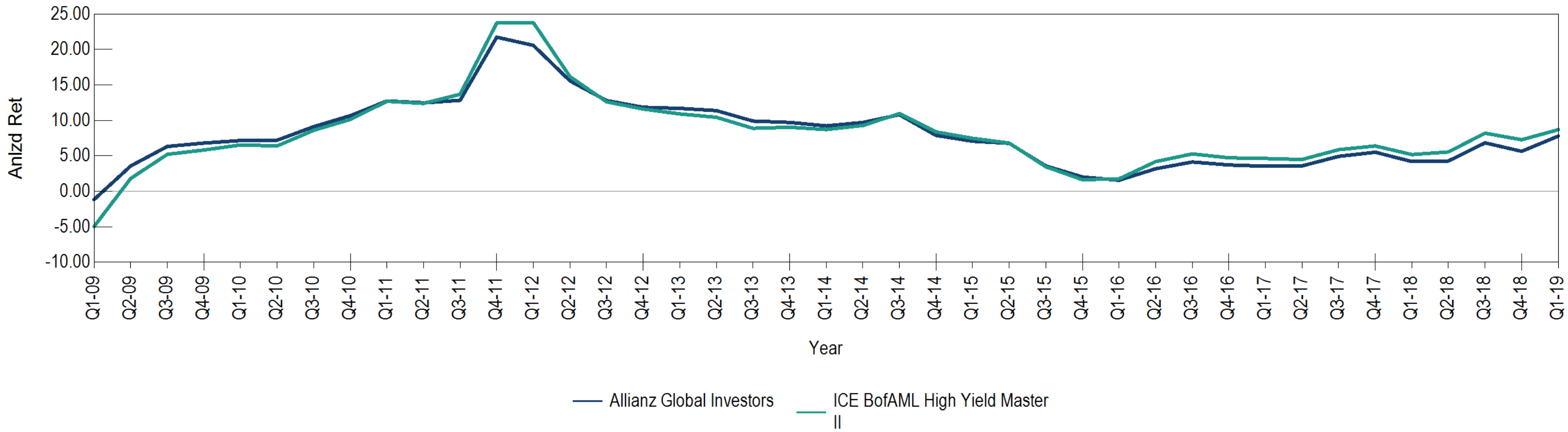
Quality distribution excludes cash.

Allianz Global Investors vs. eV US High Yield Fixed Inc Gross Universe

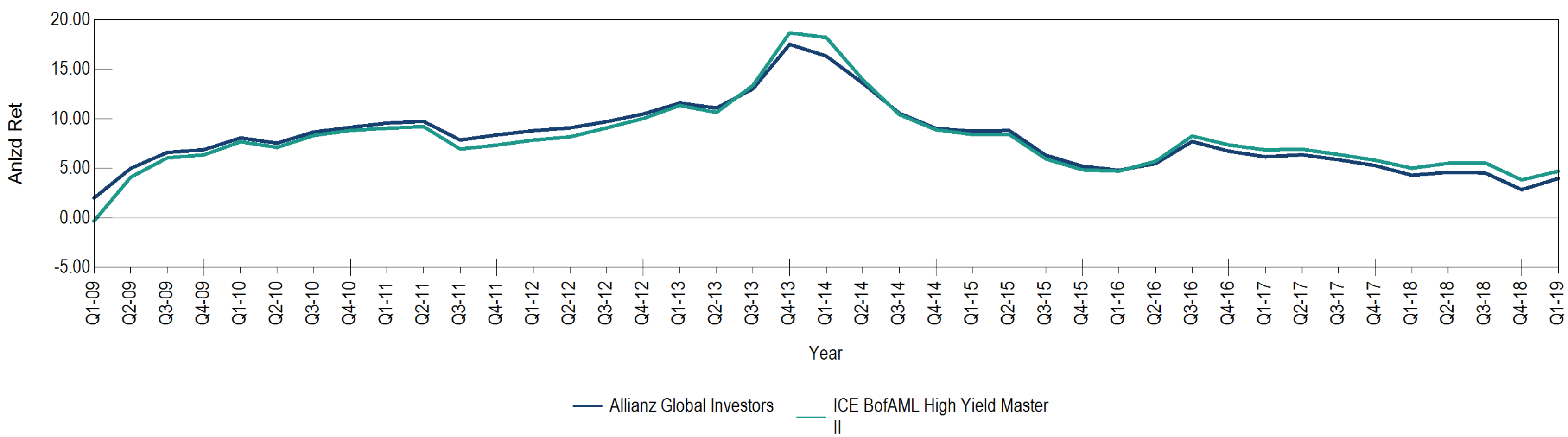


	Quarter	1 Year	3 Years	5 Years	10 Years	2018	2017	2016	2015	2014
Return (Rank)										
5th Percentile	8.0	7.0	10.2	6.0	12.5	1.7	10.0	20.3	2.3	5.2
25th Percentile	7.5	6.3	8.6	5.0	11.2	-0.5	8.3	16.0	-0.7	3.5
Median	7.0	5.8	7.9	4.6	10.5	-1.8	7.5	14.0	-2.4	2.5
75th Percentile	5.7	5.0	6.8	4.1	9.6	-2.5	6.5	11.3	-3.8	1.5
95th Percentile	3.9	3.9	4.8	3.2	7.9	-3.8	4.0	6.6	-7.2	0.0
# of Portfolios	208	208	195	182	125	210	198	183	155	141
● Allianz Global Investors	8.4 (2)	6.3 (25)	7.8 (53)	4.0 (77)	10.0 (64)	-3.2 (88)	6.5 (74)	14.3 (47)	-3.5 (68)	1.2 (83)
▲ ICE BofAML High Yield Master II	7.4 (33)	5.9 (43)	8.7 (24)	4.7 (42)	11.2 (20)	-2.3 (69)	7.5 (53)	17.5 (14)	-4.6 (83)	2.5 (50)

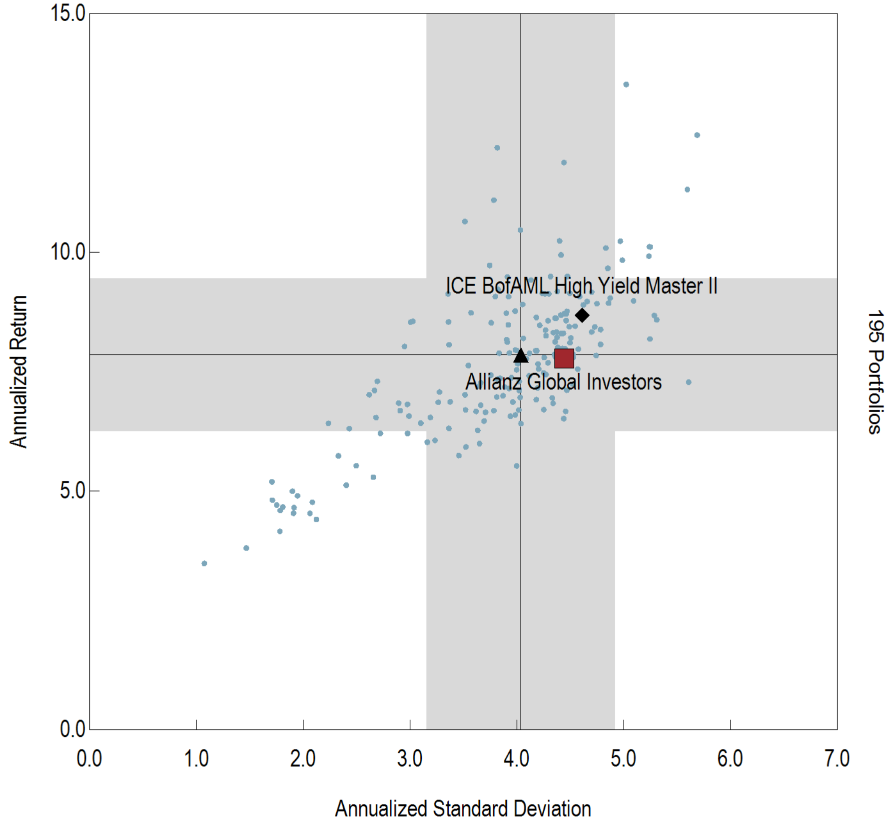
Rolling 3 Year Annualized Return (%)



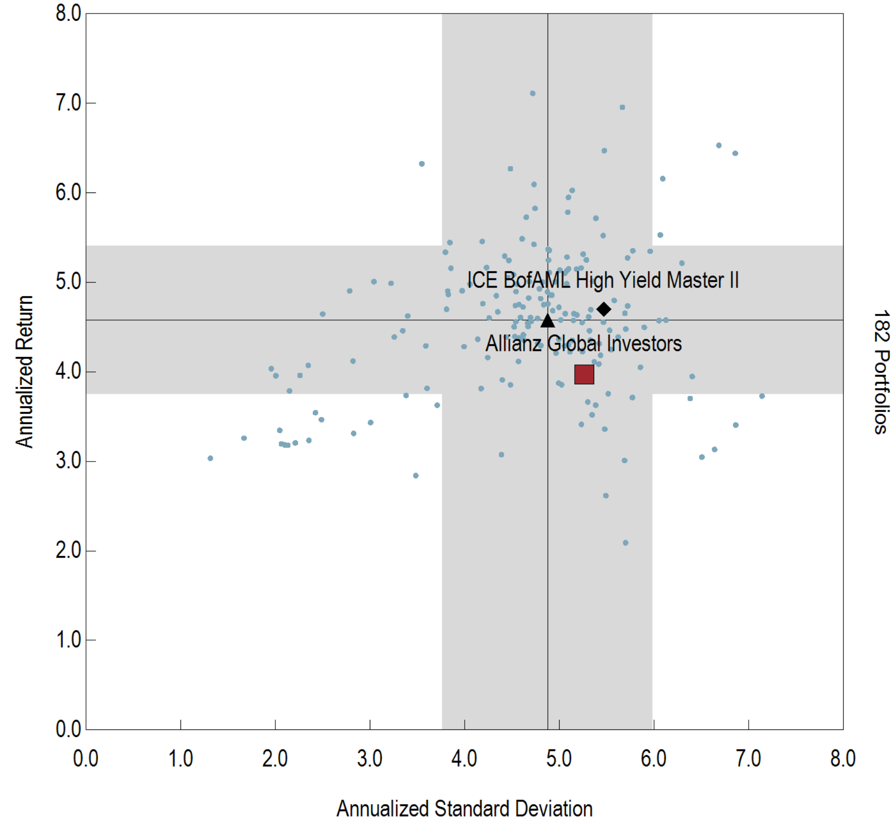
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Allianz Global Investors	7.8%	4.4%	1.5
ICE BofAML High Yield Master II	8.7%	4.6%	1.6
eV US High Yield Fixed Inc Gross Median	7.9%	4.0%	1.6

5 Years

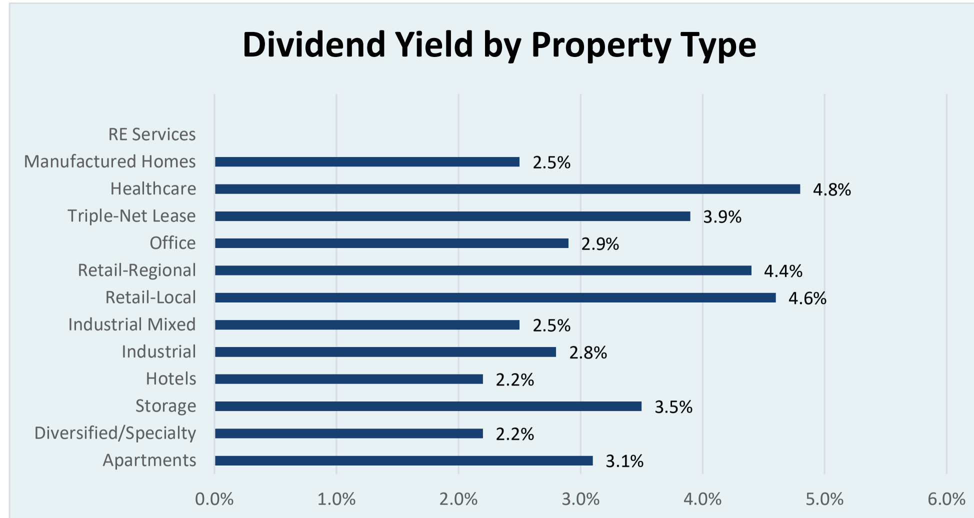
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Allianz Global Investors	4.0%	5.3%	0.6
ICE BofAML High Yield Master II	4.7%	5.5%	0.7
eV US High Yield Fixed Inc Gross Median	4.6%	4.9%	0.8

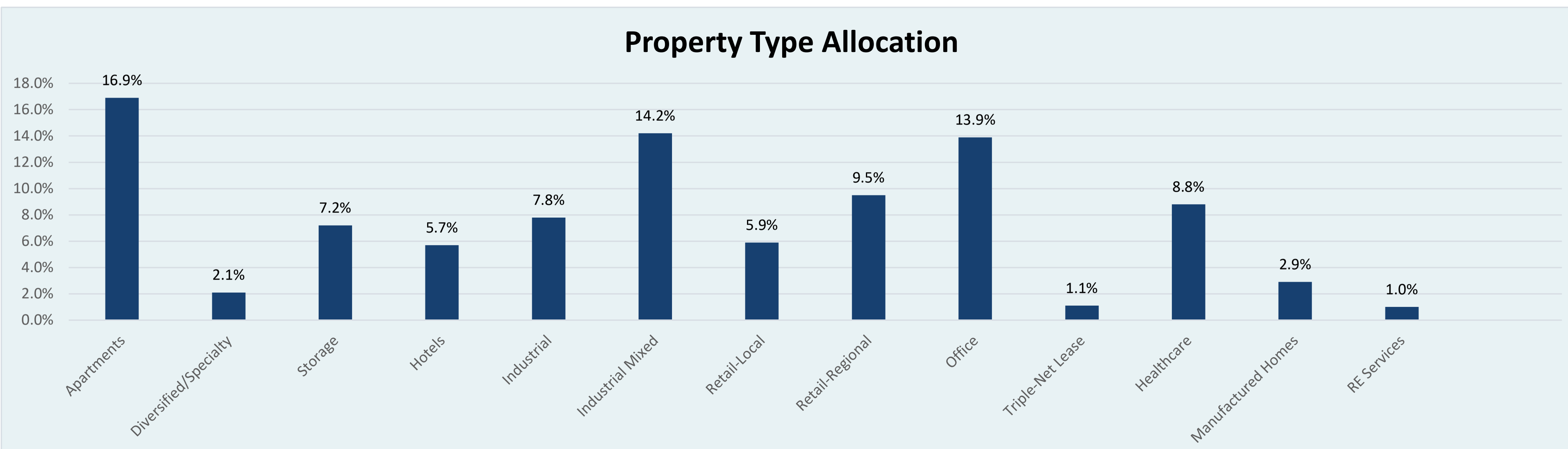
Real Estate Managers

Diversified portfolio of U.S. REITs with a focus on the underlying real estate assets

Top Five Holdings

Company	Property Type	Allocation
Simon Property Group	Retail-Regional	9.5%
Equinix Inc	Industrial Mixed	7.1%
PoLogis Inc.	Industrial	6.4%
Equity Residential	Apartments	5.8%
Essex Property Trust	Apartments	4.4%



