



## AGENDA

### RETIREMENT BOARD MEETING

SECOND MONTHLY MEETING  
November 21, 2017  
9:00 a.m.

Pleasant Hill Community Center  
McHale Room  
320 Civic Drive  
Pleasant Hill, 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  
Christina Dunn, Deputy Chief Executive Officer  
Joe Wiley, CCCERA's Chief Negotiator

Employee Organization: AFSCME, Local 2700  
Unrepresented Employees: All CCCERA unrepresented positions

#### ***OPEN SESSION***

4. Consider and take possible action to adopt Board of Retirement Resolution 2017-7 to continue to participate in Social Security coverage.
5. Consider and take possible action to adopt the CCCERA Strategic Plan for 2018-2020.
6. Consider and take possible action on renewal of contract with Segal Consulting for actuarial services.
7. Presentation from staff on the investment measures of success.
8. Education session from Verus on investment risk.
9. Review of total portfolio performance for period ending September 30, 2017.
10. Miscellaneous
  - a. Staff Report
  - b. Outside Professionals' Report
  - c. Trustees' comments

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



Meeting Date  
**11/21/17**  
Agenda Item  
**#4**

## MEMORANDUM

Date: November 21, 2017  
To: CCCERA Board of Retirement  
From: Christina Dunn, Deputy CEO  
Subject: Social Security Administration Section 218 Agreement

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### ***Background***

Historically, employees who worked for state or local governmental employers were excluded from participating in Social Security benefits and instead relied on the pension plans provided by their employer to plan for retirement. Beginning in 1951, states were allowed to enter into voluntary agreements with the Federal government to provide Social Security coverage to state and local employees. These agreements are called Section 218 Agreements, named after the section of the Social Security Act that authorizes such arrangements. A Section 218 Agreement applies to employees who are members of a qualified public retirement system. Since the employees of Contra Costa County are members of a qualified public retirement system there must be a Section 218 Agreement for the employees to participate in Social Security benefits. The members of the public retirement system can become covered by Social Security through a referendum process including a vote of the eligible members.

Contra Costa County ("County") conducted a referendum with respect to its employees who were in positions covered by a public retirement system in 1962 and established a Section 218 Agreement. Employees of CCCERA were covered by this Section 218 Agreement. The Social Security Administration provides guidance on governmental entity consolidations, annexations, hybrid consolidations, and miscellaneous transitions. A miscellaneous transition is described as a significant structural or organizational change that does not fall under the other categories, but which may impact Social Security coverage. Under a miscellaneous transition, if under state law, the result of the change is merely a change in form but not a change in substance of the entity, then the same positions that were previously covered under the entity's Section 218 Agreement would continue to exist.

On January 1, 2015, CCCERA became an independent employer, separate from the County. As a separate employer, CCCERA continued to withhold and submit social security taxes from the employees of CCCERA with the expectation that the Section 218 Agreement established by the

County would cover the employees of CCCERA since the change was considered a change in form and not a change in substance of the entity.

In January 2017, CCCERA requested an official determination from the State Social Security Administrator on the applicability of the County's Section 218 Agreement on CCCERA employees. CCCERA received notification on June 5, 2017, that the State Social Security Administrator determined the Section 218 Agreement that covers the employees of the County does not meet the coverage continuation rules to cover employees of CCCERA.

On July 12, 2017, the CCCERA Board of Retirement initiated the referendum procedures by adopting Resolution 2017-5 for employees to participate in Social security effective January 1, 2015.

On November 16, 2017, the eligible employees of CCCERA participated in a secret ballot referendum vote regarding the continued participation in social security. The majority of the eligible CCCERA employees voted in favor of participating in Social Security coverage effective January 1, 2015.

***Recommendation***

Consider and take possible action to adopt Board of Retirement Resolution 2017-7 to continue to participate in Social Security coverage in accordance with the requirements of Section 218(d) of the Social Security Act, and applicable State and Federal laws and regulations effective January 1, 2015.

RESOLUTION NO. 2017-7  
(To Accompany Application and Agreement)

WHEREAS, a majority of the eligible employees of the Contra Costa County Employees' Retirement Association, hereinafter referred to as "Public Agency", who are members of and in positions covered by the Contra Costa County Employees' Retirement Association; at a referendum conducted in accordance with the provisions of Part 4, Division 5, of Title 2 of the California Government Code, Section 218 of the Federal Social Security Act, and regulations promulgated by the Board of Administration of the California Public Employees' Retirement System, hereinafter referred to as "State", voted in favor of coverage under the provisions of the Old-Age, Survivors, Disability and Health Insurance system established by the Federal Social Security Act; and

WHEREAS, the Public Agency desires to file an application with the State and to enter into an agreement with the State to extend to such retirement system members and to other eligible employees of the Public Agency in the same coverage group, as defined in Section 218(d)(4) of the Federal Social Security Act, coverage under the said insurance system on behalf of the Public Agency; and

WHEREAS, official form "Application and Agreement PERS-SOC-32R" containing the terms and conditions under which the State will effect such inclusion has been examined by this body;

NOW, THEREFORE, BE IT RESOLVED, that said Application and Agreement on said official form be executed on behalf of the Public Agency and submitted to the State to provide coverage under the California State Social Security Agreement of March 9, 1951, of all services performed by individuals as employees of the Public Agency as members of a coverage group (as defined in Section 218(d)(4) of the Social Security Act) of the Contra Costa County Employees' Retirement Association, except the following:

1. All services excluded from coverage under the agreement by Section 218 of the Social Security Act; and
2. Services excluded by option of the Applicant as indicated in Resolution adopted at a meeting of the Contra Costa County Employees' Retirement Association on July 12, 2017: Student Services.

Effective date of coverage of services under said agreement to be January 1, 2015; and

BE IT FURTHER RESOLVED, that Christina Dunn, Deputy Chief Executive Officer, 1355 Willow Way, Suite 221 , is hereby authorized and directed to execute said Application and Agreement on behalf of and as Authorized Agent of the Public Agency and to forward same to the State for acceptance and further action; and

BE IT FURTHER RESOLVED, that authority hereafter to act as Authorized Agent, and so to conduct all negotiations, conclude all arrangements, submit all reports, and sign all agreements and instruments which may be necessary to carry out the letter and intent of the aforesaid application and agreement, in conformity with all applicable Federal and State laws, rules and regulations, is vested in the position of Deputy Chief Executive Officer.

**Contra Costa County Employees' Retirement Association**

\_\_\_\_\_

Presiding Officer

\_\_\_\_\_

Title

\_\_\_\_\_

Date

CERTIFICATION

I, Christina Dunn, Deputy Chief Executive Officer of the Contra Costa County Employees' Association, State of California, do hereby certify the foregoing to be a full, true, and correct copy of Resolution adopted by the Contra Costa County Employees' Retirement Association Board of Retirement of the Contra Costa County Employees' Association at the regular/special meeting held on the 21<sup>st</sup> day of November, 2017, as the same appears of record in my office.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Date)

## APPLICATION AND AGREEMENT

For the purposes of this application and agreement, any reference made herein to any State or Federal statute or statutes, or regulations, or part thereof, applies to all amendments thereto now or hereafter made.

For the purposes of this application and agreement, "Federal System" means Old-Age, Survivors, and Disability and Health Insurance system established by the Federal Social Security Act, "Federal agency" means the Commissioner of Social Security, or successor in function to such officer, "Board" means the Board of Administration of the Public Employees' Retirement System, acting on behalf of the State of California.

The Contra Costa County Employees' Retirement Association, a public agency as defined in Section 22009 of the Government Code\* hereinafter called Applicant, hereby makes application to the Board to execute a modification to the California State Social Security Agreement extending thereunder the Federal System to all services performed by individuals as employees of the Applicant in a coverage group as defined in Section 218(d)(4) of the Social Security Act\* of the Contra Costa County Employees' Retirement Association, a deemed retirement system except the following:

1. Those services mandatorily excluded from said agreement by Section 218 of the Social Security Act.\*
2. The following services excluded by option of the Applicant pursuant to Resolution, adopted on July 12, 2017 :

### Student Services

\*See Attachment



In order to carry into effect the common governmental duties under such statutes and in consideration of the mutual promises hereinafter made, the Applicant and the Board agree as follows:

1. The Board will execute a modification to the California State Social Security Agreement to extend thereunder the Federal System to the services of employees of Applicant as hereinbefore applied for.
2. Applicant will comply promptly and completely, throughout the term of this application and agreement, with the letter and intent of all statutes of the State of California, and Section 218 of the Federal Social Security Act, and applicable Federal and State regulations adopted pursuant thereto.
3. Applicant shall pay to the Federal Government amounts equivalent to the sum of taxes (employer-employee contributions) imposed under the Federal Insurance Contributions Act if the services of employees covered by the application and agreement constituted employment as defined in such Act. Applicant shall keep or cause to be kept accurate records of all remuneration for such services, said records to be maintained as required by Federal or State regulations, and said records shall be available for inspection or audit by the Board or its designated representative.
4. Applicant will prepare and submit such wage reports as may be required.

5. Applicant shall pay and reimburse the State at such times as may be determined by the State:
  - (a) Any sums of money that the State may be obligated to pay or forfeit to the Federal Government by reason of any failure of the Applicant, for any cause or reason, to pay the contributions, penalties, or interest required by the agreement between the Federal agency and the State at such time or in such amounts as required by the said agreement and any State or Federal regulations adopted pursuant thereto.
  - (b) In such amounts as may be determined by the State, its proportionate share of any and all costs incurred by the State in the administration of the Federal System as it affects the Applicant and its employees.
  - (c) In such amounts as may be determined by the State, the cost of any and all work and services relating to any referendum for the purposes of coverage under the Federal System held with respect to the coverage group for which coverage under the Federal System is requested herein.
  - (d) In such amounts as may be determined by the State, the costs of any audits of the books and records of the Applicant made by the State or its designated representatives pursuant to Section 22559 of the Government Code.
6. The coverage herein provided for shall be effective January 1, 2015.
7. That, subject to the aforesaid provisions and applicable law, this application and agreement may be amended by the mutual consent of the parties in writing.

8. After the filing of this application and agreement, its acceptance and execution by the State shall constitute it a binding agreement between the Applicant and the State of California with respect to the matters herein set forth.

Contra Costa County Employees' Retirement Association

Signed by:

\_\_\_\_\_  
(Authorized Agent)

And by:

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Date)

ACCEPTED: \_\_\_\_\_

BY \_\_\_\_\_  
Veronica Silva-Gil  
State Social Security Administrator  
Employer Account Management Division

## ATTACHMENT

Section 22009, Government Code:

"Public Agency" means the State, any city, county, city and county, district, municipal or public corporation or any instrumentality thereof, or boards and committees established under Chapter 10 of Division 6 of the Agricultural Code, Chapter 754 of Statutes of 1933, as amended, or Chapter 307 of the Statutes of 1935, as amended, the employees of which constitute one or more coverage groups or retirement system coverage groups.

Section 218(d)(4):

For the purposes of subsection (c) of this section, the following employees shall be deemed to be a separate coverage group:

- (A) all employees in positions which were covered by the same retirement system on the date the agreement was made applicable to such system (other than employees to whose services the agreement already applied on such date);
- (B) all employees in positions which became covered by such system at any time after such date; and
- (C) all employees in positions which were covered by such system at any time before such date and to whose services the insurance system established by this title has not been extended before such date because the positions were covered by such retirement system - including employees to whose services the agreement was not applicable on such date because such services were excluded pursuant to subsection (c)(3)(B).

The following services are mandatorily excluded:

- (a) service performed in a policeman's or fireman's position, covered by a retirement system at the time coverage is extended to the Public Agency;
- (b) service performed by an individual who is employed to relieve him from unemployment;
- (c) service performed in a hospital, home, or other institution by a patient or inmate thereof;
- (d) covered transportation service (as defined in Section 210(k) of the Social Security Act, as amended);

- (e) service (other than agricultural labor or service performed by a student) which is excluded from employment by any provision of Section 210(a) of the Social Security Act, other than paragraph 7 of such section, or service the remuneration for which is excluded from wages by paragraph (2) of Section 209(h);
- (f) service performed by an individual as an employee on a temporary basis in case of fire, storm, snow, earthquake, or similar emergency;
- (g) services performed by election officials or election workers for each calendar year in which the remuneration paid for such service is less than the threshold amount mandated by law. (The threshold amount as of January 1, 2017 was \$1,800.00).



Meeting Date  
**11/21/17**  
Agenda Item  
**#5**

## **MEMORANDUM**

Date: November 21, 2017  
To: CCCERA Board of Retirement  
From: Gail Strohl, Chief Executive Officer  
Subject: Consider and take possible action to adopt the CCCERA 2018-2020 Strategic Plan.

