



## AGENDA

### RETIREMENT BOARD MEETING

SECOND MONTHLY MEETING  
November 28, 2018  
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.

#### ***CLOSED SESSION***

3. CONFERENCE WITH LABOR NEGOTIATORS  
(Government Code Section 54957.6)

Agency designated representatives:  
Gail Strohl, Chief Executive Officer  
Anne Sommers, Admin/HR Manager  
Joe Wiley/Christopher Boucher, CCCERA's Chief Negotiator(s)

Employee Organization: AFSCME, Local 2700

4. The Board will continue in closed session pursuant to Govt. Code Section 54957 to evaluate the performance of the following public employee:

Title: Chief Executive Officer

5. The Board will continue in closed session pursuant to Govt. Code Section 54956.9(d)(1) to confer with legal counsel regarding pending litigation:
  - a. Contra Costa County Deputy Sheriffs Association, et al. v. Board of Retirement of CCCERA, et al., Supreme Court of the State of California, Case No. S247095
  - b. Wilmot v. CCCERA, et al., Court of Appeal, Case No. A152100
  - c. Nowicki v. CCCERA, et al., Contra Costa County Superior Court, Case No. C17-01266
  - d. Fernandez v. CCCERA, et al., Contra Costa County Superior Court, Case No. CIVMSN17-036

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.

***OPEN SESSION***

6. Consider and take possible action to authorize the CEO to execute a contract with PARS (Public Agency Retirement Services) for Other Post-Employment Benefit (“OPEB”) Trust Fund Management Services and to adopt Board of Retirement Resolution 2018-4 approving the adoption of the PARS Public Agencies Post-Employment Benefits Trust.
7. Consider and take possible action to authorize the CEO to execute a contract with one of the below firms for actuarial consulting services:
  - a. Presentation from Segal Consulting
  - b. Presentation from Cheiron
8. Review of total portfolio performance for period ending September 30, 2018.
  - a. Presentation from Verus
  - b. Presentation from staff
9. Consider and take possible action to adopt the 2019 CCCERA Budget.
10. Report from Audit Committee Chair on November 7, 2018 Audit Committee meeting.
11. Miscellaneous
  - a. Staff Report
  - b. Outside Professionals’ Report
  - c. Trustees’ comments

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## **MEMORANDUM**

Date: November 28, 2018

To: CCCERA Board of Retirement

From: Gail Strohl, Chief Executive Officer

Subject: Consideration of PARS (Public Agency Retirement Services) for Other Post-Employment Benefit (“OPEB”) Trust Fund Management Services.

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### ***Background***

CCCERA is the employer for all retirement system staff. (Govt. Code Section 31522.9.) As an employer, the CCCERA Board of Retirement has directed research into the establishment of a single-employer Other Post-Employment Benefit (OPEB) trust for its employees. An OPEB trust's assets, contributions and earnings would be irrevocable and provide for the prudent investment of the assets held for the purpose of providing employee OPEB for the staff employed by CCCERA in accordance with benefit terms. On February 14, 2018, the Board of Retirement adopted the Actuarial Valuation Report of Post-Employment Benefits as presented by Milliman and directed the CEO to draft an irrevocable trust agreement, funding policy and related mid-year budget adjustment and to issue an RFP to determine which option, internal or third party provider, would be more beneficial in administering the assets. On June 4, 2018 CCCERA issued a Request for Proposal to provide Other Post-Employment Benefit (“OPEB”) Trust Fund Management Services.

The scope of the RFP included:

1. Performing discretionary portfolio management including investing and reinvesting funds in accordance with those objectives and guidelines, and all applicable laws and regulations.
2. Keeping complete records of all transactions with regard to investment of funds, monitoring performance, and providing for periodic reports to CCCERA.
3. Providing statements, portfolio analysis, and performance comparisons monthly, quarterly, and annually or as agreed upon by CCCERA.

4. Receiving ongoing contributions into the Trust and processing requests for distributions.
5. Advice and consultation; throughout the contract period the firm must be available during regular business hours to provide informal advice and consultation on matters relating to the 115 Trust. Advice may include but is not limited to the analysis of funding options, asset allocation and strategies, and trust design. The firm will be expected to keep CCCERA updated on Trust related issues and developments pertaining to Federal and State tax code requirements and changes in financial reporting pronouncements issued by GASB. A senior staff member will be responsible for responding to CCCERA within one business day.
6. Board meetings: the firm shall make available up to four times per year a senior staff member to attend Board meetings for the purpose of discussing the Trust's performance and strategies.

The following four firms submitted proposals:

- CalPERS CERBT
- Public Agency Retirement Services (PARS)
- PFM Asset Management LLC
- Wells Fargo Institutional Retirement and Trust

After a review of the proposals, CalPERS and PARS were invited to interview with the evaluation committee, comprised of the CEO, Deputy CEO, CIO and Accounting Manager. The committee concluded that based on the services and products provided, PARS would be the preferred vendor. PARS utilizes HighMark as a sub-advisor. In considering the long term nature of the resources needed for OPEB, the funds would be placed in a growth oriented, passively managed portfolio that has a beneficial mix of return and risk.

The PARS annual asset fee for assets up to \$10 million is 0.25%. The trustee and investment management fee is 0.35% for assets under \$5 million. For asset levels over these amounts, there is a reduction in fee percentages for increasing asset levels.

An analysis was conducted to determine the cost and impact to CCCERA operations of having an internally administered OPEB trust. In comparing the potential legal expenses, labor costs, investment management fees, and a consideration of the time necessary to appropriately administer the internally administered trust to the costs and services provided by PARS, it was determined that utilizing a third party trust would be the better option.



***Recommendation***

Consider and take possible action to:

- authorize the CEO to execute a contract with Public Agency Retirement Services (PARS) for Other Post-Employment Benefit (“OPEB”) Trust Fund Management Services
- appoint the CEO as the CCCERA’s plan administrator for the program, whose authority shall include the selection of an appropriate investment option
- adopt Board of Retirement Resolution 2018-4 approving the adoption of the PARS Public Agencies Post-Employment Benefits Trust for the purpose of pre-funding OPEB obligations
- approve the transfer of the reserve amount currently being held for OPEB matters (approximately \$2.5 million) into the PARS account after it is setup.

**RESOLUTION OF THE RETIREMENT BOARD  
OF THE CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION**

**APPROVING THE ADOPTION OF THE  
PUBLIC AGENCIES POST-EMPLOYMENT BENEFITS TRUST  
ADMINISTERED BY PUBLIC AGENCY RETIREMENT SERVICES (PARS)**

WHEREAS, PARS has made available the PARS Public Agencies Post-Employment Benefits Trust (the "Program") for the purpose of pre-funding pension obligations and/or Other Post-Employment Benefits ("OPEB") obligations; and

WHEREAS, the Contra Costa County Employees' Retirement Association ("CCCERA") is eligible to participate in the Program, a tax-exempt trust performing an essential governmental function within the meaning of Section 115 of the Internal Revenue Code, as amended, and the Regulations issued there under, and is a tax-exempt trust under the relevant statutory provisions of the State of California; and

WHEREAS, CCCERA personnel are employees of CCCERA pursuant to Government Code section 31522.9 which became effective on January 1, 2015; and

WHEREAS, the Board of Retirement ("Board") is the governing body of CCCERA with authority to set terms and conditions of employment of CCCERA employees (*see* Govt. Code section 31522.9); and

WHEREAS, the Board wishes to establish an I.R.C. Section 115 OPEB trust for the investment of assets held for the purpose of providing CCCERA employees with other post-employment benefits; and

WHEREAS, CCCERA's adoption and operation of the Program has no effect on any current or former employee's entitlement to post-employment benefits; and

WHEREAS, the terms and conditions of post-employment benefit entitlement, if any, are governed by contracts separate from and independent of the Program; and

WHEREAS, CCCERA's funding of the Program does not, and is not intended to, create any new vested right to any benefit nor strengthen any existing vested right; and

WHEREAS, CCCERA reserves the right to make contributions, if any, to the Program.

NOW THEREFORE, BE IT RESOLVED THAT:

1. The Retirement Board hereby adopts the PARS Public Agencies Post-Employment Benefits Trust, effective December 1, 2018; and
2. The Retirement Board hereby appoints the *Chief Executive Officer*, or his/her successor or his/her designee as CCCERA's Plan Administrator for the Program; and
3. CCCERA's Plan Administrator is hereby authorized to execute the PARS legal and administrative documents on behalf of CCCERA and to take whatever additional actions are necessary to maintain CCCERA's participation in the Program and to maintain compliance

of any relevant regulation issued or as may be issued; therefore, authorizing him/her to take whatever additional actions are required to administer CCCERA's Program.

THIS RESOLUTION WAS ADOPTED BY THE AFFIRMATIVE VOTE OF THE BOARD OF RETIREMENT OF THE CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION THIS 28TH DAY OF NOVEMBER, 2018.

AYES:  
NOES:  
ABSTAIN:  
ABSENT:

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Todd Smithey  
Chairperson of the Board of Retirement

Attest:

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David MacDonald  
Secretary of the Board of Retirement

STATE OF CALIFORNIA  
COUNTY OF CONTRA COSTA

David MacDonald, the Board Secretary of CCCERA, State of California, hereby certifies that the above foregoing resolution was duly and regularly adopted by said CCCERA at a regular meeting thereof held on the November 28, 2018, and passed by a \_\_\_\_\_ vote of said Board.

IN WITNESS WHEREOF I have hereunto set my hand and seal this \_\_\_\_\_, 2018.

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Board Secretary



## MEMORANDUM

Date: November 28, 2018  
To: CCCERA Board of Retirement  
From: Timothy Price, Chief Investment Officer  
Subject: OPEB Investment Options

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### ***Background***

On November 28, 2018, the Board will consider a recommendation to contract with PARS as provider of OPEB trust fund management services. As part of that engagement, CCCERA will need to choose an investment option for this program. PARS offers several pooled investment vehicles that target various risk allocations and come in both actively and passively managed versions. PARS has also offered CCCERA a customized account where we can determine the asset allocation and select the funds.

### **Key Considerations:**

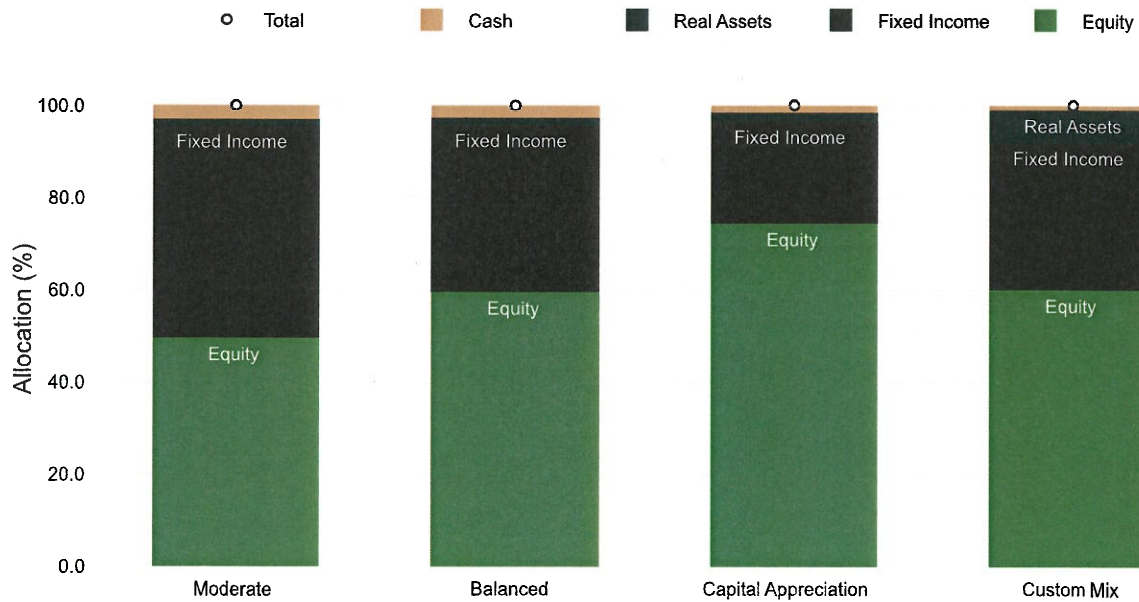
1. The OPEB obligations are largely obligations that will be paid far in the future. As such, the investment program will need to emphasize long term capital gains.
2. Monitoring the OPEB investment program will be an additional duty for staff, therefore we want to maintain simplicity whenever and wherever possible. This will lead us to prefer a passively implemented version.
3. CCCERA has expressed long-term capital market views in our growth sub-portfolio. We would like to align the OPEB vehicle with CCCERA's capital market views.

The following pages highlight the prospective returns of three PARS pooled vehicles: Moderate, Balanced and Capital Appreciation, and a potential implementation in a separate account that more closely follows the CCCERA growth sub-portfolio allocation. We would ultimately select an implementation approach that emphasizes long-term growth using a limited scope of passively managed funds that is similar to a Capital Appreciation or separate account option.

**Current Asset Allocation Mixes**

Asset Class	PARS Moderate Index Plus	PARS Balanced Index Plus	PARS Capital Appreciation Index Plus	Separate Account
Cash	3%	3%	2%	1%
Short Term Gov/Credit	12%	9%	7%	20%
Core Fixed Income	34%	27%	15%	6%
Domestic Equity	40%	48%	58%	15%
Intl Developed Equity	7%	8%	11%	30%
EM Equity	3%	4%	5%	15%
REITs	1%	2%	2%	7%

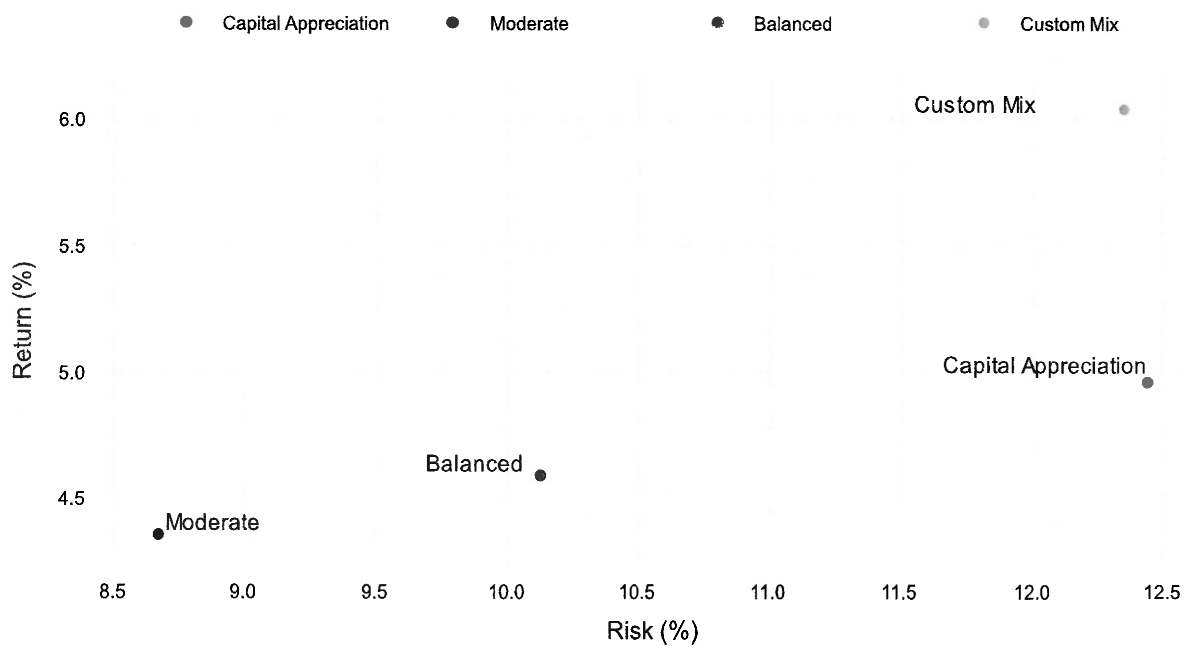
**Asset Allocation Categories**



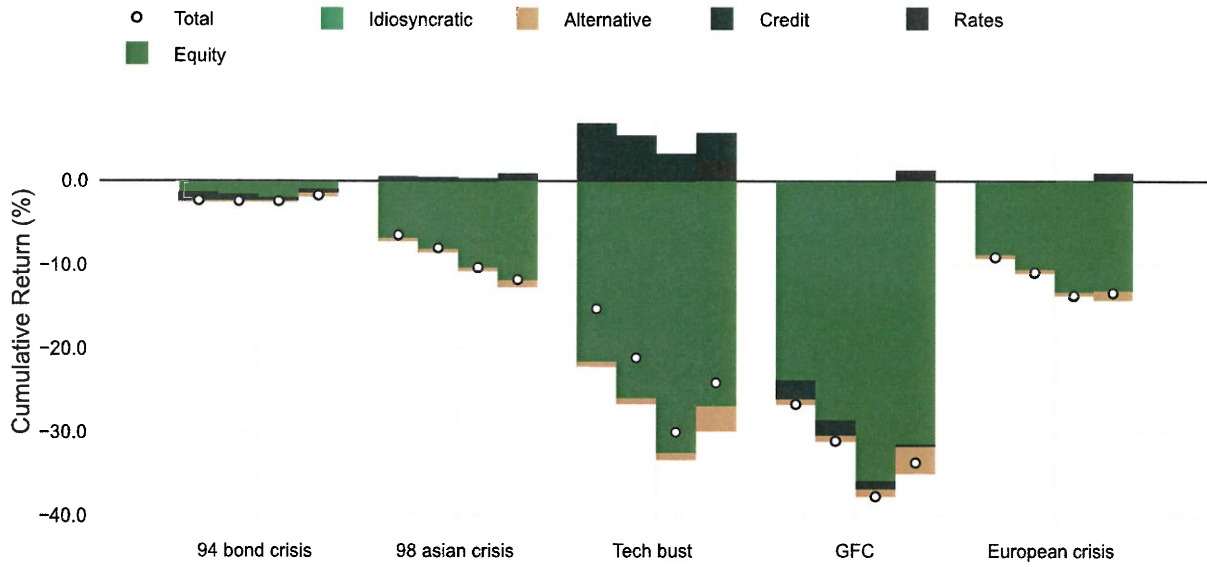
### Expected Returns

Portfolio	3 Year	5 Year	10 Year	Long Run	Volatility
Moderate	4.4%	4.4%	4.4%	4.0%	8.7%
Balanced	4.6%	4.6%	4.7%	4.3%	10.1%
Capital Appreciation	5.0%	5.0%	5.1%	4.7%	12.4%
Custom Mix	6.0%	6.1%	6.2%	5.6%	12.3%

### Risk Reward Relationship



### Stress Test







# CONTRA COSTA COUNTY EMPLOYERS RETIREMENT ASSOCIATION

Proposal for PARS Other Post-Employment Benefits (OPEB) Trust  
November 28, 2018

PUBLIC  
AGENCY  
RETIREMENT  
SERVICES | **PARS**  
TRUSTED SOLUTIONS. LASTING RESULTS.



# PARS TRUST TEAM



## Trust Administrator & Consultant

- Recordkeeping/sub-trust accounting
- Actuarial coordination
- Monitor contributions/process disbursements
- Monitor plan compliance
- Ongoing client liaison

## Trustee

- Safeguard plan assets
- Oversight protection
- Plan fiduciary
- Custodian of assets

## Investment Manager

- Investment sub-advisor to U.S. Bank
- Open architecture
- Investment strategy and asset allocation development
- Investment policy assistance

**34 years** (1984 – 2018)

**155 years** (1863 – 2018)

**99 years** (1919 – 2018)

## Corporate Experience

### Plans Under Administration

1,600+ plans, 850+ public agencies, 400,000+ participants

### Dollars under Administration

Over \$3.3 billion

Over \$5.0 trillion

Over \$15.5 billion under management



# OPEB CLIENT LIST

UPDATED: NOVEMBER 2018

## CITIES & TOWNS

Alameda	Dublin	Lakewood	Pico Rivera	Stanton
Alhambra	Elk Grove	Lemon Grove	Piedmont	Stockton
Atherton	Emeryville	Livermore	Pinole	Taft
Atwater	Escondido	Lodi	Pleasanton	Temecula
Bakersfield	Fairfax	Los Altos Hills	Port Hueneme	Temple City
Bell Gardens	Fountain Valley	Los Gatos	Redding	Tiburon
Beverly Hills	Fullerton	Mammoth Lakes	Redwood City	Tustin
Brisbane	Galt	Manhattan Beach	Rialto	Union City
Camarillo	Glendale	Morgan Hill	Richmond	Upland
Chino Hills	Grass Valley	Napa	Rohnert Park	Vallejo
Colma	Half Moon Bay	National City	Rolling Hills	Villa Park
Commerce	Hemet	Norwalk	Rosemead	West Covina
Coronado	Hercules	Novato	San Leandro	West Sacramento
Covina	Hermosa Beach	Oakley	San Ramon	Woodland
Crescent City	Huntington Beach	Oroville	Santa Ana	Yountville
Cudahy	Indian Wells	Palo Alto	Santa Clara	Yuba City
Cupertino	La Habra	Palmdale	Santa Clarita	Yucca Valley
Daly City	La Verne	Pasadena	Sausalito	
Duarte	Lake Forest	Perris	Solana Beach	

## COUNTIES

Amador	Inyo	Mono	San Benito	Trinity
Calaveras	Kern	Napa	Shasta	Tulare
Colusa	Kings	Nevada	Siskiyou	Yolo
Contra Costa	Lake	Placer	Solano	
Humboldt	Lassen	Plumas	Sonoma	
Imperial	Merced	Riverside	Sutter	

# OPEB CLIENT LIST (CONT.)

UPDATED: NOVEMBER 2018

## SPECIAL DISTRICTS

Alameda County MAD	Housing Authority of the County of Contra Costa	Santa Barbara County Law Library
Beach Cities Health District	Housing Authority of the County of San Bernardino	Santa Cruz Regional 9-1-1
Bodega Bay Public Utility District	Housing Authority of the County of Santa Cruz	South Montebello Irrigation District
Calaveras County Water District	Humboldt Bay Municipal Water District	South Coast Water District
California JPIA	Humboldt No. 1 Fire Protection District	South Orange County Wastewater Authority
California Joint Powers RMA	Menlo Park Fire Protection District	South Placer Fire Protection District
Central Contra Costa Sanitary District	Mesa Water District	Southern Marin Fire Protection District
Central Contra Costa Transit Authority	Metropolitan Transportation Commission	Superior Court of CA, County of Contra Costa
Coastside Fire Protection District	Mid-Peninsula Regional Open Space District	Superior Court of CA, County of Imperial
Contra Costa MVCD	Mid-Peninsula Water District	Superior Court of CA, County of Inyo
Crestline Village Water District	Mojave Desert AQMD	Superior Court of CA, County of Kern
Delta Diablo (Sanitation District)	Montecito Fire Protection District	Superior Court of CA, County of Marin
Desert Recreation District	Monterey Bay Air Resources District	Superior Court of CA, County of Merced
East Bay Regional Park District	Monterey Bay UAPCD	Superior Court of CA, County of Orange
East Contra Costa Fire Protection District	Moraga-Orinda Fire Protection District	Superior Court of CA, County of San Mateo
East Orange County Water District	Municipal Water District of Orange County	Superior Court of CA, County of Shasta
Eastern Sierra Community Services District	Napa County Mosquito Abatement District	Superior Court of CA, County of Siskiyou
El Dorado Hills County Water District	Novato Sanitary District	Superior Court of CA, County of Sonoma
Fallbrook Public Utility District	Orange County	Sweetwater Springs Water District*
Fort Ord Reuse Authority	Mosquito and Vector Control District	Three Valleys Municipal Water District
Fresno Irrigation District	Orange County Water District	Vallejo Flood and Wastewater District
Fresno Metropolitan Flood Control District	Pebble Beach Community Services District	Ventura Regional Sanitation District
Glenn-Colusa Irrigation District	Placer County Resource Conservation District	Walnut Valley Water District
Goleta Cemetery District	Rancho Murrieta Community Services District	West Bay Sanitary District
Goleta West Sanitary District	Rowland Water District	West County Wastewater District
Great Basin Unified APCD	Sacramento Area Flood Control Agency	Western Riverside Council of Governments
Hayward Area Recreation & Park District	San Elijo Joint Powers Authority	Yorba Linda Water District
Hesperia Fire Protection District	San Mateo County MVCD	
Housing Authority of the County of Butte		

# OPEB CLIENT LIST (CONT.)

UPDATED: NOVEMBER 2018

## SCHOOL DISTRICTS

Auburn Union School District	Hesperia Unified School District	San Bruno Park School District
Alta Loma School District	John Swett Unified School District	San Marino Unified School District
Bass Lake Joint Union Elementary School District	Lakeside Union School District	Santa Barbara Unified School District
Bellflower Unified School District	Lemon Grove School District	Santa Rita Union School District
Beverly Hills Unified School District	Madera Unified School District	Trona Joint Unified School District
Calistoga Joint Unified School District	Manteca Unified School District	Twin Rivers Unified School District
Campbell Union High School District	Moreno Valley Unified School District	Visalia Unified School District
Compton Unified School District	Natomas Unified School District	Westside Union School District
Corning Union Elementary School District	Ocean View School District	Whittier City School District
Coronado Unified School District	Ontario-Montclair School District	Wilsona School District
Cotati-Rohnert Park Unified School District	Placer Union High School District	
El Dorado Union High School District	Red Bluff Joint Union High School District	
El Monte Union High School District	Red Bluff Union Elementary School District	
Fontana Unified School District	River Delta Unified School District	
Fowler Unified School District	Riverdale Joint Union School District	

## COMMUNITY COLLEGE DISTRICTS

Grossmont-Cuyamaca CCD  
Imperial CCD  
Marin CCD  
Pasadena CCD  
San Bernardino CCD  
State Center CCD  
Yosemite CCD

## SPECIAL EDUCATION DISTRICTS

Sonoma County Office of Education  
Intelecom

# SECTION 115 TRUST BACKGROUND

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- Section 115 Trusts are used by local governments to fund essential governmental functions (i.e., medical benefits) into an irrevocable trust
- The PARS Trust received the IRS Private Letter Ruling (PLR) in July 2006 to fund OPEB Liabilities for a multiple-employer trust
- Any income derived from a Section 115 Trust is tax exempt
- **Contributions:**
  - Agency has full flexibility in regard to its contribution amounts and timing
  - Funds can be transferred into the trust at any time
- **Once contributions are placed into the PARS Trust, assets from the Trust can be used for specific benefit plan purposes including:**
  - Reimbursing the Agency for retiree health costs
  - Transferring assets directly to the provider providing OPEB benefits
  - Paying plan expenses (actuarial valuation or audit)

# COMPREHENSIVE “TURN-KEY” PROGRAM

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Trustee Services	Distribution Processing
Investment Management	Ongoing Compliance Monitoring
Annual Program Reviews	Document Preparation
Funding & Contribution Processing	Consulting/Analytical Services
Annual Trust-wide Audit	Assistance with Retirement Committee (if necessary)
Investment Guidelines Document	Full-service Program



# OPEB ACTUARIAL RESULTS

Valuation Date: January 1, 2017	Pay-as-you-Go Discount Rate: 3.75%	Percent Change	Prefunding Discount Rate: 7.00%
Actuarial Accrued Liability (AAL)	\$7,568,000	30-36% ▼	?
Actuarial Value of Assets	\$0	--	\$0
Unfunded Actuarial Accrued Liability (UAAL)	\$7,568,000	30-36% ▼	?
Annual Required Contribution (ARC) for FYE 2017	\$858,000	30-36% ▼	?
Annual Benefit Payments (Pay-as-you-Go) for FYE 2018	\$120,000	--	\$120,000

**Rule of thumb:** For every one percent increase in the discount rate, the unfunded liability is lowered by 10-12%.

# ADVANTAGES OF THE PARS TRUST

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## SECURITY

- Strong trustee — U.S. Bank — 5th largest commercial bank in the nation
- Discretionary trustee — highest level of fiduciary protection
- IRS Private Letter Ruling of PARS Combination Trust and compliance with CA Government Code – *Multiple Employer Trust*

## FLEXIBILITY

- Investments — 10 asset allocation strategies — 5 active/5 index – *Individual accounts available*
- Senior Portfolio Manager will make recommendation and assist with Investment Policy Statement (IPS)
- Termination — 90-days out with no fees incurred or immediate with funds transfer to underlying system
- There are *no requirements* to join an external Board of Authority

## EFFICIENCY

- Easy to adopt master trust
- Signature-ready, legally vetted documents
- Streamlined process (implementation within 30 days or less)
- Agency receives personalized monthly statements with their specific account activity

## SCALE/SERVICE

- Economies of Scale — Combined asset growth without risk-sharing; using lower cost institutional funds and pooled investing
- Simple Fee Structure — Asset based, fee schedule declines as assets grow, *no minimum fees*
- Personal service — PARS Consultant & HighMark Capital Management Senior Portfolio Manager dedicated to the Agency

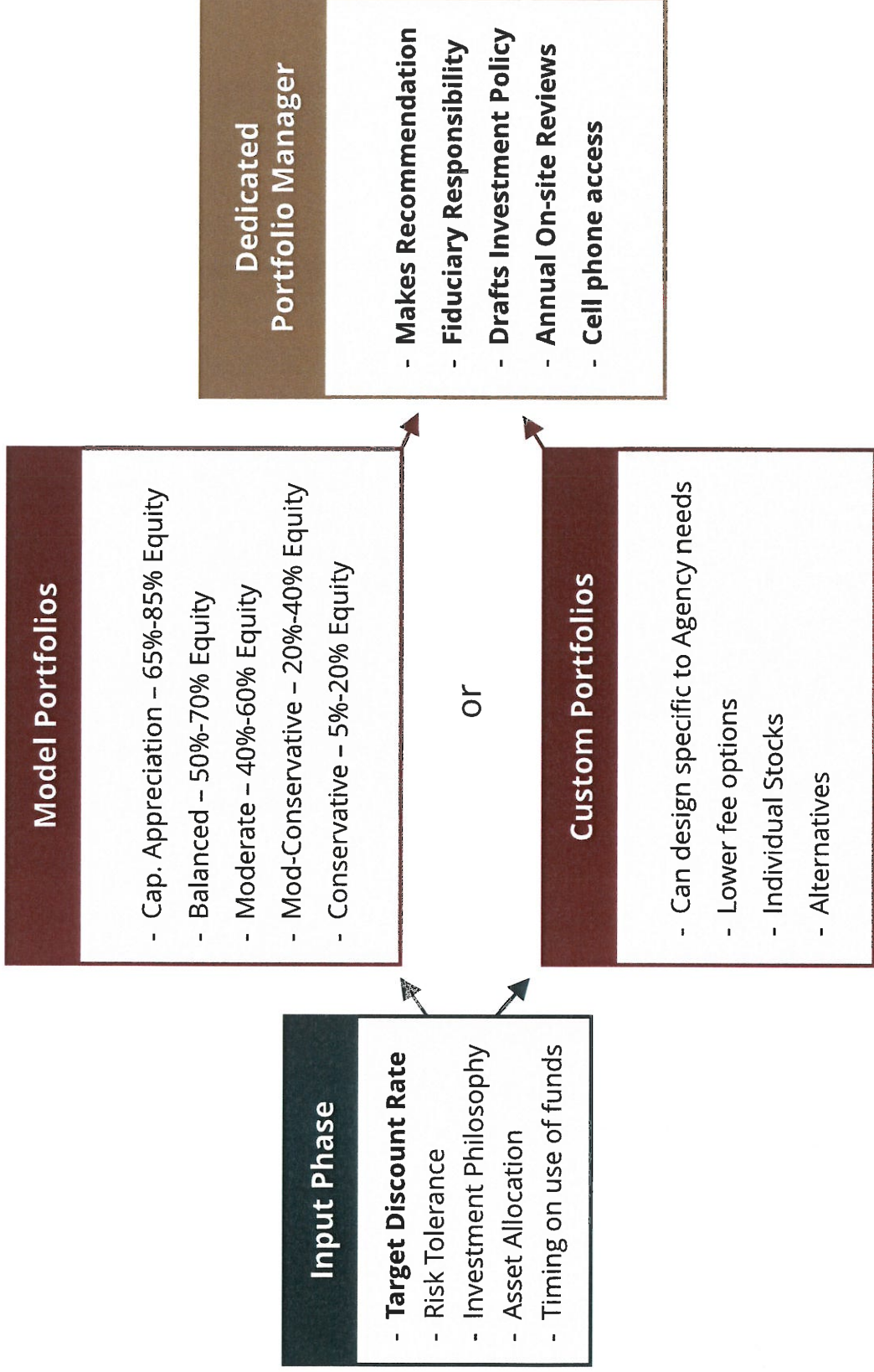


# ADVANTAGES OF PROGRAM

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- 1 Greater investment performance net of all fees (7.88% over 5 years; Capital Appreciation Strategy)
- 2 Dedicated Portfolio Manager with onsite reviews, investment policy assistance and cell phone access
- 3 PARS can reimburse up to 2 years of OPEB expenses
- 4 Choice of 5 risk tolerance levels (active or passive platforms) or custom
- 5 Transparency of holdings; HighMark discloses individual holdings and their percentages by asset class
- 6 PARS conducts a SOC-1 audit of internal organizational controls

# SIMPLE BUT FLEXIBLE INVESTMENT APPROACH



# About HighMark Capital Management, Inc.

## LONGEVITY

Managing assets for clients since **1919\***

## TALENT

- 44** investment professionals
- 27** professionals hold the Chartered Financial Analyst® (CFA) designation
- 23** years average industry experience

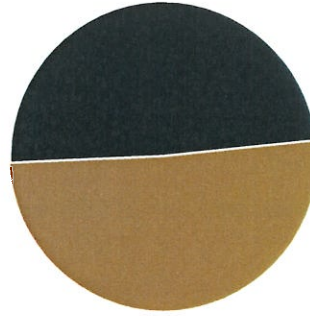
## STABILITY

Investment boutique structure headquartered in San Francisco backed by global strength within MUFG Union Bank, N.A. and Mitsubishi UFJ Financial Group

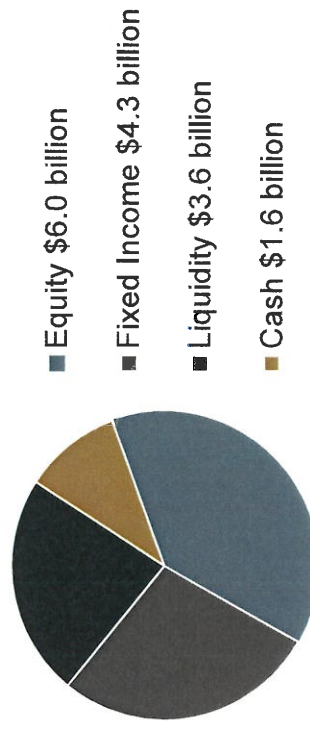
## ASSETS UNDER MANAGEMENT AND ADVISEMENT\*\*

\$15.5 billion as of 9/30/2018

Client Base



Asset Class



\* Includes predecessor organizations. HighMark Capital Management, Inc. registered with the SEC as an investment adviser on August 7, 1998.  
 \*\* Assets under management ("AUM") include assets for which HighMark provides continuous and regular supervisory and management services.  
 Assets under advisement ("AUA") include assets for which HighMark provides certain investment advisory services (including, but not limited to, investment research and strategies) for client assets of its parent company, MUFG Union Bank, N.A.

# Disciplined Investment Process

Your Plan's Portfolio Manager is supported by deep investment resources and unique processes.

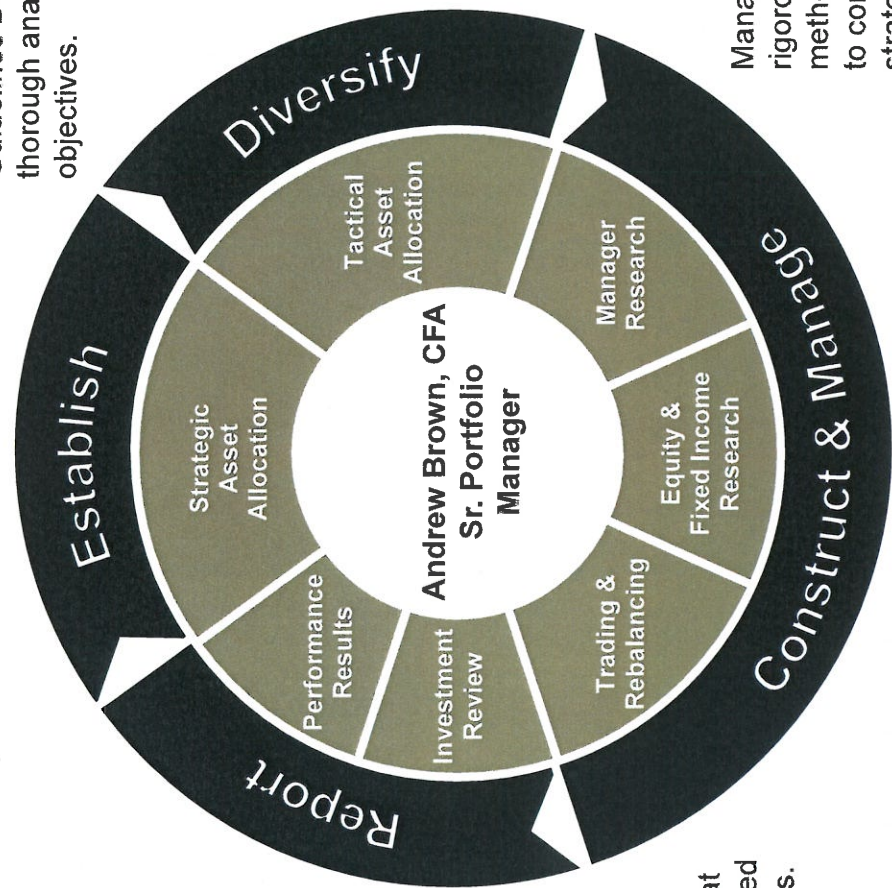
Regular investment & performance reports, as well as contact with your account portfolio manager, helps to keep you informed.

We typically invest in share classes that offer the lowest expense ratio available for that fund, which is typically reserved for larger institutional investors.

Your portfolio's strategic asset allocation policy is established in your Investment Guidelines Document (IGD) after a thorough analysis of your needs and objectives.

Asset Allocation Committee (AAC) employs a multi-factor approach to establish long-term strategic asset allocation ranges as well as provide tactical diversification guidelines in an effort to capitalize on short-term market opportunities.

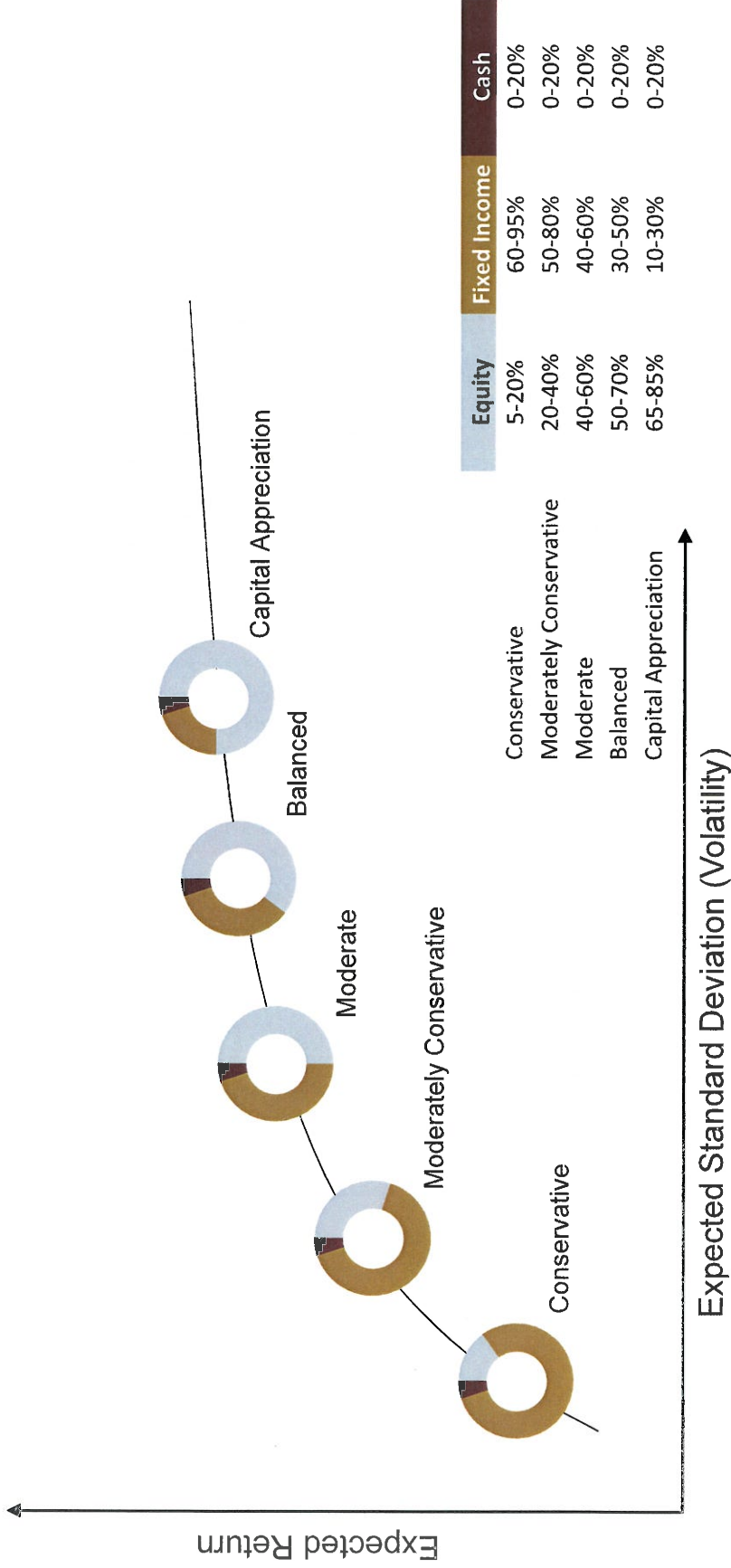
Manager Research Group utilizes rigorous due diligence methodologies to provide access to competitive externally managed strategies and index-based funds.





## Establish: Determine your Strategic Asset Allocation Strategy

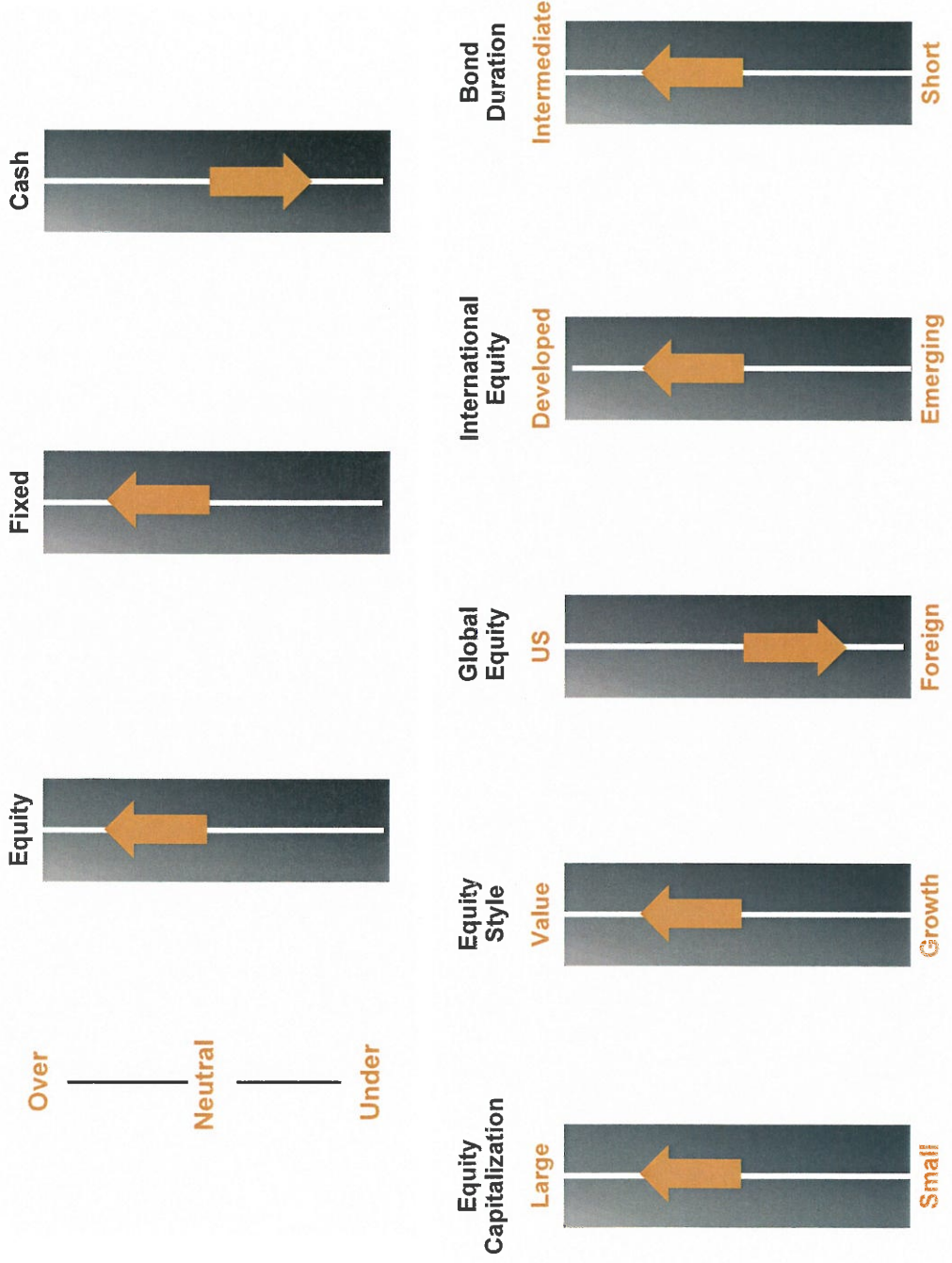
Efficient frontier of portfolios with varying ranges of equities and fixed income



Each Investment Objective reflects the associated PARS Diversified Portfolio as of 9/30/2018. A client's portfolio construction may vary depending on the client's investment needs, objectives, and restrictions as well as the prevailing market conditions at the time of investment.

# Diversify: Tactical Asset Allocation

What are we favoring today in PARS Diversified Portfolios?



# HIGHMARK CAPITAL MANAGEMENT RETURNS

RETURNS AS OF SEPTEMBER 30, 2018

	Equity (%)	1 Year	3 Years	5 Years
Capital Appreciation	65-85%	9.41%	11.35%	8.47%
Balanced	50-70%	7.44%	9.53%	7.14%
Moderate	40-60%	5.93%	8.21%	6.30%
Moderately Conservative	20-40%	3.18%	5.64%	4.62%
Conservative	5-20%	1.25%	3.76%	3.35%

\* Past performance does not guarantee future results



# NET PERFORMANCE FEE ANALYSIS

RETURNS AS OF SEPTEMBER 30, 2018

Over 1 Year			
PARS/HighMark Capital Appreciation (22% Fixed Income)	9.41%	CalPERS CERBT Strategy 1 (27% Fixed Income)	6.28%
Minus Weighted PARS Admin Fee	(-) 0.25%	Minus Fees	(-) 0.10%
Minus Weighted HM Investment Management Fee*	(-) 0.34%		
<b>1-Year Net Return</b>	<b>8.82%</b>	<b>1-Year Net Return</b>	<b>6.18%</b>
Over 3 Years			
PARS/HighMark Capital Appreciation (22% Fixed Income)	11.35%	CalPERS CERBT Strategy 1 (27% Fixed Income)	9.40%
Minus Weighted PARS Admin Fee	(-) 0.25%	Minus Fees	(-) 0.10%
Minus Weighted HM Investment Management Fee*	(-) 0.34%		
<b>3-Year Net Return</b>	<b>10.76%</b>	<b>3-Year Net Return</b>	<b>9.30%</b>
Over 5 Years			
PARS/HighMark Capital Appreciation (22% Fixed Income)	8.47%	CalPERS CERBT Strategy 1 (27% Fixed Income)	6.63%
Minus Weighted PARS Admin Fee	(-) 0.25%	Minus Fees	(-) 0.10%
Minus Weighted HM Investment Management Fee*	(-) 0.34%		
<b>5-Year Net Return</b>	<b>7.88%</b>	<b>5-Year Net Return</b>	<b>6.53%</b>

\* Utilizing 9/30/18 Fee Schedule

\*\* Subject to change due to rebalancing.

\*\*\* Past performance does not guarantee future results.



# PROGRAM FEES

## Trust Administration/Consulting Fees\*

Plan Set-Up Fee:	Ongoing Fees:
None	0.25% for assets \$0-10 million
	0.20% for assets \$10-15 million
	0.15% for assets \$15-50 million
	0.10% for assets over \$50 million



## Discretionary Trustee/Investment Management Fees\*

Plan Set-Up Fee:	Ongoing Fees:
None	0.35%* for assets under \$5 million
	0.25% for assets \$5-10 million
	0.20% for assets \$10-15 million
	0.15% for assets \$15-50 million
	0.10% for assets over \$50 million



\* PARS does not receive any compensation from the investments or any commissions, back-end loads, or any other forms of compensation.  
 \*\* Fees as of September 30, 2018. Subject to change due to rebalancing.

# KEY PARS PROGRAM ADVANTAGES

---

- 1 IRS-approved trust structure which protects the Agency from Day 1 of prefunding
- 2 Over 250 OPEB client agencies
- 3 Low cost prefunding solution with economies of scale and low investment fees
- 4 No start-up costs
- 5 No minimum annual fees
- 6 No fees charged until assets are in trust
- 7 No trading fees
- 8 No termination fees or restrictions
- 9 Historical return information over 1, 3, 5 and 10 year periods
- 10 Five (5) risk tolerance portfolios that can be either actively or passively managed in addition to a customized portfolio option

# CONTACTS

---

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Executive Vice President

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## ANDREW BROWN

Senior Portfolio Manager

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(415) 705-7605



Meeting Date  
**11/28/18**  
Agenda Item  
**#7**

## ***MEMORANDUM***

Date: November 28, 2018  
To: CCCERA Board of Retirement  
From: Gail Strohl, Chief Executive Officer  
Subject: Consider and take possible action to authorize the CEO to execute a contract for actuarial consulting services.

---

### ***Background***

On September 26, 2018, the Board approved the issuance of a RFP for actuarial consulting and actuarial audit services. The RFP was issued on September 28, 2018. There were three firms that responded for consideration of actuarial consulting services. It is anticipated that an actuarial audit recommendation will be provided at a future Board meeting.

The three firms that responded for actuarial consulting services are:

- Segal Consulting
- Milliman
- Cheiron

The evaluation committee, comprised of the CEO, Deputy CEO and Accounting Manager, reviewed proposals to determine which firms most closely met or exceeded the requirements as set forth in the RFP. It was determined that Segal Consulting and Cheiron would be the selected finalists. Amongst the other qualifications, out of the twenty 1937 Act retirement systems, Segal Consulting works with twelve plans and Cheiron works with six plans.

The evaluation committee conducted interviews with Segal Consulting and Cheiron. These interviews covered information requested in the RFP, such as the proposed team and relevant experience and qualifications. Both interviews were strong, however since the selected actuarial firm will provide consulting services to both staff and the Board, it is important that the Board has an opportunity to provide input.

**Segal Consulting**

Segal Consulting began offering actuarial services in 1954 and operates in 25 cities across the US and Canada.

The proposed team from Segal Consulting is Paul Angelo, FSA, MCAA, FCA, EA as principal and lead actuary and John Monroe, ASA, MAAA, EA as supervising actuary. Since 2003, Segal Consulting has served as actuarial consultant to CCCERA. They have assisted CCCERA with the depooling process, implementation of PEPRA and compliance with GASB 67/68. One of Segal’s advantages is how the principal and supervising actuaries possess CCCERA institutional knowledge that is helpful at times when reviewing past practice. The proposed fixed fees and hourly rates for additional work are as follows:

<b>Segal Consulting Service Costs</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
Actuarial Valuation	\$107,500	\$110,000	\$112,500
GASB 67 Valuation	\$15,500	\$16,000	\$16,500
GASB 68 Valuation	\$29,000	\$30,000	\$31,000
Triennial Experience and Assumptions Study	\$65,000	N/A	N/A
Actuarial Consulting (retainer fee)	\$16,000	\$16,000	\$16,000
<b>Total Fixed Fees</b>	<b>\$233,000</b>	<b>\$172,000</b>	<b>\$176,000</b>

<b>Hourly Rate for Additional Services</b>	<b>Hourly Rate</b>		
<b>Class of Personnel</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
Principal and Lead Actuary	\$520	\$530	\$540
Supervising Actuary	\$480	\$490	\$500
Reviewing Actuary	\$450	\$460	\$470
Senior Actuarial Analysts	\$350-\$440	\$360-\$450	\$370-\$460
Actuarial Analysts	\$230-\$340	\$240-\$350	\$250-\$360
Compliance Consultant	\$480	\$490	\$500

**Cheiron**

Cheiron was founded in 2003 and employs 64 credentialed actuarial consultants in eight offices nationwide. All of Cheiron’s business is pension and health actuarial consulting services.

The proposed team from Cheiron is William Hallmark, ASA, FCA, MAAA, EA, Anne Harper, FSA, MAAA, EA, and Graham Schmidt, ASA, FCA, MAAA, EA, as co-lead consulting actuaries. One of Cheiron’s advantages is the utilization of models to illustrate projections of potential institutional decisions. They are also able to create customized risk dashboards. The proposed fixed fees and hourly rates for additional work are as follows:

<b>Cheiron Service Costs</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
Actuarial Valuation	\$85,000	\$87,000	\$89,000	\$91,000	\$93,000
GASB 67/68 Valuation	\$15,000	\$15,300	\$15,600	\$15,900	\$16,200
Triennial Experience and Assumptions Study	\$45,000	N/A	N/A	\$47,750	N/A
Actuarial Consulting (retainer fee)	\$16,000	\$16,400	\$16,800	\$17,200	\$17,600
<b>Total Fixed Fees</b>	<b>\$161,000</b>	<b>\$118,700</b>	<b>\$121,400</b>	<b>\$171,850</b>	<b>\$126,800</b>

<b>Hourly Rate for Additional Services</b>	<b>Hourly Rate</b>				
<b>Class of Personnel</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
Principal Consulting Actuaries	\$367-\$508	\$376-\$521	\$385-\$534	\$395-\$547	\$405-\$561
Consulting Actuaries	\$282-\$438	\$289-\$449	\$296-\$460	\$303-\$472	\$311-\$484
Associate Actuaries	\$185-\$292	\$190-\$299	\$195-\$306	\$200-\$314	\$205-\$322
Senior Actuarial Analysts	\$175-\$219	\$179-\$224	\$183-\$230	\$188-\$236	\$193-\$242
Actuarial Analysts	\$154-\$195	\$158-\$200	\$162-\$205	\$166-\$210	\$170-\$215
Administrative Staff	\$105-\$114	\$108-\$117	\$111-\$120	\$114-\$123	\$117-\$126

### **Services and Costs**

The actuary is one of CCCERA's core providers responsible for the annual actuarial valuation report, triennial experience study and other various critical activities fundamental to CCCERA's operations. As a public agency, it is a prudent practice and a value oriented exercise to regularly review the marketplace for providers in this space and identify the services currently available and the costs associated with such services.

CCCERA is a complex defined benefit plan with twelve cost groups. Great care is taken in consideration of possible providers for actuarial services. It is anticipated that both actuarial firms, Segal Consulting and Cheiron, would serve CCCERA well. There are slight differences in strengths and also differences in costs. The provider search is comprehensive in nature in that one attribute is not necessarily weighted higher than the other. CCCERA has undertaken a careful and thoughtful process, which includes the Board's review and consideration of the selected finalists.

### ***Recommendation***

Consider and take possible action to authorize the CEO to execute a contract for actuarial consulting services.





# PROPOSAL TO PROVIDE ACTUARIAL CONSULTING SERVICES

**Contra Costa County Employees'  
Retirement Association**

**November 28, 2018 | Concord**

<i>Meeting Date</i> <b>11/28/18</b>
<i>Agenda Item</i> <b>#7a.</b>

 Segal Consulting



# Introductions and Presentation Objectives

---

- **Segal presenters:**
  - **Paul Angelo**, FSA, MAAA, FCA, EA  
Senior Vice President & Actuary
  - **John Monroe**, ASA, MAAA, EA  
Vice President & Actuary
  - **Eva Yum**, FSA, MAAA, FCIA, EA  
Senior Actuary
  - **Alfred Wang**, FSA, MAAA, EA  
Associate Actuarial Consultant
  - **Emily Klare**, ASA  
Associate Actuarial Consultant
- **Today's presentation:**
  - Segal's CCCERA Team
  - Segal's Distinguishing Features
  - Milestone Projects Completed for CCCERA
  - Additional Services Available to CCCERA
  - Why Segal, Questions and Discussion

# Segal's CCCERA Team

## Principal Actuary

- Paul Angelo, FSA, MAAA, FCA, EA**
- Serving CCCERA since 2003
  - Statewide reputation as communicator
  - Front line action:
    - OCERS
    - SDCERA
    - Many other 1937 Act County Retirement Systems
  - Strategic advisor
    - Funding Policy
  - Primary Presenter

## Supervising Actuary

- John Monroe, ASA, MAAA, EA**
- Serving CCCERA since 2003
  - Front line action:
    - University of California Retirement Plan
    - 1937 Act County Retirement Systems
  - Supervise Pension valuations
  - Day-to-day contact and Final Reviewer

## Reviewing Actuary

- Eva Yum, FSA, MAAA, FCIA, EA**
- Serving CCCERA since 2009
  - Valuation experience:
    - SDCERA
    - ACERA
    - LA Fire & Police
    - LA Water & Power
  - Reviews all work performed
  - Member SOA Retirement Plans Experience Committee

## Actuarial Analysts

- Alfred Wang, FSA, MAAA, EA**
- Serving CCCERA since 2012
  - Valuation experience:
    - OCERS
    - 5 other 1937 Act County Systems
- Emily Klare, ASA**
- Valuation experience:
    - CCCERA
    - SCERA
    - UC Retirement Plan
    - LA Fire & Police

# Segal's Distinguishing Features

---

- **Extensive experience as consulting actuary for public sector retirement systems**
  - Principal and Supervising Actuaries' long-term experience with Contra Costa County Employees' Retirement Association
  - 1937 Act County Employees Retirement Systems
    - Valuation actuary for 12 systems
- **Demonstrated capacity to meet deadlines and deliverables**
- **Superior communication skills of principal actuary**
  - Frequent speaker at SACRS, CALAPRS, NASRA, NCPERS etc.
  - We bring these skills to our clients through presentations at meetings
- **Commitment to public sector pension systems**
  - “Financial Economics” (“MVL”) and “DB vs DC” controversies
  - GASB, GFOA and state/national actuarial committees
    - Model funding policies based on Segal’s work with California systems
  - Society of Actuaries Retirement Plans Experience Committee
    - New mortality tables based on public plan experience



# Milestone Projects Completed for CCCERA

---

## ➤ **Depooling studies and other changes to cost structure**

- Involved specific data gathering and calculations, multiple meetings
  - Resulted in the twelve cost groups in place today
  - One of the most complicated cost structures of any 1937 Act County system
- Leave cashout methodology for employer and employee contribution rates
- Numerous new tiers, including those created by CalPEPRA

## ➤ **Funding policy design and review**

- Asset smoothing review after 2008 market downturn
- Reviews of UAAL amortization policies, reflecting emerging guidance
  - Avoiding negative amortization for new UAAL layers

## ➤ **Changes in GASB accounting and financial reporting**

- Statement 67 pension plan financial reporting
- Statement 68 employer financial reporting
  - Coordinating with plan staff and auditor and other parties
- New report formats regarded as best in industry by audit firms

# Additional Services Available to CCCERA

---

- **Segal's consulting focus is principles based**
  - Deterministic illustrations of current and proposed policies
  - For example, new UAAL layered amortization bar charts
- **Segal can provide full range of quantitative analytical tools**
  - Scenario and stress testing
  - Assumption sensitivity
  - Stochastic modeling
- **Possible application: Quantitative risk assessments**
  - Suggested (not required) under new Actuarial Standard of Practice (ASOP) 51
  - Illustrate risk of future experience differing from assumed experience
  - Example: current cost projections for employers only show expected results
    - Could show effect of one year of investment gain or loss



## **Why Segal?**

---

- Extensive experience with CCCERA and other public retirement plans
- Demonstrated local capacity and responsiveness
- Proven communicators
- Independence and stability
- California public sector specialists
- Commitment to public sector





# Questions and Discussion

 **Segal Consulting**

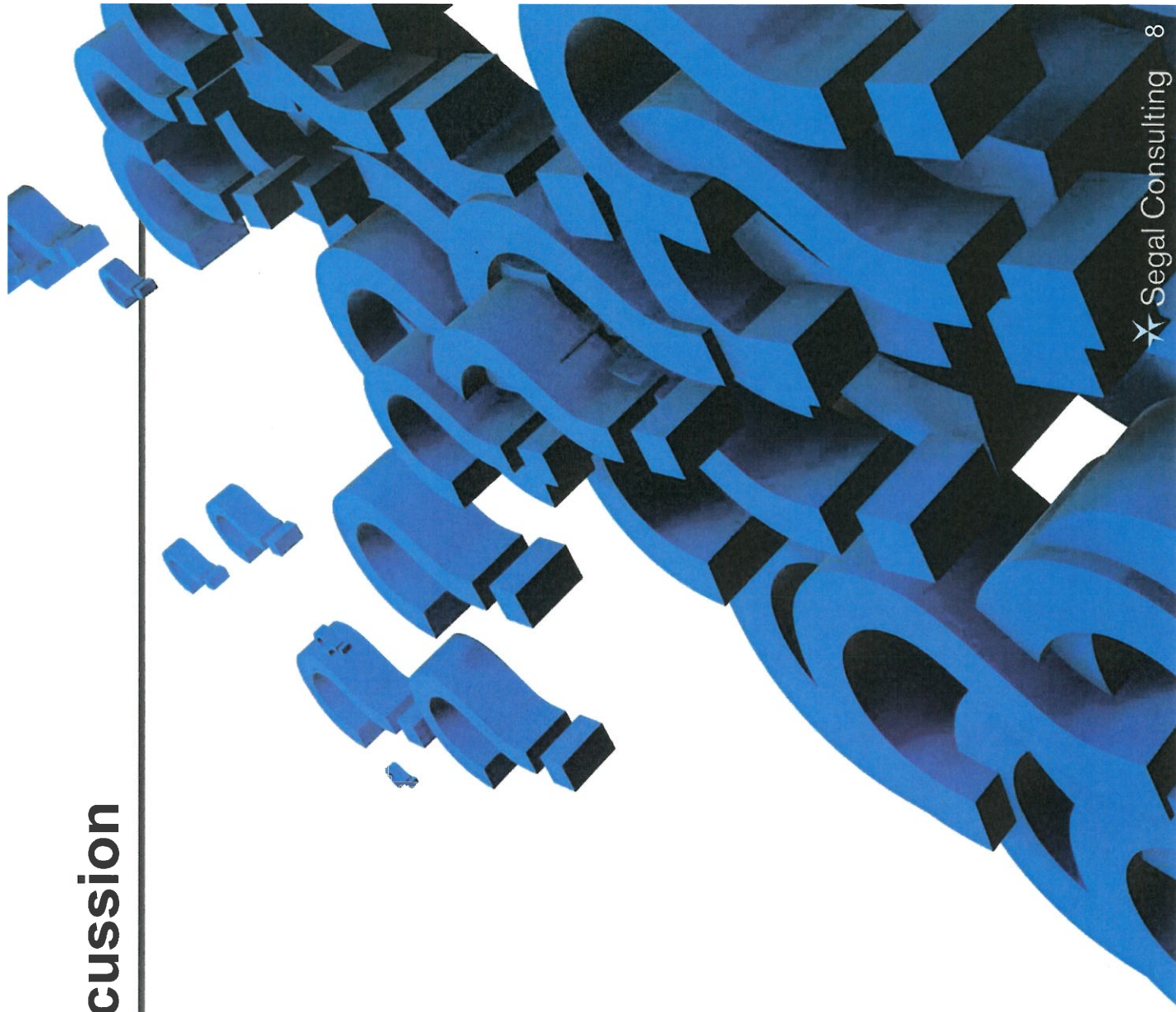
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*SVP and Actuary*  
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415-263-8273

 **Segal Consulting**

**John Monroe,**  
**ASA, MAAA, EA**  
*VP and Actuary*  
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415-263-8260

 **Segal Consulting**

**Eva Yum,**  
**FSA, MAAA, FCIA, EA**  
*Senior Actuary*  
eyum@segalco.com  
415-263-8248



Contra Costa County  
Employees' Retirement  
Association



Classic Values, Innovative Advice

Meeting Date  
**11/28/18**  
Agenda Item  
**#7b.**

# Finalist Presentation

## Proposal to Provide Actuarial Services

November 28, 2018

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



# Topics

- About Cheiron
- Our Staff
- Focus on the Client
- Understanding Risk
- Transition





## About Cheiron



- Formed in 2002 by former Milliman consultants over concerns on liability limitations
- Employee-owned with nine offices nationwide
- Highest percentage of fully credentialed actuaries in the industry
- 100% revenue from actuarial consulting with most clients being public and jointly-trusted pension and health funds
- National reputation for being proactive, responsive, and innovative



# About Cheiron – Public Sector Experience



## Statewide Plans:

- CalPERS
  - CalSTRS
  - Connecticut
  - Delaware
  - Florida
  - Illinois
  - Idaho
  - Kansas
  - Louisiana
  - Maine
  - Maryland
  - Montana
  - New Jersey
  - New York State Teachers
  - Oregon
  - Pennsylvania
  - Rhode Island
  - Texas ERS & TRS
  - Utah
  - Vermont Municipals
  - Washington State Investment Board
  - Washington
  - West Virginia
- Federal:**
- US Army
  - US Court of Appeals
  - US Tax Court
  - US Department of the Treasury

## Local Government Plans:

- Alexandria (VA)
- Allentown (PA)
- Arlington County (VA)
- Baltimore (MD)
- Chesterfield County Schools (VA)
- City of Annapolis (MD)
- City of Hampton (VA)
- City of Los Angeles (CA)
- Chattanooga (TN)
- District of Columbia
- Fairfax County (VA)
- Fresno County (CA)
- Kansas City (MO)
- Los Angeles (LACERS and LAFPP)
- **Marin County (CA)**
- **Merced County (CA)**
- Metropolitan Washington Council of Governments
- Miami (FL)
- Milwaukee County (WI)
- Newport News (VA)
- Norfolk (VA)
- Philadelphia (PA)
- Phoenix (AZ)
- Saint Louis (MO)
- San Diego (CA)
- San Francisco (CA)
- San José (CA)
- **San Joaquin County (CA)**
- San Luis Obispo (CA)
- **Santa Barbara County (CA)**
- **Stanislaus County (CA)**
- **Tulare County (CA)**
- Wichita (KS)
- Wilmington (DE)

## OPEB:

- Arkansas
- Alexandria (VA)
- Annapolis (MD)
- Delaware
- Greater Richmond Transit Company (VA)
- Hampton (VA)
- Knoxville Utilities Board (TN)
- Maine Municipal Employees Health Trust
- Maine Public Employees Retirement System Health and Life Plans
- Multnomah County (OR)
- Norfolk (VA)
- Newport News (VA)
- Oakland (CA)
- Pennsville Township (NJ)
- Philadelphia (PA)
- San Francisco (CA)
- San José (CA)
- Springfield Area Transit Co. (MA)
- US Army Community & Family Support Center
- Vienna (VA)
- Wilmington (DE)
- Westchester Medical Center (NY)



# About Cheiron – Our Mission



*To empower our clients in managing  
their risks by integrating the highest  
qualified staff with the latest  
technologies*



Classic Values, Innovative Advice

November 28, 2018

4



# Our Staff – Proposed Personnel



**Anne Harper**  
Co-Lead Actuary  
San Diego, CA

**Graham Schmidt**  
Co-Lead Actuary  
Oakland, CA

**Bill Hallmark**  
Co-Lead Actuary  
Portland, OR

**Steven Hastings**  
Project Manager  
Seattle, WA

**Steven McElhane**  
Peer Reviewer  
Washington, DC

**Michael Moehle**  
Compliance / Auditing  
Oakland, CA

**Actuarial Support**

**Administrative Support**

- The Co-Lead Actuaries, Project Managers, Special Resources, and Actuarial/Admin Support all have significant experience with '37 Act and other large California systems

# Our Staff – Quality of Our People



- **Highly skilled:**
  - Significant concentration of credentialed actuaries with strong emphasis on achieving full credentials (31 of 55 credentialed actuaries are FSAs and 39 are EAs)
  - All Cheiron consultants are “hands-on” with our technology
- **Reputation for creativity and responsiveness:**
  - Often called on to handle the most challenging and complex assignments
  - At the forefront of understanding and managing risk
- **Keep our clients satisfied:**
  - Strong long-term relationships and communication
  - Dedicated internal actuarial team independently audits our valuations



# Our Staff – Keeping Current and Influential



- We dedicate senior staff to thought-leadership positions in our industry
  - Graham Schmidt – California Actuarial Advisory Panel
  - Bill Hallmark – Prior Vice President of Pensions, American Academy of Actuaries, prior chair of Public Plans Committee
  - Stephen McElhaney – Pension Committee of the Actuarial Standards Board
  - Ken Kent – Prior Vice President of Professionalism, American Academy of Actuaries, prior chair of Public Plans Committee
- Cheiron actuaries are regular speakers at conferences sponsored by SACRS, CALAPRS, NASRA, NCTR, etc.
- Cheiron actuaries regularly testify before federal entities (such as Congress, GASB, IRS, DOL, and GAO)
- Jim Holland, our Chief Research Actuary (and former Chief Pension Actuary at the IRS), monitors government regulations and pronouncements with respect to pension and health matters, and coordinates the issuance of Cheiron’s Alerts and Advisories



# Focus on the Client



- Our objective is for the Board and staff to understand the dynamics of the system so that we can provide services tailored to your needs
  - Experience with complex plans similar to CCCERA
    - MarinCERA: 42 (and counting) cost groups, 10 employers
    - StanCERA: Functionally Focused Portfolio (FFP)
  - Understand how and why rate groups behave differently
    - Can take measures to manage these dynamics
  - Integrate actuarial and investment policies
    - FFP approach makes this even more important

# Focus on the Client



- Projections used to communicate expectations
  - Customizable
    - Ex: Separate analysis for each rate group
  - Sensitivity to different economic scenarios so potential range of outcomes can be understood
    - Easy to update as investment returns are known (provide System access through on-line portal)
  - Stress testing of benefits and liabilities also incorporated into the model
    - Emphasis on cash-flow requirements



# P-Scan and R-Scan



## Stress Testing

P-scan

Baseline  
 Historical  
 1930

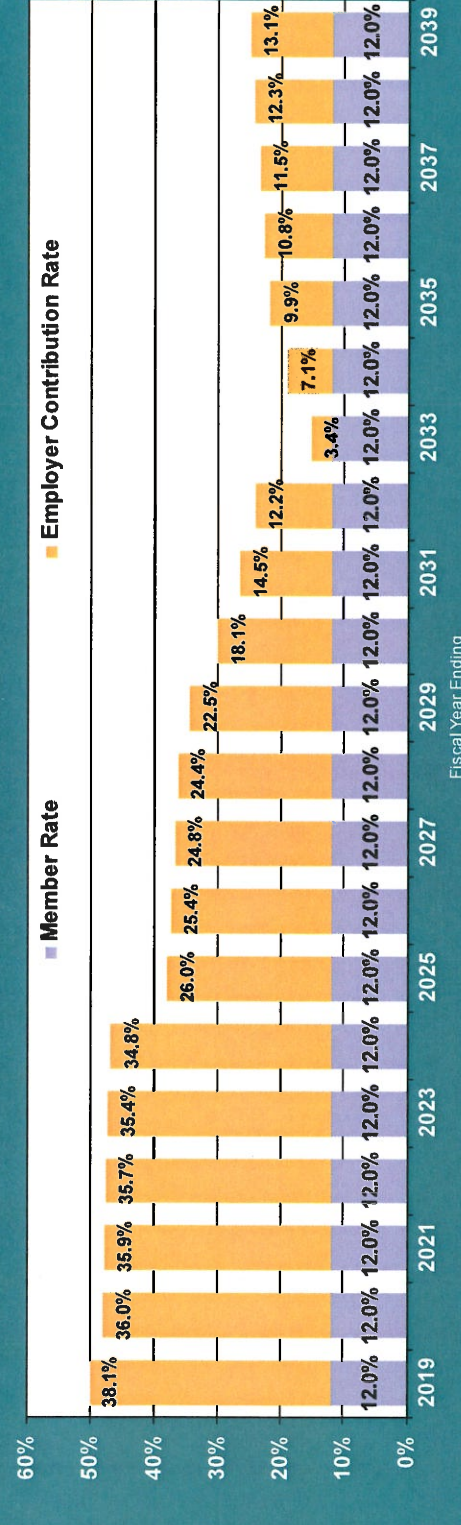
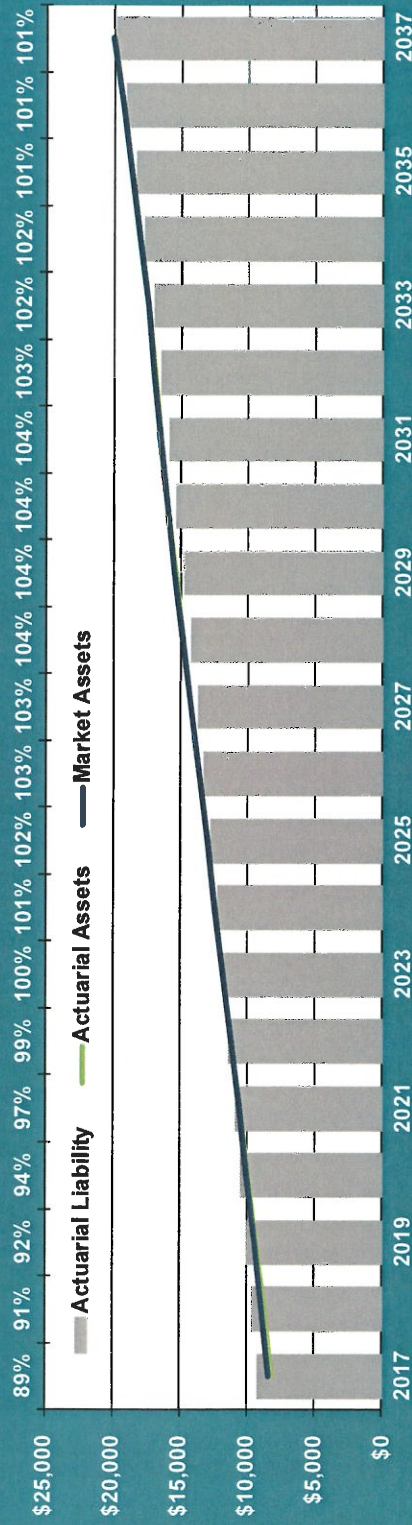
2017	7.00%
2018	7.00%
2019	7.00%
2020	7.00%
2021	7.00%
2022	7.00%
2023	7.00%
2024	7.00%
2025	7.00%
2026	7.00%
2027	7.00%
2028	7.00%
2029	7.00%
2030	7.00%
2031	7.00%
2032	7.00%
2033	7.00%
2034	7.00%
2035	7.00%
2036	7.00%
Avg	7.00%