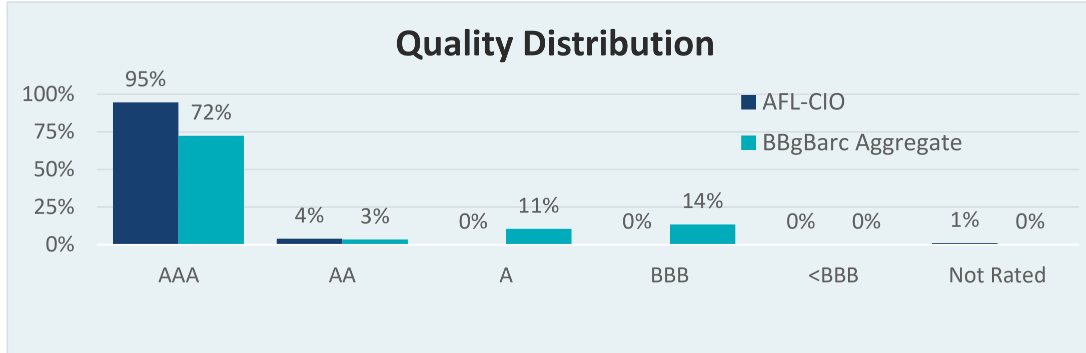


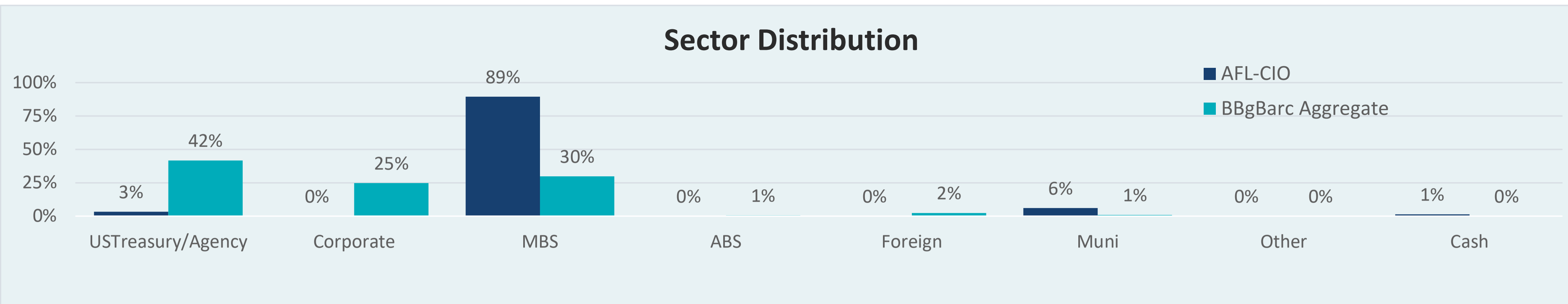
3% is allocated to Cash and Cash Equivalents.

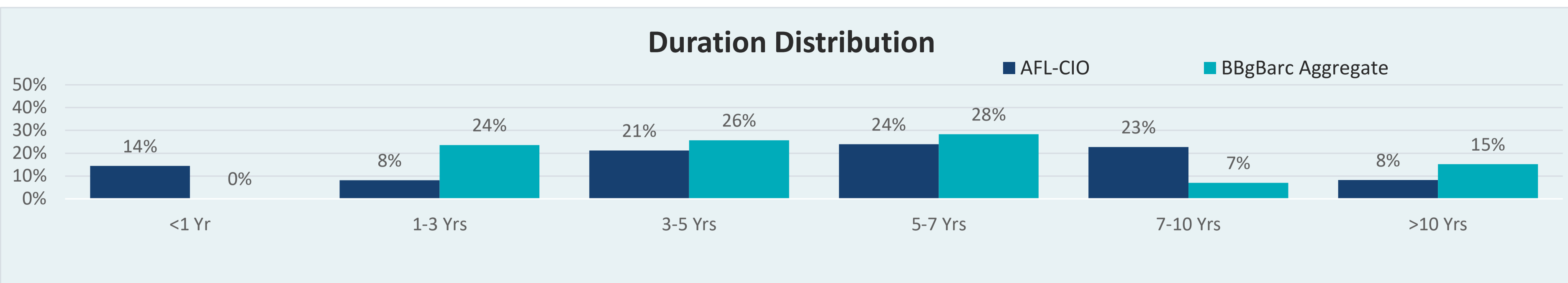
Diversifying Fixed Income Managers

Domestic core fixed income portfolio with an exclusive focus on mortgage-related securities. Primary personnel include Stephen Coyle and Chang Su.

	AFL-CIO	BBgBarc Aggregate
Effective Duration	5.59	5.95
Yield to Maturity	3.38	3.15
Average Quality	AAA	AA
Average Coupon	3.4%	3.3%

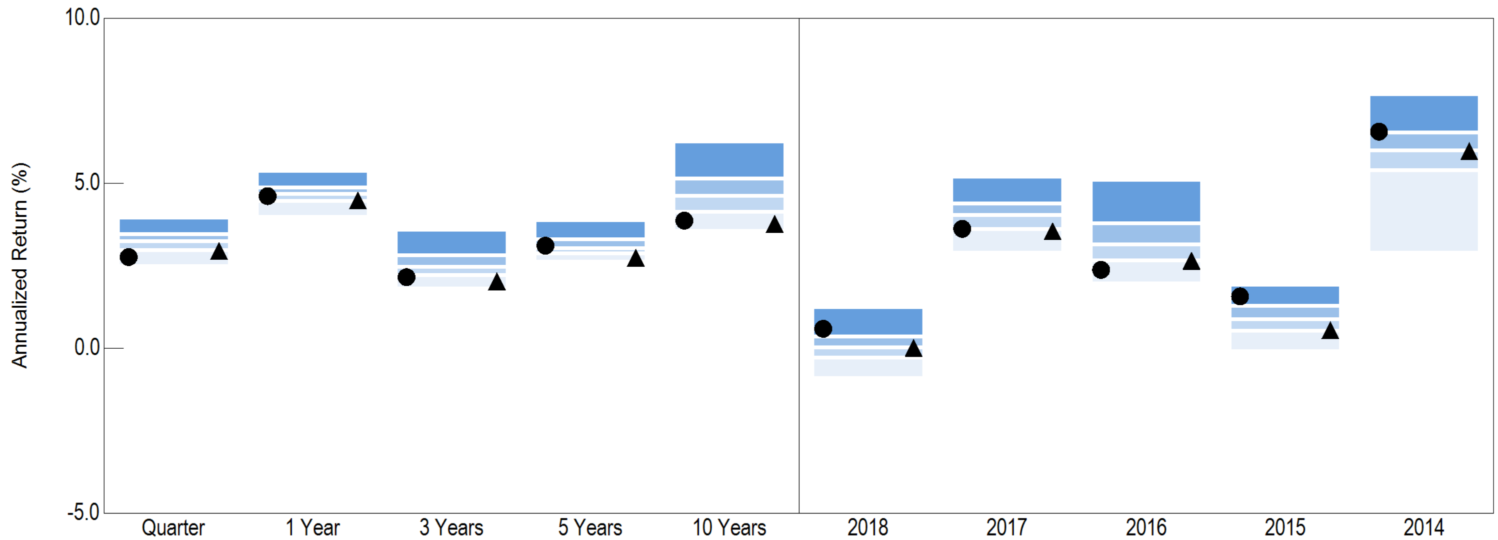






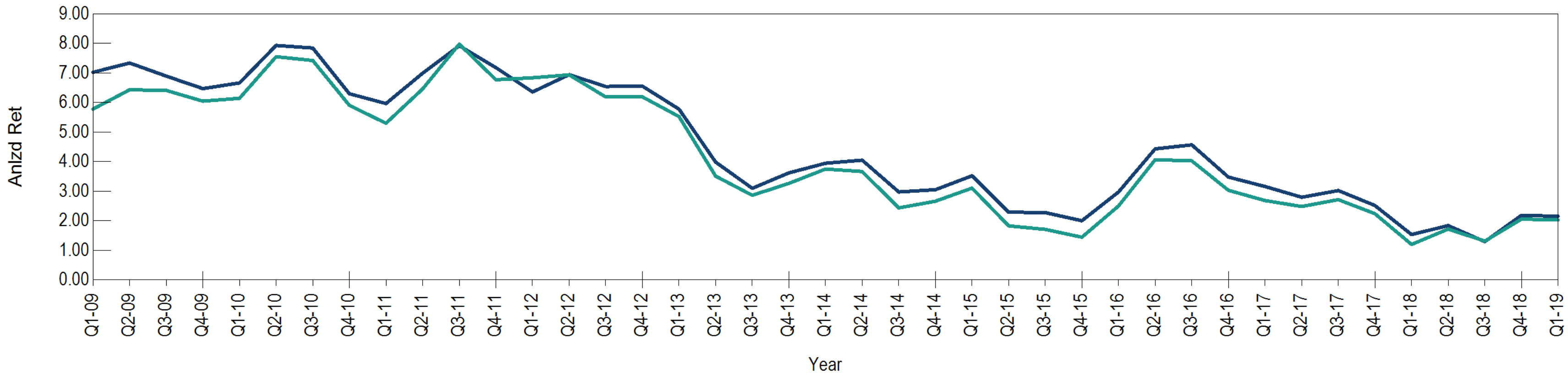
Duration and Quality distributions exclude cash.

AFL-CIO vs. eV US Core Fixed Inc Gross Universe

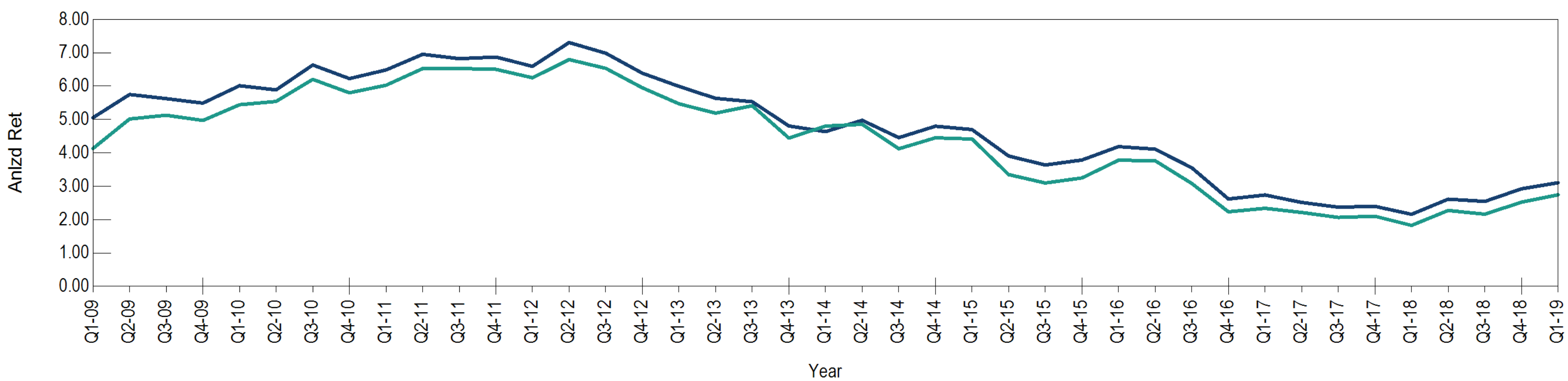


	Quarter		1 Year		3 Years		5 Years		10 Years		2018		2017		2016		2015		2014	
Return (Rank)																				
5th Percentile	4.0		5.4		3.6		3.9		6.3		1.2		5.2		5.1		1.9		7.7	
25th Percentile	3.5		4.9		2.8		3.3		5.1		0.4		4.4		3.8		1.3		6.5	
Median	3.2		4.7		2.5		3.0		4.6		0.0		4.0		3.2		0.9		6.0	
75th Percentile	3.0		4.5		2.2		2.9		4.1		-0.3		3.6		2.7		0.5		5.4	
95th Percentile	2.5		4.0		1.8		2.6		3.6		-0.9		2.9		2.0		-0.1		2.9	
# of Portfolios	232		231		228		224		205		240		233		223		196		213	
● AFL-CIO	2.8	(88)	4.6	(61)	2.2	(81)	3.1	(45)	3.9	(89)	0.6	(16)	3.6	(76)	2.4	(87)	1.6	(15)	6.6	(25)
▲ BBgBarc US Aggregate TR	2.9	(79)	4.5	(75)	2.0	(86)	2.7	(89)	3.8	(93)	0.0	(54)	3.5	(79)	2.6	(77)	0.6	(75)	6.0	(52)

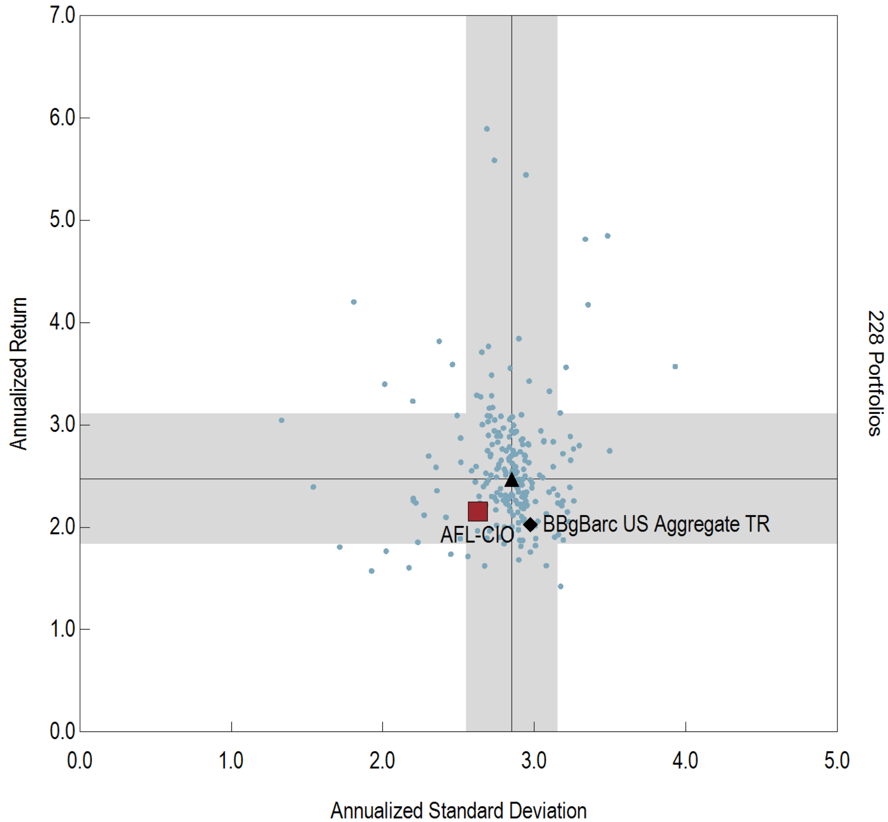
Rolling 3 Year Annualized Return (%)