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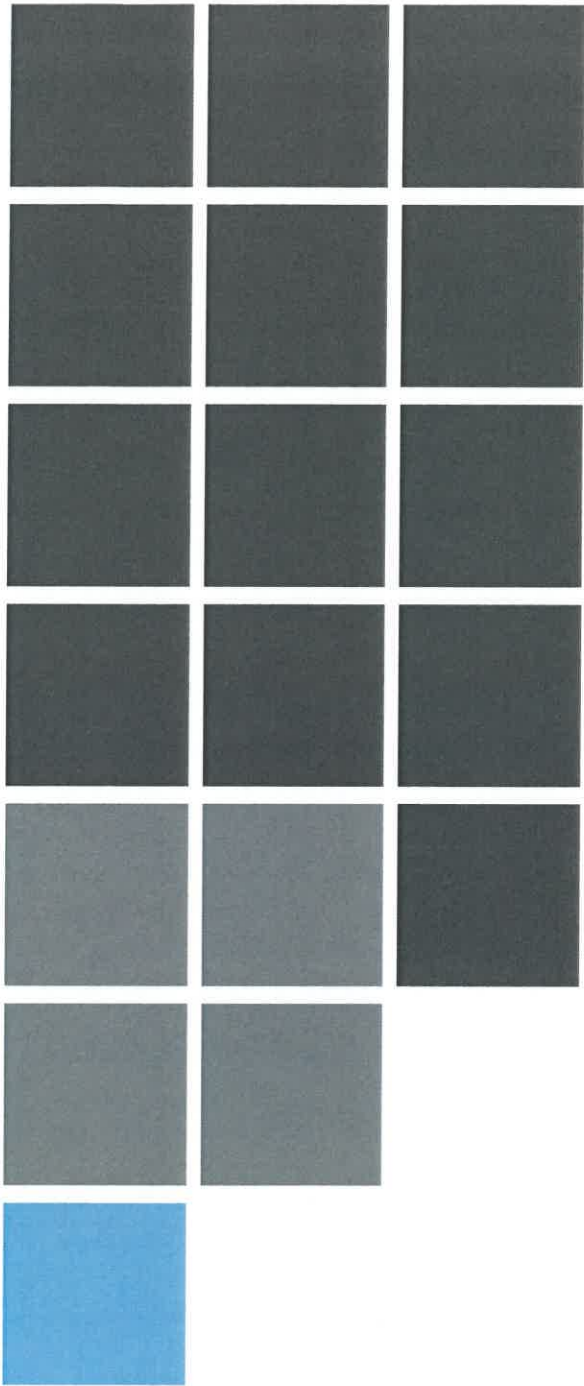
### ***Background***

A strategic plan is a planning document for the organization. The plan identifies the mission statement, core values and strategic initiatives. It is essential that the core values and strategic initiatives are aligned with the mission statement. This is the first strategic plan for CCCERA. Along with the strategic plan document is a strategic plan reference card for staff to make the plan a visual, living document. It is an effort to make the strategic direction of CCCERA at the forefront of all activities.

As a reference point, the current mission statement is: CCCERA's mission is to deliver retirement benefits to members and their beneficiaries through prudent asset management and effective administration, in accordance with all plan provisions. The proposed mission statement is: CCCERA's mission is to administer pension benefits earned by our members and to be prudent stewards of plan assets.

### ***Recommendation***

Consider and take possible action to adopt the CCCERA 2018-2020 Strategic Plan.



# 2018-2020

*Strategic Plan*



## Mission Statement

CCCERA's mission is to administer pension benefits earned by our members and to be prudent stewards of plan assets.





## Core Values

### **Trust**

CCCERA has to continue to earn the trust of the public. CCCERA employees treat all stakeholders (members, employers and the public) and each other with fairness and respect.

### **Innovation**

CCCERA will seek ways to reinvent how work is conducted in order to increase efficiencies and effectiveness. The smart development of additional tools and streamlined processes will be beneficial for the plan and its stakeholders.

### **Accountability**

CCCERA will continue to facilitate a professional work environment which encompasses greater collaboration across the organization while increasing ownership of work activities.



## Strategic Initiative

- 1 **Improve communication within the organization and with external stakeholders.**
  - Develop programs for cross-training within departments and cross-understanding across the organization.
  - Provide additional updates and more focused communications for members.
  - Continue to develop communication materials for employers and design feedback tools to increase partnerships.

## Strategic Initiative

**2** Expand use of technology across the organization to achieve goals in the most efficient manner.

- Improve functionality of pension administration system.
- Cross-departmental identification of needed technological solutions.
- Evaluate how to fully integrate technological tools for the maintenance and analysis of investment data.



## Strategic Initiative

### 3 Implement measures to improve customer service to external and internal customers.

- Develop different types of member surveys to measure effectiveness of in-person, telephone, written and online communications.
- Further develop processes and procedures for consistency of service.
- Analyze the flow of information throughout the organization to assess areas where response times can be reduced.

## Strategic Initiative

**4** Data integrity and security are of paramount importance. New projects will be implemented to ensure data is accurate and secured appropriately.

- Establish additional measures to secure physical and virtual data.
- Enhance existing risk identification and security assessments.
- Access additional tools to potentially mitigate risks.



## Strategic Initiative

**5** Institute effective training and recognition programs to foster continued employee development.

- Assess and identify areas of training needed.
- Increase opportunities for relevant, cost effective trainings.
- The other strategic initiatives will benefit from the success of this initiative.

# STRATEGIC PLAN

## 2018-2020



### MISSION

CCCERA's mission is to administer pension benefits earned by our members and to be prudent stewards of plan assets.

### CORE VALUES

#### TRUST

CCCERA has to continue to earn the trust of the public. CCCERA employees treat all stakeholders (members, employers and the public) and each other with fairness and respect.

#### INNOVATION

CCCERA will seek ways to reinvent how work is conducted in order to increase efficiencies and effectiveness. The smart development of additional tools and streamlined processes will be beneficial for the plan and its stakeholders.

#### ACCOUNTABILITY

CCCERA will continue to facilitate a professional work environment which encompasses greater collaboration across the organization while increasing ownership of work activities.

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### STRATEGIC INITIATIVES

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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Meeting Date  
**11/21/17**  
Agenda Item  
**#6**

## ***MEMORANDUM***

Date: November 21, 2017  
To: CCCERA Board of Retirement  
From: Gail Strohl, Chief Executive Officer  
Subject: Consider and take possible action on renewal of contract with Segal Consulting for actuarial services.

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### ***Background***

Segal Consulting is the current actuary for CCCERA. The current term of the Actuarial Services Agreement with Segal Consulting is expiring on December 31, 2017. CCCERA's Procurement of Products and Services Policy indicates a requirement to conduct RFPs for core vendors, such as the actuary. At this time, a one year extension to the current Segal Consulting contract is requested to allow sufficient time for the issuance of an RFP and related vendor analysis. The proposed fees include a \$2,500 increase in the annual actuarial valuation fee.

### ***Recommendation***

Consider and take possible action on renewal of contract with Segal Consulting for actuarial services.





100 Montgomery Street Suite 500 San Francisco, CA 94104-4308  
T 415.263.8200 www.segalco.com

November 10, 2017

Ms. Gail Strohl  
Chief Executive Officer  
Contra Costa County Employees' Retirement Association  
1355 Willow Way, Suite 221  
Concord, CA 94520

**Re: Actuarial Fee Proposal for a One-Year Contract Extension**

Dear Gail:

This letter presents our proposed schedule of fixed valuation fees and hourly billing rates for our services to CCCERA, commencing January 1, 2018.

As requested, this letter proposes one year of fixed fees and hourly billing rates starting January 1, 2018. Note that the December 31, 2017 actuarial valuations will be performed during 2018, and are shown under that column in the table below.

**Fixed Fee Valuation and Retainer Services**

<b>Task</b>	<b>Current: 2017</b>	<b>Proposed: 2018</b>
Actuarial Valuation (includes one meeting)	\$102,500	\$105,000
GASB Statement 67 valuation	Time charges	\$15,000
GASB Statement 68 valuation	Time charges	\$28,000
General Consulting Services (per year)	\$16,000	\$16,000

Note that we have included fixed fees for the Governmental Accounting Standards Board (GASB) Statement 67 valuation for plan reporting and for the GASB Statement 68 valuation for employer reporting. Previously this work was done on a time charges basis, when the Statements were first being implemented. Note that the GASB 68 valuation includes information for terminated employers. Also note that there is no experience study scheduled for the year 2018.

### Hourly Rates for Additional Services

The table below shows the current rates and the rates we are proposing effective January 1, 2018, which are unchanged from 2017.

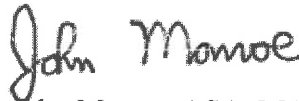
<b>Class of Personnel</b>	<b>Current: Jan 2017 to Dec 2017</b>	<b>Proposed: Jan 2018 to Dec 2018</b>
Principal Actuaries (Angelo)	\$510	\$510
Reviewing Actuaries	\$490	\$490
Supervising Actuaries (Monroe)	\$470	\$470
Senior Actuarial Analysts	\$300 - \$460	\$300 - \$460
Actuarial Analysts	\$200 - \$290	\$200 - \$290
Compliance Consultant	\$470	\$470

We look forward to working with you and the Board of Retirement for the next year.

Sincerely,



Paul Angelo, FSA, MAAA, FCA, EA  
Senior Vice President and Actuary



John Monroe ASA, MAAA, EA  
Vice President and Actuary

PPA/jl

# Defining Investment Success at CCCERA

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**Timothy Price, CFA**

Chief Investment Officer

## **June 25, 2015: Verus Presents Results from Enterprise Risk Tolerance Assessment**

- Through an Enterprise Risk Tolerance assessment, Trustees coalesced around the payment of current benefits as most important function of CCCERA
- Staff developed the Functionally Focused Portfolio approach to reflect the Board's priorities

- **Cash flow tilting negative for the first time in Plan history**
  - Positive cash flow allows plans to buy cheap assets on dips
  - Negative cash flow creates potential of permanent losses if risk assets are sold at impaired prices to meet plan needs
- **Capital markets generally fully priced today and offering lower returns with potentially higher volatility over the next decade**
  - CCCERA will need to be flexible and creative with where and when it takes on the risk associated with growth assets
  - CCCERA will need growth exposure but will need to be able to weather the expected volatility without threatening the ability of the Plan to fulfill its core investment function of paying benefits

## **How has CCCERA planned its asset allocation historically?**

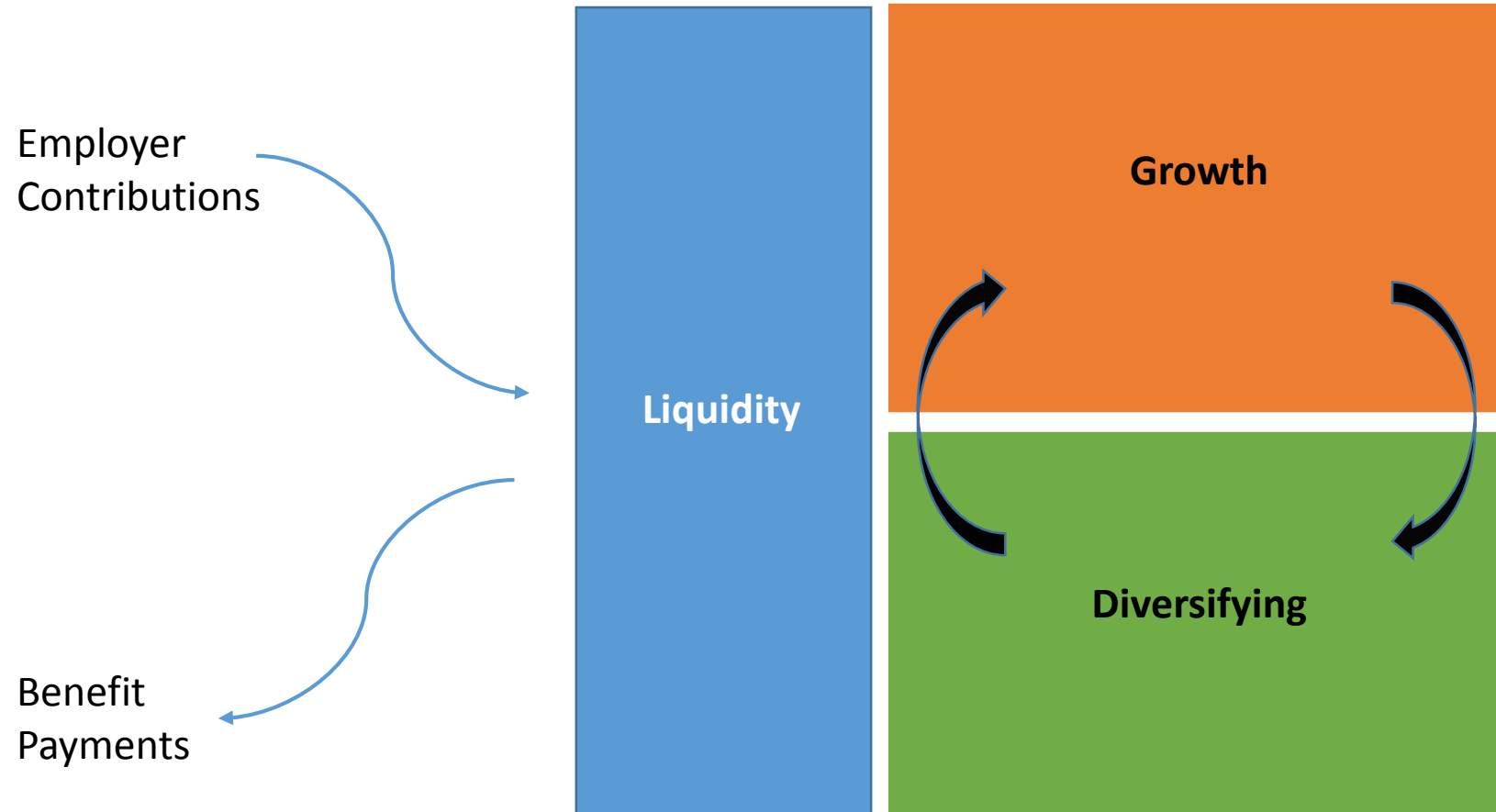
- Planned for a “most likely” environment, with the benefit of being cash flow positive
- This approach is appropriate when positive cash flow can be used for cash flow or rebalancing needs