Asset Smooth Period	5
Asset corridor	1%
Future Amortization Period	14
Phase-In/Out Period	5

CCERA  
Total

Group

Future Amortization Period	14
Phase-In/Out Period	5



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November 28, 2018



# Other Communication Tools





# Other Communication Tools



- PERC Name
- 01-000-1 N Adams County
  - 01-015-3 N1 Biglerville Borough
  - 01-015-3 N2 Biglerville Borough (CB ...
  - 01-015-3 P Biglerville Borough Police
  - 01-019-3 N Carroll Valley Borough
  - 01-019-3 P Carroll Valley Borough Pol...
  - 01-030-3 N East Berlin Borough
  - 01-030-3 P East Berlin Borough Police
  - 01-051-5 N Hamiltonban Township
  - 01-051-5 P Hamiltonban Township P...
  - 01-060-5 N Latmore Township
  - 01-099-3 N York Springs Borough

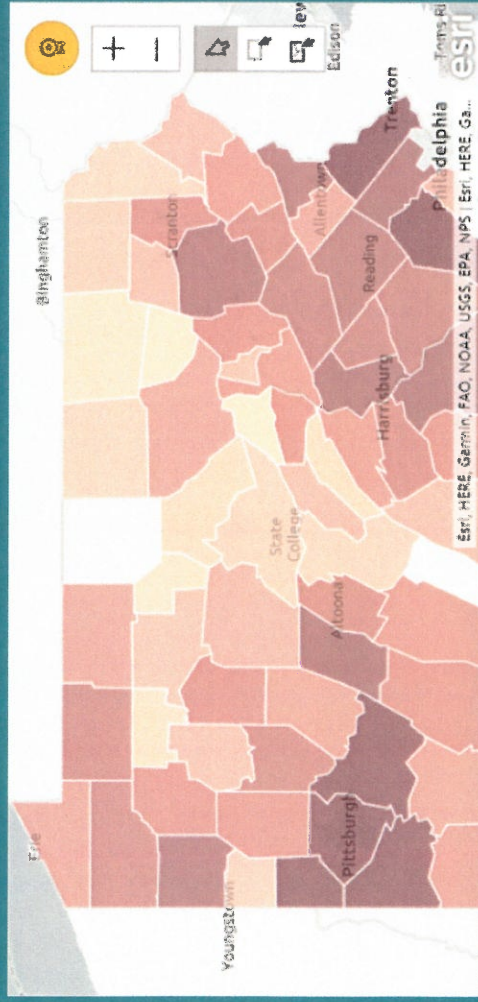
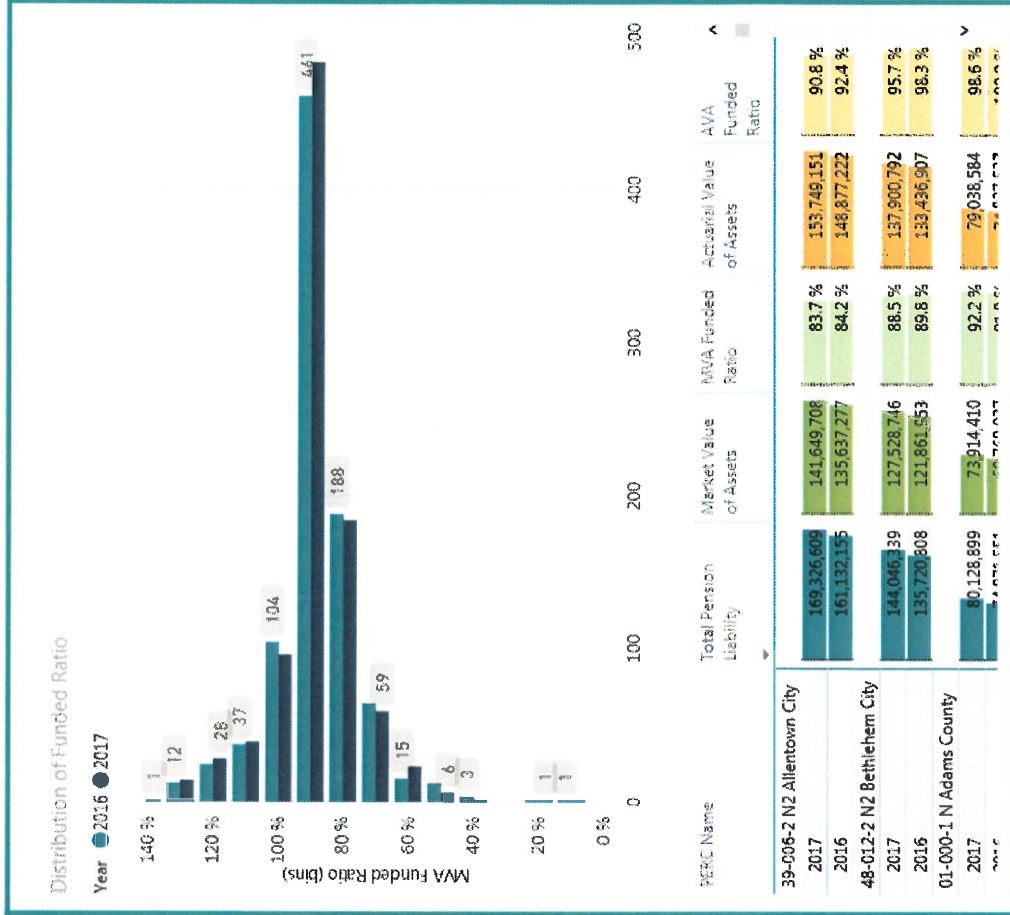
Y Q M W D  
Year



Count of PERC Code by Plan Type



## Comparison of Funded Ratio



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November 28, 2018

12

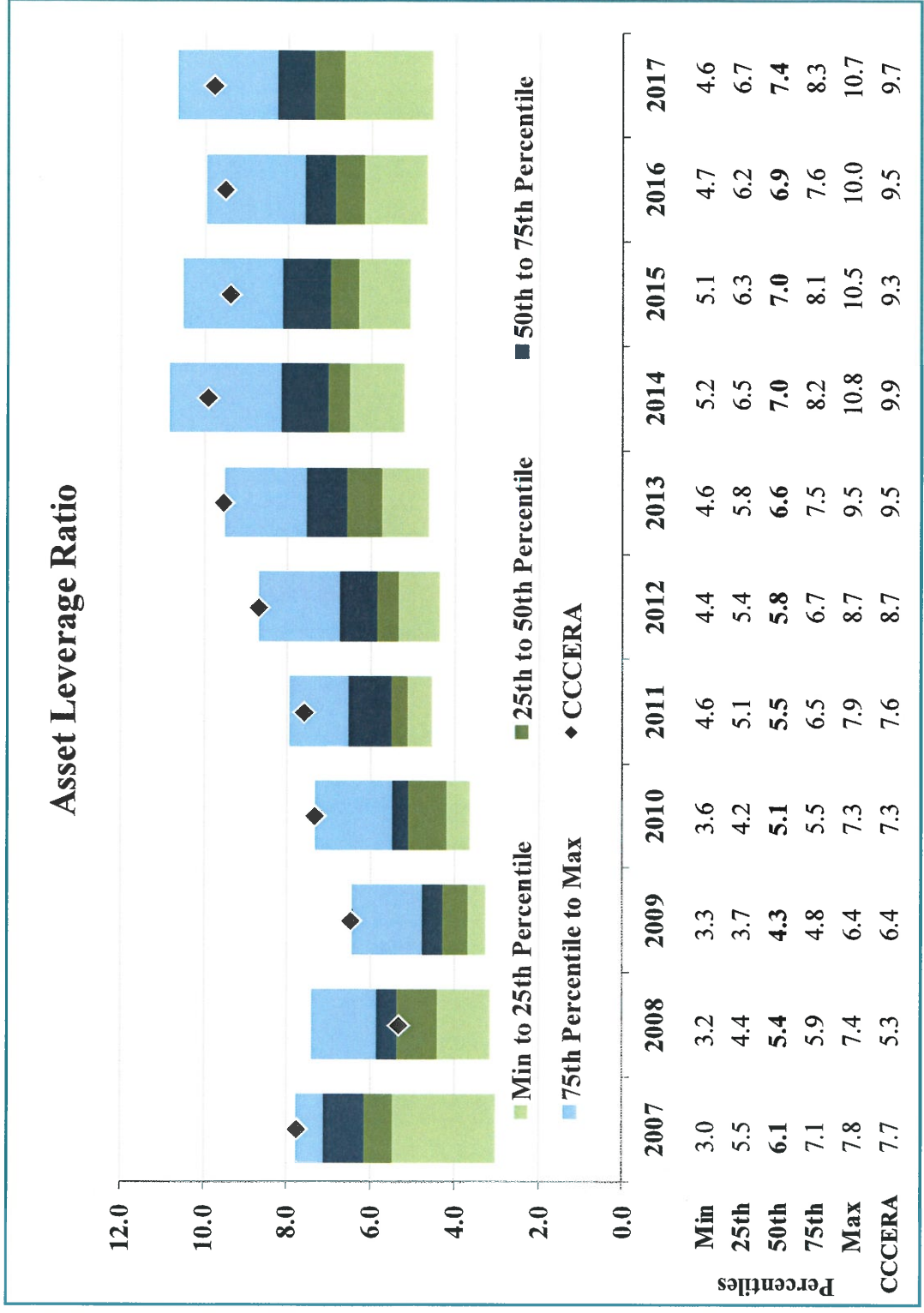


# Emphasis on Risk Management



- Cheiron emphasis on explaining and helping clients to manage risks since day 1
  - Leads the profession in projections, stress testing, simulations, etc.
  - Create customized risk dashboards for our 1937 Act plans and other public systems
  - Strong supporters of the new risk ASOP 51
    - Two of our consultants participated in drafting of the new standard
    - Example of revised section addressing ASOP 51 issues included as part of our RFP submission
    - Recent article on risk maturity provided to clients, to be included in winter SACRS magazine

# Managing Risk



# Monitoring Risk



## SBCERS PENSION PLAN RISK DASHBOARD

Click an icon below to start exploring various risk measures

Investment Risk (Short Term)	Investment Risk (Long Term)	Discount Rate Risk	Inflation Risk
Longevity (Mortality) Risk	Plan Dynamics	Peer Group Comparison I	Peer Group Comparison II





- Replication of Actuarial Valuations
  - Extensive experience replicating Segal '37 Act System valuations
  - Dedicated internal audit team
    - Significant experience replicating valuations for wide variety of public pension plans
    - Supplements capacity of consulting team during transition
- Consulting During Transition
  - Consultants immediately immerse themselves in CCCERA issues and history
  - Important to complete replication as quickly as possible, but use of projection models allows us to address any consulting issues immediately





# CHEIRON



Classic Values, Innovative Advice.

***Cheiron*** (pronounced *ki·ron*), the immortal centaur from Greek mythology, broke away from the pack and was educated by the gods. Cheiron became a mentor to classical Greek heroes, then sacrificed his immortality and was awarded in eternity as the constellation Sagittarius.

# PENSION PLAN RISK DASHBOARD

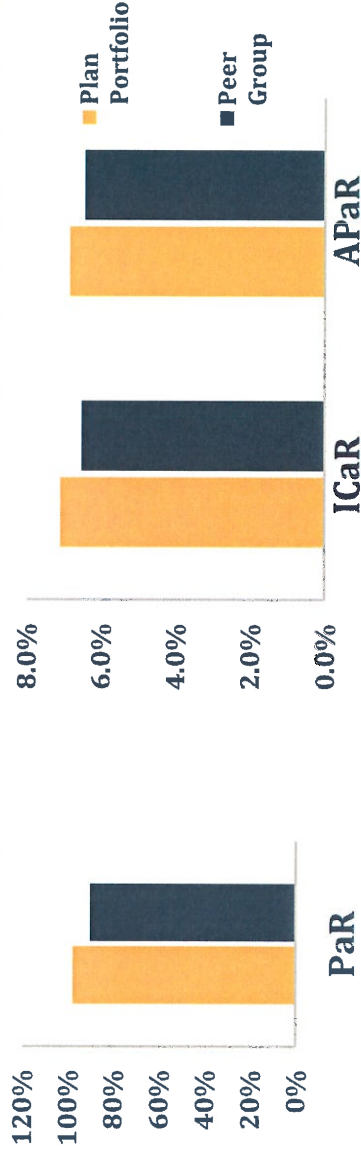
Click an icon below to start exploring various risk measures







# Short-Term Investment Risk



**Payroll at Risk (PaR)**

Allocation	Standard Dev	MVA	Payroll	PaR
Plan Portfolio	12.3%	2,801	352	98%
Peer Group	12.1%	4,864	626	90%

**Interest Cost at Risk (ICaR)**

Allocation	PaR	Discount Rate	Int on UAL	ICaR
Plan Portfolio	98%	7.00%	\$ 24.12	6.9%
Peer Group	90%	7.15%	\$ 41.26	6.4%

**Amortization Payment at Risk (APaR)**

Allocation	PaR	Amort Period	Amort Pay	APaR
Plan Portfolio	98%	19	3.88%	7.1%
Peer Group	90%	19	3.74%	6.5%

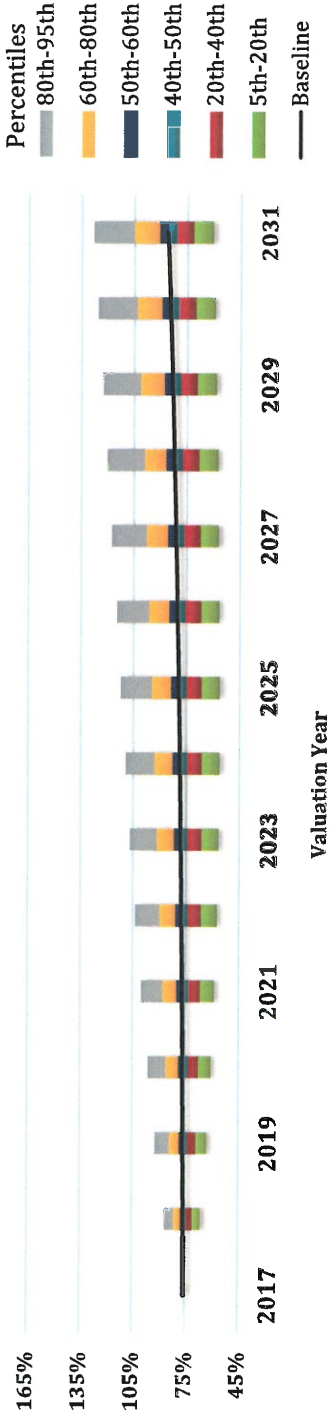


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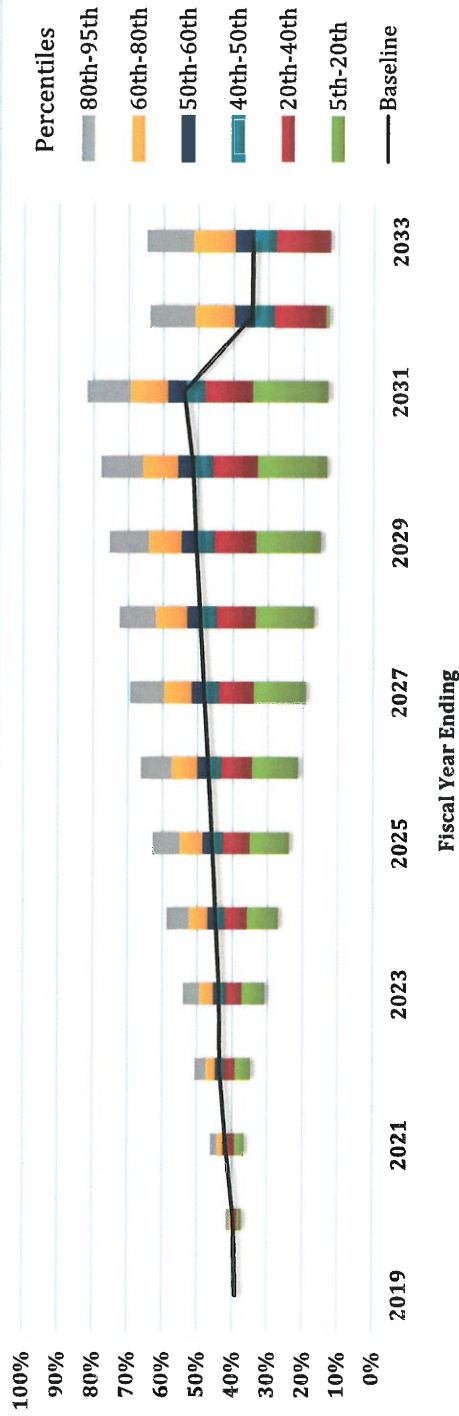
# Long-Term Investment Risk



## FUNDED STATUS ANALYSIS



## CONTRIBUTION RATE ANALYSIS



**7/1/2033**  
END DATE

**5.30%**  
EXPECTED RETURN

**8.70%**  
STANDARD  
DEVIATION





# Discount Rate Risk



Discount Rate	FYE 2019 Contribution Rate	FYE 2023 Ultimate Contribution Rate	Funded Ratio
6.00%	45.6%	59.9%	66%
7.00%	39.1%	42.6%	76%
8.00%	34.1%	27.3%	86%

## DISTRIBUTION OF RETURNS

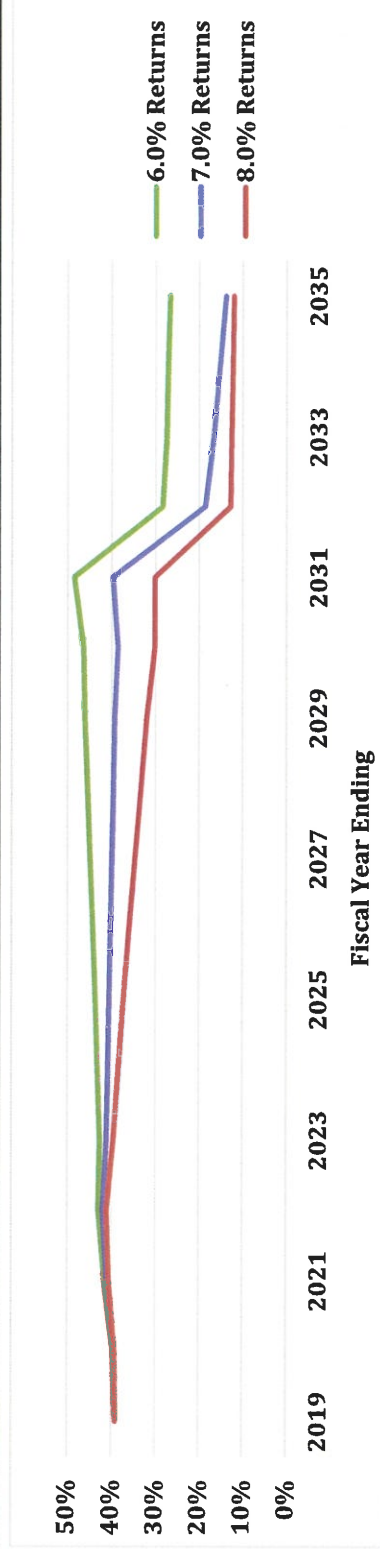
Percentile	Nominal	Real
95%	12.5%	10.0%
75%	8.6%	6.1%
50%	6.0%	3.5%
25%	3.4%	0.9%
5%	-0.1%	-2.6%

40% Probability of Achieving a 7.00% Nominal Return

42% Probability of Achieving a 4.25% Real Return

<b>7.00%</b> Expected Nominal Return (Actuarial Assumption)
<b>4.25%</b> Expected Real Return (Actuarial Assumption)
<b>6.00%</b> Expected Nominal Return (Investment Consultant)
<b>3.50%</b> Expected Real Return (Investment Consultant)

## PROJECTED CONTRIBUTION WITH 7.0% DISCOUNT RATE, WITH +/-1% ANNUAL RETURNS





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# Inflation Risk

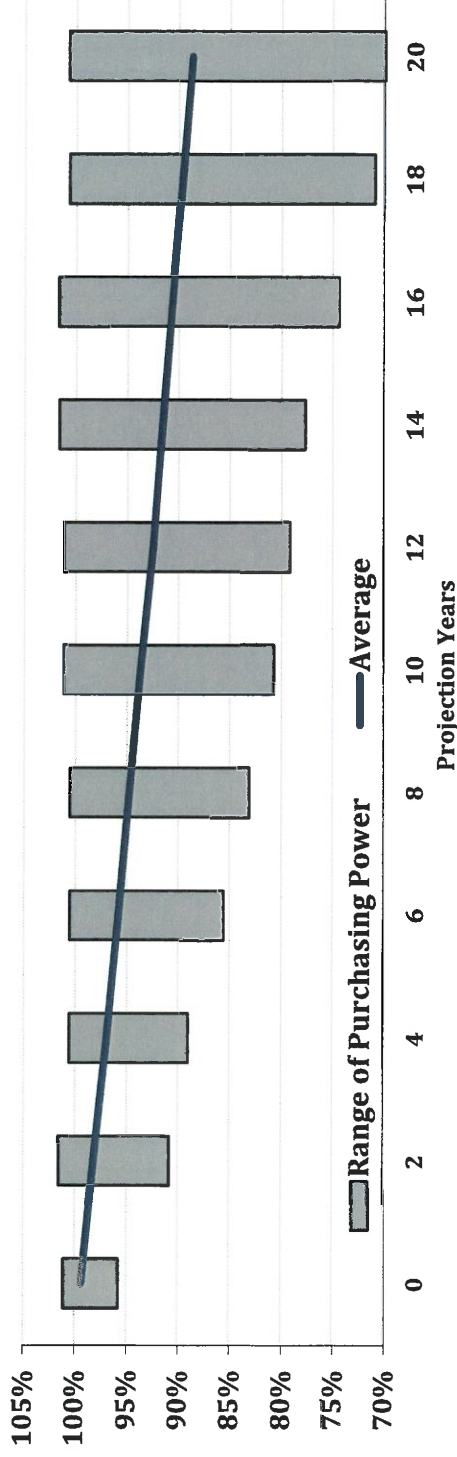


Inflation Rate*	FYE 2019 Contribution Rate	FYE 2023 Ultimate Contribution Rate	Funded Ratio
2.75%	39.1%	42.6%	75.7%
2.50%	39.8%	44.2%	74.8%
2.25%	40.0%	44.5%	74.8%

\* Assume 4.25% real return, 0.25% real wage growth

## STOCHASTIC PROJECTIONS OF PURCHASING POWER

### 2.00% COLA CAP, 2.50% Assumed Inflation



**2.50%**

Expected Base Inflation  
(Actuarial Assumption)

**2.50%**

Expected 10yr Inflation  
(Investment Consultant)

**2.25%**

Expected 10yr Inflation  
(Fed Survey)

**2.00%**

Cap on COLAs

**1.90%**

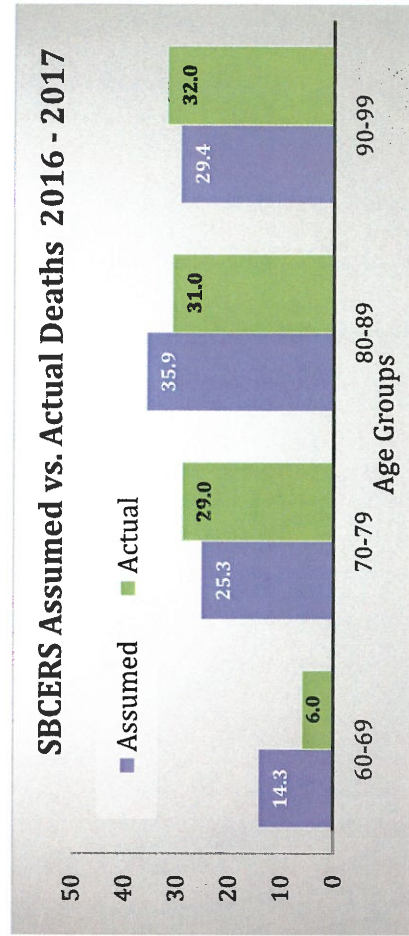
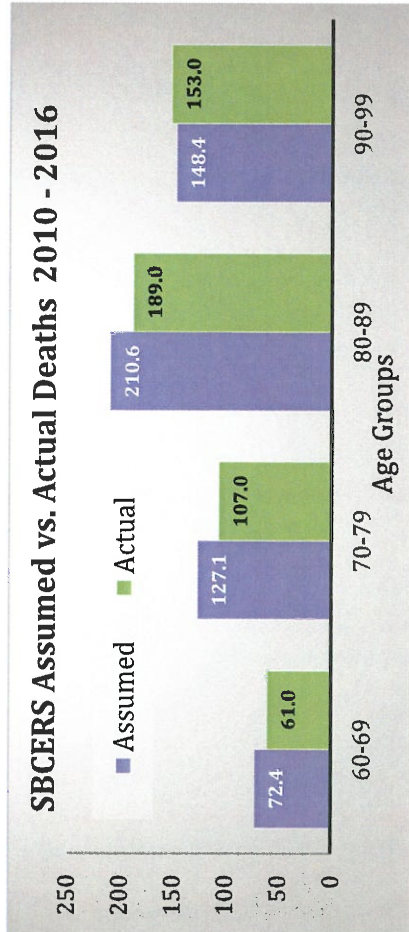
Expected COLA Growth  
(Actuarial Assumption)



# Longevity Risk



Mortality Assumption	Current Asmp Modified CalPERS w/MP2016	2017 Modified CalPERS w/MP2017	2017 CalPERS 100% A/E w/MP2017
Remaining Expected Life at 65	21.3	21.6	22.1
Funded Ratio	75.7%	75.5%	74%
FYE 2019 Contribution Rate	39.1%	39.2%	39.8%
FYE 2023 Ultimate Contribution Rate	42.6%	42.9%	44.8%

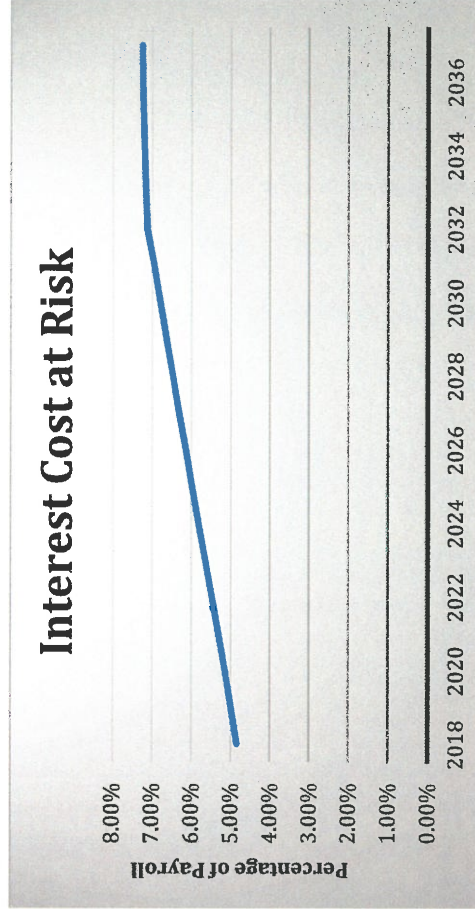
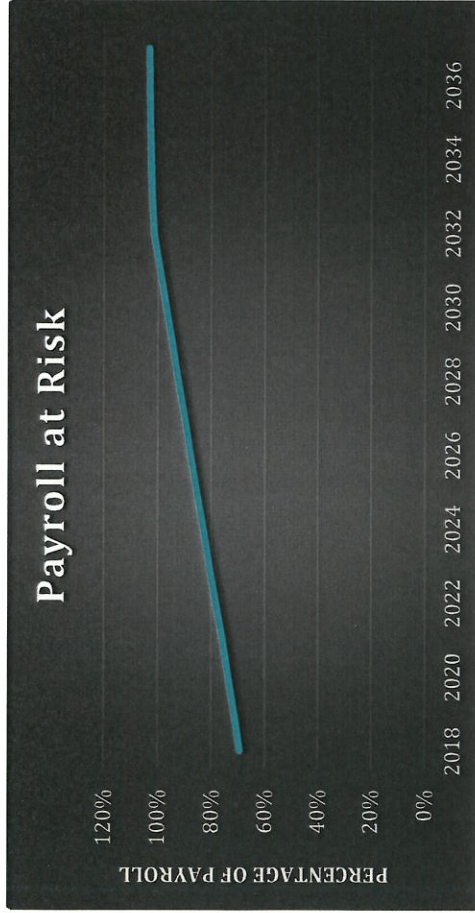
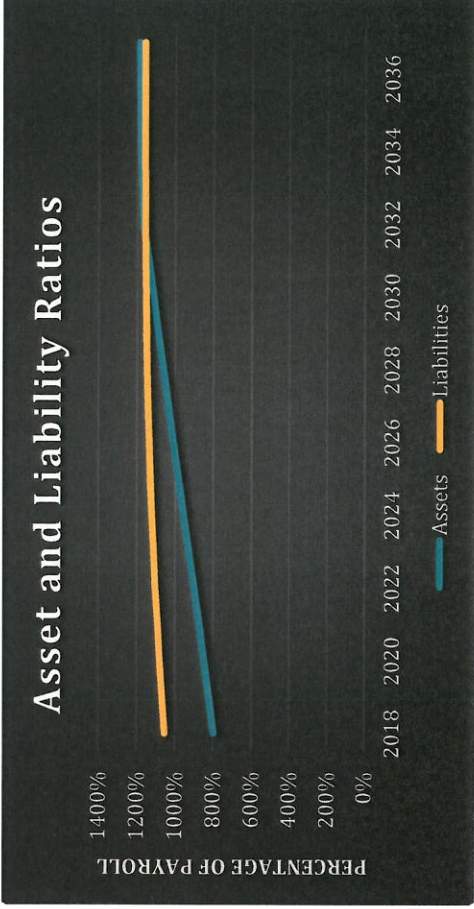
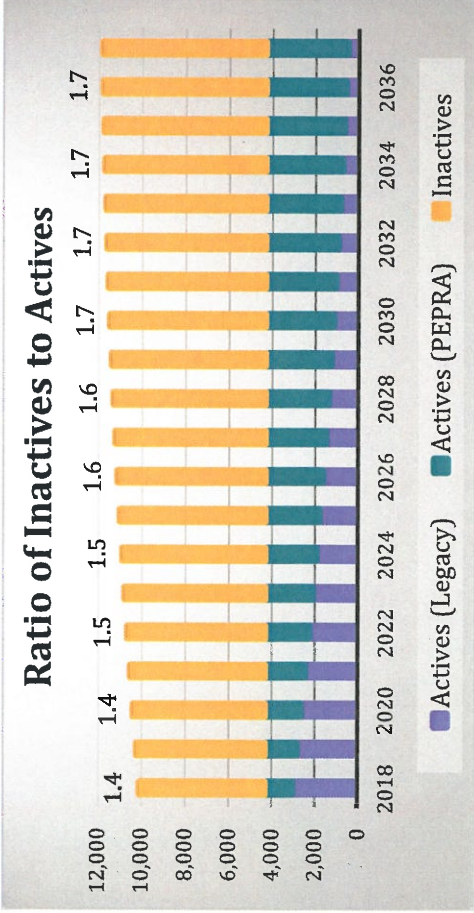






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# Plan Dynamics

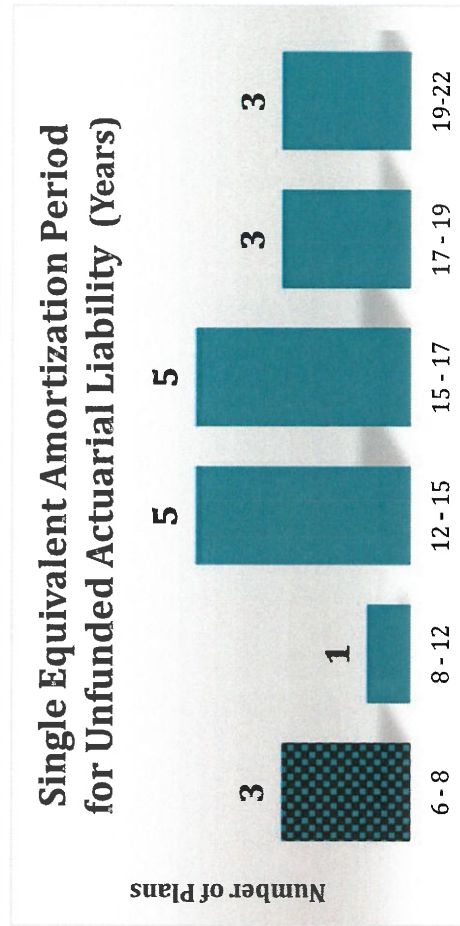
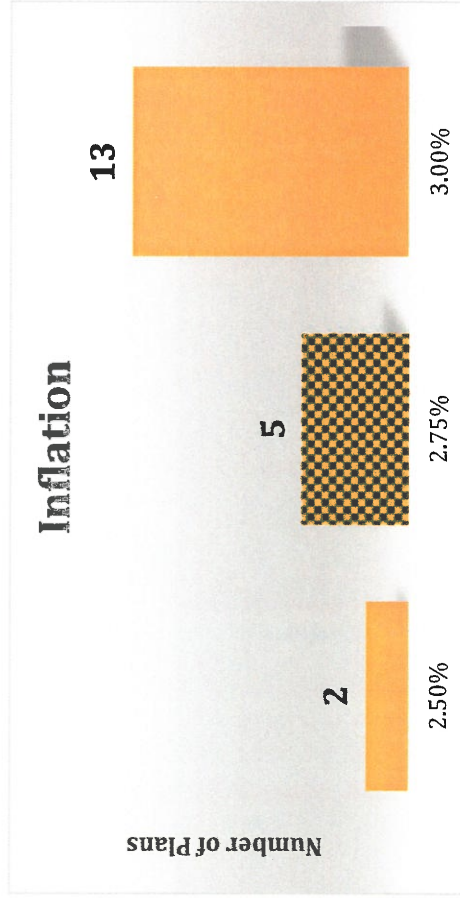
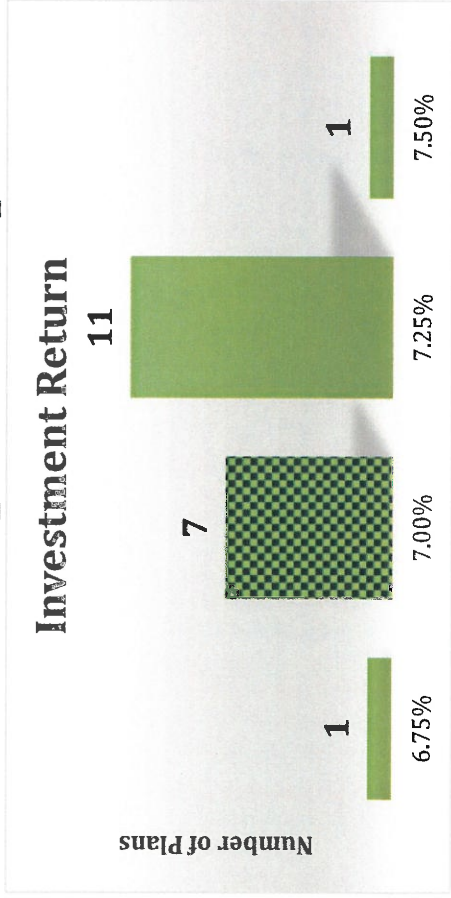






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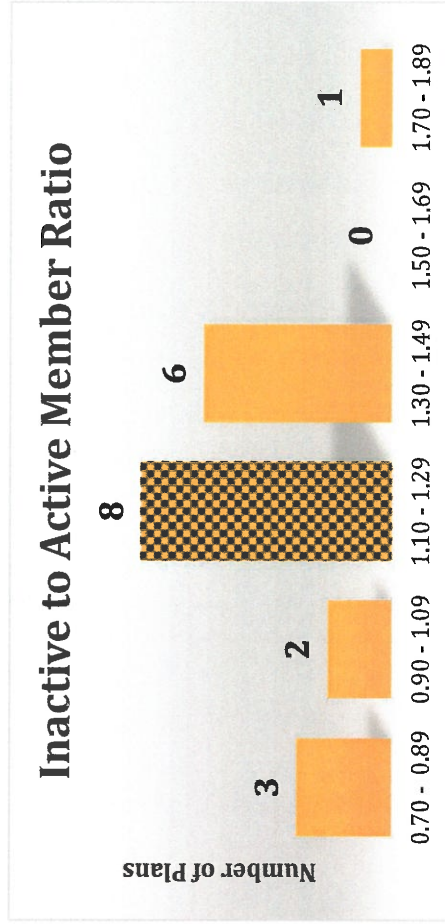
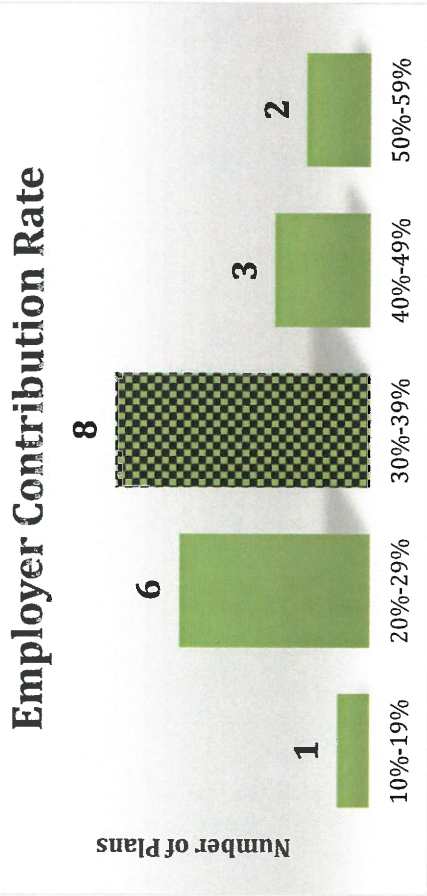
# Peer Group Assumptions





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# Peer Group Comparison



## **Mature Pension Plans are Sensitive - Manage With Care A Survey of SACRS Plan Maturity Measures**

**“Maturity doesn’t mean you stop fighting, you just change the things you fight for.” Carlos Wallace**

### **Introduction**

A good deal has been written about public plans taking on too much risk. Less has been written about the factors that make pension plans sensitive to risk.

That is about to change.

A new actuarial standard of practice on the assessment and disclosure of risk (ASOP 51) that becomes effective for annual valuations after November 2018 requires actuaries to identify and assess significant risks to pension plans and disclose plan maturity measures that are important to understanding those risks.

As pension plans mature, they become far more sensitive to risks than plans that are not mature. But, there is significant variation in the level of maturity among public pension plans. Understanding maturity and how that affects the ability of pension plans to tolerate risk is essential to understanding how they are affected differently by investment return volatility, other economic conditions, improvements in longevity and other demographic changes.

Mature pension plans are very sensitive to changes. The ups and downs of investment returns can throw mature pension plans into crisis. Changes in the economic environment or demographics of members can necessitate assumption changes that may make mature pension plans unaffordable. All of the risks pension plans face are increasingly magnified as plans mature.

We have identified key plan maturity measures and the range of those measures based on data that Cheiron compiled for all SACRS Systems from 2007 through 2017.

### **Pension Plan Maturity Measures**

#### *Support Ratio*

The most intuitive measure of pension plan maturity is the Support Ratio—the ratio of inactive<sup>1</sup> members to active members. New plans have no inactive members. Over time, active members quit their jobs, retire, and become eligible to collect benefits and new active members replace them. Contributions to the plan are often based on a percentage of active members’ payroll, and the contributions have to support each active member plus any shortfall that may have accumulated on active and inactive members. As the number of inactive members grows, the contributions needed to support the potential shortfalls related to inactive members as well as active members becomes a larger percentage of active member payroll.

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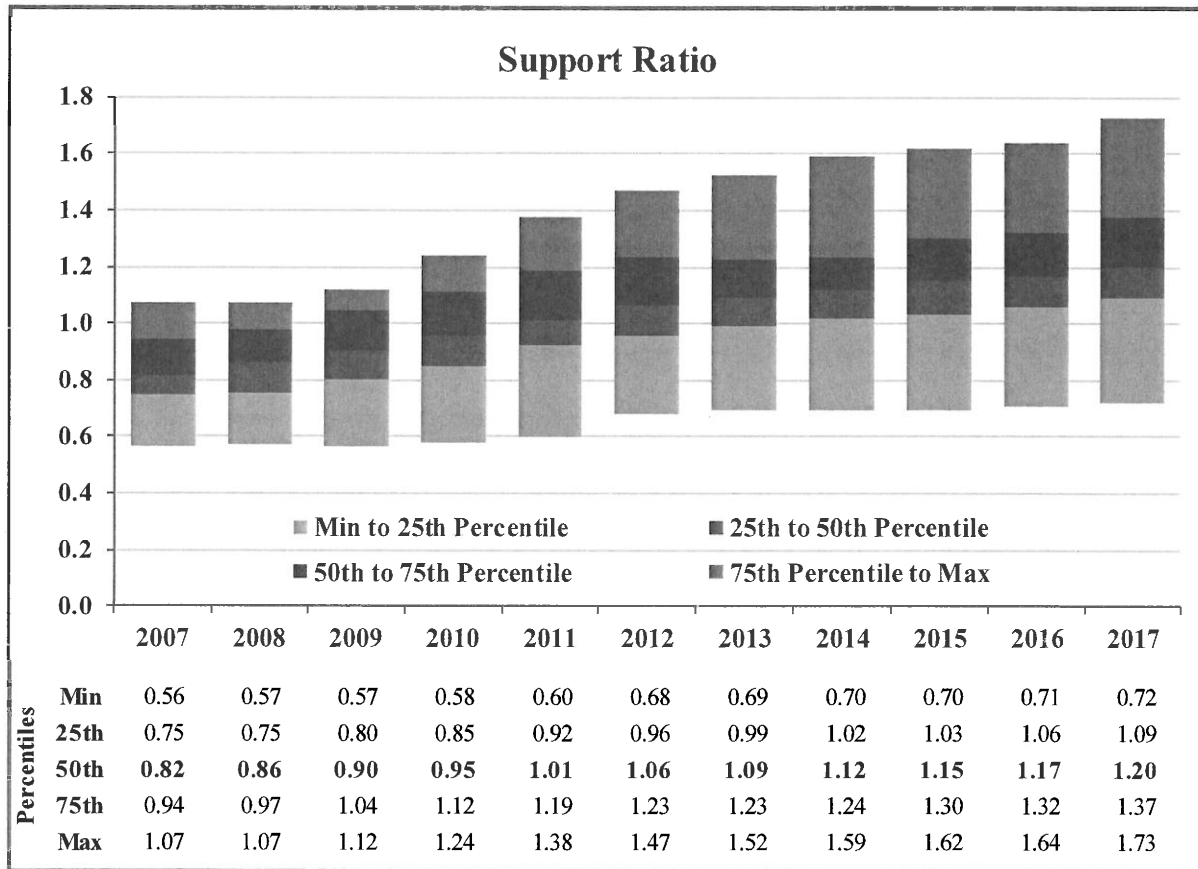
<sup>1</sup> Inactive members are members no longer employed by the sponsor who are entitled to a future benefit from the plan. They include service and disability retirees, deferred vested members and surviving beneficiaries.



Chart 1 shows the distribution of Support Ratios for SACRS plans from 2007 through 2017. Support Ratios have increased steadily, with a notable increase during the Great Recession. The number of inactive members grew faster than the number of active members for all SACRS plans, but for some plans the growth in Support Ratio was much faster than for others.

Nationally, Support Ratios have also grown following a pattern similar to the growth among SACRS plans. However, SACRS plans tend to be more mature: the median Support Ratio for plans in the Public Plan Database is 0.98 compared to 1.20 for SACRS plans.

Chart 1



### Asset Leverage Ratio

While the Support Ratio is a relatively intuitive indicator of plan maturity, it doesn't tell us how changes actually impact a plan's finances. The Asset Leverage Ratio<sup>2</sup>, in contrast, can be used to estimate the impact of investment risks on a plan's finances. The ratio is calculated by dividing the market value of the plan's assets by its payroll. Plans with large Asset Leverage Ratios are likely to have more difficulty recovering from an investment loss and receive a greater benefit

<sup>2</sup> This measure is also sometimes referred to as the Asset Volatility Ratio.

from an investment gain. They are more sensitive to investment volatility than plans with small Asset Leverage Ratios.

For example, Table 1 below summarizes the impact of a 10% investment loss compared to an assumed investment return of 7.0% (in other words a -3.0% investment return) for hypothetical plans A and B.

**Table 1**

	Hypothetical Plan	
	A	B
Asset Leverage Ratio	3.0	10.0
Loss as a Percent of Payroll	30.0%	100.0%
Interest on Loss as a Percent of Payroll	2.1%	7.0%

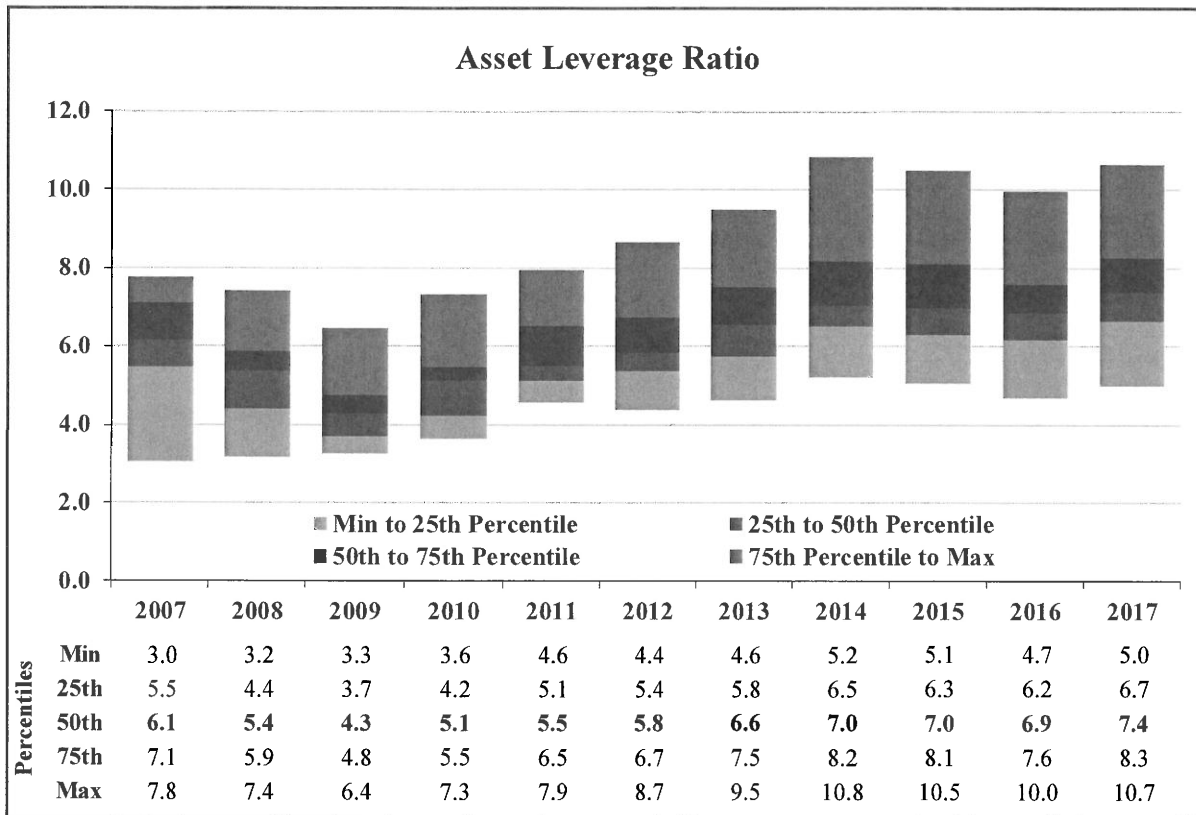
Plan A has an Asset Leverage Ratio of 3.0, so the 10% investment loss equates to 30% of payroll. Given the discount rate of 7.0%, Plan A would have to pay 2.1% of payroll to cover the interest on the investment loss, which may be an affordable increase in contribution. Plan B has an Asset Leverage Ratio of 10.0, so the 10% investment loss equates to 100% of payroll, and a 7.0% of payroll payment to cover the interest on the investment loss or more than three times as much as Plan A for the same 10% investment loss. Plan B is more sensitive to investment gains and losses than Plan A and may need to consider a more conservative investment policy than Plan A in order to lessen significant investment losses that it may not be able to afford.

Chart 2 shows the distribution of Asset Leverage Ratios for SACRS plans from 2007 through 2017. The Asset Leverage Ratio fluctuates with asset and payroll levels. In 2009, asset levels plummeted due to the stock market crash causing Asset Leverage Ratios to decline as well. Since then, asset levels have grown while payroll levels have remained relatively flat, resulting in increases in Asset Leverage Ratios for most plans.

These changes in Asset Leverage Ratios illustrate some key dynamics. Plans are more sensitive to investment risks immediately before an investment loss than immediately after, and plans that are fully funded are more sensitive to investment risks than if they were poorly funded. As a result, plans that are well-funded may want to consider reducing investment risk while plans that are poorly funded may not.

There is a wide range of Asset Leverage Ratios among SACRS plans and an even wider range among public plans nationally, indicating significant differences in sensitivity to investment risk. The highest SACRS plan had more than double the Asset Leverage Ratio of the lowest SACRS plan. Nationally, the 95<sup>th</sup> percentile plan in the Public Plan Database had an Asset Leverage Ratio that is nearly five times that of the 5<sup>th</sup> percentile plan. SACRS plans tend to have higher Asset Leverage Ratios than public plans nationally with a median Asset Leverage Ratio of 7.4 compared to 5.1 nationally. This difference reflects the generally better funding levels of SACRS plans as well as the relative level of maturity.

Chart 2



Even within plans, there can be significant differences in Asset Leverage Ratios for different employers. For example, a small special district that employs mostly safety members who earn higher benefits will likely have a higher Asset Leverage Ratio than the whole plan that includes a mix of safety and non-safety members. Plans may want to consider this metric as they consider how much investment risk each employer can afford.

Typically, plans with low Asset Leverage Ratios are more likely to be comfortable with more aggressive asset allocations while plans with a relatively high Asset Leverage Ratio may need to take a more defensive approach to investment risk.

#### *Actuarial Liability Leverage Ratio*

The Actuarial Liability Leverage Ratio equals the actuarial liability of the plan divided by payroll. As with the Asset Leverage Ratio plans with large Actuarial Liability Leverage Ratios are more sensitive to assumption changes and demographic gains and losses. In many cases, particularly among larger plans, demographic gains and losses are relatively minor, but changes in assumptions such as reducing discount rates and improving mortality assumptions have had a significant impact on public plans recently. For plans with high Actuarial Liability Leverage

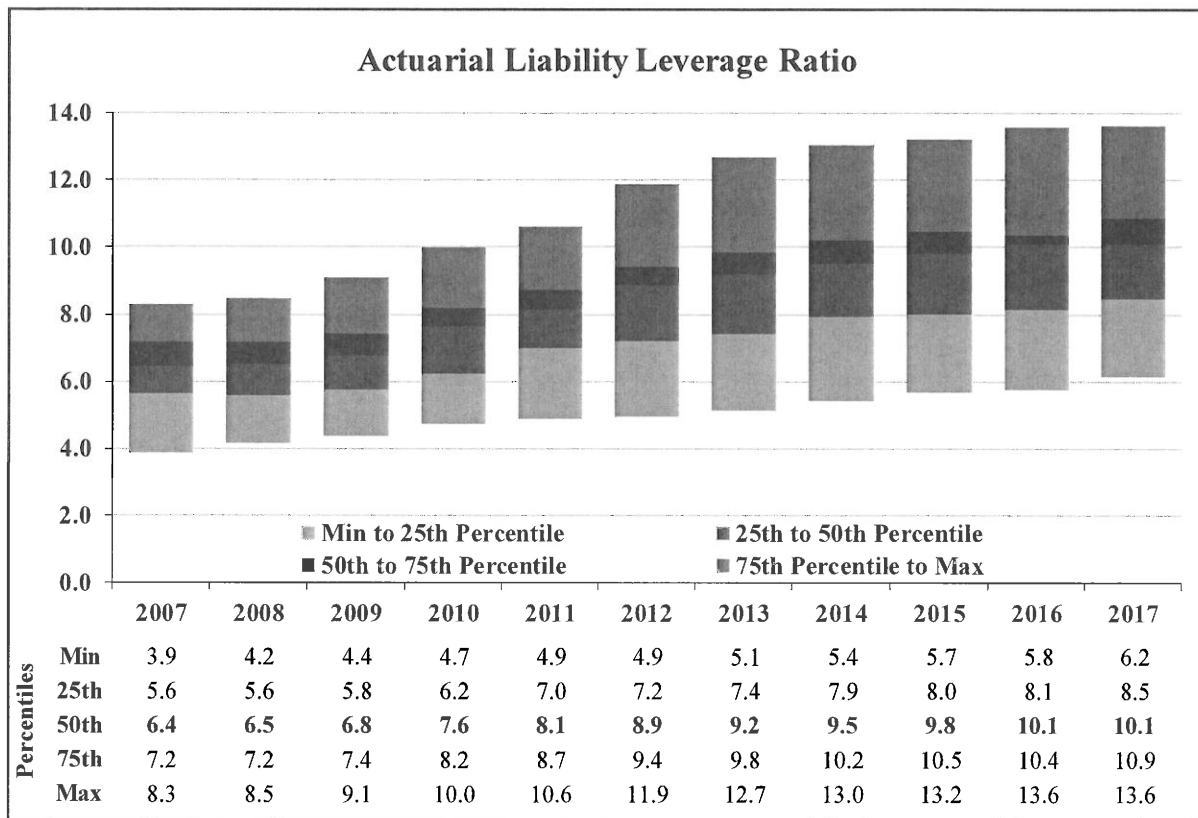


Ratios, these changes are more significant than for plans with low Actuarial Liability Leverage Ratios.

Chart 3 shows the distribution of Actuarial Liability Leverage Ratios for SACRS plans from 2007 through 2017. Unlike the median Asset Leverage Ratio, the median Actuarial Liability Leverage Ratio increased at a relatively steady rate throughout the period.

As with the Asset Leverage Ratio, there is a wide range of Actuarial Liability Leverage Ratios among SACRS plans and an even wider range among public plans nationally that may make different policies appropriate for managing changes. Plans with high Actuarial Liability Leverage Ratios may have a greater need to phase in the impact of assumption changes and to target a level of conservatism in their assumptions even as it is more difficult to do so.

**Chart 3**



*Net Cash Flow*

We define net cash flow as total contributions less benefit payments and administrative expenses as a percentage of assets. A negative cash flow indicates that benefit payments and expenses are larger than contributions, and significantly negative cash flow makes a plan more sensitive to near-term investment returns, particularly negative returns. When investments lose money and

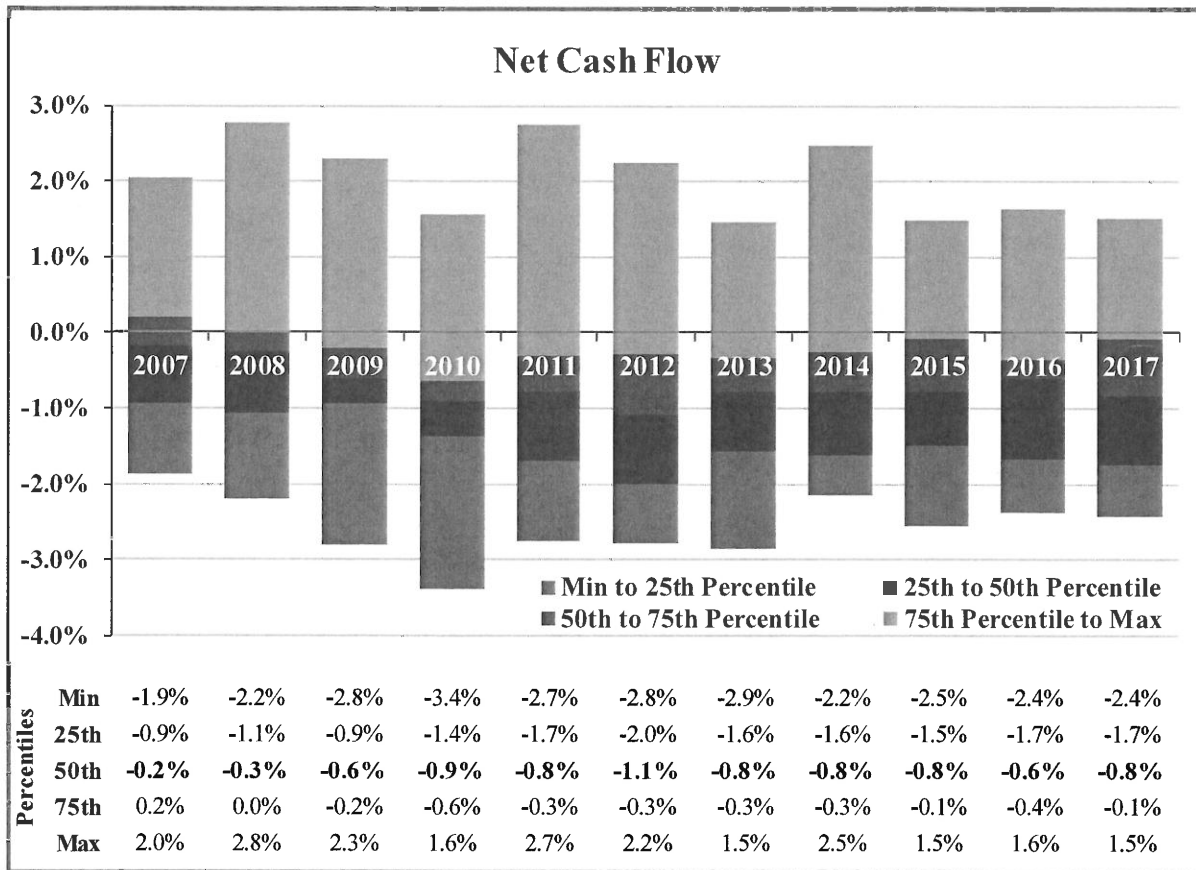
the net cash flow is negative, the asset base from which plans need to recover is smaller. As a result, plans need an even higher investment return to recover. For example, if net cash flow is zero, to recover from a 20% loss a plan would need an investment return of 25% ( $1 \div 0.8$ ). But if the plan had a negative cash flow of 15% of assets, it would need more than a 30% return to recover ( $0.85 \div 0.65$ ).

Negative cash flow does not indicate a plan has been managed poorly. In fact, the entire objective of pre-funding a pension plan is to accumulate assets to pay benefits instead of just paying benefits with contributions. The objective of pre-funding is to create negative cash flow. Moreover, plans that are very well-funded will have low contribution rates even as they pay out significant benefits – a situation with highly negative cash flow.

For public plans that always contribute an Actuarially Determined Contribution, cash flow is most negative when the plans are well-funded. When funding levels decline; contribution levels increase easing the negative cash flow. However, for plans where the contribution rates are fixed or cannot be increased, negative cash flow combined with declining funding levels can indicate that the plan may be at risk of insolvency.

Chart 4 below shows the distribution of Net Cash Flow for the SACRS plans from 2007 through 2017. More than 75% of the SACRS plans had negative cash flows during the period but at very moderate levels. The lowest SACRS plan in 2017 had net cash flow of -2.4% compared to -2.7% for the median plan in the Public Plan Database. As SACRS plans continue to improve funding levels, negative cash flow may become a more significant issue.

Chart 4



**Conclusion**

With the implementation of ASOP 51 and its requirement to disclose plan maturity measures that help explain the risks faced by the plan, we expect an increased focus on plan maturity measures. To put these measures in context, it is helpful to understand how a public plan compares to its universe of public plans. SACRS plans tend to be more tightly grouped than public plans nationally, but there are still significant differences in maturity levels between plans. With this perspective, plans can gain insight into how sensitive they are to various risks compared to their peers and develop policies to manage those risks. Plans that are more mature may want to consider ways to reduce their exposure to risks compared to other plans even at the expense of increased costs, and plans that are less mature may be willing to have a greater exposure to risks compared to other plans in order to reduce expected costs.



**PERSPECTIVES  
THAT DRIVE  
ENTERPRISE  
SUCCESS**



**PERIOD ENDING: SEPTEMBER 30, 2018**

Investment Performance Review for

**Contra Costa County Employees' Retirement Association**



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Investment Landscape

TAB I

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Investment Performance  
Review

TAB II





**PERSPECTIVES  
THAT DRIVE  
ENTERPRISE  
SUCCESS**

4<sup>TH</sup> QUARTER 2018  
Investment Landscape



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Appendix 40

# 3<sup>rd</sup> quarter summary

## THE ECONOMIC CLIMATE

- The U.S., Mexico, and Canada reached a new trade agreement. The new deal, USMCA, involves few changes to NAFTA, but may create mildly more favorable terms for U.S. businesses. [p. 13](#)
- The U.S. continued to outshine other developed economies in Q2 with its strongest quarterly growth since 2014. A few smaller emerging market economies experienced idiosyncratic weakness that led to concerns of economic contagion, but fundamentals in most countries still appear strong. [p. 14, 16](#)

## PORTFOLIO IMPACTS

- Emerging market equities delivered slight losses in Q3, but seem to have stabilized as currency depreciation recently subsided (MSCI Emerging Markets Index -1.1%, JP Morgan EM Currency Index -1.6%). We maintain a positive outlook on emerging market equities. [p. 30](#)
- The Fed raised the target range for the fed funds rate by 0.25% to a range of 2.00%-2.25%. The probability of a December rate hike was 78%, as of October 8th. [p. 20, 22](#)
- U.S. trade discussions have narrowed in on China. Negotiations between the two countries in recent months do not appear to have produced tangible results. [p. 17](#)

## THE INVESTMENT CLIMATE

- Another strong quarter of U.S. corporate earnings is expected in Q3 on both an absolute and relative basis. S&P 500 earnings and revenue growth are forecast to be 19.3% and 6.9% YoY, respectively. [p. 27](#)
- Fixed income yields around the world rose slightly. The U.S. Treasury yield hit a 7-year high of 3.23%, reigniting investor concerns over rising interest rates. [p. 20](#)
- The Italian coalition government sparred with the European Commission over its fiscal spending plans. Fading ECB stimulus will likely lift interest rates on European bonds, which is creating doubts around the sustainability of Italy's debt. [p. 14, 15](#)

## ASSET ALLOCATION ISSUES

- Capital market returns have been largely flat-to-negative in 2018, with U.S. equities being the exception. Diversification remains important, but has been painful for investors in this environment. [p. 26](#)
- Trade conflicts between the U.S. and its trading partners appear to be mostly resolved. All eyes are on negotiations between U.S. and Chinese representatives, though it increasingly appears that these negotiations are broader in nature than trade alone. [p. 17](#)

A neutral to mild risk overweight may be warranted in today's environment



# What drove the market in Q3?

## “Bullish U.S. stocks leave the rest of the world trailing”

### S&P 500 VS. MSCI ACWI EX U.S. RELATIVE MONTHLY PERFORMANCE

Apr	May	Jun	Jul	Aug	Sep
-3.1%	3.2%	1.4%	1.4%	4.6%	-0.1%

Article Source: Financial Times, September 13<sup>th</sup>, 2018

## “Traders take Fed’s cues, pile on bets on U.S. rate hikes”

### YEAR-END 2020 MARKET IMPLIED FED FUNDS RATE

Apr	May	Jun	Jul	Aug	Sep
2.70%	2.55%	2.65%	2.72%	2.62%	2.82%

Article Source: Reuters, September 17<sup>th</sup>, 2018

## “Fitch cuts Italy’s credit outlook on debt and governance concerns”

### 10-YEAR ITALIAN-GERMAN YIELD SPREAD

Apr	May	Jun	Jul	Aug	Sep
123	245	238	228	291	268

Article Source: Financial Times, August 31<sup>st</sup>, 2018

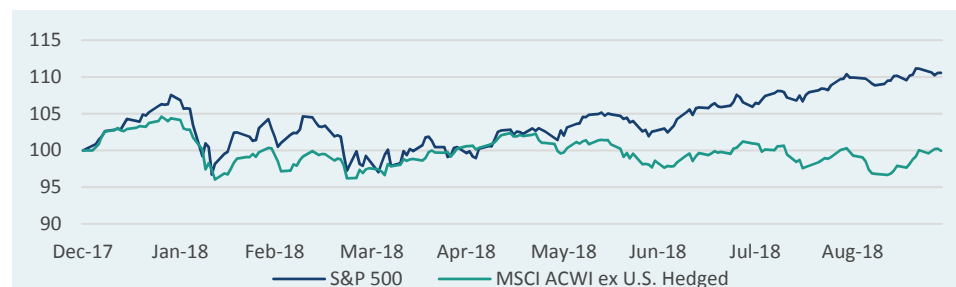
## “No breakthrough in U.S.-China trade talks as new tariffs kick in”

### U.S. IMPORTS SUBJECT TO RECENTLY ENACTED TARIFFS (\$ BILLIONS)

Apr	May	Jun	Jul	Aug	Sep
33	33	56	90	106	306

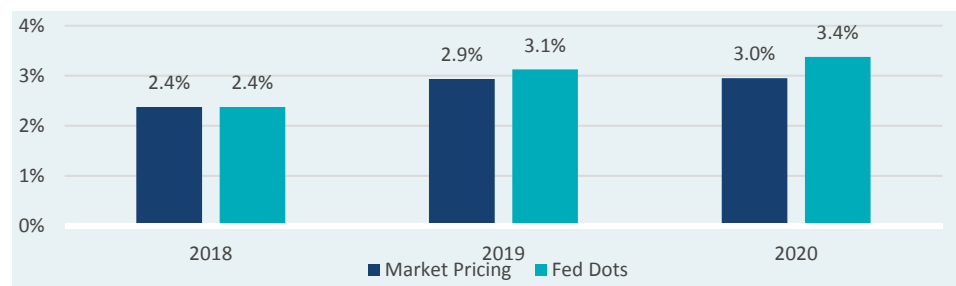
Article Source: CNBC, August 23<sup>rd</sup>, 2018

## U.S. VS. NON-U.S. EQUITY YTD PERFORMANCE



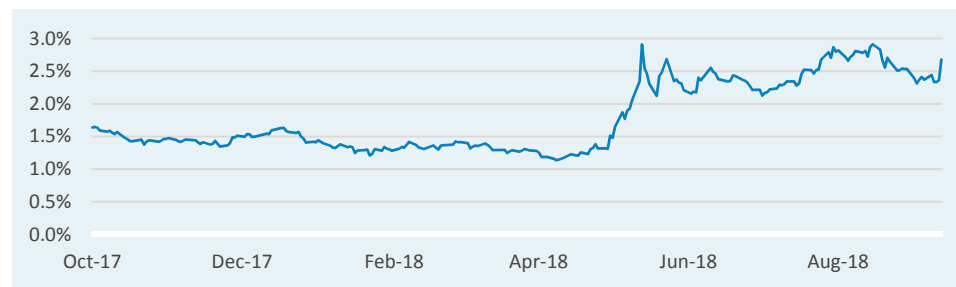
Source: Bloomberg, as of 9/30/18

## MARKET IMPLIED FED FUNDS PRICING VS. FED DOTS (YEAR-END)



Source: Bloomberg, Federal Reserve, as of 10/8/18

## 10-YEAR ITALIAN-GERMAN SOVEREIGN YIELD SPREAD



Source: Bloomberg, as of 9/30/18

# Economic environment

# U.S. economics summary

- Real GDP growth was 2.9% year-over-year in the second quarter. Expectations for third quarter growth have risen alongside recently strengthening U.S. economic data.
- U.S. inflation fell slightly to 2.3% YoY, moving closer to the U.S. Core CPI rate of 2.2% YoY.
- Non-farm payrolls added 134,000 jobs in September, missing the consensus estimate of 185,000. Hurricane Florence likely contributed to the miss, as leisure and hospitality employment fell by 17,000, the largest drop in a year.
- The U3 unemployment rate fell from 3.9% to 3.7% in September, the lowest rate since 1969. The U6 unemployment increased from 7.4% to 7.5%.
- The United States, Mexico, and Canada reached an agreement on a new trade deal to replace NAFTA.

The new deal, USMCA, included provisions aimed towards protecting the business interests of North American auto manufacturers as well as workers' wages. The deal also partially opened the Canadian dairy market to U.S. farmers.

- The U.S. imposed 10% tariffs on \$200 billion of Chinese goods on September 24<sup>th</sup>. The White House claimed that the tariff rate will advance from 10% to 25% at year-end if no progress is made through negotiations in the meantime. China retaliated with tariffs of 10% on \$60 billion of U.S. imports.
- As expected, the Federal Open Market Committee raised the target range for the fed funds rate by 0.25%, moving the new range to 2.00%-2.25%. The market implied odds for an additional December rate hike were 78%, as of October 8th.

	Most Recent	12 Months Prior
GDP (YoY)	2.9% <i>6/30/18</i>	2.1% <i>6/30/17</i>
Inflation (CPI YoY, Core)	2.2% <i>9/30/18</i>	1.7% <i>9/30/17</i>
Expected Inflation (5yr-5yr forward)	2.2% <i>9/30/18</i>	2.0% <i>9/30/17</i>
Fed Funds Target Range	2.00 – 2.25% <i>9/30/18</i>	1.00 – 1.25% <i>9/30/17</i>
10 Year Rate	3.1% <i>9/30/18</i>	2.3% <i>9/30/17</i>
U-3 Unemployment	3.7% <i>9/30/18</i>	4.2% <i>9/30/17</i>
U-6 Unemployment	7.5% <i>9/30/18</i>	8.3% <i>9/30/17</i>

# GDP growth

Real GDP growth accelerated to 2.9% YoY (4.2% quarterly annualized rate) in the second quarter, driven in part by fiscal stimulus. This quarterly growth rate marked the fastest pace of expansion since the third quarter of 2014.

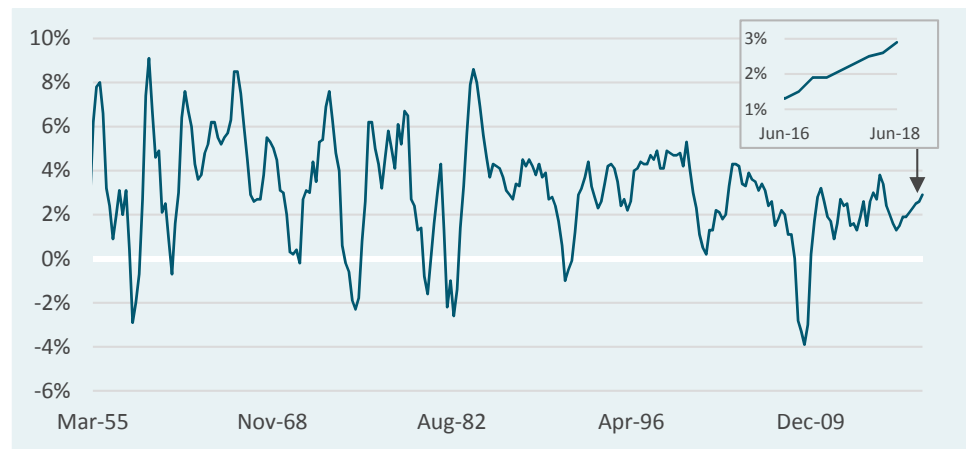
The consumer was once again the biggest contributor to growth after a slowdown in the previous quarter. Consumer spending added 2.6% to the quarterly growth rate. Exports and business investment also boosted growth – each contributed 1.1% to GDP growth. However, some of the increase in exports may have been a result of businesses

attempting to ship goods ahead of pending tariffs, pulling future growth into the current quarter.

Although the current expansion is near the longest on record, it still appears the economy is on solid footing without many typical signs of late-cycle overheating. While we are cautious about a potential prolonged economic war between the U.S. and China, we do not believe the tariffs that have been implemented thus far will in themselves create a material drag on the domestic economy. We remain watchful for any indirect effects on consumer and business confidence that could lead to a slowdown in activity.

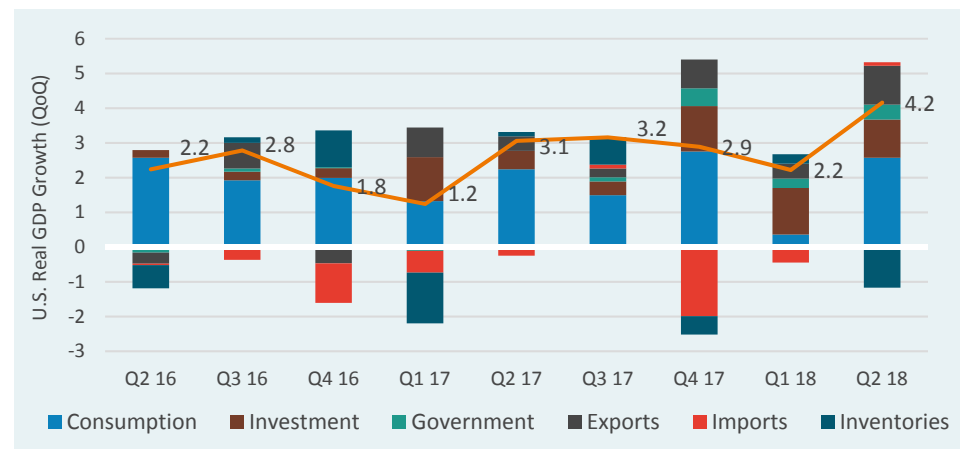
GDP growth was the highest since Q3 2014

## U.S. REAL GDP GROWTH (YOY)



Source: Bloomberg, as of 6/30/18

## U.S. GDP COMPONENTS



Source: BEA, annualized quarterly rate, as of 6/30/18



# Inflation

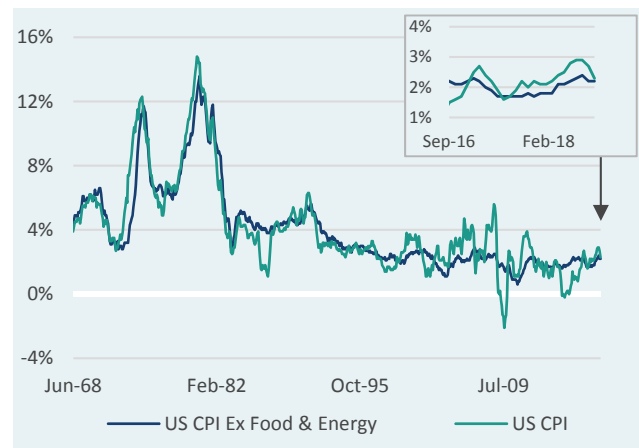
Inflation has remained relatively muted throughout the current economic cycle. Headline and core CPI rose 2.2% and 2.3%, respectively over the 12 months ending in September.