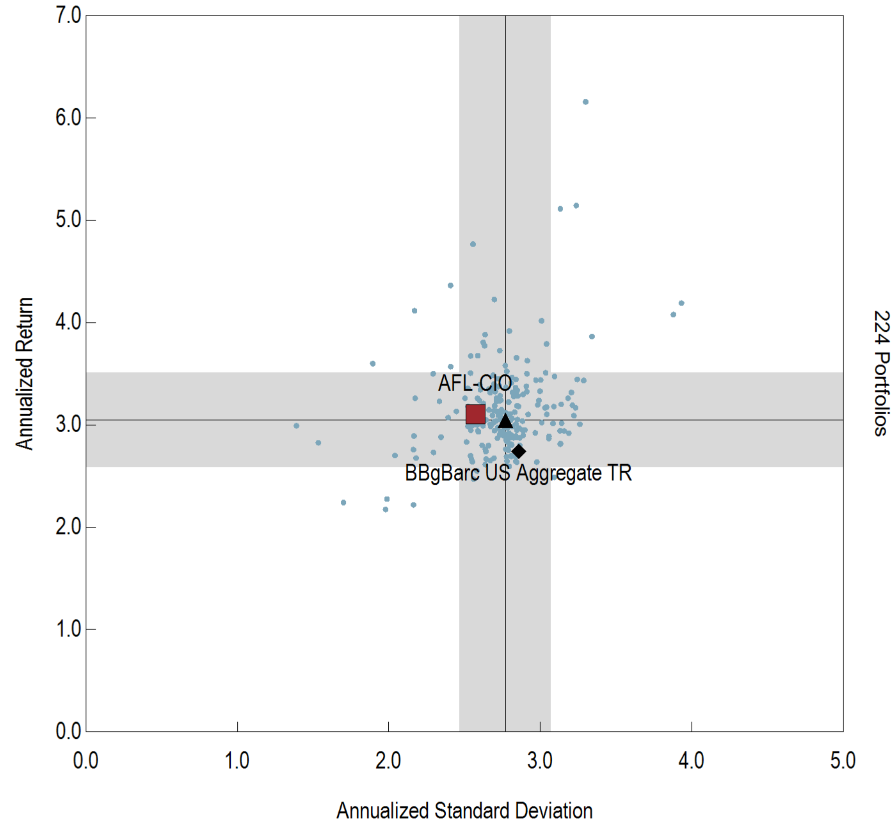
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

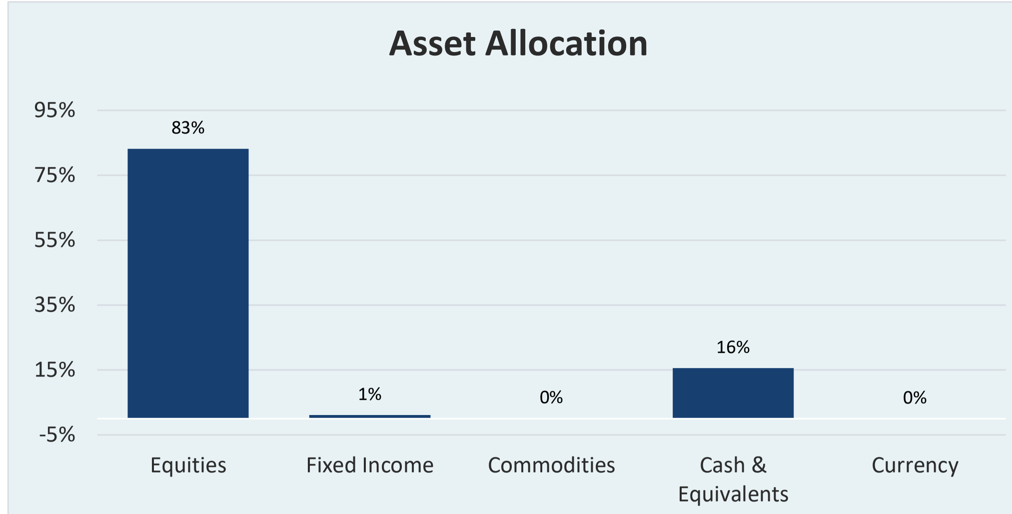
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
AFL-CIO	2.2%	2.6%	0.4
BBgBarc US Aggregate TR	2.0%	3.0%	0.3
eV US Core Fixed Inc Gross Median	2.5%	2.9%	0.4

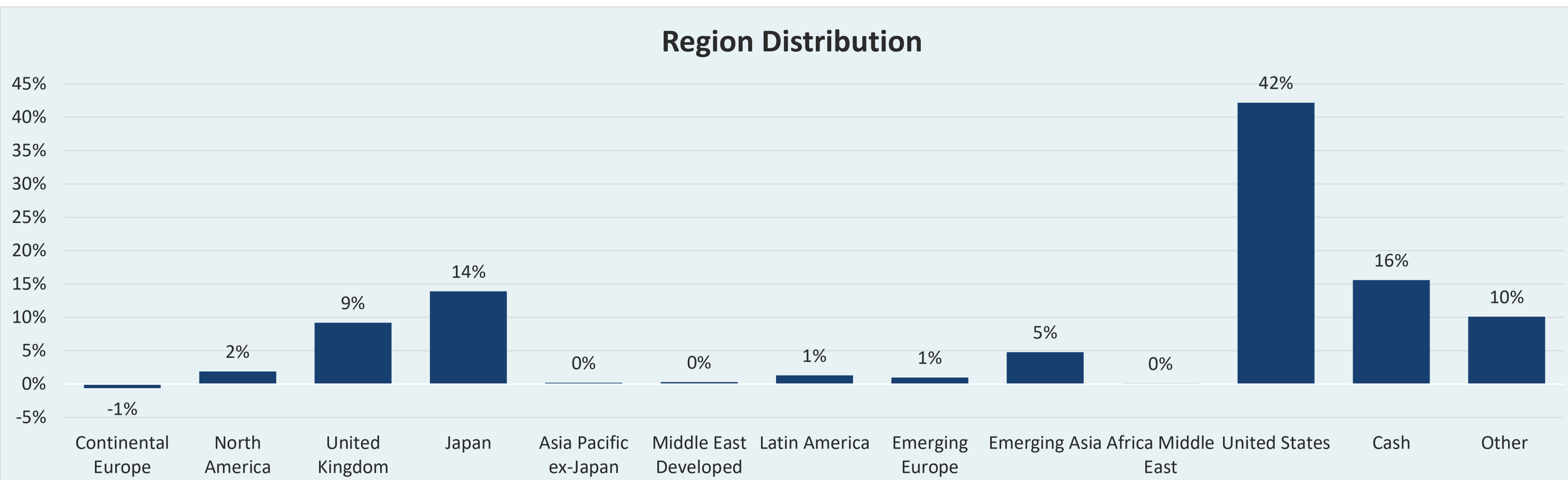
5 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
AFL-CIO	3.1%	2.6%	0.9
BBgBarc US Aggregate TR	2.7%	2.9%	0.7
eV US Core Fixed Inc Gross Median	3.0%	2.8%	0.8

Tactical multi-asset class real return strategy with a focus on managing risk of active strategies used to gain exposure to attractive assets of markets.

	Wellington Total Return
Number of Equity Holdings	1123
Number of Commodity Holdings	139
Effective Duration (Years)	2.80
Average Quality	D

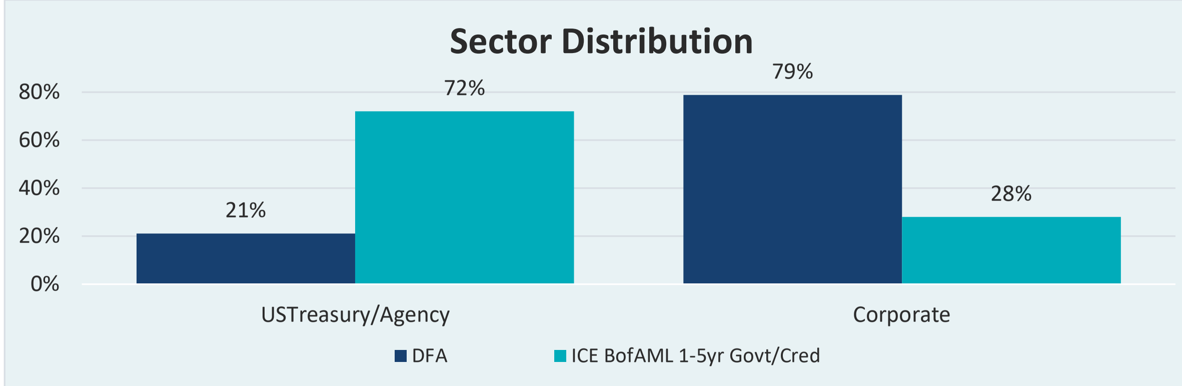


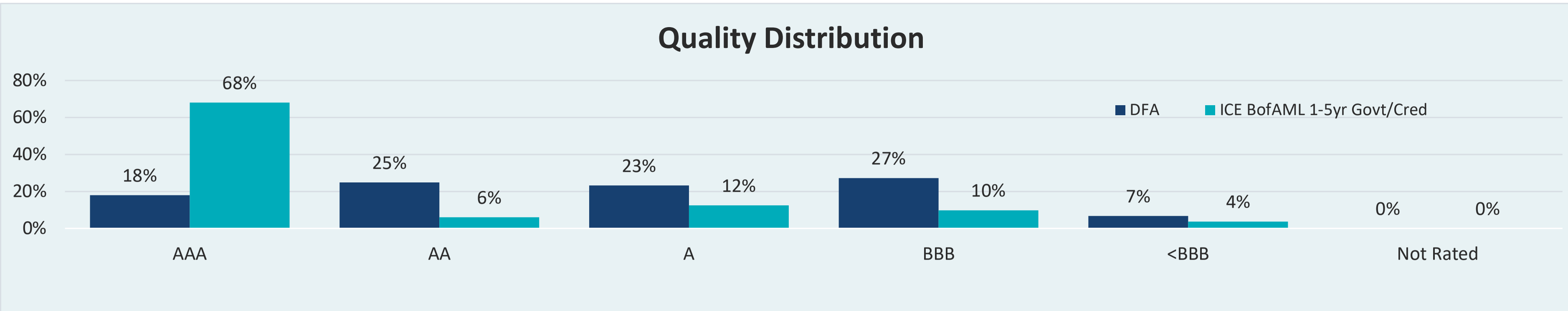


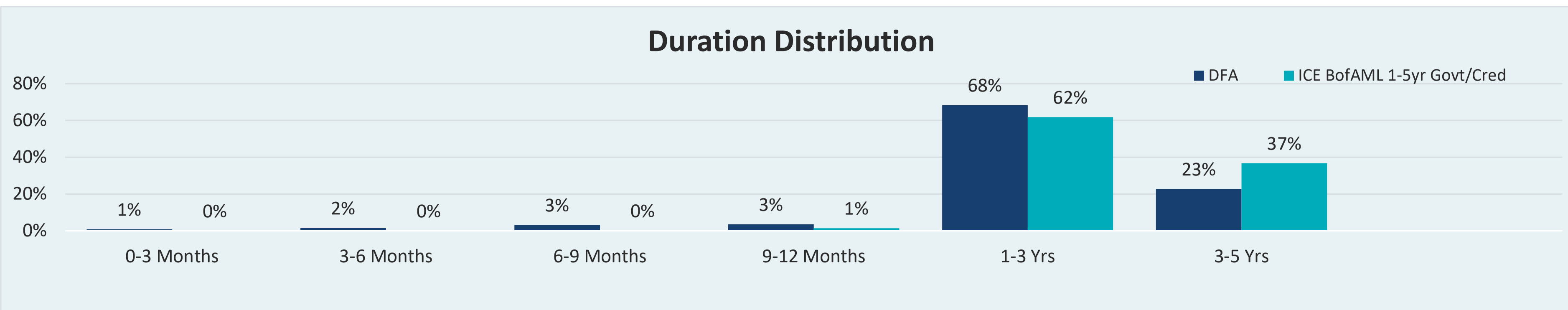
Liquidity Managers

Domestic short term US credit fixed income portfolio that maximizes total return through income and capital appreciation. Primary personnel include Dave Plecha and Joseph Kolerich.

	DFA	ICE BofAML 1-5yr Govt/Cred
Effective Duration	2.31	2.63
Yield to Maturity	2.73	2.54
Average Quality	A	Aa1
Average Coupon	2.78%	2.66%

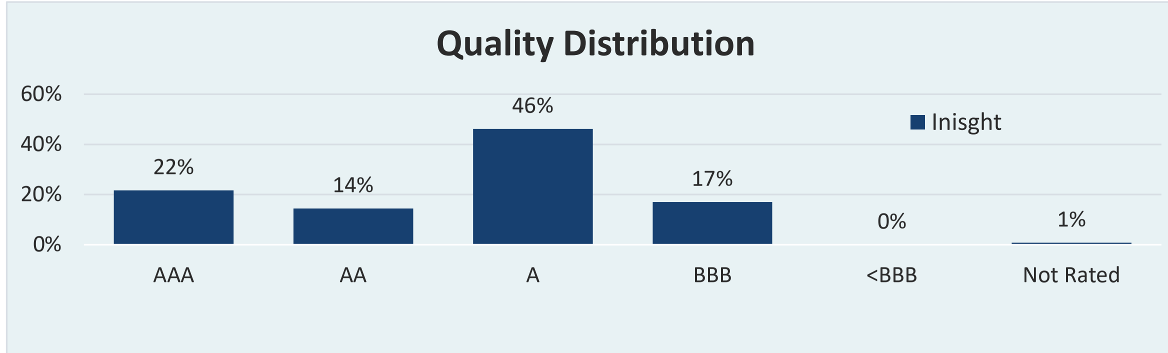


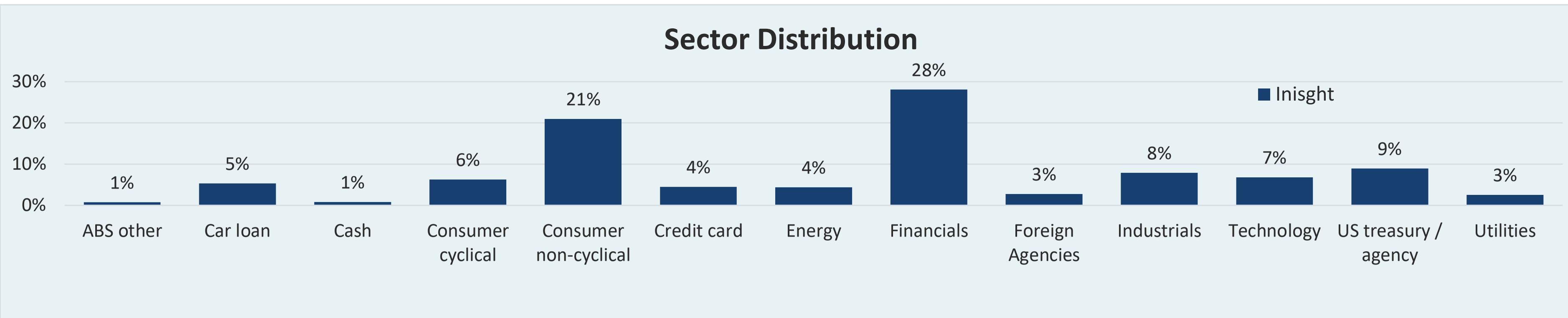


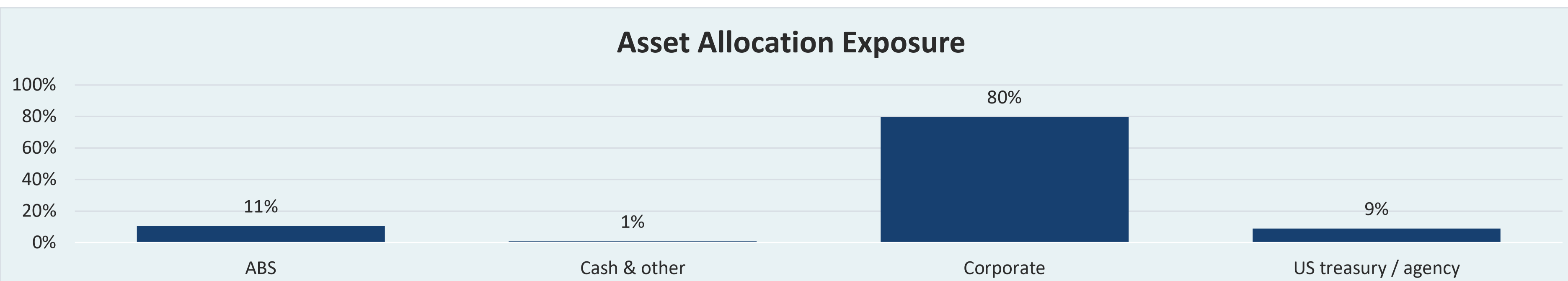


High quality, short duration multi-sector fixed income portfolio comprised of Treasuries, Agencies, investment grade corporates, and ABS designed specifically to meet CCCERA's liabilities. Key personnel include Gerard Berrigan and Jesse Fogarty.