## **How would CCCERA like to plan going forward?**

- Plan for a variety of long-term outcomes by neutralizing near term liquidity needs
- Focus on long term growth and health of the plan

# Pension Fund Investment Functions

- 1) Pay current benefits
- 2) Grow assets for future benefit payments
- 3) Weather markets to ensure functions #1 and #2 are achieved





# Investment Measures of Success

- CCCERA's Board has a fiduciary duty to oversee the investment portfolio
- Historically, returns relative to peers and benchmarks have been the primary tool for the Board to evaluate the success and health of the portfolio
- **FFP is designed to allow the Board to have a more focused conversation around asset allocation ultimately to clarify the oversight of the pension plan**

FFP Sub-Portfolio	Measure of Success
Liquidity	<ul style="list-style-type: none"> <li>• Low risk posture</li> <li>• Sized appropriately to allow the Board to focus on long-term portfolio positioning</li> </ul>
Growth	<ul style="list-style-type: none"> <li>• Long-term growth competitive against benchmark returns</li> </ul>
Diversifying	<ul style="list-style-type: none"> <li>• Must be liquid in order to redeploy in times of stress</li> <li>• Diversification of factors that drive returns that are unique from the Growth portfolio</li> </ul>

# Portfolio Oversight

- CCCERA's portfolio is tailored to specific objectives the Board has identified. Success should be measured against the achievement of these objectives
- Benchmark returns and peer comparisons do not fully capture the unique objectives of CCCERA's portfolio
- Benchmarks and peer comparisons may be appropriate for a partial evaluation of a manager or portfolio, but lack the explanatory power to fully assess success and should not be exclusive measures of success

	Portfolio Objective	Are These Appropriate Measures?			Appropriate Measurement Period
		Benchmark	Peer Return Comparison	Organizational Review	
Total Fund	Pay all promised benefits	Y	N	Y	Annually
Liquidity	Store and disburse benefit payments	N	N	Y	Monthly
Growth	Grow assets for future benefit payments	Y	Y	Y	Annually
Risk Diversifying	Reduce total fund volatility	N	N	Y	Quarterly

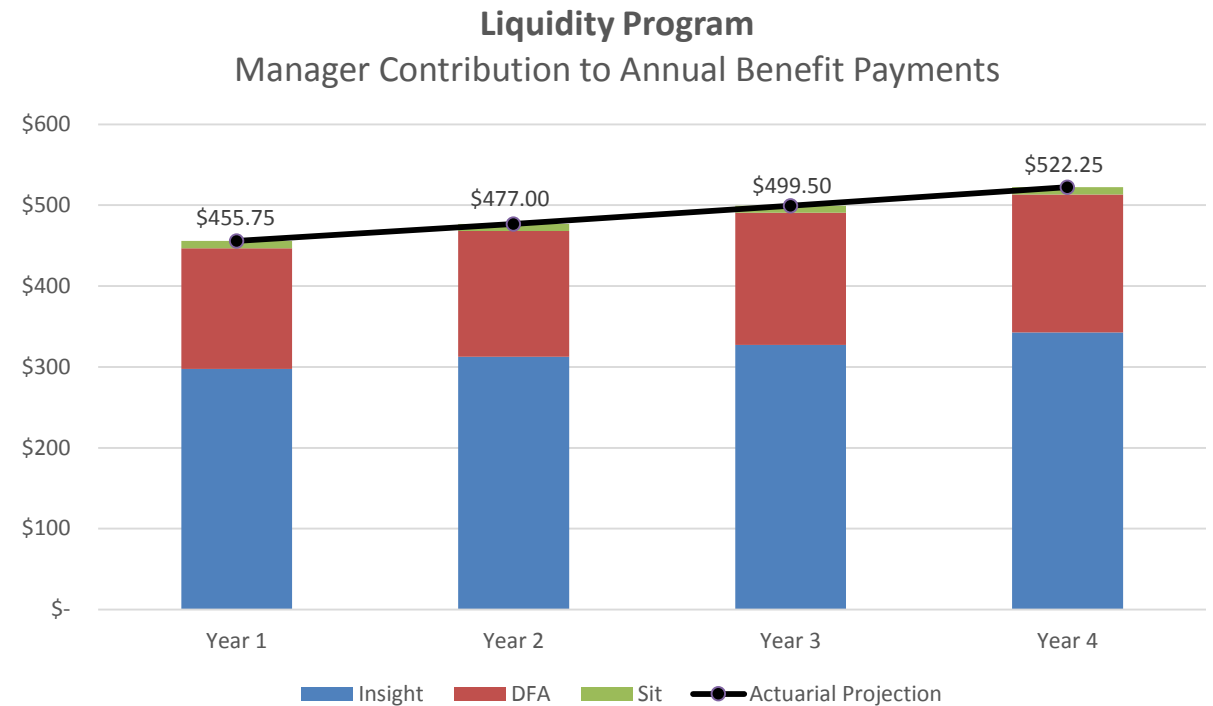
# Liquidity

- The Liquidity sub-portfolio is the cornerstone of the FFP
- Surety in the near term ability to make benefit payments allows for risk to be allocated in other parts of the portfolio
- **The liquidity sub-portfolio is designed to take the least investment risk. The liquidity sub-portfolio must be sized appropriately and invested conservatively in order to fulfill the function of storing and dispersing benefit payments.**

Objective	Measurement
Match 4 years of benefit payments with high certainty	Program size vs liabilities Quality ratings Duration
Produce cash flow to match monthly benefit payment	Portfolio cash flow (monthly)

# Liquidity Structure

- CCCERA's Liquidity Sub-portfolio is made up of three managers serving distinct roles:
  - **Insight:** Completion portfolio which makes a payment through net income and bond maturities that bridges the gap between other managers and projected payment. Insight is the completion manager of the Liquidity sub-portfolio, and has the largest portfolio.
  - **DFA:** Pays out a pre-determined monthly amount. DFA sources liquidity from across their portfolio.
  - **Sit:** Pays out net income on monthly basis.
- All managers maintain high portfolio level quality ratings, and low portfolio level durations to produce a stable, high quality fixed income allocation



# Growth

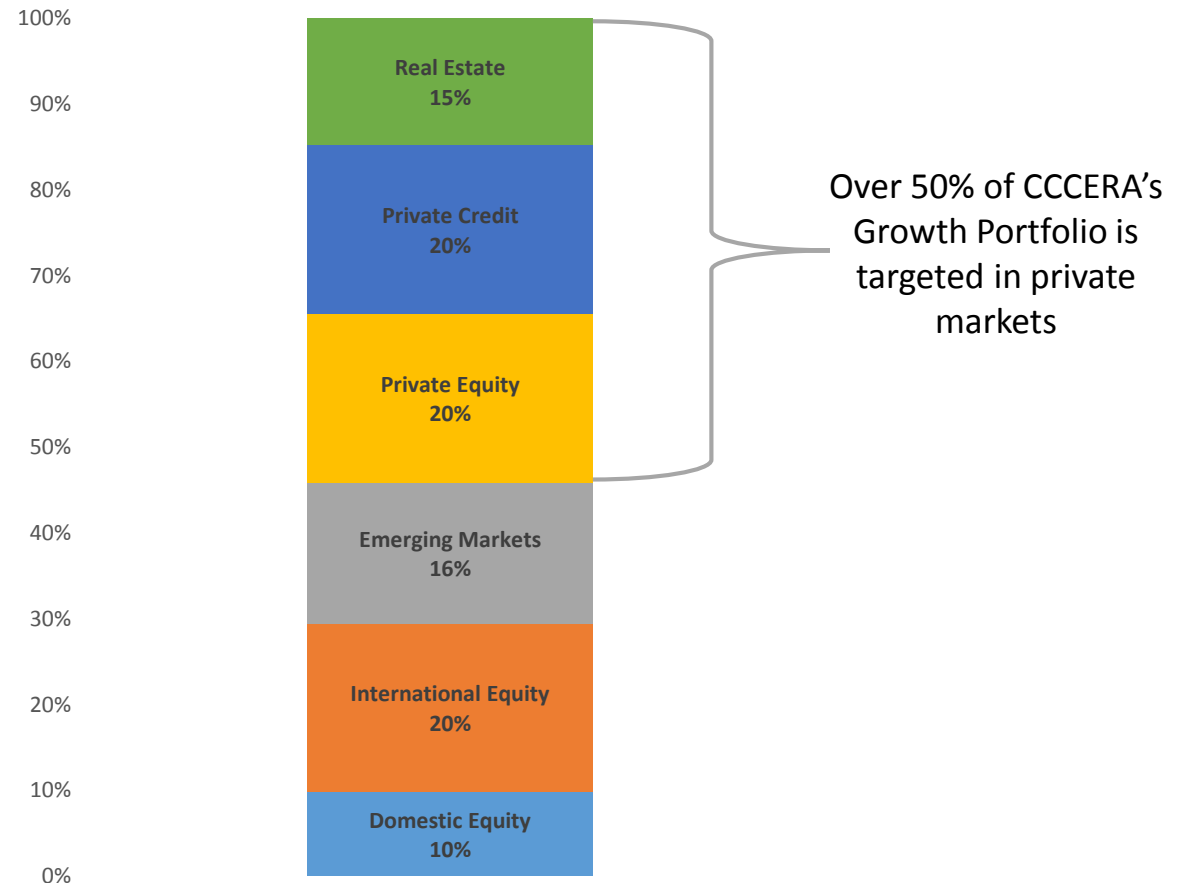
- The objective of the Growth sub-portfolio is to grow Plan assets that will be used for future benefit payments (years 5+).
- The lions share of investment risk in CCCERA's Total Fund is in the Growth sub-portfolio, but the risk should be rewarded.
- Seek to avoid any investment where capital could be permanently lost, resulting in a shrinking of assets available to grow. This will be achieved through plan design and conservative underwriting.