Although there has been some occasional concern in the market over a potential spike in inflation, we have yet to see any sustained pressure on consumer prices. This effect has not been confined to the current cycle. In fact, secular disinflation caused in part by automation and

globalization has contributed to stable core inflation of around 1-3% per annum since the early 1990s.

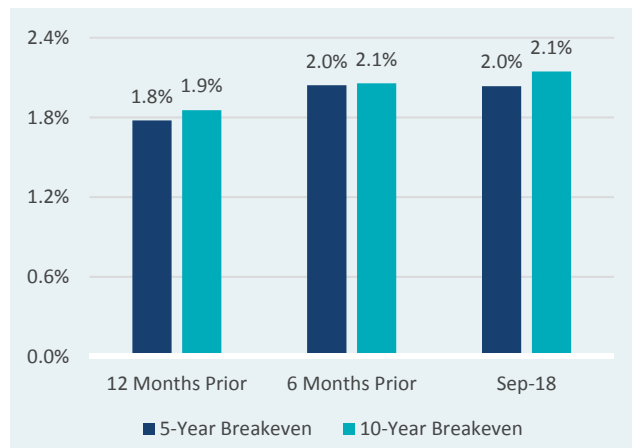
The potential impact of tariffs on inflation has been widely scrutinized, but it is important to note that the flow-through from import prices to consumer prices is ambiguous. The flow-through will depend on numerous factors including substitution effects and the price elasticity of demand. At this point, we do not expect a material increase in inflation due to tariffs.

**U.S. CPI (YOY)**



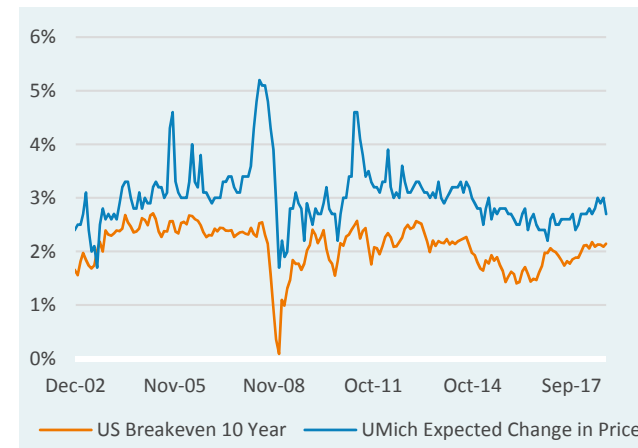
Source: Bloomberg, as of 9/30/18

**BREAKEVEN INFLATION RATES**



Source: Bloomberg, as of 9/30/18

**INFLATION EXPECTATIONS**



Source: Bloomberg, as of 9/30/18

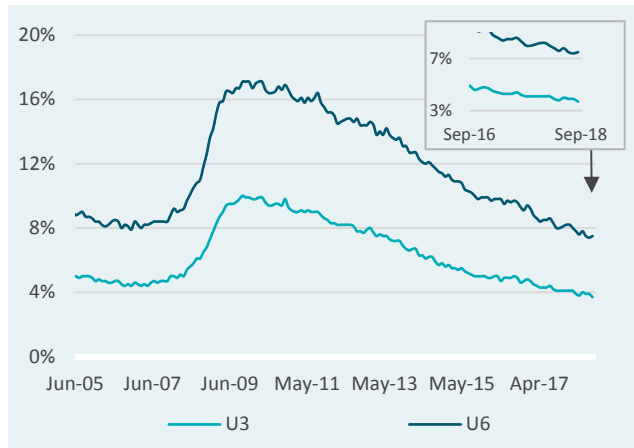
# Labor market

Labor market trends were largely unchanged over the quarter. The economy continued to add jobs at a fairly steady pace and the U-3 unemployment rate fell further from 4.0% to 3.7% in September. The broader U-6 unemployment rate also tightened, dropping from 7.8% to 7.5%. This measure has finally recovered to below its pre-global financial crisis level, indicating that there may be fewer pockets of labor market slack as potential workers increasingly search for and find employment. However, looking at the broadest measure of employment – the percentage of Americans currently employed, we are currently at 60%, compared to 63% prior in 2006. This seems to suggest that labor slack remains.

Wage growth remained moderate as average hourly earnings for private workers rose 2.7% from the previous year in September. On a real basis, however, wages rose 0.7% YoY, in-line with the long-term average since 1970.

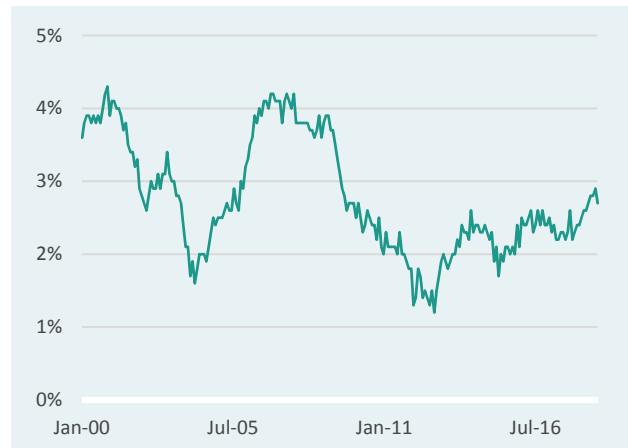
Surging job openings, along with business survey responses, suggest companies are having a difficult time finding qualified workers. As of August, there were 7.1 million job openings compared to only 6.2 million people classified as unemployed.

**UNEMPLOYMENT RATE**



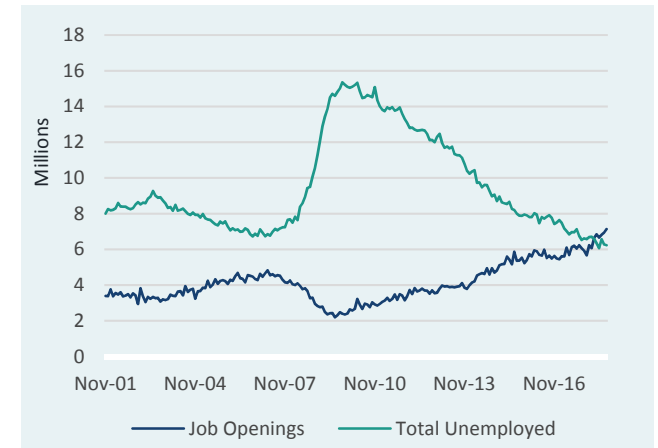
Source: FRED, as of 9/30/18

**AVERAGE HOURLY EARNINGS (YOY)**



Source: Bloomberg, as 9/30/18

**JOB OPENINGS VS TOTAL UNEMPLOYED**



Source: Bloomberg, as of 8/31/18

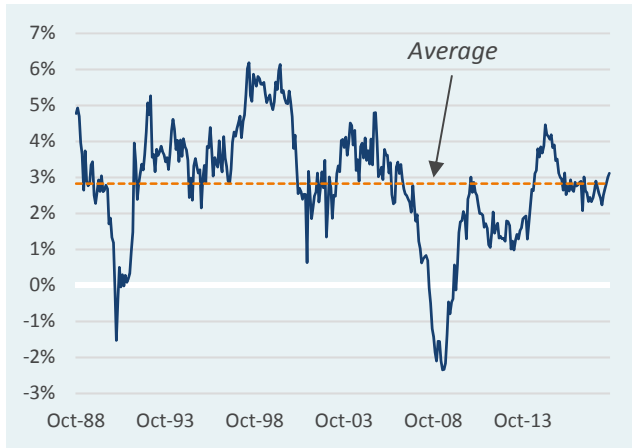
# The consumer

Real consumer spending rose 3.1% from the previous year in August, in-line with the long-term average over the past 30 years. Conditions facing consumers, including moderate income gains, a tight labor market, and low interest rates are still supportive of spending. Despite some evidence that the U.S. is moving into the later stages of the economic cycle, we have yet to see big increases in consumer spending, which is often indicative of overconfidence.

With the 30-year mortgage rate nearing 5%, there have been increasing concerns over the impact of rising rates on the

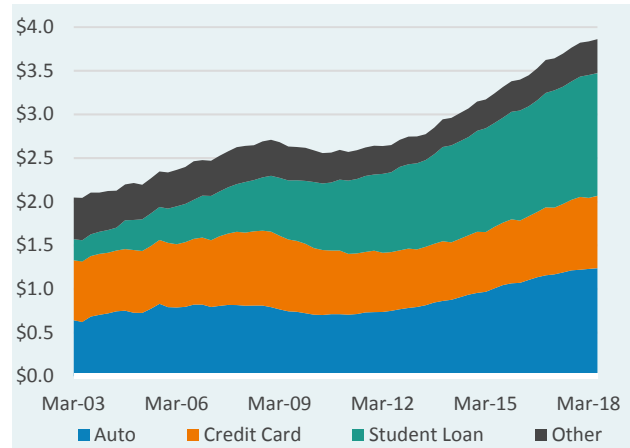
cost of living. However, a rise in market interest rates will impact various types of debt in different ways. For example, nearly all U.S. mortgage debt issued since the global financial crisis has been with fixed interest rates. Higher mortgage rates will have a greater impact on new home buyers, rather than all homeowners. In fact, household mortgage debt service fell to a cycle low of 4.2% of disposable income in the second quarter. On the other hand, interest rates on shorter-term debt, such as auto and credit card loans, will be much quicker to reflect changes in market rates.

**REAL CONSUMER SPENDING (YOY)**



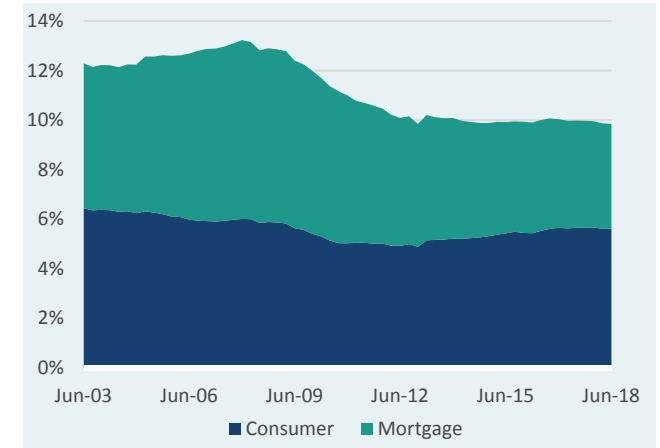
Source: Bloomberg, as of 8/31/18

**NON-HOUSING DEBT BALANCE (TRILLIONS)**



Source: FRBNY, as of 6/30/18

**DEBT SERVICE AS % OF DISPOSABLE INCOME**



Source: Federal Reserve, as of 6/30/18

# Sentiment

Sentiment readings from both households and businesses are incredibly strong. Americans across all income subgroups expressed optimism for the future, according to the University of Michigan Consumer Sentiment survey. The most often cited concern was U.S. tariffs, which were mentioned by one third of respondents. Those surveyed were optimistic about their personal financial situation, continued economic growth, and low inflation.

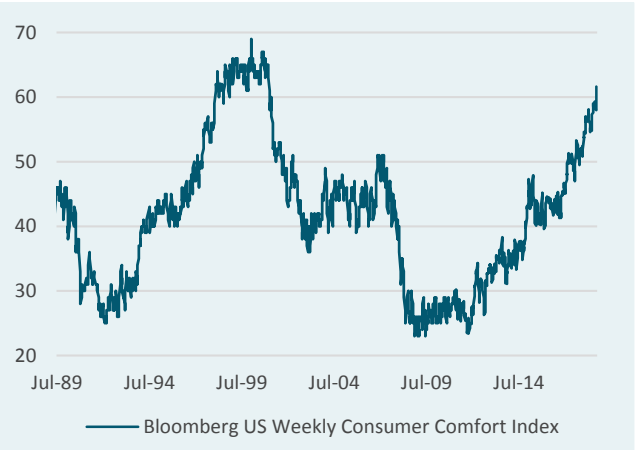
The Bloomberg U.S. Weekly Consumer Confidence Index has surpassed its 17-year high of 59.3, reflecting a rosy outlook

for personal finances, wages, and the economy.

The NFIB Small Business Optimism Index reached 107.9 in September – the third strongest reading in the 45-year history of the index. NFIB commented, “In the small business half of the economy, 2018 has produced 45-year record high measures of job openings, hiring plans, actual job creation, compensation increases (actual and planned), profit growth, and inventory investment.” The positive outlook of small business owners is likely supportive of continued economic growth.

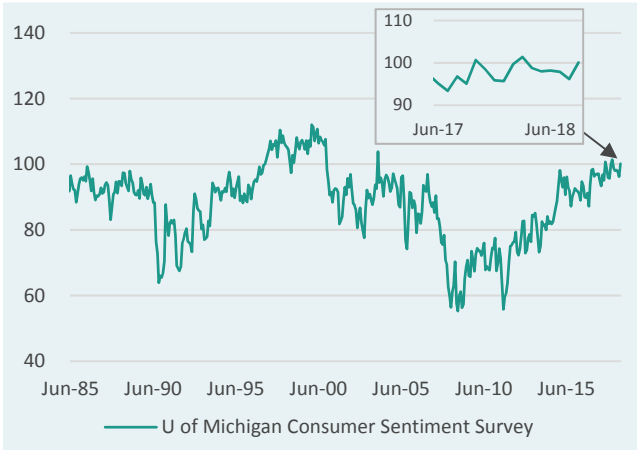
Consumers and business are confident about the future

**CONSUMER COMFORT INDEX**



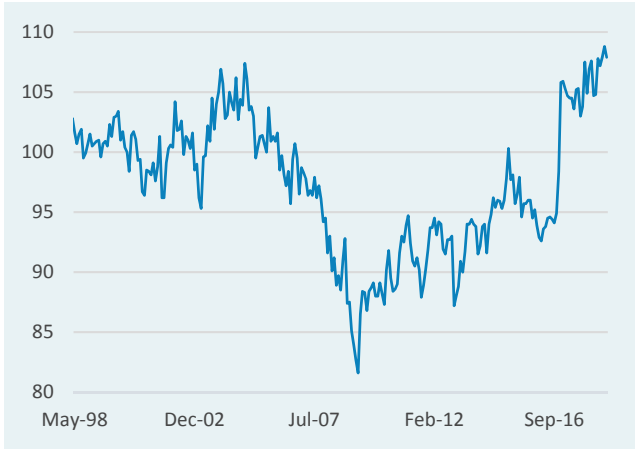
Source: Bloomberg, as of 9/30/18 (see Appendix)

**CONSUMER SENTIMENT**



Source: University of Michigan, as of 9/30/18 (see Appendix)

**NFIB SMALL BUSINESS OPTIMISM INDEX**



Source: NFIB, as of 9/30/18 (see Appendix)



# Housing

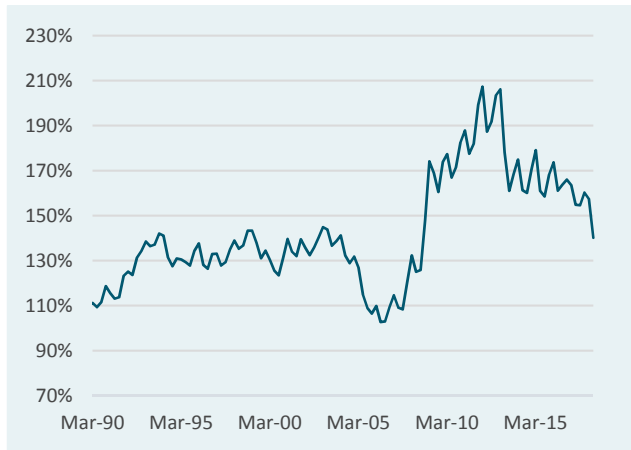
Single-family home prices appreciated at a strong pace. As of July, the Case-Shiller National Home Price Index was up 4.7% year-to-date. Over the past 5 years home prices have risen 5.3% per annum, outpacing wage growth and likely creating difficulties for those planning new purchases.

Nationwide home prices are now 11% above the previous high reached in mid-2006. Lower interest rates have partially offset rising prices, though this effect is fading as

borrowing rates have moved back towards pre-2008 levels.

U.S. home affordability has dropped materially in 2018 and is now back to a level not seen since late 2008. The 30-year fixed mortgage interest rate rose from 4.0% in January to more than 4.7% through the end of September. Home sales have recently slowed - perhaps a result of less buyer-friendly conditions.

**HOUSING AFFORDABILITY INDEX**



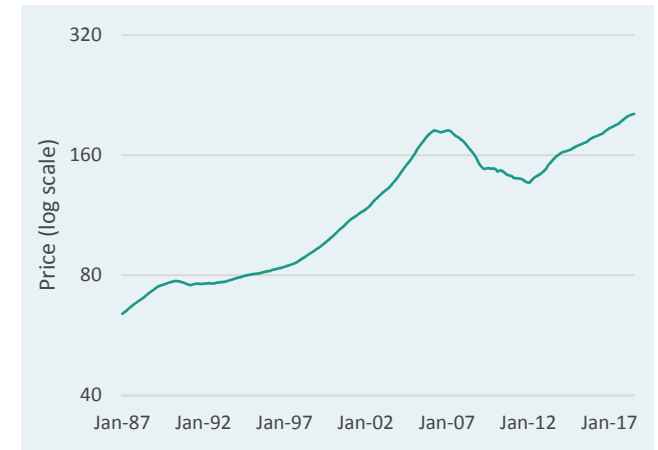
Source: Bloomberg, as of 6/30/18

**EXISTING HOME SALES (MILLIONS)**



Source: Bloomberg, SAAR, as of 8/31/18

**U.S. HOME PRICE INDEX**



Source: Case-Shiller National Home Price Index, as of 7/31/18

# International economics summary

- The U.S., Mexico, and Canada reached an agreement on a trade deal to replace NAFTA. The new U.S.-Mexico-Canada Agreement (USMCA) involves few material changes to NAFTA, but the terms appear mildly more favorable for U.S. businesses.
- U.S. negotiations with China, its largest trading partner, continued with little apparent progress. The U.S. imposed 10% tariffs on \$200 billion of Chinese goods on September 24<sup>th</sup>. The White House claimed that the tariff rate will advance from 10% to 25% at year-end if no progress is made in the meantime. China responded with retaliatory tariffs of 10% on \$60 billion of U.S. imports.
- Trade negotiations with other trading partners appear to be mostly resolved, easing concerns of a global trade war.
- Developed market economies are expected to grow less quickly in the coming years, while emerging economy growth rates are expected to rise.
- PMI readings around the globe have weakened during 2018, led by the Eurozone. U.S. PMIs remain very high, indicating expansion in the manufacturing and services sectors.
- The Italian coalition government sparred with the European Commission over its fiscal spending plans. Fading ECB stimulus will likely lift interest rates on European bonds, creating doubts around the sustainability of Italy's debt.
- The U.S. dollar appreciated by 1% during the quarter. A stable dollar would help dampen the volatility of unhedged equity investments, particularly in emerging markets where currency moves have been larger.

Area	GDP (Real, YoY)	Inflation (CPI, YoY)	Unemployment
United States	2.9% <i>6/30/18</i>	2.7% <i>8/31/18</i>	3.8% <i>9/30/18</i>
Eurozone	2.1% <i>6/30/18</i>	2.1% <i>9/30/18</i>	8.3% <i>6/30/18</i>
Japan	1.3% <i>6/30/18</i>	1.3% <i>8/31/18</i>	2.4% <i>6/30/18</i>
BRICS Nations	5.8% <i>6/30/18</i>	2.5% <i>6/30/18</i>	5.5% <i>6/30/18</i>
Brazil	1.0% <i>6/30/18</i>	4.5% <i>9/30/18</i>	12.2% <i>9/30/18</i>
Russia	1.9% <i>6/30/18</i>	3.4% <i>9/30/18</i>	4.6% <i>8/31/18</i>
India	8.2% <i>6/30/18</i>	3.7% <i>8/31/18</i>	8.8% <i>12/31/17</i>
China	6.7% <i>6/30/18</i>	2.3% <i>8/31/18</i>	3.8% <i>6/30/18</i>

# International economics

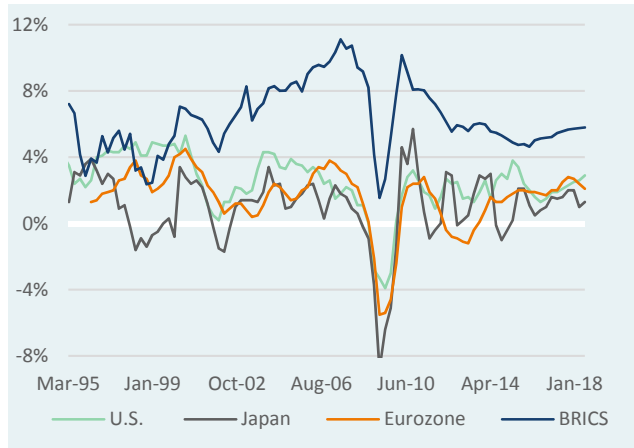
While U.S. economic growth improved, international growth remained moderate. In the Eurozone, real GDP rose 2.1% YoY in Q2, down from 2.4% in Q1. In addition to slowing growth, political uncertainty in Italy and less stimulus from the European Central Bank has clouded the economic outlook. The political situation in Italy highlights the problems caused by an uneven recovery across the Eurozone. While the French and German economies may be in a position to withstand monetary tightening, it does not appear that this is the case in places such as Italy, Spain, and Portugal.

Political issues have also created much uncertainty in the United Kingdom with the March 2019 deadline for a Brexit deal fast approaching. Theresa May's initial plan was rejected by the European Union, and it appears both sides have at least considered how to move forward without a deal.

Synchronized global growth has moderated

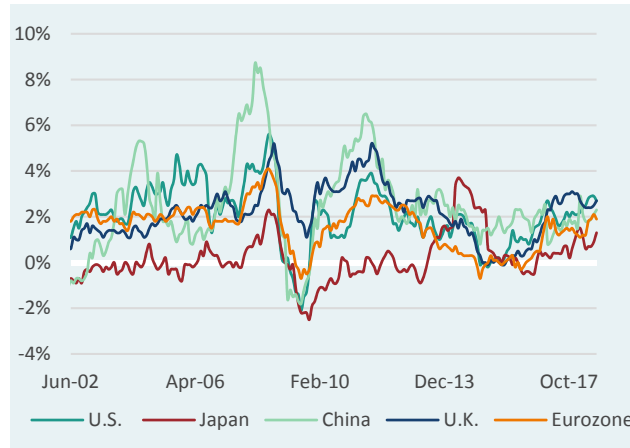
Developed international inflation remains well below central bank targets, which may provide greater flexibility for management of these economic imbalances.

**REAL GDP GROWTH (YOY)**



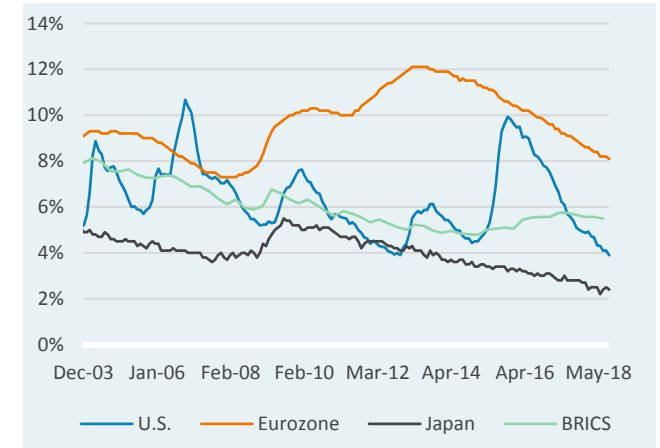
Source: Bloomberg, as of 6/30/18

**INFLATION (CPI YOY)**



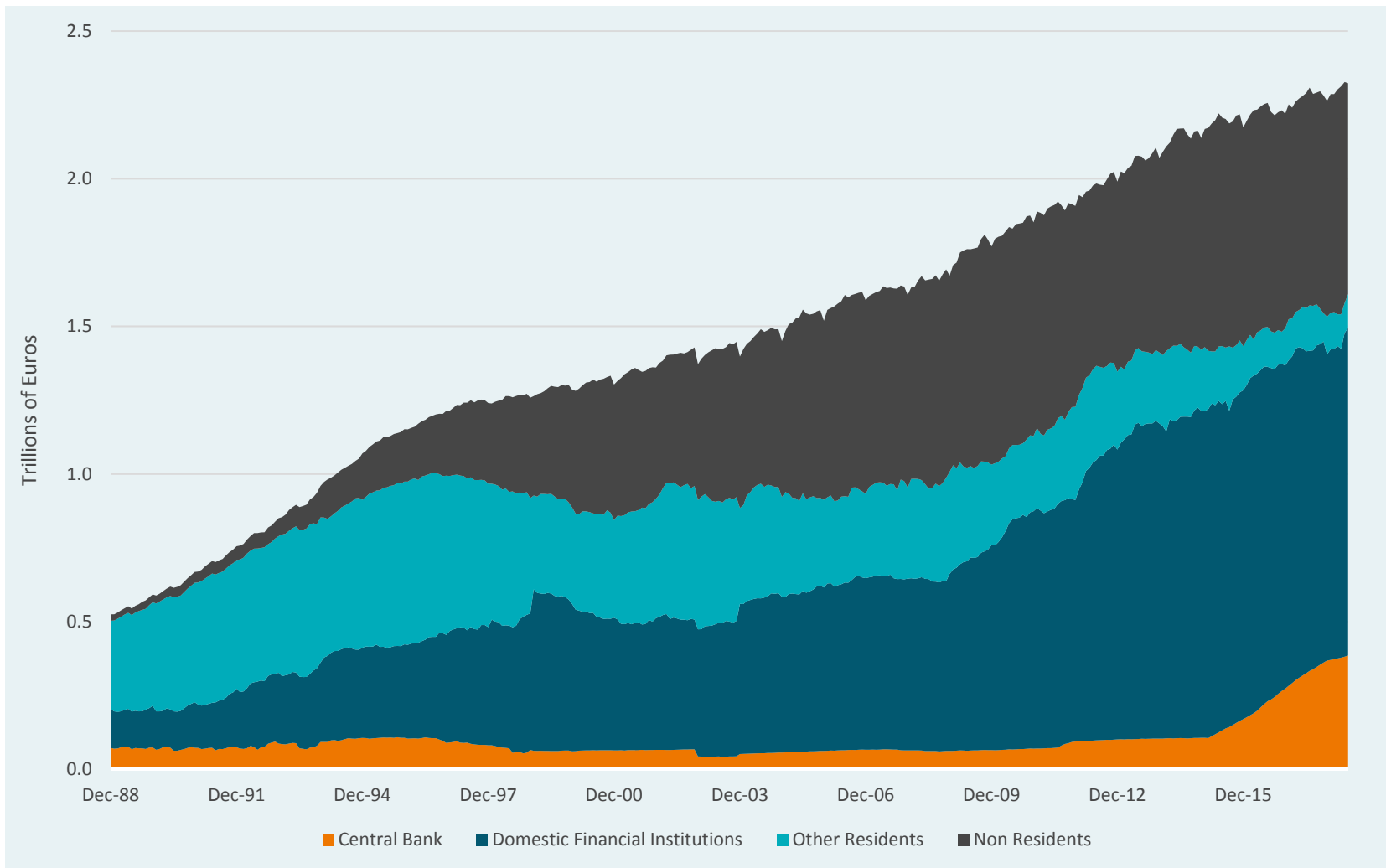
Source: Bloomberg, as of 8/31/18

**UNEMPLOYMENT RATE**



Source: Bloomberg, as of 8/31/18 or most recent release

# Italian debt ownership



European banks have helped suppress Italian bond yields

This support may be dwindling as central bank stimulus ends

Source: Bank of Italy, as of 6/30/18



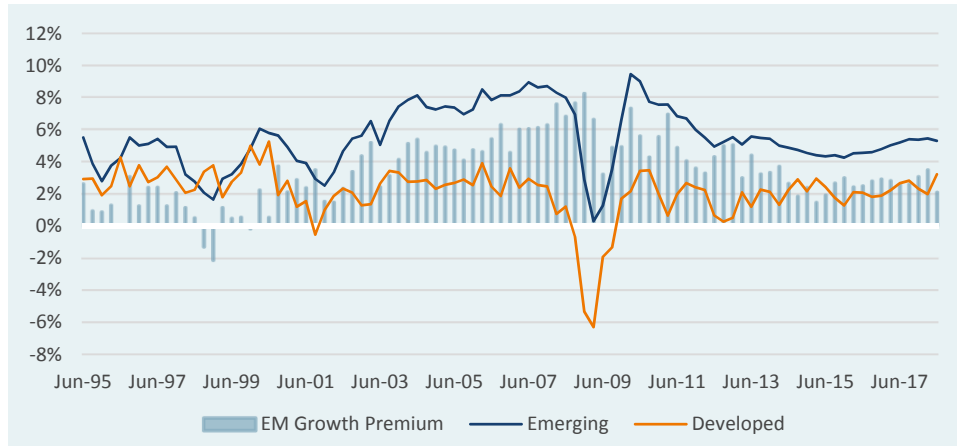
# Emerging economies

Several events over the quarter helped lead to broad weakness in emerging markets assets and to investor concerns about contagion, including a 25% plunge in the Turkish lira in August and Argentina securing a \$50 billion bailout from the IMF. Contagion events in EM economies, such as the Asian financial crisis in the 1990s, have been characterized by a trigger event that caused mass capital outflows, currency depreciation, rising domestic interest rates, and eventually recession. These economies have withstood multiple recent shocks, but the last serious emerging market contagion occurred nearly 20 years ago. This likely reflects material changes in these economies that have made them more resilient to exogenous events.

First, the development of local savings institutions has created a marginal buyer of debt when foreign investors sell that has helped combat interest rate shocks. Second, more emerging economies have moved to flexible exchange rate systems and accumulated significant FX reserves, which gives them more control to slow currency depreciation. Third, many emerging markets have trimmed their reliance on foreign capital, particularly in terms of hard currency debt. Overall, we believe emerging economies remain on solid footing, and provide investors with opportunities in both the short- and long-term.

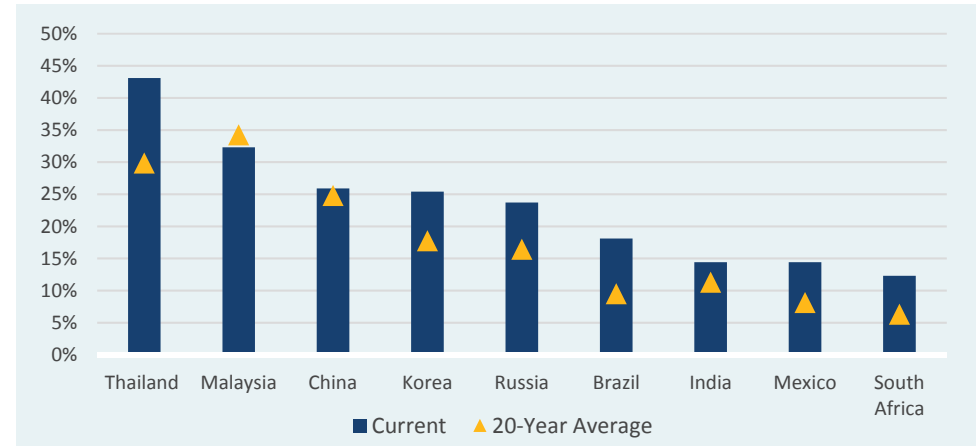
Economic contagion fears seem overblown

EMERGING VS. DEVELOPED ECONOMY REAL GDP GROWTH (YOY)



Source: IMF, as of 6/30/18

FX RESERVES (% OF GDP)



Source: IMF, GDP as of 6/30/18, FX reserves as of 8/31/18

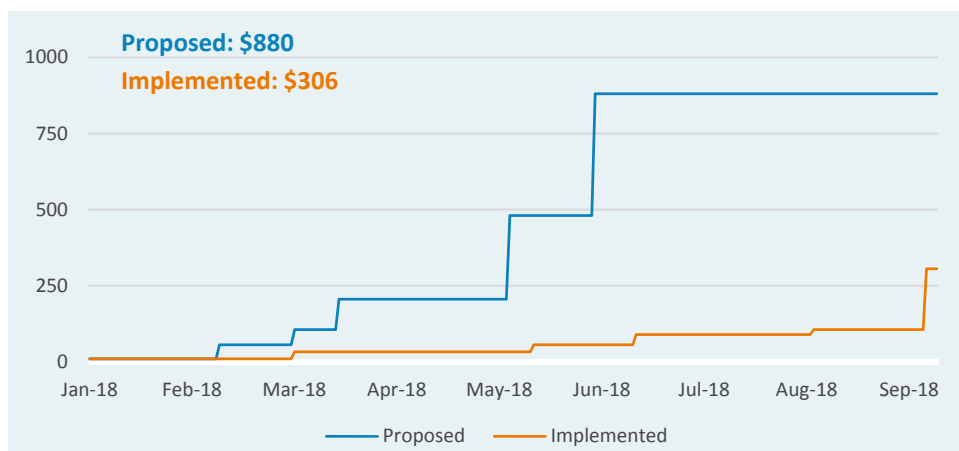
# U.S.-China trade

Following the successful renegotiation of NAFTA, the Trump Administration has clearly focused in on U.S. and China trade terms. The U.S. implemented 10% tariffs on an additional \$200 billion of Chinese imports that may rise to a 25% rate at the beginning of next year if no progress is made in the meantime. China responded with retaliatory tariffs of 5-10% on \$60 billion of U.S. imports. Based on equity market reactions to this point, and the growing divide between U.S. and China market performance, it appears investors may be more concerned with the impact of trade on China. Chinese equities are down more than 30% from their recent peak in January, while U.S. equities have moved steadily higher.

As the conflict between the two sides continues to drag on, it appears that this may be more than just a trade war. Recent developments, including U.S. sanctions on Chinese military leaders and naval run-ins in the South China Sea, point towards a much broader struggle centered around global hegemony. U.S. policy focused on confronting China's rise as a world power would represent a marked break from the past and widen the potential outcomes. If this is the case, the chances of a trade deal may be lower, and even the conclusion of a successful trade deal may not be a safe indicator of a return to stable relations between the two countries.

The U.S.-China conflict appears to be about more than just trade

U.S. IMPORTS SUBJECT TO TARIFFS (\$ BILLIONS)



Source: Verus, as of 9/30/18, only includes recently proposed or implemented tariffs

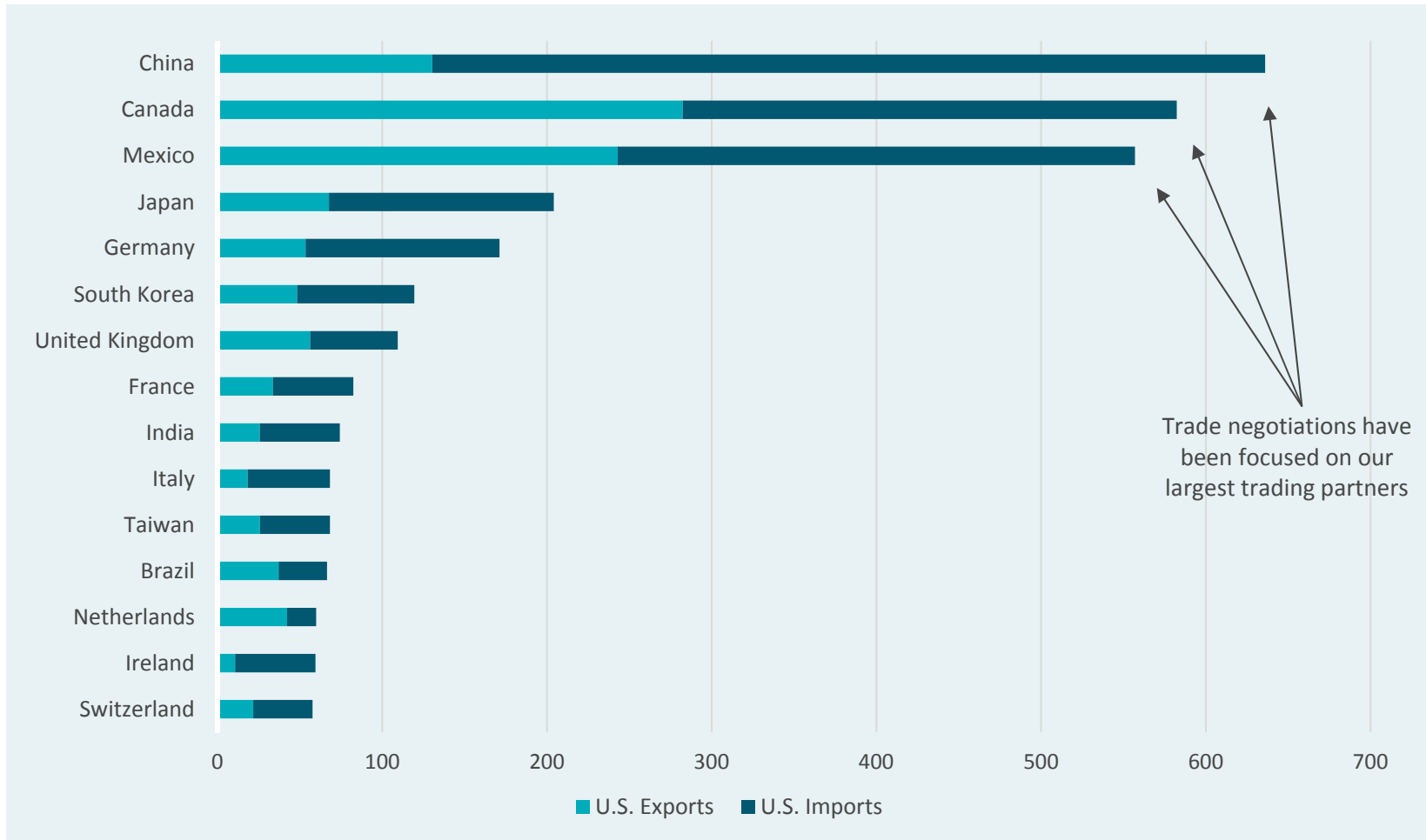
1-YEAR EQUITY PRICE MOVEMENT (INDEXED TO 100)



Source: Bloomberg, as of 9/30/18, China A shares are represented by the CSI 300 Index

# U.S. trade

U.S. TRADING PARTNERS (\$BILLIONS)



U.S. negotiations have focused on our largest trade partners

NAFTA will be replaced by the U.S.-Mexico-Canada Agreement (USMCA)

Trade negotiations have been focused on our largest trading partners

Source: U.S. Census Bureau, year 2017

# Fixed income rates & credit



# Interest rate environment

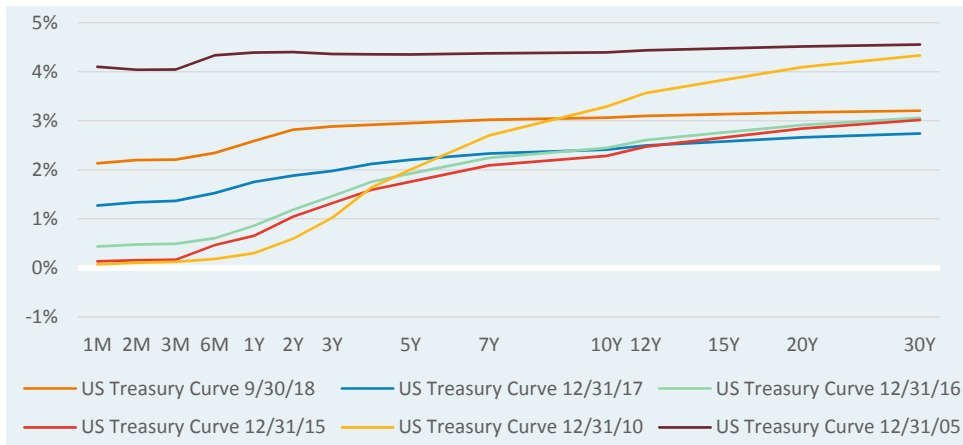
- The Federal Reserve raised the target range for the fed funds rate by 0.25%, to a range of 2.00%-2.25%. The odds for a December rate hike were 78%, as of October 8th.
- Fixed income yields around the world moved slightly higher during the quarter. The U.S. Treasury yield rose to a 7-year high of 3.23%, reigniting investor concerns over rising interest rates. The spread between 2- and 10-year yields has remained steady at around 30 bps.
- In September, the European Central Bank left interest rates unchanged, and confirmed its intent to leave rates at current levels “at least through the summer of 2019, and in any case for as long as necessary to ensure the continued sustained convergence of inflation to levels that are below, but close to, 2% over the medium term.” The ECB also stated that bond purchases of \$30 billion euros per month would be cut in half beginning in October, and would stop altogether at the end of the year.
- The yield spread between Italian and German 10-year bonds has exhibited significant volatility following Italy’s political shakeup in the second quarter. Discussions around compliance with European Union budget rules, and the general fear that Italy may push either for structural monetary policy changes, or to leave the Eurozone, contributed to a tumultuous quarter.
- Emerging market local and hard yields were rangebound in Q3, but remained elevated due to continued idiosyncratic risks in countries such as Turkey and Argentina.

Area	Short Term (3M)	10 Year
United States	2.19%	3.06%
Germany	(0.56%)	0.47%
France	(0.56%)	0.80%
Spain	(0.39%)	1.50%
Italy	0.01%	3.15%
Greece	1.12%	4.18%
U.K.	0.77%	1.57%
Japan	(0.13%)	0.13%
Australia	1.89%	2.67%
China	2.97%	3.63%
Brazil	6.58%	11.76%
Russia	7.02%	8.69%

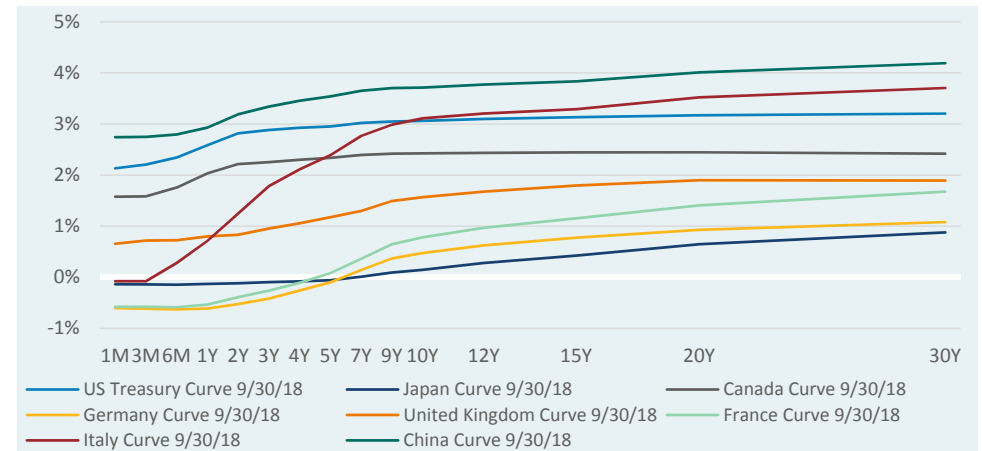
Source: Bloomberg, as of 9/30/18

# Yield environment

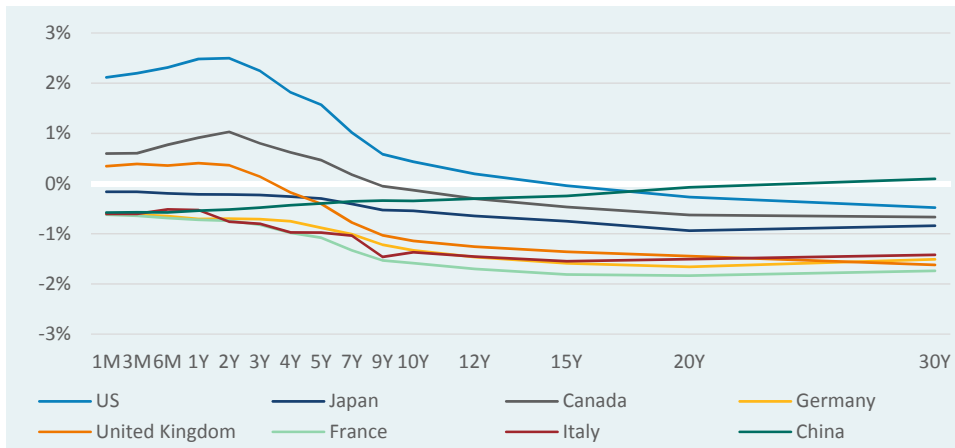
## U.S. YIELD CURVE



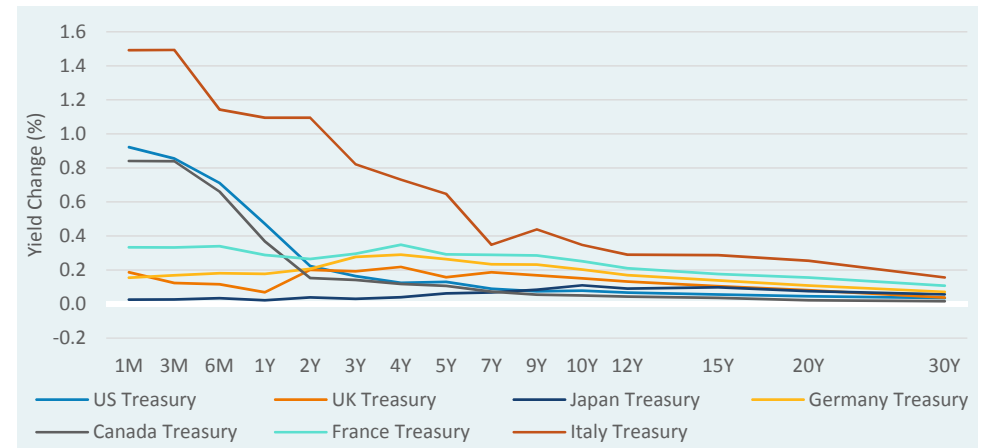
## GLOBAL GOVERNMENT YIELD CURVES



## YIELD CURVE CHANGES OVER LAST FIVE YEARS



## IMPLIED CHANGES OVER NEXT YEAR



Source: Bloomberg, as of 9/30/18

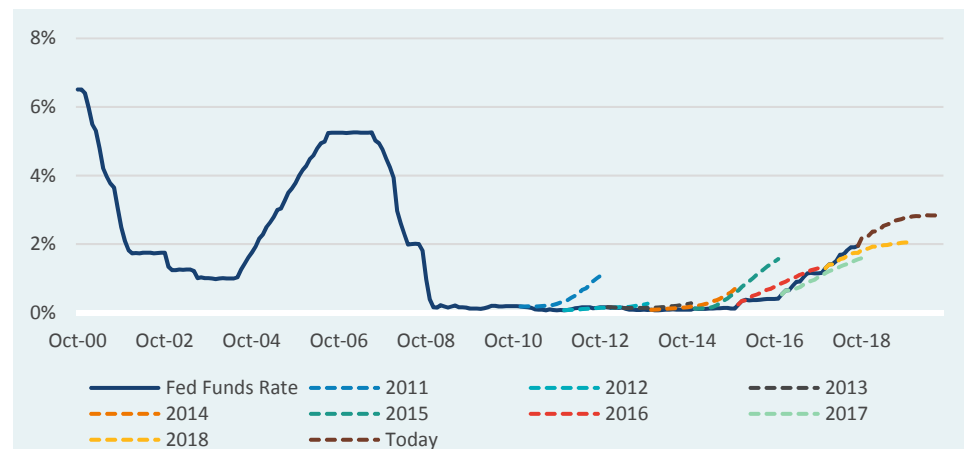
# Fed tightening vs. expectations

The market raised its expectations for further Fed tightening during the quarter. Investors are now pricing in a fourth rate hike in December, but only two more through the end of 2020, which would bring the fed funds rate to near 3%. Meanwhile, Fed officials have communicated a slightly more aggressive path of tightening with expectations to increase the benchmark interest rate to 3.4% by the end of 2020.

Over the past few years, there has been an interesting shift in how Fed policy has come in relative to market

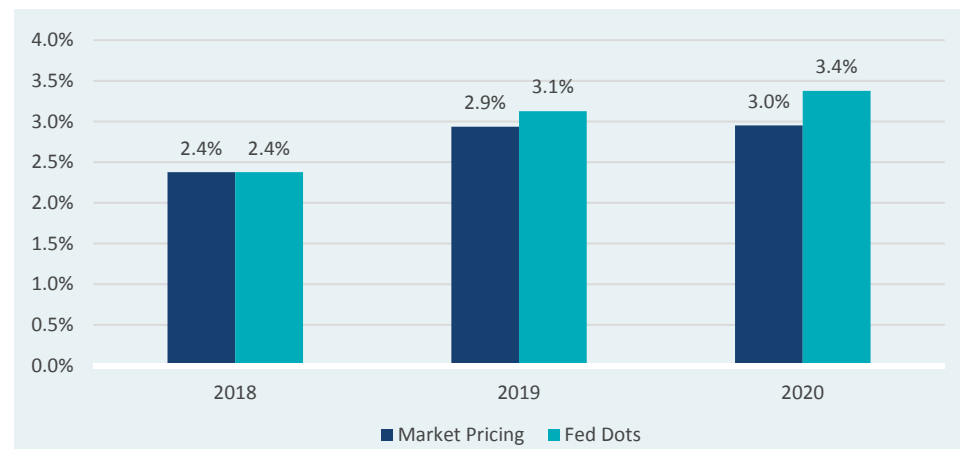
expectations. From 2010 to 2015, the market consistently overestimated when and by how much the Fed would hike rates. However, beginning in 2016 the Fed has been more aggressive than the market expected. Given the current differences between market pricing and Fed expectations, this trend has the potential to continue, which would likely act as a headwind to financial asset prices. However, it is important to remember that official guidance from the Fed dot plot assumes that economic conditions unfold as expected. Based on the uncertain future state of the economy, the Fed may be cautious relative its current expectations.

## FED FUNDS RATE VS. MARKET EXPECTATIONS



Source: Bloomberg, as of 9/30/18, dotted lines are forward pricing at the start of the year

## FED FUNDS EXPECTATIONS AT YEAR-END



Source: Bloomberg, Federal Reserve, as of 10/8/18

# Credit environment

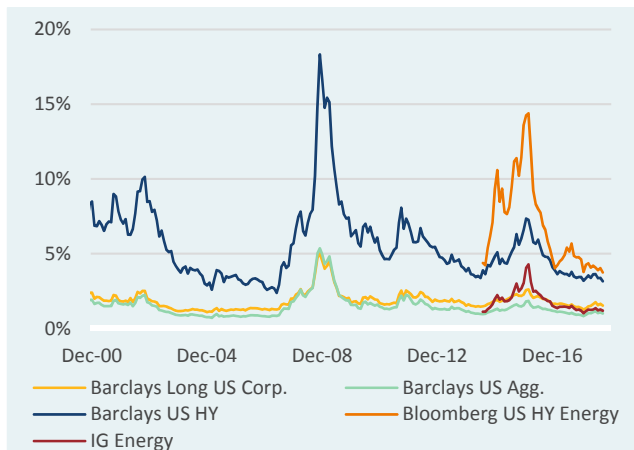
Spreads in both bank loans and high yield credit are well below their historical averages. Loans are outperforming high yield bonds for only the second time in the last 13 years. Bank loans have limited duration risk due to their floating-rate nature, which is a quality that some investors have seen as attractive due to the rising rate story. However, credit quality in bank loans has deteriorated throughout the cycle as covenant-lite loans have dominated new issuance. While bank loans offer interest rate protection and a small spread premium over high yield, investors may be paying for this by taking greater downside risk.

U.S. high yield option-adjusted spreads tightened to a decade low in September, despite concerns over a global growth slowdown, rising U.S. Treasury yields, and a volatile landscape in emerging markets. The asset class generated a 2.4% total return over the quarter.

Based on low interest rates and tight spreads, we do not believe investors are being properly compensated for credit risk and recommend an underweight to U.S. investment and high yield credit.

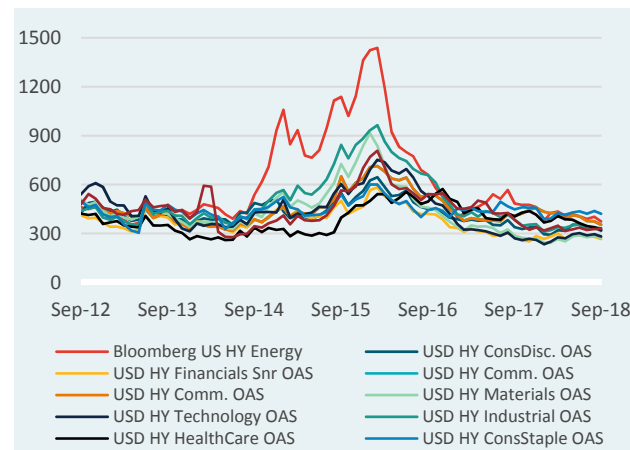
Credit spreads are tight across the capital structure

## SPREADS



Source: Barclays, Bloomberg, as of 9/30/18

## HIGH YIELD SECTOR SPREADS (BPS)



Source: Bloomberg, as of 9/30/18

Market	Credit Spread (OAS 9/30/18)	Credit Spread (1 Year Ago)
Long US Corporate	1.5%	1.5%
US Aggregate	1.0%	1.0%
US High Yield	3.2%	3.5%
US Bank Loans*	3.7%	4.2%

Source: Barclays, Credit Suisse, Bloomberg, as of 9/30/18

\*Discount margin 4-year life



# Issuance and default

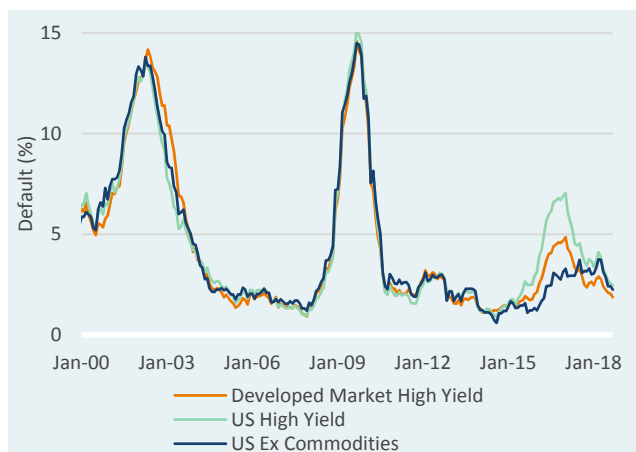
Default activity has been low and stable in the U.S. credit market. The par-weighted default rate remains below its long-term average of 3.0-3.5%, currently at 2.0% for high yield bonds. Total default activity in the last six months encompassed five defaults and \$3.8 billion in affected bonds and loans, the lightest volume over a six-month period since June 2011.

Senior loan and high yield markets have essentially recovered from a wave of defaults seen in 2015-2016, generated from the energy and metals/mining sectors.

Recovery rates for high yield bonds have vastly improved since that time.

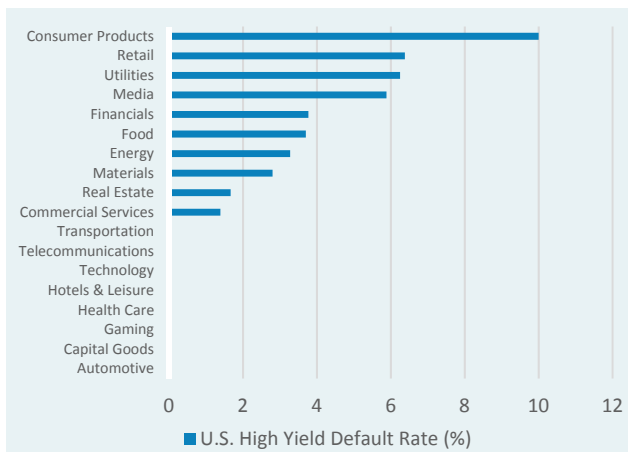
High yield new issue activity has totaled \$175 billion so far this year, which is down 35% over the same period a year ago. Meanwhile, issuance in leveraged loans totaled \$611 billion year-to-date. Notably, repricing activity represents 38% of total volume. New issue spreads continue to compress with strong demand supported by significant retail and institutional inflows into both high yield and senior loan asset classes, as well as CLO formation.

**HY DEFAULT TRENDS (ROLLING 1 YEAR)**



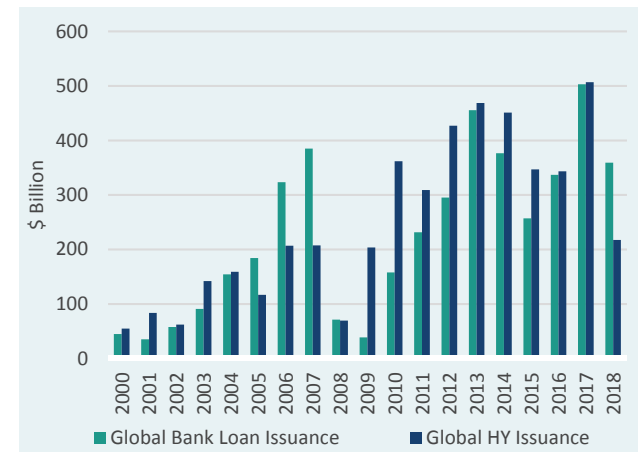
Source: BofA Merrill Lynch, as of 9/30/18

**HY SECTOR DEFAULTS (LAST 12 MONTHS)**



Source: BofA Merrill Lynch, as of 9/30/18 – par weighted

**GLOBAL ISSUANCE (BILLIONS)**



Source: Bloomberg, BofA Merrill Lynch, as of 9/30/18

# Equity

# Equity environment

- U.S. equities delivered strong returns during the quarter (S&P 500 +7.7%), and have outperformed year-to-date. We remain concerned about the large valuation difference between U.S. and international equities, though the relatively positive outlook for the domestic economy should justify some of the valuation difference.
- Emerging market equities delivered slight losses in Q3, but seem to have stabilized as currency depreciation subsided (MSCI Emerging Markets Index -1.1%, JP Morgan EM Currency Index -1.6%). Many emerging market currencies have rebounded from their lows. We maintain a positive outlook on emerging market equities.
- Developed non-U.S. equities have remained range bound following the selloff in the first quarter. International equity performance outside of emerging markets has been flat (MSCI EAFE +1.4% unhedged, +2.9% hedged).
- Another strong quarter of U.S. corporate earnings is expected in Q3 on both an absolute and relative basis. S&P 500 earnings and revenue growth is expected to be 19.3% and 6.9% YoY, respectively. Earnings growth in 2019 is expected to be 10.2% YoY.
- Large cap equities (Russell 1000 7.4%) outperformed small cap (Russell 2000 3.6%) during the quarter. Value stocks lagged growth by a similar margin (Russell 1000 Value 5.7% vs. Russell 1000 Growth 9.2%).
- The performance gap between growth and value equities widened further in Q3. The differential continued to be driven by strong returns generated by large names in the tech sector.

	QTD TOTAL RETURN		YTD TOTAL RETURN		1 YEAR TOTAL RETURN	
	(unhedged)	(hedged)	(unhedged)	(hedged)	(unhedged)	(hedged)
US Large Cap (Russell 1000)	7.4%		10.5%		17.8%	
US Small Cap (Russell 2000)	3.6%		11.5%		15.2%	
US Large Value (Russell 1000 Value)	5.7%		3.9%		9.5%	
US Large Growth (Russell 1000 Growth)	9.2%		17.1%		26.3%	
International Large (MSCI EAFE)	1.4%	2.9%	0.1%	2.9%	2.7%	7.1%
Eurozone (Euro Stoxx 50)	(0.2%)	1.2%	(2.5%)	1.6%	(4.6%)	(0.3%)
U.K. (FTSE 100)	(1.8%)	(0.2%)	(2.7%)	2.0%	3.2%	7.4%
Japan (NIKKEI 225)	6.2%	8.7%	6.8%	7.4%	19.7%	20.7%
Emerging Markets (MSCI Emerging Markets)	(1.1%)	(0.2%)	(7.7%)	(3.8%)	(0.8%)	1.9%

Source: Russell Investments, MSCI, STOXX, FTSE, Nikkei, as of 9/30/18

# Domestic equity

U.S. equities delivered strong returns during the quarter (S&P 500 +7.7%), and have outperformed year-to-date. Fears of trade conflict crowded the headlines, with the focus nearly all on China as the U.S. successfully concluded negotiations with other trading partners. Equity markets on both sides have generally rallied on news of potential resolution, though the performance gap between U.S. and Chinese equities has trended wider. Trade frictions will likely remain a headwind to performance.

Another strong quarter of U.S. corporate earnings is expected in Q3 on both an absolute and relative basis. S&P 500 earnings and revenue growth are expected to be 19.3% and 6.9% YoY, respectively. Earnings growth in 2019 is expected to be 10.2% YoY. If analyst forecasts are as overly optimistic as they typically are, this would put 2019 earnings growth at a more average rate of 5-6%. While average earnings growth can be conducive to moderate positive equity returns, current relatively high valuations could case concerns once growth rates decelerate.

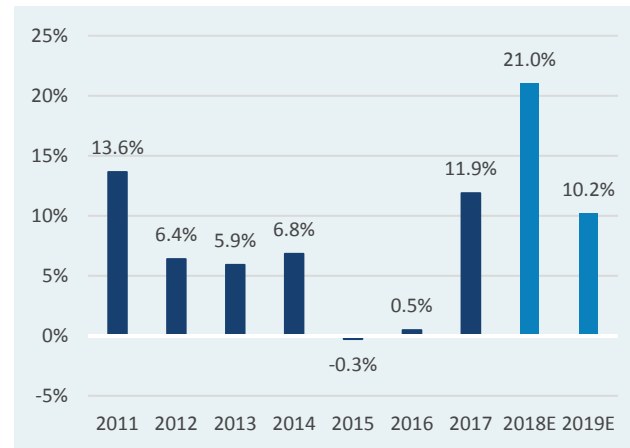
U.S. equities have risen with earnings growth and strong fundamentals, despite trade concerns

## U.S. EQUITIES



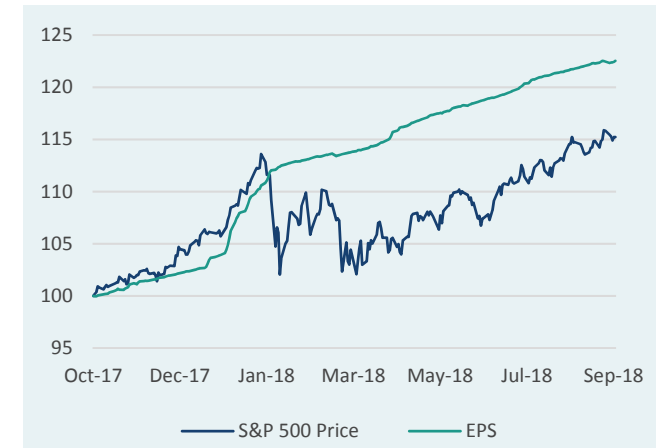
Source: Russell Investments, as of 9/30/18

## CALENDAR YEAR EARNINGS GROWTH



Source: FactSet, as of 10/12/18

## S&P 500 PRICE & EARNINGS



Source: Bloomberg, as of 9/30/18



# Domestic equity size & style

Large cap equities (Russell 1000 7.4%) outperformed small cap equities (Russell 2000 3.6%) during the quarter.

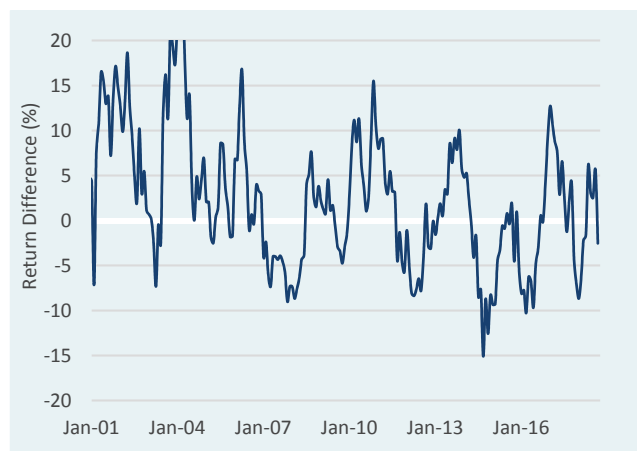
Growth stocks outpaced value stocks by a similar margin (Russell 1000 Growth 9.2% vs. Russell 1000 Value 5.7%).

Differences between sector composition in large-cap style benchmarks have explained much of the recent growth outperformance. Nearly 50% of the Russell 1000 Growth Index is in the more cyclical Information Technology and Consumer Discretionary sectors, which have been by far

and away the best performing sectors over the past year.

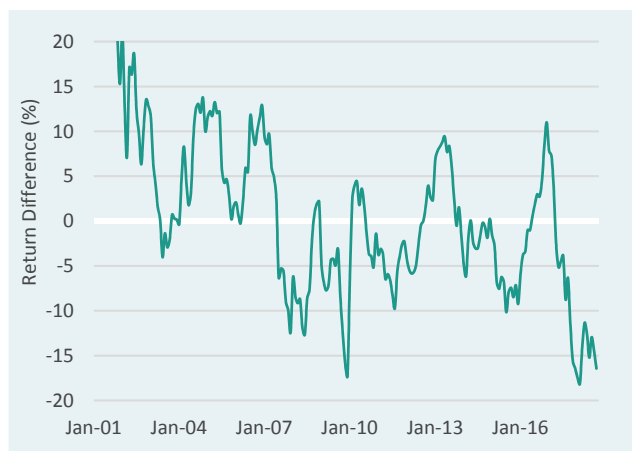
Size and value factor performance continues to frustrate investors. While the extent of underperformance is not anomalous, it may be testament to the long-term nature of factor investing. Unless an investor believes that these risk premia no longer exist, maintaining exposure and avoiding capitulation should be the primary goal.

**SMALL CAP VS LARGE CAP (YOY)**



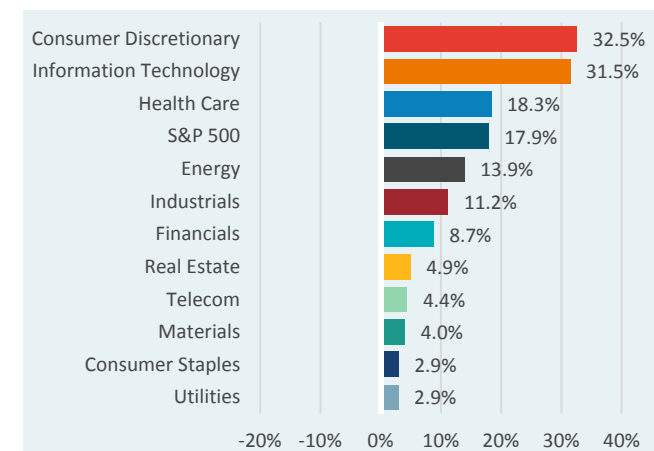
Source: FTSE, as of 9/30/18

**VALUE VS GROWTH (YOY)**



Source: FTSE, as of 9/30/18

**1-YEAR S&P 500 SECTOR RETURNS**



Source: Morningstar, as of 9/30/18

# International developed equity

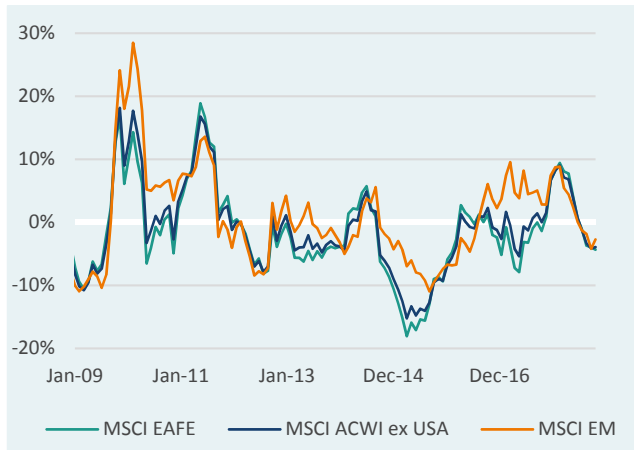
Unhedged international equities underperformed U.S. equities during Q3 (MSCI EAFE +1.4% vs. S&P 500 +7.7%). On a currency hedged basis, international equities delivered returns of 2.9%.

Currency movement continued to create losses for unhedged equity investors. U.S. investors that hedged their international equity exposure outperformed their unhedged peers by approximately 5% year-to-date (MSCI EAFE Index).

Regional divergence in earnings remained a story in Q3. Year-over-year growth in forward earnings reached 23% for U.S. equities, while estimates fell from 14% to 9% in emerging markets and from 12% to 10% in international developed markets, according to MSCI estimates.

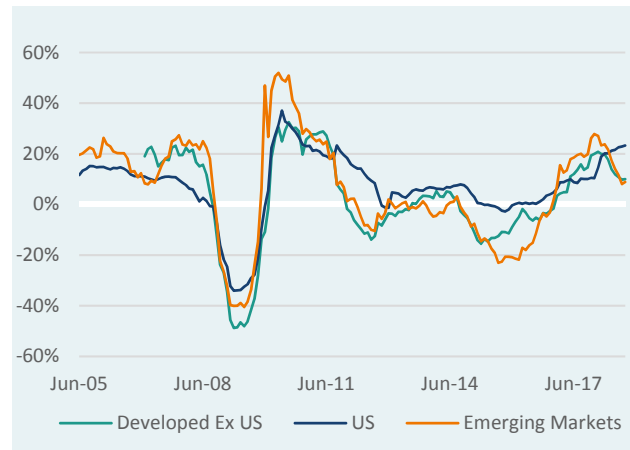
Differences in forward P/E multiples between U.S. and non-U.S. equities remained high. At quarter-end, this valuation gap relative to international developed equity ranked in the 96<sup>th</sup> percentile since 2005. The U.S.-EM valuation gap ranked in the 89<sup>th</sup> percentile over the same period.

**EFFECT OF CURRENCY (1-YEAR ROLLING)**



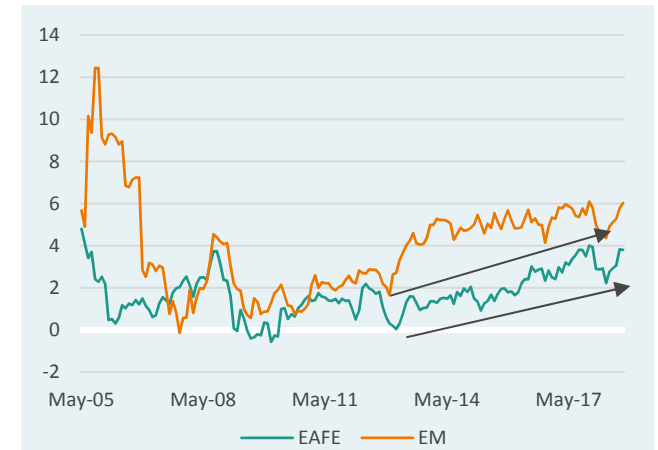
Source: MSCI, as of 9/30/18

**EARNINGS GROWTH (YOY)**



Source: MSCI, as of 9/30/18 – YoY growth in forward earnings

**FORWARD P/E SPREADS RELATIVE TO U.S.**



Source: MSCI, as of 9/30/18

# Emerging market equity

Emerging market equities delivered a slight loss in Q3 but seem to have stabilized as currency depreciation subsided (MSCI Emerging Markets Index -1.1%, JP Morgan EM Currency Index -1.6%). Many of these currencies have rebounded from their lows.

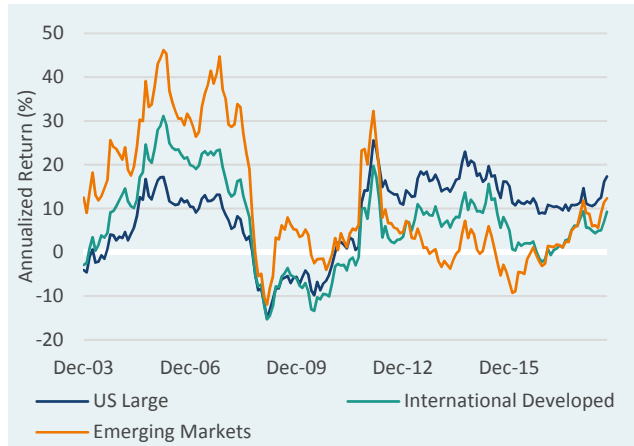
Developed markets are expected to grow less quickly in the coming years while emerging economic growth is expected to rise. A positive growth premium of emerging economies relative to developed economies has

historically acted as a tailwind for EM outperformance.

We believe positive emerging economy growth trends, attractive valuations, a strong earnings environment, and depressed currencies should provide an environment of strong relative equity performance across these markets.