	Inisight	BBgBarc 1-3yr Govt
Effective Duration	1.48	1.91
Yield to Maturity	2.78	2.31
Average Quality	A+	AAA
Average Coupon	2.4%	2.1%

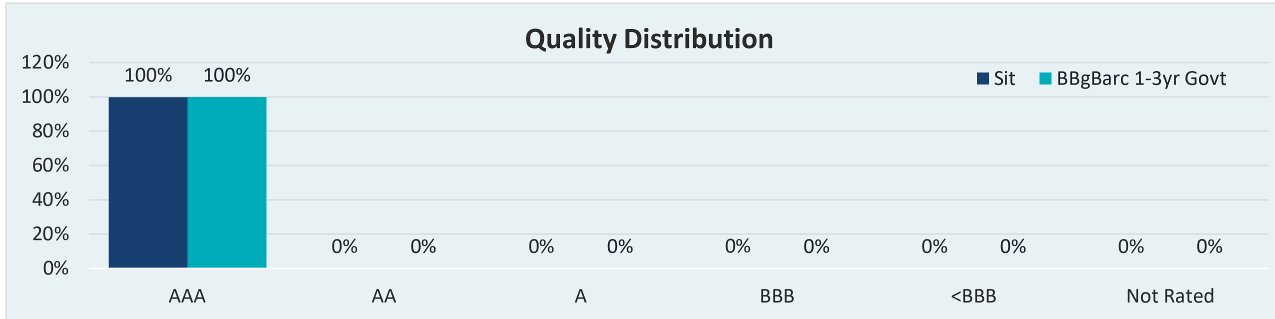


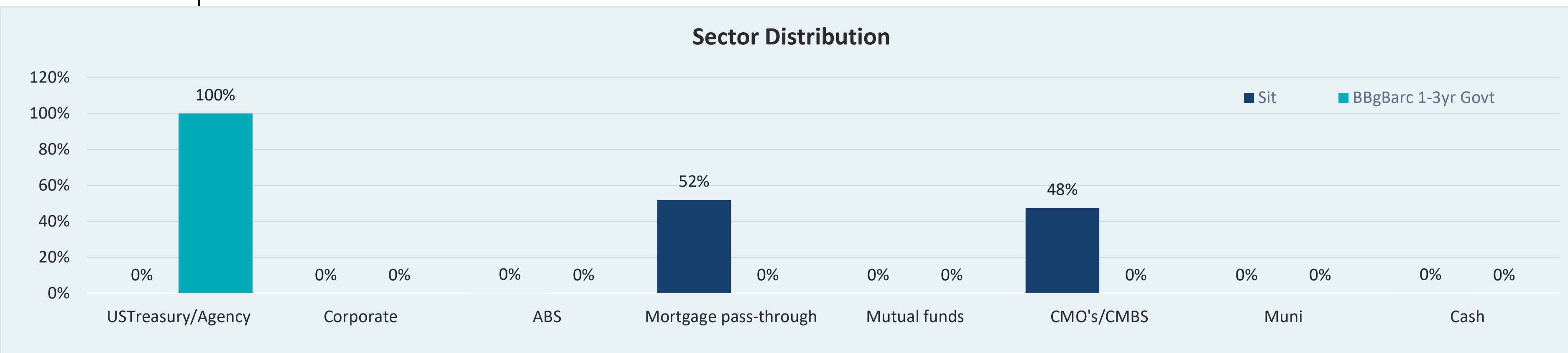


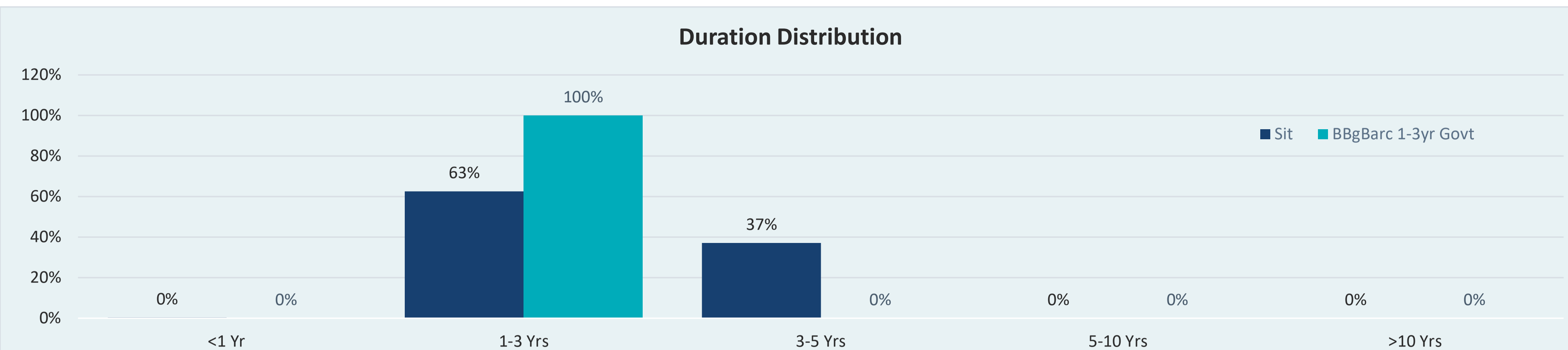


Short duration fixed income portfolio with a focus on earning high levels of interest income. Primary personnel include Bryce Doty, Paul Jungquist and Michael Brilley.

	Sit	BBgBarc 1-3yr Govt
Adjusted Duration	2.70	1.9
Yield to Maturity	2.80	2.3
Average Quality	AAA	AAA
Average Coupon	6.8%	2.1%







Performance Return Calculations

Performance is calculated using Modified Dietz and for time periods with large cash flow (generally greater than 10% of portfolio value), Time Weighted Rates of Return (TWRR) methodologies. Monthly returns are geometrically linked and annualized for periods longer than one year.

Data Source

Verus is an independent third party consulting firm and calculates returns from best source book of record data. Returns calculated by Verus may deviate from those shown by the manager in part, but not limited to, differences in prices and market values reported by the custodian and manager, as well as significant cash flows into or out of an account. It is the responsibility of the manager and custodian to provide insight into the pricing methodologies and any difference in valuation.

Illiquid Alternatives

Due to the inability to receive final valuation prior to report production, closed end funds (including but are not limited to Real Estate, Hedge Funds, Private Equity, and Private Credit) performance is typically reported at a one-quarter lag. Valuation is reported at a one-quarter lag, adjusted for current quarter flow (cash flows are captured real time). Closed end fund performance is calculated using a time-weighted return methodology consistent with all portfolio and total fund performance calculations. For Private Markets, performance reports also include Verus-calculated multiples based on flows and valuations (e.g. DPI and TVPI) and manager-provided IRRs.

Policy & Custom Index Composition

Policy Index (7/1/2018 - present)	11% Russell 3000, 19% MSCI ACWI ex-US (Gross), 11% MSCI ACWI (Net), 1% Wilshire REIT, 1.8% NCREIF Property Index, 7.2% NCREIF ODCE Index, 2% CPI + 4%, 10% S&P 500 +4% (Lagged), 4% ICE BofAML High Yield Master II +2%, 2% ICE BofAML High Yield Master II, 23% BBgBarc 1-3 Yr Gov/Credit, 3.5% BBgBarc US Aggregate, 2% BBgBarc Global Aggregate, 2.5% HFRI EH Equity Market Neutral.
Policy Index (10/1/2017 - 6/30/2018)	16.3% Russell 3000, 18.8% MSCI ACWI ex-US (Gross), 8.6% MSCI ACWI (Net), 1% Wilshire REIT, 1.6% NCREIF Property Index, 6.4% NCREIF ODCE Index, 2.5% CPI + 4%, 10.1% S&P 500 +4% (Lagged), 1.9% ICE BofAML High Yield Master II +2%, 4.3% ICE BofAML High Yield Master II, 25% BBgBarc 1-3 Yr Gov/Credit, 3.5% BBgBarc US Aggregate.
Policy Index (1/1/2017 - 9/30/2017)	22.9% Russell 3000, 11% MSCI ACWI ex-US (Gross), 10.9% MSCI ACWI (Net), 1% Wilshire REIT, 1.7% NCREIF Property Index, 6.8% NCREIF ODCE Index, 3.6% CPI + 4%, 8.1% S&P 500 +4% (Lagged), 1.7% ICE BofAML High Yield Master II +2%, 5.1% ICE BofAML High Yield Master II, 22.4% BBgBarc 1-3 Yr Gov/Credit, 3.2% BBgBarc US Aggregate, 1.6% 91-Day T-Bills.
Policy Index (4/1/2012-12/31/2016)	27.7% Russell 3000, 10.6% MSCI ACWI ex-US (Gross), 12.3% MSCI ACWI (Net), 19.6% BBgBarc U.S. Aggregate, 5% ICE BofAML High Yield Master II, 4% BBgBarc Global Aggregate, 13.5% Real Estate Benchmark, 6.8% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills.
Policy Index (4/1/2011-3/31/2012)	31% Russell 3000, 10.4% MSCI EAFE (Gross), 9.6% MSCI ACWI (Net), 25% BBgBarc U.S. Aggregate, 3% ICE BofAML High Yield Master II, 4% BBgBarc Global Aggregate, 8.4% DJ Wilshire REIT, 3.1% NCREIF, 5% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills.
Policy Index (4/1/2010-3/31/2011)	35.6% Russell 3000, 10.4% MSCI EAFE (Gross), 5% MSCI ACWI (Net), 25% BBgBarc U.S. Aggregate, 3% ICE BofAML High Yield Master II, 4% BBgBarc Global Aggregate, 8.4% DJ Wilshire REIT, 3.1% NCREIF, 5% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills.
Policy Index (7/1/2009-3/31/2010)	40.6% Russell 3000, 10.4% MSCI EAFE (Gross), 25% BBgBarc U.S. Aggregate, 3% ICE BofAML High Yield Master II, 4% BBgBarc Global Aggregate, 8.4% DJ Wilshire REIT, 3.1% NCREIF, 5% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills.
Custom Growth Benchmark (7/1/2018 - present)	16.0% Russell 3000, 27.5% MSCI ACWI ex-US (Gross), 15.9% MSCI ACWI (Net), 1.5% Wilshire REIT, 2.6% NCREIF Property Index, 10.4% NCREIF ODCE Index, 14.5% S&P 500 +4% (Lagged), 5.8% ICE BofAML High Yield Master II +2%, 2.9% ICE BofAML High Yield Master II, 2.9% BBgBarc Global Bond
Custom Growth Benchmark (9/30/2017-6/30/2018)	23.6% Russell 3000, 27.2% MSCI ACWI ex-US (Gross), 12.5% MSCI ACWI (Net), 1.5% Wilshire REIT, 2.3% NCREIF Property Index, 9.3% NCREIF ODCE Index, 14.6% S&P 500 +4% (Lagged), 2.8% ICE BofAML High Yield Master II +2%, 6.2% ICE BofAML High Yield Master II
Custom Growth Benchmark (1/1/2017-9/30/2017)	32.6% Russell 3000, 15.7% MSCI ACWI ex-US (Gross), 15.5% MSCI ACWI (Net), 1.4% Wilshire REIT, 2.4% NCREIF Property Index, 9.6% NCREIF ODCE Index, 1.6% CPI +4%, 11.5% S&P 500 +4% (Lagged), 2.4% ICE BofAML High Yield Master II +2%, 7.3% ICE BofAML High Yield Master II
Custom Growth Benchmark (Prior to 1/1/2017)	Weighted-average of the benchmarks of the sub-composites that make up the composite.
Custom Diversifying Benchmark (7/1/2018 - present)	43.75% BBgBarc US Aggregate, 25% CPI + 4%, 31.25% HFRI EH Equity Market Neutral.
Custom Diversifying Benchmark (10/1/2017 - 6/30/2018)	58.33% BBgBarc US Aggregate, 41.67% CPI + 4%.
Custom Diversifying Benchmark (1/1/2017 - 9/30/2017)	56.1% BBgBarc US Aggregate, 43.9% CPI + 4%.
Custom Diversifying Benchmark (Prior to 1/1/2017)	Weighted-average of the benchmarks of the sub-composites that make up the composite.
Real Estate Benchmark (current)	11% Wilshire REIT, 18% NCREIF Property Index, 71% NCREIF ODCE Index.
Real Estate Benchmark (4/1/2012-11/30/2016)	40% Wilshire REIT, 50% NCREIF Property Index, 10% FTSE/EPRA NAREIT Developed ex-US.