Objective	Measurement
Growth of plan assets for future (years 5+) benefit payments	Absolute returns Benchmark relative returns
High risk adjusted returns	Sharpe Ratios
Avoid permanent impairment of capital	Risk assessment of total growth portfolio

# Growth Structure

- The Growth portfolio has large allocations to private markets, which is possible due to the risk off-setting elements of the Liquidity and Risk Diversification sub-portfolios.
- CCCERA has recently retained the StepStone Group to assist in the deployment and oversight of CCCERA's assets in the private markets
- Allocations to public markets in the Growth sub-portfolio have recently been restructured, with reductions in domestic equity and the hiring of two emerging markets managers
- **The Growth sub-portfolio is designed to capture any growth opportunities the market presents**

CCCERA Growth Sub-portfolio Allocation



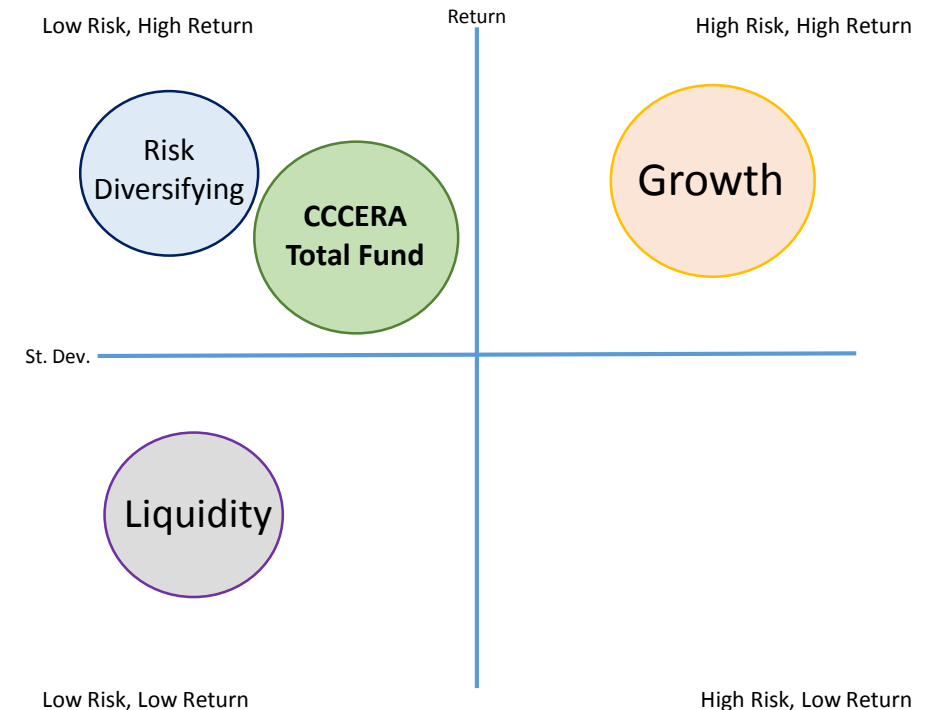
# Risk Diversifying

- The purpose of the Risk Diversifying sub-portfolio is to reduce Total Fund volatility and maintain a low absolute volatility for the Risk Diversifying sub-portfolio
- Acting as an offset to the Growth sub-portfolio, the Risk Diversifying sub-portfolio should “zig” when the Growth sub-portfolio “zags” to allow for opportunistic rebalancing

Objective	Measurement
Offset volatility in growth sub-portfolio	Low correlation to ACWI <i>(MSCI ACWI used as a proxy for broad market growth)</i>
Positive returns in non-stressed markets	Positive real returns
Provide liquidity for opportunistic re-balancing in market stress events	High liquidity <i>(measured by the amount of the portfolio which can be redeemed within 30-90 days)</i>

# Total Fund

- CCCERA's Total Fund is performing well when the underlying functions are achieving their unique objectives
- If the Liquidity, Growth, and Risk Diversifying portfolios are achieving their objectives, CCCERA's Total Fund should exhibit a low volatility, moderate return profile over long time periods
- Success is measured at two levels:
  - Did the sub-portfolios meet or exceed their simple benchmarks over an appropriate period?
  - Did the total fund meet or exceed the simple policy index over an appropriate time period?





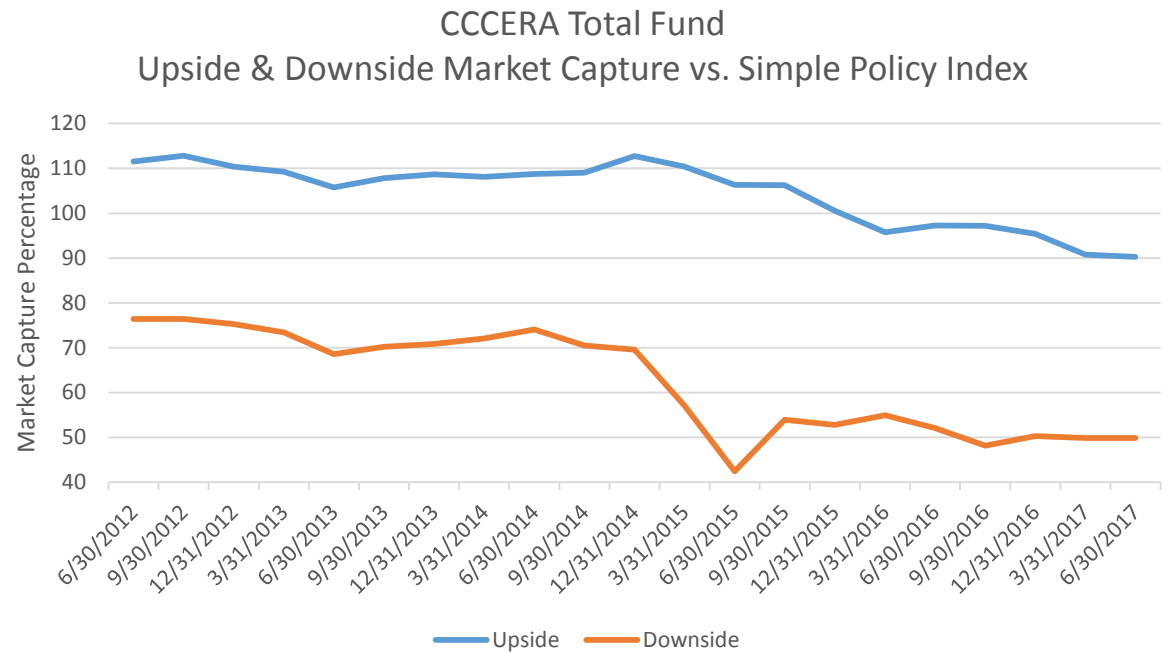
# Total Fund – Quarterly Attribution

- Simple attribution allows the trustees to put an individual quarter's performance into context, and show if short term results were driven by allocation or selection decisions.
- This exercise puts a periodic performance into context, but does not measure success.

	CCCERA Total Fund			Simple Policy Index			Analysis		
	Allocation	Return	Return Contribution	Allocation	Return	Return Contribution	Allocation Difference	Return Difference	Total Effect
Liquidity	19%	0.5%	0.1%	25%	0.3%	0.1%	-7%	0.2%	0.0%
Growth	76%	3.9%	3.0%	63%	4.3%	2.7%	13%	-0.4%	0.3%
Risk Diversifying	5%	3.0%	0.2%	12%	0.2%	0.0%	-7%	2.8%	0.1%
Total Fund	100%		3.2%	100%		2.8%	0%		0.4%

# Total Fund – Market Relative Performance

- Risk taken in CCCERA's portfolio, and the use of complex investment structures should allow CCCERA to capture more market upside, while limiting drawdowns (with drawdowns comes the potential to permanently impair long term capital)
- Measuring the upside and downside market capture of CCCERA's Total Fund provides an aggregated view of the success of the size and composition of the Liquidity, Growth, and Risk Diversifying Sub-portfolios

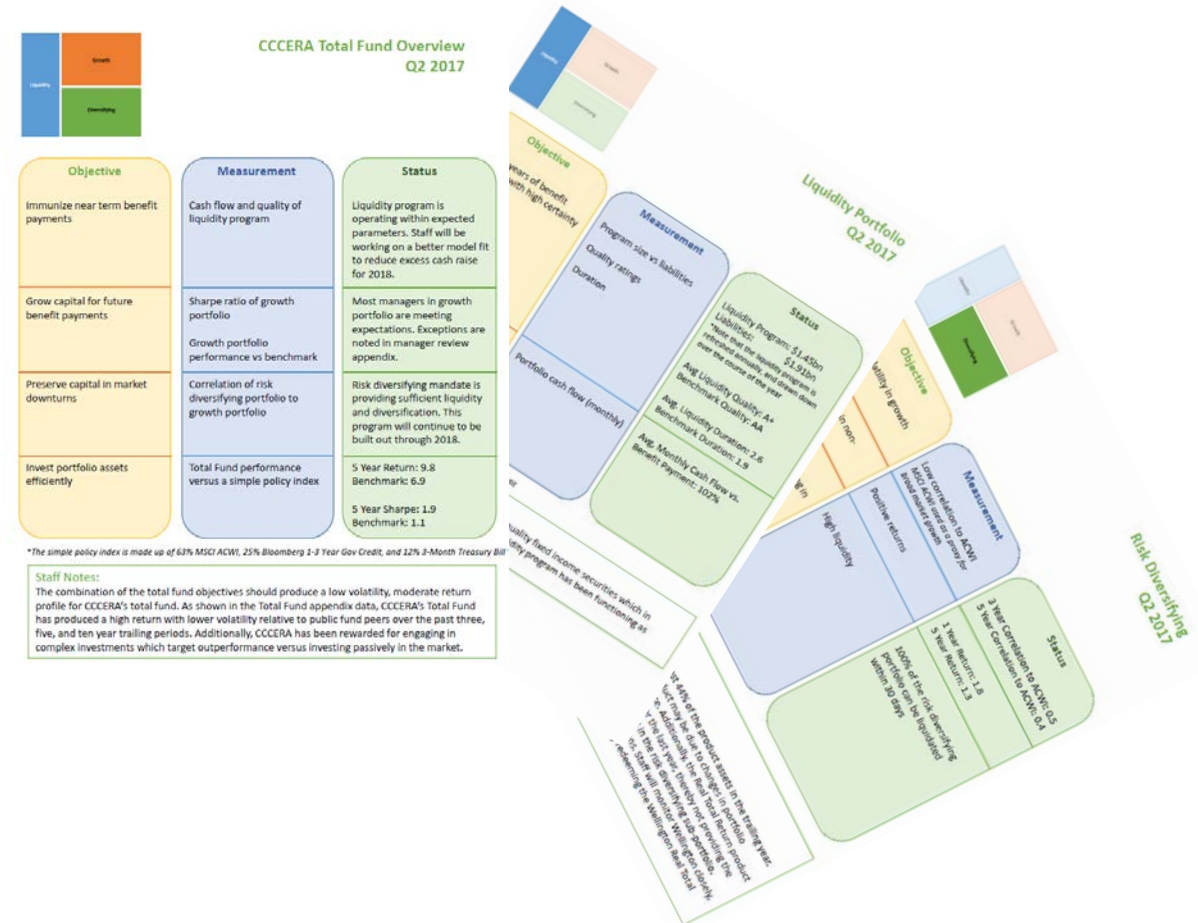


# Signal or Noise?

- While we will present staff reports quarterly to provide context to the Trustees when reviewing the quarterly investment performance report, many of these items need to be measured over longer time periods
- Each year, there will be a detailed presentation on the rationale, structure and performance of each sub-portfolio, including any suggested enhancements or changes

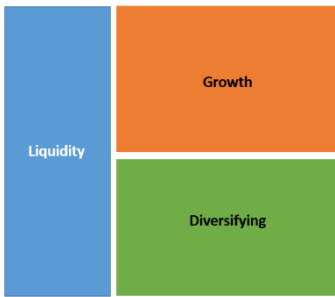
# Governance

- CCCERA Investment Staff is developing new reports which review the Sub-portfolios and evaluate progress towards their unique objectives
- The new reports will be presented to the Board quarterly, and allow for functionally-aligned portfolio oversight
- Examples of the new reports are included with today's presentation. A version of these reports will be presented starting with the first quarter of 2018



# CCCERA Total Fund Overview

## Q2 2017



Objective	Measurement	Status
Immunize near term benefit payments	Cash flow and quality of liquidity program	Liquidity program is operating within expected parameters. Staff will be working on a tailoring model fit to reduce excess cash raise for 2018.
Grow capital for future benefit payments	Sharpe ratio of growth portfolio  Growth portfolio performance vs benchmark	Most managers in growth portfolio are meeting expectations. Exceptions are noted in manager review appendix.
Preserve capital in market downturns	Correlation of risk diversifying portfolio to growth portfolio	Risk diversifying mandate is providing sufficient liquidity and diversification. This program will continue to be built out through 2018.
Invest portfolio assets efficiently	Total Fund performance versus a simple policy index	5 Year Return: 9.8 Benchmark: 6.9  5 Year Sharpe: 1.9 Benchmark: 1.1

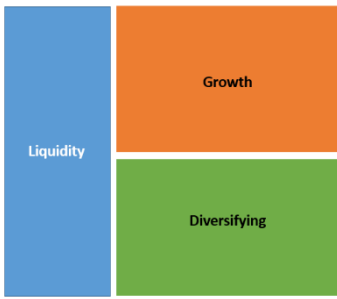
*\*The simple policy index is made up of 63% MSCI ACWI, 25% Bloomberg 1-3 Year Gov Credit, and 12% 3-Month Treasury Bill*

### Staff Notes:

The combination of the total fund objectives should produce a low volatility, moderate return profile for CCCERA's total fund. As shown in the Total Fund appendix data, CCCERA's Total Fund has produced a high return with lower volatility relative to public fund peers over the past three, five, and ten year trailing periods. Additionally, CCCERA has been rewarded for engaging in complex investments which target outperformance versus investing passively in the market.