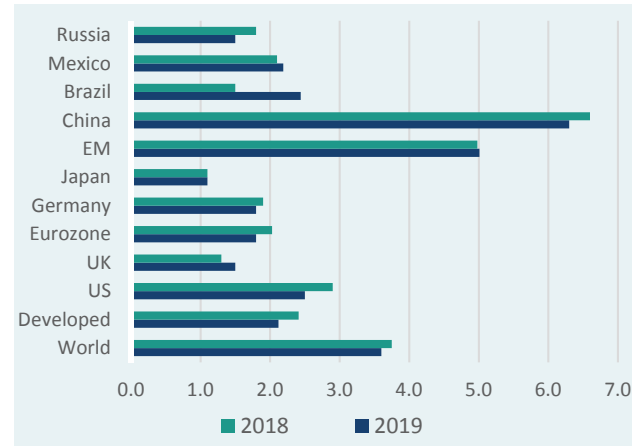
Conditions remain positive for medium-term EM equity performance, though volatility may persist

**EQUITY PERFORMANCE (3YR ROLLING)**



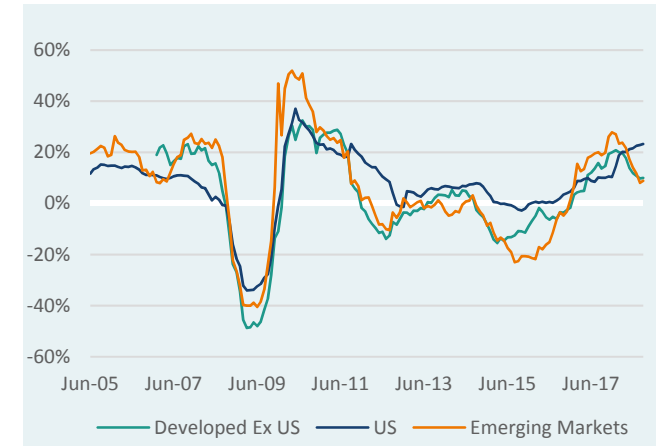
Source: Standard & Poor's, MSCI, as of 9/30/18

**GDP GROWTH EXPECTATIONS (%)**



Source: Bloomberg, as of 9/30/18

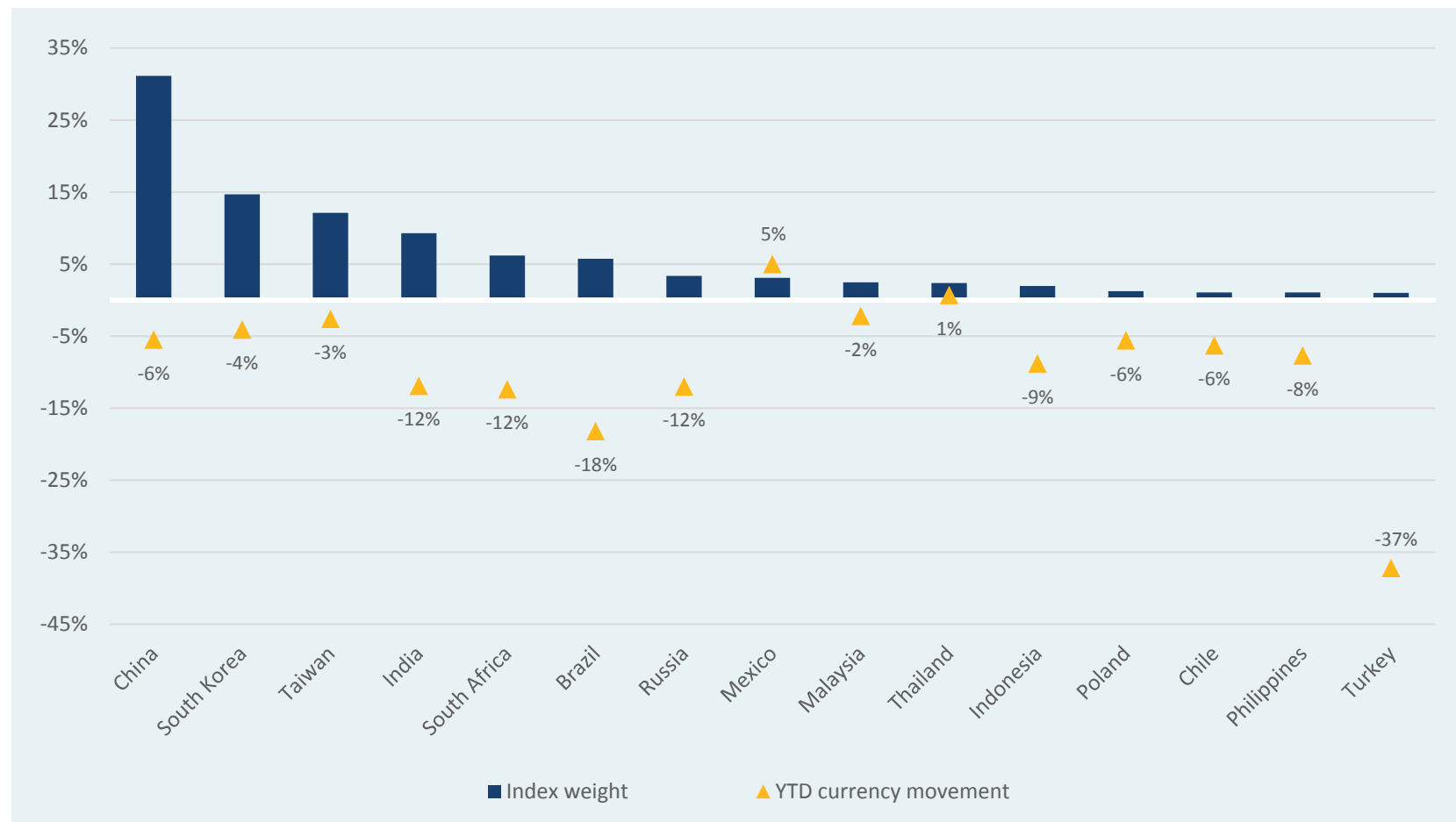
**EARNINGS GROWTH (YOY)**



Source: MSCI, as of 9/30/18 – YoY growth in forward earnings

# Emerging market currency movement

Currency moves across most of EM are in-line with DM (~5% depreciation)



South Africa, Brazil, and Russia are causing greater currency pain in EM

Many of these currencies have recovered some of their losses

Source: MSCI, Bloomberg, as of 9/30/18

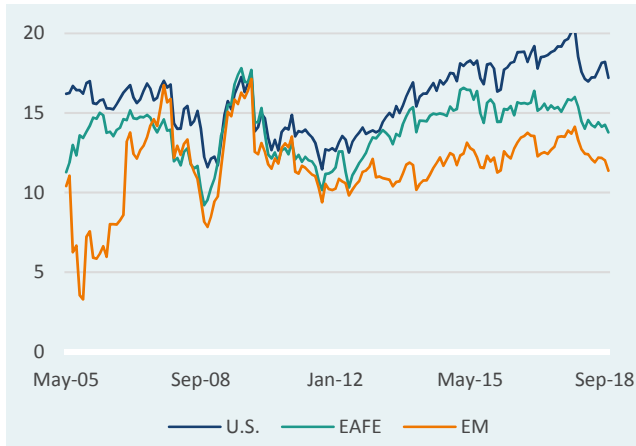


# Equity valuations

Forward equity P/E multiples moved lower during the quarter and year-to-date as strong earnings growth expectations came to fruition. We remain concerned about the large valuation difference between U.S. and international equities, though the relatively positive domestic economic outlook and strong expected earnings growth through year-end should justify some of the valuation difference. However, because a significant portion of U.S. earnings outperformance has been due to a one-time tax cut, it may become more difficult to justify the valuation disparity beyond 2018.

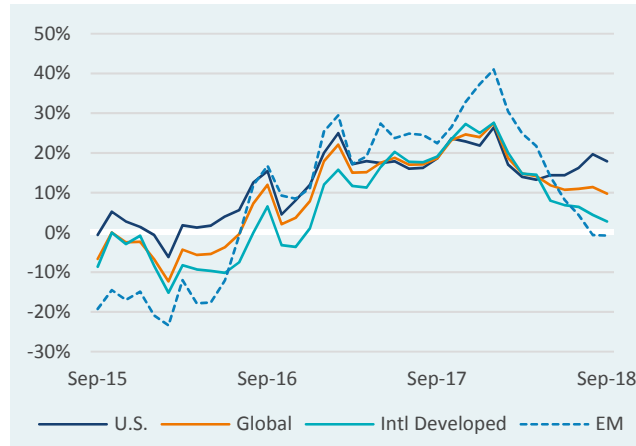
Looking at markets through our *carry, value, trend, and macro* lens, carry and value have improved through lower prices and higher underlying earnings. Trend has flattened out in international markets as equity performance has been rangebound year-to-date. The macro environment has weakened outside the U.S., with economic data indicating a more average backdrop.

**FORWARD P/E RATIOS**



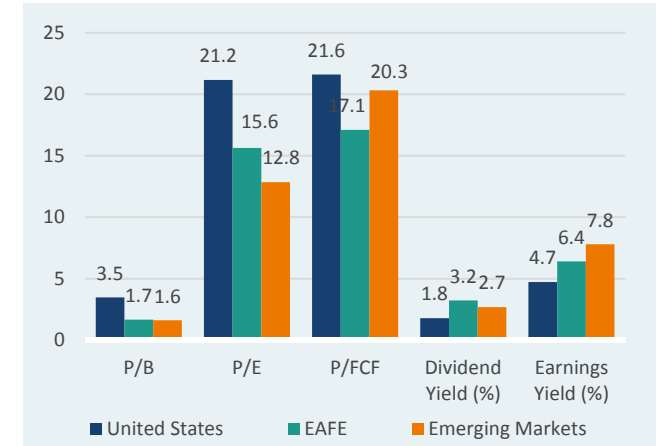
Source: MSCI, as of 9/30/18

**MOMENTUM (1YR)**



Source: Standard & Poor's, MSCI, as of 9/30/18

**VALUATION METRICS (3-MONTH AVERAGE)**



Source: Bloomberg, as of 9/30/18 - trailing P/E

# Equity volatility

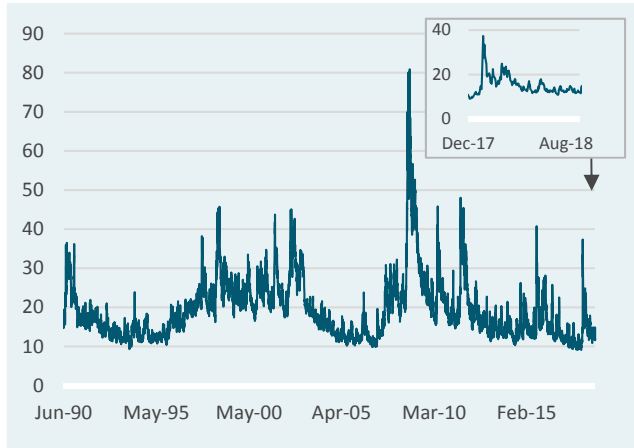
U.S. equity volatility remains muted. The VIX index ranged from 11 to 16 for the entirety of the quarter. Despite such an extended period of below-average volatility, it may be helpful to remember that the VIX Index has averaged 19.3 since 1990. Volatility has remain depressed or elevated for extended periods of time.

Realized volatility of the S&P 500 was below average at 9.1%. International equities have also exhibited muted volatility (MSCI EAFE 9.1%, MSCI Emerging Markets 13.3%).

Stories of idiosyncratic emerging market crises dominated news headlines over the quarter. However, emerging market equity volatility is at an average level (MSCI EM). At the end of the third quarter, the one-month implied volatility of the index was 17.1%, slightly below its three-year average of 18.5%. In Q3, the MSCI EM Index fell 1.1%, bringing the year-to-date decline to 7.7%.

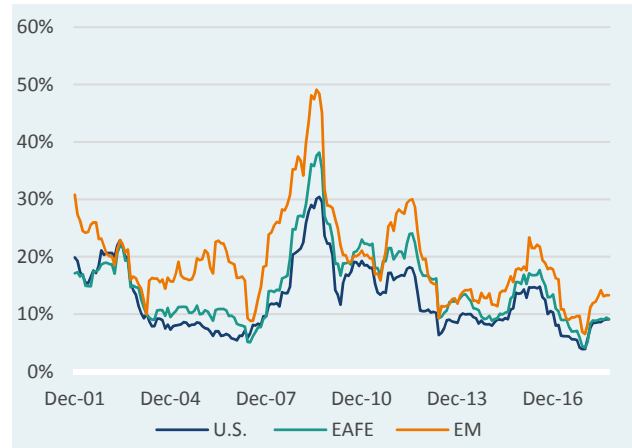
Global equity volatility remained below average

U.S. IMPLIED VOLATILITY (VIX)



Source: CBOE, as of 9/30/18

REALIZED 1-YEAR ROLLING VOLATILITY



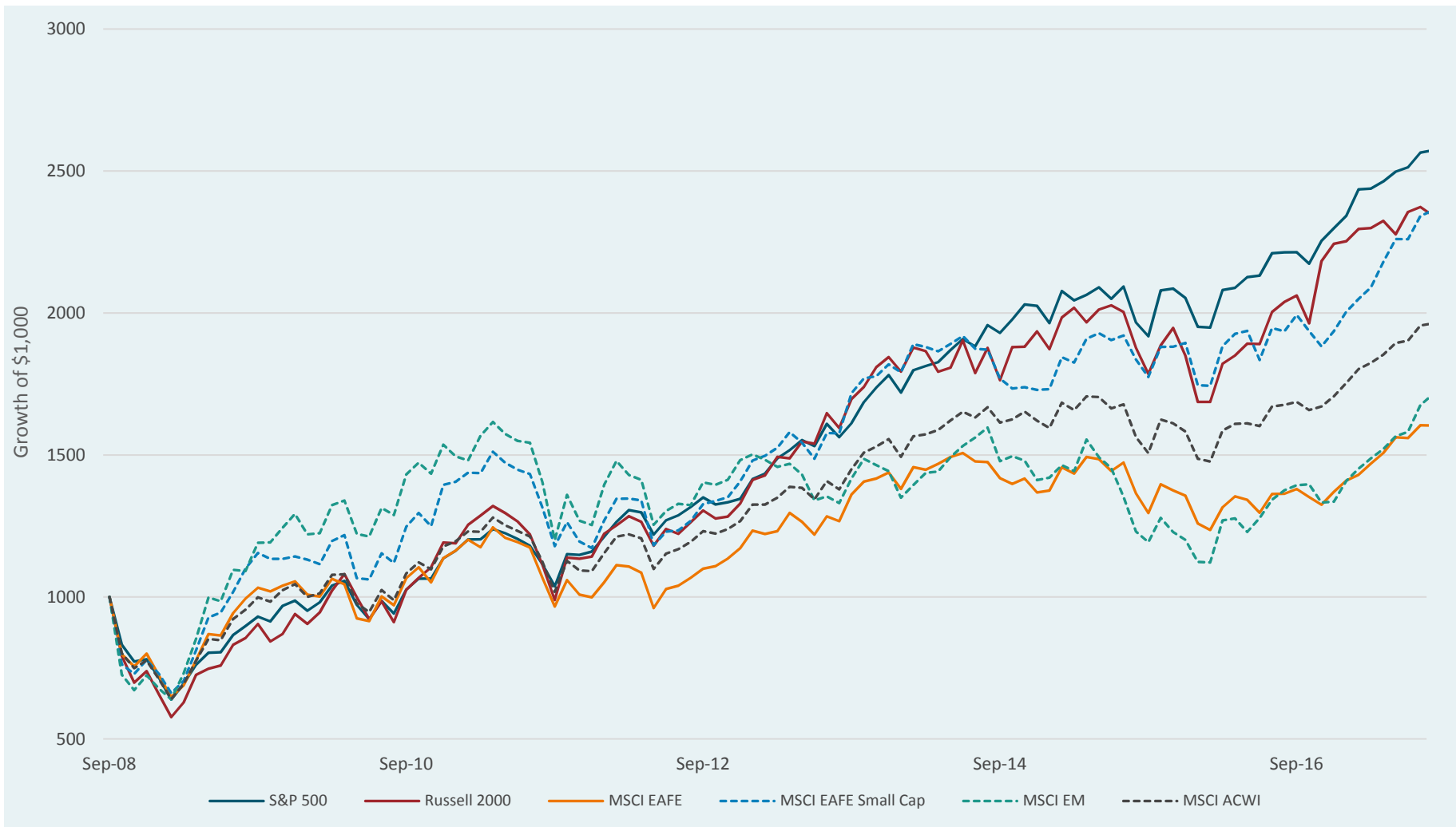
Source: Bloomberg, as of 9/30/18

MSCI EM INDEX 1-MONTH IMPLIED VOLATILITY



Source: Bloomberg, as of 9/30/18

# Long-term equity performance



Source: Morningstar, as of 9/30/18

# Other assets



# Currency

The U.S. dollar appreciated 1% during the quarter on a trade-weighted dollar basis. A stable dollar going forward would help dampen the volatility of unhedged equity investments, particularly in emerging markets where currency moves have been larger. Some of the worst performing emerging market currencies have partially recovered from 2<sup>nd</sup> quarter losses.

Major currencies have fluctuated widely relative to the U.S. dollar in 2018. Most currencies strengthened through the first quarter, but this trend reversed when international economic growth began to show weakness, which helped

push up the value of the dollar. Because foreign currencies have been positively correlated with equity markets, these movements have added to total volatility.

Wide short-term interest rate differentials between the U.S. and the rest of the world have created a tailwind for those hedging U.S. dollar exposures. For example, based on current FX forward pricing, an investor would lock in an annualized gain of 3.3% when hedging the euro, which is typically the biggest foreign currency exposure in portfolios.

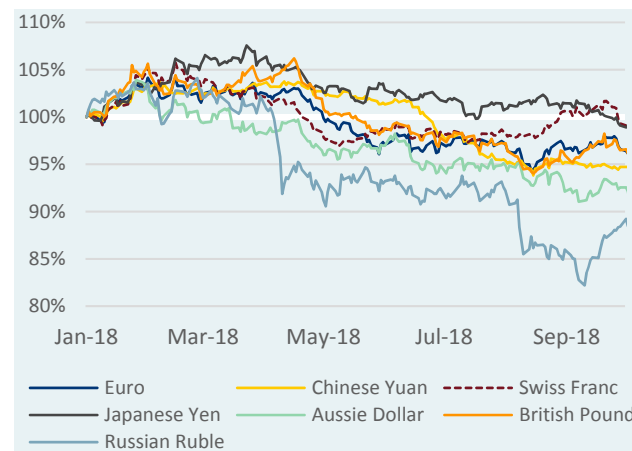
The U.S. dollar materially appreciated, reversing a multi-year downtrend

U.S. DOLLAR TRADE WEIGHTED INDEX



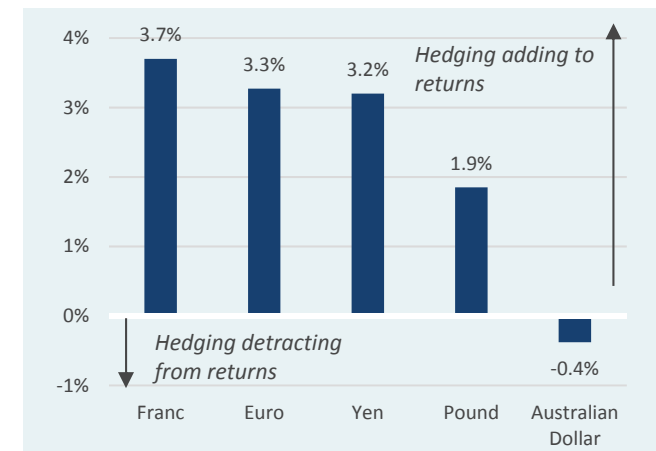
Source: Federal Reserve, as of 9/30/18

USD MOVES VS MAJOR CURRENCIES



Source: Verus, Bloomberg, as of 9/30/18

ANNUALIZED FX HEDGING COSTS (GAINS)



Source: Bloomberg, as of 9/30/18, based on 3-month FX forwards

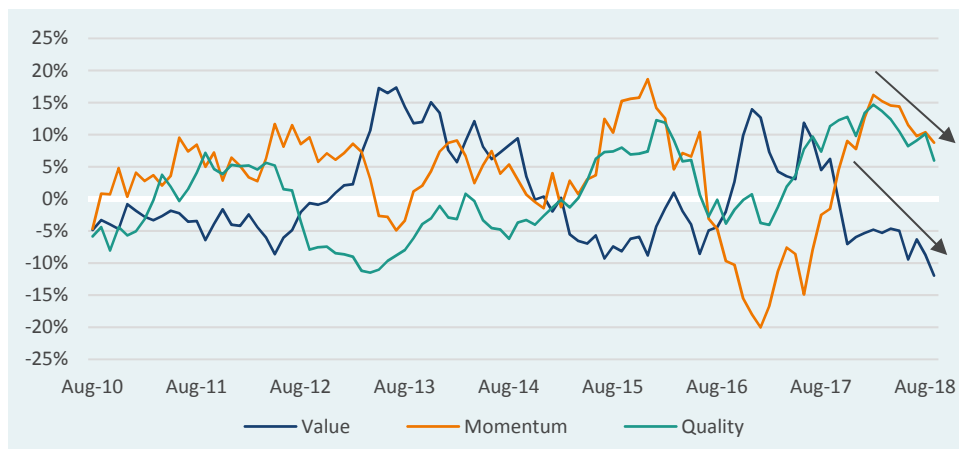
# Alternative beta

Alternative beta strategies have suffered sharp losses so far this year, near a two standard deviation downside event for many strategies based on historical returns and volatility. Returns from managers we follow were better in the third quarter, but most strategies are still digging out of a hole created in the first two quarters of the year. Factor exposure, in particular equity value, can help explain some of the poor performance. The long drawdown in the value factor has come at a time when other factors that are often relied on in alt beta strategies, including trend-following and short volatility, have also experienced losses. The magnitude of the

drawdown in the value factor is within normal bounds based on history, but it has been the longest on record. Momentum in U.S. equities has performed well, but this has not been enough to offset negative value returns.

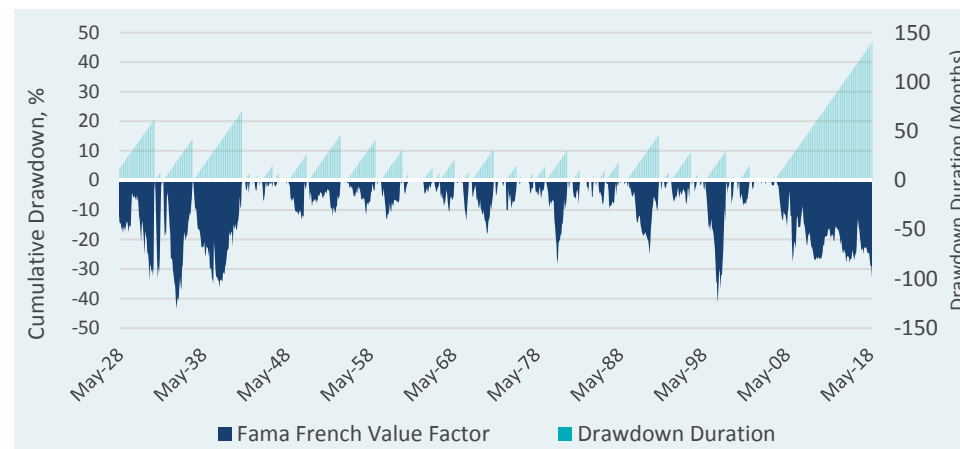
We reiterate our belief that alternative beta strategies are not “broken” per se, but instead have reflected extreme drawdowns in some factors and muted returns in others. We will continue to closely monitor these strategies and engage in frequent discussions with managers.

**U.S. MARKET NEUTRAL FACTOR PERFORMANCE (12-MONTH ROLLING)**



Source: S&P Dow Jones, Thematic Market Neutral Indices, as of 9/30/18

**VALUE FACTOR DRAWDOWN MAGNITUDE AND DURATION**



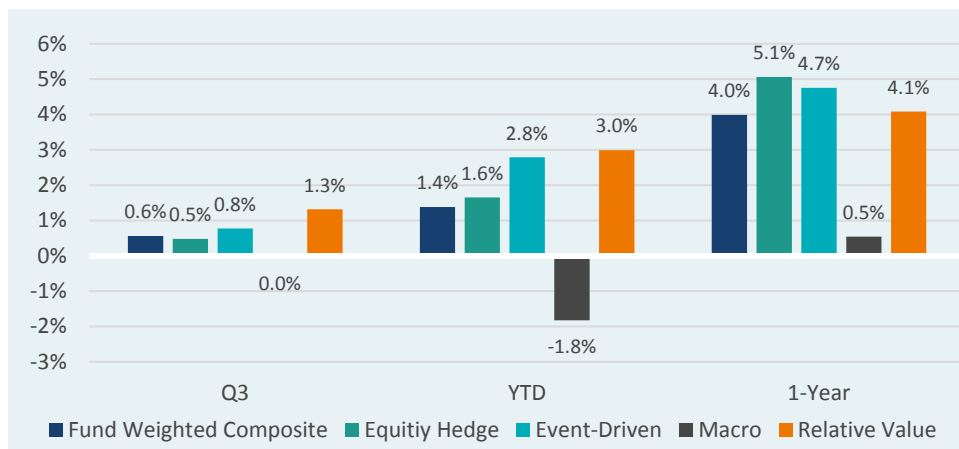
Source: Kenneth French Data Library, as of 8/31/18

# Hedge funds

Hedge funds delivered modestly positive results across strategies in Q3 (HFRI Fund Weighted Composite +0.6%). Equity-focused managers had mixed results. Funds specializing in health care (+5.0%) stood out as strong performers. At the beginning of the quarter, growth-oriented managers had enjoyed a run of favorable results relative to value-oriented peers dating back to Q4 2017. Growth manager results relative to peers suffered as a narrow set of high growth equity names sold off in the quarter. Many other equity-focused managers were marginally positive or flat. Emerging market fund results ranged from small losses in Latin America to significant losses in China and India.

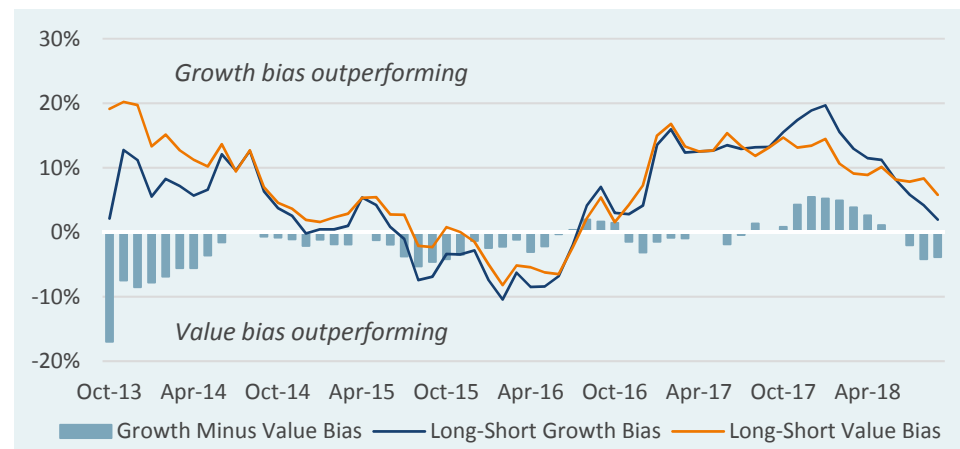
Within the fixed income markets, managers that focused on the credit and asset-backed securities sectors, in aggregate, were up about +1.5% for the quarter. Most other fixed income focused investment styles were modestly positive to flat for the period. Due to the relatively tight credit spreads, many credit-oriented managers are now carefully allocating capital to idiosyncratic long positions to protect against downside losses from a potential increase in spreads.

## HFRI HEDGE FUND STYLE PERFORMANCE



Source: HFRI, as of 9/30/18

## GROWTH VS VALUE BIAS IN LONG-SHORT EQUITY MANAGERS (1-YR ROLLING PERFORMANCE)



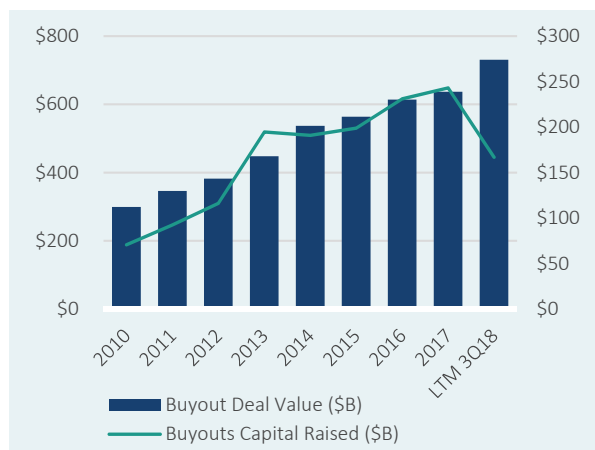
Source: HFRI, as of 9/30/18

# Private markets

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

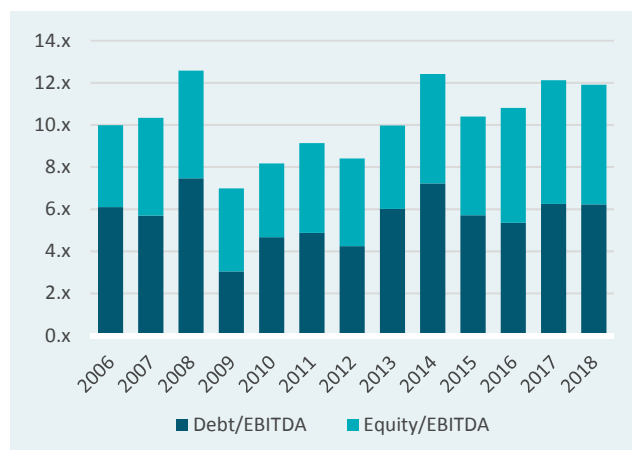
- Buyout activity has continued to increase in 2018. Through the third quarter buyouts are up 25% and 24% when measured by dollar value and number of transactions, respectively. The size of the average buyout is virtually unchanged from 2017 (\$142 million). Unlike deal flow, fund capital raising has slowed from the peaks of 2017. Only 143 buyout funds representing \$121 billion closed so far this year, down from 184 funds representing \$178 billion through the same period last year. Trailing-twelve-month funds raised is down 25% from a record \$224 billion in 2017.
- Buyout multiples are largely unchanged from 2017. Average EV/EBITDA is 11.9x through September 30, 2018 (down from 12.1x in 2017) with debt multiples averaging 5.7x through the third quarter. Debt as a percentage of transaction value remains at 50%, which is down from 60% in 2013.
- Venture capital fundraising and deal volumes continue to set records. \$32 billion of venture capital has been raised in the U.S. through the first 9 months of 2018, an increase of 33% over the same period last year. Similarly, venture deals are up 37%. In fact, year-to-date venture deal volume (\$84 billion) exceeds the record of \$82 billion that was set in 2017.
- Balancing high deal multiples and a growing number of deals against a slowdown in fundraising, we advocate selectivity in fund investments.

**BUYOUTS DEAL VOLUME & CAPITAL RAISED**



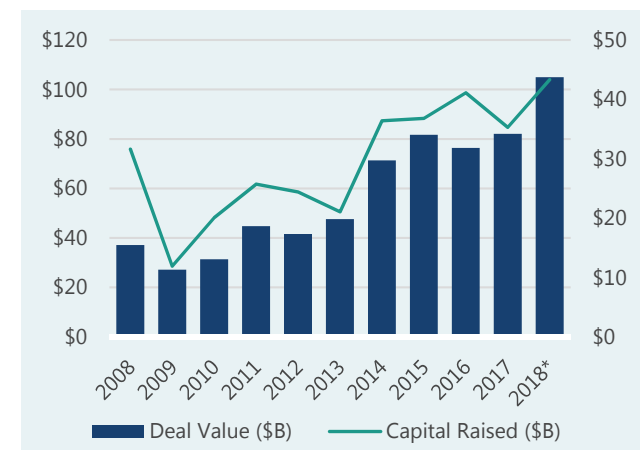
Source: PitchBook

**TRANSACTION MULTIPLES**



Source: PitchBook

**VENTURE DEAL VOLUME & FUNDRAISING**



Source: PitchBook



# Appendix

# Periodic table of returns

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	YTD	5-Year	10-Year
Large 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	17.1	16.6	14.3
Small 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	15.8	13.7	12.7
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	11.5	12.1	12.1
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	10.5	11.1	11.1
Small 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	7.1	10.7	9.8
Large 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	3.9	9.9	9.5
Real Estate	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	3.5	9.2	6.3
60/40 Global Portfolio	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	1.4	5.6	6.2
Cash	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	1.3	4.4	5.4
Hedge Funds of Funds	-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	1.2	3.6	5.4
International Equity	-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	5.1	-1.4	3.2	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	-1.6	2.2	2.6
Commodities	-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	-2.0	0.5	0.3
Emerging Markets Equity	-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	-7.7	-7.2	-6.2

WORST

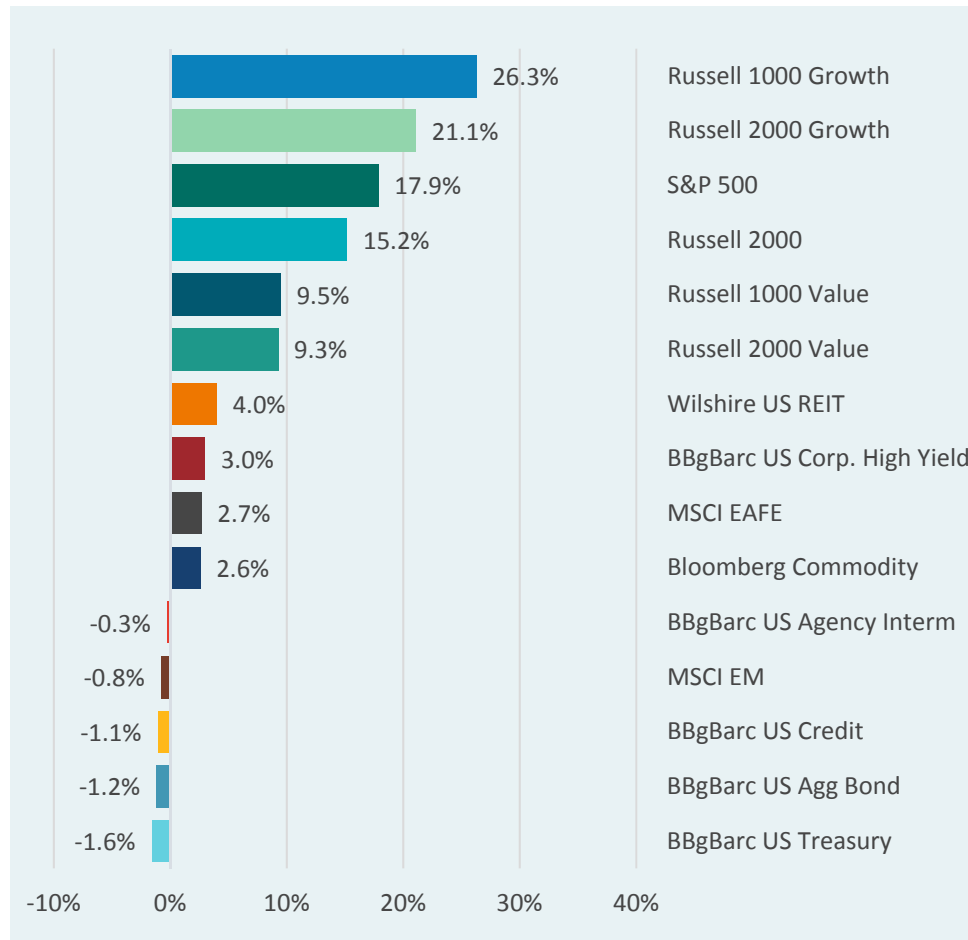
BEST

<span style="color: #ADD8E6;">■</span> Large Cap Equity	<span style="color: #006400;">■</span> Small Cap Growth	<span style="color: #8B4513;">■</span> Commodities
<span style="color: #008080;">■</span> Large Cap Value	<span style="color: #FFD700;">■</span> International Equity	<span style="color: #4682B4;">■</span> Real Estate
<span style="color: #000080;">■</span> Large Cap Growth	<span style="color: #FF8C00;">■</span> Emerging Markets Equity	<span style="color: #90EE90;">■</span> Hedge Funds of Funds
<span style="color: #7FFFD4;">■</span> Small Cap Equity	<span style="color: #808080;">■</span> US Bonds	<span style="color: #FF0000;">■</span> 60% MSCI ACWI/40% BBgBarc Global Bond
<span style="color: #008000;">■</span> Small Cap Value	<span style="color: #D3D3D3;">■</span> Cash	

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 6/30/18.

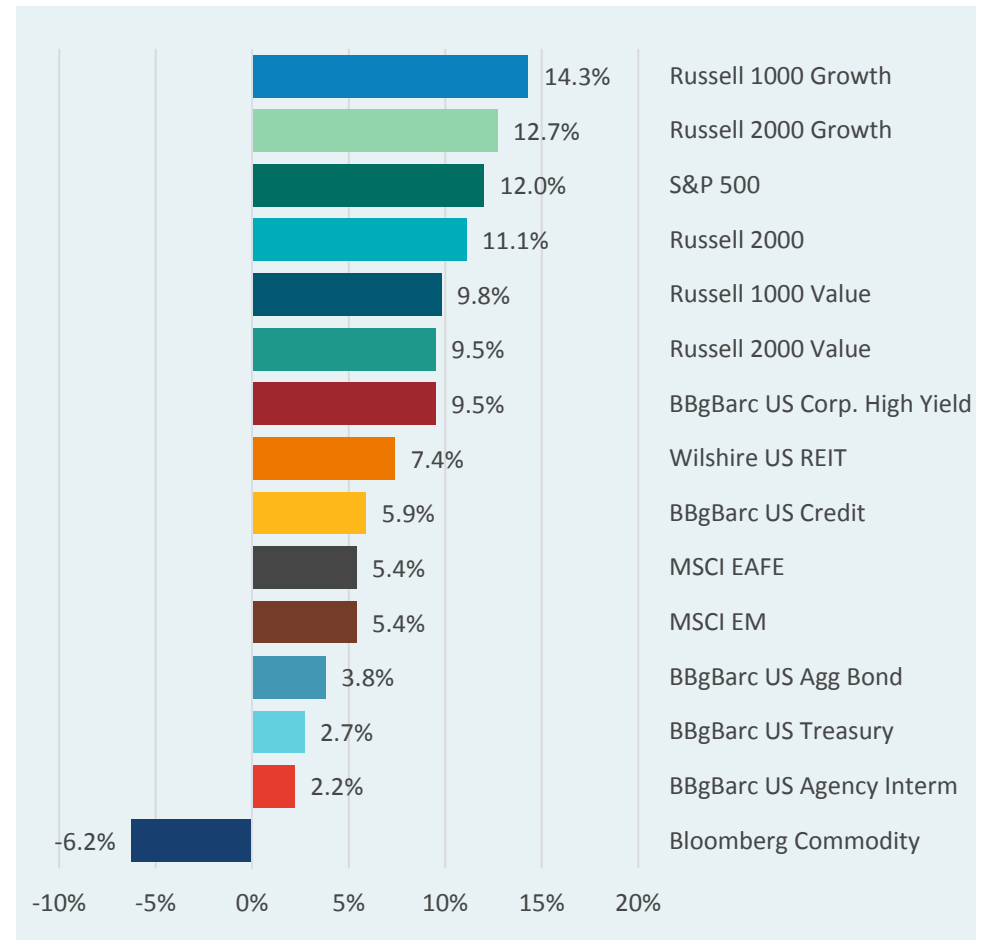
# Major asset class returns

ONE YEAR ENDING SEPTEMBER



Source: Morningstar, as of 9/30/18

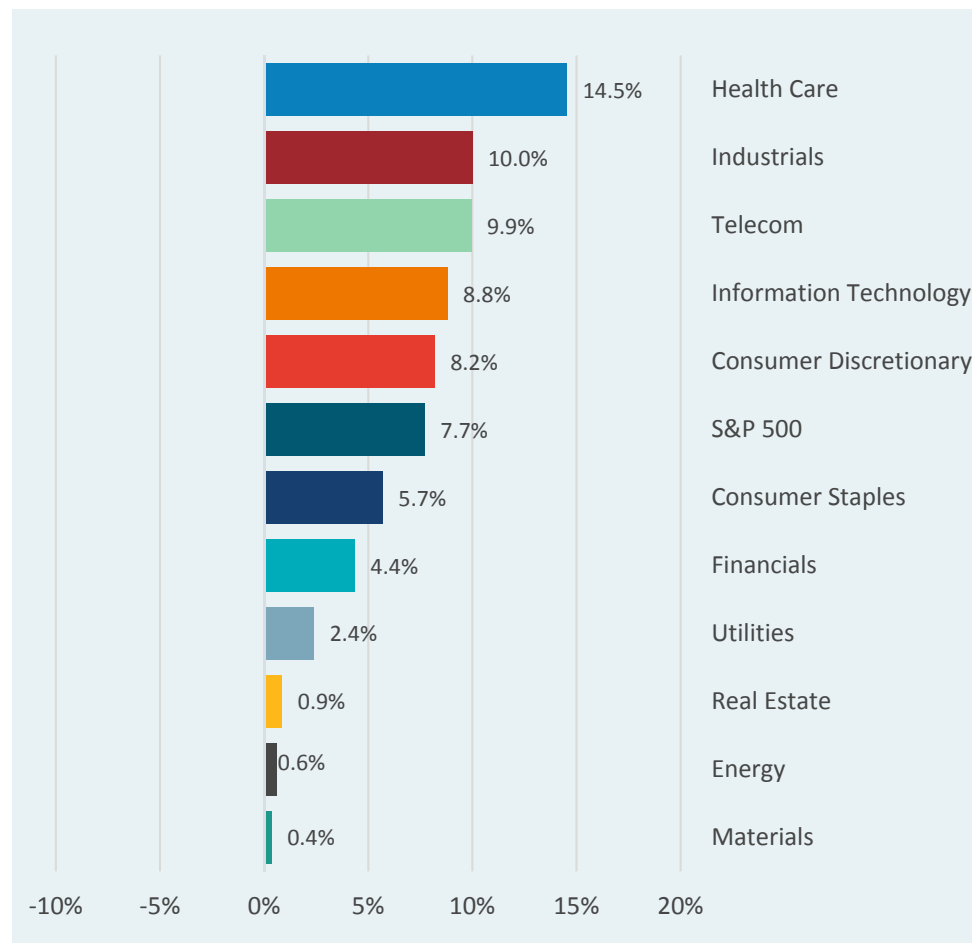
TEN YEARS ENDING SEPTEMBER



Source: Morningstar, as of 9/30/18

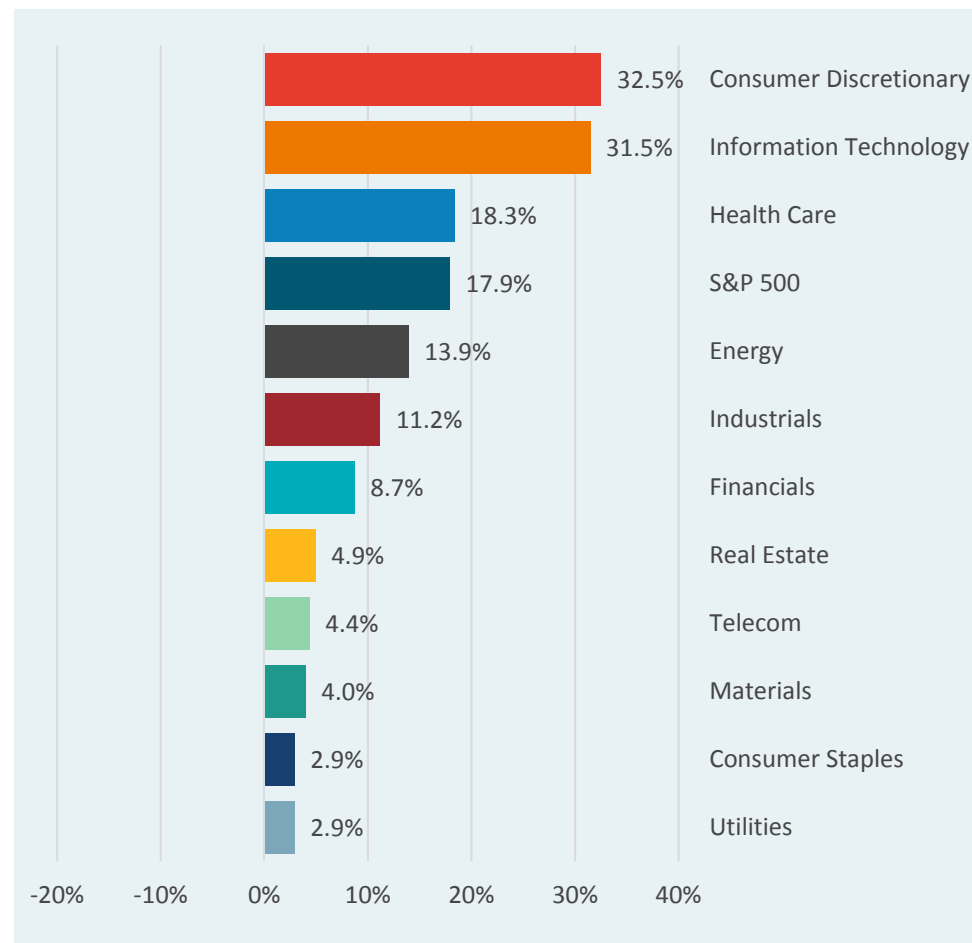
# S&P 500 sector returns

THIRD QUARTER



Source: Morningstar, as of 9/30/18

ONE YEAR ENDING SEPTEMBER



Source: Morningstar, as of 9/30/18



# Detailed index returns

## DOMESTIC EQUITY

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
<b>Core Index</b>							
S&P 500	0.6	7.7	10.6	17.9	17.3	13.9	12.0
S&P 500 Equal Weighted	0.1	5.4	7.3	13.9	15.4	12.5	13.1
DJ Industrial Average	2.0	9.6	8.8	20.8	20.5	14.6	12.2
Russell Top 200	0.8	8.4	11.7	19.3	18.1	14.5	12.0
Russell 1000	0.4	7.4	10.5	17.8	17.1	13.7	12.1
Russell 2000	(2.4)	3.6	11.5	15.2	17.1	11.1	11.1
Russell 3000	0.2	7.1	10.6	17.6	17.1	13.5	12.0
Russell Mid Cap	(0.6)	5.0	7.5	14.0	14.5	11.7	12.3
<b>Style Index</b>							
Russell 1000 Growth	0.6	9.2	17.1	26.3	20.6	16.6	14.3
Russell 1000 Value	0.2	5.7	3.9	9.5	13.6	10.7	9.8
Russell 2000 Growth	(2.3)	5.5	15.8	21.1	18.0	12.1	12.7
Russell 2000 Value	(2.5)	1.6	7.1	9.3	16.1	9.9	9.5

## INTERNATIONAL EQUITY

<b>Broad Index</b>							
MSCI ACWI	0.4	4.3	3.8	9.8	13.4	8.7	8.2
MSCI ACWI ex US	0.5	0.7	(3.1)	1.8	10.0	4.1	5.2
MSCI EAFE	0.9	1.4	(1.4)	2.7	9.2	4.4	5.4
MSCI EM	(0.5)	(1.1)	(7.7)	(0.8)	12.4	3.6	5.4
MSCI EAFE Small Cap	(0.7)	(0.9)	(2.2)	3.7	12.4	8.0	9.7
<b>Style Index</b>							
MSCI EAFE Growth	(0.2)	1.5	0.6	5.8	10.3	5.6	6.2
MSCI EAFE Value	2.1	1.2	(3.5)	(0.4)	8.1	3.1	4.5
<b>Regional Index</b>							
MSCI UK	1.8	(1.7)	(2.7)	2.9	6.2	2.2	4.9
MSCI Japan	3.0	3.7	1.6	10.2	12.1	6.8	6.0
MSCI Euro	(0.1)	(0.4)	(3.6)	(3.2)	8.5	3.9	3.4
MSCI EM Asia	(1.7)	(1.8)	(6.8)	1.0	13.5	6.7	8.2
MSCI EM Latin American	4.7	4.8	(6.9)	(9.1)	13.7	(2.3)	0.7

Source: Morningstar, HFR, as of 9/30/18

## FIXED INCOME

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
<b>Broad Index</b>							
BBgBarc US TIPS	(1.1)	(0.8)	(0.8)	0.4	2.0	1.4	3.3
BBgBarc US Treasury Bills	0.2	0.5	1.3	1.5	0.8	0.5	0.4
BBgBarc US Agg Bond	(0.6)	0.0	(1.6)	(1.2)	1.3	2.2	3.8
<b>Duration</b>							
BBgBarc US Treasury 1-3 Yr	(0.1)	0.2	0.2	(0.0)	0.4	0.6	1.1
BBgBarc US Treasury Long	(3.0)	(2.9)	(5.8)	(3.6)	0.7	4.4	5.5
BBgBarc US Treasury	(0.9)	(0.6)	(1.7)	(1.6)	0.2	1.3	2.7
<b>Issuer</b>							
BBgBarc US MBS	(0.6)	(0.1)	(1.1)	(0.9)	1.0	2.0	3.3
BBgBarc US Corp. High Yield	0.6	2.4	2.6	3.0	8.1	5.5	9.5
BBgBarc US Agency Interm	(0.2)	0.2	0.0	(0.3)	0.6	1.1	2.2
BBgBarc US Credit	(0.3)	0.9	(2.1)	(1.1)	3.0	3.4	5.9

## OTHER

<b>Index</b>							
Bloomberg Commodity	1.9	(2.0)	(2.0)	2.6	(0.1)	(7.2)	(6.2)
Wilshire US REIT	(2.8)	(5.4)	2.2	4.0	7.1	9.2	7.4
CS Leveraged Loans	0.7	4.4	4.4	5.6	5.4	4.4	5.8
Alerian MLP	(2.0)	7.0	5.2	3.3	3.9	(2.8)	10.0
<b>Regional Index</b>							
JPM EMBI Global Div	1.5	2.3	(3.0)	(1.9)	6.0	5.4	7.5
JPM GBI-EM Global Div	2.6	(1.8)	(8.1)	(7.4)	5.2	(1.7)	2.7
<b>Hedge Funds</b>							
HFRI Composite	(0.2)	0.6	1.5	4.1	5.4	4.1	4.6
HFRI FOF Composite	(0.0)	0.4	1.2	3.3	3.4	3.2	2.6
<b>Currency (Spot)</b>							
Euro	(0.2)	(0.5)	(3.3)	(1.8)	1.3	(3.0)	(1.9)
Pound	0.3	(1.2)	(3.6)	(2.8)	(4.9)	(4.2)	(3.1)
Yen	(2.4)	(2.5)	(0.8)	(0.9)	1.8	(2.9)	(0.7)

# 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.lanqerresearch.com](http://www.lanqerresearch.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](http://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/>)

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# Contra Costa County Employees' Retirement Association

Investment Performance Review

Period Ending: September 30, 2018



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SEATTLE 206-622-3700

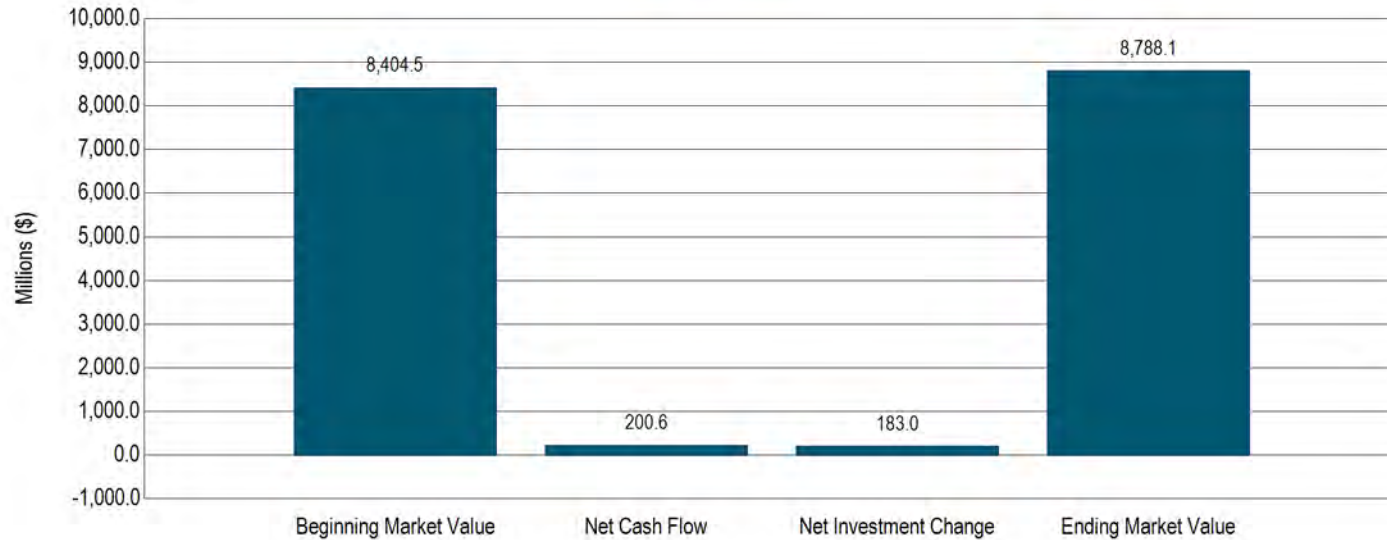
LOS ANGELES 310-297-1777

SAN FRANCISCO 415-362-3484

**Portfolio Reconciliation**

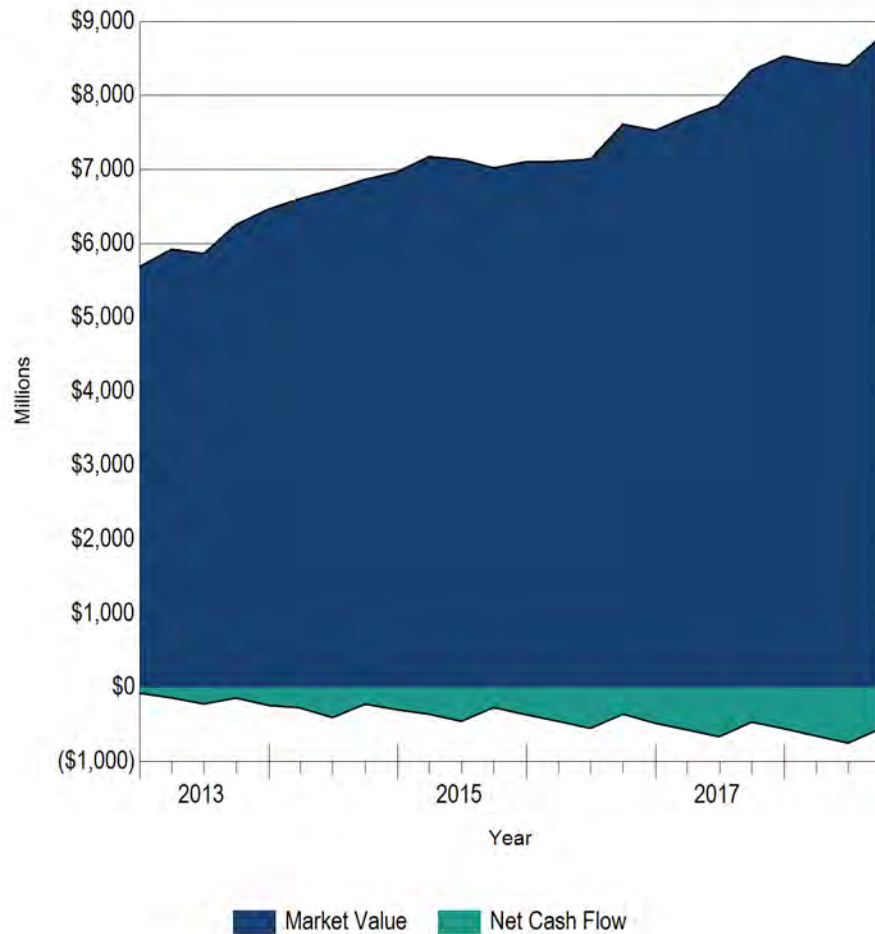
	Last Three Months	Year-To-Date
Beginning Market Value	\$8,404,526,351	\$8,532,697,023
Net Cash Flow	\$200,608,538	\$18,859,189
Net Investment Change	\$183,005,675	\$236,584,353
Ending Market Value	\$8,788,140,564	\$8,788,140,564

**Change in Market Value  
Last Three Months**

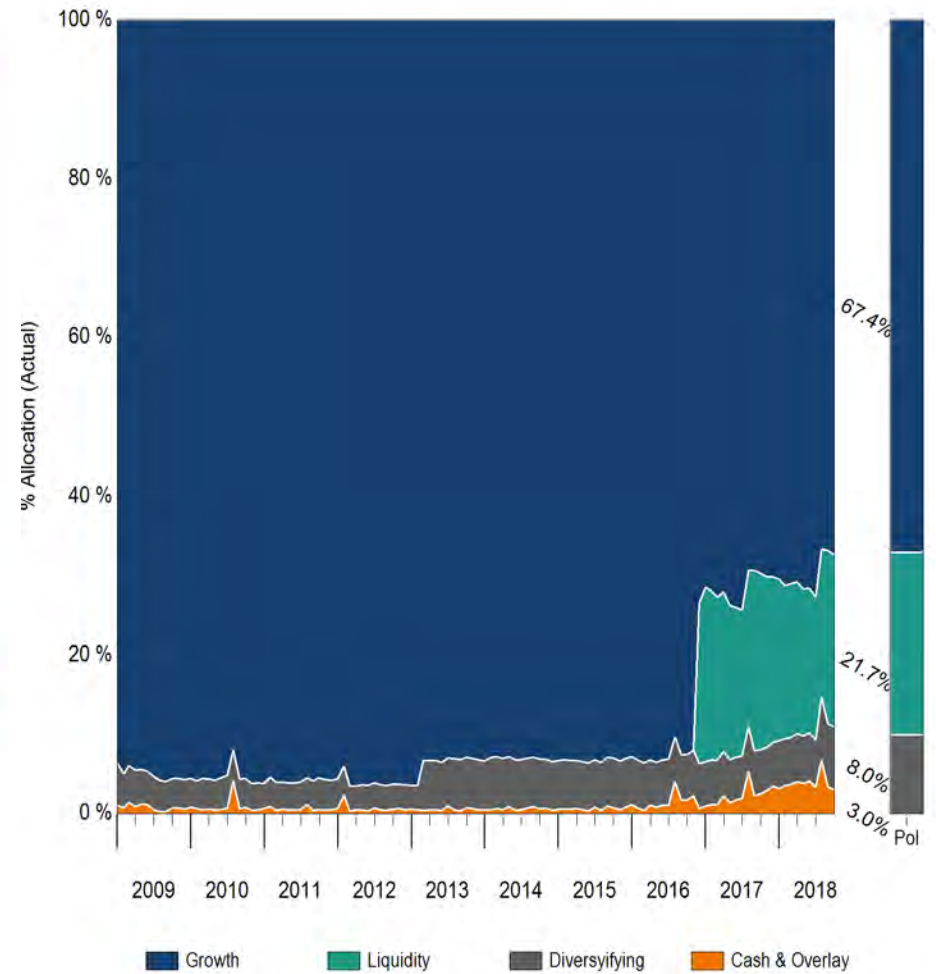


Contributions and withdrawals may include intra-account transfers between managers/funds.

Market Value History  
Cumulative Cash Flows



Asset Allocation History



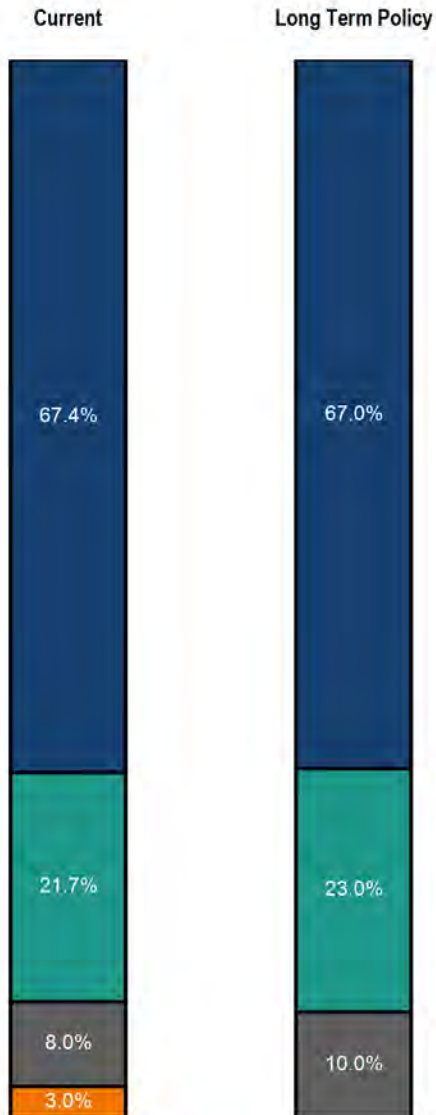
Policy reflects FFP 4-Yr allocations approved in March 2018.



Total Fund

Asset Allocation vs. Long Term Target Policy

Period Ending: September 30, 2018



Allocation vs. Long Term Target

	Current Balance	Current Allocation	Long Term Target	Difference
Growth	\$5,920,464,157	67.4%	67.0%	\$32,409,979
Liquidity	\$1,904,373,694	21.7%	23.0%	-\$116,898,636
Diversifying	\$702,519,927	8.0%	10.0%	-\$176,294,129
Cash & Overlay	\$260,782,785	3.0%	--	\$260,782,785
<b>Total</b>	<b>\$8,788,140,564</b>	<b>100.0%</b>	<b>100.0%</b>	

Allocation vs. Current Targets

	Current Balance	Current Allocation	Current Target	Difference
Growth	\$5,920,464,157	67.4%	69.0%	-\$143,352,832
Liquidity	\$1,904,373,694	21.7%	23.0%	-\$116,898,636
Diversifying	\$702,519,927	8.0%	8.0%	-\$531,318
Cash & Overlay	\$260,782,785	3.0%	--	\$260,782,785
<b>Total</b>	<b>\$8,788,140,564</b>	<b>100.0%</b>	<b>100.0%</b>	

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

Total Fund  
Executive Summary (Net of Fees)

Period Ending: September 30, 2018

	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2017	2016	2015	2014	2013
<b>Total Fund</b>	<b>100.0</b>	<b>2.1</b>	<b>2.6</b>	<b>5.9</b>	<b>8.5</b>	<b>7.5</b>	<b>7.8</b>	<b>13.9</b>	<b>6.9</b>	<b>2.1</b>	<b>7.7</b>	<b>15.6</b>
<i>Policy Index</i>		1.8	2.1	5.5	9.1	7.8	--	13.8	8.8	0.6	9.0	15.6
<b>Growth</b>	<b>67.4</b>	<b>2.7</b>	<b>3.8</b>	<b>8.5</b>	<b>10.8</b>	<b>9.0</b>	<b>--</b>	<b>18.7</b>	<b>7.6</b>	<b>2.3</b>	<b>8.1</b>	<b>16.7</b>
<i>Custom Growth Benchmark</i>		2.6	3.0	7.9	11.6	9.2	--	20.0	10.1	0.3	8.4	15.9
<b>Diversifying</b>	<b>8.0</b>	<b>0.0</b>	<b>-1.4</b>	<b>-1.1</b>	<b>0.2</b>	<b>0.4</b>	<b>2.8</b>	<b>2.6</b>	<b>0.8</b>	<b>-1.8</b>	<b>1.7</b>	<b>-1.9</b>
<i>Custom Diversifying Benchmark</i>		-0.1	0.1	0.7	2.9	3.4	4.4	4.7	4.1	2.5	5.4	-1.6
<b>Liquidity</b>	<b>21.7</b>	<b>0.5</b>	<b>0.5</b>	<b>0.4</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>1.4</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<i>BBgBarc US Govt/Credit 1-3 Yr. TR</i>		0.3	0.4	0.2	--	--	--	0.8	--	--	--	--

\*Correlation between the Growth and Diversifying composites is -.15, .02 and .26 over the previous 1, 3 and 5 year periods respectively.

*Policy Index (4/1/2018 - Present): 5% S&P 500, 13% MSCI EAFE, 11% MSCI Emerging Markets, 11% Cambridge US Private Equity (Lagged), 12% S&P Leverage Loan Index +2%, 5% NCREIF Property Index +2%, 4% NCREIF Property Index +4%, 1% Wilshire REIT, 3% MSCI ACWI, 2% BBgBarc US Aggregate, 23% BBgBarc 1-3 Yr Gov/Credit, 3% BBgBarc Treasury 7-10 Yr, 7% HFRI Fund of Funds.*  
*Policy Index (12/1/2016 -3/31/2018): 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%, 1.6% 90-day T-Bills.*  
*Policy Index (4/1/2012-11/30/16): 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.*

# Total Fund

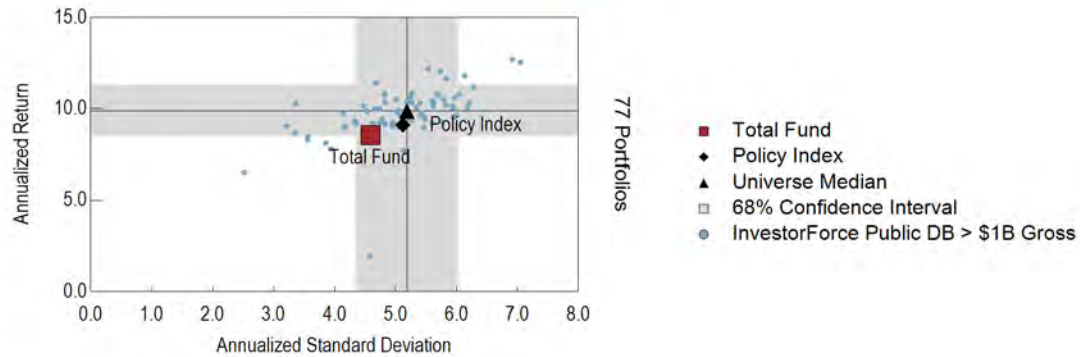
## Executive Summary (Net of Fees)

Period Ending: September 30, 2018

### 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	8.55%	-0.54%	4.59%	0.92%	0.84	1.81%	0.88	1.67	-0.30	91.12%	87.02%

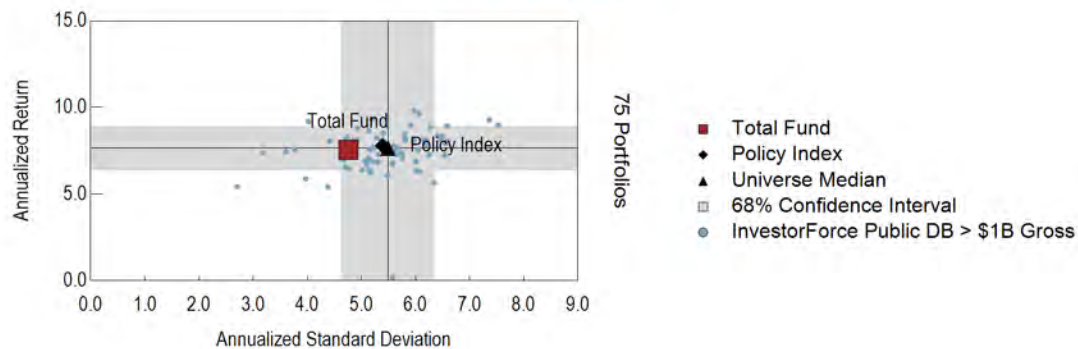
### Risk vs. Return



### 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	7.53%	-0.24%	4.76%	1.04%	0.84	1.78%	0.89	1.47	-0.13	88.44%	80.97%

### Risk vs. Return



Total Fund  
Performance Summary (Gross of Fees)

Period Ending: September 30, 2018

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2017	2016	2015	2014	2013
<b>Total Fund</b>	<b>8,788,140,564</b>	<b>100.0</b>	<b>2.1</b>	<b>2.8</b>	<b>6.2</b>	<b>8.9</b>	<b>8.0</b>	<b>8.4</b>	<b>14.2</b>	<b>7.4</b>	<b>2.7</b>	<b>8.4</b>	<b>16.4</b>
Policy Index			1.8	2.1	5.5	9.1	7.8	--	13.8	8.8	0.6	9.0	15.6
InvestorForce Public DB > \$1B Gross Rank			64	68	77	89	37	26	83	74	5	6	33
<b>Total Fund ex Overlay &amp; Cash</b>	<b>8,527,357,779</b>	<b>97.0</b>	<b>2.2</b>	<b>3.0</b>	<b>6.4</b>	<b>9.0</b>	<b>8.1</b>	<b>8.4</b>	<b>14.1</b>	<b>7.4</b>	<b>2.7</b>	<b>8.4</b>	<b>16.4</b>
Policy Index			1.8	2.1	5.5	9.1	7.8	--	13.8	8.8	0.6	9.0	15.6
InvestorForce Public DB > \$1B Gross Rank			58	62	72	85	32	26	84	74	5	6	33
<b>Growth</b>	<b>5,920,464,157</b>	<b>67.4</b>	<b>2.8</b>	<b>4.1</b>	<b>8.8</b>	<b>11.2</b>	<b>9.6</b>	<b>--</b>	<b>19.1</b>	<b>8.1</b>	<b>3.0</b>	<b>8.8</b>	<b>17.5</b>
Custom Growth Benchmark			2.6	3.0	7.9	11.6	9.2	--	20.0	10.1	0.3	8.4	15.9
<b>Total Domestic Equity</b>	<b>1,240,863,302</b>	<b>14.1</b>	<b>6.4</b>	<b>10.4</b>	<b>17.3</b>	<b>16.9</b>	<b>13.6</b>	<b>12.8</b>	<b>23.9</b>	<b>11.5</b>	<b>1.1</b>	<b>11.4</b>	<b>36.2</b>
Russell 3000			7.1	10.6	17.6	17.1	13.5	12.0	21.1	12.7	0.5	12.6	33.6
InvestorForce Public DB US Eq Gross Rank			64	44	43	42	14	8	6	77	21	50	19
BlackRock Russell 1000 Index	132,550,519	1.5	7.4	10.5	17.7	--	--	--	--	--	--	--	--
Russell 1000			7.4	10.5	17.8	--	--	--	--	--	--	--	--
eV US Large Cap Equity Gross Rank			40	40	41	--	--	--	--	--	--	--	--
Jackson Square Partners	341,398,816	3.9	7.3	13.6	17.4	15.2	13.5	14.2	29.3	-4.4	6.1	13.9	35.4
Russell 1000 Growth			9.2	17.1	26.3	20.6	16.6	14.3	30.2	7.1	5.7	13.0	33.5
eV US Large Cap Growth Equity Gross Rank			68	74	89	90	84	35	47	98	37	31	40
Robeco Boston Partners	309,138,715	3.5	7.6	5.9	13.5	15.3	11.8	11.7	20.1	15.1	-3.9	12.0	37.4
Russell 1000 Value			5.7	3.9	9.5	13.6	10.7	9.8	13.7	17.3	-3.8	13.5	32.5
eV US Large Cap Value Equity Gross Rank			13	39	35	36	41	25	23	50	65	55	24
Emerald Advisers	250,301,015	2.8	7.3	15.6	24.7	17.5	14.2	15.4	28.8	10.1	4.1	7.3	50.3
Russell 2000 Growth			5.5	15.8	21.1	18.0	12.1	12.7	22.2	11.3	-1.4	5.6	43.3
eV US Small Cap Growth Equity Gross Rank			59	79	62	77	37	36	26	54	19	21	27
Ceredex	207,467,922	2.4	1.6	6.4	14.1	15.2	10.8	--	11.4	29.8	-4.4	3.3	36.5
Russell 2000 Value			1.6	7.1	9.3	16.1	9.9	--	7.8	31.7	-7.5	4.2	34.5
eV US Small Cap Value Equity Gross Rank			49	42	17	48	49	--	48	32	52	74	66

Individual closed end funds are not shown in performance summary table. Transition account has \$294,333.78 of residual cash. Goldman Sachs has \$17,786 of residual cash. JPM Global has \$161,514 of residual cash. Lazard has \$39,796 of residual cash. Intech Large Cap has \$6,315 of residual cash. Intech Global Low Vol has \$22,737 of residual cash. Parametric Defensive Equity funded 7/23/2018. 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 (Gross of Fees)

Period Ending: September 30, 2018

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2017	2016	2015	2014	2013
<b>Total International Equity</b>	<b>1,609,065,488</b>	<b>18.3</b>	<b>0.5</b>	<b>-4.5</b>	<b>1.3</b>	<b>8.2</b>	<b>5.1</b>	<b>4.8</b>	<b>25.5</b>	<b>1.2</b>	<b>-1.2</b>	<b>0.3</b>	<b>17.8</b>
MSCI ACWI ex USA Gross			0.8	-2.7	2.3	10.5	4.6	5.7	27.8	5.0	-5.3	-3.4	15.8
MSCI EAFE Gross			1.4	-1.0	3.2	9.8	4.9	5.9	25.6	1.5	-0.4	-4.5	23.3
InvestorForce Public DB ex-US Eq Gross Rank			42	79	62	99	49	83	90	89	28	5	50
<b>International Equity</b>	<b>949,263,440</b>	<b>10.8</b>	<b>1.7</b>	<b>-0.9</b>	<b>3.4</b>	<b>9.5</b>	<b>5.8</b>	<b>5.2</b>	<b>25.3</b>	<b>1.2</b>	<b>-1.2</b>	<b>0.3</b>	<b>17.8</b>
MSCI ACWI ex USA Gross			0.8	-2.7	2.3	10.5	4.6	5.7	27.8	5.0	-5.3	-3.4	15.8
InvestorForce Public DB ex-US Eq Gross Rank			8	11	17	80	23	75	93	89	28	5	50
Pyrford	459,027,031	5.2	3.6	-0.7	3.0	8.5	--	--	19.8	3.4	-2.9	--	--
MSCI ACWI ex USA Value			1.7	-3.7	0.4	9.3	--	--	22.7	8.9	-10.1	--	--
eV ACWI ex-US Value Equity Gross Rank			1	4	17	61	--	--	84	74	59	--	--
William Blair	490,236,409	5.6	-0.1	-1.0	3.8	10.3	6.4	--	30.9	-1.4	0.5	-1.2	20.9
MSCI ACWI ex USA Growth			-0.3	-2.5	3.1	10.6	5.3	--	32.0	0.1	-1.3	-2.6	15.5
eV ACWI ex-US Growth Equity Gross Rank			52	67	74	82	75	--	81	55	69	37	44
<b>Emerging Markets Equity</b>	<b>659,802,048</b>	<b>7.5</b>	<b>-1.1</b>	<b>-9.2</b>	<b>-1.5</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
MSCI Emerging Markets			-1.1	-7.7	-0.8	--	--	--	--	--	--	--	--
InvestorForce Public DB Emg Mkt Eq Gross Rank			41	51	29	--	--	--	--	--	--	--	--
PIMCO RAE Emerging Markets	348,136,428	4.0	1.1	-5.8	0.7	--	--	--	--	--	--	--	--
MSCI Emerging Markets			-1.1	-7.7	-0.8	--	--	--	--	--	--	--	--
eV Emg Mkts Equity Gross Rank			13	19	24	--	--	--	--	--	--	--	--
TT Emerging Markets	311,665,621	3.5	-3.5	-12.8	-3.9	--	--	--	--	--	--	--	--
MSCI Emerging Markets			-1.1	-7.7	-0.8	--	--	--	--	--	--	--	--
eV Emg Mkts Equity Gross Rank			67	89	69	--	--	--	--	--	--	--	--
<b>Total Global Equity</b>	<b>775,623,703</b>	<b>8.8</b>	<b>2.7</b>	<b>4.6</b>	<b>9.2</b>	<b>13.9</b>	<b>9.8</b>	<b>6.6</b>	<b>23.7</b>	<b>7.6</b>	<b>2.2</b>	<b>5.2</b>	<b>23.7</b>
MSCI ACWI			4.3	3.8	9.8	13.4	8.7	8.2	24.0	7.9	-2.4	4.2	22.8
InvestorForce Public DB Glbl Eq Gross Rank			80	58	69	30	50	15	79	40	16	41	64
Artisan Partners	411,145,313	4.7	3.7	8.6	13.7	18.0	12.9	--	32.9	5.6	9.2	3.9	26.1
MSCI ACWI			4.3	3.8	9.8	13.4	8.7	--	24.0	7.9	-2.4	4.2	22.8
eV All Global Equity Gross Rank			52	16	20	8	9	--	11	61	4	56	51
First Eagle	364,295,113	4.1	1.5	0.5	4.5	10.7	7.4	--	15.1	11.7	0.2	4.5	17.9
MSCI ACWI			4.3	3.8	9.8	13.4	8.7	--	24.0	7.9	-2.4	4.2	22.8
eV All Global Equity Gross Rank			80	81	86	83	79	--	89	19	49	51	80