Manager Line Up

Manager	Inception Date	Data Source	Manager	Inception Date	Data Source
BlackRock Russell 1000 Index	4/20/2017	BlackRock	Invesco Real Estate IV	6/30/2014	Invesco
Jackson Square Partners	5/1/2005	Northern Trust	Invesco Real Estate V	2/20/2019	Invesco
Boston Partners	6/1/1995	Northern Trust	Oaktree REOF V	12/31/2011	Oaktree
Emerald Advisors	4/7/2003	Northern Trust	Oaktree REOF VI	9/30/2013	Oaktree
Ceredex	11/6/2011	Northern Trust	Oaktree REOF VII	4/1/2015	Oaktree
Pyrford	4/25/2014	State Street	Siguler Guff DREOF	1/25/2012	Siguler Guff
William Blair	10/29/2010	William Blair	Siguler Guff DREOF II	8/31/2013	Siguler Guff
PIMCO RAE Emerging Markets	2/28/2017	State Street	Siguler Guff DREOF II Co-Inv	1/27/2016	Siguler Guff
TT Emerging Markets	7/27/2017	TT	Paulson Real Estate Fund II	11/10/2013	Paulson
Artisan Partners	10/1/2012	SEI Trust	AE Industrial Partners Fund II	4/8/2019	StepStone Group
First Eagle	1/18/2011	Northern Trust	Adams Street Partners	3/18/1996	StepStone Group
Allianz Global Investors	4/25/2000	Northern Trust	Adams Street Partners II	1/16/2009	StepStone Group
Adelante	9/30/2001	Northern Trust	Adams Street Partners Venture	4/28/2017	StepStone Group
AQR Global Risk Premium - EL	1/18/2019	AQR	Adams Street Partners - BFP	1/18/1996	StepStone Group
Panagora Risk Parity Multi Asset	3/15/2019	Panagora	Adams Street Partners - Fund 5	9/21/2012	StepStone Group
AFL-CIO	6/30/1991	AFL-CIO	Aether Real Assets IV	3/16/2016	StepStone Group
Wellington Real Total Return	2/26/2013	Northern Trust	Aether Real Assets III	11/27/2013	StepStone Group
Parametric Defensive Equity	7/23/2018	Northern Trust	Bay Area Equity Fund	6/14/2004	StepStone Group
Sit Short Duration	11/2/2016	Northern Trust	Bay Area Equity Fund II	12/7/2009	StepStone Group
DFA Short Credit	11/21/2016	Northern Trust	Carpenter Bancfund	1/31/2008	StepStone Group
Insight Short Duration	11/18/2016	Northern Trust	Commonfund	6/28/2013	StepStone Group
Parametric Overlay	3/29/2017	Northern Trust	EIF US Power Fund I	11/26/2003	StepStone Group
Cash	-	Northern Trust	EIF US Power Fund II	8/16/2005	StepStone Group
Angelo Gordon Energy Credit Opp	9/24/2015	StepStone Group	EIF US Power Fund III	5/30/2007	StepStone Group
StepStone CC Opportunities Fund	2/1/2018	StepStone Group	EIF US Power Fund IV	11/28/2011	StepStone Group
Torchlight II	9/30/2006	StepStone Group	EIF US Power Fund V	11/28/2016	StepStone Group
Torchlight III	12/31/2008	StepStone Group	Nogales	2/15/2004	StepStone Group
Torchlight IV	7/1/2012	StepStone Group	Paladin III	11/30/2007	StepStone Group
Torchlight V	7/1/2012	StepStone Group	Ocean Avenue Fund II	6/11/2014	StepStone Group
Angelo Gordon Realty Fund VIII	1/23/2012	Angelo Gordon	Ocean Avenue Fund III	4/15/2016	StepStone Group
Angelo Gordon Realty Fund IX	12/8/2014	Angelo Gordon	Pathway 6	5/24/2011	StepStone Group
DLJ RECP III	6/23/2005	DLJ	Pathway 7	2/7/2013	StepStone Group
DLJ RECP IV	2/11/2008	DLJ	Pathway	11/9/1998	StepStone Group
DLJ RECP V	7/1/2014	DLJ	Pathway 2008	12/26/2008	StepStone Group
DLJ RECP VI	3/19/2019	DLJ	Siguler Guff CCCERA Opps	6/3/2014	StepStone Group
LaSalle Income & Growth VI	7/16/2013	LaSalle	Siguler Guff Secondary Opps	11/30/2016	StepStone Group
LaSalle Income & Growth VII	2/28/2017	LaSalle	Siris Partners IV	3/15/2019	StepStone Group
Hearthstone II	6/17/1998	Hearthstone	Wastewater Opp. Fund	12/8/2015	StepStone Group
Long Wharf Fund IV	7/3/2013	Long Wharf			
Long Wharf Fund V	9/30/2016	Long Wharf			
Invesco Real Estate II	11/26/2007	Invesco			
Invesco Real Estate III	6/30/2013	Invesco			

Other Disclosures

All data prior to 12/31/2014 was provided by previous consultant.
As of 7/1/2018 all Private Equity and Private Credit data is provided by StepStone Group.

Glossary

Allocation Effect: An attribution effect that describes the amount attributable to the managers' asset allocation decisions, relative to the benchmark.

Alpha: The excess return of a portfolio after adjusting for market risk. This excess return is attributable to the selection skill of the portfolio manager. Alpha is calculated as: Portfolio Return - [Risk-free Rate + Portfolio Beta x (Market Return - Risk-free Rate)].

Benchmark R-squared: Measures how well the Benchmark return series fits the manager's return series. The higher the Benchmark R-squared, the more appropriate the benchmark is for the manager.

Beta: A measure of systematic, or market risk; the part of risk in a portfolio or security that is attributable to general market movements. Beta is calculated by dividing the covariance of a security by the variance of the market.

Book-to-Market: The ratio of book value per share to market price per share. Growth managers typically have low book-to-market ratios while value managers typically have high book-to-market ratios.

Capture Ratio: A statistical measure of an investment manager's overall performance in up or down markets. The capture ratio is used to evaluate how well an investment manager performed relative to an index during periods when that index has risen (up market) or fallen (down market). The capture ratio is calculated by dividing the manager's returns by the returns of the index during the up/down market, and multiplying that factor by 100.

Correlation: A measure of the relative movement of returns of one security or asset class relative to another over time. A correlation of 1 means the returns of two securities move in lock step, a correlation of -1 means the returns of two securities move in the exact opposite direction over time. Correlation is used as a measure to help maximize the benefits of diversification when constructing an investment portfolio.

Excess Return: A measure of the difference in appreciation or depreciation in the price of an investment compared to its benchmark, over a given time period. This is usually expressed as a percentage and may be annualized over a number of years or represent a single period.

Information Ratio: A measure of a manager's ability to earn excess return without incurring additional risk. Information ratio is calculated as: excess return divided by tracking error.

Interaction Effect: An attribution effect that describes the portion of active management that is contributable to the cross interaction between the allocation and selection effect. This can also be explained as an effect that cannot be easily traced to a source.

Portfolio Turnover: The percentage of a portfolio that is sold and replaced (turned over) during a given time period. Low portfolio turnover is indicative of a buy and hold strategy while high portfolio turnover implies a more active form of management.

Price-to-Earnings Ratio (P/E): Also called the earnings multiplier, it is calculated by dividing the price of a company's stock into earnings per share. Growth managers typically hold stocks with high price-to-earnings ratios whereas value managers hold stocks with low price-to-earnings ratios.

R-Squared: Also called the coefficient of determination, it measures the amount of variation in one variable explained by variations in another, i.e., the goodness of fit to a benchmark. In the case of investments, the term is used to explain the amount of variation in a security or portfolio explained by movements in the market or the portfolio's benchmark.

Selection Effect: An attribution effect that describes the amount attributable to the managers' stock selection decisions, relative to the benchmark.

Sharpe Ratio: A measure of portfolio efficiency. The Sharpe Ratio indicates excess portfolio return for each unit of risk associated with achieving the excess return. The higher the Sharpe Ratio, the more efficient the portfolio. Sharpe ratio is calculated as: Portfolio Excess Return / Portfolio Standard Deviation.

Sortino Ratio: Measures the risk-adjusted return of an investment, portfolio, or strategy. It is a modification of the Sharpe Ratio, but penalizes only those returns falling below a specified benchmark. The Sortino Ratio uses downside deviation in the denominator rather than standard deviation, like the Sharpe Ratio.

Standard Deviation: A measure of volatility, or risk, inherent in a security or portfolio. The standard deviation of a series is a measure of the extent to which observations in the series differ from the arithmetic mean of the series. For example, if a security has an average annual rate of return of 10% and a standard deviation of 5%, then two-thirds of the time, one would expect to receive an annual rate of return between 5% and 15%.

Style Analysis: A return based analysis designed to identify combinations of passive investments to closely replicate the performance of funds

Style Map: A specialized form or scatter plot chart typically used to show where a Manager lies in relation to a set of style indices on a two-dimensional plane. This is simply a way of viewing the asset loadings in a different context. The coordinates are calculated by rescaling the asset loadings to range from -1 to 1 on each axis and are dependent on the Style Indices comprising the Map.

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Meeting Date
05/22/19
Agenda Item
#10b.

Memorandum

Date: May 22, 2019

To: CCCERA Board of Retirement

From: Timothy Price, Chief Investment Officer

Subject: Investment Staff Report – Q1 2019

Overview

On a quarterly basis CCCERA's Board receives a report which details critical elements of CCCERA's Functionally Focused Portfolio's sub-portfolios. The purpose of the report is to highlight elements of the sub-portfolios which are good indicators to the Board of the program's efficient and effective operation.

Summary

CCCERA's Total Fund is performing as expected, exhibiting returns above expectations for the amount of risk taken. This is measured by the Sharpe Ratio (risk-adjusted return), and a comparison to the Simple Target Index. The Simple Target Index is the most basic index which could replicate CCCERA's Total Fund, and is made up of 69% MSCI ACWI, 23% Bloomberg 1-3 Year Gov/Credit, and 8% 3-Month Treasury Bills (please see the Total Fund pages in the appendix for additional details). CCCERA's portfolio is much more complex, especially as it relates to allocations to private equity, private credit, and real estate.

CCCERA has been rewarded for implementing a more complex portfolio, and has outperformed the Simple Target Index over the trailing five years, while experiencing less risk (volatility). Details on performance relative to this index are included in the appendix. It is worth noting that CCCERA's Total Fund return is an aggregate of the performance of the Liquidity, Growth, and Risk Diversifying sub-portfolios.

1) **Liquidity**

   The purpose of the liquidity program is to match four years of benefit payments with high credit quality, low duration assets. The liquidity sub-portfolio is made up of three fixed income managers, all of whom pursue a high quality, low duration investment approach. Through the first quarter of 2019, all managers held high quality portfolios (as measured by credit ratings), low duration portfolios. The average credit quality for the entire liquidity program is AA- (AAA is the highest rating), and the duration is an aggregate 2.04 years, which is considered short duration. Additional details on the liquidity program managers are available in the appendix.

2) **Growth**
The Growth portfolio is designed to take advantage of capital appreciation and income opportunities globally. To achieve this, the Growth portfolio includes a variety of assets, from stocks and growth oriented bonds to private equity, real estate, and private credit. In the first quarter, CCCERA's Growth portfolio returned 8.3% on the strength of a rebound in global public equity markets.

3) **Risk Diversifying**
The Risk Diversifying mandate holds assets that are expected to diversify the growth portfolio's volatility while offering moderate growth. The mandate as a whole seeks to be highly liquid, have a low beta to the growth market, and produce positive real returns. In the first quarter, the Risk Diversifying mandate fulfilled most of these goals. The entire mandate is able to be liquidated within 30 days, meeting the requirement of high liquidity. The correlation of the mandate to growth markets is 0.3, which shows good diversification. Trailing real (net of inflation) returns over the past five years is -1.3%, which is well below expectations. We continue to explore additional mandates that can strengthen this sub-portfolio.

The Liquidity, Growth, and Risk Diversifying sub-portfolios are largely functioning well and within expectations. The product teams and asset managers are stable, and at this time we see few causes of organizational concern at our investment managers. CCCERA's Total Fund in aggregate is performing in line with expectations, having a higher return and a lower level of volatility compared to the Simple Target Index. Enclosed are additional details on CCCERA's Total Fund, sub-portfolios, and individual investment strategies.

CCCERA Portfolio Report Card

Below we have itemized those elements of each of CCCERA's sub-portfolios and Total Fund which we believe the Board should pay particular attention to. Additional details on each of the sub-portfolios are available in the appendix.

Liquidity

Objective	Measurement	Current Period Data	Status
High Quality	Credit Quality	AA-	Meeting Expectations
Low Risk	Duration	2.04 years	Meeting Expectations
Appropriately Sized	Months of Benefit Payments Invested	40 Months	Meeting Expectations

Growth

Objective	Measurement	Current Period Data	Status
Growth of Plan Assets	Absolute Returns	Trailing 5yr return of 7.5%	Meeting Expectations
	Benchmark Relative Returns	1.0% over ACWI over trailing 5 years	Meeting Expectations
Efficient Capital Deployment	Sharpe Ratio	CCCERA: 1.05 MSCI ACWI: 0.52 (over trailing 5 years)	Meeting Expectations

Risk Diversifying

Objective	Measurement	Current Period Data	Status
Offset Volatility in Growth Portfolio	Correlation	0.3 over trailing 5 years	Meeting Expectations
Positive Real Returns	Returns	Trailing 5yr real return of -1.3%	Below Expectations
High Liquidity	% of Portfolio that can be liquidated within 90 days	100%	Meeting Expectations

Total Fund

Objective	Component/Measurement	Status
Store 4 Years of Benefit Payments	Liquidity Sub-portfolio	Meeting Expectations
Participate in Growth Opportunities	Growth Sub-portfolio	Meeting Expectations
Provide an offset to Growth volatility	Risk Diversifying Sub-portfolio	Meeting Expectations
Produce superior risk adjusted returns	Total Fund Sharpe Ratio	Meeting Expectations

Appendix – Liquidity Sub-Portfolio

Manager Reviews

Organizational Stability

	Portfolio Management Assessment	1 Year Product Asset Growth	1 Year Firm Asset Growth	Regulatory Action in Last Year?
Insight	Good	-3%	N/A	N
Sit	Good	-4%	-4%	N
DFA	Good	-1%	-2%	N

Performance

	Portfolio Average Credit Quality	Portfolio Average Duration	Portfolio Average Coupon	1 Year Total Return
Insight	A+	1.5	2.4	3.4%
Sit	AAA	2.7	6.8	4.3%
DFA	A	2.3	2.8	3.8%

Manager Notes:

Insight: CCCERA was notified on March 25, 2019 that Jesse Fogarty, Senior Portfolio Manager will be leaving Insight. Jesse was a member of the team that managed CCCERA's account and focused on the credit exposure in the portfolio. Jesse's responsibilities have been assigned to Andrew Catalan, who Jesse previously reported to. Gerry Berrigan remains our lead portfolio manager.

Manager Theses:
The Liquidity Portfolio is a combination of three managers which work together to match four years of CCCERA's liabilities. The portfolio is refreshed every year during the annual funding plan.

Insight: Insight plays a completion role in the liquidity program, matching out liabilities with short duration government and corporate fixed income securities.

DFA: Dimensional Fund Advisors runs a strategy that focuses on obtaining fixed income exposures via the most liquid securities available. DFA contributes to the Liquidity Program by selling securities at regular intervals to pay a portion of CCCERA's monthly benefit payment.

Sit: Sit invests in high yielding government backed mortgages. The cash flow from these securities is harvested monthly to make up a portion of CCCERA's monthly benefit payment.