# CCCERA Total Fund Overview

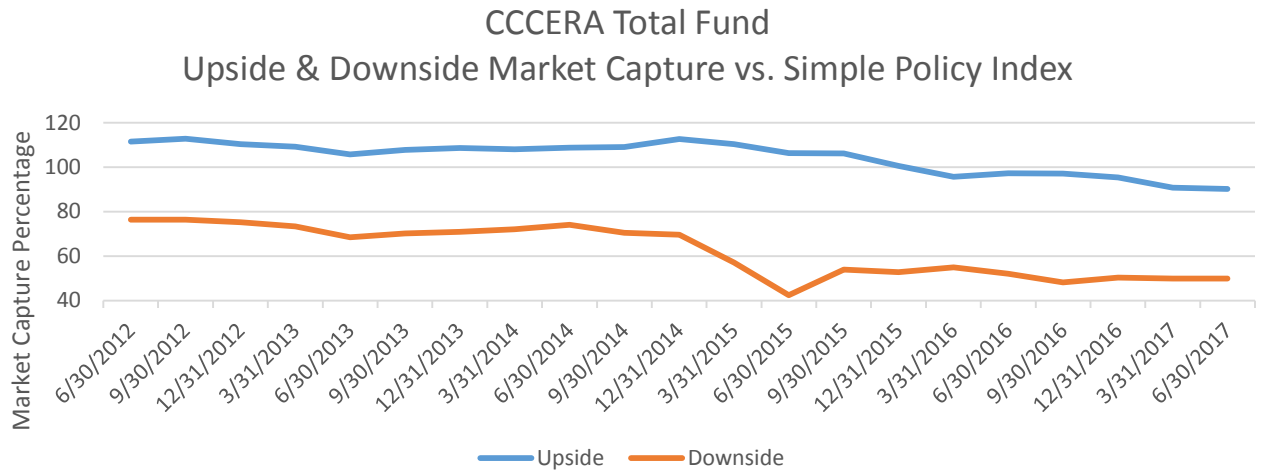
## Q2 2017



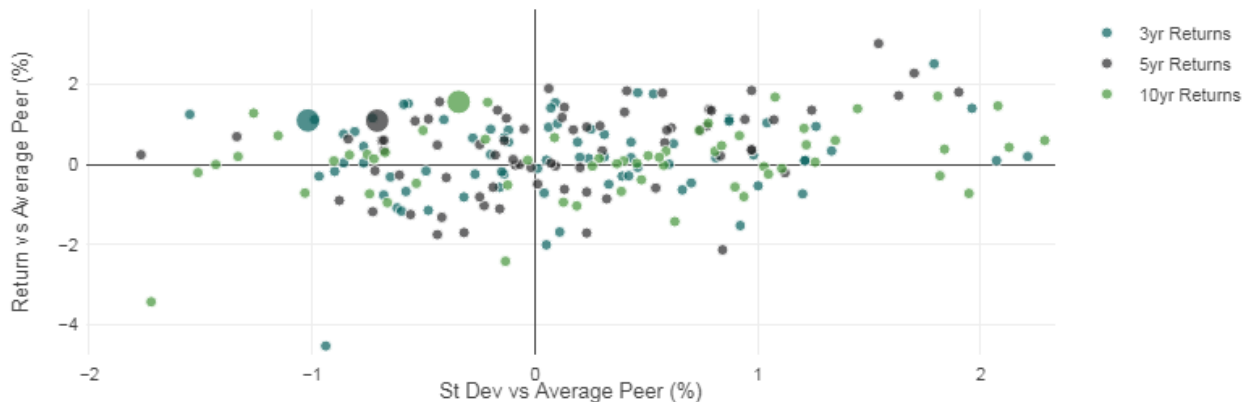
### Total Fund Quarterly Attribution:

	CCCERA Total Fund			Simple Policy Index			Analysis		
	Allocation	Return	Return Contribution	Allocation	Return	Return Contribution	Allocation Difference	Return Difference	Total Effect
Liquidity	19%	0.5%	0.1%	25%	0.3%	0.1%	-7%	0.2%	0.0%
Growth	76%	3.9%	3.0%	63%	4.3%	2.7%	13%	-0.4%	0.3%
Risk Diversifying	5%	3.0%	0.2%	12%	0.2%	0.0%	-7%	2.8%	0.1%
Total Fund	100%		3.2%	100%		2.8%	0%		0.4%

### Total Fund Upside/Downside Market Capture:



### Total Fund Long Term Risk/Reward vs Peers:





# Liquidity Portfolio Q2 2017

Objective	Measurement	Status
<p>Match 4 years of benefit payments with high certainty</p> <p>Produce cash flow to match monthly benefit payment</p>	<p>Program size vs liabilities</p> <p>Quality ratings</p> <p>Duration</p> <p>Portfolio cash flow (monthly)</p>	<p>Liquidity Program: \$1.45bn Liabilities: \$1.65bn *Note that the liquidity program is refreshed annually, and drawn down over the course of the year</p> <p>Avg Liquidity Quality: A+ Benchmark Quality: AA</p> <p>Avg. Liquidity Duration: 2.6 Benchmark Duration: 1.9</p> <p>Avg, Monthly Cash Flow vs. Benefit Payment: 102%</p>

*The benchmark index is the Bloomberg 1-3 Year Gov Credit*

### Staff Notes:

CCCERA's liquidity program consists of stable, high quality fixed income securities which in aggregate maintain a short duration posture. The liquidity program has been functioning as expected through the first nine months of the program.

# Growth Portfolio

## Q2 2017



### Objective

Growth of plan assets for future (years 5+) benefit payments

High risk adjusted returns

Avoid permanent impairment of capital

### Measurement

Absolute returns

Benchmark relative returns

Sharpe Ratios

### Status

5 Year Return:  
Benchmark Return:

10 Year Return:  
Benchmark Return:

5 Year Sharpe:  
Benchmark:

10 Year Sharpe:  
Benchmark:

*The benchmark index is the MSCI ACWI*

### Staff Notes:

Both Ceredex and Pyrford have underperformed relative to expectations. Jackson Square has had a material performance impact from their position in Valeant, while Ceredex follows a value discipline which has been out of favor. Additionally, Ceredex requires all holdings to pay a dividend, which has limited buying opportunities for the fund.

CCCERA's private market allocation is transitioning from a structure fund of funds to direct funds, which should increase absolute returns.

Staff has conducted on-sites with Pyrford, First Eagle, Artisan, PIMCO/RAE, and TT International in 2017.



# Risk Diversifying Q2 2017

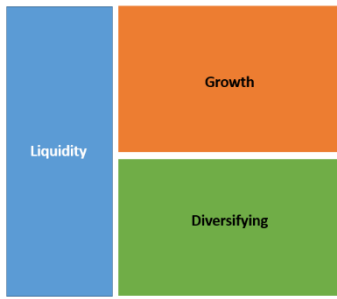


Objective	Measurement	Status
Offset volatility in growth portfolio	Low correlation to ACWI <i>MSCI ACWI used as a proxy for broad market growth</i>	3 Year Correlation to ACWI: 0.5 5 Year Correlation to ACWI: 0.4
Positive returns in non-stressed markets	Positive real returns	1 Year Return: 1.8 5 Year Return: 1.3
Provide liquidity for opportunistic re-balancing in market stress events	High liquidity	100% of the risk diversifying portfolio can be liquidated within 30 days

The benchmark index is the Bloomberg Barclays U.S. Treasury 1-5 Year Index.

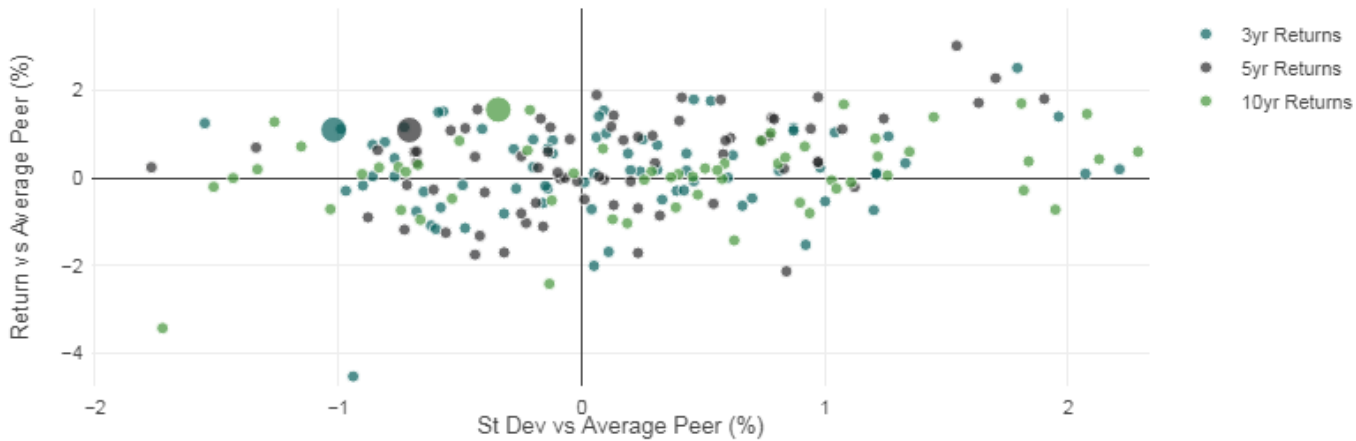
**Staff Notes:**

The Wellington Real Total Return portfolio has lost 44% of the product assets in the trailing year. This is concerning to Staff. Asset losses in the product may be due to changes in portfolio management personnel and/or product performance. Additionally, the Real Total Return product has had a high correlation to the growth portfolio over the last year, thereby not providing the diversification benefit generally desired from managers in the risk diversifying sub-portfolio. Longer term correlation is roughly in line with expectations. Staff will monitor Wellington closely, and may seek to fund new risk diversifying mandates by redeeming the Wellington Real Total Return Portfolio.



# CCCERA Total Fund Appendix Data

CCCERA Total Fund Risk Reward vs. Peers



CCCERA Total Fund Performance vs Simple Policy Index

	One Year		Three Years		Five Years		Ten Years	
	CCCERA	SPI	CCCERA	SPI	CCCERA	SPI	CCCERA	SPI
Return	11.5	11.7	6.3	3.4	9.8	6.9	6.7	3.4
Volatility	3.2	3.4	5.1	6.8	5.1	6.3	9.2	10.6
Sharpe	3.4	3.3	1.2	0.5	1.9	1.1	0.7	0.3

The simple policy index is made up of 63% MSCI ACWI, 25% Bloomberg 1-3 Year Gov Credit, and 12% 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 than 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 policy index over longer 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 per unit of volatility. Over longer trailing periods, the Total Fund has produced a high Sharpe ratio relative to the simple policy index, indicating that CCCERA is being favorably rewarded for the risk in the portfolio.

# Liquidity Portfolio

## Appendix Data



### Manager Reviews:

#### Organizational Stability

	Portfolio Management Assessment	1 Year Product Asset Growth	1 Year Firm Asset Growth	Regulatory Action in Last Year?
Insight	Good	--	8%	N
Sit	Good	22%	1%	N
DFA	Good	33%	25%	N

#### Performance

	Portfolio Average Credit Quality	Portfolio Average Duration	Portfolio Average Coupon	1 Year Total Return
Insight	A	1.38	4.49	--
Sit	AAA	2.42	6.67	0.0%
DFA	A	2.76	2.56	0.8%

### Manager Notes:

#### 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.

# Growth Portfolio

## Appendix Data



### 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	4%	17%	N
Jackson Square	Good	-18%	-18%	N
BlackRock Index Fund	Good	35%	16%	N
Emerald Advisors	Good	39%	21%	N
Ceredex	Good	-1%	0%	N
Pyrford (BMO)	Good	1%	2%	N
William Blair	Satisfactory	5%	10%	Y
First Eagle	Good	16%	16%	N
Artisan Global	Good	74%	15%	N
PIMCO/RAE EM	Good	39%	7%	N
TT EM	Good	210%	-12%	N
Adelante	Good	15%	-21%	N
Allianz	Good	26%	9%	N
Private Equity	Good	--	--	N
Private Credit	Satisfactory	--	--	N
Real Estate	Good	--	--	N

#### Performance

	Trailing 1 Year Return	Trailing 5 Year Return	Performance in Line with Expectations?
Boston Partners	20.9%	14.7%	Y
Jackson Square	18.3%	13.7%	N
BlackRock Index Fund	18.1%	14.7%	Y
Emerald Advisors	28.5%	17.2%	Y
Ceredex	12.7%	14.1%	N
Pyrford (BMO)	12.8%	8.6%	Y
William Blair	17.3%	9.3%	Y
First Eagle	12.1%	9.6%	Y
Artisan Global	25.9%	15.5%	Y
PIMCO/RAE EM	28.5%	5.0%	--
TT EM	29.8%	10.2%	--
Adelante	0.1%	9.8%	Y
Allianz	13.2%	5.5%	Y
	1Yr Premium	5 Year Premium	
Private Equity	-18.7%	2.2%	N
Private Credit	--	--	--
Real Estate	8.9%	3.0%	Y

# Growth Portfolio

## Appendix Data



### Manager Notes:

#### William Blair:

On August 8, 2017, Michelle Seitz, head of Investment Management, resigned from the firm and accepted a position with another firm. Ms. Seitz had been with William Blair for 22 years at the time of her departure. Stephanie Braming, who was previously a portfolio manager for CCCERA's International Growth portfolio was named head of William Blair Investment Management on October 16, 2017. Stephanie's responsibilities on the International Growth portfolio have been transferred to Ken McAtamney. Ken joined William Blair in 2005 and previously served as co-director of research, as well as mid-large cap Industrials and Healthcare analyst.