Individual closed end funds are not shown in performance summary table. Transition account has \$294,333.78 of residual cash. Goldman Sachs has \$17,786 of residual cash. JPM Global has \$161,514 of residual cash. Lazard has \$39,796 of residual cash. Intech Large Cap has \$6,315 of residual cash. Intech Global Low Vol has \$22,737 of residual cash. Parametric Defensive Equity funded 7/23/2018. 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 (Gross of Fees)

Period Ending: September 30, 2018

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2017	2016	2015	2014	2013
<b>Private Credit</b>	<b>264,270,349</b>	<b>3.0</b>	<b>1.9</b>	<b>4.3</b>	<b>6.9</b>	<b>8.8</b>	<b>11.2</b>	<b>8.3</b>	<b>10.4</b>	<b>8.2</b>	<b>12.9</b>	<b>15.4</b>	<b>17.2</b>
ICE BofAML High Yield Master II +2%			2.9	4.0	5.0	10.3	7.6	11.6	9.6	19.8	-2.7	4.5	9.6
<b>Total High Yield</b>	<b>349,380,629</b>	<b>4.0</b>	<b>2.3</b>	<b>1.7</b>	<b>1.9</b>	<b>6.8</b>	<b>4.5</b>	<b>8.7</b>	<b>6.5</b>	<b>14.3</b>	<b>-3.5</b>	<b>1.2</b>	<b>8.8</b>
ICE BofAML High Yield Master II			2.4	2.5	2.9	8.2	5.5	9.4	7.5	17.5	-4.6	2.5	7.4
eV US High Yield Fixed Inc Gross Rank			54	81	87	68	85	56	74	47	68	83	28
Allianz Global Investors	349,380,629	4.0	2.3	1.7	1.9	6.8	4.5	8.7	6.5	14.3	-3.5	1.2	8.8
ICE BofAML High Yield Master II			2.4	2.5	2.9	8.2	5.5	9.4	7.5	17.5	-4.6	2.5	7.4
eV US High Yield Fixed Inc Gross Rank			54	81	87	68	85	56	74	47	68	83	28
<b>Total Real Estate</b>	<b>722,607,083</b>	<b>8.2</b>	<b>1.6</b>	<b>6.9</b>	<b>9.6</b>	<b>9.1</b>	<b>11.8</b>	<b>7.2</b>	<b>11.1</b>	<b>5.5</b>	<b>13.5</b>	<b>20.6</b>	<b>10.5</b>
Real Estate Benchmark			1.9	5.9	8.0	8.2	9.5	7.4	7.1	6.7	8.3	18.8	7.1
NCREIF-ODCE			2.1	6.5	8.7	8.8	10.7	5.6	7.6	8.8	15.0	12.5	13.9
NCREIF Property Index			1.7	5.3	7.2	7.8	9.6	6.4	7.0	8.0	13.3	11.8	11.0
Adelante	67,577,089	0.8	0.8	1.3	3.7	6.4	9.8	7.8	7.8	4.1	5.1	33.4	3.6
Wilshire REIT			0.7	2.2	4.0	7.1	9.2	7.4	4.2	7.2	4.2	31.8	1.9
<b>Private Equity</b>	<b>958,301,688</b>	<b>10.9</b>	<b>3.8</b>	<b>9.7</b>	<b>13.2</b>	<b>10.5</b>	<b>12.8</b>	<b>10.4</b>	<b>11.9</b>	<b>9.4</b>	<b>11.6</b>	<b>17.3</b>	<b>15.0</b>
S&P 500 Index +4% (Lagged)			4.4	12.7	18.9	16.4	17.9	14.5	23.3	20.0	3.4	24.5	24.0
<b>Diversifying</b>	<b>702,519,927</b>	<b>8.0</b>	<b>0.0</b>	<b>-1.2</b>	<b>-0.8</b>	<b>0.5</b>	<b>0.8</b>	<b>3.1</b>	<b>2.8</b>	<b>1.3</b>	<b>-1.4</b>	<b>2.2</b>	<b>-1.5</b>
Custom Diversifying Benchmark			-0.1	0.1	0.7	2.9	3.4	4.4	4.7	4.1	2.5	5.4	-1.6
<b>Diversifying Fixed Income</b>	<b>499,629,930</b>	<b>5.7</b>	<b>-0.3</b>	<b>-1.5</b>	<b>-1.2</b>	<b>1.1</b>	<b>2.4</b>	<b>3.9</b>	<b>2.8</b>	<b>2.8</b>	<b>1.6</b>	<b>6.6</b>	<b>-1.9</b>
eV US Core Fixed Inc Gross Rank			99	77	88	96	64	90	96	72	15	25	78
AFL-CIO	314,654,516	3.6	-0.1	-1.4	-1.1	1.3	2.5	4.0	3.6	2.4	1.6	6.6	-1.9
BBgBarc US Aggregate TR			0.0	-1.6	-1.2	1.3	2.2	3.8	3.5	2.6	0.6	6.0	-2.0
eV US Core Fixed Inc Gross Rank			92	67	81	90	55	86	76	87	15	25	78
Wellington Real Total Return	184,975,415	2.1	-0.7	-1.7	-1.3	-0.6	-1.3	--	1.9	-0.1	-4.9	-2.5	--
CPI + 4%			1.2	5.4	6.4	6.1	5.6	--	6.2	6.2	4.8	4.8	--
<b>Diversifying Equity</b>	<b>202,889,997</b>	<b>2.3</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
Parametric Defensive Equity	202,889,997	2.3	--	--	--	--	--	--	--	--	--	--	--
91 Day T-Bill +4%			--	--	--	--	--	--	--	--	--	--	--

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Total Fund  
Performance Summary (Gross of Fees)

Period Ending: September 30, 2018

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2017	2016	2015	2014	2013
<b>Liquidity</b>	<b>1,904,373,694</b>	<b>21.7</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>1.5</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
BBgBarc US Govt/Credit 1-3 Yr. TR			0.3	0.4	0.2	--	--	--	0.8	--	--	--	--
eV US Short Duration Fixed Inc Gross Rank			47	62	60	--	--	--	50	--	--	--	--
DFA Short Credit	442,518,917	5.0	0.5	0.0	-0.2	--	--	--	1.9	--	--	--	--
ICE BofAML 1-5 Yrs US Corp & Govt TR			0.3	0.0	-0.3	--	--	--	1.3	--	--	--	--
eV US Short Duration Fixed Inc Gross Rank			50	96	98	--	--	--	26	--	--	--	--
Insight Short Duration	940,109,107	10.7	0.5	0.9	1.0	--	--	--	1.5	--	--	--	--
BBgBarc US Govt/Credit 1-3 Yr. TR			0.3	0.4	0.2	--	--	--	0.8	--	--	--	--
eV US Short Duration Fixed Inc Gross Rank			35	24	28	--	--	--	50	--	--	--	--
Sit Short Duration	521,745,670	5.9	0.5	0.4	0.3	--	--	--	1.3	--	--	--	--
BBgBarc US Govt 1-3 Yr TR			0.2	0.3	0.0	--	--	--	0.4	--	--	--	--
eV US Short Duration Fixed Inc Gross Rank			53	72	76	--	--	--	68	--	--	--	--
<b>Total Cash</b>	<b>213,487,749</b>	<b>2.4</b>	<b>0.4</b>	<b>1.1</b>	<b>1.4</b>	<b>1.0</b>	<b>0.2</b>	<b>--</b>	<b>0.9</b>	<b>0.9</b>	<b>0.1</b>	<b>-3.0</b>	<b>8.8</b>
91 Day T-Bills			0.5	1.3	1.6	0.9	0.5	--	0.9	0.3	0.0	0.0	0.0
Cash	213,487,749	2.4	0.4	1.1	1.4	1.0	1.1	3.2	0.9	0.9	0.1	1.4	4.5

Individual closed end funds are not shown in performance summary table. Transition account has \$294,333.78 of residual cash. Goldman Sachs has \$17,786 of residual cash. JPM Global has \$161,514 of residual cash. Lazard has \$39,796 of residual cash. Intech Large Cap has \$6,315 of residual cash. Intech Global Low Vol has \$22,737 of residual cash. Parametric Defensive Equity funded 7/23/2018. 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: September 30, 2018

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2017	2016	2015	2014	2013
<b>Total Fund</b>	<b>8,788,140,564</b>	<b>100.0</b>	<b>2.1</b>	<b>2.6</b>	<b>5.9</b>	<b>8.5</b>	<b>7.5</b>	<b>7.8</b>	<b>13.9</b>	<b>6.9</b>	<b>2.1</b>	<b>7.7</b>	<b>15.6</b>
<i>Policy Index</i>			1.8	2.1	5.5	9.1	7.8	--	13.8	8.8	0.6	9.0	15.6
<b>Total Fund ex Overlay &amp; Cash</b>	<b>8,527,357,779</b>	<b>97.0</b>	<b>2.1</b>	<b>2.8</b>	<b>6.1</b>	<b>8.6</b>	<b>7.6</b>	<b>7.8</b>	<b>13.8</b>	<b>6.9</b>	<b>2.1</b>	<b>7.7</b>	<b>15.6</b>
<i>Policy Index</i>			1.8	2.1	5.5	9.1	7.8	--	13.8	8.8	0.6	9.0	15.6
<b>Growth</b>	<b>5,920,464,157</b>	<b>67.4</b>	<b>2.7</b>	<b>3.8</b>	<b>8.5</b>	<b>10.8</b>	<b>9.0</b>	<b>--</b>	<b>18.7</b>	<b>7.6</b>	<b>2.3</b>	<b>8.1</b>	<b>16.7</b>
<i>Custom Growth Benchmark</i>			2.6	3.0	7.9	11.6	9.2	--	20.0	10.1	0.3	8.4	15.9
<b>Total Domestic Equity</b>	<b>1,240,863,302</b>	<b>14.1</b>	<b>6.3</b>	<b>10.1</b>	<b>16.8</b>	<b>16.4</b>	<b>13.1</b>	<b>12.4</b>	<b>23.5</b>	<b>11.1</b>	<b>0.6</b>	<b>11.0</b>	<b>35.7</b>
<i>Russell 3000</i>			7.1	10.6	17.6	17.1	13.5	12.0	21.1	12.7	0.5	12.6	33.6
BlackRock Russell 1000 Index	132,550,519	1.5	7.4	10.4	17.7	--	--	--	--	--	--	--	--
<i>Russell 1000</i>			7.4	10.5	17.8	--	--	--	--	--	--	--	--
Jackson Square Partners	341,398,816	3.9	7.2	13.3	17.0	14.7	13.0	13.7	28.7	-4.8	5.6	13.4	35.0
<i>Russell 1000 Growth</i>			9.2	17.1	26.3	20.6	16.6	14.3	30.2	7.1	5.7	13.0	33.5
Robeco Boston Partners	309,138,715	3.5	7.5	5.7	13.2	15.0	11.4	11.4	19.7	14.7	-4.2	11.6	37.0
<i>Russell 1000 Value</i>			5.7	3.9	9.5	13.6	10.7	9.8	13.7	17.3	-3.8	13.5	32.5
Emerald Advisers	250,301,015	2.8	7.2	15.1	24.0	16.8	13.5	14.7	28.0	9.4	3.5	6.6	49.4
<i>Russell 2000 Growth</i>			5.5	15.8	21.1	18.0	12.1	12.7	22.2	11.3	-1.4	5.6	43.3
Ceredex	207,467,922	2.4	1.5	5.9	13.5	14.6	10.1	--	10.7	29.1	-5.0	2.7	35.8
<i>Russell 2000 Value</i>			1.6	7.1	9.3	16.1	9.9	--	7.8	31.7	-7.5	4.2	34.5
<b>Total International Equity</b>	<b>1,609,065,488</b>	<b>18.3</b>	<b>0.4</b>	<b>-4.8</b>	<b>0.9</b>	<b>7.7</b>	<b>4.7</b>	<b>4.4</b>	<b>25.0</b>	<b>0.8</b>	<b>-1.6</b>	<b>0.0</b>	<b>17.4</b>
<i>MSCI ACWI ex USA Gross</i>			0.8	-2.7	2.3	10.5	4.6	5.7	27.8	5.0	-5.3	-3.4	15.8
<i>MSCI EAFE Gross</i>			1.4	-1.0	3.2	9.8	4.9	5.9	25.6	1.5	-0.4	-4.5	23.3
<b>International Equity</b>	<b>949,263,440</b>	<b>10.8</b>	<b>1.6</b>	<b>-1.2</b>	<b>3.0</b>	<b>9.0</b>	<b>5.4</b>	<b>4.8</b>	<b>24.8</b>	<b>0.8</b>	<b>-1.6</b>	<b>0.0</b>	<b>17.4</b>
<i>MSCI ACWI ex USA Gross</i>			0.8	-2.7	2.3	10.5	4.6	5.7	27.8	5.0	-5.3	-3.4	15.8
Pyrford	459,027,031	5.2	3.5	-1.0	2.6	8.0	--	--	19.3	3.0	-3.3	--	--
<i>MSCI ACWI ex USA Value</i>			1.7	-3.7	0.4	9.3	--	--	22.7	8.9	-10.1	--	--
William Blair	490,236,409	5.6	-0.2	-1.3	3.4	9.9	6.0	--	30.4	-1.8	0.0	-1.7	20.4
<i>MSCI ACWI ex USA Growth</i>			-0.3	-2.5	3.1	10.6	5.3	--	32.0	0.1	-1.3	-2.6	15.5
<b>Emerging Markets Equity</b>	<b>659,802,048</b>	<b>7.5</b>	<b>-1.3</b>	<b>-9.6</b>	<b>-2.0</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<i>MSCI Emerging Markets</i>			-1.1	-7.7	-0.8	--	--	--	--	--	--	--	--
PIMCO RAE Emerging Markets	348,136,428	4.0	1.0	-6.0	0.3	--	--	--	--	--	--	--	--
<i>MSCI Emerging Markets</i>			-1.1	-7.7	-0.8	--	--	--	--	--	--	--	--
TT Emerging Markets	311,665,621	3.5	-3.7	-13.2	-4.5	--	--	--	--	--	--	--	--
<i>MSCI Emerging Markets</i>			-1.1	-7.7	-0.8	--	--	--	--	--	--	--	--

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Total Fund  
Performance Summary (Net of Fees)

Period Ending: September 30, 2018

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2017	2016	2015	2014	2013
<b>Total Global Equity</b>	<b>775,623,703</b>	<b>8.8</b>	<b>2.5</b>	<b>4.0</b>	<b>8.3</b>	<b>13.1</b>	<b>9.1</b>	<b>6.1</b>	<b>22.8</b>	<b>6.9</b>	<b>1.6</b>	<b>4.5</b>	<b>22.9</b>
<i>MSCI ACWI</i>			4.3	3.8	9.8	13.4	8.7	8.2	24.0	7.9	-2.4	4.2	22.8
Artisan Partners	411,145,313	4.7	3.5	8.0	12.8	17.1	12.1	--	31.9	4.8	8.4	3.1	25.2
<i>MSCI ACWI</i>			4.3	3.8	9.8	13.4	8.7	--	24.0	7.9	-2.4	4.2	22.8
First Eagle	364,295,113	4.1	1.4	0.0	3.7	9.8	6.6	--	14.3	10.9	-0.6	3.7	17.1
<i>MSCI ACWI</i>			4.3	3.8	9.8	13.4	8.7	--	24.0	7.9	-2.4	4.2	22.8
<b>Private Credit</b>	<b>264,270,349</b>	<b>3.0</b>	<b>1.9</b>	<b>4.3</b>	<b>6.9</b>	<b>8.2</b>	<b>10.0</b>	<b>5.9</b>	<b>10.4</b>	<b>6.9</b>	<b>11.6</b>	<b>12.3</b>	<b>15.7</b>
<i>ICE BofAML High Yield Master II +2%</i>			2.9	4.0	5.0	10.3	7.6	11.6	9.6	19.8	-2.7	4.5	9.6
<b>Total High Yield</b>	<b>349,380,629</b>	<b>4.0</b>	<b>2.2</b>	<b>1.4</b>	<b>1.5</b>	<b>6.4</b>	<b>4.1</b>	<b>8.4</b>	<b>6.1</b>	<b>13.9</b>	<b>-3.9</b>	<b>0.8</b>	<b>8.4</b>
<i>ICE BofAML High Yield Master II</i>			2.4	2.5	2.9	8.2	5.5	9.4	7.5	17.5	-4.6	2.5	7.4
Allianz Global Investors	349,380,629	4.0	2.2	1.4	1.5	6.4	4.1	8.3	6.1	13.9	-3.9	0.8	8.4
<i>ICE BofAML High Yield Master II</i>			2.4	2.5	2.9	8.2	5.5	9.4	7.5	17.5	-4.6	2.5	7.4
<b>Total Real Estate</b>	<b>722,607,083</b>	<b>8.2</b>	<b>1.6</b>	<b>6.8</b>	<b>9.5</b>	<b>8.8</b>	<b>11.0</b>	<b>6.2</b>	<b>11.0</b>	<b>4.8</b>	<b>12.4</b>	<b>19.1</b>	<b>8.9</b>
<i>Real Estate Benchmark</i>			1.9	5.9	8.0	8.2	9.5	7.4	7.1	6.7	8.3	18.8	7.1
<i>NCREIF-ODCE</i>			2.1	6.5	8.7	8.8	10.7	5.6	7.6	8.8	15.0	12.5	13.9
<i>NCREIF Property Index</i>			1.7	5.3	7.2	7.8	9.6	6.4	7.0	8.0	13.3	11.8	11.0
Adelante	67,577,089	0.8	0.6	0.9	3.1	5.9	9.3	7.2	7.2	3.6	4.6	32.7	3.0
<i>Wilshire REIT</i>			0.7	2.2	4.0	7.1	9.2	7.4	4.2	7.2	4.2	31.8	1.9
<b>Private Equity</b>	<b>958,301,688</b>	<b>10.9</b>	<b>3.8</b>	<b>9.7</b>	<b>13.2</b>	<b>10.2</b>	<b>11.8</b>	<b>8.6</b>	<b>11.9</b>	<b>8.9</b>	<b>9.9</b>	<b>15.2</b>	<b>12.7</b>
<i>S&amp;P 500 Index +4% (Lagged)</i>			4.4	12.7	18.9	16.4	17.9	14.5	23.3	20.0	3.4	24.5	24.0
<b>Diversifying</b>	<b>702,519,927</b>	<b>8.0</b>	<b>0.0</b>	<b>-1.4</b>	<b>-1.1</b>	<b>0.2</b>	<b>0.4</b>	<b>2.8</b>	<b>2.6</b>	<b>0.8</b>	<b>-1.8</b>	<b>1.7</b>	<b>-1.9</b>
<i>Custom Diversifying Benchmark</i>			-0.1	0.1	0.7	2.9	3.4	4.4	4.7	4.1	2.5	5.4	-1.6
<b>Diversifying Fixed Income</b>	<b>499,629,930</b>	<b>5.7</b>	<b>-0.4</b>	<b>-1.7</b>	<b>-1.4</b>	<b>0.8</b>	<b>2.1</b>	<b>3.6</b>	<b>2.6</b>	<b>2.3</b>	<b>1.1</b>	<b>6.1</b>	<b>-2.4</b>
AFL-CIO	314,654,516	3.6	-0.2	-1.8	-1.5	0.9	2.1	3.6	3.2	1.9	1.1	6.1	-2.4
<i>BBgBarc US Aggregate TR</i>			0.0	-1.6	-1.2	1.3	2.2	3.8	3.5	2.6	0.6	6.0	-2.0
Wellington Real Total Return	184,975,415	2.1	-0.7	-1.7	-1.3	-0.9	-1.7	--	1.9	-0.6	-5.4	-3.1	--
<i>CPI + 4%</i>			1.2	5.4	6.4	6.1	5.6	--	6.2	6.2	4.8	4.8	--

Individual closed end funds are not shown in performance summary table. Transition account has \$294,333.78 of residual cash. Goldman Sachs has \$17,786 of residual cash. JPM Global has \$161,514 of residual cash. Lazard has \$39,796 of residual cash. Intech Large Cap has \$6,315 of residual cash. Intech Global Low Vol has \$22,737 of residual cash. Parametric Defensive Equity funded 7/23/2018. Effective 7/1/2018, Private Credit and Private Equity data provided by StepStone Group.

Total Fund  
Performance Summary (Net of Fees)

Period Ending: September 30, 2018

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2017	2016	2015	2014	2013
<b>Diversifying Equity</b>	<b>202,889,997</b>	<b>2.3</b>	--	--	--	--	--	--	--	--	--	--	--
Parametric Defensive Equity	202,889,997	2.3	--	--	--	--	--	--	--	--	--	--	--
91 Day T-Bill +4%			--	--	--	--	--	--	--	--	--	--	--
<b>Liquidity</b>	<b>1,904,373,694</b>	<b>21.7</b>	<b>0.5</b>	<b>0.5</b>	<b>0.4</b>	--	--	--	<b>1.4</b>	--	--	--	--
BBgBarc US Govt/Credit 1-3 Yr. TR			0.3	0.4	0.2	--	--	--	0.8	--	--	--	--
DFA Short Credit	442,518,917	5.0	0.4	-0.1	-0.3	--	--	--	1.8	--	--	--	--
ICE BofAML 1-5 Yrs US Corp & Govt TR			0.3	0.0	-0.3	--	--	--	1.3	--	--	--	--
Insight Short Duration	940,109,107	10.7	0.5	0.9	0.9	--	--	--	1.5	--	--	--	--
BBgBarc US Govt/Credit 1-3 Yr. TR			0.3	0.4	0.2	--	--	--	0.8	--	--	--	--
Sit Short Duration	521,745,670	5.9	0.4	0.3	0.1	--	--	--	1.1	--	--	--	--
BBgBarc US Govt 1-3 Yr TR			0.2	0.3	0.0	--	--	--	0.4	--	--	--	--
<b>Total Cash</b>	<b>213,487,749</b>	<b>2.4</b>	<b>0.4</b>	<b>1.1</b>	<b>1.4</b>	<b>1.0</b>	<b>0.2</b>	--	<b>0.9</b>	<b>0.9</b>	<b>0.1</b>	<b>-3.0</b>	<b>8.8</b>
91 Day T-Bills			0.5	1.3	1.6	0.9	0.5	--	0.9	0.3	0.0	0.0	0.0
Cash	213,487,749	2.4	0.4	1.1	1.4	1.0	1.1	2.8	0.9	0.9	0.1	1.4	4.5

Individual closed end funds are not shown in performance summary table. Transition account has \$294,333.78 of residual cash. Goldman Sachs has \$17,786 of residual cash. JPM Global has \$161,514 of residual cash. Lazard has \$39,796 of residual cash. Intech Large Cap has \$6,315 of residual cash. Intech Global Low Vol has \$22,737 of residual cash. Parametric Defensive Equity funded 7/23/2018. Effective 7/1/2018, Private Credit and Private Equity data provided by StepStone Group.



Total Fund  
Closed End Funds - Investment Summary

Period Ending: September 30, 2018

StepStone Group Analysis (*)												
Closing Date	Manager Name/Fund Name	Estimated Market Value as of 9/30/18 <sup>1</sup>	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)	Tot. Value/ Paid-In (TVPI)	Latest Valuation
<b>Private Credit</b>												
8/31/2015	Angelo Gordon Energy Credit Opp.	\$8,885,518	\$16,500,000	114%	\$18,750,000	\$0	\$1,650,000	\$15,900,816	\$2,319,783	0.85	1.32	6/30/2018
12/18/2017	Stepstone CC Opportunities Fund	\$163,821,339	\$850,000,000	22%	\$187,214,257	\$62,745,866	\$22,145,620	\$21,999,146	\$662,785,743	0.12	0.99	6/30/2018
7/1/2006	Torchlight II	\$14,268,286	\$128,000,000	170%	\$218,143,853	\$0	\$0	\$190,915,176	\$0	0.88	0.94	9/30/2018
12/12/2008	Torchlight III	\$495,635	\$75,000,000	112%	\$83,788,637	\$0	\$0	\$124,323,016	\$0	1.48	1.49	9/30/2018
8/1/2012	Torchlight IV	\$24,712,199	\$60,000,000	141%	\$84,424,263	\$189,699	\$13,327,471	\$88,348,615	\$0	1.05	1.34	6/30/2018
3/12/2015	Torchlight V	\$52,087,372	\$75,000,000	60%	\$45,000,000	\$0	\$1,419,737	\$3,967,135	\$30,000,000	0.09	1.25	6/30/2018
<b>Total Private Credit</b>		<b>\$264,270,349</b>										
<b>% of Portfolio (Market Value)</b>		<b>3.0%</b>										

\*All Data provided by StepStone Group

<sup>1</sup>Latest valuation + capital calls - distributions

Total Fund  
Closed End Funds - Investment Summary

Period Ending: September 30, 2018

Verus Internal Analysis												
Inception Date	Manager Name/Fund Name	Estimated Market Value as of 9/30/2018 <sup>3</sup>	Total Commitment	Total % Called	Capital Called	Current Qtr. Capital Called	Current Qtr. Distributions	Total Distributions <sup>5</sup>	Remaining Commitment	Distrib./Paid-In (DPI) <sup>1</sup>	Tot. Value/Paid-In (TVPI) <sup>2</sup>	Latest Valuation
<b>Real Estate</b>												
1/23/2012	Angelo Gordon Realty Fund VIII	\$28,329,814	\$80,000,000	94%	\$75,401,855	\$0	\$4,046,129	\$91,824,630	\$12,334,302	1.22	1.59	6/30/2018
12/8/2014	Angelo Gordon Realty Fund IX	\$55,893,997	\$65,000,000	78%	\$50,700,000	\$3,900,000	\$0	\$5,200,000	\$20,897,500	0.10	1.21	6/30/2018
6/23/2005	DLJ RECP III	\$23,160,899	\$75,000,000	95%	\$70,968,662	\$0	\$0	\$72,565,242	\$4,031,338	1.02	1.35	6/30/2018
2/11/2008	DLJ RECP IV	\$91,523,074	\$100,000,000	95%	\$95,460,264	\$1,368,066	\$4,320,522	\$67,629,710	\$4,539,736	0.71	1.67	6/30/2018
7/1/2014	DLJ RECP V	\$41,114,961	\$75,000,000	96%	\$72,221,782	\$0	\$0	\$50,780,984	\$32,513,179	0.70	1.27	6/30/2018
6/17/1998	Hearthstone II <sup>4</sup>	-\$3,265	\$25,000,000	80%	\$19,932,386	\$0	\$0	\$19,952,734	\$2,520,348	1.00	1.00	6/30/2018
11/26/2007	Invesco Real Estate II	\$426,040	\$85,000,000	92%	\$78,202,813	\$0	\$0	\$100,620,489	\$6,797,187	1.29	1.29	9/30/2018
6/30/2013	Invesco Real Estate III	\$13,631,891	\$35,000,000	93%	\$32,386,423	\$0	\$0	\$32,987,218	\$2,613,577	1.02	1.44	9/30/2018
6/30/2014	Invesco Real Estate IV	\$25,180,530	\$35,000,000	78%	\$27,360,622	\$1,987,078	\$0	\$7,578,475	\$7,639,378	0.28	1.20	9/30/2018
7/16/2013	LaSalle Income & Growth VI	\$36,535,272	\$75,000,000	95%	\$71,428,571	\$0	\$0	\$70,239,356	\$3,571,429	0.98	1.49	6/30/2018
2/28/2017	LaSalle Income & Growth VII	\$55,915,879	\$75,000,000	62%	\$46,589,379	\$0	\$0	\$0	\$28,410,621	0.00	1.20	6/30/2018
7/3/2013	Long Wharf Fund IV	\$13,626,014	\$25,000,000	100%	\$25,000,000	\$0	\$937,068	\$21,858,355	\$0	0.87	1.42	9/30/2018
9/30/2016	Long Wharf Fund V	\$44,483,242	\$50,000,000	88%	\$43,784,988	\$5,026,848	\$1,599,452	\$4,341,369	\$6,215,012	0.10	1.12	9/30/2018
12/31/2011	Oaktree REOF V	\$5,899,329	\$50,000,000	100%	\$50,000,000	\$0	\$1,040,000	\$79,716,587	\$25,750,000	1.59	1.71	9/30/2018
9/30/2013	Oaktree REOF VI	\$43,041,789	\$80,000,000	100%	\$80,000,000	\$0	\$6,595,795	\$63,193,907	\$18,400,000	0.79	1.33	9/30/2018
4/1/2015	Oaktree REOF VII	\$25,931,467	\$65,000,000	37%	\$24,245,000	\$11,245,000	\$0	\$4,615,000	\$45,370,000	0.19	1.26	9/30/2018
11/10/2013	Paulson Real Estate Fund II	\$24,790,291	\$20,000,000	98%	\$19,524,008	\$178,385	\$178,385	\$4,773,381	\$475,992	0.24	1.51	6/30/2018
1/25/2012	Siguler Guff DREOF	\$45,445,343	\$75,000,000	93%	\$69,375,000	\$0	\$6,288,046	\$74,007,949	\$5,625,000	1.07	1.72	6/30/2018
8/31/2013	Siguler Guff DREOF II	\$56,787,637	\$70,000,000	82%	\$57,120,000	\$1,400,000	\$2,735,000	\$21,683,632	\$12,880,000	0.38	1.37	6/30/2018
1/27/2016	Siguler Guff DREOF II Co-Inv	\$23,315,790	\$25,000,000	79%	\$19,850,362	\$0	\$0	\$0	\$5,149,638	0.00	1.17	6/30/2018
<b>Total Closed End Real Estate</b>		<b>\$655,029,994</b>	<b>\$1,185,000,000</b>	<b>87%</b>	<b>\$1,029,552,116</b>	<b>\$25,105,377</b>	<b>\$27,740,397</b>	<b>\$793,569,019</b>	<b>\$245,734,236</b>	<b>0.77</b>	<b>1.41</b>	
<b>% of Portfolio (Market Value)</b>		<b>7.5%</b>										

<sup>1</sup>(DPI) is equal to (capital returned / capital called)

<sup>2</sup>(TVPI) is equal to (market value + capital returned) / capital called

<sup>3</sup>Latest valuation + capital calls - distributions

<sup>4</sup>No further capital to be called

<sup>5</sup>Total distributions may include recallable distributions

Total Fund  
Closed End Funds - Investment Summary

Period Ending: September 30, 2018

StepStone Group Analysis (*)													
Closing Date	Manager Name/Fund Name	Estimated Market Value as of 9/30/18 <sup>1</sup>	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)	Tot. Value/ Paid-In (TVPI)	Latest Valuation	
<b>Private Equity &amp; Venture Capital</b>													
2/11/2004	Adams Street Partners	\$143,194,231	\$210,000,000	84%	\$175,403,125	\$0	\$6,178,231	\$123,295,416	\$34,596,875	0.69	1.53	6/30/2018	
12/31/2008	Adams Street Partners II	\$10,379,369	\$30,000,000	95%	\$28,365,000	\$0	\$1,132,020	\$37,724,287	\$1,635,000	1.33	1.70	6/30/2018	
12/31/2008	Adams Street Partners - Fund 5	\$23,119,628	\$40,000,000	77%	\$30,611,900	\$0	\$2,569,395	\$13,182,572	\$9,388,100	0.43	1.19	6/30/2018	
1/18/1996	Adams Street Partners - BPF	\$2,571,949	\$59,565,614	108%	\$64,307,595	\$0	\$166,442	\$101,879,771	\$2,048,205	1.58	1.62	6/30/2018	
3/31/2016	Adams Street Venture Innovation	\$18,825,407	\$75,000,000	27%	\$19,912,500	\$9,000,000	\$0	\$0	\$55,087,500	0.00	0.95	6/30/2018	
11/27/2013	Aether Real Assets III	\$23,158,113	\$25,000,000	82%	\$20,541,923	\$1,406,790	\$1,013,847	\$1,944,589	\$6,161,242	0.09	1.22	6/30/2018	
11/30/2013	Aether Real Assets III Surplus	\$57,390,660	\$50,000,000	91%	\$45,266,354	\$0	\$0	\$2,812,143	\$6,579,486	0.06	1.33	6/30/2018	
1/30/2016	Aether Real Assets IV	\$26,461,976	\$50,000,000	48%	\$24,208,157	\$1,440,312	\$210,653	\$842,005	\$26,621,075	0.03	1.13	6/30/2018	
11/26/2003	Bay Area Equity Fund	\$2,892,127	\$10,000,000	100%	\$10,000,000	\$0	\$0	\$36,331,243	\$0	3.63	3.92	6/30/2018	
11/26/2003	Bay Area Equity Fund II	\$11,260,076	\$10,000,000	100%	\$10,000,000	\$0	\$0	\$2,026,313	\$0	0.20	1.33	6/30/2018	
1/16/2008	Carpenter Bancfund	\$0	\$30,000,000	98%	\$29,314,657	\$0	\$5,076,648	\$49,128,304	\$904,309	1.68	1.68	9/30/2018	
6/30/2013	Commonfund	\$48,489,393	\$50,000,000	85%	\$42,696,848	\$1,874,999	\$1,711,201	\$5,988,698	\$7,600,003	0.14	1.28	6/30/2018	
11/26/2003	EIF US Power Fund I	\$55,209	\$30,000,000	130%	\$38,960,280	\$0	\$0	\$64,404,030	\$0	1.65	1.65	6/30/2018	
7/15/2005	EIF US Power Fund II	\$18,861,259	\$50,000,000	130%	\$65,029,556	\$0	\$1,732,692	\$64,099,634	\$1	0.99	1.28	3/31/2018	
5/31/2007	EIF US Power Fund III	\$22,927,430	\$65,000,000	110%	\$71,409,097	\$26,089	\$266,830	\$71,755,741	-\$26,089	1.00	1.33	6/30/2018	
8/31/2010	EIF US Power Fund IV	\$44,860,695	\$50,000,000	119%	\$59,625,588	\$2,471,374	\$3,407,206	\$25,225,856	\$4,120,704	0.42	1.18	6/30/2018	
11/28/2016	EIF US Power Fund V	\$31,308,892	\$50,000,000	75%	\$37,429,905	\$9,979,207	\$2,810,167	\$6,163,454	\$16,747,866	0.16	1.00	6/30/2018	
2/12/2004	Nogales	\$42,964	\$15,000,000	120%	\$18,026,408	\$0	\$0	\$13,844,471	\$1,291,060	0.77	0.77	9/30/2017	
2/28/2010	Oaktree PIF 2009	\$9,436,522	\$40,000,000	87%	\$34,812,448	\$118	\$800,000	\$39,187,764	\$6,308,961	1.13	1.40	9/30/2018	
8/15/2013	Ocean Avenue Fund II	\$27,335,083	\$30,000,000	76%	\$22,800,000	\$0	\$1,500,000	\$6,290,744	\$7,200,000	0.28	1.47	6/30/2018	
4/15/2016	Ocean Avenue Fund III	\$32,142,680	\$50,000,000	56%	\$28,000,000	\$4,500,000	\$2,000,000	\$3,000,000	\$22,000,000	0.11	1.26	6/30/2018	
11/30/2007	Paladin III	\$23,044,678	\$25,000,000	131%	\$32,807,435	\$242,327	\$78,505	\$23,614,995	\$600,715	0.72	1.42	6/30/2018	
8/22/2011	Pathway 6	\$39,078,079	\$40,000,000	90%	\$36,062,931	\$374,936	\$984,950	\$14,231,658	\$5,818,466	0.39	1.48	6/30/2018	
7/10/2013	Pathway 7	\$63,485,135	\$70,000,000	83%	\$58,033,910	\$1,812,734	\$2,185,303	\$11,222,606	\$14,330,811	0.19	1.29	6/30/2018	
11/23/2015	Pathway 8	\$32,551,240	\$50,000,000	57%	\$28,668,564	\$1,928,610	\$0	\$2,891,512	\$23,030,046	0.10	1.24	6/30/2018	
1/19/1999	Pathway	\$23,861,705	\$125,000,000	100%	\$124,442,501	\$200,574	\$1,833,144	\$164,610,799	\$11,185,659	1.32	1.51	6/30/2018	
7/31/2009	Pathway 2008	\$23,720,246	\$30,000,000	95%	\$28,436,080	\$54,000	\$1,123,578	\$21,983,356	\$3,790,501	0.77	1.61	6/30/2018	
6/3/2014	Siguler Guff CCCERA Opportunities	\$159,723,586	\$200,000,000	68%	\$135,702,500	\$4,200,000	\$0	\$19,422,898	\$68,950,546	0.14	1.32	6/30/2018	
8/31/2013	Siguler Guff Secondary Opportunities	\$26,700,320	\$50,000,000	44%	\$22,056,740	\$0	\$1,226,938	\$12,536,850	\$36,770,272	0.57	1.91	6/30/2018	
12/8/2015	Wastewater Opportunity Fund	\$11,423,036	\$25,000,000	54%	\$13,438,065	\$3,720,246	\$0	\$14,872	\$11,584,161	0.00	0.85	6/30/2018	
<b>Total Private Equity and Venture Capital</b>		<b>\$958,301,688</b>	<b>\$1,634,565,614</b>	<b>83%</b>	<b>\$1,356,370,067</b>	<b>\$43,232,316</b>	<b>\$38,007,749</b>	<b>\$939,656,582</b>	<b>\$384,325,475</b>	<b>0.70</b>	<b>1.40</b>		
<b>% of Portfolio (Market Value)</b>		<b>10.9%</b>											

\* All Data provided by StepStone Group  
<sup>1</sup> Latest valuation + capital calls - distributions



Total Fund

Closed End Funds - IRR Summary

Period Ending: September 30, 2018

Private Credit	Inception	Fund Level (G)	CCCERA (G)	Fund Level (N)	CCCERA (N)	IRR Date
Angelo Gordon Energy Cred Opp.	09/24/2015	-	-	16.9%	15.0%	06/30/2018
Stepstone CC Opportunities Fund <sup>1</sup>	02/02/2018	-	-	-	-	-
Torchlight II	07/01/2006	-0.4%	-0.2%	-1.6%	-1.4%	09/30/2018
Torchlight III	12/12/2008	18.3%	16.3%	13.7%	13.8%	06/30/2018
Torchlight IV	08/01/2012	14.1%	14.4%	10.8%	11.4%	09/30/2018
Torchlight V	03/12/2015	24.3%	24.1%	15.6%	15.4%	06/30/2018

Real Estate	Inception	Fund Level (G)	CCCERA (G)	Fund Level (N)	CCCERA (N)	IRR Date
Angelo Gordon VIII	01/23/2012	-	-	-	15.9%	06/30/2018
Angelo Gordon IX	12/08/2014	-	-	-	13.1%	06/30/2018
DLJ RECP III	06/23/2005	1.0%	1.0%	-2.0%	-2.0%	06/30/2018
DLJ RECP IV	02/11/2008	7.0%	7.0%	4.0%	5.0%	06/30/2018
DLJ RECP V	07/01/2014	26.0%	26.0%	14.0%	14.0%	06/30/2018
Hearthstone II	06/17/1998	-	30.1%	-	30.1%	06/30/2018
Invesco Fund III	06/30/2013	20.3%	-	14.6%	-	06/30/2018
Invesco Fund IV	06/30/2014	18.3%	-	12.8%	-	06/30/2018
LaSalle Income & Growth VI	07/16/2013	16.3%	16.3%	13.5%	13.5%	09/30/2018
LaSalle Income & Growth VII	02/28/2017	15.8%	16.4%	13.7%	14.1%	09/30/2018
Long Wharf IV	07/03/2013	17.5%	17.6%	12.7%	12.7%	09/30/2018
Long Wharf V	09/30/2016	15.6%	18.2%	9.8%	11.2%	09/30/2018
Oaktree REOF V	12/31/2011	17.2%	-	12.7%	-	09/30/2018
Oaktree REOF VI	09/30/2013	15.2%	-	10.2%	-	09/30/2018
Oaktree REOF VII	04/01/2015	88.8%	-	45.5%	-	09/30/2018
Paulson	11/10/2013	-	-	14.9%	-	12/31/2017
Siguler Guff I	01/25/2012	14.7%	17.2%	13.2%	14.1%	06/30/2018
Siguler Guff II	08/31/2013	14.4%	14.0%	13.0%	11.6%	06/30/2018
Siguler Guff DREOF II Co-Inv	01/27/2016	13.0%	13.1%	11.8%	9.9%	06/30/2018

<sup>1</sup> Manager has yet to report IRR figure due to no capital invested or meaningful distributions.

<sup>2</sup> Fund level data includes CCCERA and all other fund investors.

<sup>3</sup> Net IRR calculated after deductions of management fees and carried interest to the General Partner.

Total Fund  
Closed End Funds - IRR Summary

Period Ending: September 30, 2018

Private Equity & Venture Capital	Inception	Fund Level (G)	CCCERA (G)	Fund Level (N)	CCCERA (N)	IRR Date
Adams Street Partners	3/18/1996	11.6%	12.6%	-	10.1%	6/30/2018
Adams Street Partners II	1/16/2009	17.2%	17.5%	-	15.0%	6/30/2018
Adams Street Partners - Fund 5	9/21/2012	9.4%	9.3%	-	6.8%	6/30/2018
Adams Street Partners Venture	4/28/2017	-3.1%	-3.1%	-	-18.5%	6/30/2018
Adams Street Partners - BPF	1/18/1996	14.3%	14.3%	-	11.6%	6/30/2018
Aether Real Assets III	11/27/2013	-	-	9.7%	-	6/30/2018
Aether Real Assets III Surplus	11/27/2013	-	-	11.9%	-	6/30/2018
Aether Real Assets IV	1/1/2016	-	-	14.0%	-	6/30/2018
Bay Area Equity Fund I	6/14/2004	25.9%	28.9%	23.2%	23.2%	6/30/2018
Bay Area Equity Fund II	12/7/2009	6.4%	6.4%	5.3%	5.3%	6/30/2018
Carpenter Bancfund	1/31/2008	-	-	-	10.1%	6/30/2018
CommonFund <sup>4</sup>	6/28/2013	-	11.4%	-	10.1%	6/30/2018
Energy Investor Fund	11/26/2003	33.5%	34.7%	28.5%	28.3%	6/30/2018
Energy Investor Fund II	8/16/2005	6.6%	6.1%	3.9%	3.5%	6/30/2018
Energy Investor Fund III	5/30/2007	8.2%	8.2%	5.8%	5.8%	6/30/2018
Energy Investor Fund IV	11/28/2011	11.6%	11.2%	6.7%	6.5%	6/30/2018
Energy Investor Fund V <sup>1</sup>	11/26/2016	-	-	-	-	-
Nogales	2/15/2004	-	-4.5%	-8.6%	-8.8%	3/31/2017
Oaktree PIF 2009	2/18/2010	7.5%	-	7.3%	-	9/30/2018
Ocean Avenue II	6/11/2014	-	-	14.8%	-	6/30/2018
Ocean Avenue III	4/15/2016	-	-	32.7%	-	6/30/2018
Paladin III	11/30/2007	16.0%	-	8.0%	-	6/30/2018
Pathway 6	5/24/2011	16.8%	16.8%	13.9%	13.9%	6/30/2018
Benchmark <sup>4</sup>		15.0%	-	-	-	6/30/2018
Pathway 7	2/7/2013	15.4%	15.4%	12.2%	12.2%	6/30/2018
Benchmark <sup>5</sup>		14.6%	-	-	-	6/30/2018
Pathway 8 <sup>1</sup>	11/6/2015	20.5%	21.3%	17.9%	19.1%	6/30/2018
Benchmark <sup>6</sup>		15.0%	-	-	-	6/30/2018
Pathway Private Equity Fund	11/9/1998	10.4%	10.4%	8.6%	8.6%	6/30/2018
Benchmark <sup>7</sup>		10.5%	-	-	-	6/30/2018
Pathway Private Equity Fund 2008	12/26/2008	15.4%	15.4%	12.7%	12.7%	6/30/2018
Benchmark <sup>8</sup>		13.5%	-	-	-	6/30/2018
Siguler Guff CCCERA Opportunities	6/3/2014	19.5%	20.1%	18.9%	16.7%	6/30/2018
Siguler Guff Secondary Opportunities <sup>8</sup>	11/30/2016	81.1%	522.1%	75.2%	281.3%	6/30/2018
Wastewater Opportunity Fund	12/8/2015	-1.5%	-	-17.1%	-	6/30/2018

<sup>1</sup>Manager has yet to report IRR figure due to no capital invested or meaningful distributions.

<sup>2</sup>Fund level data includes CCCERA and all other fund investors.

<sup>3</sup>Net IRR calculated after deductions of management fees and carried interest to the General Partner.

<sup>4</sup>Private iQ global all private equity median pooled return for vintage years 2011-2014, as of June 30, 2018.

<sup>5</sup>Private iQ global all private equity median pooled return for vintage years 2012-2016, as of June 30, 2018.

<sup>6</sup>Private iQ global all private equity median pooled return for vintage years 2015-2018, as of June 30, 2018.

<sup>7</sup>Private iQ global all private equity median pooled return for vintage years 1999-2011, as of June 30, 2018.

<sup>8</sup>Private iQ global all private equity median pooled return for vintage years 2008-2014, as of June 30, 2018.



Total Fund  
Performance Analysis - 3 Years (Net of Fees)

Period Ending: September 30, 2018

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	14.72%	-5.83%	10.66%	-3.74%	0.90	5.60%	0.73	1.30	-1.04	79.64%	119.38%
Robeco Boston Partners	14.95%	1.40%	10.53%	0.32%	1.08	3.07%	0.92	1.34	0.46	106.94%	96.35%
Emerald Advisers	16.81%	-1.17%	14.03%	-0.97%	0.99	4.65%	0.89	1.14	-0.25	91.55%	94.96%
Ceredex	14.61%	-1.51%	11.81%	2.09%	0.78	6.13%	0.80	1.16	-0.25	82.76%	84.11%
Pyrford	8.03%	-1.26%	9.08%	1.85%	0.67	5.95%	0.76	0.79	-0.21	60.49%	58.67%
William Blair	9.86%	-0.74%	10.49%	-0.31%	0.96	2.61%	0.94	0.86	-0.28	93.32%	96.93%
Artisan Partners	17.13%	3.73%	11.38%	2.80%	1.07	5.44%	0.77	1.43	0.69	124.54%	101.79%
First Eagle	9.84%	-3.56%	7.07%	0.51%	0.70	3.95%	0.85	1.27	-0.90	60.77%	54.63%
Allianz Global Investors	6.43%	-1.76%	4.55%	-0.84%	0.89	1.26%	0.94	1.22	-1.40	83.10%	101.29%
Adelante	5.87%	-1.21%	11.82%	-0.66%	0.92	1.92%	0.98	0.42	-0.63	84.82%	92.30%
AFL-CIO	0.86%	-0.46%	2.36%	-0.26%	0.85	0.80%	0.92	0.00	-0.57	76.48%	83.84%
Wellington Real Total Return	-0.85%	-6.91%	4.79%	-4.12%	0.54	4.79%	0.01	-0.36	-1.44	4.69%	23,772.75%

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

Total Fund  
Performance Analysis - 5 Years (Net of Fees)

Period Ending: September 30, 2018

	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	13.05%	-3.54%	11.22%	-3.18%	0.98	4.86%	0.81	1.12	-0.73	88.93%	115.52%
Robeco Boston Partners	11.45%	0.73%	10.66%	0.03%	1.07	3.04%	0.92	1.02	0.24	105.99%	100.53%
Emerald Advisers	13.51%	1.37%	15.43%	1.17%	1.02	5.64%	0.87	0.84	0.24	105.40%	97.81%
Ceredex	10.14%	0.23%	12.58%	1.71%	0.85	5.49%	0.84	0.76	0.04	88.76%	90.51%
William Blair	5.96%	0.64%	10.25%	1.06%	0.92	2.66%	0.94	0.53	0.24	92.49%	90.57%
Artisan Partners	12.07%	3.41%	11.21%	3.45%	0.99	5.55%	0.75	1.03	0.61	111.20%	83.62%
First Eagle	6.55%	-2.11%	7.09%	0.74%	0.67	4.20%	0.86	0.85	-0.50	56.99%	63.94%
Allianz Global Investors	4.13%	-1.41%	4.60%	-0.88%	0.90	1.07%	0.96	0.78	-1.32	83.01%	99.82%
Adelante	9.27%	0.02%	12.73%	0.65%	0.93	1.80%	0.99	0.69	0.01	89.35%	92.46%
AFL-CIO	2.10%	-0.06%	2.46%	0.21%	0.88	0.73%	0.93	0.64	-0.08	87.63%	82.89%
Wellington Real Total Return	-1.70%	-7.27%	5.21%	-8.70%	1.26	5.06%	0.06	-0.43	-1.44	-10.62%	820.26%

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

# Total Fund Investment Fund Fee Analysis

Period Ending: September 30, 2018

Name	Asset Class	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
BlackRock Russell 1000 Index	Growth	0.03% of Assets	\$132,550,519	\$39,765	0.03%
Jackson Square Partners	Growth	0.50% of First 100.0 Mil, 0.40% of Next 150.0 Mil, 0.35% Thereafter	\$341,398,816	\$1,419,896	0.42%
Robeco Boston Partners	Growth	0.50% of First 25.0 Mil, 0.30% Thereafter	\$309,138,715	\$977,416	0.32%
Emerald Advisers	Growth	0.75% of First 10.0 Mil, 0.60% Thereafter	\$250,301,015	\$1,516,806	0.61%
Ceredex	Growth	0.85% of First 10.0 Mil, 0.68% of Next 40.0 Mil, 0.51% Thereafter	\$207,467,922	\$1,160,086	0.56%
Pyrford	Growth	0.70% of First 50.0 Mil, 0.50% of Next 50.0 Mil, 0.35% Thereafter	\$459,027,031	\$1,856,595	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	\$490,236,409	\$1,885,709	0.38%
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	\$348,136,428	\$1,879,114	0.54%
TT Emerging Markets	Growth	0.70% of First 100.0 Mil, 0.65% of Next 100.0 Mil, 0.60% Thereafter	\$311,665,621	\$2,019,994	0.65%
Artisan Partners	Growth	0.75% of Assets	\$411,145,313	\$3,083,590	0.75%
First Eagle	Growth	0.75% of Assets	\$364,295,113	\$2,732,213	0.75%
Allianz Global Investors	Growth	0.50% of First 50.0 Mil, 0.40% of Next 50.0 Mil, 0.35% Thereafter	\$349,380,629	\$1,322,832	0.38%
AFL-CIO	Diversifying	0.43% of Assets	\$314,654,516	\$1,353,014	0.43%

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

Total Fund  
Investment Fund Fee Analysis

Period Ending: September 30, 2018

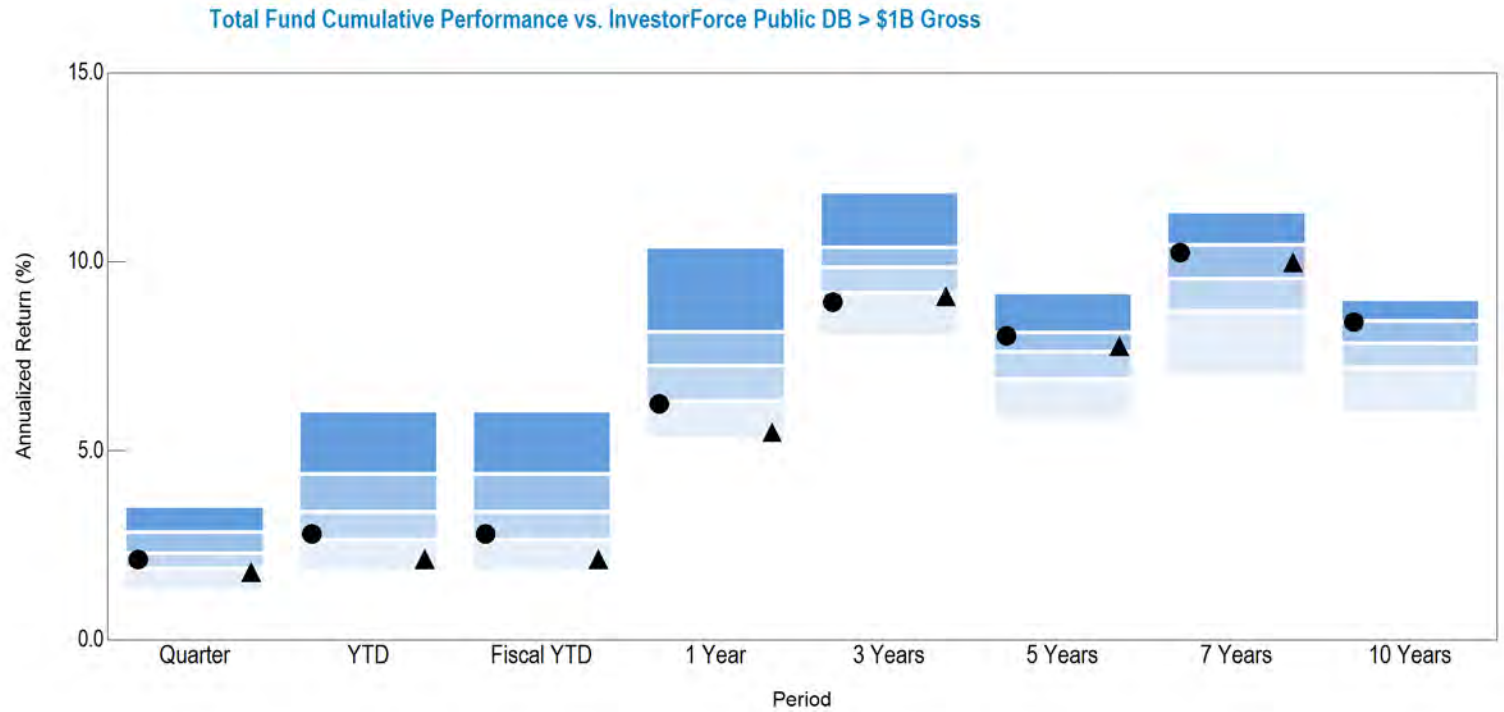
Name	Asset Class	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
Wellington Real Total Return	Diversifying	0.35% of Assets	\$184,975,415	\$647,414	0.35%
Parametric Defensive Equity	Diversifying	0.42% of First 200.0 Mil, 0.39% Thereafter	\$202,889,997	\$851,271	0.42%
DFA Short Credit	Liquidity	0.20% of First 25.0 Mil, 0.10% Thereafter	\$442,518,917	\$467,519	0.11%
Insight Short Duration	Liquidity	0.06% of First 500.0 Mil, 0.05% of Next 500.0 Mil, 0.04% Thereafter	\$940,109,107	\$520,055	0.06%
Sit Short Duration	Liquidity	0.15% of Assets	\$521,745,670	\$782,619	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: September 30, 2018



	Quarter		YTD		Fiscal YTD		1 Year		3 Years		5 Years		7 Years		10 Years	
<b>5th Percentile</b>	3.5		6.1		6.1		10.4		11.8		9.2		11.3		9.0	
<b>25th Percentile</b>	2.9		4.4		4.4		8.2		10.4		8.1		10.5		8.4	
<b>Median</b>	2.3		3.4		3.4		7.3		9.9		7.6		9.6		7.8	
<b>75th Percentile</b>	1.9		2.7		2.7		6.3		9.2		6.9		8.7		7.2	
<b>95th Percentile</b>	1.3		1.8		1.8		5.3		8.0		5.8		7.0		6.0	
<b># of Portfolios</b>	78		77		77		77		77		75		74		71	
<b>● Total Fund</b>	2.1	(64)	2.8	(68)	2.8	(68)	6.2	(77)	8.9	(89)	8.0	(37)	10.2	(29)	8.4	(26)
<b>▲ Policy Index</b>	1.8	(80)	2.1	(88)	2.1	(88)	5.5	(91)	9.1	(82)	7.8	(46)	10.0	(34)	--	(--)

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.

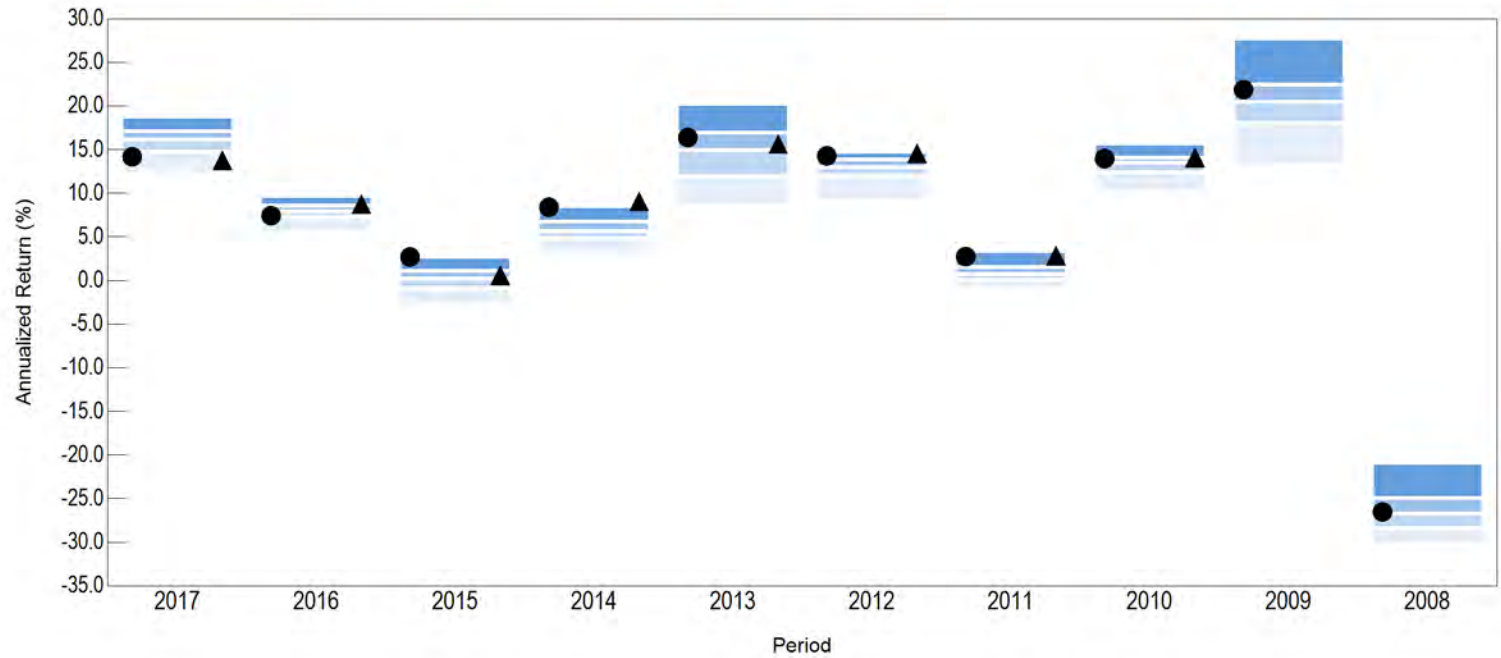


# Total Fund

## Peer Universe Comparison: Consecutive Periods (Gross of Fees)

Period Ending: September 30, 2018

Total Fund Consecutive Periods vs. InvestorForce Public DB > \$1B Gross



	Return (Rank)									
	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
5th Percentile	18.8	9.7	2.7	8.5	20.2	14.7	3.3	15.7	27.7	-21.0
25th Percentile	17.2	8.6	1.1	6.8	17.0	13.9	1.6	14.2	22.5	-24.9
Median	16.2	8.0	0.3	5.7	15.0	13.0	0.8	13.5	20.5	-26.7
75th Percentile	14.8	7.4	-0.7	4.9	12.0	12.1	0.1	12.5	18.1	-28.3
95th Percentile	12.4	5.5	-2.8	3.1	8.7	9.2	-0.9	10.2	13.4	-30.2
# of Portfolios	98	92	98	79	67	74	68	66	66	65
● Total Fund	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)	-26.5 (48)
▲ Policy Index	13.8 (89)	8.8 (17)	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.

Total Fund

Peer Universe Comparison: Consecutive Periods (Net of Fees)

Period Ending: September 30, 2018

Total Fund Consecutive Periods vs. InvestorForce Public DB > \$1B Net

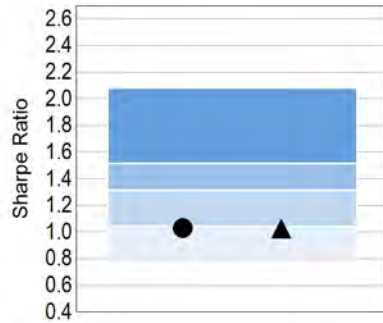


	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
<b>5th Percentile</b>	18.6	9.3	2.4	7.6	19.5	14.3	4.2	15.1	27.5	-20.9
<b>25th Percentile</b>	16.6	8.4	0.8	6.1	16.0	13.4	1.5	13.8	21.7	-25.7
<b>Median</b>	15.6	7.7	-0.4	5.1	14.3	12.7	0.6	12.8	20.0	-26.9
<b>75th Percentile</b>	14.1	7.1	-1.3	4.4	11.0	11.8	-0.3	11.8	17.7	-28.3
<b>95th Percentile</b>	10.7	5.3	-3.2	2.6	8.5	9.0	-1.2	9.3	13.4	-30.5
<b># of Portfolios</b>	61	62	57	55	48	44	42	41	40	39
<b>● Total Fund</b>	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)	-26.9 (51)
<b>▲ Policy Index</b>	13.8 (84)	8.8 (14)	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)

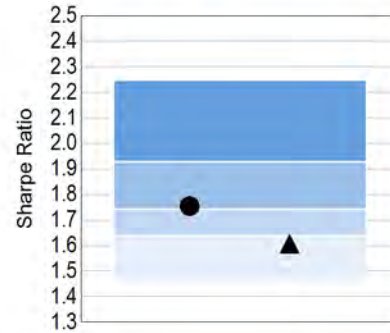
Period Ending: September 30, 2018

Sharpe Ratio  
 1 Year



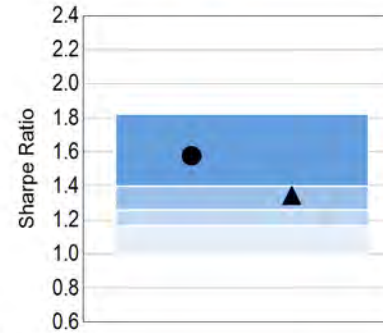
● Total Fund	
Value	1.0
Rank	78
▲ Policy Index	
Value	1.0
Rank	79
Universe	
5th %tile	2.1
25th %tile	1.5
Median	1.3
75th %tile	1.0
95th %tile	0.8

Sharpe Ratio  
 3 Year



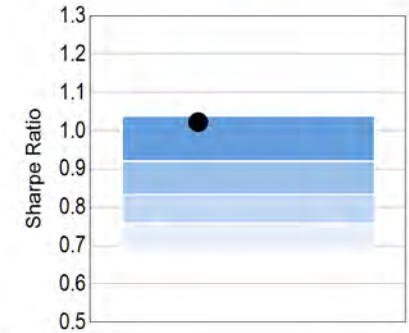
● Total Fund	
Value	1.8
Rank	48
▲ Policy Index	
Value	1.6
Rank	81
Universe	
5th %tile	2.2
25th %tile	1.9
Median	1.7
75th %tile	1.6
95th %tile	1.5

Sharpe Ratio  
 5 Year



● Total Fund	
Value	1.6
Rank	14
▲ Policy Index	
Value	1.3
Rank	36
Universe	
5th %tile	1.8
25th %tile	1.4
Median	1.3
75th %tile	1.2
95th %tile	1.0

Sharpe Ratio  
 10 Year



● Total Fund	
Value	1.0
Rank	7
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	1.0
25th %tile	0.9
Median	0.8
75th %tile	0.8
95th %tile	0.7

## Domestic Equity Managers

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# Jackson Square Partners Manager Portfolio Overview

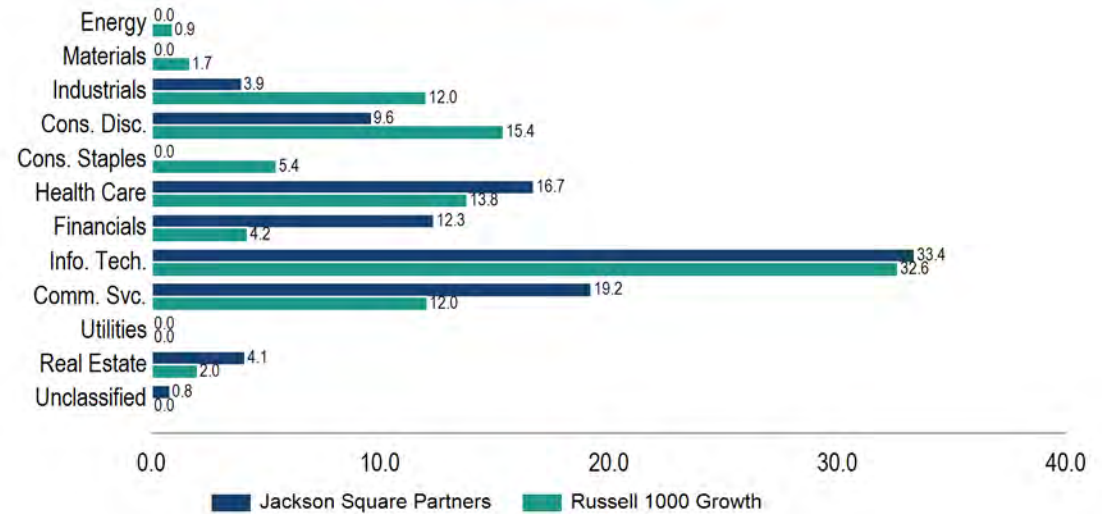
Period Ending: September 30, 2018

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 Prislín.

## Characteristics

	Portfolio	Russell 1000 Growth
Number of Holdings	30	542
Weighted Avg. Market Cap. (\$B)	172.43	291.64
Median Market Cap. (\$B)	42.94	12.71
Price To Earnings	38.25	28.60
Price To Book	8.99	9.17
Price To Sales	7.04	5.45
Return on Equity (%)	17.25	32.14
Yield (%)	0.79	1.17
Beta	1.28	1.00

## Sector Allocation (%) vs Russell 1000 Growth



## Largest Holdings

	End Weight	Return
MICROSOFT	8.84	16.43
VISA 'A'	6.18	13.49
MASTERCARD	5.72	13.42
BIOGEN	5.04	21.73
IQVIA HOLDINGS	4.89	29.97
PAYPAL HOLDINGS	4.52	5.49
KKR AND A	3.99	10.43
FEDEX	3.92	6.33
TAKE TWO INTACT.SFTW.	3.88	16.59
ALPHABET A	3.65	6.90

## Top Contributors

	Avg Wgt	Return	Contribution
MICROSOFT	8.63	16.43	1.42
IQVIA HOLDINGS	4.13	29.97	1.24
BIOGEN	4.57	21.73	0.99
VISA 'A'	6.24	13.49	0.84
ILLUMINA	2.54	31.43	0.80
MASTERCARD	5.72	13.42	0.77
TAKE TWO INTACT.SFTW.	3.59	16.59	0.60
AUTODESK	2.95	19.09	0.56
DOLLAR GENERAL	3.20	11.18	0.36
HASBRO	2.30	14.60	0.34

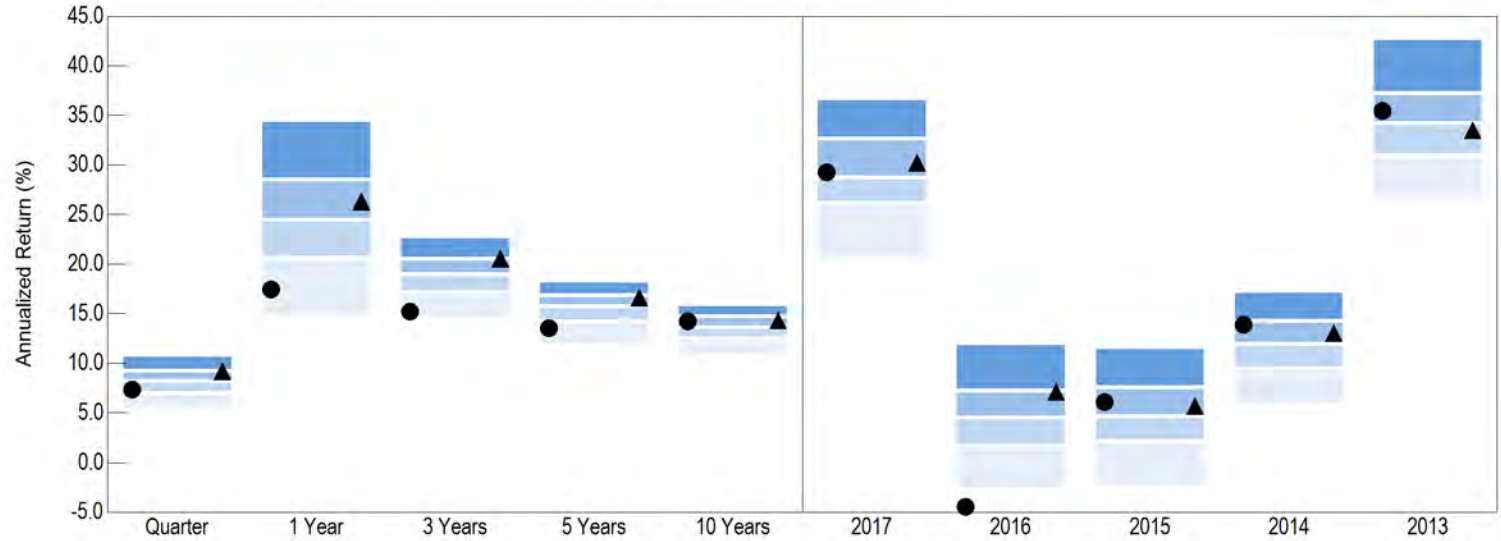
## Bottom Contributors

	Avg Wgt	Return	Contribution
ELECTRONIC ARTS	3.06	-14.56	-0.45
APPLIED MATS.	2.45	-15.93	-0.39
TRIPADVISOR 'A'	3.21	-8.33	-0.27
EBAY	2.64	-8.94	-0.24
DENTSPLY SIRONA	1.49	-13.58	-0.20
ALIBABA GROUP HLDG.SPN. ADR 1:1	1.77	-11.19	-0.20
CHARLES SCHWAB	2.91	-3.57	-0.10
ASML HLDG.ADR 1:1	0.57	-5.03	-0.03
EQUINIX REIT	1.58	1.23	0.02
DOMINO'S PIZZA	0.50	4.68	0.02

Unclassified sector allocation includes cash allocations.