Appendix – Growth Sub-Portfolio

Manager Reviews

Organizational Stability

	Portfolio Management Assessment	1 Year Product Asset Growth	1 Year Firm Asset Growth	Regulatory Action in Last Year?
Boston Partners	Good	2%	-8%	N
Jackson Square	Good	-11%	-5%	N
BlackRock Index Fund	Good	45%	3%	N
Emerald Advisors	Good	4%	-2%	N
Ceredex	Good	-14%	-5%	N
Pyrford (BMO)	Good	8%	7%	N
William Blair	Good	-15%	-14%	N
First Eagle	Good	-12%	-13%	N
Artisan Global	Good	4%	-6%	N
PIMCO/RAE EM	Good	6%	-1%	N
TT EM	Good	26%	13%	N
Adelante	Good	23%	22%	N
Allianz	Good	11%	N/A	N
AQR	Good	-8%	-10%	N
PanAgora	Good	5%	-11%	N
Private Equity	Good	--	--	N
Private Credit	Good	--	--	N
Real Estate	Good	--	--	N

Performance

	Trailing 1 Year Return	Trailing 5 Year Return	Performance in Line with Expectations?
Boston Partners	2%	8%	Y
Jackson Square	8%	10%	Y
BlackRock Index Fund	9%	11%	Y
Emerald Advisors	10%	11%	Y
Ceredex	3%	7%	Y
Pyrford (BMO)	0%	3%	Y
William Blair	-6%	4%	Y
First Eagle	3%	6%	Y
Artisan Global	4%	11%	Y
PIMCO/RAE EM	-10%	5%	Y
TT EM	-7%	9%	Y
Adelante	19%	10%	Y
Allianz	5%	3%	Y
AQR	6%	4%	Y
PanAgora	5%	7%	Y
	1Yr Premium	5 Year Premium	
Private Equity	11%	5%	Y
Private Credit	2%	4%	Y
Real Estate	7%	4%	Y

Manager Notes:

Staff completed an on-site with Simon Fennell of William Blair in April 2019 to understand the recent performance, portfolio positioning and the impact of leadership changes. Our dialog with the firm is ongoing, but quite constructive.

Manager Theses:
The growth portfolio includes all managers in public and private equity, real estate, and private credit. These managers grow CCCERA's assets for future benefit payments (beyond the four years already covered by the Liquidity program).

Boston Partners: Large cap domestic equity which follows a value discipline. Boston Partners will buy out of favor companies and sell them when their intrinsic values are reflected in the market. Expected to outperform in flat to falling markets.

Jackson Square: Domestic equity large cap growth portfolio concentrated in companies with sustainable long-term growth characteristics. This portfolio should outperform in rapidly rising markets.

BlackRock Index Fund: Large cap domestic equity portfolio which should follow the Russell 1000 Index.

Emerald Advisors: Small cap growth equity seeking companies with high growth rates. Expected to produce strong returns in rising markets, and weak returns in falling markets.

Ceredex: Domestic equity small cap value portfolio of companies with dividend yields and low valuations. This portfolio should outperform flat markets.

Pyrford (BMO): International equity value portfolio of non-US companies with low valuations at the country and stock level. This portfolio should outperform in flat markets.

William Blair: International equity growth portfolio of non-US companies with high growth rates constructed from the security level. This portfolio should outperform in rapidly rising markets.

First Eagle: Global equity portfolio that is benchmark agnostic comprised of companies with low valuations.

Artisan Global Opportunities: Global equity portfolio of companies that is benchmark agnostic with accelerating profit cycles and a focus on capital allocation.

PIMCO/RAE Emerging Markets: Quantitative equity with a value orientation. This portfolio follows the fundamental indexing approach (ranking companies by metrics other than market capitalization), resulting in a diversified, low turnover portfolio. This portfolio underperforms in momentum driven markets.

TT International Emerging Markets: Concentrated, growth oriented manager which invests in small and mid-cap emerging market companies. TT employs both a top-down and a bottom-up research approach, and seeks to outperform by identifying companies that have a catalyst to drive future growth.

Adelante: Diversified portfolio of U.S. REITs with a focus on the underlying real estate assets. Adelante is a public market proxy of the core real estate market.

Allianz High Yield Fixed Income: Domestic high yield fixed income portfolio with a focus on security selection. Allianz will focus on the higher quality segment of the high yield universe. Allianz should provide a steady income stream, and provide downside protection in falling markets.

Private Equity: CCCERA invests in private equity to generate returns above those available in the public equity markets.

Private Credit: CCCERA invests in private credit to generate cash flow streams above those available in the public debt markets.

Real Estate: CCCERA invests in value-add, distressed, and opportunistic real estate to generate returns from the capital appreciation and cash flow associated with commercial real estate investment.

Risk Parity: Multi-asset approach that strives for balanced contributions to total portfolio risk from multiple asset classes.

Appendix – Risk Diversifying Sub-Portfolio

Organizational Stability

	Portfolio Management Assessment	1 Year Product Asset Growth	1 Year Firm Asset Growth	Regulatory Action in Last Year?
AFL-CIO	Good	-1%	-1%	N
Parametric	Good	17%	0%	N
Wellington	Satisfactory	-21%	-1%	N

Performance

	Trailing 1 Year Correlation to Growth	Trailing 3 Year Correlation to Growth	1 Year Return	5 Year Return	% of Portfolio Liquid in 30 Days
AFL-CIO	0.0	0.0	5%	3%	100%
Parametric	1.0	0.9	6%	7%	100%
Wellington	0.5	0.4	-1%	-2%	100%

Manager Notes:

Wellington:

The Real Total Return strategy follows a dual mandate of diversification as well as a sensitivity to inflation. The lack of inflationary pressures in the U.S. has meant that the inflation sensitive strategies have experienced negative results over the past several years. Staff is currently evaluating alternate strategies that we may wish to pursue within this portion of the Risk Diversifying Sub-Portfolio

Manager Theses:

Managers in the risk diversifying allocation seek to have a low correlation with the growth portfolio, positive returns in flat and falling equity markets, and a high degree of liquidity. These managers work together to offset some of the risks in the growth portfolio.

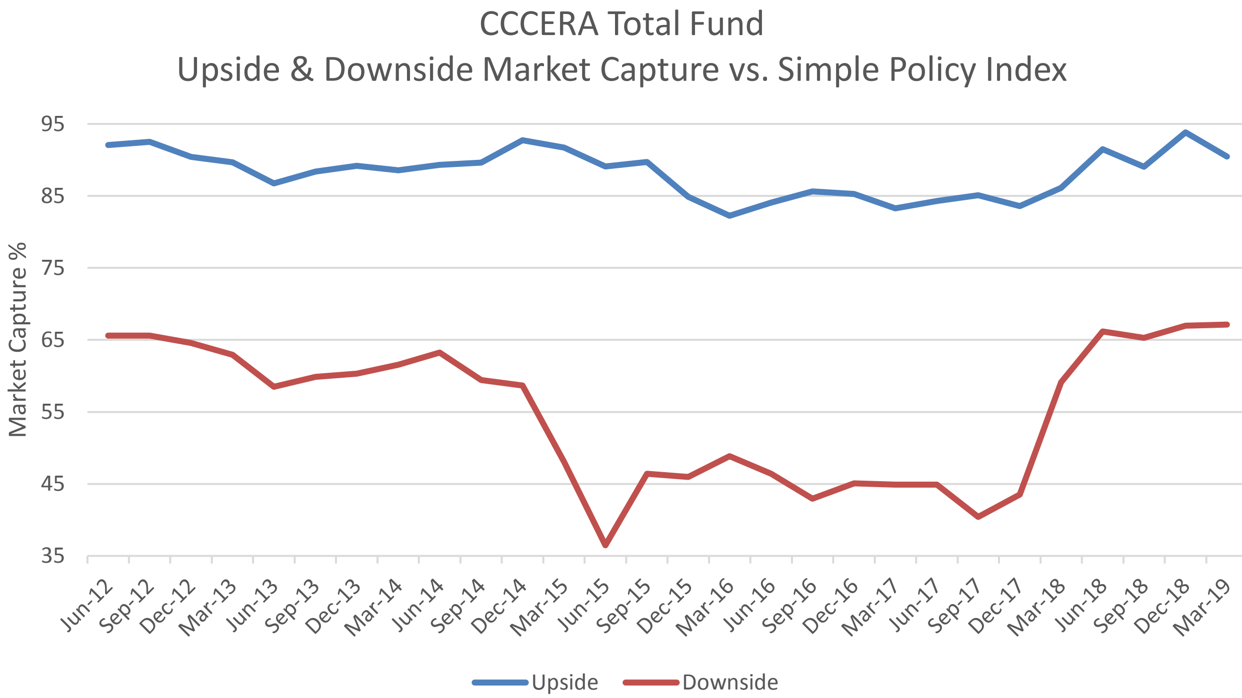
AFL-CIO: Portfolio of domestic, high quality fixed income securities which are backed by commercial and residential mortgages.

Parametric: Portfolio of paired options selling intended to collect insurance premiums by selling puts and calls on the S&P 500 with collateral invested in US Treasury portfolio.

Wellington: Multi-strategy fund which tactically rotates between assets to produce returns.

Appendix Data – Total Fund

Rolling 3-Year Total Fund Upside/Downside Market Capture



*The composition of the Simple Target Index has mirrored changes in CCCERA's asset allocation over time: from 2008 to 2012 the benchmark was 73% MSCI ACWI, 23% Bloomberg 1-3 Year Gov/Credit, and 4% 3-Month Treasury Bills. From 2012 to 2016 the composition was 74% MSCI ACWI, 18% Bloomberg 1-3 Year Gov/Credit, and 9% 3-Month Treasury Bills. From 2016 to 2017 the composition was 63% MSCI ACWI, 25% Bloomberg 1-3 Year Gov/Credit, and 12% 3-Month Treasury Bills, from 2017 to June 2018 the composition was 61% MSCI ACWI, 27% Bloomberg 1-3 Year Gov/Credit, and 12% 3-Month Treasury Bills and from July 2018 to present the composition is 69% MSCI ACWI, 23% Bloomberg 1-3 Year Gov/Credit, and 8% 3-Month Treasury Bills.

Total Fund Quarterly Attribution

	CCCERA Total Fund			**Simple Target Index**			**Analysis**		
	Allocation	Return	Return Contribution	Allocation	Return	Return Contribution	Allocation Difference	Return Difference	Total Effect
Liquidity	26%	1.7%	0.4%	23%	1.2%	0.3%	2.6%	0.5%	0.2%
Growth	66%	8.3%	5.5%	69%	12.2%	8.4%	-3.0%	-3.9%	-2.9%
Risk Diversifying	8%	2.5%	0.2%	8%	0.6%	0.0%	0.4%	1.9%	0.2%
Total Fund	100%		6.1%	100%		8.7%	0.0%		-2.6%

CCCERA Total Fund Performance vs. Simple Target Index

	One Year		Three Years		Five Years		Ten Years	
	CCCERA	STI	CCCERA	STI	CCCERA	STI	CCCERA	STI
Return	3.6	3.0	7.6	7.1	6.3	4.5	10.6	8.9
Volatility	9.7	14.3	5.7	8.1	5.5	7.6	8.3	11.1
Sharpe	**0.2**	**0.1**	**1.1**	**0.7**	**1.0**	**0.5**	**1.2**	**0.8**

The Simple Target Index is made up of 69% MSCI ACWI, 23% Bloomberg 1-3 Year Gov/Credit, and 8% 3-Month Treasury Bill. This purpose of this index is to examine whether or not CCCERA is being rewarded for pursuing a more nuanced portfolio versus a very simple representative index.

CCCERA's Total Fund has produced strong risk adjusted returns over most trailing periods. Additionally, the CCCERA Portfolio has exceeded the Simple Target Index over all trailing periods. This would indicate that CCCERA has been rewarded for engaging in more complex investments which target outperformance versus investing passively in the publicly traded market.

The Sharpe ratio is a measure of risk adjusted returns which shows the amount of return a portfolio earns above the risk free rate per unit of volatility. Over all trailing periods, the Total Fund has produced a better Sharpe ratio relative to the Simple Target Index, indicating that CCCERA is being favorably rewarded for the risk taken in the portfolio.

THE PRIVATE EQUITY EXCLUSIVE

PRODUCED BY: THE PENSION BRIDGE

Meeting Date
05/22/19
Agenda Item
#11a.

TRUMP INTERNATIONAL HOTEL, CHICAGO | JULY 22ND & 23RD, 2019

The Private Equity Exclusive is an event produced by **The Pension Bridge.** It's the only private equity conference in the institutional investment industry with a controlled attendance structure that is designed to benefit the LPs, GPs and Consultants. The most influential investment decision-makers, most closely involved with Pension Plan Private Equity allocations, will come together for this exclusive event. Leading LPs from Public Pension Funds, Corporate Funds, Sovereign Wealth Funds, Foundations, Endowments, Family Offices, Non-Discretionary Private Equity Consultants, General Partners and Fund of Funds will join us in this unique setting.

At **The Private Equity Exclusive**, we will have **better than a 2:1 Ratio of Pension Plan LP/Consultant to GP/Investment Manager Firm**. The event attracts approximately 200 Pension Funds and Non-Discretionary Consultants. The GP/Manager firms are limited to only 75. We will also allow for 10 Placement Agents and only a few service providers. This will be the ONLY conference in the Institutional Private Equity Industry that will attract this elite group while benefiting each attendee from both an educational and relationship perspective.

Amid sustained volatility in the public markets and peak cycle uncertainty, we'll learn from the experts about the most important issues, outlooks, challenges, opportunities and trends that will shape the Private Equity Industry for today and the future. Our highly regarded speaker faculty will provide in-depth analysis on:

- ✓ How to Minimize Mistakes in Buyouts
- ✓ Where can we find Good Returns in Credit Without Taking Inordinate Risk?
- ✓ Pension Plan LP Views on GP-Led Restructurings, Fund to Fund Sales, Subscription Lines and More
- ✓ ESG Progression – Framework for Monitoring and Reporting
- ✓ Best Approaches to Managing Private Market Risks
- ✓ Could the Co-Investment Boom Come Back to Bite?
- ✓ Most Attractive and Vulnerable Sectors for Distressed Investing
- ✓ Areas of Growth and Creative Ways to Find Deals for Secondaries
- ✓ Emerging Market Headwinds and Effects of Recent Macro Developments
- ✓ Globalization of Venture Capital
- ✓ Is Mezzanine an All-Weather Allocation and Does it Make Sense Now?
- ✓ Recent Trends and Most Promising Areas for Impact Investing
- ✓ How do Growth Equity GPs Differentiate Themselves in this Competitive Landscape?
- ✓ Uncertainty in the Energy Markets – What should be an LPs Approach?
- ✓ Where to find Higher Return Potential in Infrastructure Projects

Hear about these vital issues and plenty more important topics as we learn about how to adapt to our Private Equity Industry that is on the verge of a major transformation with the next inevitable downturn.

THE PRIVATE EQUITY EXCLUSIVE HAS TWO GOALS IN MIND

Our first goal is to provide the **highest level of education** with the top speaker faculty. Our highly esteemed panel participants will discuss the different issues, trends and strategies so that you're best prepared to navigate through these uncertain market conditions.

Our second goal is to help **build relationships** between the Limited Partners, General Partners and Non-Discretionary Consultants in a controlled attendance structure. This event offers the connections necessary for solidifying current relationships and meeting contacts for prospective allocations. We have provided the best possible networking atmosphere to accomplish this objective.

We look forward to a strong event and a very productive one from both an educational and relationship perspective. We hope that you will join us in Chicago to be amongst the most powerful and elite in the Institutional Private Equity Community!