This past spring, William Blair reached a settlement with the SEC regarding a previously disclosed matter involving the William Blair Funds. This settlement, which included a fine of \$4.5 million, related to two items – payment errors and a disclosure matter. The issues noted in the SEC settlement did not affect CCCERA's investment in the International Growth portfolio.

### 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.

# Growth Portfolio

## Appendix Data



### Manager Theses (continued):

**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.

# Risk Diversifying Appendix Data



## Manager Reviews:

### Organizational Stability

	Portfolio Management Assessment	1 Year Product Asset Growth	1 Year Firm Asset Growth	Regulatory Action in Last Year?
AFL-CIO	Good	2%	2%	N
Wellington	Satisfactory	-44%	5%	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	0.49	-0.08	0.0%	2.5%	100%
Wellington	0.72	0.46	4.1%	-0.4%	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 appears to be focused on private equity investments and associated valuation practices and is not related to the CCCERA Real Total Return portfolio.

## Manager Theses:

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

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

**Wellington:** Multiple asset fund which tactically rotates between assets to produce returns.



**PERSPECTIVES  
THAT DRIVE  
ENTERPRISE  
SUCCESS**



**NOVEMBER 21, 2017**

Investment Risk Education

**Contra Costa Employees' Retirement Association**



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# Executive summary

- This session is dedicated to furthering our understanding and use of investment risk concepts and metrics.
- While CCCERA has included specific risk language into its investment policy statement, reporting, and analysis of asset allocation options, it can be further enhanced to improve future decision making.
- No action is required of the Board; today's session is for educational purposes and to form the foundation for further considerations.

# Introduction

# Scope: Investment risk

- This session focuses on investment risk concepts, definitions, and metrics.
- Investment risks are one of many risks facing a pension plan.
- Other risks outside of the scope of this presentation include:
  - Funding risk. Source of funding into the plan may be subject to their own economic uncertainties, which is partially addressed in the Enterprise Risk Tolerance but also includes other components outside of this analysis.
  - Operational risks at the investment managers, Staff, etc.
  - Counterparty risk. Particularly important in forwards contracts, etc.
  - Headline or Peer risk.
  - Political risk.
- Because the success of a pension plan relies on a plan sponsor, we are required to think critically about risk to ensure the burden on the sponsor is fair and appropriate while preserving intergenerational equality.

# Risk tolerance: Ability & willingness

Investment risk is the potential for loss accepted by an investor in order to earn a return

- Ability describes the amount of loss an investor can sustain over a given time horizon in pursuit of a desired return.
  - It should reflect a reasoned approach to assessing what could happen under a worst-case scenario and how the plan would respond to it.
- Willingness describes the amount of loss an investor is willing to sustain over a given time horizon in pursuit of a desired return.
  - It should be lower (i.e. less risky) than the level deemed appropriate by the Tolerance.

Investors accept risk to earn returns. But how much?...

Ability and Willingness help to frame this answer but are necessarily subjective concepts.

# Enterprise risk tolerance

# Credit ratings

- Moody’s assigned the County an issuer rating in the High Quality Investment Grade category and the County’s POBs fall within the Upper-Medium grade.
- S&P’s Issuer Credit Rating for the County is highest issued by the company and the POBs are rated just a notch below.
- Both firms assigned the County’s ratings a Stable outlook, which has been unchanged since 2007.

## COMMENTARY FROM MOODY’S:

### Strengths

- Large, diverse tax base.
- Strong resident wealth levels.
- Quick payout of general fund and lease obligations.

### Challenges

- Notable but manageable social service burden.
- Combined lease and pension obligation requirements which are the among the highest relative to similarly rated credits.
- Weak fiscal position relative to similarly rated credits.

	Moody’s	S&P
Issuer Rating	Aa2 (3 of 21)	AAA (1 of 22)
Pension Obligation Bonds	A1 (5 of 21)	AA+ (2 of 22)

City	Moody’s	S&P	Pension Funded Ratio	Outstanding POBs (000s)	County Revenue (000s)	POB to Revenue	Revenue as of FY
Alameda	Aaa	AA+	77.3%	\$198,891	\$2,773,769	7.2%	6/30/2016
Contra Costa	Aa2	AAA	84.5%	\$297,460	\$3,013,929	9.9%	6/30/2016
Los Angeles	Aa2	AA+	83.3%	-	\$22,556,352	-	6/30/2016
Orange	Aa1	AA	71.7%	-	\$2,159,500	-	9/30/2016
Sacramento	A2	A	87.3%	\$1,114,323	\$2,946,754	37.8%	6/30/2016
San Bernardino	Aa2	AA	81.9%	\$662,694	\$3,981,057	16.6%	6/30/2016
San Diego	Aaa	AAA	76.1%	\$649,860	\$4,316,100	15.1%	6/30/2016
Santa Clara	Aa2	AAA	80.6%	\$367,118	\$5,095,172	7.2%	6/30/2016

Sources: Contra Costa County CAFR FY 2016; Contra Costa County Debt Report FY 2016; each respective county’s CAFR FY 2016  
[https://www.moodys.com/research/Moodys-has-affirmed-Contra-Costa-Countys-CA-Aa2-Issuer-Rating--PR\\_266769](https://www.moodys.com/research/Moodys-has-affirmed-Contra-Costa-Countys-CA-Aa2-Issuer-Rating--PR_266769) as of February 20, 2013.

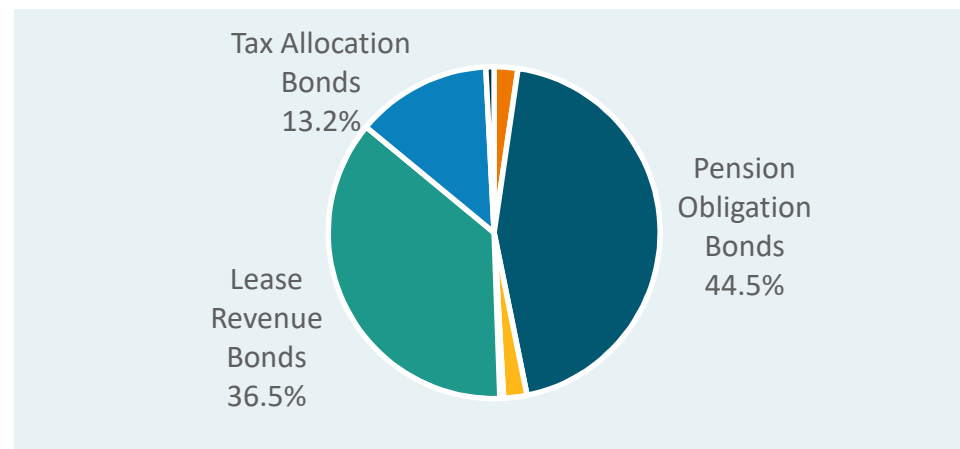
# Long-term obligations

- The county’s legal General Obligation bonded debt limit is 5% of the value of taxable property (taxable property is also commonly referred to as assessed value).
- The county’s assessed value is \$176 billion and the legal debt limit about \$8.8 billion.
- Total long-term debt obligations for the county is valued at \$668.3 million, well under the legal limit.
- Pension Obligation Bonds were issued in 2003 and will mature in 2022.

If necessary, the County has the capacity to issue POBs to meet contribution requirements or to fund the unfunded liability.

	Value (\$ Thousands)	Allocation (%)
Capital Lease Obligations	15,453	2.3%
Pension Obligation Bonds	297,460	44.5%
Retirement Litigation Settlement	15,128	2.3%
Notes Payable	2,093	0.3%
Other Bonds Payable	455	0.1%
Lease Revenue Bonds	244,058	36.5%
Tax Allocation Bonds	88,265	13.2%
Special Assessment Debt	5,375	0.8%
<b>Total</b>	<b>668,287</b>	<b>100.0%</b>

ALLOCATION OF OUTSTANDING DEBT (%)



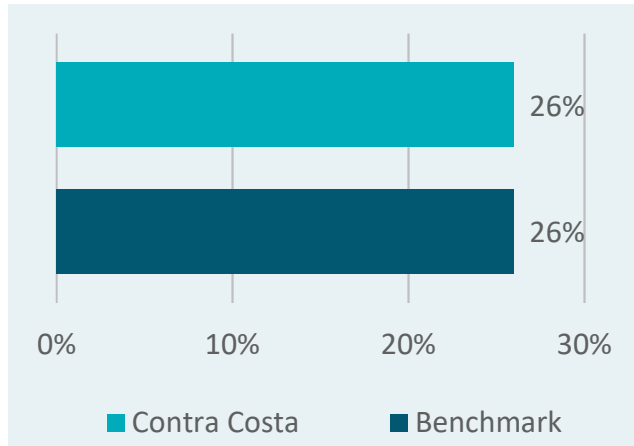
Source: Contra Costa County CAFR FY 2016



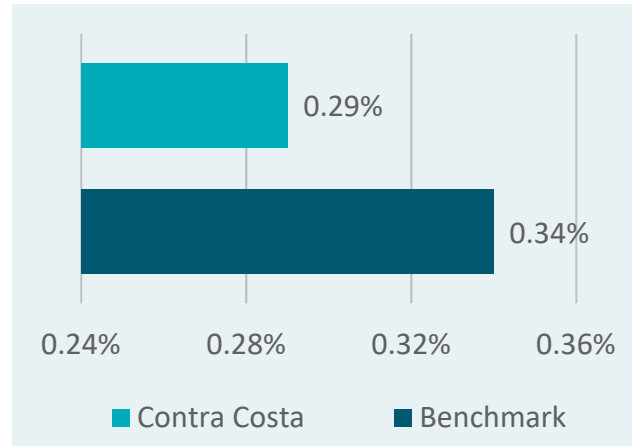
# Debt ratios

- Contra Costa’s debt is 26% of governmental revenues, which is in line with the median Large Urban California County.
- Total debt is 0.29% of the County’s assessed value (taxable property), well below the legal limit of 5% and slightly below the median Large Urban California County.
- Debt payments to General Fund Revenue is 4.8%, which is a higher ratio relative to the benchmark.

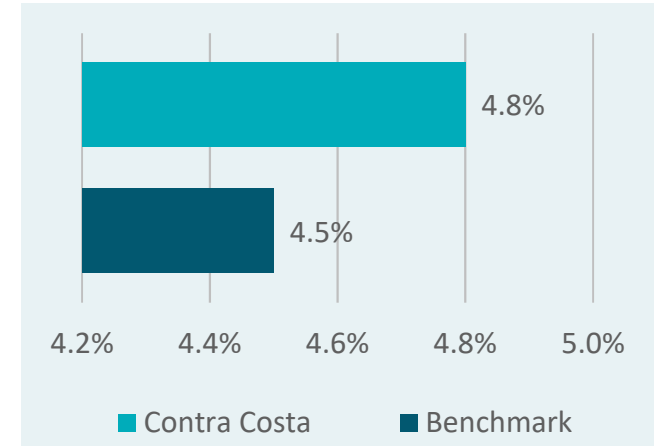
DEBT TO GOVERNMENTAL REVENUES (%)



DEBT TO ASSESSED VALUE (%)



DEBT PAYMENT TO GENERAL FUND REVENUE (%)



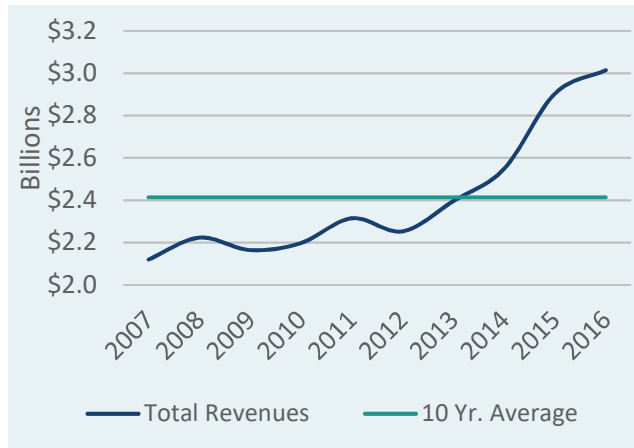
Sources: Contra Costa County Debt Report FY 2016

Benchmark: MDA’s Large Urban California County Median, Montague DeRose and Associates (MDA) is the County’s financial advisor and compiles a database for these measures.