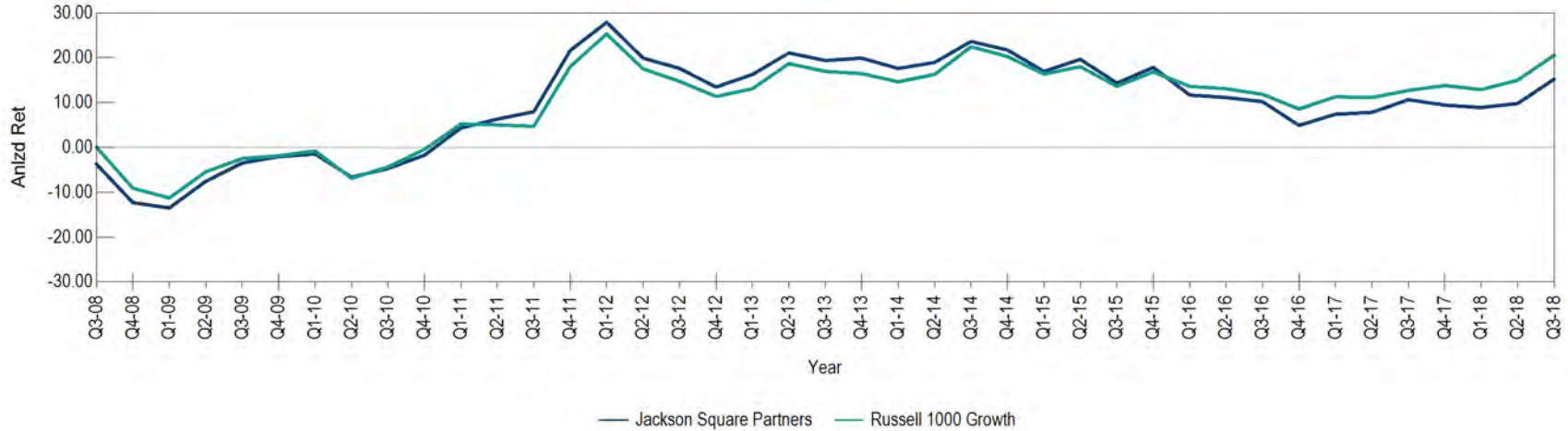


Jackson Square Partners vs. eV US Large Cap Growth Equity Gross Universe

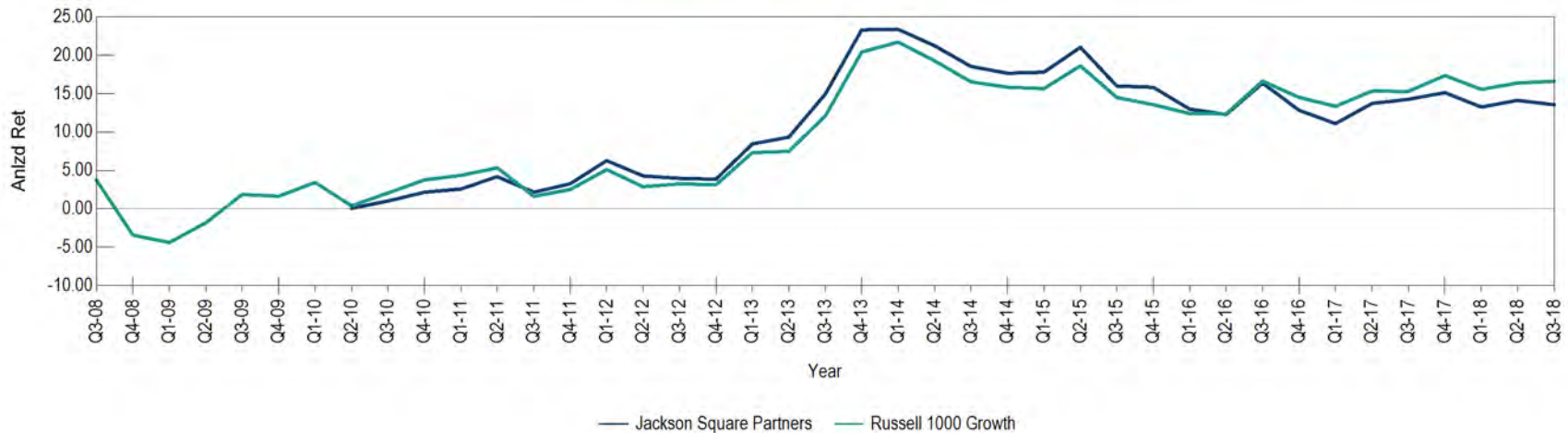


	Quarter	1 Year	3 Years	5 Years	10 Years	2017	2016	2015	2014	2013
<b>5th Percentile</b>	10.8	34.5	22.8	18.3	15.9	36.7	12.0	11.6	17.3	42.8
<b>25th Percentile</b>	9.2	28.5	20.5	16.9	14.7	32.7	7.3	7.6	14.3	37.3
<b>Median</b>	8.3	24.5	19.0	15.8	13.7	28.8	4.6	4.7	12.0	34.3
<b>75th Percentile</b>	7.0	20.7	17.2	14.2	12.6	26.2	1.8	2.1	9.5	31.0
<b>95th Percentile</b>	5.3	14.8	14.5	11.9	10.7	20.5	-2.7	-2.4	5.8	26.6
<b># of Portfolios</b>	253	253	246	242	216	265	282	270	291	274
<b>● Jackson Square Partners</b>	7.3 (68)	17.4 (89)	15.2 (90)	13.5 (84)	14.2 (35)	29.3 (47)	-4.4 (98)	6.1 (37)	13.9 (31)	35.4 (40)
<b>▲ Russell 1000 Growth</b>	9.2 (27)	26.3 (39)	20.6 (25)	16.6 (34)	14.3 (34)	30.2 (42)	7.1 (26)	5.7 (42)	13.0 (38)	33.5 (56)

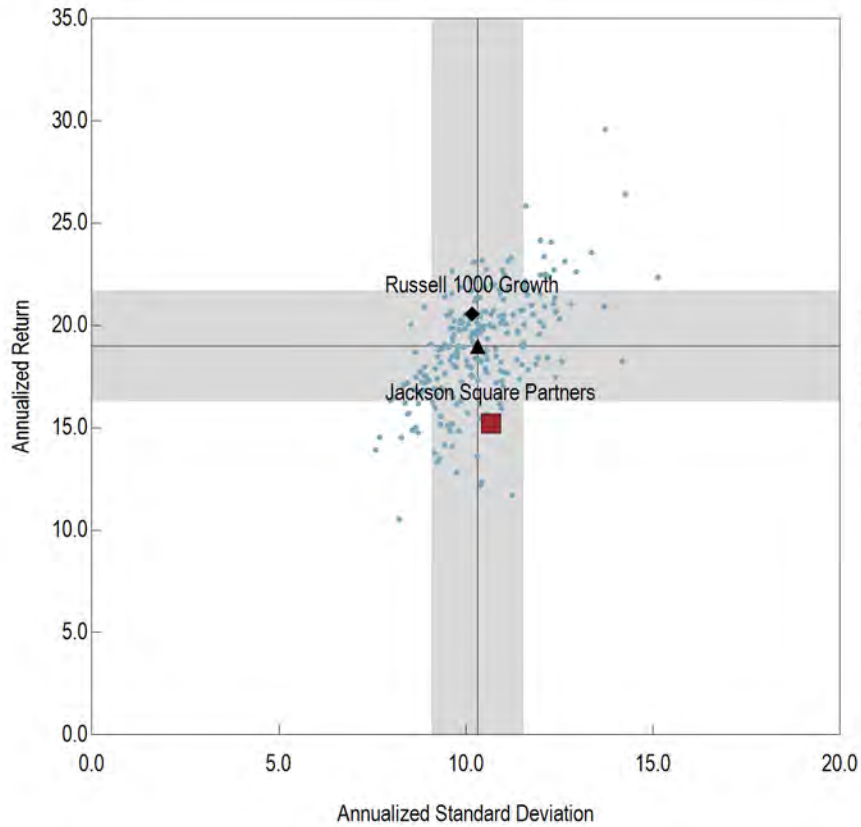
Rolling 3 Year Annualized Return (%)



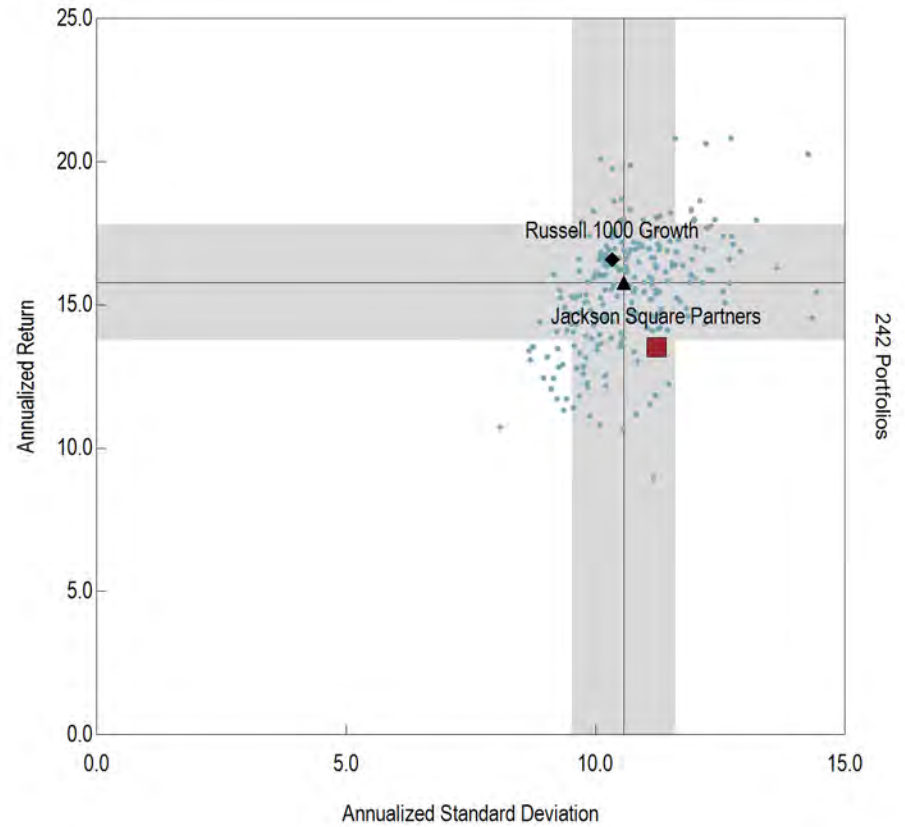
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Jackson Square Partners	15.2%	10.7%	1.3
Russell 1000 Growth	20.6%	10.2%	1.9
eV US Large Cap Growth Equity Gross Median	19.0%	10.3%	1.8

5 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Jackson Square Partners	13.5%	11.2%	1.2
Russell 1000 Growth	16.6%	10.3%	1.6
eV US Large Cap Growth Equity Gross Median	15.8%	10.6%	1.4

# Robeco Boston Partners Manager Portfolio Overview

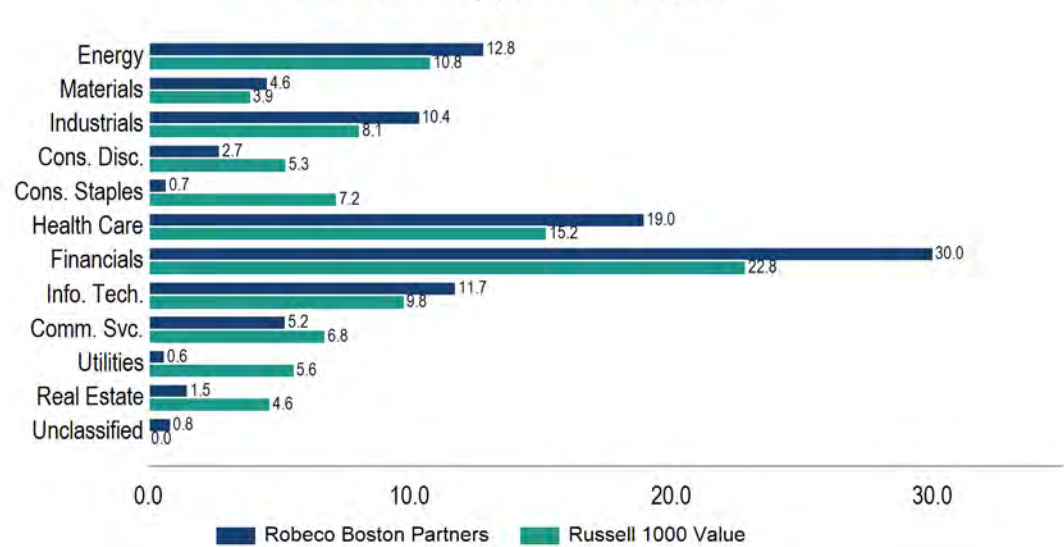
Period Ending: September 30, 2018

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	78	727
Weighted Avg. Market Cap. (\$B)	152.74	119.71
Median Market Cap. (\$B)	36.82	9.69
Price To Earnings	20.95	20.58
Price To Book	2.96	2.85
Price To Sales	2.62	2.99
Return on Equity (%)	15.64	12.85
Yield (%)	2.25	2.47
Beta	1.04	1.00

## Sector Allocation (%) vs Russell 1000 Value



## Largest Holdings

	End Weight	Return
BANK OF AMERICA	4.24	5.01
JOHNSON & JOHNSON	4.19	14.63
BERKSHIRE HATHAWAY 'B'	4.15	14.71
JP MORGAN CHASE & CO.	3.89	8.88
CITIGROUP	3.62	7.87
CISCO SYSTEMS	3.39	13.94
WELLS FARGO & CO	3.07	-4.50
PFIZER	2.85	22.51
COMCAST A	2.74	8.54
CHEVRON	2.61	-2.36

## Top Contributors

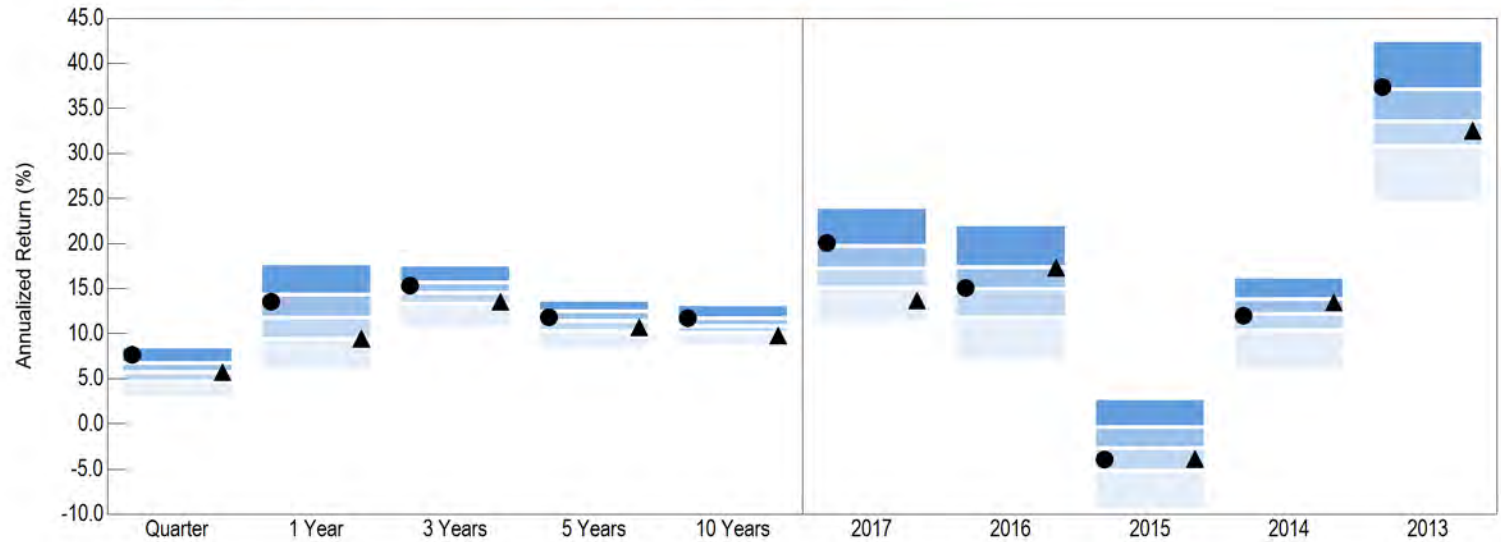
	Avg Wgt	Return	Contribution
BERKSHIRE HATHAWAY 'B'	4.04	14.71	0.59
JOHNSON & JOHNSON	4.04	14.63	0.59
PFIZER	2.62	22.51	0.59
CISCO SYSTEMS	3.21	13.94	0.45
CVS HEALTH	1.67	23.26	0.39
JP MORGAN CHASE & CO.	4.01	8.88	0.36
ORACLE	2.02	17.48	0.35
MERCK & COMPANY	1.97	17.67	0.35
ANDEAVOR	1.91	16.92	0.32
CITIGROUP	3.62	7.87	0.28

## Bottom Contributors

	Avg Wgt	Return	Contribution
WELLS FARGO & CO	3.14	-4.50	-0.14
EQT	0.69	-19.80	-0.14
OWENS CORNING	0.51	-14.08	-0.07
EBAY	0.75	-8.94	-0.07
CHEVRON	2.77	-2.36	-0.07
CIMAREX EN.	0.64	-8.48	-0.05
WESTROCK	0.83	-5.55	-0.05
CRH ADR 1:1	0.59	-6.80	-0.04
LLOYDS BANKING GP.SPN. ADR 1:4	0.51	-7.03	-0.04
LABORATORY CORP.OF AM. HDG.	0.96	-3.26	-0.03

Unclassified sector allocation includes cash allocations.

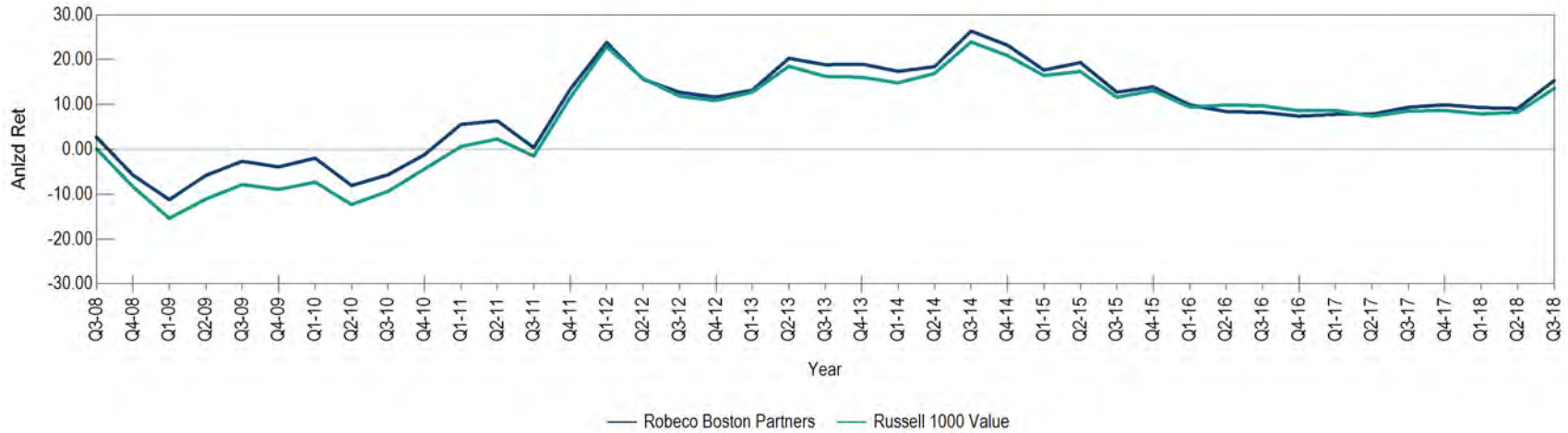
Robeco Boston Partners vs. eV US Large Cap Value Equity Gross Universe



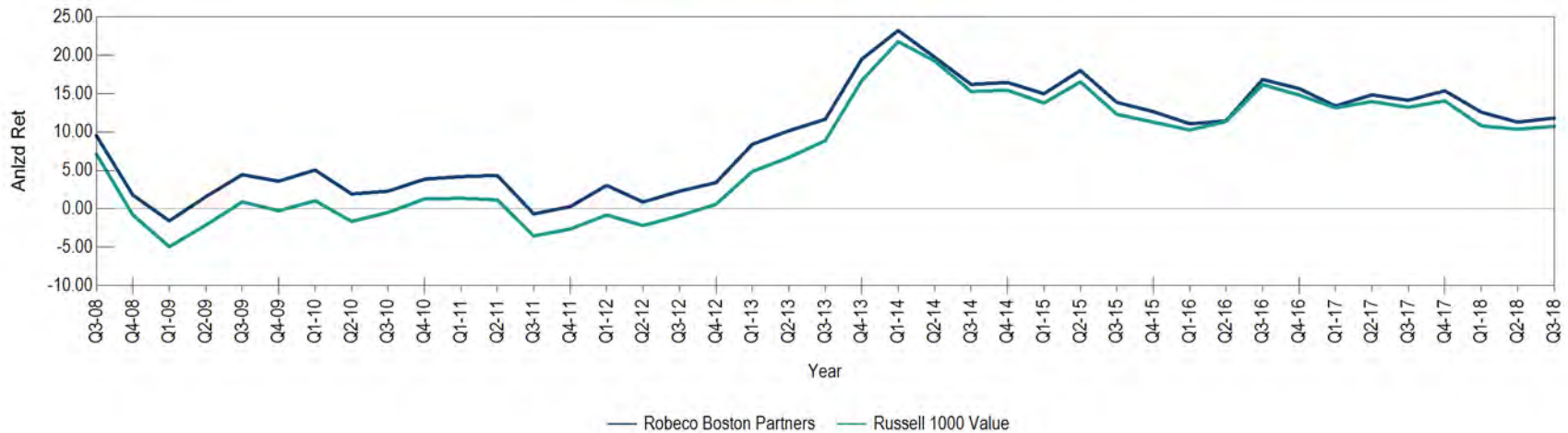
	Return (Rank)										
	Quarter	1 Year	3 Years	5 Years	10 Years	2017	2016	2015	2014	2013	
5th Percentile	8.5	17.8	17.6	13.7	13.2	24.0	22.1	2.8	16.3	42.5	
25th Percentile	6.8	14.3	15.7	12.5	11.7	19.8	17.4	-0.4	13.9	37.2	
Median	5.8	11.8	14.6	11.4	10.8	17.2	15.0	-2.6	12.2	33.6	
75th Percentile	4.7	9.5	13.3	10.3	10.1	15.1	11.8	-5.1	10.4	30.8	
95th Percentile	2.9	5.9	10.5	8.2	8.7	11.2	7.0	-9.4	5.9	24.6	
# of Portfolios	334	334	332	323	267	342	346	312	307	310	
● Robeco Boston Partners	7.6 (13)	13.5 (35)	15.3 (36)	11.8 (41)	11.7 (25)	20.1 (23)	15.1 (50)	-3.9 (65)	12.0 (55)	37.4 (24)	
▲ Russell 1000 Value	5.7 (53)	9.5 (76)	13.6 (73)	10.7 (68)	9.8 (82)	13.7 (87)	17.3 (26)	-3.8 (64)	13.5 (33)	32.5 (60)	

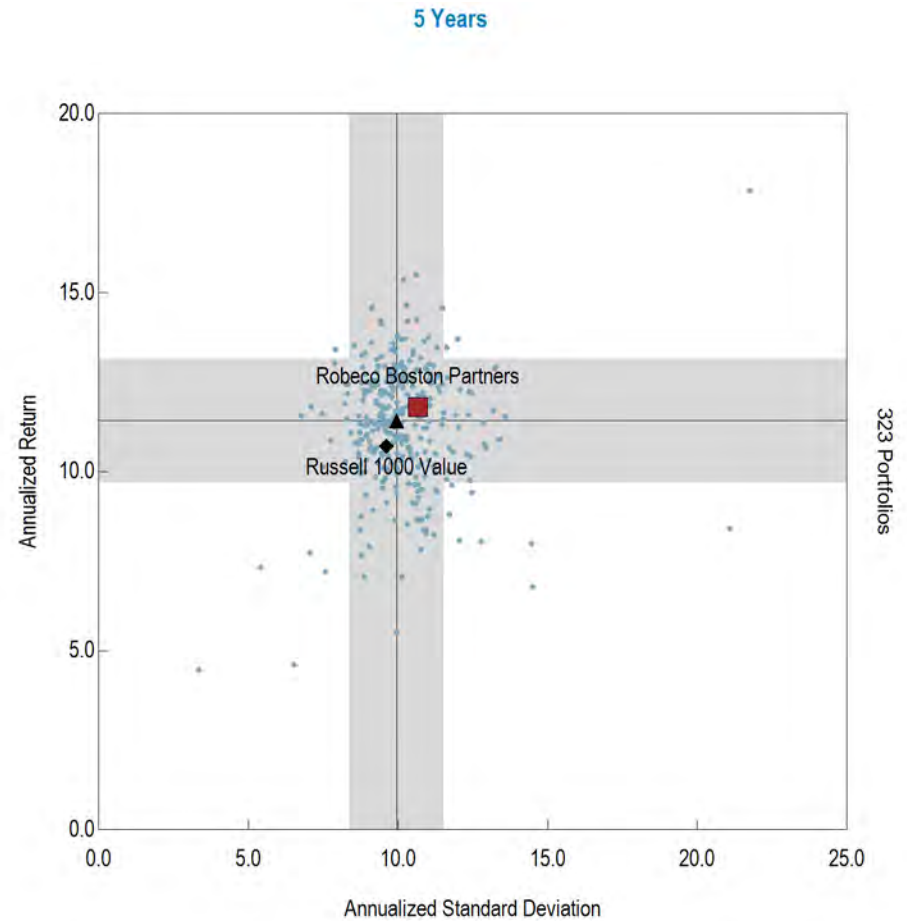
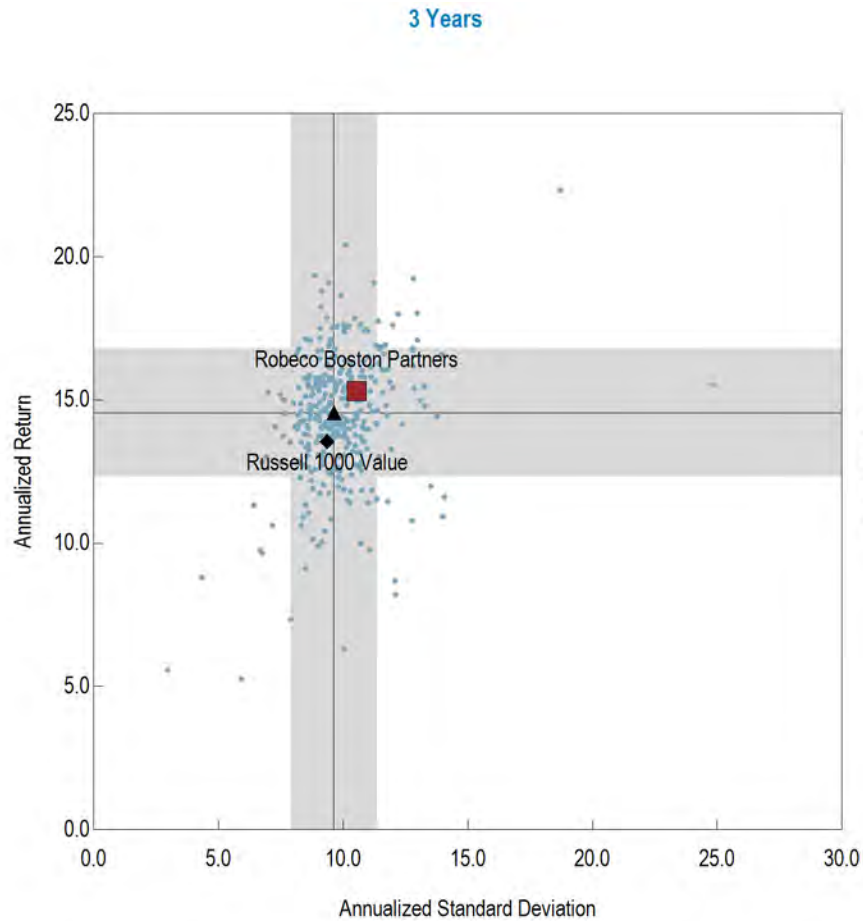


Rolling 3 Year Annualized Return (%)



Rolling 5 Year Annualized Return (%)





	<b>3 Years</b>		
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Robeco Boston Partners	15.3%	10.5%	1.4
Russell 1000 Value	13.6%	9.4%	1.4
eV US Large Cap Value Equity Gross Median	14.6%	9.6%	1.4

	<b>5 Years</b>		
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Robeco Boston Partners	11.8%	10.7%	1.1
Russell 1000 Value	10.7%	9.6%	1.1
eV US Large Cap Value Equity Gross Median	11.4%	10.0%	1.1

# Emerald Advisers Manager Portfolio Overview

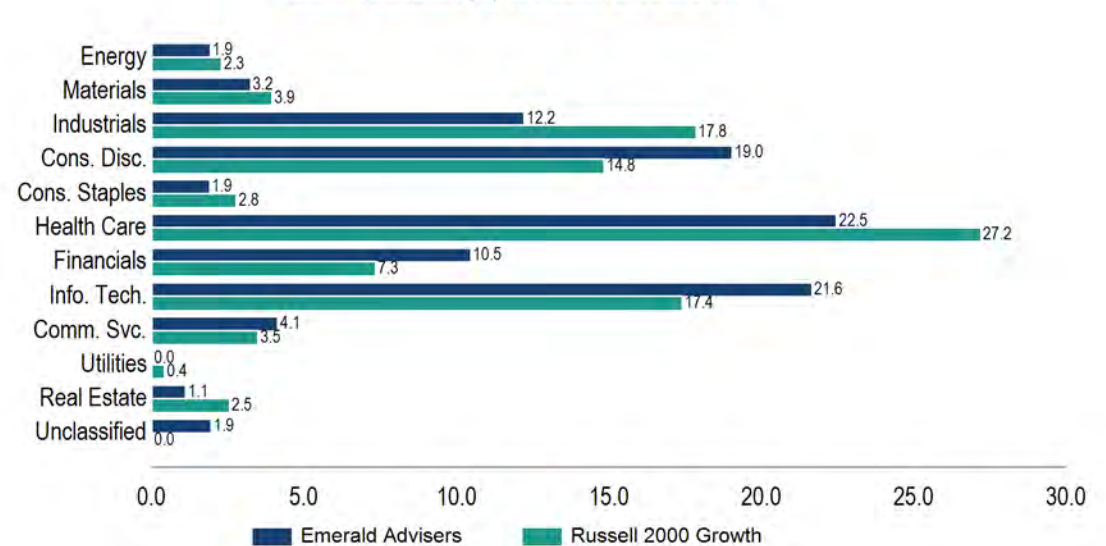
Period Ending: September 30, 2018

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	119	1,253
Weighted Avg. Market Cap. (\$B)	2.90	2.65
Median Market Cap. (\$B)	2.02	1.04
Price To Earnings	-8.55	18.97
Price To Book	7.11	5.86
Price To Sales	4.14	3.66
Return on Equity (%)	-0.59	6.90
Yield (%)	0.43	0.46
Beta	1.29	1.00

## Sector Allocation (%) vs Russell 2000 Growth



## Largest Holdings

	End Weight	Return
CHEGG	2.53	2.30
VONAGE HOLDINGS	2.24	9.85
FIVE BELOW	2.00	33.11
EPAM SYSTEMS	1.87	10.75
VARONIS SYSTEMS	1.84	-1.68
CADENCE BANCORP.'A'	1.83	-9.04
TREX	1.75	22.99
CIENA	1.58	17.84
AMER.EAG.OUTFITTERS	1.54	7.43
REATA PHARMS.CL.A	1.50	133.80

## Top Contributors

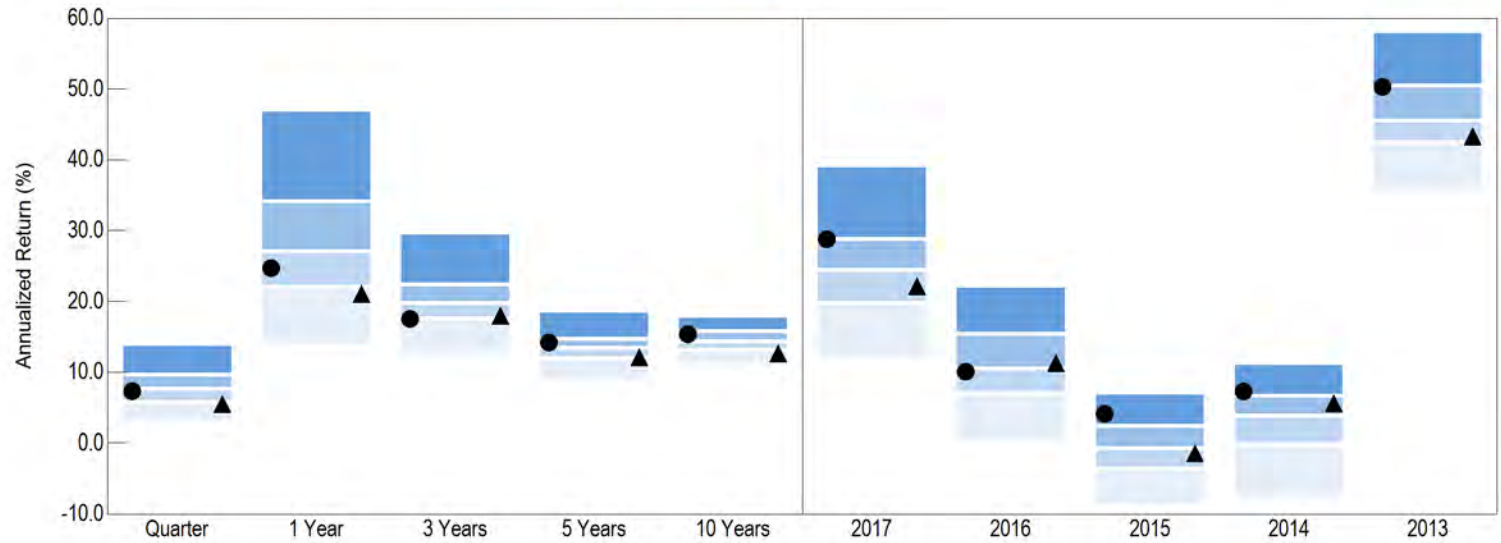
	Avg Wgt	Return	Contribution
REATA PHARMS.CL.A	1.20	133.80	1.61
TANDEM DIABETES CARE	0.87	94.55	0.82
TELADOC HEALTH	1.23	48.75	0.60
FIVE BELOW	1.67	33.11	0.55
AVROBIO	0.50	81.62	0.41
TREX	1.73	22.99	0.40
OLLIES BARGAIN OUTLET HLDG.	1.16	32.55	0.38
SEAWORLD ENTERTAINMENT	0.82	44.04	0.36
ALARMCOM HOLDINGS	0.78	42.15	0.33
MERCURY SYSTEMS	0.72	45.35	0.33

## Bottom Contributors

	Avg Wgt	Return	Contribution
FCB FINANCIAL HDG.CL.A	2.07	-19.39	-0.40
USA TECHNOLOGIES	0.81	-48.57	-0.39
CLOVIS ONCOLOGY	0.54	-35.41	-0.19
CADENCE BANCORP.'A'	2.00	-9.04	-0.18
EXTRACTION OIL & GAS	0.75	-23.14	-0.17
INSTRUCTURE	0.91	-16.80	-0.15
ADAMAS PHARMACEUTICALS	0.64	-22.49	-0.14
PUMA BIOTECHNOLOGY	0.60	-22.49	-0.14
PROOFPOINT	1.66	-7.79	-0.13
TOPBUILD	0.45	-27.47	-0.12

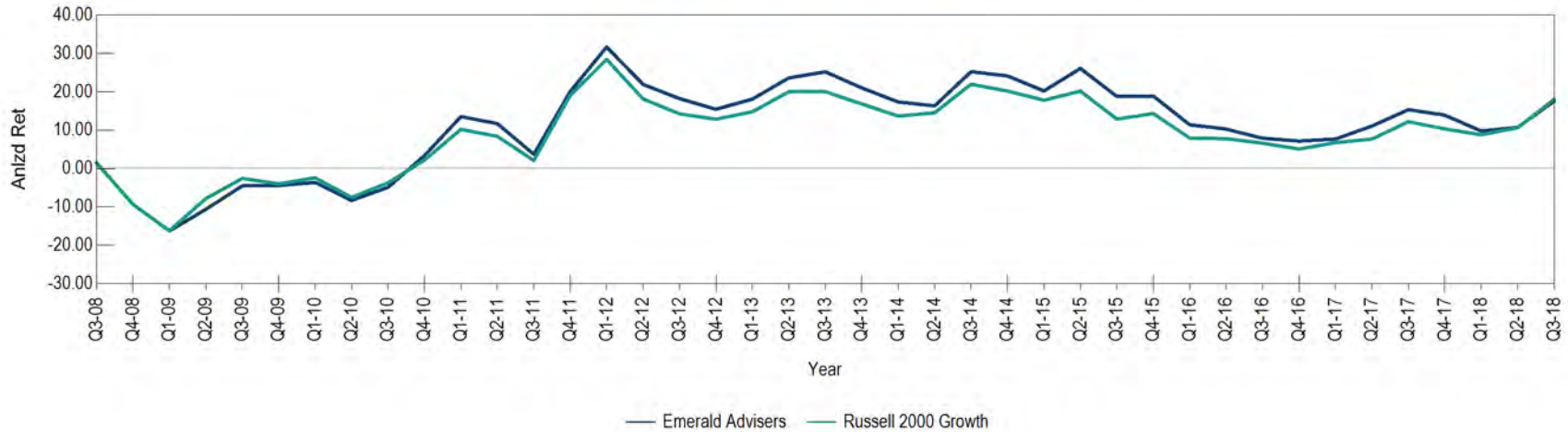
Unclassified sector allocation includes cash allocations.

Emerald Advisers vs. eV US Small Cap Growth Equity Gross Universe

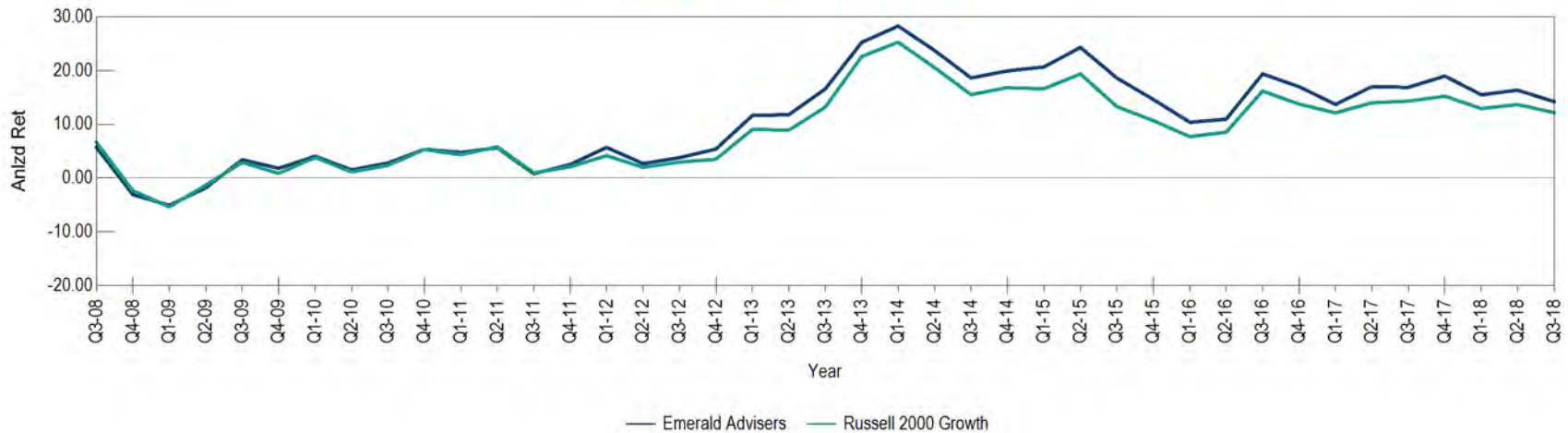


	Quarter	1 Year	3 Years	5 Years	10 Years	2017	2016	2015	2014	2013
<b>5th Percentile</b>	14.0	47.0	29.6	18.7	17.9	39.2	22.2	7.1	11.3	58.2
<b>25th Percentile</b>	9.7	34.2	22.5	14.8	15.8	28.9	15.5	2.5	6.7	50.6
<b>Median</b>	7.8	27.1	19.8	13.5	14.4	24.6	10.6	-0.6	3.9	45.6
<b>75th Percentile</b>	5.8	22.1	17.7	12.0	13.2	19.8	7.1	-3.5	-0.1	42.6
<b>95th Percentile</b>	3.0	13.9	12.5	8.8	11.1	12.1	0.2	-8.7	-7.6	35.6
<b># of Portfolios</b>	165	165	159	152	135	174	170	154	161	160
<b>● Emerald Advisers</b>	7.3 (59)	24.7 (62)	17.5 (77)	14.2 (37)	15.4 (36)	28.8 (26)	10.1 (54)	4.1 (19)	7.3 (21)	50.3 (27)
<b>▲ Russell 2000 Growth</b>	5.5 (77)	21.1 (79)	18.0 (73)	12.1 (75)	12.7 (83)	22.2 (62)	11.3 (49)	-1.4 (59)	5.6 (32)	43.3 (70)

Rolling 3 Year Annualized Return (%)

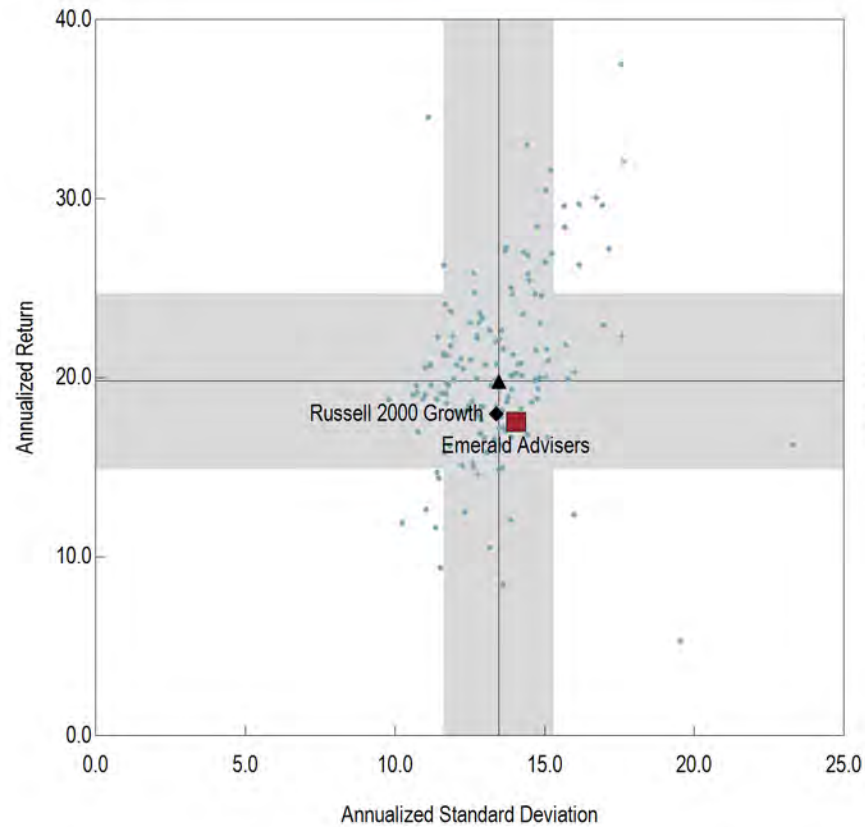


Rolling 5 Year Annualized Return (%)

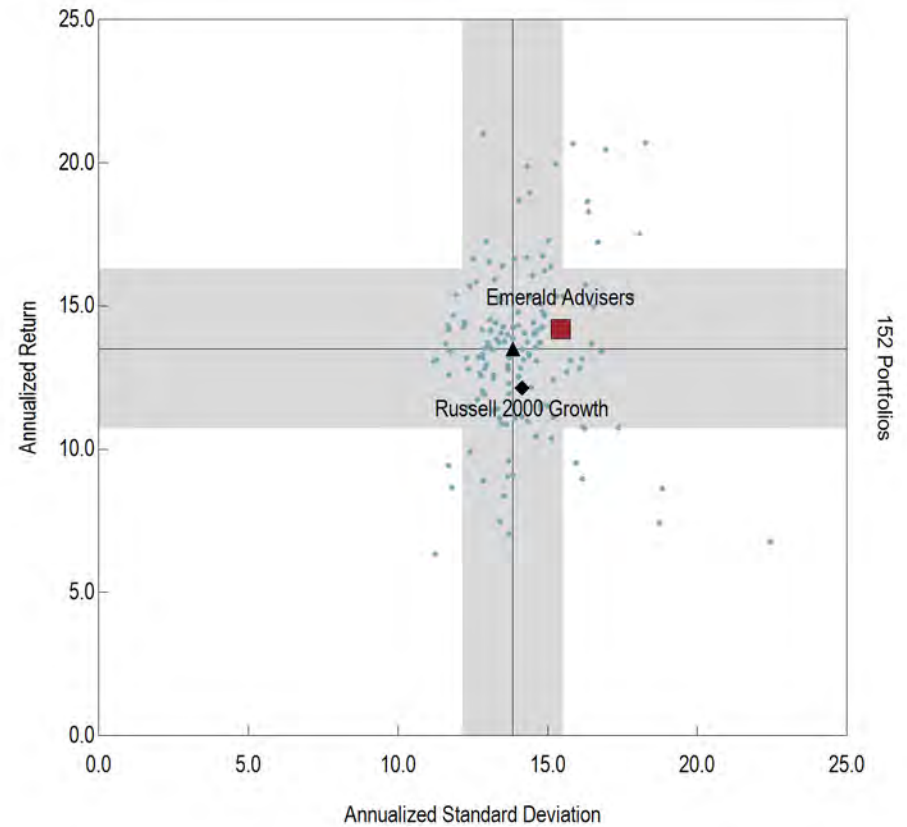




3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Emerald Advisers	17.5%	14.0%	1.2
Russell 2000 Growth	18.0%	13.4%	1.3
eV US Small Cap Growth Equity Gross Median	19.8%	13.5%	1.4

5 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Emerald Advisers	14.2%	15.4%	0.9
Russell 2000 Growth	12.1%	14.1%	0.8
eV US Small Cap Growth Equity Gross Median	13.5%	13.8%	0.9

# Ceredex Manager Portfolio Overview

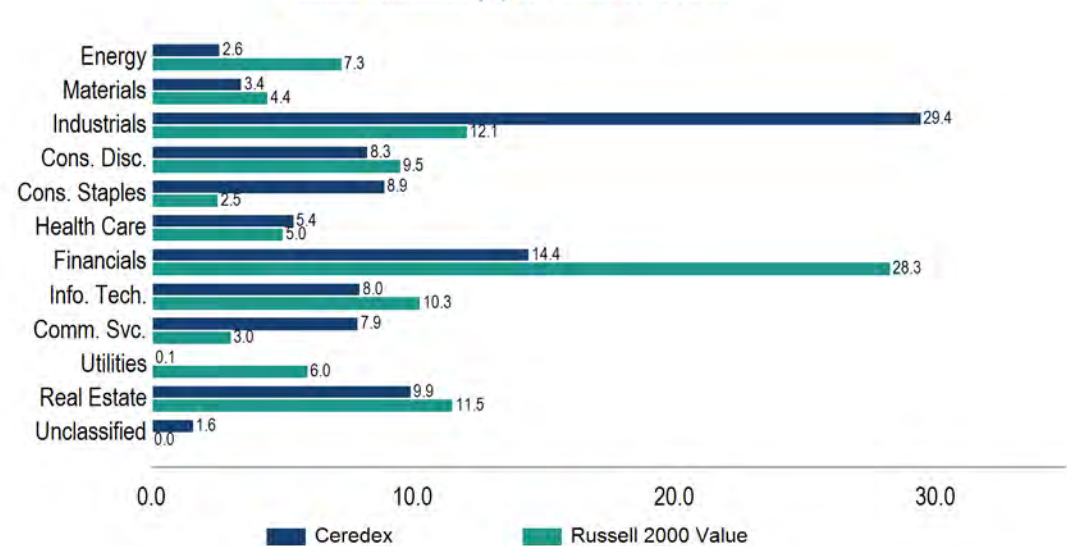
Period Ending: September 30, 2018

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	1,387
Weighted Avg. Market Cap. (\$B)	2.55	2.12
Median Market Cap. (\$B)	1.74	0.80
Price To Earnings	21.40	14.47
Price To Book	3.16	1.78
Price To Sales	2.22	2.56
Return on Equity (%)	16.11	7.12
Yield (%)	2.43	1.79
Beta	0.56	1.00

## Sector Allocation (%) vs Russell 2000 Value



## Largest Holdings

	End Weight	Return
ENERGIZER HOLDINGS	4.52	-6.41
MEREDITH	4.20	1.16
KEMPER	4.02	6.68
POWER INTEGRATIONS	4.01	-13.29
HILL-ROM HOLDINGS	3.87	8.32
B & G FOODS	3.81	-6.62
TETRA TECH	3.67	16.95
EVERCORE A	2.95	-4.20
PHYSICIANS REALTY TST.	2.86	7.34
TANGER FAC.OUTLET CNTRS.	2.55	-1.15

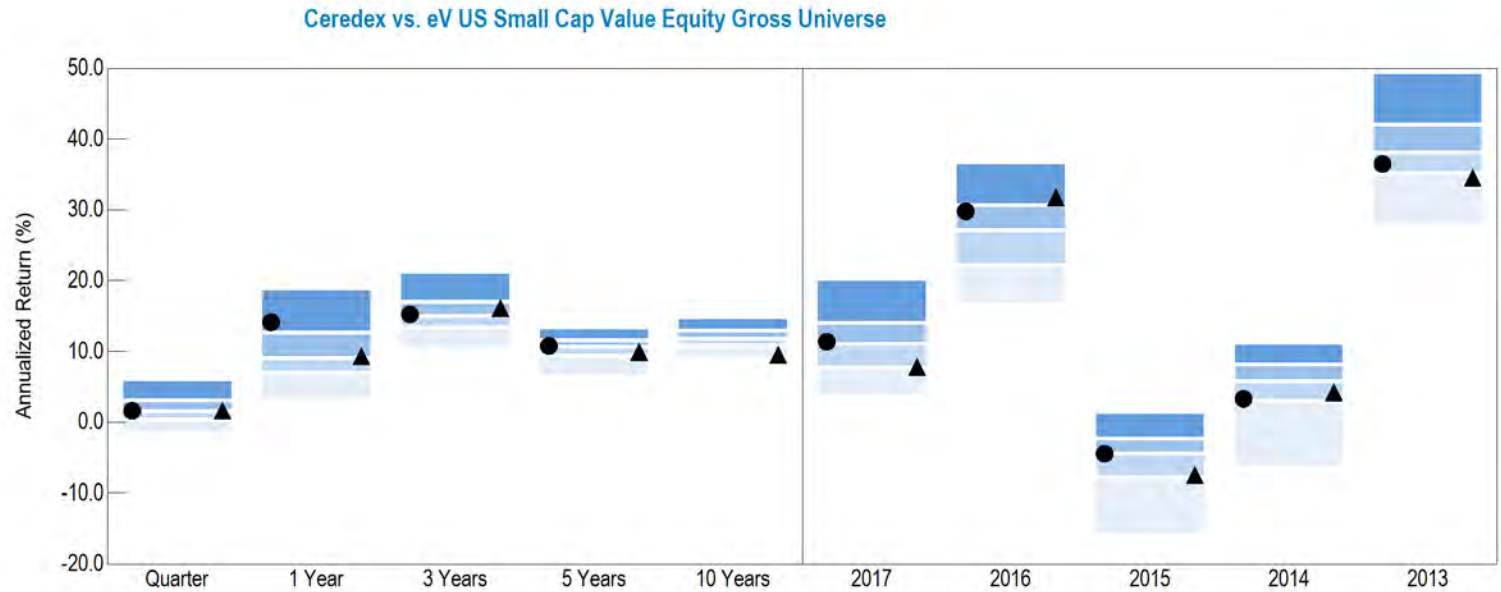
## Top Contributors

	Avg Wgt	Return	Contribution
AMC ENTERTAINMENT HDG. CL.A	1.55	40.12	0.62
TETRA TECH	3.40	16.95	0.58
CUBIC	2.41	13.99	0.34
HERMAN MILLER	2.31	13.86	0.32
HILL-ROM HOLDINGS	3.77	8.32	0.31
KEMPER	3.89	6.68	0.26
SM ENERGY	1.10	22.73	0.25
KNOLL	1.52	13.42	0.20
PHYSICIANS REALTY TST.	2.78	7.34	0.20
SIMPSON MNFG.	1.06	16.92	0.18

## Bottom Contributors

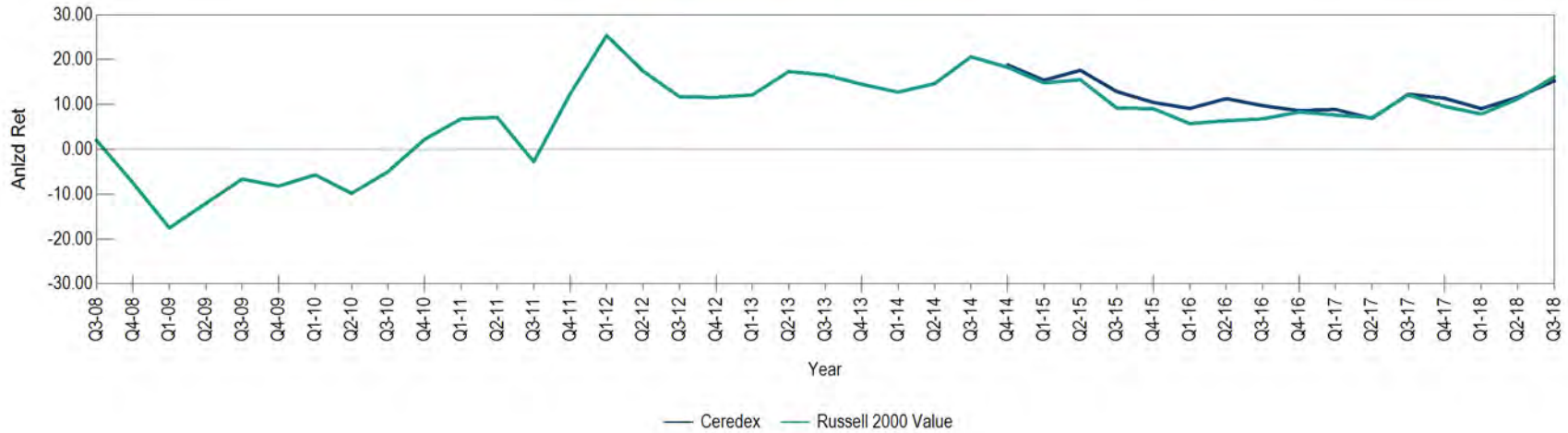
	Avg Wgt	Return	Contribution
PLANTRONICS	2.39	-20.74	-0.50
ENERGIZER HOLDINGS	4.76	-6.41	-0.31
KORN FERRY INTERNATIONAL	1.39	-20.33	-0.28
B & G FOODS	4.22	-6.62	-0.28
APOGEE ENTERPRISES	1.88	-13.95	-0.26
LITHIA MOTORS 'A'	1.88	-13.36	-0.25
HECLA MINING	0.96	-19.75	-0.19
GRANITE CON.	0.80	-17.66	-0.14
EVERCORE A	3.18	-4.20	-0.13
PHIBRO ANIMAL HLTH.CL.A	1.98	-6.65	-0.13

Unclassified sector allocation includes cash allocations.

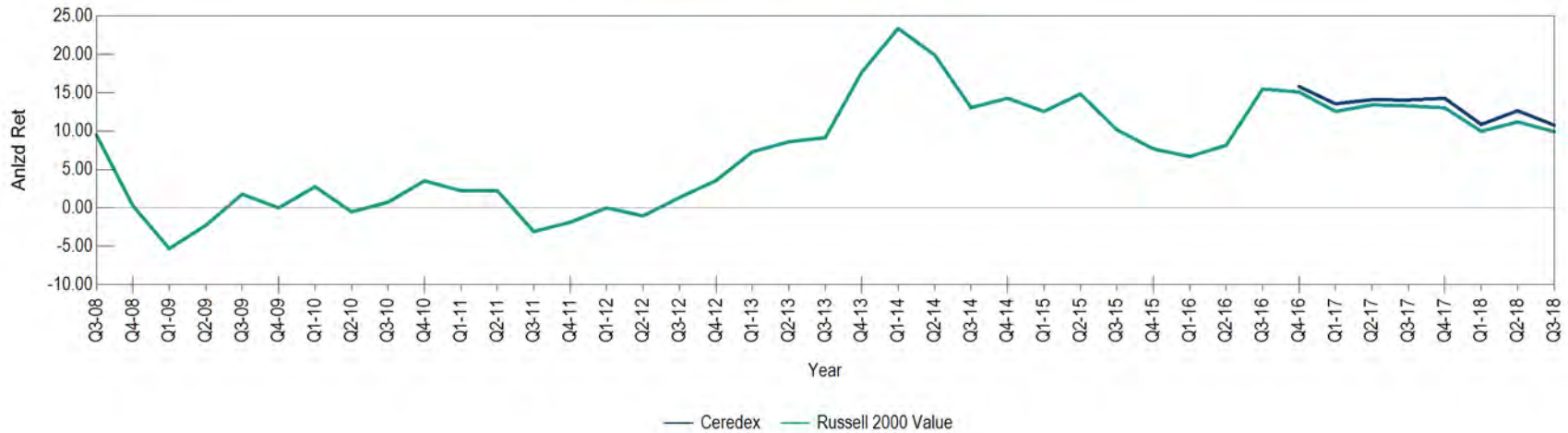


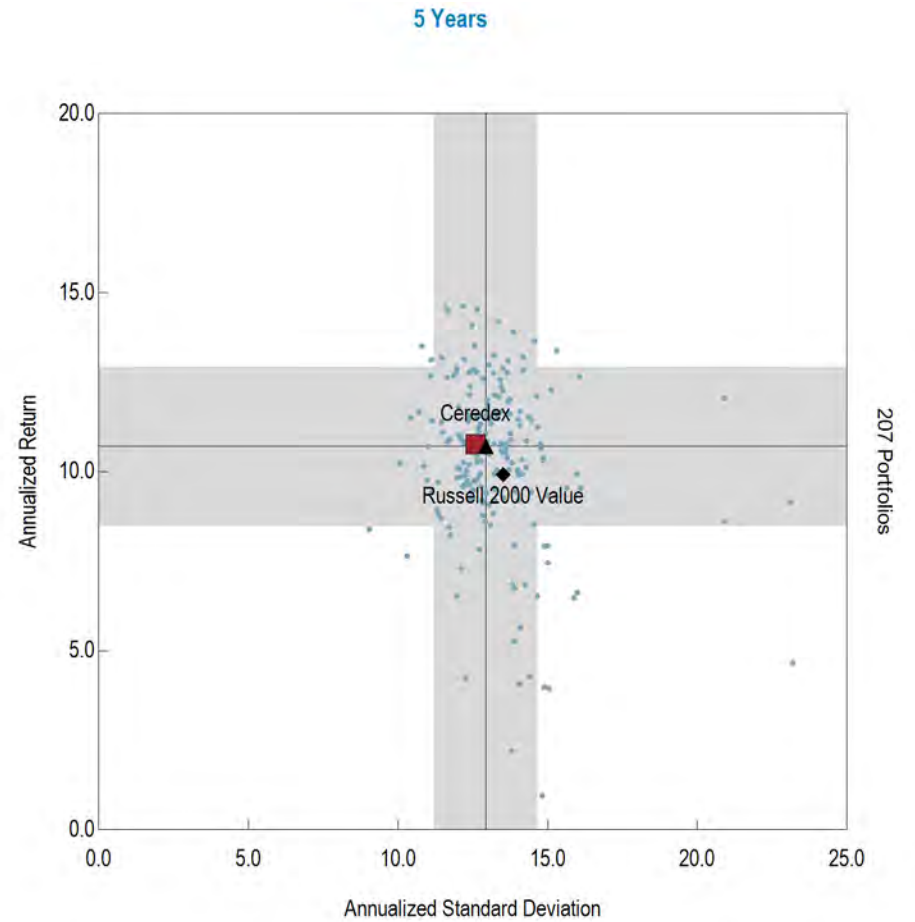
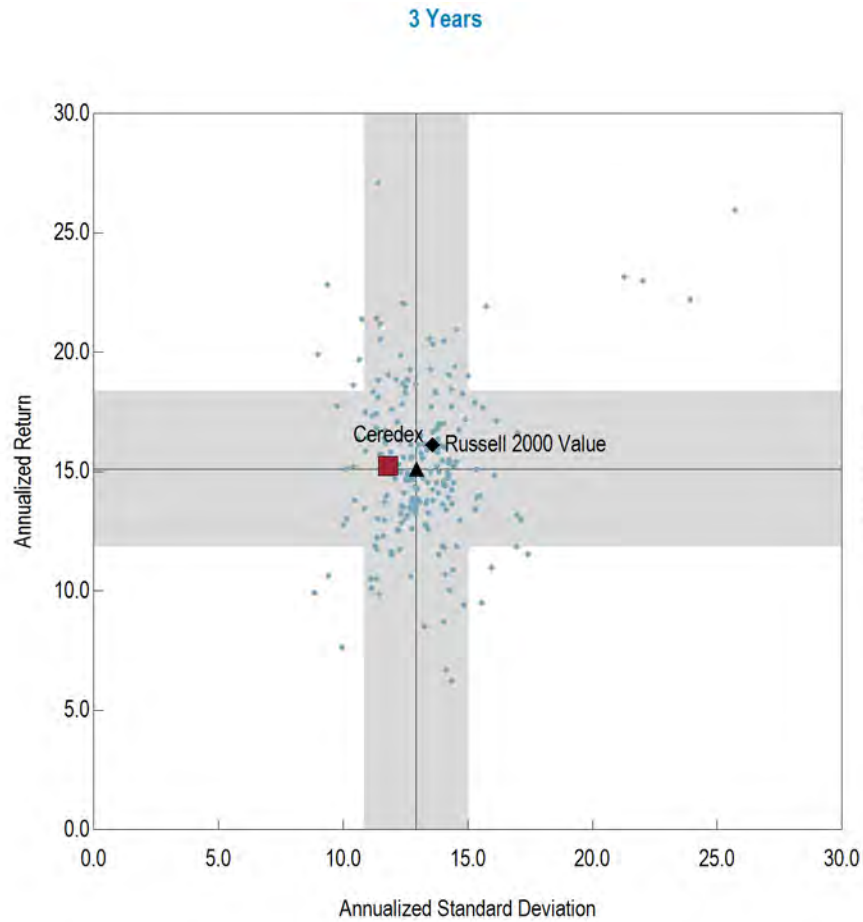
	Quarter	1 Year	3 Years	5 Years	10 Years	2017	2016	2015	2014	2013
<b>5th Percentile</b>	6.0	18.9	21.2	13.3	14.8	20.2	36.7	1.5	11.2	49.4
<b>25th Percentile</b>	3.1	12.7	17.1	11.6	13.0	14.1	30.7	-2.2	8.2	42.1
<b>Median</b>	1.6	9.1	15.1	10.7	11.8	11.1	27.2	-4.3	5.8	38.1
<b>75th Percentile</b>	0.4	7.0	13.4	9.4	10.9	7.8	22.2	-7.7	3.1	35.2
<b>95th Percentile</b>	-1.6	3.0	10.4	6.5	9.0	3.7	16.8	-15.8	-6.3	27.8
<b># of Portfolios</b>	221	221	216	207	175	224	222	212	206	199
<b>● Ceredex</b>	1.6 (49)	14.1 (17)	15.2 (48)	10.8 (49)	-- (--)	11.4 (48)	29.8 (32)	-4.4 (52)	3.3 (74)	36.5 (66)
<b>▲ Russell 2000 Value</b>	1.6 (49)	9.3 (49)	16.1 (35)	9.9 (66)	9.5 (94)	7.8 (75)	31.7 (17)	-7.5 (74)	4.2 (68)	34.5 (78)

Rolling 3 Year Annualized Return (%)



Rolling 5 Year Annualized Return (%)





**3 Years**

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Ceredex	15.2%	11.8%	1.2
Russell 2000 Value	16.1%	13.6%	1.1
eV US Small Cap Value Equity Gross Median	15.1%	12.9%	1.1

**5 Years**

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Ceredex	10.8%	12.6%	0.8
Russell 2000 Value	9.9%	13.5%	0.7
eV US Small Cap Value Equity Gross Median	10.7%	12.9%	0.8



# International Equity Managers

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# Pyrford Manager Portfolio Overview

Period Ending: September 30, 2018

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.

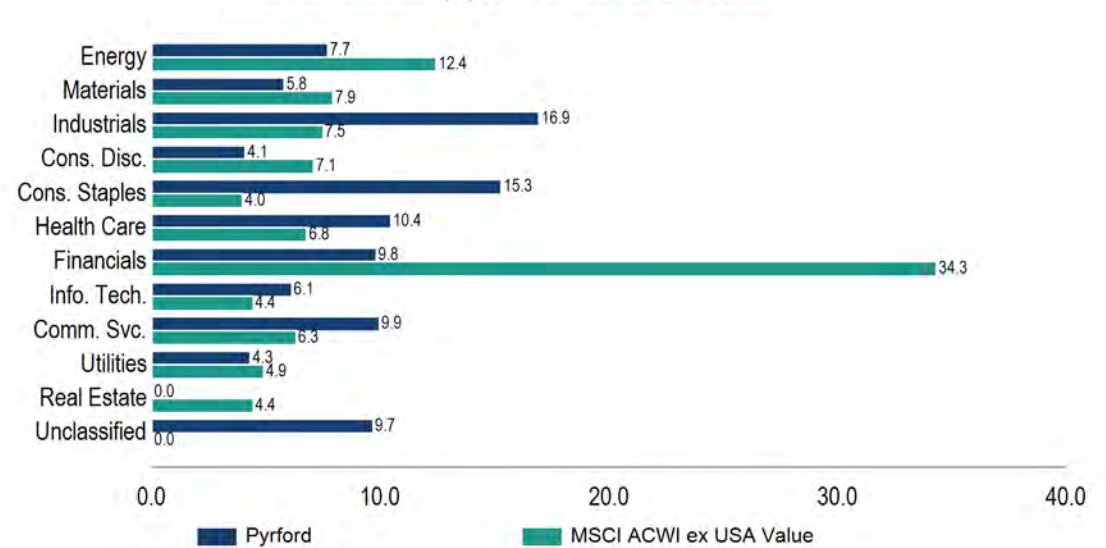
## Characteristics

	MSCI ACWI Portfolio	MSCI ACWI ex USA Value
Number of Holdings	65	1,274
Weighted Avg. Market Cap. (\$B)	63.47	58.24
Median Market Cap. (\$B)	23.50	6.98
Price To Earnings	20.10	13.73
Price To Book	3.36	1.53
Price To Sales	2.39	1.70
Return on Equity (%)	17.88	11.82
Yield (%)	3.69	4.04
Beta	0.54	1.00

## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	83.6%	74.7%
Emerging*	6.7%	25.3%
Cash	9.7%	
<b>Top 10 Largest Countries</b>		
Switzerland	13.6%	4.8%
United Kingdom	11.5%	15.7%
Australia	10.9%	4.5%
Japan	10.3%	16.6%
Cash	9.7%	0.0%
France	8.4%	7.3%
Germany	5.7%	5.2%
Netherlands	5.3%	1.2%
Singapore	4.9%	0.9%
Taiwan*	3.9%	3.0%
<b>Total-Top 10 Largest Countries</b>	<b>84.0%</b>	<b>59.2%</b>

## Sector Allocation (%) vs MSCI ACWI ex USA Value



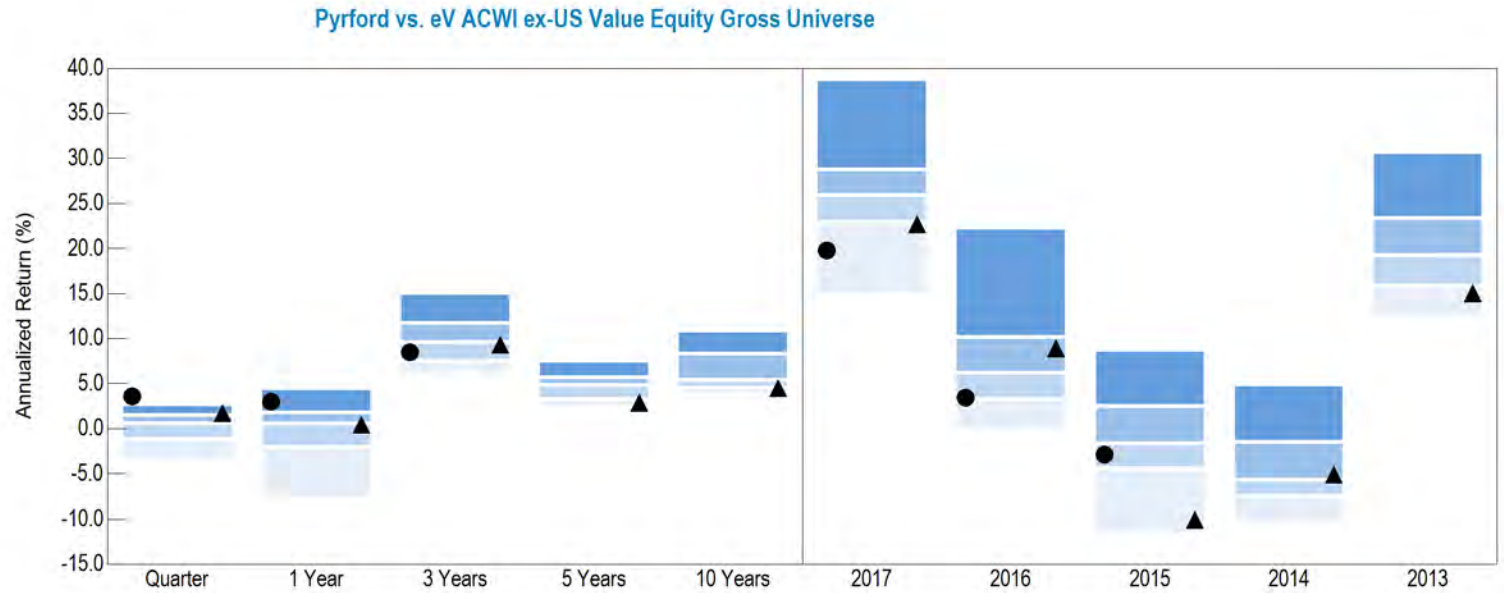
## Top Contributors

	Avg Wgt	Return	Contribution
BRAMBLES	2.24	21.76	0.49
NOVARTIS 'R'	2.97	13.97	0.42
ROCHE HOLDING	3.21	9.59	0.31
TAIWAN SEMICON.MNFG.	1.44	21.07	0.30
NESTLE 'R'	3.48	8.16	0.28
NIHON KOHDEN	1.47	14.34	0.21
FUCHS PETROLUB PREF.	1.59	12.93	0.21
AXIATA GROUP	1.20	17.13	0.21
SANOFI	1.87	10.94	0.20
BRENTAG	1.72	11.87	0.20

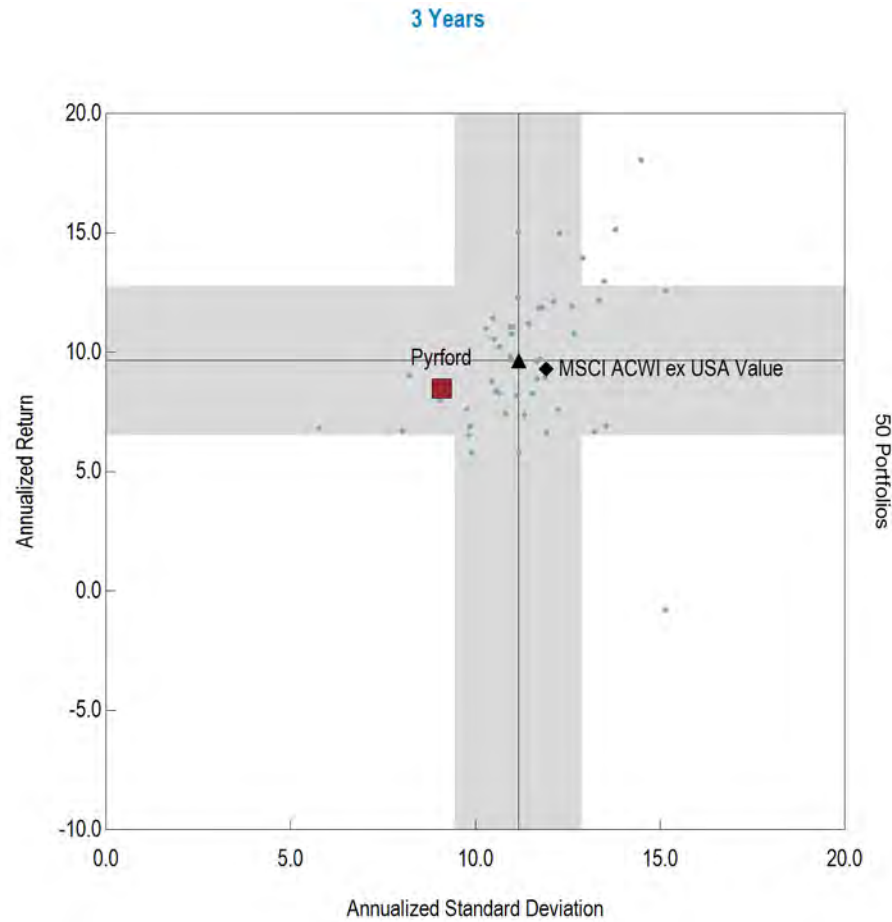
## Bottom Contributors

	Avg Wgt	Return	Contribution
WOOLWORTHS GROUP	2.31	-7.93	-0.18
JAPAN TOBACCO	2.79	-6.55	-0.18
SSE	1.30	-12.07	-0.16
VODAFONE GROUP	1.22	-11.61	-0.14
NATIONAL GRID	1.95	-6.76	-0.13
BRITISH AMERICAN TOBACCO	1.69	-7.56	-0.13
RUBIS	0.91	-13.32	-0.12
NEWCREST MINING	0.92	-12.15	-0.11
ASSA ABLOY B	1.73	-5.86	-0.10
SUMITOMO RUBBER INDS.	1.43	-5.53	-0.08

Unclassified sector allocation includes cash allocations.



	Return (Rank)									
5th Percentile	2.7	4.4	15.0	7.5	10.8	38.8	22.3	8.7	4.9	30.7
25th Percentile	1.5	1.8	11.8	5.8	8.3	28.8	10.2	2.5	-1.4	23.4
Median	0.7	0.6	9.7	4.9	5.5	26.0	6.2	-1.6	-5.7	19.3
75th Percentile	-1.1	-2.0	7.6	3.3	4.6	23.0	3.3	-4.3	-7.4	15.9
95th Percentile	-3.4	-7.6	6.1	2.4	3.8	15.0	-0.1	-11.6	-10.4	12.4
# of Portfolios	54	54	50	42	27	56	55	45	37	34
● Pyrford	3.6 (1)	3.0 (17)	8.5 (61)	-- (--)	-- (--)	19.8 (84)	3.4 (74)	-2.9 (59)	-- (--)	-- (--)
▲ MSCI ACWI ex USA Value	1.7 (19)	0.4 (54)	9.3 (53)	2.9 (91)	4.5 (78)	22.7 (77)	8.9 (35)	-10.1 (93)	-5.1 (49)	15.0 (83)



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Pyrford	8.5%	9.1%	0.8
MSCI ACWI ex USA Value	9.3%	11.9%	0.7
eV ACWI ex-US Value Equity Gross Median	9.7%	11.2%	0.8

# William Blair Manager Portfolio Overview

Period Ending: September 30, 2018

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.