MONDAY, JULY 22ND
Trump International Hotel, Chicago

2:45 PM – REGISTRATION, MEET AND GREET

3:30 PM – MID-YEAR INVESTOR OUTLOOK

Highlights from the latest Global Private Equity Barometer

- Private Equity Returns and Allocations
- LP Performance and Remuneration
- LP Investments in GP Management Companies
- GP-Led Secondary Transactions
- ESG Considerations as Investment Criteria
- Innovation in Private Equity
- Diversity in Private Equity

3:45 PM – KEYNOTE SPEAKER

4:15 PM – ENVIRONMENTAL, SOCIAL AND GOVERNANCE, (ESG)

- Do we have Proof that ESG Integration is a Driver for Better Returns?
- Do Firms with Good Performance on SASB Topics Outperform Firms with Poor Performance on those Topics?
- What are Some Common Myths About ESG?
- How should ESG be best Incorporated into the Investment and Due Diligence Process?
- How are LPs Currently Monitoring GPs' Responsible Investment Practices?
- What is the Framework for more Consistency on Full Disclosure for GPs Reporting?
- Will there come a time when Plan Sponsors Only Invest with UN PRI Investment Manager Signatory Firms?
- Financial Stability Board, (FSB) and its Guidelines to Disclose the Risks that Portfolio Companies face from Climate Change – what Approach should be Taken? What Climate Change Risk Factors should we be Analyzing?
- What are ways you can use UN Sustainable Development Goals, (SDGs) to Help Investing in New Opportunities and Identify Future Areas of Risk?
- Have you Required all of your Portfolio Companies to Implement a Cybersecurity Policy, Code of Conduct or Apply Cyber-Risk Management Measures?
- With Diversity Gaining Traction, will Gender Diversity at the Portfolio Company Level be something that is Monitored? Will it get to the point of Setting Diversity Targets?
- Understanding Relevant Benchmarks for ESG Risk Measurement and Performance
- What are the Pros and Cons of Possible ESG Regulation by the SEC?

4:50 PM – IMPACT INVESTING

- How do you Best Align with UN's Sustainable Development Goals? How can LPs best Evaluate the SDGs in their Allocation Decisions?
- What are the Opportunities for Impact Investing in Emerging Markets vs. Developed Markets?
- What are some Recent Trends you've seen in this Space? Most Promising Areas?
- What does the Future Hold for Impact Investing?
- When we have an Inevitable Downturn or Recession, will Investors Abandon this Investment? When and How will it Become Mainstream?
- Investing in Technology for Social Impact
- With Areas of High Water Stress and a Larger Future Shortfall Between Water Supply and Demand, where are the Most Attractive Opportunities?
- What are the Top Challenges of Impact Investing Projects? What are the Biggest Areas of Risk?
- What are some Roadblocks for Investors?
Do Larger Firms have an Advantage in this Space?
- How should Impact Investors think about Reporting? Have you Embraced the Need for Disclosure with Sustainability Accounting Standards Board, (SASB)?
- Measuring Social Impact – should you verify that the Funds you Invest in have their Portfolios Independently Measured and Verified by B Lab's GIIRS Impact Rating System?
- Cambridge Associates PE/VC Impact Investing Benchmark – any early Conclusions on Returns?

5:20 PM – EMERGING MARKETS

- Macro Overview and Recent Developments – how does that affect your Investments?
- With Central Banks Tapering, do you see Weaker EM Returns? What about a Stronger Dollar for a Prolonged Period? Weak Commodity Prices?
- How have Emerging Market Headwinds Impacted your Deployment?
- Who has Delivered Better Returns – Country-Specific Managers, Region-Specific Managers or Global EM Managers?
- How have Emerging Market Returns stacked up vs. Developed Markets over the long run? Given the Current Environment, will EM Outperform Developed Markets?
- Which EM Region is Most Promising over the Next Cycle?
- What is your Expected Outcome for China when considering their Credit and Real Estate Bubbles, Massive Gov't Stimulus and the Ongoing Trade War?
- Do you see Opportunities in India with their Attractive Demographics and Urbanization? Have we seen Progress with Reforms for Investors?
- Growth and Outlook for Southeast Asia
- What is the Proper Approach to Africa Going Forward for Higher Returns? What Sectors will Provide the Greatest Opportunity?
- Any Frontier Markets that are showing Strong Growth that you find Attractive?
- With Pro-Investment Reforms for Key Markets in Latin America, what is your Outlook for this Region?
- How do Valuations look relative to Risk in Various Regions? Do you see Risk being Appropriately Priced?
- How should Currency Risks and Hedging be Factored in by GPs and LPs?
- What are the Most Common LP Concerns?

6:00 PM – COCKTAIL RECEPTION

7:15 PM – COCKTAIL RECEPTION CONCLUDES

TUESDAY, JULY 23RD

Trump International Hotel, Chicago

7:00 AM – BREAKFAST

8:00 AM – PENSION PLAN LP PERSPECTIVES

- Given the Macro Environment, what if anything are you Doing Differently? Are you Preparing for the next Global Financial Crisis? What are your Returns Expectations?
- How do you Balance the Concern of the Need to Invest in a Lower Returns Environment with High Valuations?
- Which Non-Correlation Strategies to the PE Space have you Allocated to or Favor?
- Are you Seeking Investments with a Subscription Model for Greater Visibility of Revenues and Less Volatility? If so, What Recurring Revenue Metrics do you look for in SaaS and Other Companies?
- Does it Concern you that Subscription Lines have made it Harder to Assess Return Sources? Have you Been Successful in Seeking Greater Transparency to Look Past this Fund-Level Financial Engineering?
- Have you seen the Pendulum of Power Swing Towards the GPs? If so, will this Change if we see an Extended Downturn?
- What Creative Deal Terms have you seen? Do you have the Freedom to Invest in Funds with Non-Traditional Terms?
- What are your Views on Fund to Fund Sales?
- What are your Views on GP-Led Restructurings?
- Is it a Red Flag to you if Managers coming back to Market Earlier than Expected to Raise Capital?
- How are you thinking about Gender Diversity at the Manager Level? Could it become a Deal-Breaker in the Future without seeing Meaningful Efforts by GPs for Diversity?
- Have you gotten More Involved in your GPs Valuation Process? How have you Achieved this Transparency Demand?
- From an LP Perspective, what does not work in Fundraising? What does it take to Stand Out?
- What are the Strong Points about your Program? How do you Differentiate yourself as a Good LP?
- What are your Top Priorities at the moment? Most Attractive Investments?

8:40 AM – FEATURED PANEL: CURRENT STATE OF THE PRIVATE EQUITY MARKET

(A) INVESTMENT, DEAL AND EXIT ENVIRONMENT

- State of the U.S. and Global Economy – what is your Outlook and Expectations for its Effects on Private Equity? What is your Biggest Worry or Uncertainty?
- Private Market Risk – as a Consultant, what are you telling your Clients about how they should Manage Risk? As an LP, how are you Approaching New Investments or Guarding Against your Existing Portfolio?
- What can Pension Plans do to Avoid getting involved in Expensive Deals?
- Where are your Most Optimistic Returns Going Forward as far as Sector, Geography or Niche Strategy? What's your Biggest Worry?
- What are your Expectations for the Exits Market?
- What's Driving the Interest in Micro-Specialization? Which Recent Specialized Funds had a Successful Fundraise that's of Interest?
- What do Demographic Trends and Population Aging Mean for Growth and Investments? Are there any Less Desirable or Favorable Investments as a Result?
- Which Technological Disruption will directly affect Private Equity and Create the Best Opportunities? How Prevalent will Blockchain or Artificial Intelligence Become for PE Managers?
- What are the Reasons why we've seen Outperformance of First Time Funds? Any Caution for First Time Funds in the Upcoming Downcycle?
- Does the Use of Subscription Lines Concern you with a Rise in Interest Rates and/or a Down Trending Market? Could it Cause an LP Default on a Capital Call in a Perfect Storm Scenario?
- With Momentum gathering for GP Led-Secondaries, how do you see that Market Developing?
- Do you see Reason for Caution in Co-Investments?
- With a Slew of Corporate Carve-Outs going on, what sort of Value Creation can one Expect? Is this a Lasting Trend?

(B) LP/GP RELATIONSHIP – FEES, TERMS AND ALIGNMENT OF INTERESTS

- Will the ILPA Guidelines for Subscription Lines Impede the Use of these Facilities?
- Tax Bill Limiting GPs Interest Expense Deductibility – will this Create Negative Consequences for GPs Leveraged Transactions or Credit Strategies with a Bias Towards Preferred and Common Equity?
- Revenue Recognition Standard – how will New Accounting Standards affect Private Equity Firms' Portfolio Companies and what Industries will be seeing the Most Drastic Changes?
- Will the Mandatory Performance Framework, (MPF) and the Certificate in Entity and Intangible Valuation, (CEIV) change the Industry's Valuation Process?
- Have you seen Progress with Cyber-Risk Management for PE Firms and their Portfolio Companies? As an Investor, do you Demand to have a Policy in place?
- What has been the SEC's Impact on you when it comes to Fees, Expenses or Transparency?
- With Direct Investments on the Rise for Large Pensions and Sovereign Wealth Funds doing Direct Investments, do you feel they have the Necessary Talent and Skills to Succeed?
- What Effect will the Growing Shadow Capital Space have on the GP/LP Relationship?
- Where do you see the LP/GP Relationship in the Future when it comes to Separately Managed Accounts, Strategic Partnerships, Co-Investments, LPs Concentrating Portfolios, etc.?

9:30 AM – CO-INVESTMENTS

- Assess the Health of the Co-Investment Market Amid the Bullish Optimism
- Could the Co-Investment Boom Come Back to Bite? What is Highest on the Risk Curve that could Go Wrong?
- What will happen to Co-Investments in a Down Market?
- Have Co-Investments Outperformed Net Fund Returns?
- What do you want out of a Co-Investment Program other than Lower Fees? Better Control of Deployment Pace? Great Way to Deepen a Relationship?
- What is the GP Perspective? Developing a Process and then Giving it Away for something you Prefer to Charge for?
- Working with External Advisors vs. Doing it Yourself
- How can an LP go about Distinguishing Themselves in terms of getting Desired Allocations?
- Are Smaller LPs at a Disadvantage as far as Deal Opportunities go? If so, why?
- Adverse Selection – do GPs sometimes show the Worse Deals to Co-Investors and keep the Most Promising Deals for Themselves? Do GPs sometimes do Deals Outside of their Investing Size or Strategy Norm?
- What's the right Balance of the Investment Decision based on the Quality of the GP vs. the Quality of the Deal?
- For Co-Investment Deals that Underperform, what are the Reasons Why?
- How do you Benchmark Performance of a Co-Investment Portfolio?
- Do Investors Target a Ratio of Fund to Co-Investments?
- What are the Advantages and Disadvantages of Sidecar Vehicles or Special Purpose Vehicles?
- Understanding the Trends and Performance of Co-Investments in Small, Medium and Large Buyouts. Where do Co-Investments make the most sense?

10:10 AM – REFRESHMENT BREAK

10:40 AM – BUYOUTS

(A) DEAL FLOW, FINANCING AND AREAS OF OPPORTUNITY

- What are the Biggest Macro Issues and Concerns?
- Given the Current Environment, how are you Navigating the Competitive Landscape for Deals?
- With High Deal Valuations, should LPs Expect Returns to Trend Downward over time? What are your Returns Expectations from Recent Vintages?
- How do you Avoid Mistakes? What is the Top Lesson You've Learned from Past Experience?
- What Sectors or Geographies should you Avoid in this Environment? Which ones do you find Attractive?
- Will the Surge in Tech Buyouts Continue? What are the Factors behind the Heightened Tech Interest?
- Do you see Attractive Opportunities in Europe? Which Geographies and Sectors?
- How does Underwriting Change for this Environment? Any Trends?
- How do you view Credit relative to the Risks in today's Market?
- How do you think about the Use of Leverage?
- When you Raise your Next Fund, what Considerations do you make when thinking about your Fund Size?

(B) POST-ACQUISITION VALUE-ADD AND EXITS

- What are your Expectations for Exits and Distributions over the Next Year and Few Years?
- If you focus on Long-Term Value Creation to Generate Stable Cashflow, how Long a Holding Period are you Embracing?
- How do you Consider Volatility when Valuing a Private Company?
- What Procedures have you Identified and Learned from recent Successful Exits?
- What Levers have you seen Pulled to Narrow the Spread Between Gross and Net Returns?
- How do you view the Risk/Reward for Quasi-Strategic Buyers to Grow their Portfolio Companies via Add-Ons?
- When is a Dividend Recap Appropriate? Can it create a Financial Burden and Future Risk for Portfolio Companies?

(C) LP ISSUES

- Will we Trend towards LPs Dictating the Format and Usage of Subscription Lines of Credit? Could that Erode the IRR "Head-Start" that Credit Lines have Generated for GPs?
- As an LP, should you Decrease Exposure to this Market? Decrease Commitments? Sell through Secondaries?
- Which Strategies might Perform Well Independent of the Economy?
- What are your Thoughts on GPs Selling Minority Stakes in their Management Companies to Investors?
- What are the Problems you see in the GP Space that you would Correct?

11:25 AM – GROWTH EQUITY

- What are LPs looking for in a Growth Equity Strategy? What do you Aim to Delver?
- How does the Operational Value-Add Differ from Buyouts? Is Sustaining Revenue Growth Most Important?
- How do the Risk/Returns of Growth Equity Compare to Buyouts and Venture?
- With Ferocious Competition, how does a GP Differentiate Themselves?
- How do you think about Companies you're Making a Deal With? Do you Sway Towards or Away from VC Growth?
- Have you Altered your Underwriting with Current Market Conditions?
- Operationally Involved Post Investment – do you think it's Effective as a Minority Investor to Build out Post-Investment Value-Add Groups? Do the Best Companies tend to be those with No Shortage of Capital?
- How does the Size of the Fund play into Performance?
- What is the right way to Benchmark this Strategy?
- Any Red Flags for LPs to Avoid when it comes to Growth Equity Managers?
- Aside from High Pricing, what are the Biggest Challenges Growth Equity Managers are Facing Today?

11:55 AM – SECONDARIES

- What should Investors expect in terms of Returns for Diversified Secondaries Funds compared with a Diversified PE Portfolio?
- What are the Sources of Value-Add for Secondary Funds? Which are more or less Repeatable?
- What are the Risk/Return Characteristics of Secondaries vs. Private Equity in general?
- How is the Balance today between LPs Looking to Buy vs. Sell their LP Interests?
- How are you Sourcing Transactions?
- Current Pricing – Pressures/Opportunities
- What have you seen recently in regards to Leverage?
- How has the Use of Capital Call Facilities Reduced the Need for Secondary Funds in Managing J-Curve Exposure?
- Where are the Areas of Growth for you in the Secondary Space? New Categories of LPs, Separately Managed Accounts, Restructurings, etc.
- GP Fund Restructurings as a Meaningful Part of Secondary Deal Flow – Have you seen it as a Source of Friction with LPs? What goes on Behind the Scenes?
- Stapled Secondaries – why is there an Importance of GPs Disclosing both Optionality and their Effect on Pricing to LPs?
- What sort of Creative Ways to Find Attractive Deals in this Mature Market have you seen?
- With Tail-End Portfolios on the Rise, will this become a Steady and Constant Need? What are they Selling for?
- Fundraising – what should LPs look for to Identify Differentiation, Specialization and Diversification?
- How is the Current State of Play in the Asia Secondary Market?
- What would be your Advice to LPs considering Selling one or more Legacy Partnership Interests?