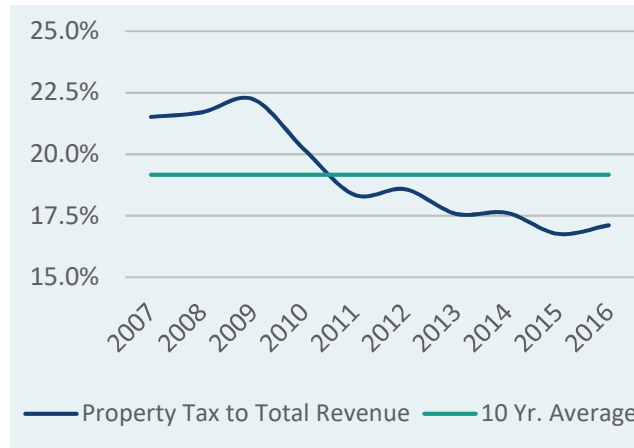
# Revenues

- County revenues have been increasing since 2007 and are significantly above the 10 year average.
- Property Tax Revenue is a stable source of income and has averaged about 19% of the County’s revenues over the last 10 years.
- Non-Tax revenue is a less stable income source that includes grants, intra-governmental contributions, and investment earnings.
- Non-Tax revenues make up about 37% of all revenues and have been declining as a share of total revenue since 2007.

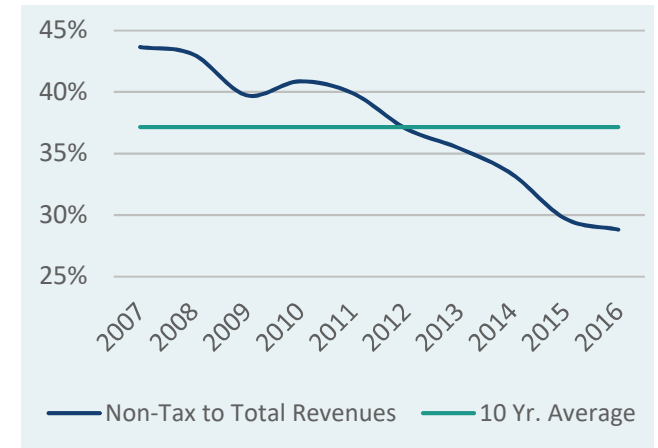
**TOTAL COUNTY REVENUES (\$)**



**PROPERTY TAX TO TOTAL REVENUES (%)**



**NON-TAX TO TOTAL REVENUES (%)**

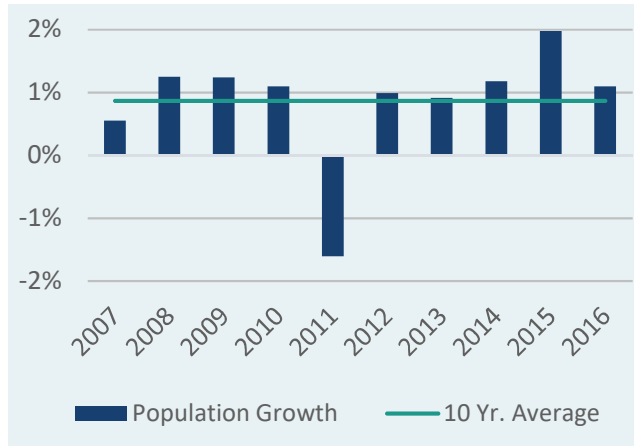


Source: Contra Costa County CAFRs FY 2016 – FY 2008

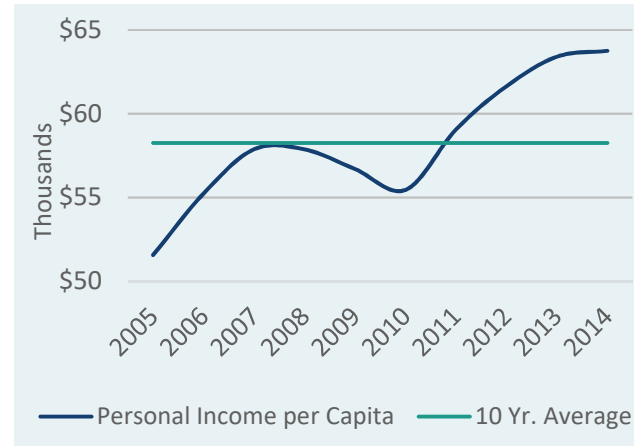
# Economic & demographic statistics

- Population growth has been relatively stable over the last 10 years averaging about 0.9%. The only year the county experienced negative population growth over that time frame was in 2011.
- Personal income per capital has been trending upwards and is currently significantly above the 10 year average.
- The unemployment rate has improved from the highs between 2009-2011 and is currently at 4.9%, well below the 10 year average.

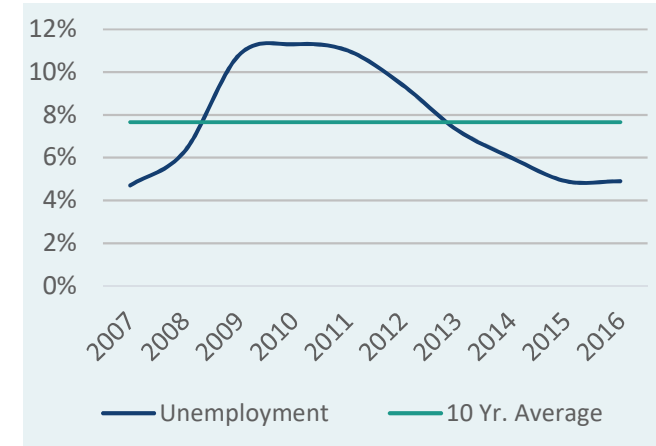
**POPULATION GROWTH (%)**



**PERSONAL INCOME PER CAPITA (\$)**



**UNEMPLOYMENT RATE (%)**

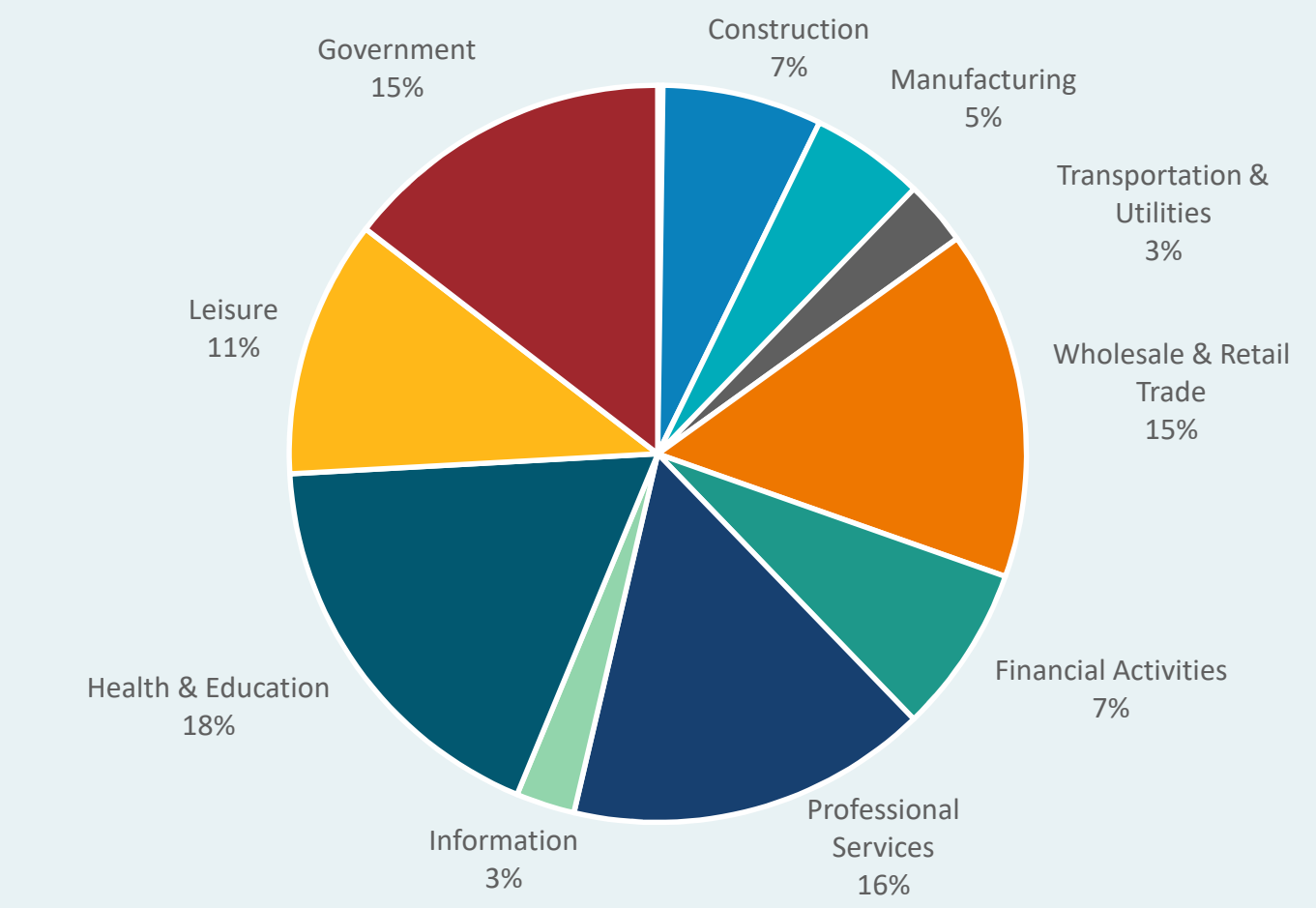


Source: Contra Costa County CAFRs FY 2016 – FY 2008

Note: personal income per capita not reported for FY 2015 and FY 2016

# Employment

EMPLOYMENT BY INDUSTRY (2015)



CCCERA has a diverse employment base.

The largest industry, Health and Education, accounts for 17.9% of county-wide employment.

Source: Contra Costa County Economic Forecast, [http://www.dot.ca.gov/hq/tpp/offices/eab/index\\_files/2016/ContraCosta2016.pdf](http://www.dot.ca.gov/hq/tpp/offices/eab/index_files/2016/ContraCosta2016.pdf)

# Summary

## Overall, Contra Costa County enjoys favorable financial and economic conditions

- The County's credit ratings from Moody's and S&P are high and stable.
- Long-Term debt obligations are well under the legal limit.
- Total Debt is about 1/4 of governmental revenue, which indicates good coverage.
- County revenues have steadily increased and did not experience a large setback following the financial crisis.
- Improving unemployment rates, stable population growth, and a diverse employment base imply a stable tax base.

# Terminology

# What is risk?

- Uncertainty. This does not mean we cannot manage risk. This means we believe there are a range of events that can happen in the future and we cannot say with certainty what will happen.
  - Investing requires the taking of positions that will be affected by future developments
  - The existence of negative possibilities surrounding those future developments presents risk
  - Intelligent investors pursue prospective returns that they think will compensate them for bearing the risk of negative future developments
- The future should not be viewed as a fixed outcome, but as a range of possibilities. The range of possibilities should be informed on the basis of insight into their respective likelihoods, as a probability distribution.

Institutions can build better portfolios if they understand the risks they are taking and ensure they are being properly compensated for those risks

# Volatility and correlation

**Definition:** Volatility is the standard deviation of returns. Standard deviation (SD) is the square root of the average squared deviation of the returns from its mean. Correlation measures the interdependence of returns and ranges from negative 1 to positive 1.

**Metrics:** *Historical* volatility is calculated with return series using the formula:

$$SD = \sqrt{\frac{\sum(x - \bar{x})^2}{n}}$$

*Implied* volatility is calculated using options pricing formulas applied to actual options prices.

**Interpretation:** Statistically, assuming normally distributed returns, 67% of returns fall within 1 SD of the average. Similarly, 95% of returns fall within 2 SDs. Implied volatility reflects current market expectations of near-term volatility. These measures help to set realistic expectations under normal market conditions.

**Limitations:** SD assumes normally distributed returns. Returns are similar to but different than normally distributed yielding SD as a less effective measure for drawdown or tail-risk analysis.