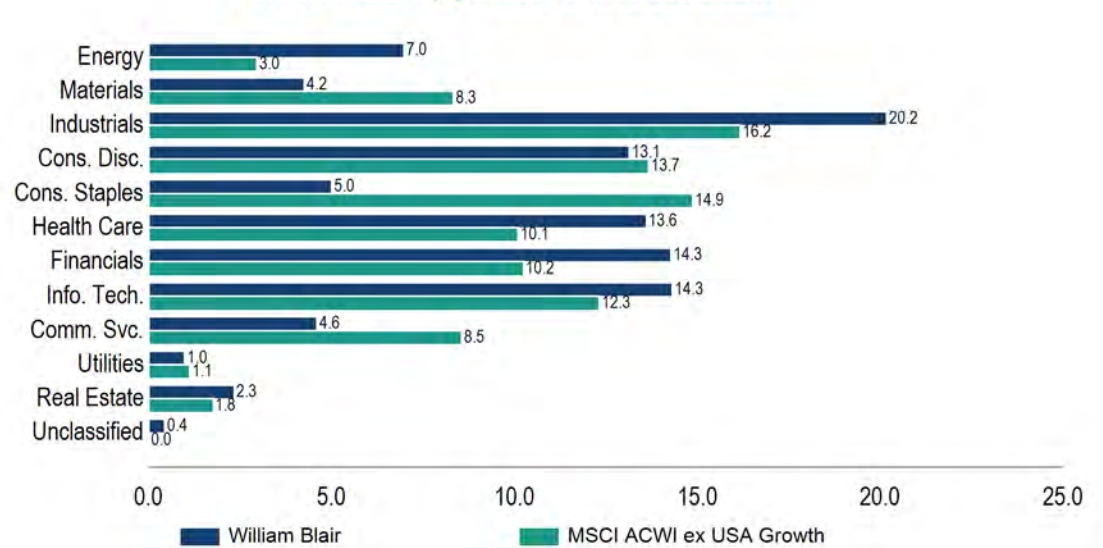
## Characteristics

	Portfolio	MSCI ACWI ex USA Growth
Number of Holdings	186	1,150
Weighted Avg. Market Cap. (\$B)	51.26	66.10
Median Market Cap. (\$B)	9.28	8.36
Price To Earnings	28.82	24.31
Price To Book	5.88	4.14
Price To Sales	4.40	3.08
Return on Equity (%)	23.53	19.39
Yield (%)	1.70	1.99
Beta	0.92	1.00

## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	89.3%	76.1%
Emerging*	10.3%	23.9%
<b>Top 10 Largest Countries</b>		
United Kingdom	15.1%	8.6%
France	13.2%	8.3%
Japan	12.7%	16.8%
Canada	7.1%	6.6%
Germany	6.3%	7.8%
Netherlands	4.8%	3.4%
Hong Kong	4.7%	2.4%
Denmark	4.3%	2.0%
Sweden	4.3%	2.4%
Switzerland	3.8%	6.5%
<b>Total-Top 10 Largest Countries</b>	<b>76.3%</b>	<b>64.7%</b>

## Sector Allocation (%) vs MSCI ACWI ex USA Growth



## Top Contributors

	Avg Wgt	Return	Contribution
WIRECARD	1.06	35.83	0.38
LONZA GROUP	1.23	29.24	0.36
TAIWAN SEMICON.SPN.ADR 1:5	1.31	20.79	0.27
AMADEUS IT GROUP	1.08	17.75	0.19
LULULEMON ATHLETICA	0.60	30.15	0.18
MTU AERO ENGINES HLDG.	0.93	18.29	0.17
TOTAL	2.16	7.62	0.16
DAIKIN INDUSTRIES	1.31	11.66	0.15
DSV 'B'	1.15	12.58	0.14
NINTENDO	0.99	12.62	0.12

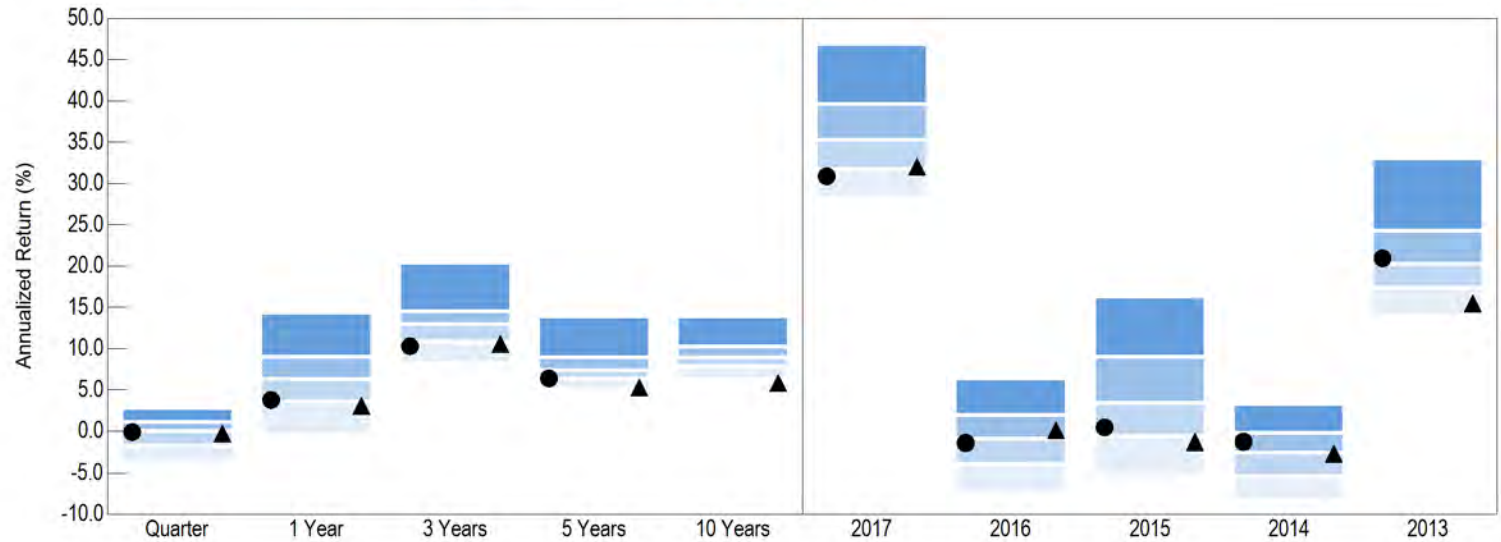
## Bottom Contributors

	Avg Wgt	Return	Contribution
TENCENT HOLDINGS	1.78	-17.71	-0.32
ALIBABA GROUP HLDG.SPN. ADR 1:1	1.94	-11.19	-0.22
GALAXY ENTERTAINMENT GP.	1.09	-17.31	-0.19
YES BANK	0.39	-48.89	-0.19
ASAHI GROUP HOLDINGS	1.11	-15.33	-0.17
CSPC PHARMACEUTICAL GP.	0.48	-29.69	-0.14
VALEO	0.55	-20.54	-0.11
MARUTI SUZUKI INDIA	0.53	-20.62	-0.11
KERING	1.65	-5.03	-0.08
DOLLARAMA	0.43	-18.68	-0.08

Unclassified sector allocation includes cash allocations.

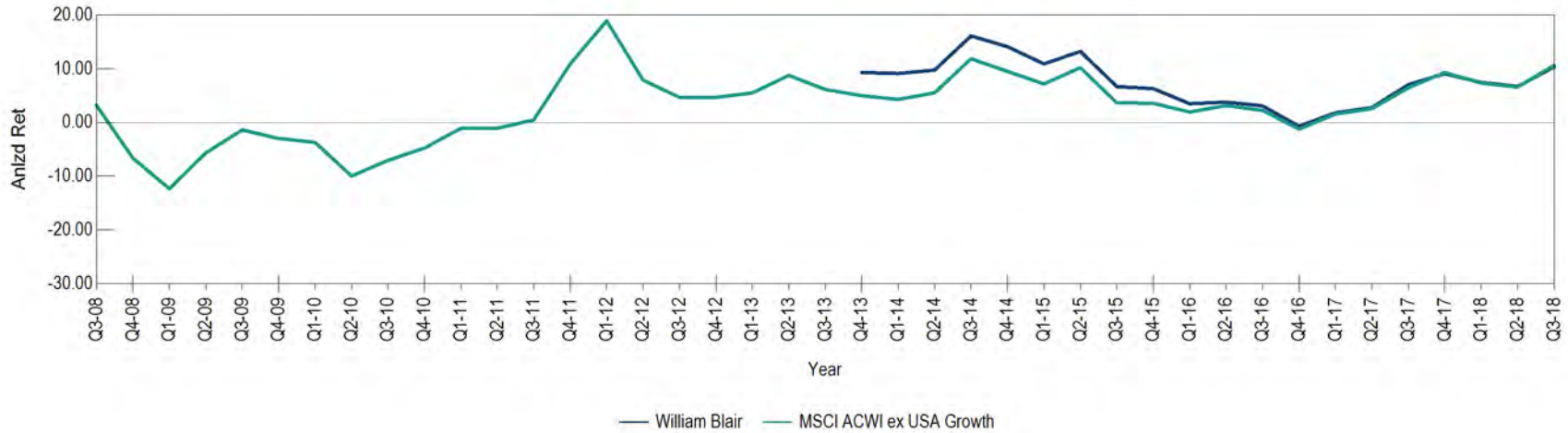


William Blair vs. eV ACWI ex-US Growth Equity Gross Universe

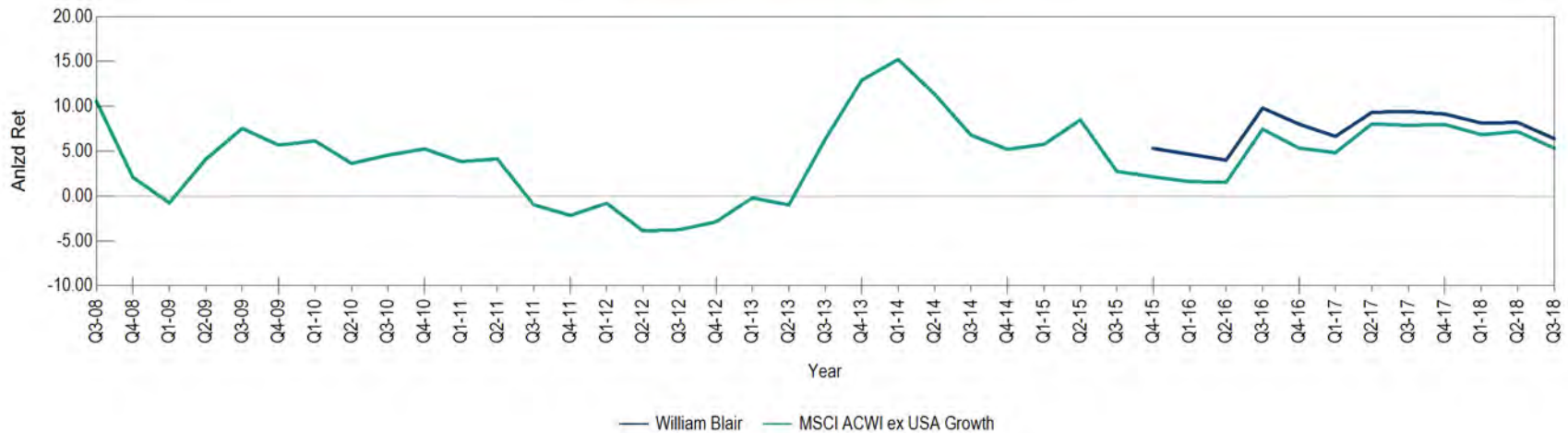


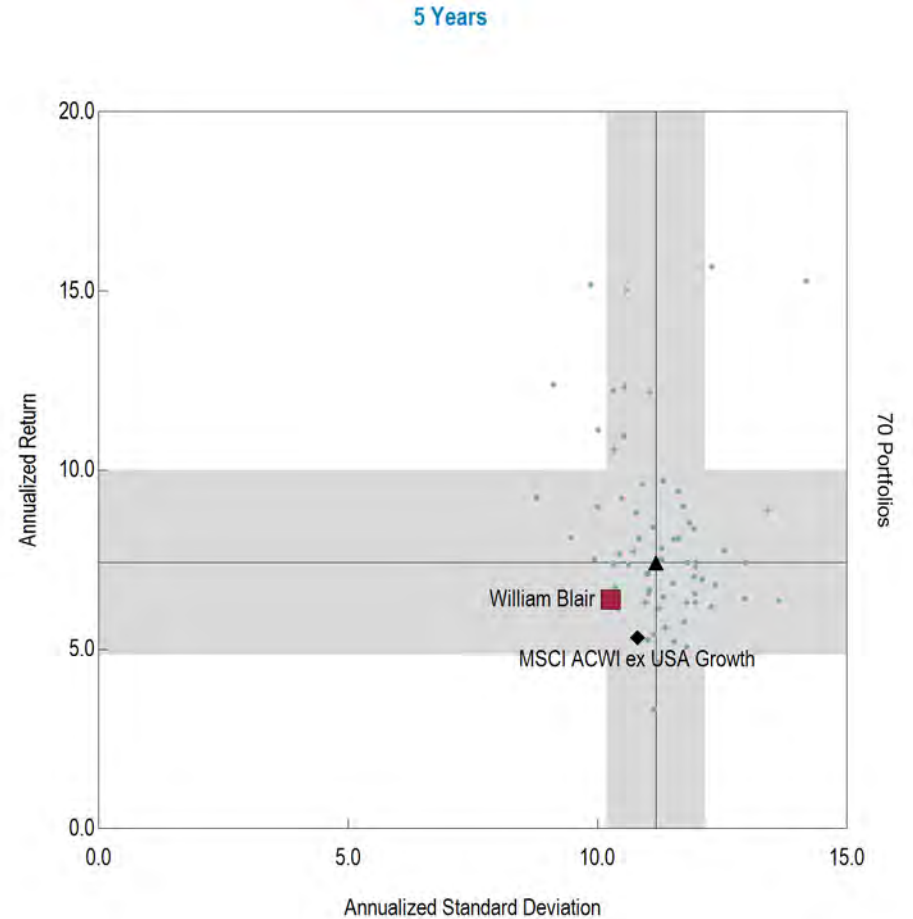
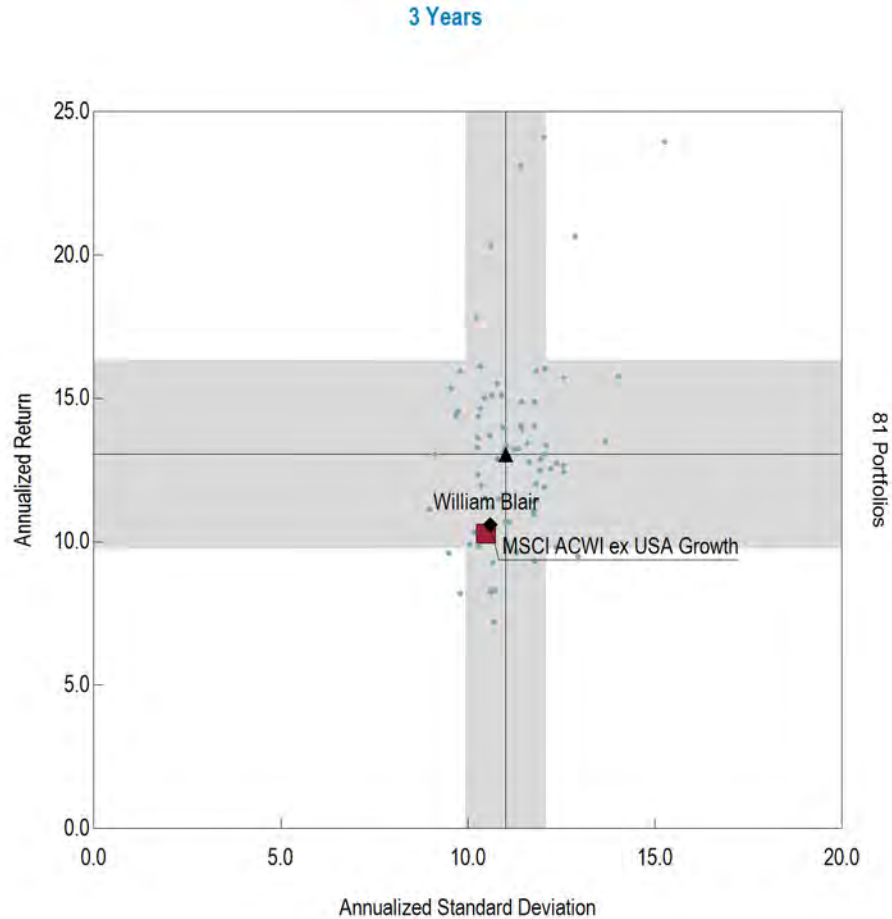
	Return (Rank)									
5th Percentile	2.8	14.3	20.3	13.8	13.9	46.8	6.3	16.3	3.2	33.0
25th Percentile	1.1	9.1	14.6	9.0	10.3	39.6	2.0	9.0	-0.1	24.3
Median	0.0	6.4	13.0	7.4	9.0	35.3	-0.9	3.5	-2.5	20.3
75th Percentile	-1.7	3.6	11.0	6.4	7.9	31.8	-3.9	-0.5	-5.3	17.5
95th Percentile	-3.8	-0.5	8.3	5.1	6.4	28.3	-7.4	-5.4	-8.2	14.0
# of Portfolios	85	85	81	70	54	94	90	70	50	46
● William Blair	-0.1 (52)	3.8 (74)	10.3 (82)	6.4 (75)	-- (--)	30.9 (81)	-1.4 (55)	0.5 (69)	-1.2 (37)	20.9 (44)
▲ MSCI ACWI ex USA Growth	-0.3 (53)	3.1 (80)	10.6 (80)	5.3 (93)	5.8 (99)	32.0 (75)	0.1 (45)	-1.3 (83)	-2.6 (53)	15.5 (87)

Rolling 3 Year Annualized Return (%)



Rolling 5 Year Annualized Return (%)





	<b>3 Years</b>		
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
William Blair	10.3%	10.5%	0.9
MSCI ACWI ex USA Growth	10.6%	10.6%	0.9
eV ACWI ex-US Growth Equity Gross Median	13.0%	11.0%	1.1

	<b>5 Years</b>		
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
William Blair	6.4%	10.3%	0.6
MSCI ACWI ex USA Growth	5.3%	10.8%	0.4
eV ACWI ex-US Growth Equity Gross Median	7.4%	11.2%	0.6

# PIMCO RAE Emerging Markets Manager Portfolio Overview

Period Ending: September 30, 2018

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.

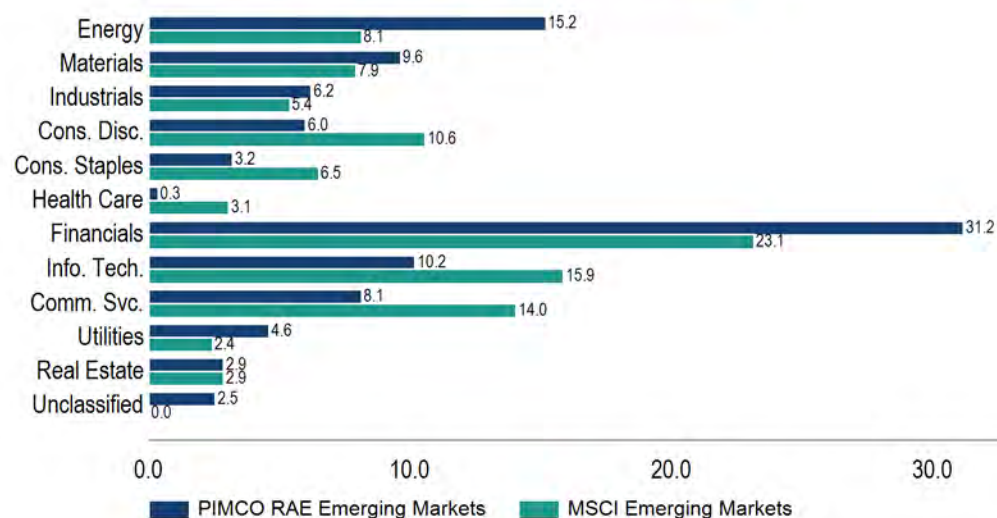
## Characteristics

	Portfolio	MSCI Emerging Markets
Number of Holdings	602	1,151
Weighted Avg. Market Cap. (\$B)	39.80	79.27
Median Market Cap. (\$B)	3.53	5.31
Price To Earnings	9.95	18.58
Price To Book	1.28	3.09
Price To Sales	1.20	2.52
Return on Equity (%)	11.21	17.71
Yield (%)	3.86	2.65
Beta		1.00

## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	10.8%	0.0%
Emerging*	86.7%	100.0%
<b>Top 10 Largest Countries</b>		
Korea*	20.4%	14.9%
China*	19.1%	30.9%
Hong Kong	10.3%	0.0%
Taiwan*	10.2%	12.3%
Russia*	10.1%	3.6%
Brazil*	4.7%	6.2%
South Africa*	4.3%	6.2%
India*	4.1%	8.6%
Thailand*	3.2%	2.5%
Cash	2.5%	0.0%
<b>Total-Top 10 Largest Countries</b>	<b>88.9%</b>	<b>85.2%</b>

## Sector Allocation (%) vs MSCI Emerging Markets



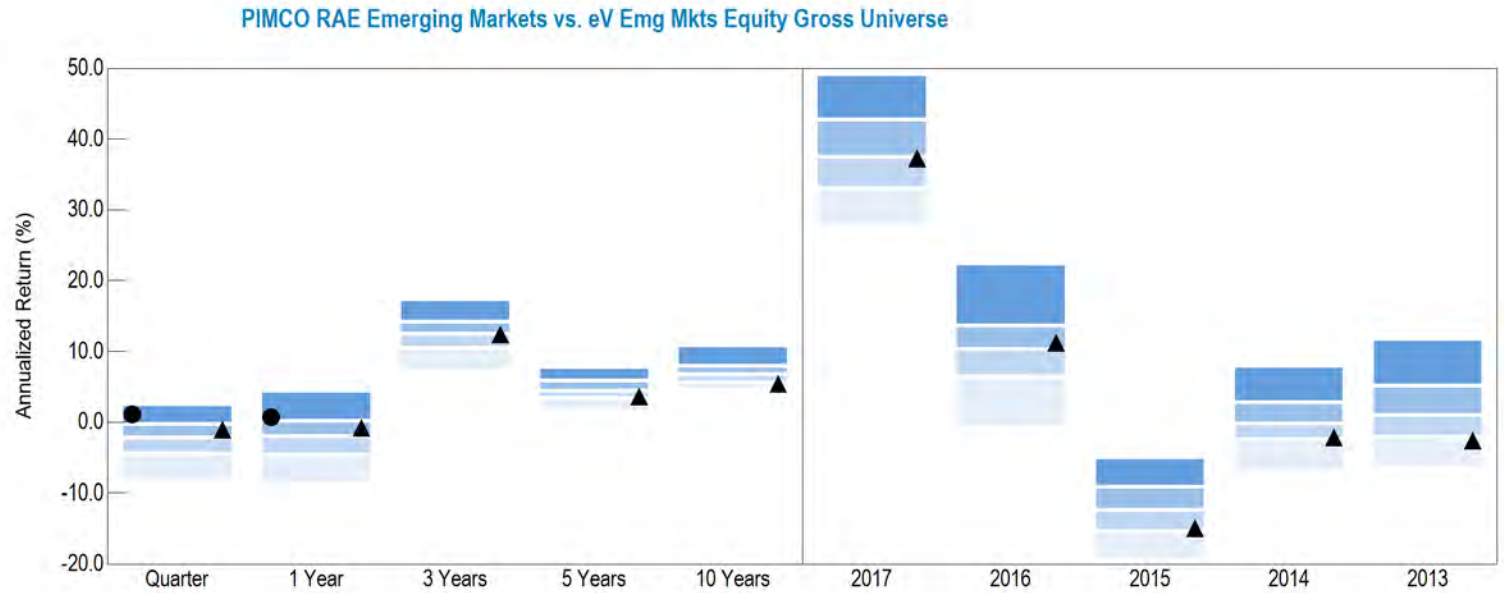
## Top Contributors

	End Weight	Return	Contribution
PJSC GAZPROM ADR CDI 1:2	4.01	20.19	0.81
PJSC LUKOIL SPON (LON) ADR	1.95	15.47	0.30
CNOOC	1.72	17.34	0.30
LENOVO GROUP	0.59	41.87	0.25
CHINA MOBILE	1.33	13.74	0.18
CHINA PTL.& CHM. 'H'	1.18	14.82	0.17
LG UPLUS	0.53	31.33	0.17
TAIWAN SEMICON.SPN.ADR 1:5	0.76	20.79	0.16
VALE ON	0.69	19.49	0.14
SK TELECOM SPN.ADR 9:1	0.69	19.55	0.13

## Bottom Contributors

	End Weight	Return	Contribution
BANK OF CHINA 'H'	2.06	-5.23	-0.11
MTN GROUP	0.51	-20.10	-0.10
ALPHA BANK	0.26	-35.64	-0.09
CHINA NATIONAL BUILDING MATERIAL 'H'	0.86	-10.32	-0.09
HACI OMER SABANCI HLDG.	0.24	-34.10	-0.08
LG ELECTRONICS	0.58	-14.05	-0.08
NATIONAL BK.OF GREECE	0.23	-33.81	-0.08
TURKIYE IS BANKASI 'C'	0.18	-40.86	-0.07
POSCO	0.71	-10.06	-0.07
KOREA ELECTRIC POWER	0.85	-7.85	-0.07

Unclassified sector allocation includes cash allocations.



	Return (Rank)															
5th Percentile	2.5	4.4	17.3	7.8	10.8	49.2	22.4	-5.0	8.0	11.7						
25th Percentile	-0.2	0.2	14.2	5.9	8.1	42.8	13.7	-9.0	2.9	5.2						
Median	-2.1	-1.9	12.5	4.5	6.9	37.6	10.4	-12.2	-0.1	1.0						
75th Percentile	-4.3	-4.5	10.6	3.5	5.7	33.2	6.6	-15.3	-2.4	-2.0						
95th Percentile	-8.2	-8.7	7.3	1.6	4.7	27.8	-0.6	-19.2	-7.0	-6.3						
# of Portfolios	347	346	327	285	146	343	337	273	251	198						
● PIMCO RAE Emerging Markets	1.1 (13)	0.7 (24)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)						
▲ MSCI Emerging Markets	-1.1 (38)	-0.8 (36)	12.4 (53)	3.6 (72)	5.4 (83)	37.3 (53)	11.2 (45)	-14.9 (70)	-2.2 (74)	-2.6 (80)						



# TT Emerging Markets Manager Portfolio Overview

Period Ending: September 30, 2018

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

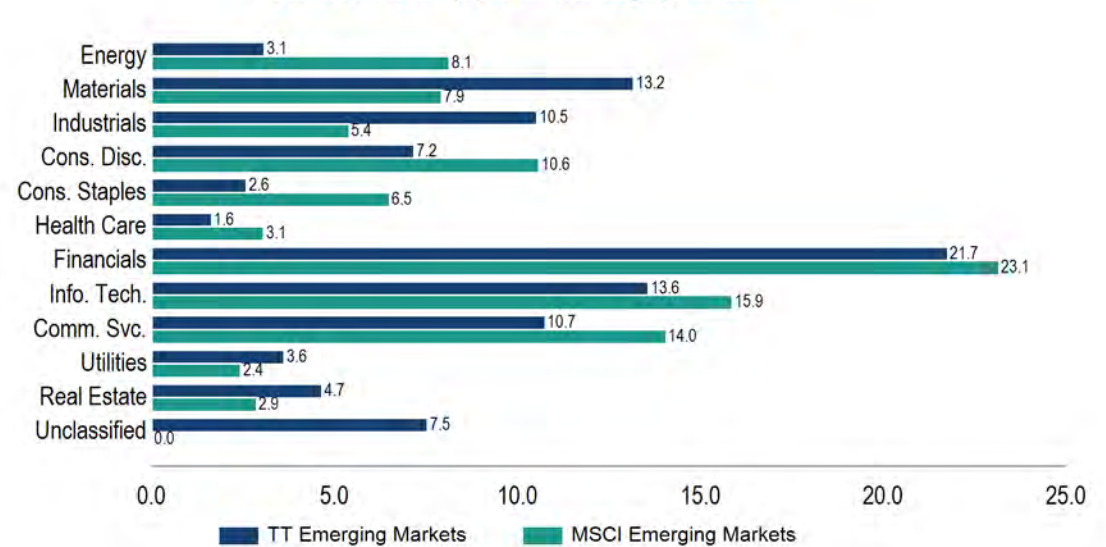
	Portfolio	MSCI Emerging Markets
Number of Holdings	63	1,151
Weighted Avg. Market Cap. (\$B)	59.15	79.27
Median Market Cap. (\$B)	7.19	5.31
Price To Earnings	18.76	18.58
Price To Book	3.12	3.09
Price To Sales	3.35	2.52
Return on Equity (%)	20.05	17.71
Yield (%)	2.05	2.65
Beta		1.00

## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	17.9%	0.0%
Emerging*	77.4%	100.0%
Frontier**	1.5%	0.0%
<b>Top 10 Largest Countries</b>		
China*	18.4%	30.9%
Korea*	17.0%	14.9%
India*	14.4%	8.6%
Hong Kong	8.4%	0.0%
Brazil*	7.7%	6.2%
Russia*	5.6%	3.6%
United Kingdom	5.2%	0.0%
Taiwan*	4.9%	12.3%
South Africa*	4.3%	6.2%
Cash	3.1%	0.0%
<b>Total-Top 10 Largest Countries</b>	<b>88.9%</b>	<b>82.7%</b>

Unclassified sector allocation includes cash allocations.

## Sector Allocation (%) vs MSCI Emerging Markets



## Top Contributors

	End Weight	Return	Contribution
ROSNEFT OIL CO.GDR	1.66	20.32	0.34
MAANSHAN IRON & STL.'H'	1.12	27.64	0.31
OLD MUTUAL LIMITED (LON)	2.46	11.54	0.28
HCL TECHNOLOGIES	2.31	11.23	0.26
PETROLEO BRASILEIRO ADR 1:2	0.88	20.62	0.18
HANA FINANCIAL GROUP	3.87	4.46	0.17
GPO FINANCE BANORTE	0.79	21.48	0.17
SASOL	1.94	6.91	0.13
PING AN INSURANCE (GROUP) OF CHINA 'H'	1.03	11.45	0.12
ASE INDUSTRIAL HOLDING	1.51	7.60	0.11

## Bottom Contributors

	End Weight	Return	Contribution
ALIBABA GROUP HLDG.SPN. ADR 1:1	4.71	-11.19	-0.53
TENCENT HOLDINGS	2.94	-17.71	-0.52
SHAFSN.PHARM.(GROUP) 'H'	1.63	-27.31	-0.44
EDELWEISS FNSR.	0.93	-39.12	-0.36
NASPERS	2.40	-15.01	-0.36
WIZZ AIR HOLDINGS	1.52	-21.06	-0.32
WONIK IPS	1.56	-19.91	-0.31
SUNNY OPTICAL TECH.(GP.)	0.79	-37.99	-0.30
YANGTZE OPTC.FRE.& CABLE JOINT STOCK 'H'	1.27	-23.23	-0.29
ARVIND	1.20	-24.18	-0.29

## Global Equity Managers

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# Artisan Partners Manager Portfolio Overview

Period Ending: September 30, 2018

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.

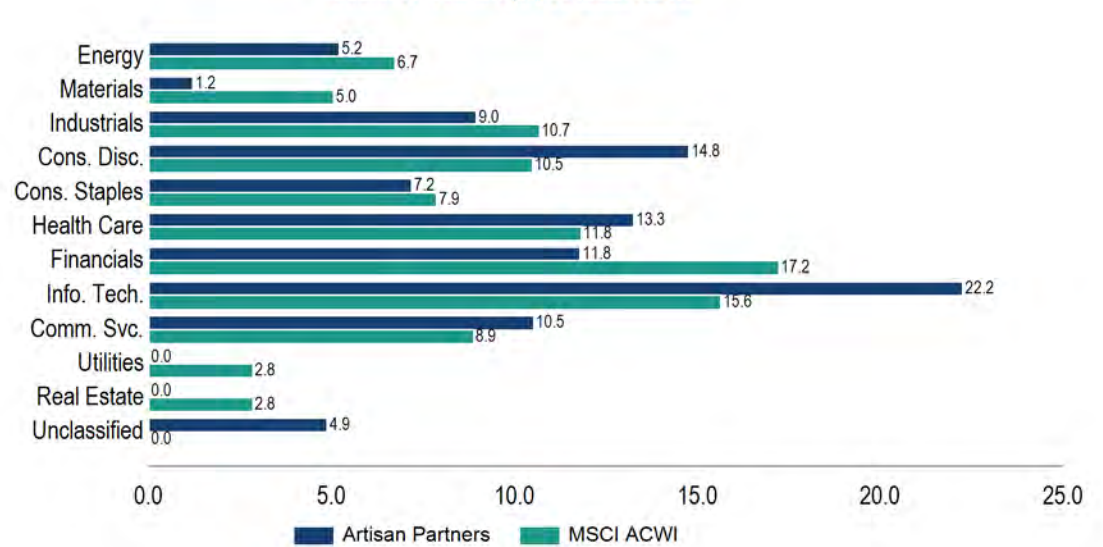
## Characteristics

	Portfolio	MSCI ACWI
Number of Holdings	46	2,791
Weighted Avg. Market Cap. (\$B)	80.72	148.68
Median Market Cap. (\$B)	32.70	9.59
Price To Earnings	42.16	21.71
Price To Book	7.61	3.84
Price To Sales	6.25	3.19
Return on Equity (%)	20.83	18.57
Yield (%)	0.97	2.37
Beta	1.37	1.00

## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	93.6%	88.9%
Emerging*	2.0%	11.1%
<b>Top 10 Largest Countries</b>		
United States	50.3%	55.0%
Japan	8.1%	7.5%
United Kingdom	7.4%	5.4%
Hong Kong	7.2%	1.1%
Switzerland	5.3%	2.5%
Cash	4.4%	0.0%
Netherlands	3.4%	1.0%
Spain	2.6%	0.9%
Denmark	2.0%	0.5%
France	2.0%	3.5%
<b>Total-Top 10 Largest Countries</b>	<b>93.2%</b>	<b>77.6%</b>

## Sector Allocation (%) vs MSCI ACWI



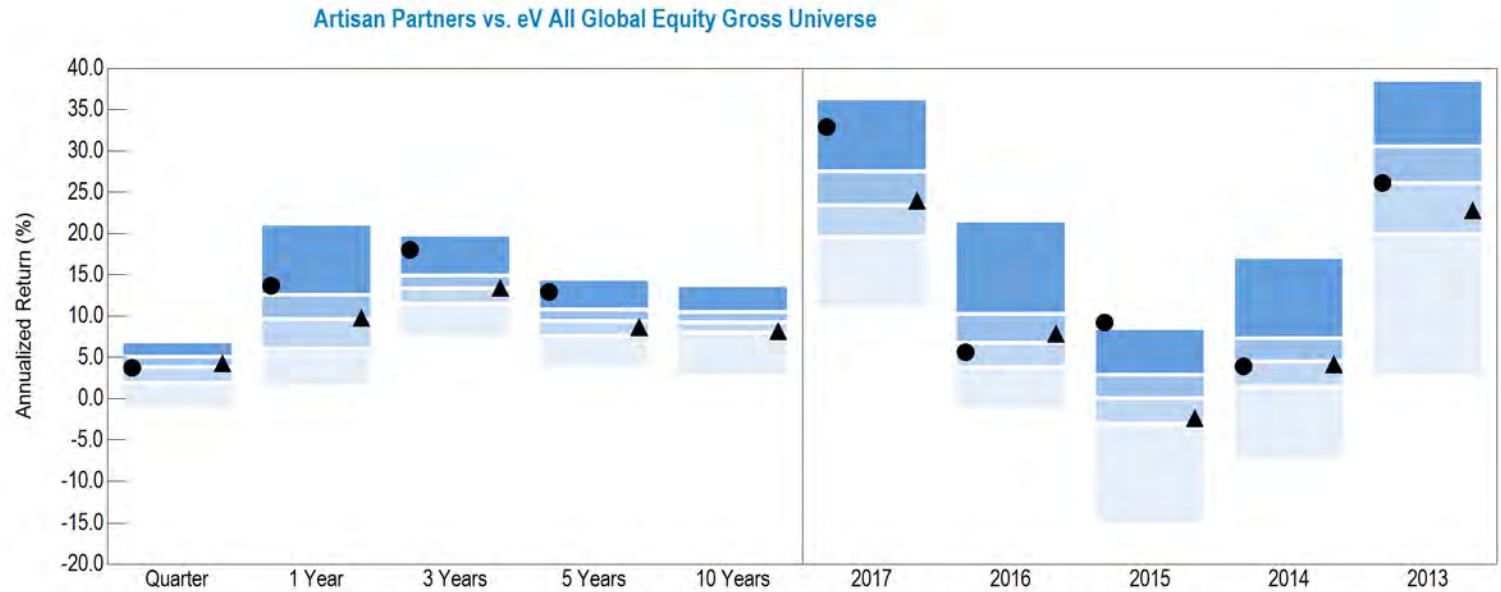
## Top Contributors

	Avg Wgt	Return	Contribution
VISA 'A'	6.29	13.49	0.85
BOSTON SCIENTIFIC	2.87	17.74	0.51
LONZA GROUP	1.55	29.24	0.45
ATLASSIAN 'A'	0.78	53.77	0.42
AMADEUS IT GROUP	2.35	17.75	0.42
ANTHEM	2.57	15.45	0.40
TECHTRONIC INDS.	2.34	15.49	0.36
PROGRESSIVE OHIO	1.69	20.10	0.34
IHS MARKIT	6.65	4.59	0.31
SALESFORCE.COM	1.76	16.59	0.29

## Bottom Contributors

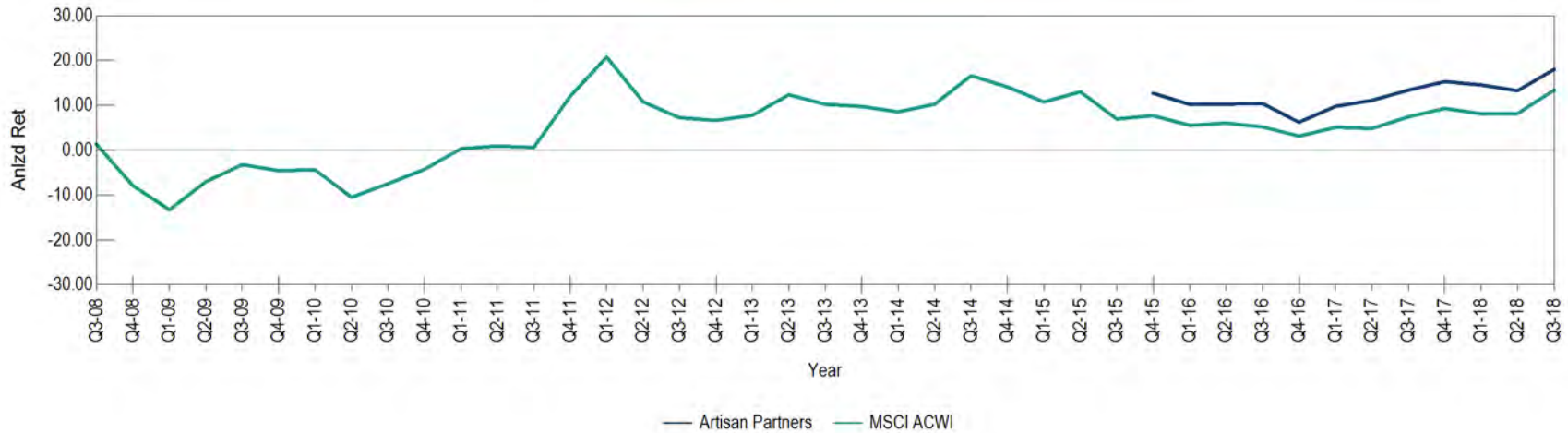
	Avg Wgt	Return	Contribution
JD.COM 'A' ADR 1:2	1.44	-33.02	-0.47
TENCENT HOLDINGS	2.40	-17.71	-0.42
NOBLE ENERGY	2.86	-11.30	-0.32
SANDS CHINA	1.93	-15.27	-0.29
STATE STREET	3.04	-9.50	-0.29
HDFC BANK ADR 1:3	2.30	-10.40	-0.24
APTIV	2.60	-8.23	-0.21
PIONEER NTRL.RES.	2.71	-7.87	-0.21
INTERTEK GROUP	1.54	-13.74	-0.21
ING GROEP	1.88	-8.05	-0.15

Unclassified sector allocation includes cash allocations.

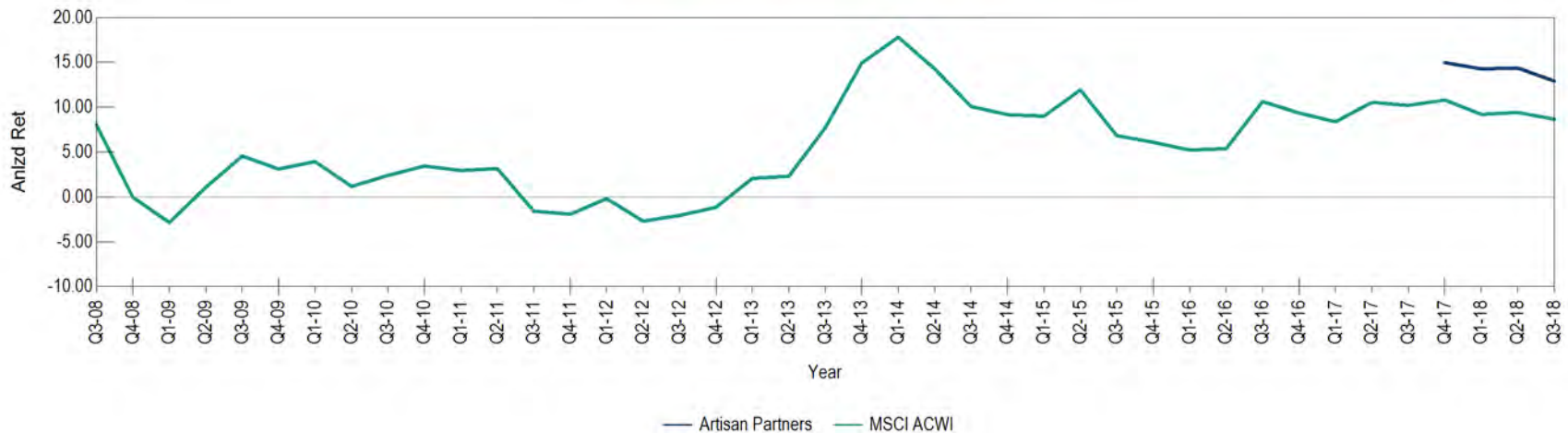


	Quarter	1 Year	3 Years	5 Years	10 Years	2017	2016	2015	2014	2013
<b>5th Percentile</b>	6.9	21.1	19.8	14.5	13.7	36.3	21.5	8.5	17.1	38.6
<b>25th Percentile</b>	5.1	12.6	14.9	10.9	10.6	27.6	10.3	3.0	7.4	30.6
<b>Median</b>	3.8	9.7	13.4	9.4	9.2	23.5	6.8	0.1	4.6	26.2
<b>75th Percentile</b>	2.0	6.1	11.5	7.6	8.1	19.6	3.9	-2.9	1.5	20.0
<b>95th Percentile</b>	-1.3	1.5	7.4	3.8	2.7	11.0	-1.4	-15.1	-7.4	2.7
<b># of Portfolios</b>	905	904	844	738	461	880	842	692	609	552
<b>● Artisan Partners</b>	3.7 (52)	13.7 (20)	18.0 (8)	12.9 (9)	-- (--)	32.9 (11)	5.6 (61)	9.2 (4)	3.9 (56)	26.1 (51)
<b>▲ MSCI ACWI</b>	4.3 (41)	9.8 (50)	13.4 (50)	8.7 (63)	8.2 (74)	24.0 (47)	7.9 (42)	-2.4 (73)	4.2 (54)	22.8 (66)

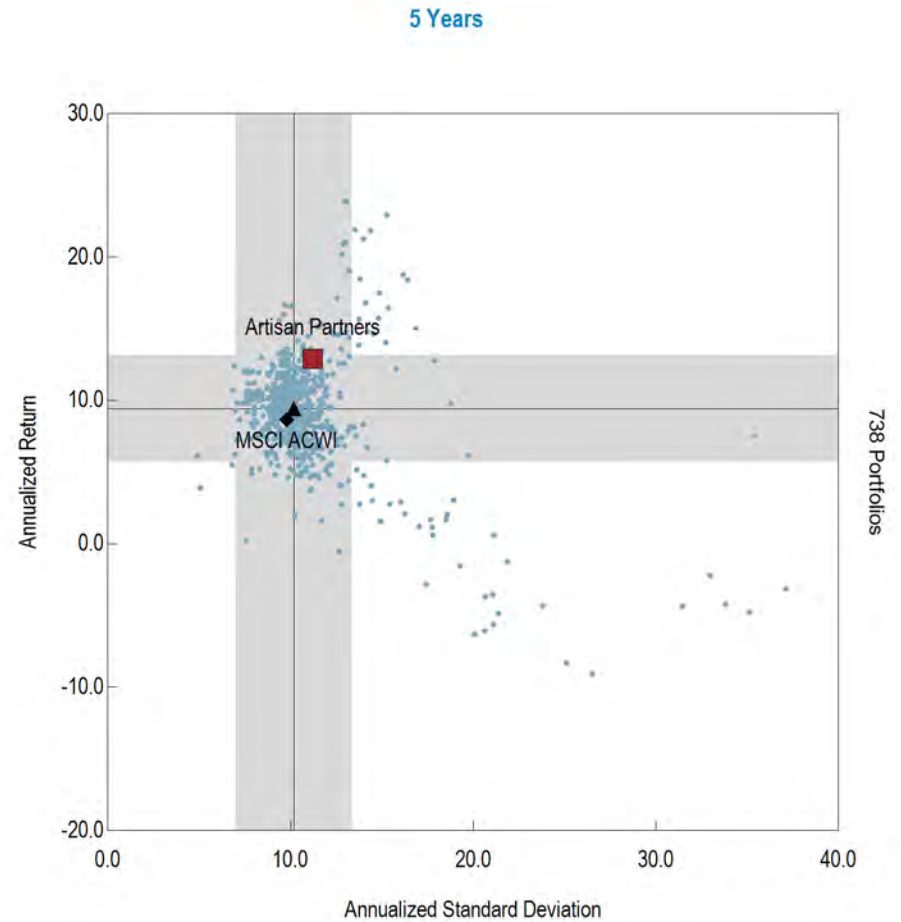
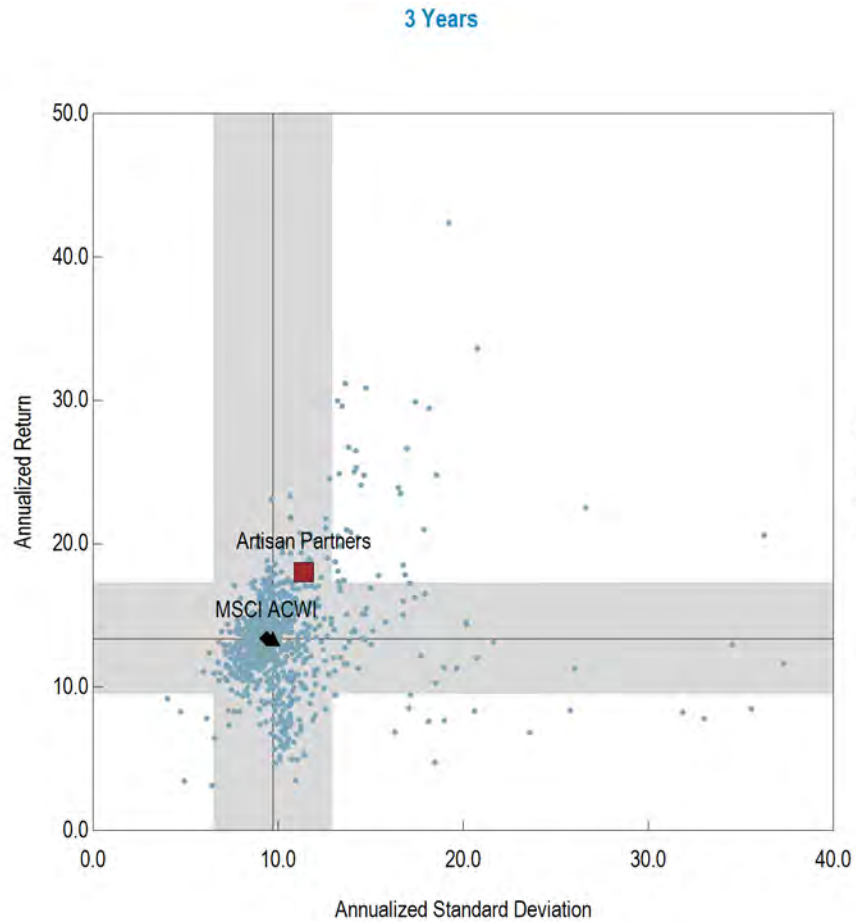
Rolling 3 Year Annualized Return (%)



Rolling 5 Year Annualized Return (%)







	3 Years		
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Artisan Partners	18.0%	11.4%	1.5
MSCI ACWI	13.4%	9.4%	1.3
eV All Global Equity Gross Median	13.4%	9.7%	1.3

	5 Years		
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Artisan Partners	12.9%	11.2%	1.1
MSCI ACWI	8.7%	9.8%	0.8
eV All Global Equity Gross Median	9.4%	10.2%	0.9

# First Eagle Manager Portfolio Overview

Period Ending: September 30, 2018

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

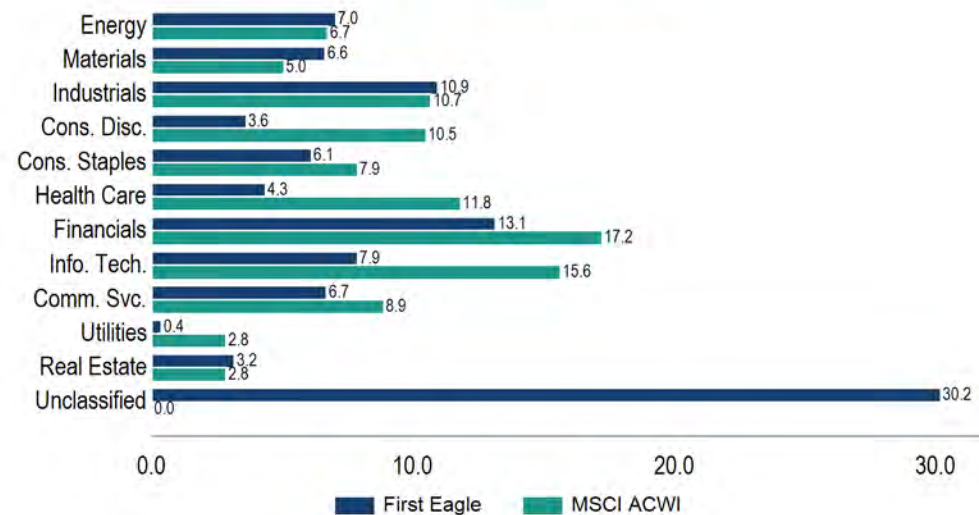
## Characteristics

	Portfolio	MSCI ACWI
Number of Holdings	165	2,791
Weighted Avg. Market Cap. (\$B)	78.70	148.68
Median Market Cap. (\$B)	19.45	9.59
Price To Earnings	17.65	21.71
Price To Book	3.15	3.84
Price To Sales	3.28	3.19
Return on Equity (%)	16.29	18.57
Yield (%)	2.36	2.37
Beta	0.58	1.00

## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	78.8%	88.9%
Emerging*	3.7%	11.1%
Cash	17.4%	
<b>Top 10 Largest Countries</b>		
United States	47.7%	55.0%
Cash	17.4%	0.0%
Japan	11.1%	7.5%
France	5.3%	3.5%
United Kingdom	4.2%	5.4%
Canada	2.9%	3.0%
Korea*	1.7%	1.7%
Switzerland	1.5%	2.5%
Germany	1.2%	2.9%
Hong Kong	1.2%	1.1%
<b>Total-Top 10 Largest Countries</b>	<b>94.0%</b>	<b>82.6%</b>

## Sector Allocation (%) vs MSCI ACWI



## Top Contributors

	Avg Wgt	Return	Contribution
ORACLE	2.19	17.48	0.38
FLOWSERVE	0.63	35.83	0.23
MICROSOFT	1.25	16.43	0.20
UNION PACIFIC	1.03	15.54	0.16
XILINX	0.63	23.45	0.15
ANTHEM	0.79	15.45	0.12
HCA HEALTHCARE	0.32	35.95	0.12
COMCAST A	1.33	8.54	0.11
CH ROBINSON WWD.	0.62	17.60	0.11
AMERICAN EXPRESS	1.10	9.05	0.10

## Bottom Contributors

	Avg Wgt	Return	Contribution
WEYERHAEUSER	1.37	-10.62	-0.15
OMNICOM GROUP	1.23	-10.05	-0.12
SCHLUMBERGER	1.40	-8.38	-0.12
CIELO ON	0.44	-25.03	-0.11
FRESNILLO	0.39	-28.47	-0.11
GOLDCORP (NYS)	0.43	-25.46	-0.11
AGNICO EAGLE MINES	0.41	-25.27	-0.10
WHEATON PRMTL. (NYS)	0.44	-20.27	-0.09
FANUC	1.40	-5.08	-0.07
NEWCREST MINING	0.57	-12.15	-0.07

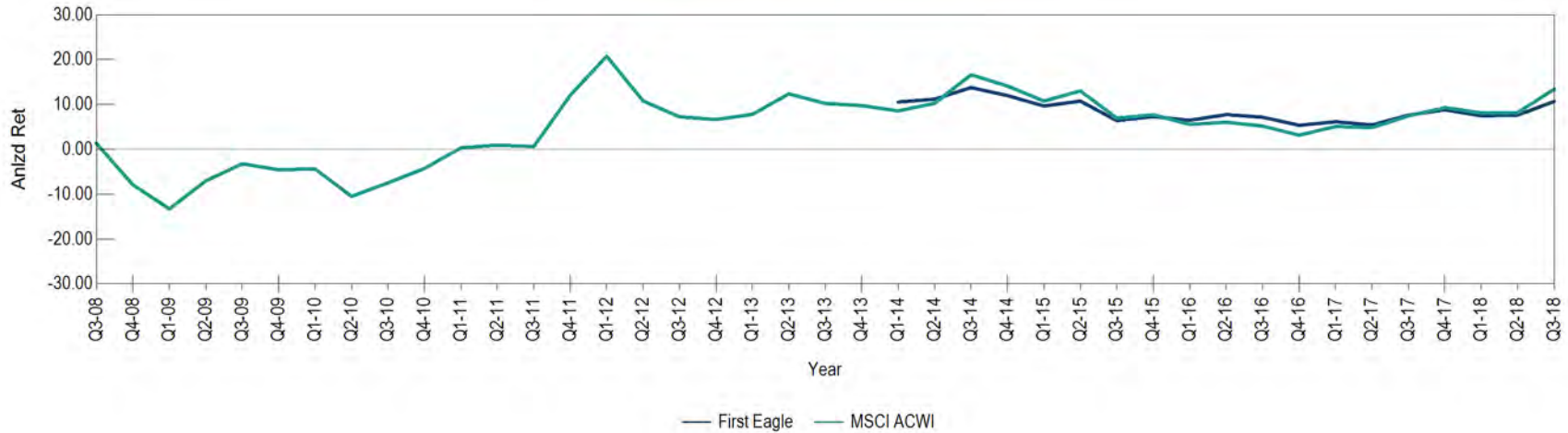
Unclassified sector allocation includes cash allocations and Gold allocations (7.7% as of 9/30/2018).

First Eagle vs. eV All Global Equity Gross Universe

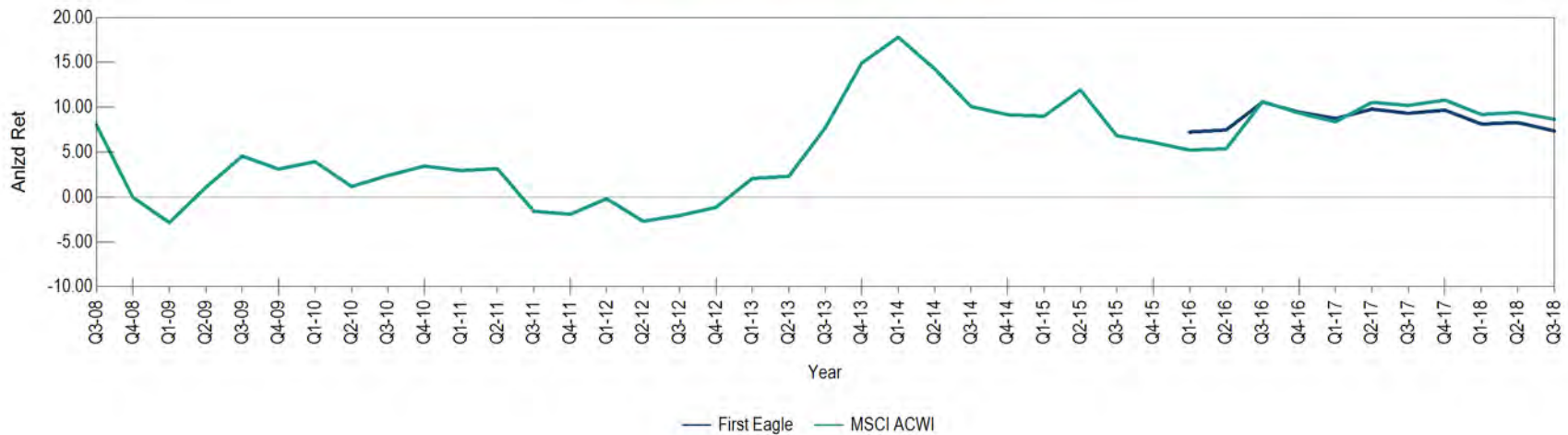


	Quarter	1 Year	3 Years	5 Years	10 Years	2017	2016	2015	2014	2013
<b>5th Percentile</b>	6.9	21.1	19.8	14.5	13.7	36.3	21.5	8.5	17.1	38.6
<b>25th Percentile</b>	5.1	12.6	14.9	10.9	10.6	27.6	10.3	3.0	7.4	30.6
<b>Median</b>	3.8	9.7	13.4	9.4	9.2	23.5	6.8	0.1	4.6	26.2
<b>75th Percentile</b>	2.0	6.1	11.5	7.6	8.1	19.6	3.9	-2.9	1.5	20.0
<b>95th Percentile</b>	-1.3	1.5	7.4	3.8	2.7	11.0	-1.4	-15.1	-7.4	2.7
<b># of Portfolios</b>	905	904	844	738	461	880	842	692	609	552
<b>● First Eagle</b>	1.5 (80)	4.5 (86)	10.7 (83)	7.4 (79)	-- (--)	15.1 (89)	11.7 (19)	0.2 (49)	4.5 (51)	17.9 (80)
<b>▲ MSCI ACWI</b>	4.3 (41)	9.8 (50)	13.4 (50)	8.7 (63)	8.2 (74)	24.0 (47)	7.9 (42)	-2.4 (73)	4.2 (54)	22.8 (66)

Rolling 3 Year Annualized Return (%)

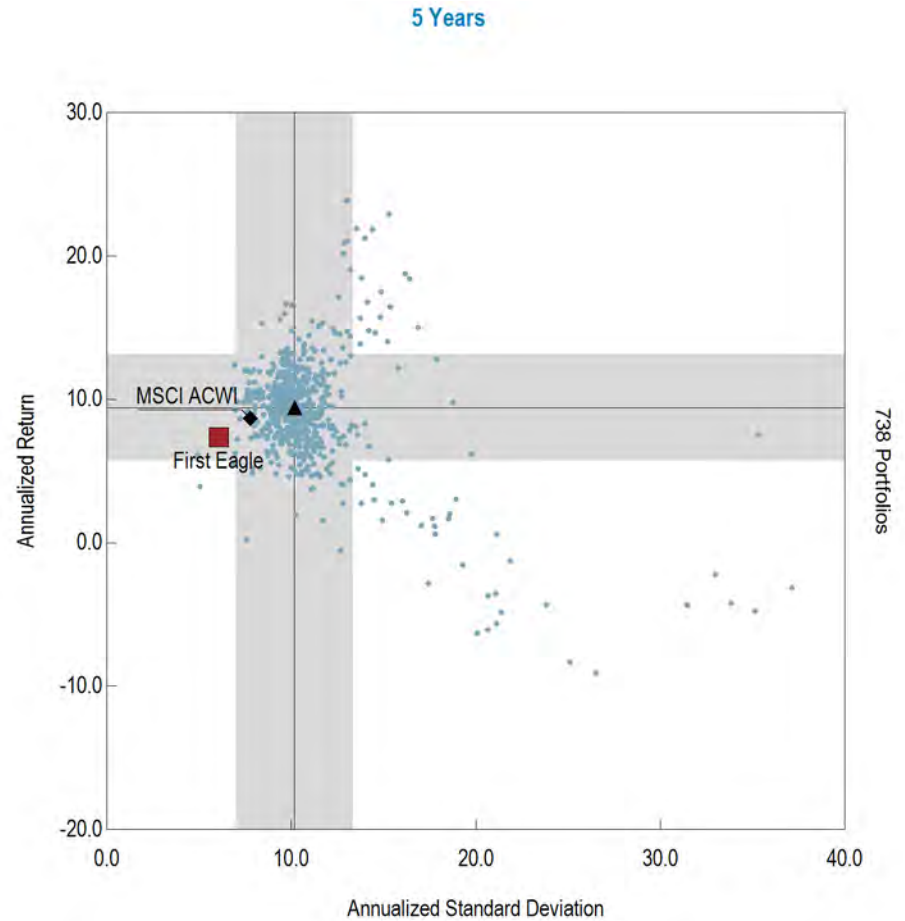
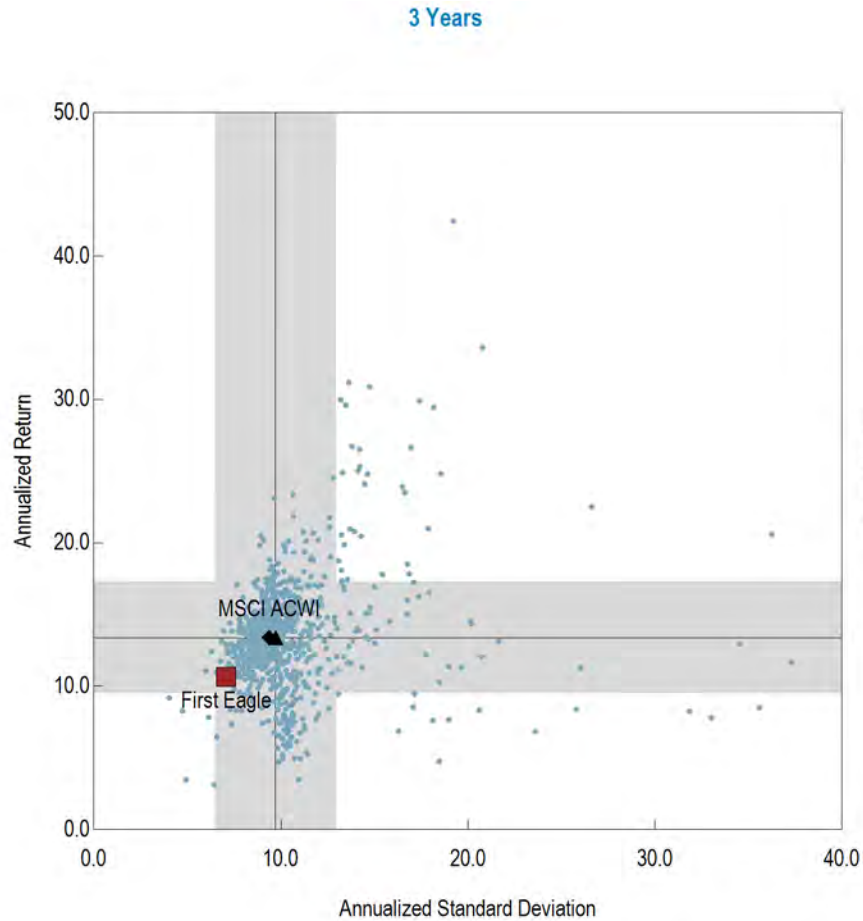


Rolling 5 Year Annualized Return (%)



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

Period Ending: September 30, 2018



**3 Years**

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
First Eagle	10.7%	7.1%	1.4
MSCI ACWI	13.4%	9.4%	1.3
eV All Global Equity Gross Median	13.4%	9.7%	1.3

**5 Years**

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
First Eagle	7.4%	7.1%	1.0
MSCI ACWI	8.7%	9.8%	0.8
eV All Global Equity Gross Median	9.4%	10.2%	0.9

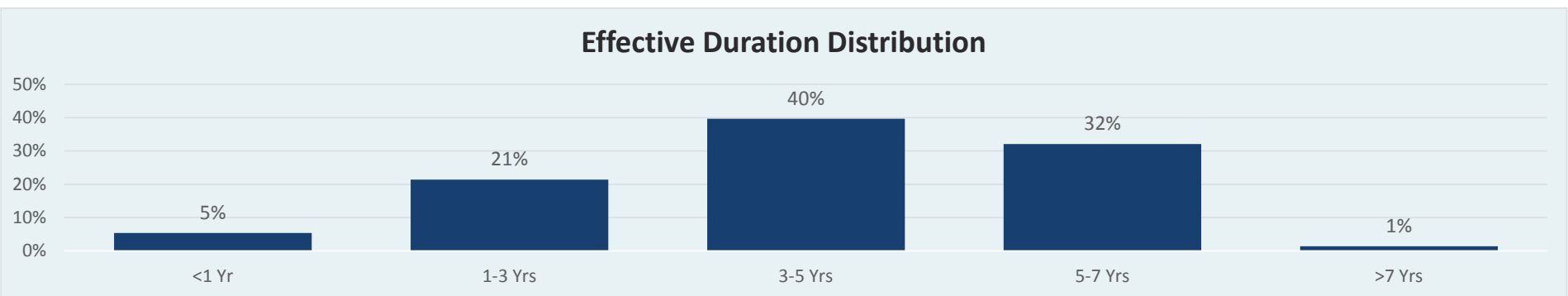
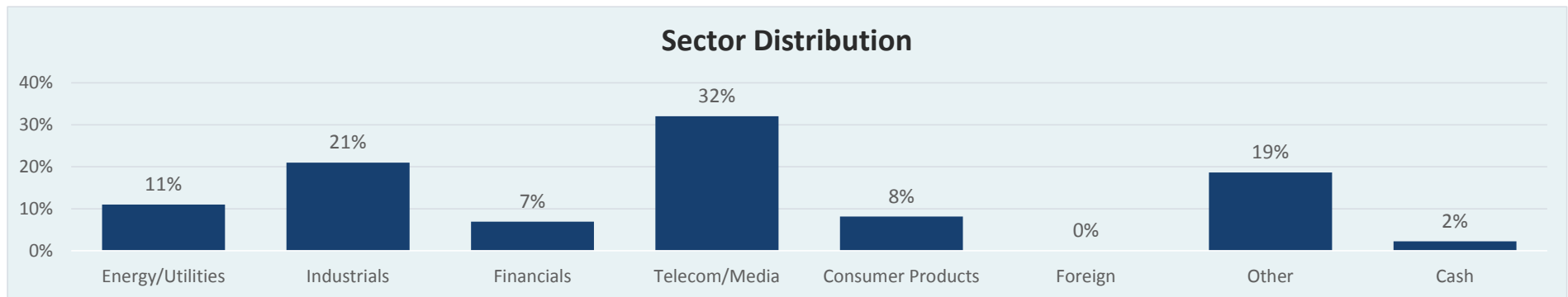
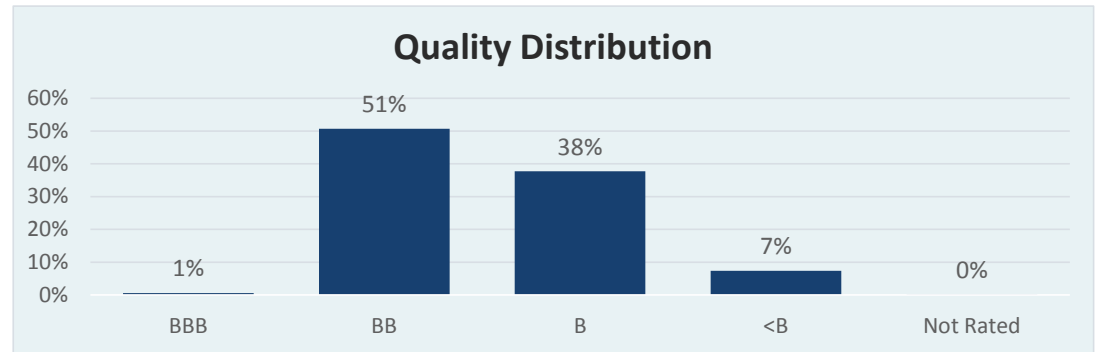


## High Yield Managers

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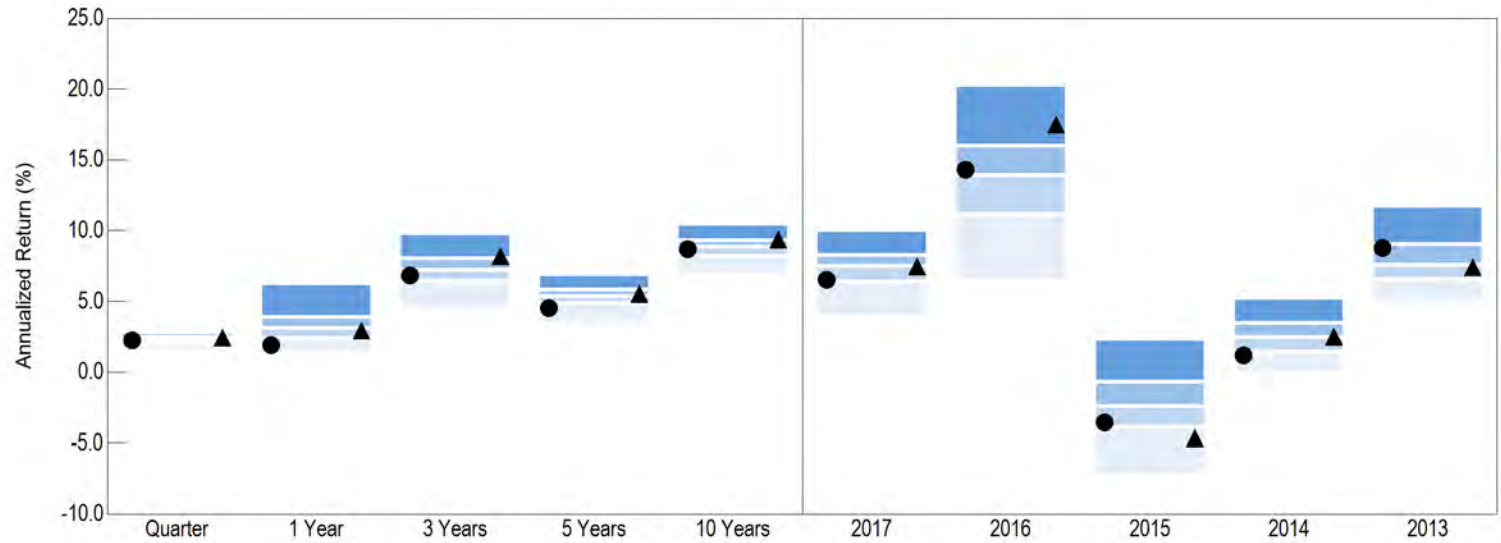
Domestic high yield fixed income portfolio with a focus on security selection. Primary personnel include Douglas Forsyth, Justin Kass, William Stickney, and Michael Yee.

	Allianz	ICE BofAML HY Master II
Effective Duration	4.10	4.00
Yield to Maturity	6.00	6.00
Average Quality	B1	B1
Average Coupon	6.3%	6.3%



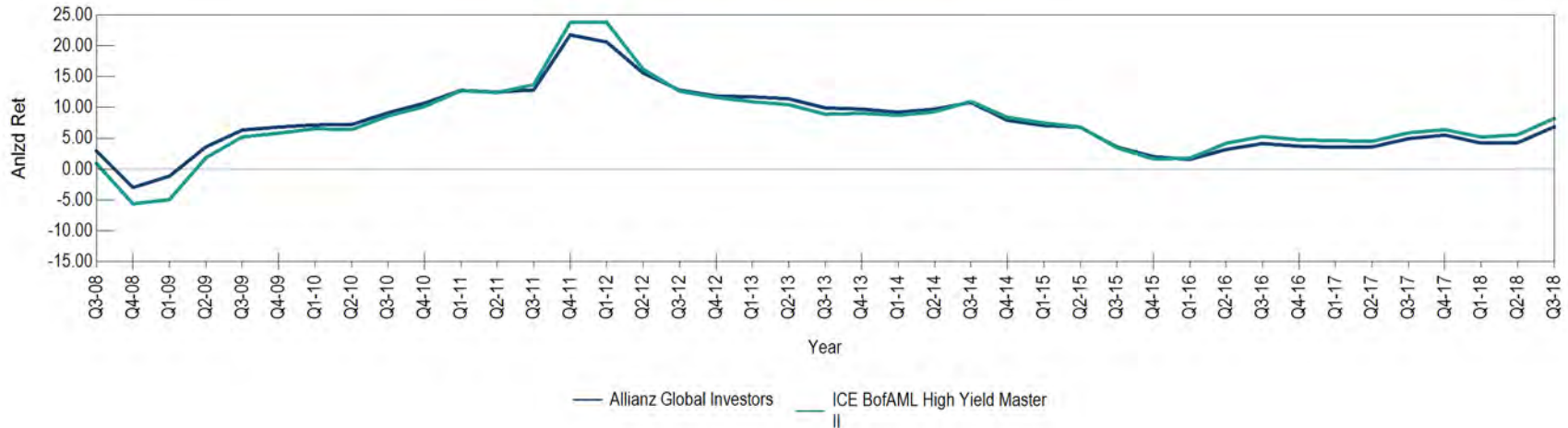
Quality distribution excludes cash.