12:30 PM – LUNCH

1:30 PM – PRIVATE CREDIT

- Are we in Extra Innings for the Credit Cycle? Why Does Private Debt Continue to be Attractive for LPs?
- What are the Biggest Deterrents to Deploying Capital Today?
- What Speculative Excesses or Over-Exuberance have you seen?
- Where can we find Good Returns Without Taking Inordinate Risk?
- What Range of Returns should Investors Assume for the Various Risk Profiles Across Private Credit?
- How should Investors think about Fund Level Leverage? Is there an Optimal Leverage Point for Various Credit Strategies Across the Spectrum?
- What are the Latest Trends in Deal Structuring?
- What Sub-Sectors are you Favoring and Avoiding in the Middle Market Direct Lending Space?
- Do you Believe Non-Sponsored Investing could Grow with Signs of Crowding in the Sponsored Market? What are the Benefits/Risks?
- Thoughts on Unitranche? Expectations for Default Rates and Loss Given Default?
- Where do Investors see the Illiquidity Premium Available in Today's Market? How Quickly can Illiquidity Premium and Spreads Move if we get a Spike in Volatility?
- How is the Opportunity Set in European Credit? Where is the Best Value?
- How much Transparency should LPs Demand from their Credit Managers during both Initial Underwriting and Ongoing Monitoring?
- With the Huge Inflows into Private Credit, how big is the Concern about how those Assets are Valued? Should Firms Outsource the Valuation Work?
- How should Pension Plans go about Analyzing, Selecting and Implementing the various Credit Funds?
- How do you Assess the New Credit Players in this Space when Selecting a Credit Manager?

2:15 PM – MEZZANINE

- How Severely have other Forms of Financing Hurt Middle-Market Mezzanine? Have you Lowered your Lending Rates and Returns Expectations as a Result?
- What type of Value-Add can a Mezz Provider bring to the table? How does it Meet some the of Changes in the Market?
- Where does Mezz Fit within a Multi-Strategy Credit Portfolio?
- Do you Consider Mezzanine to be an All-Weather Allocation?
- Does it Make Sense to Invest in Mezz Right Now?
- Market Update: Purchase Price Multiples, Leverage Multiples, Senior Leverage Multiples, Cash Coupons, PIK, etc.
- What is the Tradeoff of Sponsored vs. Non-Sponsored Deals?
- What are you seeing in terms of Add-Backs and Covenants?
- What is your Approach to Equity Co-Investments? Warrants?
- How does the Need for an Equity Cushion to come into play for Withstanding a Downturn?
- What are the Deal Risks Associated with Mezz?
- Fund Level Leverage – what are the Financing Terms? How Much is Too Much?
- What are the Market Risks Associated with Mezz in regards to being Late in the Credit Cycle and Interest Rates?
- Risk/Reward of Small, Middle and Large Market
- What Returns Expectations should LPs have?

2:45 PM – PREFERRED EQUITY

- Preferred Equity Explained – Raising Capital/Unlocking Liquidity Without the Constraints of Debt Financing or a Secondary Sale
- Benefits of Issuing Evergreen Securities with No Mandatory Redemption Date – does this Trump the Higher Expense to the Borrower?
- What are the Advantages and Cautions of this Financing Model?
- Which Industry Participants can Benefit and How?
- Do you see Seasoned Secondaries Players moving into Preferred Equity? Can this be the Next Evolution of the Market?
- How might Increased Competition in this Space affect the Preferred Equity Market?
- What is the Skillset Required?
- Should Secondaries Buyers be Worried about whether Preferred Equity will Eat Into their Potential Deal Flow?
- Where does Preferred Equity Fit Within a Portfolio Allocation?

3:00 PM – REFRESHMENT BREAK

3:25 PM – DISTRESSED INVESTING – OPPORTUNISTIC AND SPECIAL SITUATIONS

- What do you see as a Catalyst for the Next Distressed Cycle?
- Where are Default Rates now and how much do you Expect it to Rise in the Coming Years?
- How Big a Role do you Expect Corporate Debt to Play and the Huge Growth of BBB- Rated Bonds?
- Which Sectors are most Vulnerable at the End of the Cycle?
- How is Liquidity in the Distressed Space and how might that affect Valuations should a Credit Event Occur?
- Where are the most Attractive Strategies and Sectors? Any Areas that should be Avoided?
- Will Direct Lending Lead to a Distressed Opportunity? If so, why?
- How Critical is it to Buy a Distressed Opportunity Well vs. the Ability to Operationally Create Value?
- U.S. Distressed Opportunity vs. the European Opportunity Set. Which Countries, Sectors, Types of Deals should be looked at?
- Opportunity Set and Risks in Asia. Do you Find it Hard to do Business in this Region?
- What Skills are Required for Distressed-for-Control Investments?
- When taking Operating Control of a Company, what Problems/Issues can Arise? What's the Upside of Getting it Right?
- Distressed Debt Vehicles in Hedge Fund Format vs. PE Draw-Down Style Structures – what are the Pros and Cons of each?
- What are the Biggest Challenges to Delivering Returns in this Competitive Landscape?
- What is the Right Style, Size and Approach for an Investor to Select a Distressed Manager?

4:00 PM – VENTURE CAPITAL

- State of the Venture Industry – Valuations, Mega Funds and Exit Market
- Do you believe Valuations are at a Peak? Could Lower Returns be on the Horizon?
- Are Private IPOs replacing Traditional IPOs? Will this Continue to Grow and Flourish?
- Venture Capital Winners – Limited Access to the Top Few VCs that Generate the Bulk of the Industry's Returns? What's the Best Approach to this Challenge?
- Is Technology the Platform Behind the Next Big Thing in Venture? Which Specific Technology Stands Out as a Future Return Driver?
- Globalization of Venture Capital – which Overseas VC Markets do you view as Attractive? What is the Best way to Gain Exposure?
- What are the Biggest Challenges or Headwinds Facing Venture Today?
- What are the Dynamics Driving the Liquidity Challenge? What are the Solutions?
- Is it Hard to Find a New Venture Capital Investment? How Hard is it to Compete for the Best Companies to Invest?
- Thoughts on Seed Stage and Micro Venture Capital Managers? What do you need to know about this Approach?
- VC Access via Direct Fund Commitments, Fund of Funds, Co-Investments, Secondaries – Considerations for each, Allocation Issues, Internal Resources, etc.
- Pension Transparency Impact – what are the Regulatory Issues facing Pension Funds when Investing in Venture Capital?

4:35 PM – PRIVATE EQUITY ENERGY

(A) TRADITIONAL

- Is now the Time to be Investing Given the Risk and Uncertainty? What's been the Recent LP Sentiment and Approach? Have they Backed Off, Sold Stakes, Bought Secondaries?
- With Energy Private Equity in a Holding Pattern with EBITDA Multiple Offers coming in Lower than Valuation Expectations, what will Spur Exits?
- Where do you see the Best Opportunities and Most Attractive Sectors? Appealing Projects on Upstream, Midstream, etc?
- Where do you see Opportunities in the Royalty Space?
- How Important are the Credit Markets in the Deployment of Private Capital and what Role has it Recently Played?
- How much Leverage is Too Much Leverage?
- Finding a Common Ground on Risk Protection Between Management and a GP – will Hedging Protect you in a Multi-Year Price Disruption?
- How do you think about Supply/Demand in North America due to the Permian?
- What does the Future hold for Shale and Natural Gas?
- How should we think about the Risk and Approach to this Space in a Climate Change Focused World?
- When can we expect Secondary Buyers to Capitalize on GP-Led Restructurings of Energy Funds and Assets? Have we seen these Deals yet?
- Will Special Purpose Acquisition Companies, (SPACs) continue to be a Fixture in the Oil and Gas Industry? What's the Appeal and Potential Downside?

(B) RENEWABLES

- How have Tax Credits of Renewables Impacted the Industry over the Past Decade and how will the Phase-out of Subsidies affect the Industry?
- What Advances are Required to Increase the Penetration of Renewable Energy Sources? Thoughts on Battery Storage Technology?
- What Sectors within Renewables or Alternative Forms of Energy do you find Attractive? Will the Best Opportunities be in the U.S. or in Emerging Markets?
- What's the Most Important Risk Factor for Investors thinking about Deploying Capital in Renewables?
- How will Technology and Big Data Play a Role in Renewables?
- Thoughts on the Renewable Energy Financing Trend?
- What are the Key Characteristics you should look for in a GP Team?

5:05 PM – INFRASTRUCTURE

- With High Valuations, a Surge in Average Deal Size and High Competition, what does that mean for your Returns Expectations?
- With High Competition for Larger Investments, do you believe there could be More Return Potential in Smaller Projects?
- Which Sectors and Strategies do you see the Most Attractive Opportunities? Any Emerging Trends/Themes?
- Which Geographies are Most Appealing? Developed or Emerging Economies? Greenfield vs. Brownfield in those Regions?
- What are the Main Blockers to Investment in Countries outside of the U.S.?
- Do you see Infrastructure Debt as Attractive? Will it deliver for Investors Searching for Yield?
- What are your Views on the Growing Appetite for Direct Investment from Pension Funds Buying Assets from Infrastructure Money Managers?
- What are your Expectations for Growth in U.S. Energy and Transportation Related Projects?
- The Demand for Renewable Infrastructure – which Area is the Most Attractive?
- How have GPs Adopted ESG Principals and what are the Remaining Challenges?
- Implementation Considerations – Primary Partnerships, Direct, Co-Investment, Fund of Funds or Separate Accounts. Any Advantages or Limitations that Stand Out?
- What are the Advantages of Open-Ended Funds Over Closed-Ended Funds and do you expect a Surge in Open-Ended Funds in the Coming Years?
- What should you look for in an Infrastructure Manager?
- What Threats do Cyberattacks Pose to U.S. Infrastructure, Specifically Energy Infrastructure? Is the Industry Prepared?
- What are the Major Technological Trends that will Shape Infrastructure Investing in the Coming Years?

5:40 PM – CONFERENCE CONCLUDES

5:40 PM – WRISTBANDS FOR NETWORKING EVENT HANDED OUT IN CONFERENCE ROOM

6:00 PM – TRUMP TERRACE COCKTAIL RECEPTION AND DINNER NETWORKING EVENT

Hosted by The Pension Bridge – Join our group for a cocktail reception and dinner at The Terrace, located on the 16th floor of the Trump Tower. Meet many of the most influential decision makers from our industry at this sophisticated outdoor oasis showcasing iconic views of Chicago's dramatic cityscape. The Pension Bridge Group will utilize will this glamorous space for meetings and conversation with quality contacts while taking in views of the Chicago River, Wrigley Clock Tower and Lake Michigan.

9:00 PM – NETWORKING EVENT CONCLUDES

REGISTRATION:

To register or receive more information about The 2019 Private Equity Exclusive:

BOCA RATON OFFICE CONTACT:

Brett Semel

(561) 455-2729

bsemel@pensionbridge.com

NEW YORK OFFICE CONTACT:

Andrew Blake

(516) 818-7989

ablake@pensionbridge.com

Please visit **www.pensionbridge.com** for additional details. **Registration is not available online.**

About The Pension Bridge: We are an innovative company offering educational conferences of the highest quality. Our objective is to provide an education to the institutional investment community while providing an impressive speaker faculty in a setting that is conducive to great networking. We help institutional money managers connect with Pension Funds and Consultants across the country in a fun, enjoyable atmosphere. Our events can act as a stepping stone to a successful financial relationship or simply help build the investment education.

Our management team's unique skills, operating experience, and industry relationships help to make our events the main attraction in the industry. We pride ourselves on being there to cater to our clients' wants and needs. Our ratio of plan sponsor to investment manager allows our events to be the most desirable and accommodating in the conference industry. The Pension Bridge is known for its strength, stability, relationships and operational excellence.

THE PENSION BRIDGE

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Public Funds Forum

September 3-5, 2019 // Park City, Utah

Meeting Date
05/22/19
Agenda Item
#11b.

Day One
Tuesday, September 3, 2019

1:00 pm - 4:30 pm	Check-In and Registration
6:00 pm - 6:15 pm	Opening Remarks
6:15 pm - 7:15 pm	Session 1: Decency vs. Division: Charting a New Course
7:30 pm - 10:30 pm	Deer Valley Street Fare Dinner

Day Two
Wednesday, September 4, 2019

7:00 am - 8:00 am	Breakfast
8:00 am - 9:00 am	Session 2: Innovation, Information and Investing
9:00 am - 10:00 am	Session 3: Index Funds and Common Ownership
10:00 am - 10:15 am	Networking Break
10:15 am - 11:15 am	Session 4: The Politics of Investing: Dark Money, Fake News and Front Groups
11:15 am - 12:15 pm	Session 5: New Trends in Securities Litigation
12:15 pm - 1:00 pm	Lunch
1:00 pm - 2:00 pm	Session 6: Fraud Is Not a Trade Secret
2:00 pm - 3:00 pm	Session 7: Breakout Sessions
3:00 pm - 4:00 pm	Session 8: Best Practices in Fund Governance
5:30 pm - 6:30 pm	Cocktail Reception
6:30 pm - 12:00 am	Nordic Nights Dinner

Day Three
Thursday, September 5, 2019

7:00 am - 8:00 am	Breakfast
8:00 am - 9:00 am	Session 9: How Big Data and Technology Are Changing the Investment Business
9:00 am - 10:00 am	Session 10: Private Equity: A New Approach for Fees, Governance and Transparency (That You May Not Have Heard About!)
10:00 am - 10:15 am	Networking Break
10:15 am - 11:00 am	Session 11: Roundup of Investor Initiatives
11:00 am - 12:00 pm	Session 12: Hedging 2020: Lead-up to the Election Year
12:00 pm - 12:10 pm	Closing Remarks
12:30 pm - 5:30 pm	Lunch and Networking Activities

2019 Public Funds Forum
September 3-5, 2019
9100 Marsac Avenue, Park City, Utah 84060

First Name: Middle: Last Name:

Title:

Company:

Address:

Address 2:

City:

State:

Zip/Region:

Country:

Telephone: Fax: Email:

Name of Guest: (if applicable) (if applicable)

REGISTRATION:

The registration fee for the conference is $895.*
The guest fee is $475.

○ Bill me ○ Credit Card ○ Check ○ Waiver request*

NETWORKING ACTIVITY (please select one of the following):

○ Culinary Tour ○ Hiking ○ Paddle Rafting ○ Trail Bike Ride ○ None

CONTINUING EDUCATION:

CLE and CPE accreditations are available for attendance at the conference.
Please indicate the accreditations, if any, being sought:

☐ CLE ☐ CPE ☐ None

HOTEL ACCOMMODATIONS:

A discounted block of rooms has been reserved at the Montage Deer Valley for the conference. Register by March 30, 2019 to receive a discounted room rate of $350 per night (not including applicable taxes). Please call 1 (435) 604-1300 and reference "Public Funds Forum" to reserve your room.

The registration fee includes admission to the conference sessions, educational materials, meals and refreshments, and a choice of either the Culinary Tour, Hiking, Paddle Rafting or Trail Bike Ride networking activities that are integral to the conference agenda.

Conference attendees may bring guests for an additional fee of $475. Guest attendance is limited to the Deer Valley Street Fare and Nordic Nights dinners. Guests may participate in the Culinary Tour, Hiking, Paddle Rafting or Trail Bike Ride for an additional fee.

*Upon request and as legally permissible, the registration fee may be waived subject to applicable gift and gratuity limitations. Public officials in certain jurisdictions may accept all or part of conference benefits free of charge. Conference networking activities will be offered at fair market value for guests that may not accept participation free of charge. Public officials are encouraged to contact their ethics officials with questions.