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

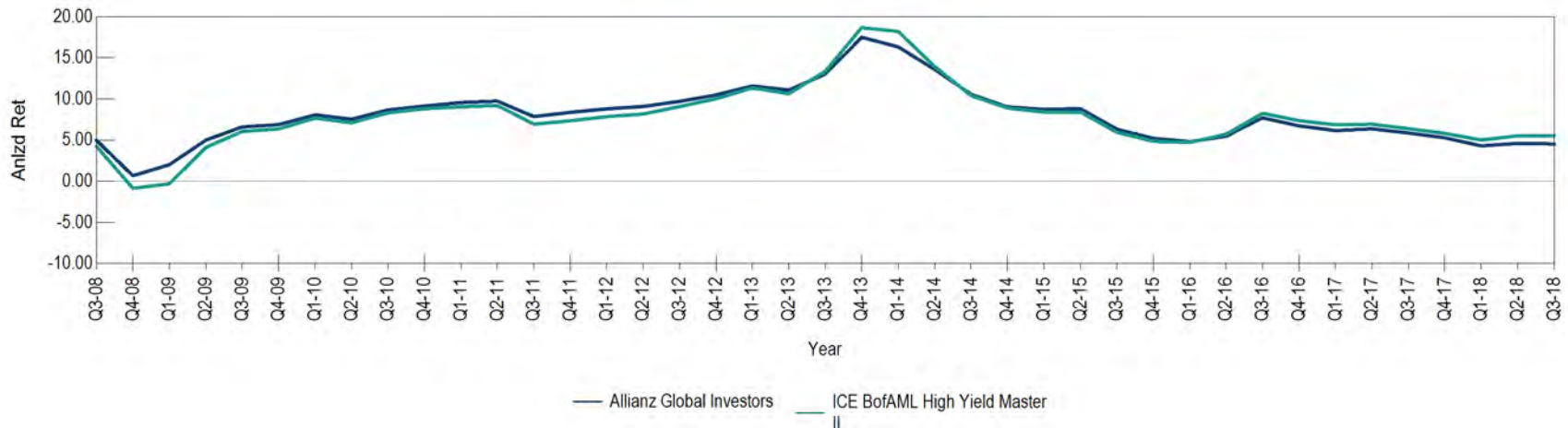


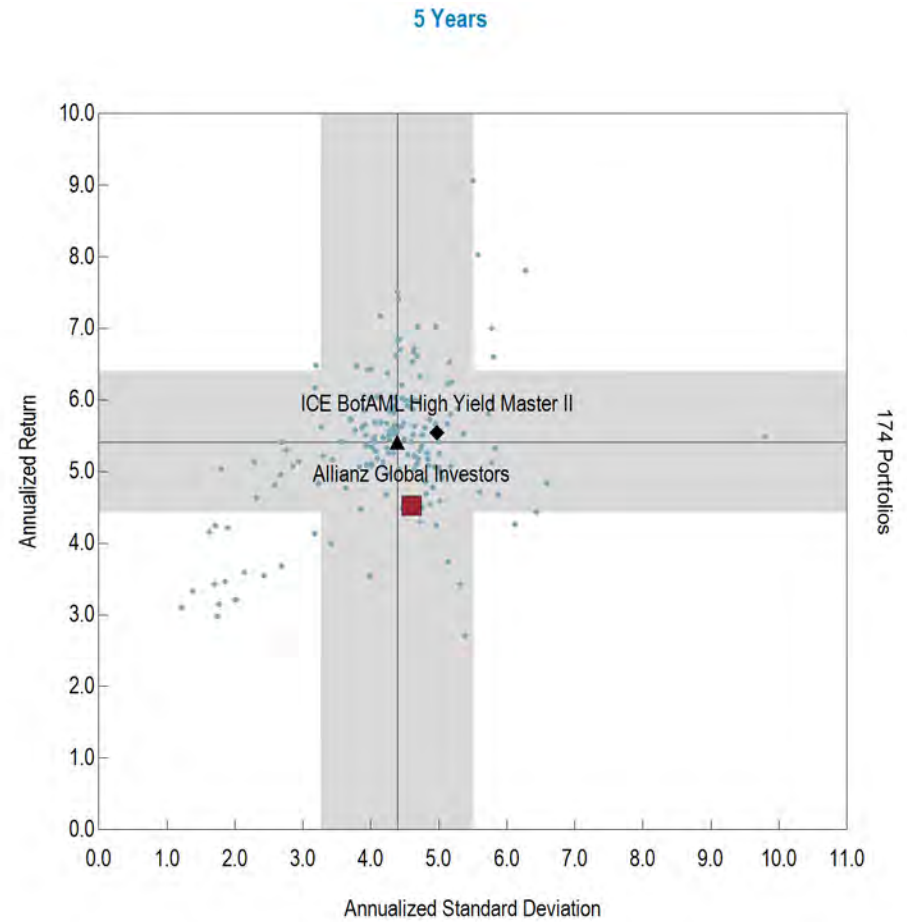
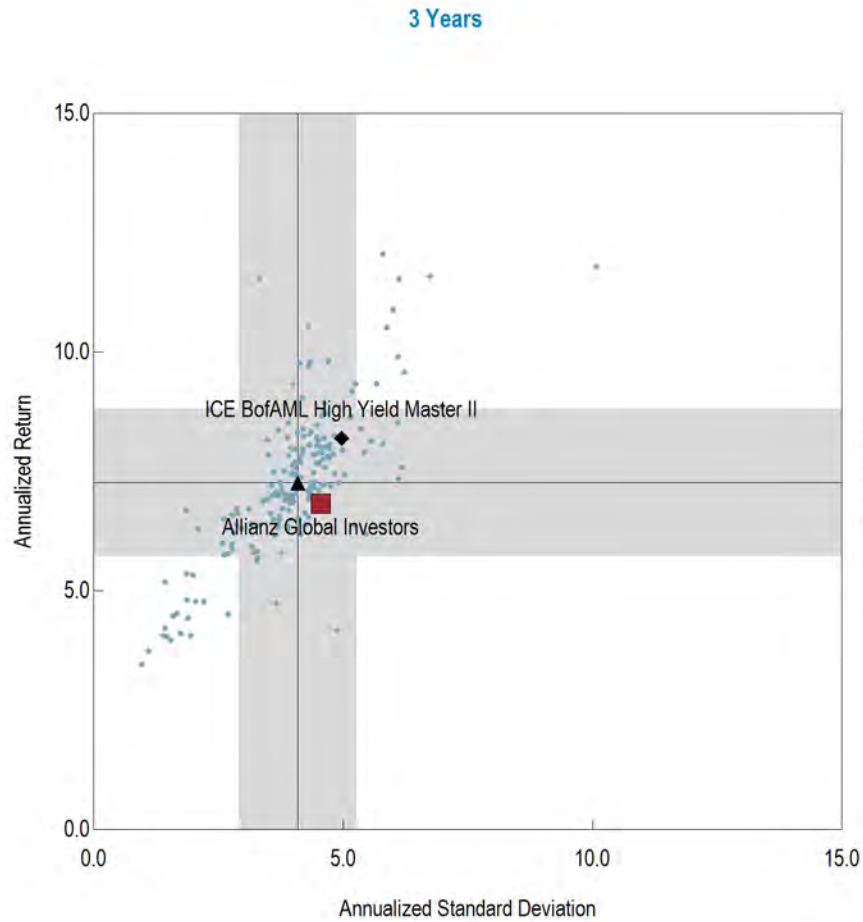
	Return (Rank)									
	Quarter	1 Year	3 Years	5 Years	10 Years	2017	2016	2015	2014	2013
5th Percentile	2.8	6.3	9.8	6.9	10.5	10.0	20.3	2.3	5.2	11.7
25th Percentile	2.5	3.9	8.1	5.9	9.3	8.3	16.0	-0.7	3.5	9.1
Median	2.3	3.1	7.3	5.4	8.9	7.5	14.0	-2.4	2.5	7.6
75th Percentile	2.0	2.4	6.5	4.9	8.3	6.5	11.3	-3.8	1.5	6.6
95th Percentile	1.6	1.4	4.5	3.5	7.0	4.0	6.6	-7.2	0.0	5.0
# of Portfolios	204	204	194	174	125	198	183	155	141	130
● Allianz Global Investors	2.3 (54)	1.9 (87)	6.8 (68)	4.5 (85)	8.7 (56)	6.5 (74)	14.3 (47)	-3.5 (68)	1.2 (83)	8.8 (28)
▲ ICE BofAML High Yield Master II	2.4 (34)	2.9 (57)	8.2 (22)	5.5 (41)	9.4 (23)	7.5 (53)	17.5 (14)	-4.6 (83)	2.5 (50)	7.4 (55)

Rolling 3 Year Annualized Return (%)



Rolling 5 Year Annualized Return (%)





	<b>3 Years</b>			<b>5 Years</b>			
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	
Allianz Global Investors	6.8%	4.6%	1.3	Allianz Global Investors	4.5%	4.6%	0.9
ICE BofAML High Yield Master II	8.2%	5.0%	1.5	ICE BofAML High Yield Master II	5.5%	5.0%	1.0
eV US High Yield Fixed Inc Gross Median	7.3%	4.1%	1.6	eV US High Yield Fixed Inc Gross Median	5.4%	4.4%	1.2



## Real Estate Managers

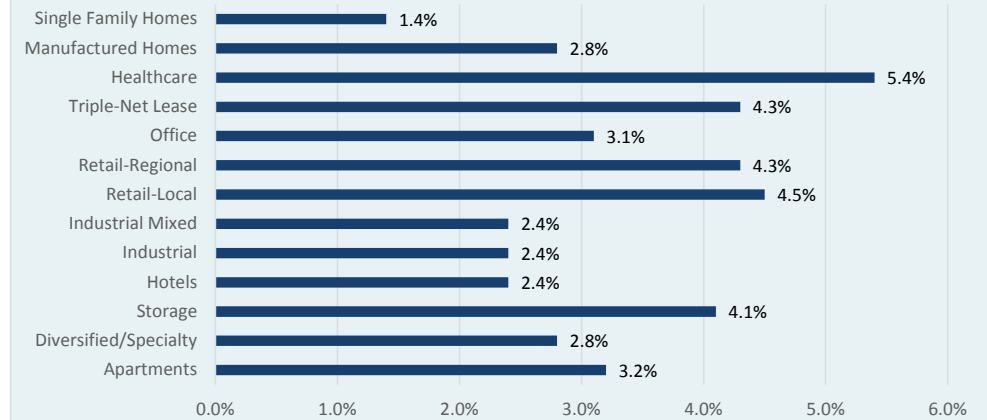
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Diversified portfolio of U.S. REITs with a focus on the underlying real estate assets

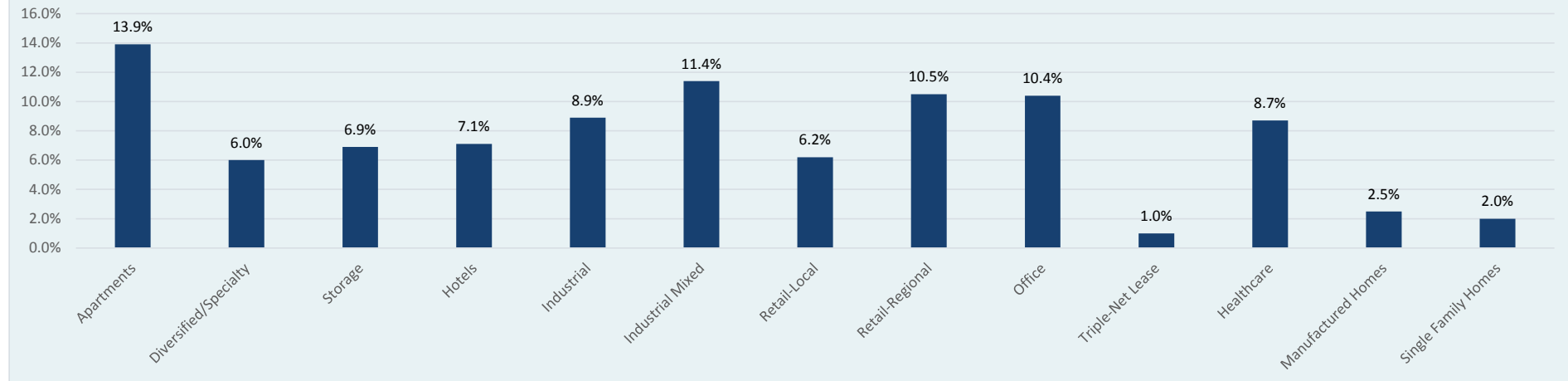
**Top Five Holdings**

Company	Property Type	Allocation
Simon Property Group	Retail-Regional	10.5%
ProLogis Inc.	Industrial	7.5%
Equinix Inc	Industrial Mixed	6.0%
Equity Residential	Apartments	4.7%
Alexandria RE Equities	Office	4.3%

**Dividend Yield by Property Type**



**Property Type Allocation**



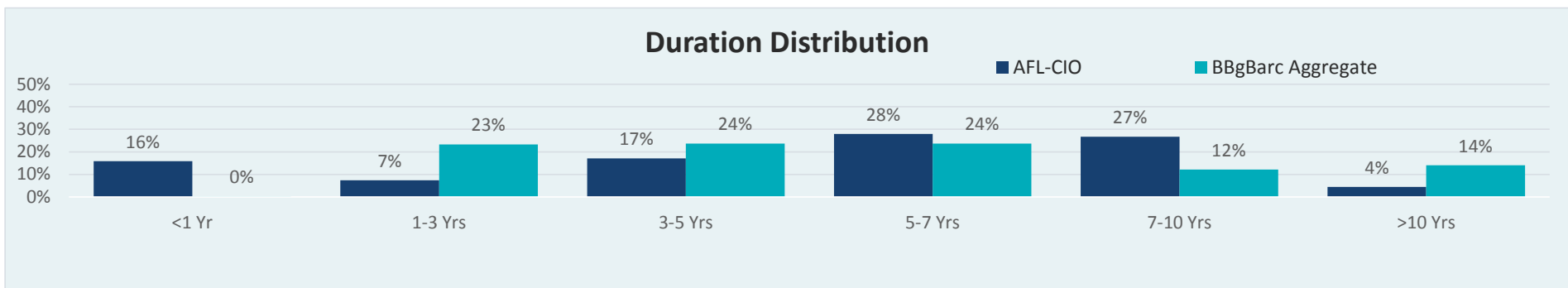
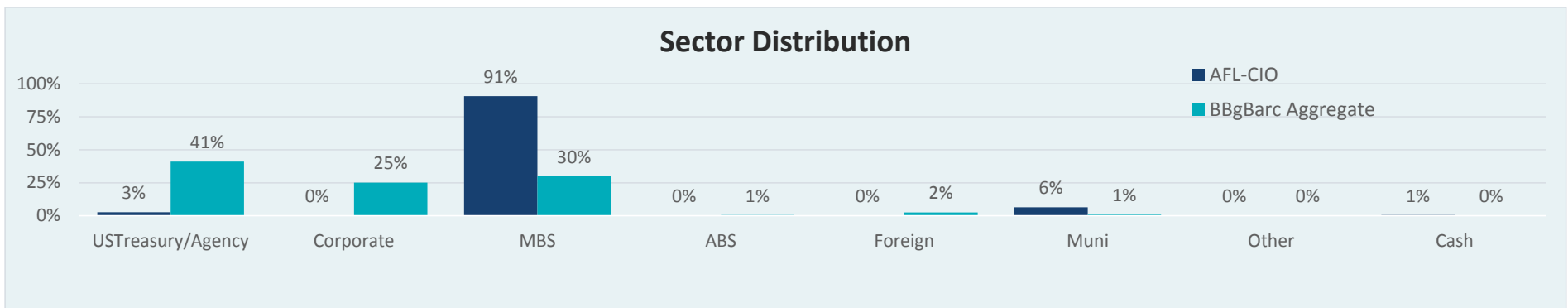
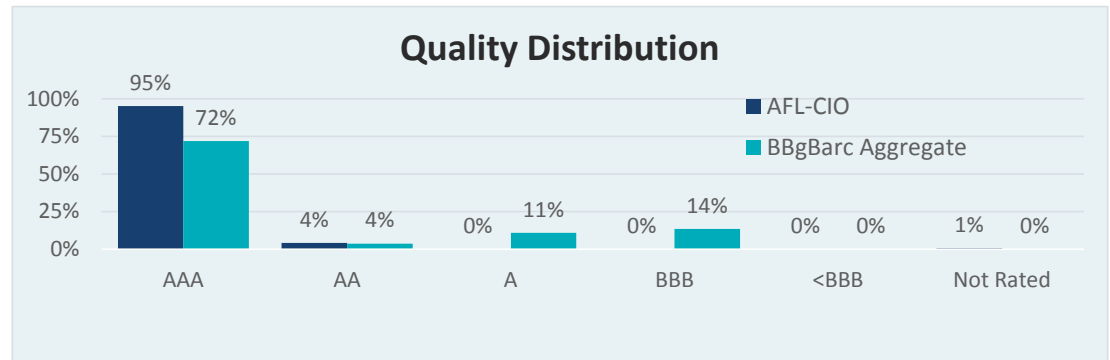
3% is allocated to Cash and Cash Equivalents.

## Diversifying Fixed Income Managers

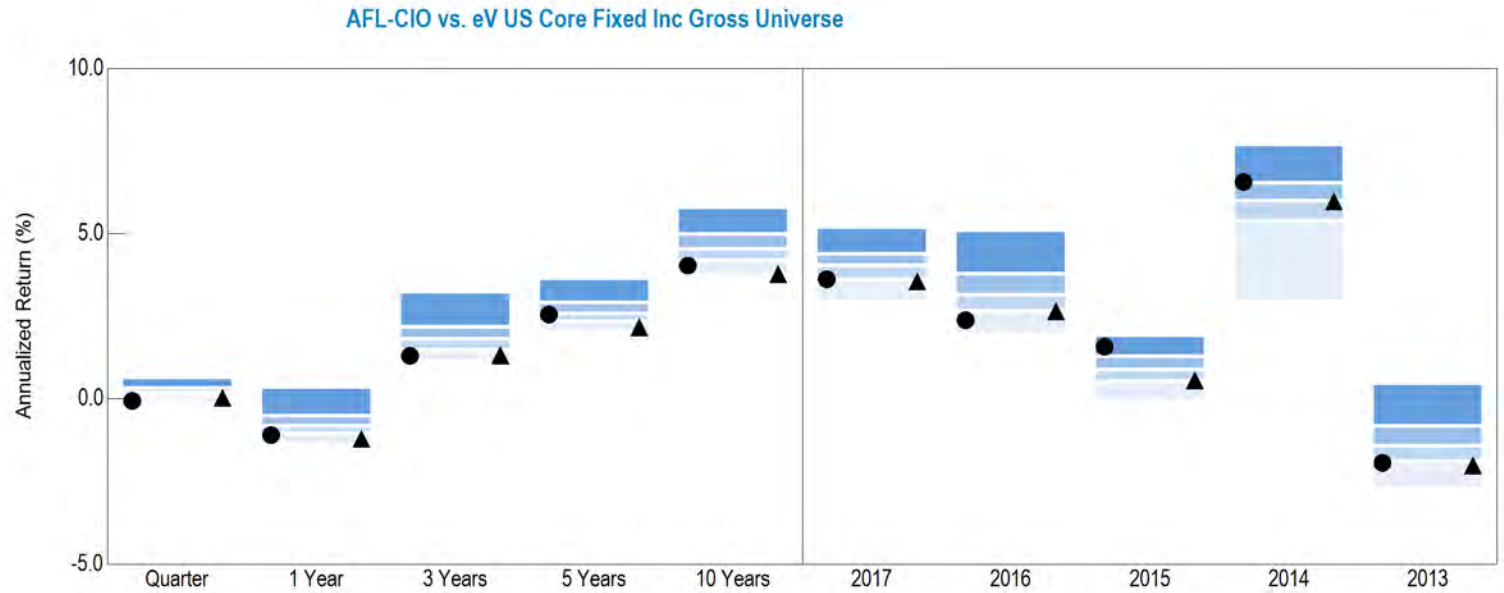
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Domestic core fixed income portfolio with an exclusive focus on mortgage-related securities. Primary personnel include Stephen Coyle and Chang Su.

	AFL-CIO	BBgBarc Aggregate
Effective Duration	5.61	6.01
Yield to Maturity	3.43	3.17
Average Quality	AAA	AA
Average Coupon	3.4%	3.2%



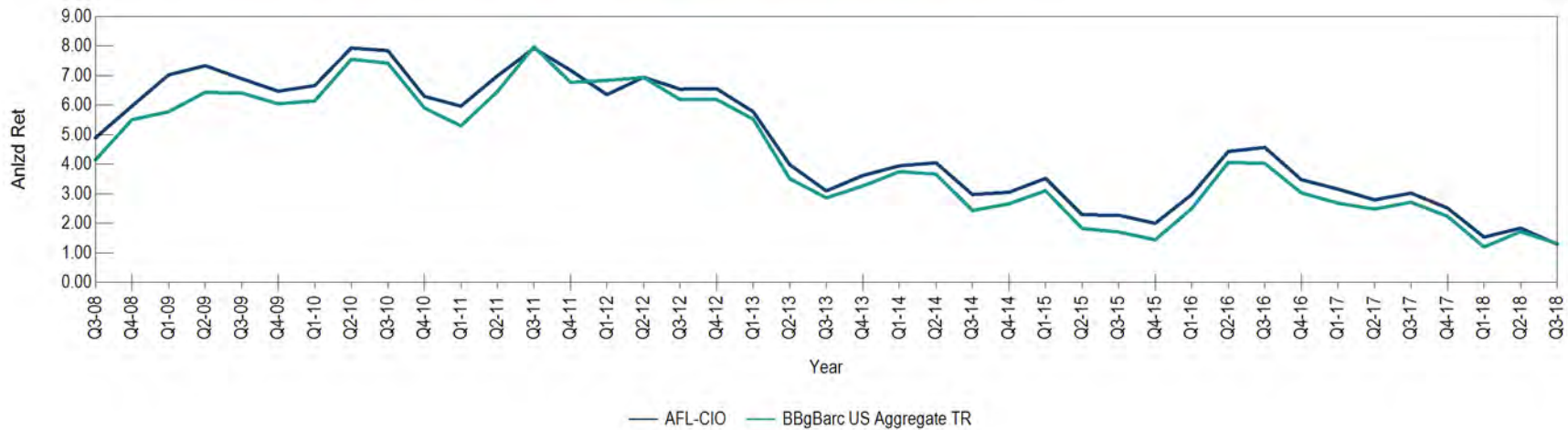
Duration and Quality distributions exclude cash.



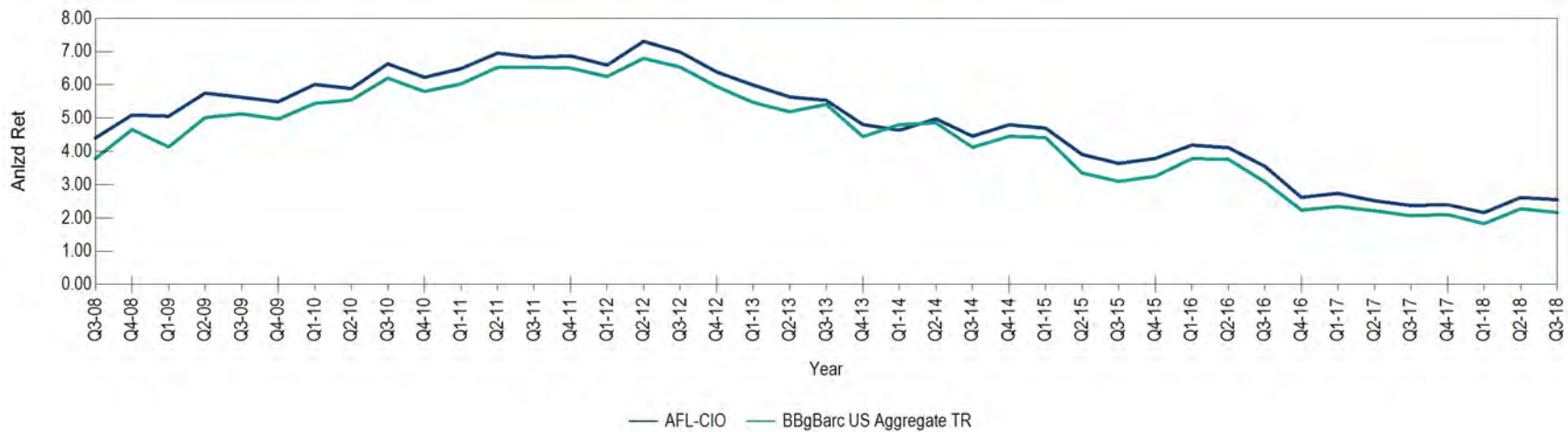
	Return (Rank)									
5th Percentile	0.6	0.4	3.2	3.6	5.8	5.2	5.1	1.9	7.7	0.5
25th Percentile	0.3	-0.5	2.2	2.9	5.0	4.4	3.8	1.3	6.5	-0.8
Median	0.2	-0.8	1.8	2.6	4.6	4.0	3.2	0.9	6.0	-1.4
75th Percentile	0.1	-1.0	1.5	2.4	4.2	3.6	2.7	0.5	5.4	-1.9
95th Percentile	-0.1	-1.4	1.1	2.0	3.8	2.9	2.0	-0.1	2.9	-2.7
# of Portfolios	235	235	232	229	207	233	223	196	213	209
● AFL-CIO	-0.1 (92)	-1.1 (81)	1.3 (90)	2.5 (55)	4.0 (86)	3.6 (76)	2.4 (87)	1.6 (15)	6.6 (25)	-1.9 (78)
▲ BBgBarc US Aggregate TR	0.0 (87)	-1.2 (89)	1.3 (90)	2.2 (91)	3.8 (95)	3.5 (79)	2.6 (77)	0.6 (75)	6.0 (52)	-2.0 (82)

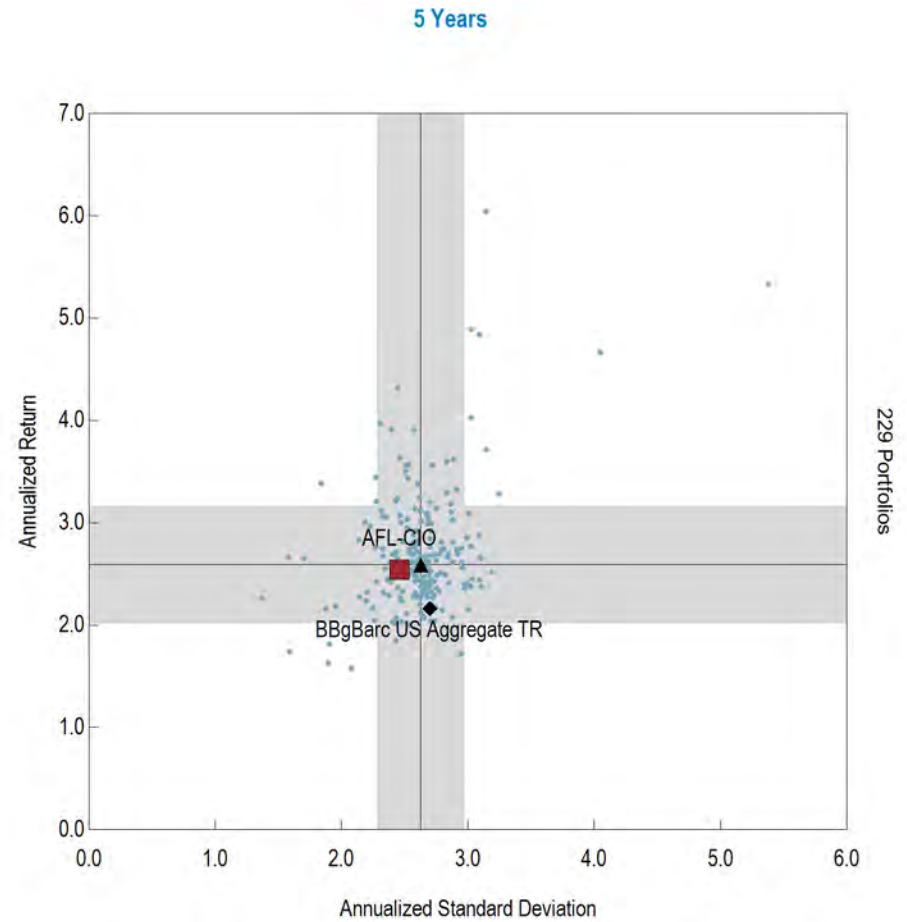
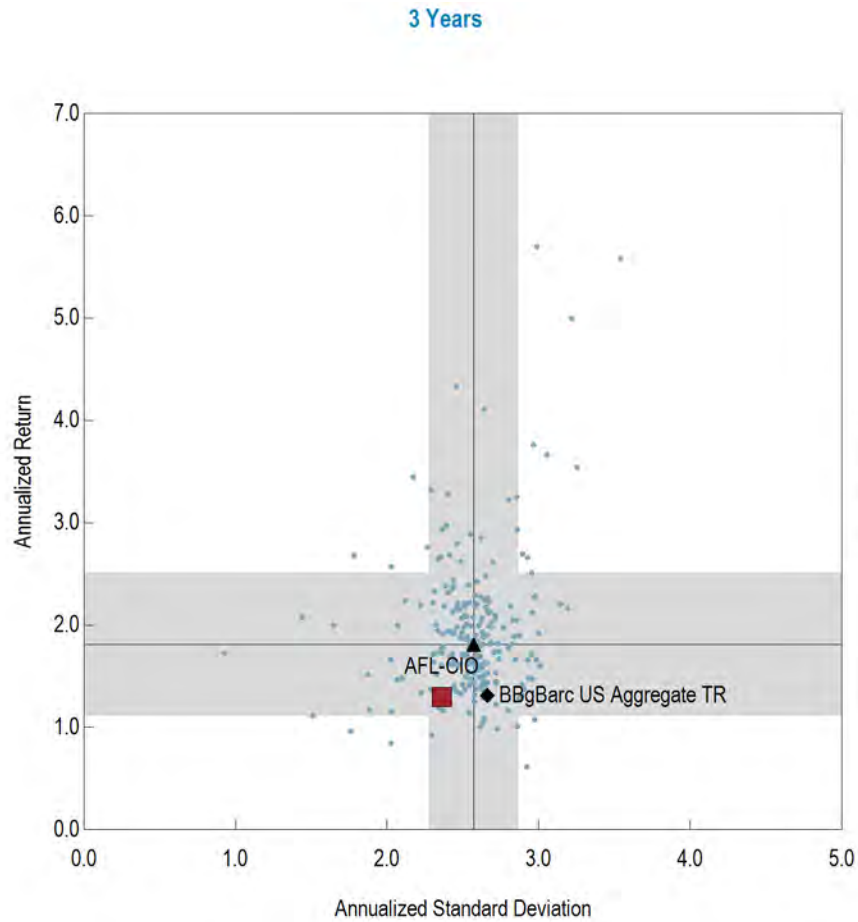


Rolling 3 Year Annualized Return (%)



Rolling 5 Year Annualized Return (%)





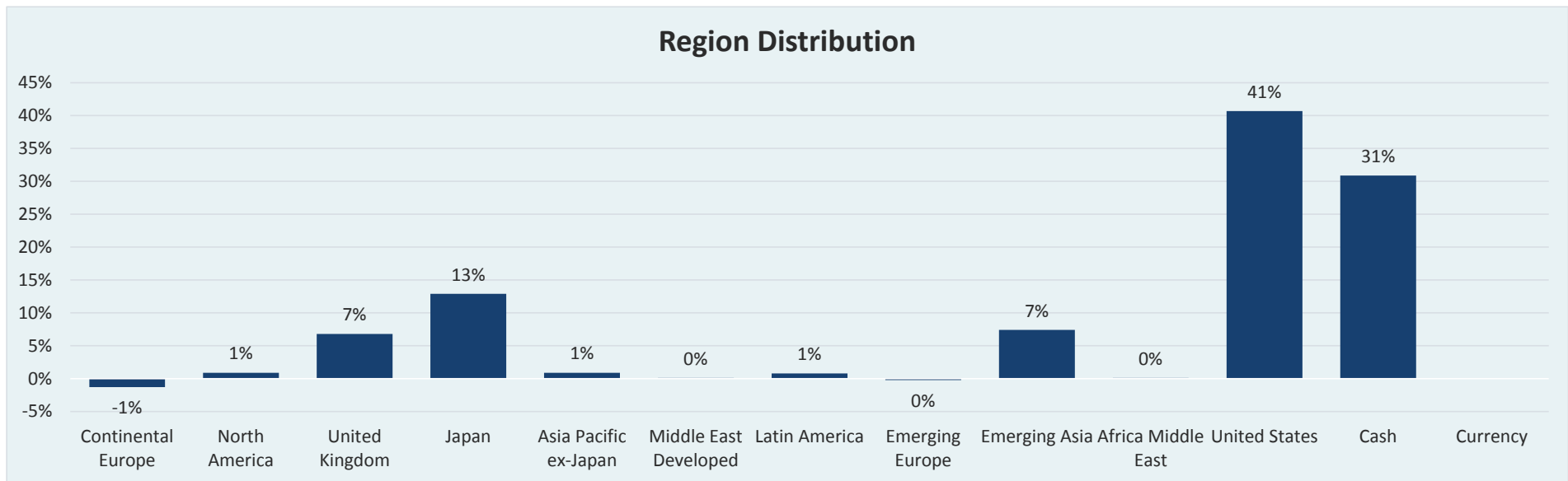
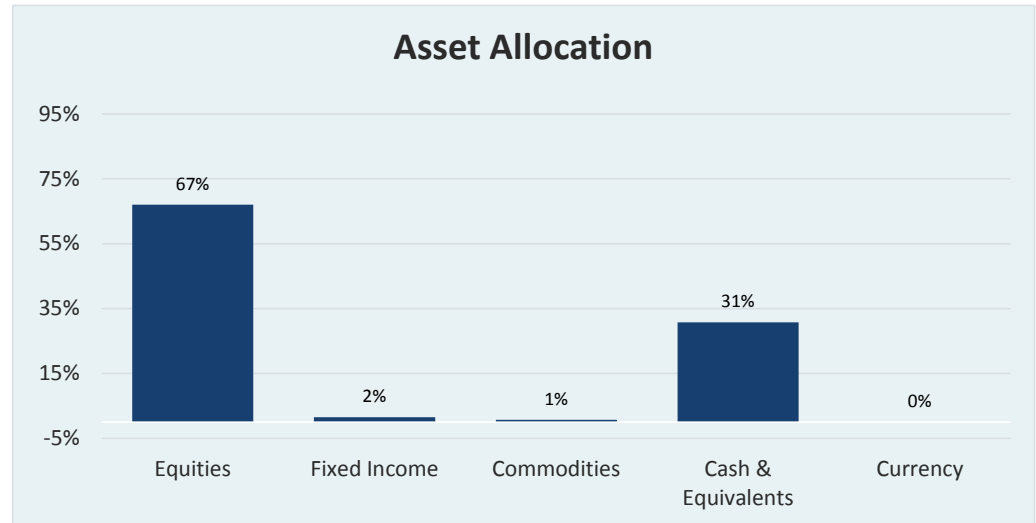
	3 Years			5 Years		
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
AFL-CIO	1.3%	2.4%	0.2	AFL-CIO	2.5%	0.8
BBgBarc US Aggregate TR	1.3%	2.7%	0.2	BBgBarc US Aggregate TR	2.2%	0.6
eV US Core Fixed Inc Gross Median	1.8%	2.6%	0.4	eV US Core Fixed Inc Gross Median	2.6%	0.8

# Wellington Total Return Manager Portfolio Overview

Period Ending: September 30, 2018

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	959
Number of Commodity Holdings	158
Effective Duration (Years)	4.90
Average Quality	D



## Liquidity Managers

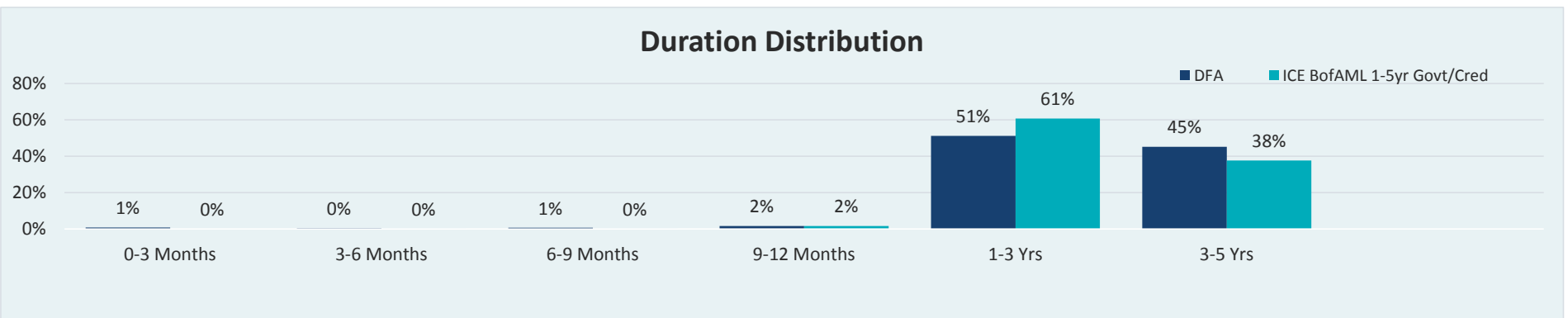
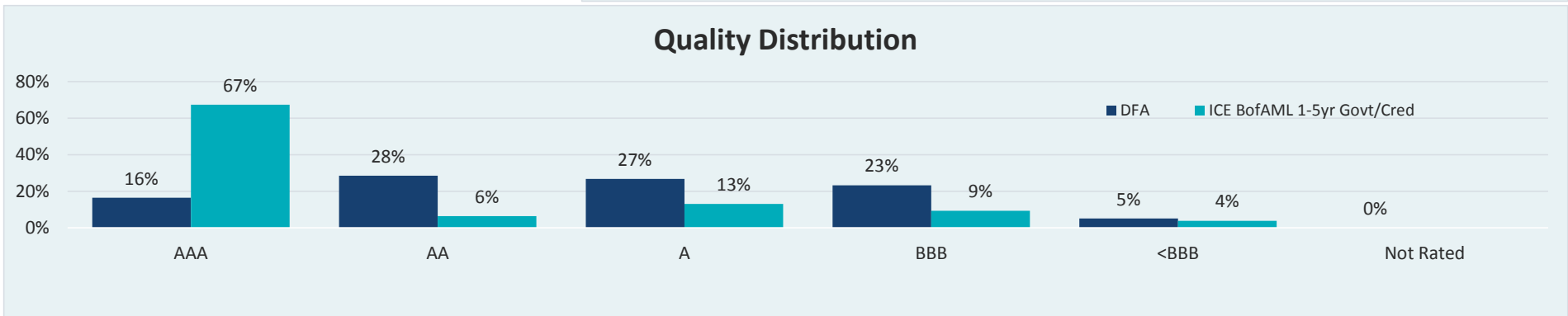
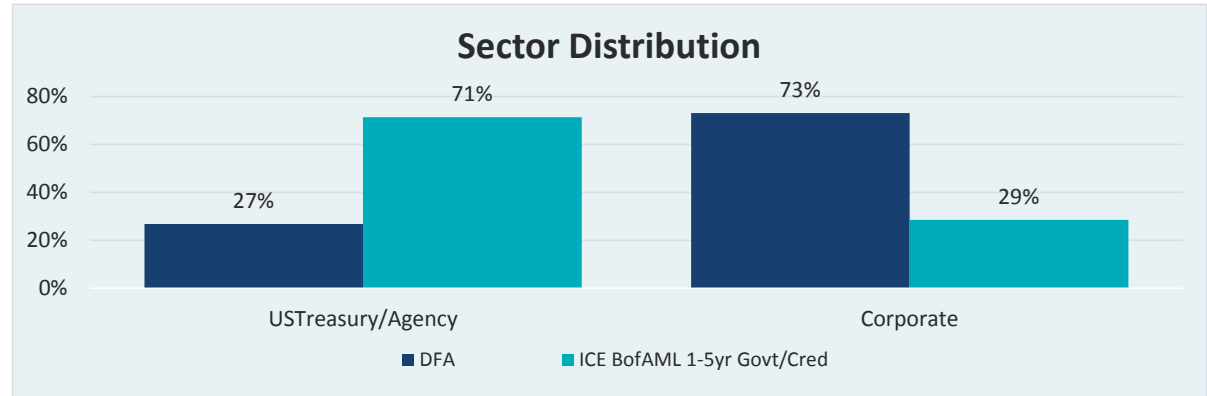
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DFA Short Credit  
 Manager Portfolio Overview

Period Ending: September 30, 2018

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	2.67	2.65
Yield to Maturity	3.36	3.09
Average Quality	A+	Aa1
Average Coupon	2.77%	2.57%



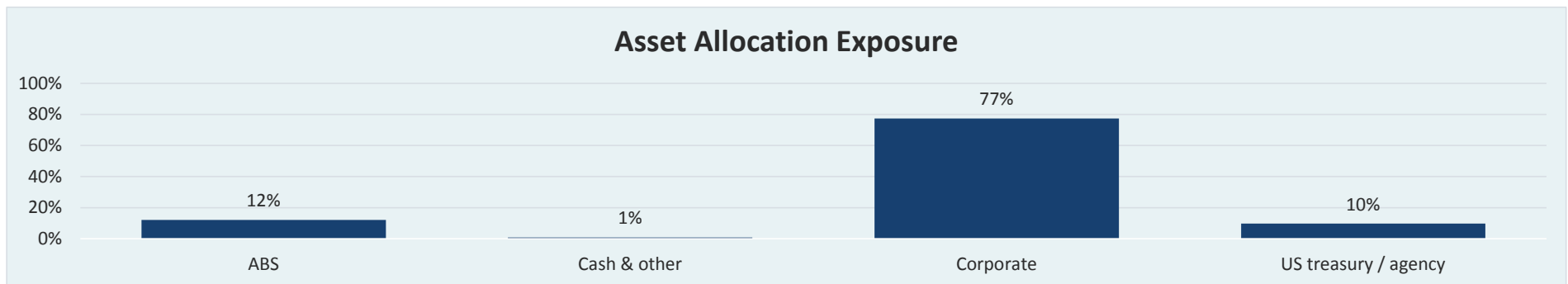
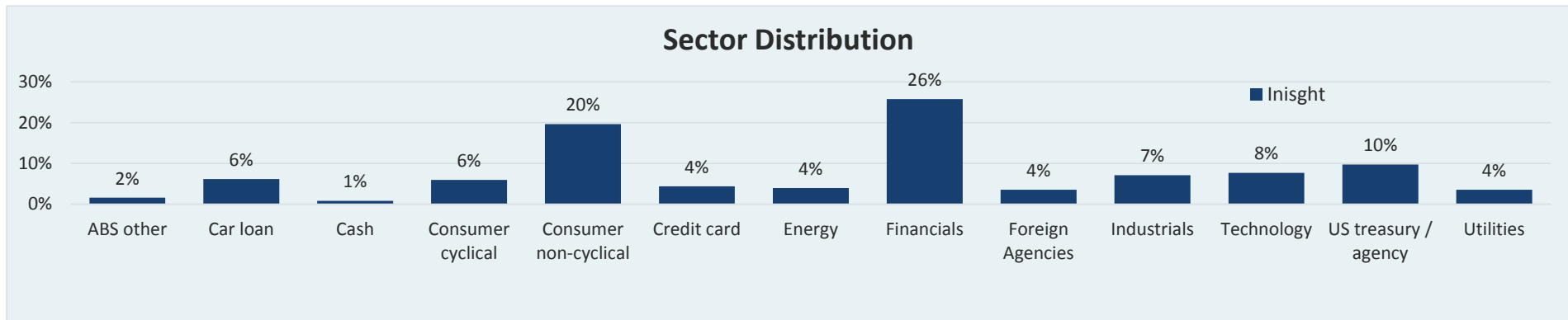
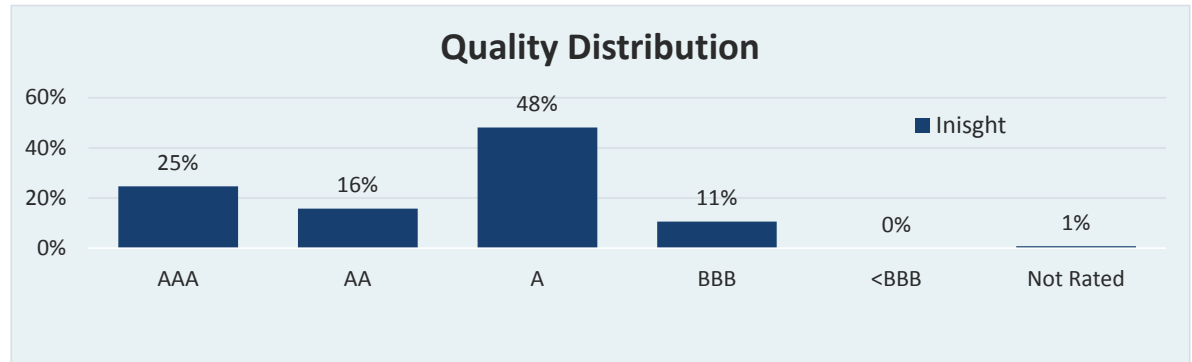


# Insight Short Duration Manager Portfolio Overview

Period Ending: September 30, 2018

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.

	<b>Inisight</b>	<b>BBgBarc 1-3yr Govt</b>
Effective Duration	1.63	1.91
Yield to Maturity	3.05	1.98
Average Quality	A-	AAA
Average Coupon	2.4%	2.0%

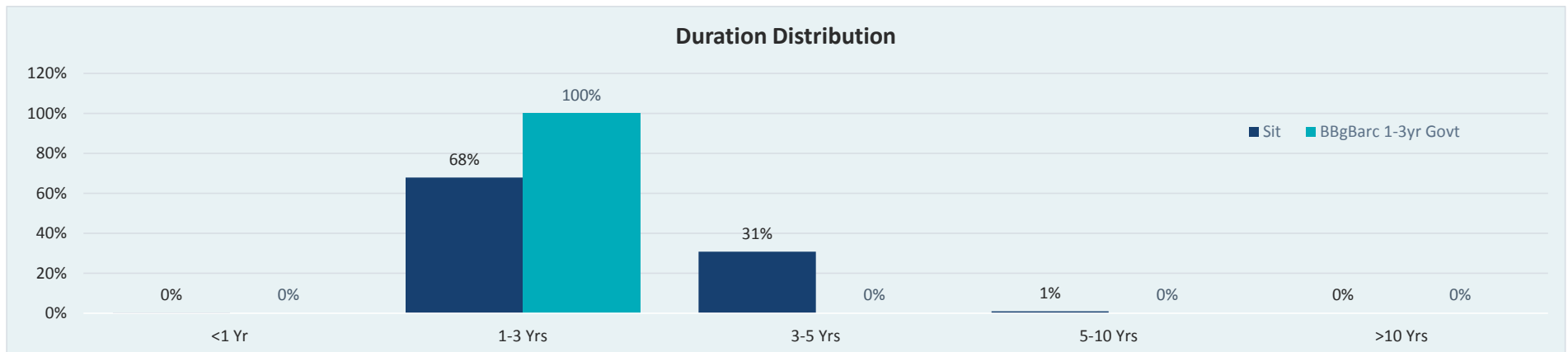
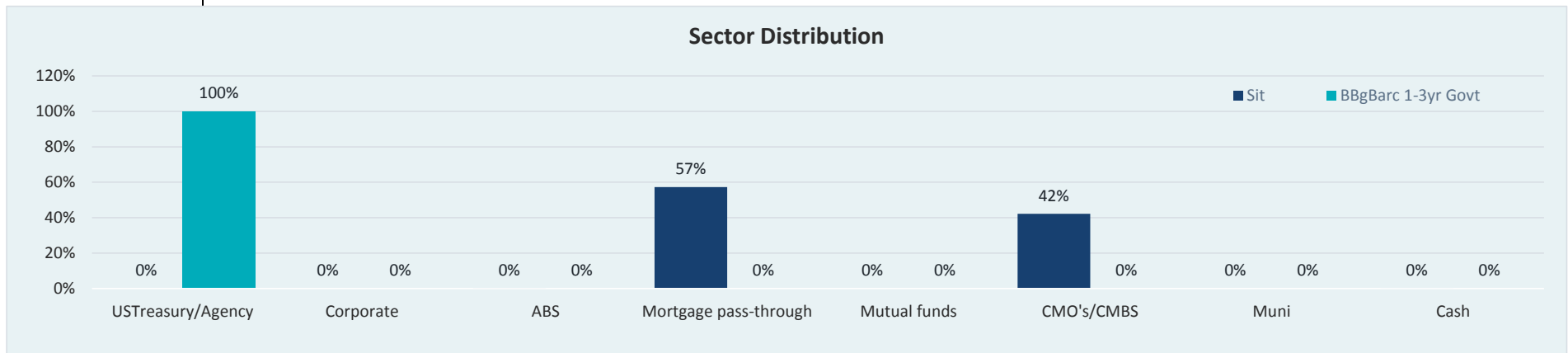
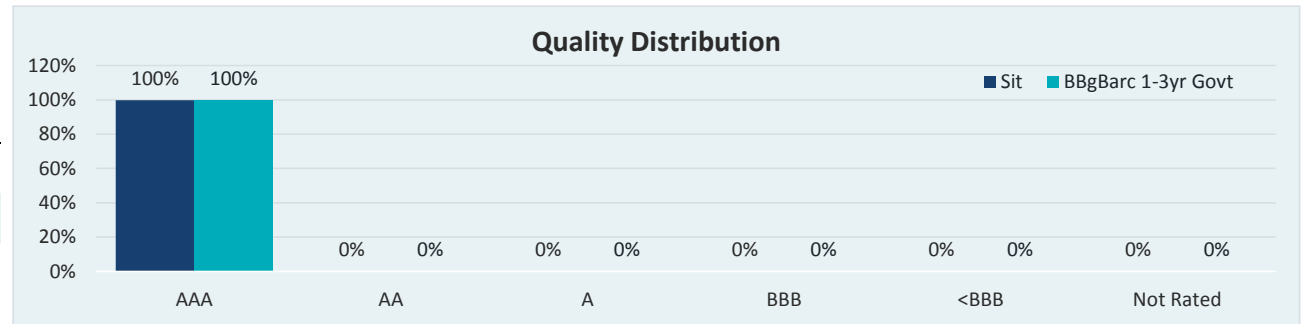


# Sit Short Duration Manager Portfolio Overview

Period Ending: September 30, 2018

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	2.60	1.9
Yield to Maturity	3.20	2.8
Average Quality	AAA	AAA
Average Coupon	6.6%	2.0%



**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.

**Manager Line Up**

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



DLJ RECP V	7/1/2014	DLJ	Pathway 7	2/7/2013	StepStone Group
Wastewater Opp. Fund	12/8/2015	StepStone Group	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	Aether Real Assets IV	3/16/2016	StepStone Group
Hearthstone II	6/17/1998	Hearthstone	StepStone CC Opportunities Fund	2/1/2018	StepStone Group
Parametric Overlay	3/29/2017	State Street	Parametric Defensive Equity	7/23/2018	State Street

**Policy & Custom Index Composition**

Policy Index (4/1/2018 - present)	5% S&P 500, 13% MSCI EAFE, 11% MSCI Emerging Markets, 11% Cambridge Associates US Private Equity, 12% S&P/LSTA Leveraged Loan Index+2%, 5% NCREIF Property Index +2%, 4.0% NCREIF Property Index +4%, 1% Wilshire REIT, 3% MSCI ACWI, 2% BBgBarc US Aggrgate, 23% BBgBarc 1-3 Yr Gov/Credi, 3% BBgBarc US Treasury 7-10 Year TR, 7% HFRI Fund of Funds Composite Index
Policy Index (12/1/2016 - 3/31/2018)	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%, 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, 1.6% 90-day T-Bills, 3.2% BBgBarc US Aggregate.
Policy Index (4/1/2012-11/30/2016)	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 (4/1/2018-Current)	7.5% S&P 500, 19.4% MSCI EAFE, 16.4% MSCI Emerging Markets, 16.4% Cambridge Associates US Private Equity, 17.9% S&P/LSTA Leveraged Loan Index+2%, 7.5% NCREIF Property Index +2%, 6.0% NCREIF Property Index +4%, 1.5% Wilshire REIT, 4.5% MSCI ACWI, 3% BBgBarc US Aggrgate.
Custom Growth Benchmark (Prior to 4/1/2018)	Weighted-average of the benchmarks of the sub-composites that make up the composite.
Custom Diversifying Benchmark (4/1/2018-Current)	30% BBgBarc US Treasury 7-10 Year TR, 70% HFRI Fund of Funds Composite Index
Custom Diversifying Benchmark (Prior to 4/1/2018)	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.

**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

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**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:  $\text{Portfolio Return} - [\text{Risk-free Rate} + \text{Portfolio Beta} \times (\text{Market Return} - \text{Risk-free Rate})]$ .

**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:  $\text{Portfolio Excess Return} / \text{Portfolio Standard Deviation}$ .

**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  
**11/28/18**  
Agenda Item  
**#8b.**

**Memorandum**

Date: November 28, 2018  
To: CCCERA Board of Retirement  
From: Timothy Price, Chief Investment Officer  
Subject: Investment Staff Report – Q3 2018

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**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 third quarter of 2018, all managers held high quality portfolios (as measured by credit ratings), low duration portfolios. The average credit quality for the entire liquidity program is A+ (AAA is

the highest rating), and the duration is an aggregate 2.1 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 third quarter, CCCERA's Growth portfolio was up modestly, with strength in domestic markets being offset by weakness in international and emerging markets. This trends mirrors that of the prior quarter.

## **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 third 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 beta of the mandate to growth markets is approximately 0.0, which shows good diversification. Trailing real (net of inflation) returns over the past five years is -1.1%, which is below expectations. The addition of the Parametric Defensive Equity portfolio to the risk-diversifying sub-portfolio during the third quarter is expected to help long-term returns. Long term returns for mandates in the Risk Diversifying portfolio are expected to be between 4% and 8% on an annualized basis.

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	A+	Meeting Expectations
Low Risk	Duration	2.1 years	Meeting Expectations
Appropriately Sized	Months of Benefit Payments Invested	46 Months	Meeting Expectations

#### Growth

Objective	Measurement	Current Period Data	Status
Growth of Plan Assets	Absolute Returns	Trailing 5yr return of 9.6%	Meeting Expectations
	Benchmark Relative Returns	0.9% over ACWI over trailing 5 years	Meeting Expectations
Efficient Capital Deployment	Sharpe Ratio	CCCERA: 1.59 MSCI ACWI: 1.04 (over trailing 5 years)	Meeting Expectations

#### Risk Diversifying

Objective	Measurement	Current Period Data	Status
Offset Volatility in Growth Portfolio	Beta	0.0 over trailing 5 years	Meeting Expectations
Positive Real Returns	Returns	Trailing 5yr real return of -1.1%	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 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	--	6%	N
Sit	Good	-2%	0%	N
DFA	Good	3%	9%	N

#### Performance

	Portfolio Average Credit Quality	Portfolio Average Duration	Portfolio Average Coupon	1 Year Total Return
Insight	A-	1.6	2.4	0.5%
Sit	AAA	2.6	6.6	0.4%
DFA	A+	2.7	2.8	1.7%

### Manager Notes:

#### Sit:

Mike Brilley, head of fixed income, will be retiring at the end of 2018. No expected impact as Mike played no role on CCCERA's account and will not be replaced.

#### 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 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	10%	6%	N
Jackson Square	Good	-8%	-8%	N
BlackRock Index Fund	Good	65%	8%	N
Emerald Advisors	Good	18%	17%	N
Ceredex	Good	-6%	-4%	N
Pyrford (BMO)	Good	17%	9%	N
William Blair	Good	-6%	-16%	N
First Eagle	Good	-4%	-8%	N
Artisan Global	Good	16%	3%	N
PIMCO/RAE EM	Good	7%	2%	N
TT EM	Good	89%	26%	N
Adelante	Good	-5%	-3%	N
Allianz	Good	16%	6%	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	13%	12%	Y
Jackson Square	17%	13%	Y
BlackRock Index Fund	18%	14%	Y
Emerald Advisors	24%	14%	Y
Ceredex	14%	11%	Y
Pyrford (BMO)	3%	5%	Y
William Blair	4%	6%	Y
First Eagle	4%	7%	Y
Artisan Global	14%	13%	Y
PIMCO/RAE EM	1%	5%	Y
TT EM	-4%	8%	Y
Adelante	4%	10%	Y
Allianz	2%	4%	Y
	1Yr Premium	5 Year Premium	
Private Equity	3.4%	-1.6%	N
Private Credit	-3%	1%	Y
Real Estate	-0.3%	2.3%	Y

**Manager Notes:**

None.

**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.

**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.

**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.

## Appendix – Risk Diversifying Portfolio

### Organizational Stability

	Portfolio Management Assessment	1 Year Product Asset Growth	1 Year Firm Asset Growth	Regulatory Action in Last Year?
AFL-CIO	Good	0%	0%	N
Wellington	Satisfactory	40%	3%	Y

### 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	-0.3	-0.1	-1%	3%	100%
Wellington	0.0	0.1	-1%	-1%	100%

### Manager Notes:

#### Wellington:

On May 12, 2017, the US Securities and Exchange Commission notified Wellington that it was opening an investigation into some aspects of Wellington's private company investment activities. The investigation appeared to be focused on private equity investments and associated valuation practices unrelated to the CCCERA Real Total Return portfolio. On October 24, 2018, The SEC informed Wellington that it had concluded its investigation and does not intend to recommend any enforcement action against the firm.

#### Manager Theses:

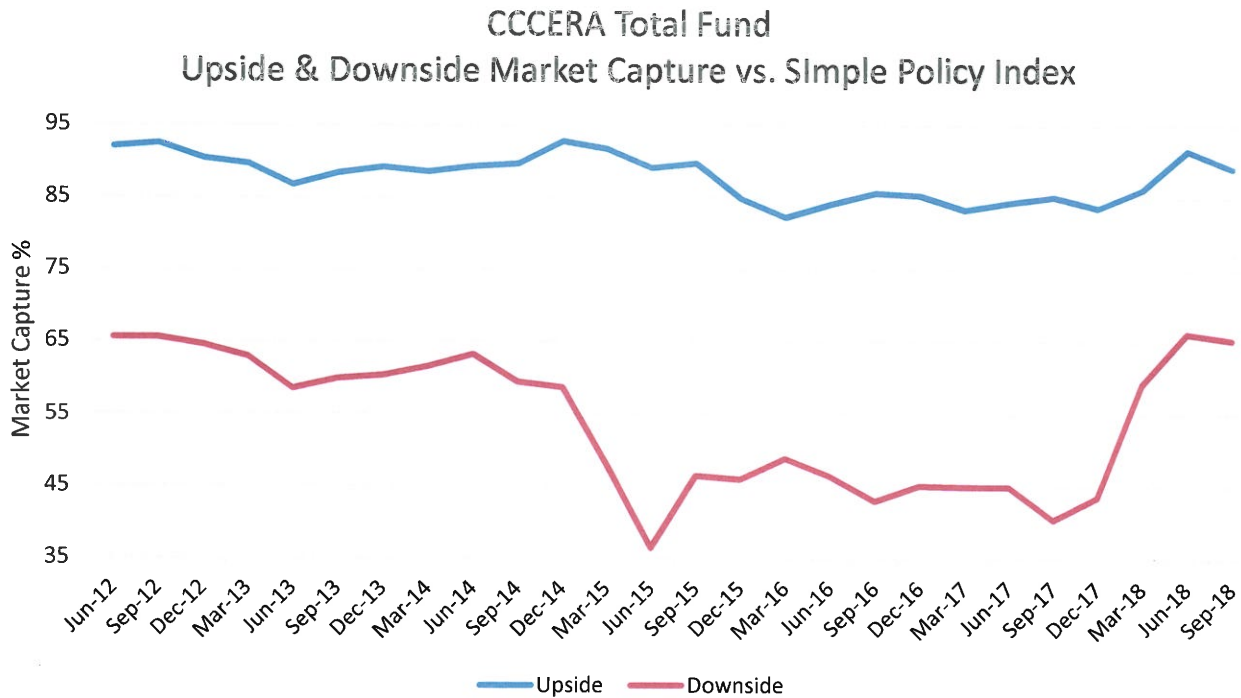
Managers in the risk diversifying allocation seek to have a low correlation with the growth portfolio, positive returns in flat and falling equity markets, and a high degree of liquidity. These managers work together to offset some of the risks in the growth portfolio.

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

**Wellington:** Multiple asset 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	21%	0.5%	0.1%	23%	0.3%	0.1%	-2%	0.2%	0.0%
Growth	73%	2.8%	2.1%	69%	4.3%	3.0%	4%	-1.5%	-0.9%
Risk Diversifying	6%	0.5%	0.0%	8%	0.5%	0.0%	-2%	0.0%	0.0%
<b>Total Fund</b>	<b>100%</b>		<b>2.2%</b>	<b>100%</b>		<b>3.1%</b>	<b>0%</b>		<b>-0.9%</b>



### 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	6.2	6.2	8.9	8.7	8.0	5.8	9.0	6.3
Volatility	4.5	5.3	4.6	6.1	4.8	6.7	8.5	11.4
<b>Sharpe</b>	<b>1.0</b>	<b>0.9</b>	<b>1.8</b>	<b>1.3</b>	<b>1.6</b>	<b>0.8</b>	<b>1.0</b>	<b>0.5</b>

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 high 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 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.

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# 2019

## Annual Budget

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## BUDGET SUMMARY

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November 28, 2018

Dear Board Members,

It is with pleasure to present the 2019 Proposed Operating Budget for Contra Costa County Employees' Retirement Association (CCCERA).

CCCERA continuously strives towards the priority of effective and efficient administration of the plan, safeguarding plan assets wherever possible, and ensuring that our members are provided with the best customer service. The activities in this proposed budget support the strategic initiatives.

Included in the 2019 Proposed Budget, there are estimated expenses for anticipated staffing of investment officer vacancies, temporary staff for Subledger decommission and member record security projects, funding for the health benefits (OPEB) trust, and professional services for legal, building consultant, and IT systems improvements.

The presentation format of the budget varied slightly from last year's version whereby line items are summarized into major expense line items which match the same presentation in the annual CAFR report. In addition to a proposed 2019 budget, also included is a 2018 budget versus actuals update through October 2018.

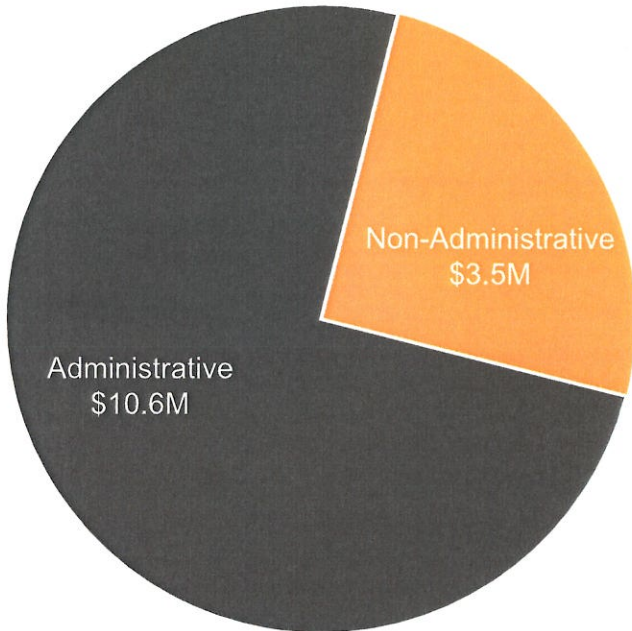
The budget process itself included greater participation and interaction with department managers. This allowed for more informed planning of cost estimates and forecasts using actual versus budget updates. For better understanding and review, the budget is summarized into major expense line items.

The 2019 Proposed Operating Budget is divided into three sections:

- *2019 Proposed Total Budget*—this section summarizes and combines all expenses from the *2019 Proposed Administrative* and *2019 Proposed Non-Administrative Budget*.
- *2019 Proposed Administrative Budget*—this section is comprised of expenses from administrative departments including Executive and Compliance, Administration/HR, Accounting, Information Technology, Retirement, and Member Services. Administrative expenses are capped by a statutory limit of 21 basis points against the latest Actuarial Accrued Liability prepared as of December 31, 2017.
- *2019 Proposed Non-Administrative Budget*—this section includes expenses for the Disaster Recovery Program as well as expenses for Investment and Legal departments. These expenses are not subject and excluded from the statutory limit on administrative expenses. All legal fees relating to outside legal counsel, investment counsel, disability review, and labor negotiation are presented in the Non-Administrative Budget.



**Total 2019 Proposed Budget \$14.1M**



The 2019 Proposed Total Budget is \$14.1 Million, an overall increase of \$566 thousand or 4%, compared to the 2018 budget. This overall increase is a mixture of increases and offsetting decreases. The increases are attributed to recruitment and temporary staff to cover vacancies and assist with Subledger decommission and safeguarding of member record projects, increased funding for health benefits OPEB trust, additional professional fees for outside legal, assistance from a building consultant, actuarial benefit statement preparation, and IT system improvement and disaster recovery expenses. The decreases are due to anticipated completion of ICON audit consultant work and lower anticipated training and travel expenses.

The 2019 Proposed Administrative Budget is \$10.6 million, an increase of \$517 thousand or 5%, compared to the 2018 budget.

*Section 31580.2 of the California Government Code limits administrative expenses to 0.21% of the current Actuarial Accrued Liability (AAL). As of December 31, 2017, the AAL is \$9,239,246,920 which results in a limit of \$19.4 million. The proposed 2019 administrative expenses of \$10.6 million are 0.115% of the AAL and well under the capped amount.*

The 2019 Proposed Non-Administrative Budget is \$3.5 million, an increase of \$49 thousand or 1%, as compared to the 2018 budget.

**Recommendation:**

It is recommended for the Board to adopt the 2019 Proposed Total Budget.

Thank you for your consideration.

Respectfully submitted,

Henry Gudino, CPA  
Accounting Manager

## 2018-2020 STRATEGIC INITIATIVES

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- 1. Improve communication within the organization and with external stakeholders.**
- 2. Expand use of technology across the organization to achieve goals in the most efficient manner.**
- 3. Implement measures to improve customer service to external and internal customers.**
- 4. Data integrity and security are of paramount importance. New projects will be implemented to ensure data is accurate and secured appropriately.**
- 5. Institute effective training and recognition programs to foster continued employee development.**



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**2019  
PROPOSED  
TOTAL BUDGET**



## 2019 PROPOSED TOTAL BUDGET

### 2019 Proposed Total Budget Including Administrative and Non-Administrative Departments

	2018 Budget	10/31/18 YTD Actuals	\$ Budget Remaining	% Budget Remaining	2019 Proposed Total Budget	\$ Change 2018 Budget	% Change 2018 Budget
<b>Personnel Services:</b>							
Salaries & Wages	5,846,600	4,642,880	1,203,720	21%	6,087,900	241,300	4%
Employee Benefits & Retirement	4,393,900	3,405,582	988,318	22%	4,700,000	306,100	7%
<b>Total Personnel Services</b>	<b>\$10,240,500</b>	<b>\$8,048,462</b>	<b>\$2,192,038</b>	<b>21%</b>	<b>\$10,787,900</b>	<b>\$547,400</b>	<b>5%</b>
<b>Operational Expenses:</b>							
<b>Professional Services:</b>							
Outside Legal Counsel Services	595,000	439,756	155,244	26%	626,000	31,000	5%
Audit Services	313,500	127,959	185,541	59%	267,000	(46,500)	(17%)
Actuary - Benefit Statements	65,000	70,649	(5,649)	(9%)	75,000	10,000	13%
Disability Hearings/Medical Reviews	156,000	34,314	121,686	78%	150,000	(6,000)	(4%)
Other Professional Services	4,600	1,769	2,831	62%	51,200	46,600	91%
<b>Total Professional Services</b>	<b>\$1,134,100</b>	<b>\$674,448</b>	<b>\$459,652</b>	<b>41%</b>	<b>\$1,169,200</b>	<b>\$35,100</b>	<b>3%</b>
<b>Office Expenses:</b>							
Office Lease	433,500	396,252	37,248	9%	453,200	19,700	4%
Telephone & Internet Services	61,700	51,872	9,828	16%	61,500	(200)	-
Equipment Lease & Maintenance	26,500	22,742	3,758	14%	25,000	(1,500)	(6%)
Furniture & Equipment	12,500	5,646	6,854	55%	11,000	(1,500)	(14%)
Office Supplies & Maintenance	80,800	47,463	33,337	41%	84,500	3,700	4%
Printing & Postage	141,000	87,055	53,945	38%	134,500	(6,500)	(5%)
Training & Education	177,100	103,981	73,119	41%	165,000	(12,100)	(7%)
Travel & Transportation	258,700	148,208	110,492	43%	230,100	(28,600)	(12%)
Insurance	260,000	163,146	96,855	37%	260,000	-	-
<b>Total Office Expenses</b>	<b>\$1,451,800</b>	<b>\$1,026,363</b>	<b>\$425,437</b>	<b>29%</b>	<b>\$1,424,800</b>	<b>\$(27,000)</b>	<b>(2%)</b>
<b>Information Technology Systems:</b>							
Support Service & Software Contracts	416,200	365,777	50,423	12%	437,300	21,100	5%
Hardware & Equipment Maintenance	68,500	30,057	38,443	56%	62,600	(5,900)	(9%)
Project Consulting	85,000	15,435	69,566	82%	85,000	-	-
<b>Total IT Systems</b>	<b>\$569,700</b>	<b>\$411,268</b>	<b>\$158,432</b>	<b>28%</b>	<b>\$584,900</b>	<b>\$15,200</b>	<b>3%</b>
Assets Depreciation	112,000	85,499	26,501	24%	107,200	(4,800)	(4%)
<b>Total Expenses</b>	<b>\$13,508,100</b>	<b>\$10,246,040</b>	<b>\$3,262,060</b>	<b>24%</b>	<b>\$14,074,000</b>	<b>\$565,900</b>	<b>4%</b>



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**2019  
PROPOSED  
ADMINISTRATIVE  
BUDGET**



## 2019 PROPOSED ADMINISTRATIVE BUDGET

### 2019 Proposed Administrative Budget

	2018 Budget	10/31/18 YTD Actuals	\$ Budget Remaining	% Budget Remaining	2019 Proposed Total Budget	\$ Change 2018 Budget	% Change 2018 Budget
<b>Personnel Services:</b>							
Salaries & Wages	4,388,200	3,657,675	730,525	17%	4,612,900	224,700	5%
Employee Benefits & Retirement	3,482,500	2,785,774	696,726	20%	3,727,900	245,400	7%
<b>Total Personnel Services</b>	<b>\$7,870,700</b>	<b>\$6,443,449</b>	<b>\$1,427,251</b>	<b>18%</b>	<b>\$8,340,800</b>	<b>\$470,100</b>	<b>6%</b>
<b>Operational Expenses:</b>							
<b>Professional Services:</b>							
Audit Services	313,500	127,959	185,541	59%	267,000	(46,500)	(17%)
Actuary - Benefit Statements	65,000	70,649	(5,649)	(9%)	75,000	10,000	13%
Disability Hearing/ Medical Reviews	156,000	34,314	121,686	78%	150,000	(6,000)	(4%)
Other Professional Services	3,600	819	2,781	77%	50,200	46,600	93%
<b>Total Professional Services</b>	<b>\$538,100</b>	<b>\$233,741</b>	<b>\$304,359</b>	<b>57%</b>	<b>\$542,200</b>	<b>\$4,100</b>	<b>1%</b>
<b>Office Expenses:</b>							
Office Lease	380,200	350,444	29,756	8%	411,700	31,500	8%
Telephone & Internet Services	49,600	26,731	22,869	46%	47,100	(2,500)	(5%)
Equipment Lease & Maintenance	26,500	22,742	3,758	14%	25,000	(1,500)	(6%)
Furniture & Equipment	9,500	4,997	4,503	47%	10,000	500	5%
Office Supplies & Maintenance	72,800	41,881	30,919	42%	76,500	3,700	5%
Printing & Postage	139,500	86,989	52,511	38%	132,800	(6,700)	(5%)
Training & Education	152,600	94,055	58,545	38%	144,500	(8,100)	(6%)
Travel & Transportation	129,700	92,015	37,685	29%	130,900	1,200	1%
Insurance	260,000	163,146	96,855	37%	260,000	-	-
<b>Total Office Expenses</b>	<b>\$1,220,400</b>	<b>\$883,000</b>	<b>\$337,400</b>	<b>28%</b>	<b>\$1,238,500</b>	<b>\$18,100</b>	<b>1%</b>
<b>Information Technology Systems:</b>							
Support Service & Software Contracts	255,800	261,484	(5,684)	(2%)	311,100	55,300	18%
Hardware & Equipment Maintenance	60,500	27,652	32,848	54%	49,500	(11,000)	(22%)
Project Consulting	80,000	15,435	64,566	81%	65,000	(15,000)	(23%)
<b>Total IT Systems</b>	<b>\$396,300</b>	<b>\$304,571</b>	<b>\$91,729</b>	<b>23%</b>	<b>\$425,600</b>	<b>\$29,300</b>	<b>7%</b>
Assets Depreciation	80,500	55,431	25,069	31%	75,700	(4,800)	(6%)
<b>Total Expenses</b>	<b>\$10,106,000</b>	<b>\$7,920,191</b>	<b>\$2,185,809</b>	<b>22%</b>	<b>\$10,622,800</b>	<b>\$516,800</b>	<b>5%</b>



**2019  
PROPOSED  
NON-ADMINISTRATIVE  
BUDGET**

**Investments, Legal,  
and Disaster Recovery  
Program**



## 2019 PROPOSED NON-ADMINISTRATIVE BUDGET

### 2019 Proposed Non-Administrative Budget Investments, Legal, and Disaster Recovery Program

	2018 Budget	10/31/18 YTD Actuals	\$ Budget Remaining	% Budget Remaining	2019 Proposed Total Budget	\$ Change 2018 Budget	% Change 2018 Budget
<b>Personnel Services:</b>							
Salaries & Wages	1,458,400	985,206	473,194	32%	1,475,000	16,600	1%
Employee Benefits & Retirement	911,400	619,808	291,592	32%	972,100	60,700	6%
<b>Total Personnel Services</b>	<b>\$2,369,800</b>	<b>\$1,605,013</b>	<b>\$764,787</b>	<b>32%</b>	<b>\$2,447,100</b>	<b>\$77,300</b>	<b>3%</b>
<b>Operational Expenses:</b>							
<b>Professional Services:</b>							
Fiduciary & General Legal Counsel	398,000	260,051	137,949	35%	398,000	-	-
Investment Legal Counsel	125,000	122,822	2,178	2%	150,000	25,000	17%
Disabilities Legal Services	72,000	56,884	15,116	21%	78,000	6,000	8%
Other Professional Services	1,000	950	50	5%	1,000	-	-
<b>Total Professional Services</b>	<b>\$596,000</b>	<b>\$440,707</b>	<b>\$155,293</b>	<b>26%</b>	<b>\$627,000</b>	<b>\$31,000</b>	<b>5%</b>
<b>Office Expenses:</b>							
Office Lease	53,300	45,808	7,492	14%	41,500	(11,800)	(28%)
Telephone & Internet Services	12,100	25,141	(13,041)	(108%)	14,400	2,300	16%
Furniture & Equipment	3,000	649	2,351	78%	1,000	(2,000)	(200%)
Office Supplies & Maintenance	8,000	5,582	2,418	30%	8,000	-	-
Printing & Postage	1,500	66	1,434	96%	1,700	200	12%
Training & Education	24,500	9,925	14,575	59%	20,500	(4,000)	(20%)
Travel & Transportation	129,000	56,192	72,808	56%	99,200	(29,800)	(30%)
<b>Total Office Expenses</b>	<b>\$231,400</b>	<b>\$143,363</b>	<b>\$88,037</b>	<b>38%</b>	<b>\$186,300</b>	<b>\$(45,100)</b>	<b>(24%)</b>
<b>Information Technology Systems:</b>							
Support Service & Software Contracts	160,400	104,293	56,107	35%	126,200	(34,200)	(27%)
Hardware & Equipment Maintenance	8,000	2,405	5,595	70%	13,100	5,100	39%
Project Consulting	5,000	-	5,000	100%	20,000	15,000	75%
<b>Total IT Systems</b>	<b>\$173,400</b>	<b>\$106,698</b>	<b>\$66,702</b>	<b>38%</b>	<b>\$159,300</b>	<b>\$(14,100)</b>	<b>(9%)</b>
Assets Depreciation	31,500	30,068	1,432	5%	31,500	-	-
<b>Total Expenses</b>	<b>\$3,402,100</b>	<b>\$2,325,849</b>	<b>\$1,076,251</b>	<b>32%</b>	<b>\$3,451,200</b>	<b>\$49,100</b>	<b>1%</b>



**2019  
PROPOSED  
CAPITAL  
BUDGET**



## 2019 PROPOSED CAPITAL BUDGET

### 2019 Proposed Capital Budget

	Asset Purchase Cost	2019 Depreciation
<b>2019 Capital Purchases</b>		
Hardware & Software	\$130,245	\$21,700
<b>Prior Years Capital Purchases</b>		
Leasehold Improvements	23,555	5,000
Hardware & Software	391,203	68,500
Furniture & Equipment	60,395	12,000
	<b>\$605,398</b>	<b>\$107,200</b>