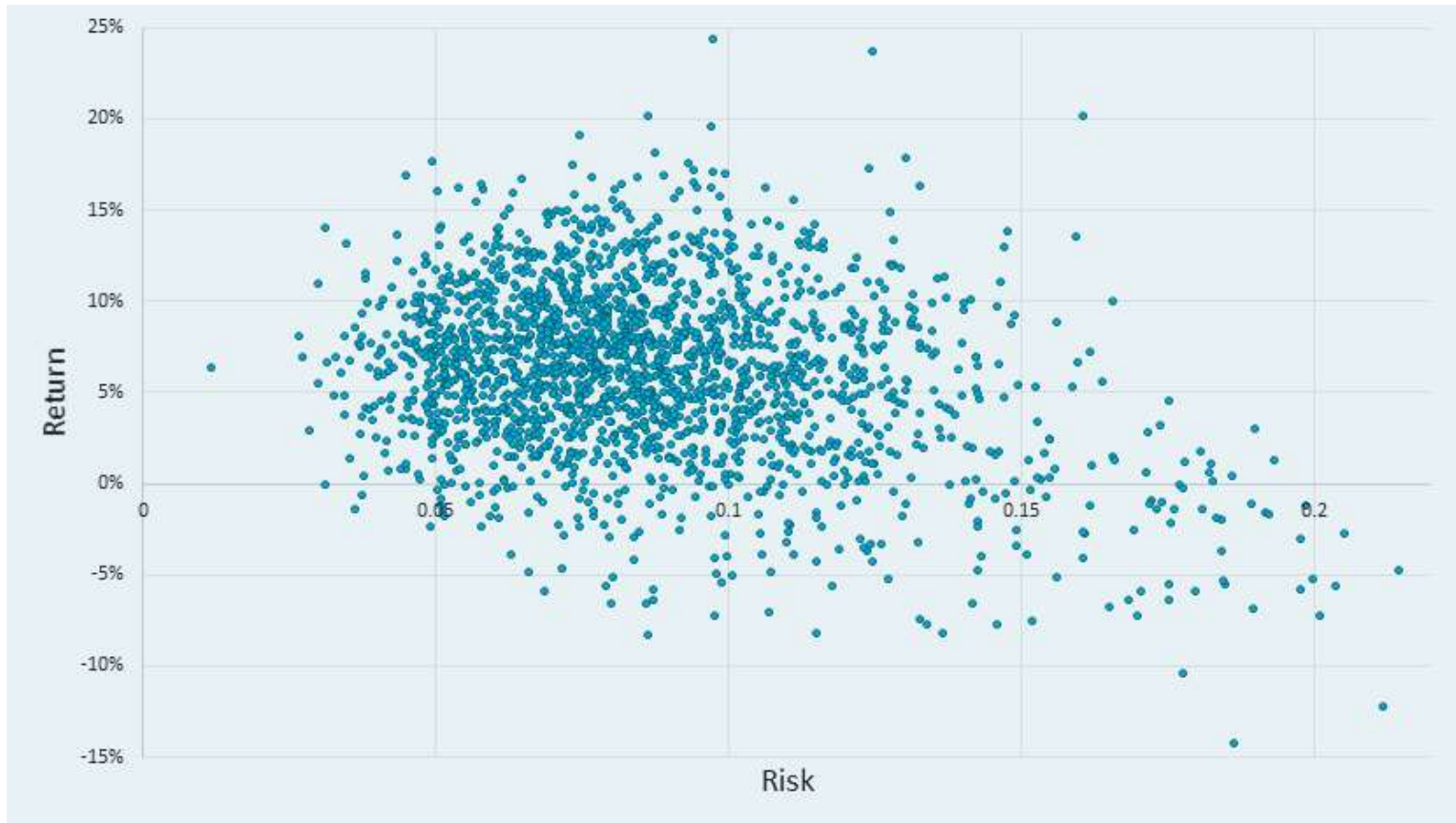
Historical volatility is a backward-looking metric that can differ significantly from future results.

Implied volatility is a coincident indicator reflecting current market conditions, which can change quickly.



# Risk / return simulated results

60/20/10/7/3 – GLOBAL EQUITY/US CORE BONDS/HF/REAL ESTATE/COMMODITIES



The same asset allocation, simulated thousands of times to generate possible outcomes.

Even within the area of concentration, results vary considerably.

Source: MPI, Verus

# Volatility examples

**Example #1.** Volatility of a single stock over a 1-yr time period.



**Example #2.** Volatility of a single stock over 10 years with benefit payments



# Volatility with correlation example

**Example #3.** Volatility and correlations of a three-asset portfolio over a 1-yr time period.



# Active risk

**Definition:** Volatility can be measured in absolute or relative terms. Absolute risk looks at the volatility as demonstrated in the previous examples. Active risk measures the volatility of an investment strategy versus its benchmark. The manager of the strategy is actively deciding how to deviate from the benchmark in order to outperform it.

**Metrics:** Active risk is commonly measured as Tracking Error using the formula:

$$TE = \sqrt{\frac{\sum(R_p - R_{BM})^2}{N - 1}}$$

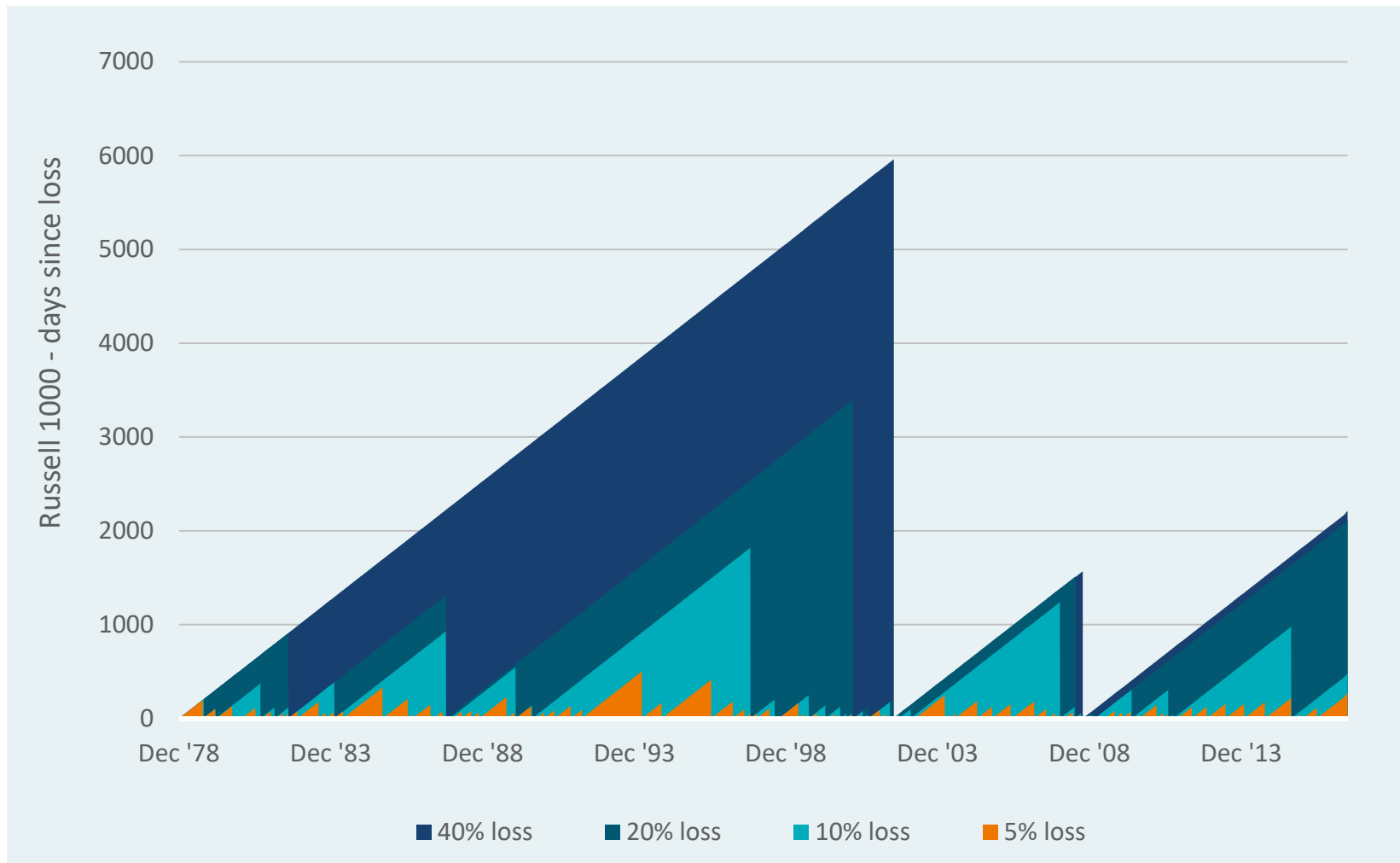
**Interpretation:** Active management may seek to outperform a passively managed benchmark by simply increasing the volatility of the strategy. Investors do not necessarily benefit from higher returns, though, particularly during market corrections. Active risk solves this problem by measuring the increased or decreased risk that the strategy is undertaking relative to the passively managed benchmark so that investors may determine whether the active management is truly creating value or just increasing volatility.

**Limitations:** Tracking error may be indicative of an investment manager purposefully increasing or decreasing volatility given market conditions. It is best to consider tracking error over various timeframes and market environments to determine whether the manager is skilled at increasing or decreasing risk at the appropriate times.

# Drawdown & tail-risk

- Definition:** Drawdown is a measure of both returns and time over which an investment experienced a decline in value from a peak to a trough. It is based on actual historical results. Tail-risk measures both the probability and expected returns of a significant loss. When assuming normally distributed returns, tail-risk is the left tail of the return distribution.
- Metrics:** Drawdown is typically measured in percentage terms with notation of when the drawdown occurred. The recovery period from the drawdown is also frequently provided.
- Tail-risk can be approximated with drawdown for actual results. It may also be modeled with statistical tools to determine the Value-at-Risk (VaR) and Conditional Value-at-Risk (CVaR).
- Verus leverages historic scenarios in BarraOne to measure tail risk. These historic scenarios simulate current portfolio positions through actual market movements that occurred.
- Interpretation:** Both measures attempt to quantify worst-case scenarios when normal market conditions do not prevail. Because actual historical returns are not normally distributed, these metrics show how investments behave under extreme conditions.
- Limitations:** Drawdown metrics capture results from the past. Exact historical conditions do not repeat exactly, so future results may be better or worse than drawdown metrics would show. Additionally, recovery periods from a drawdown should be expected to vary significantly.

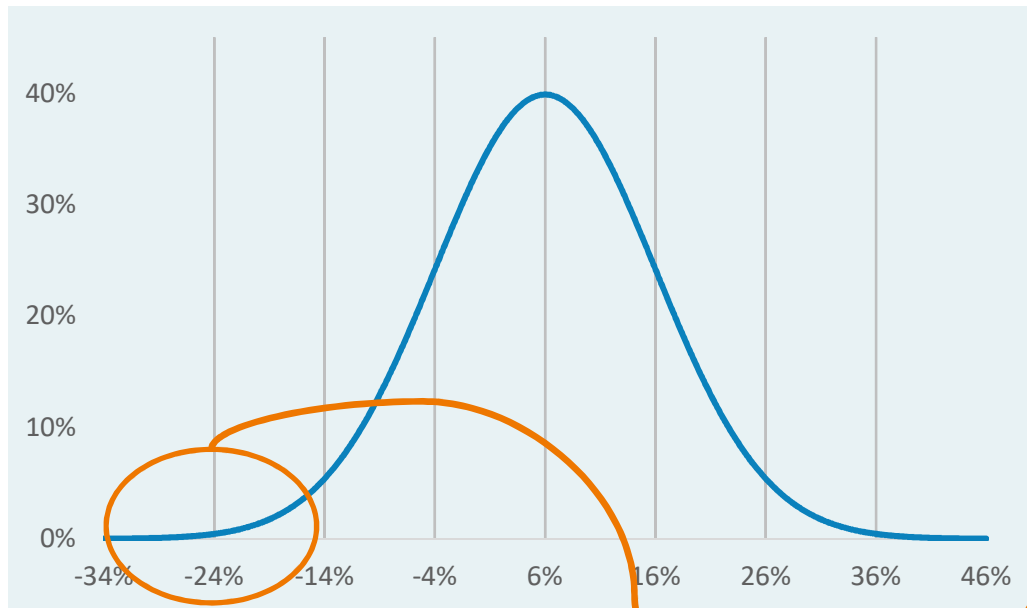
# Drawdown experience



Market surprises are normal and in most cases should not affect long-term portfolio planning

Source: Bloomberg

# Tail-risk concept

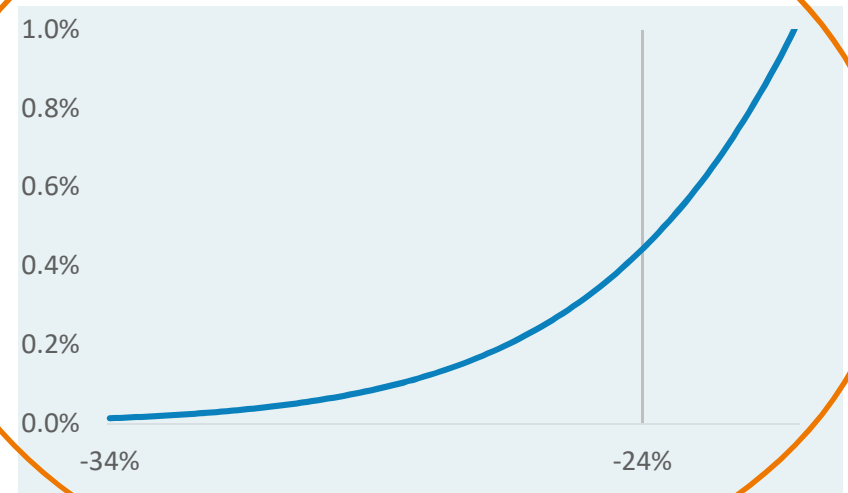


1. Robust datasets can illustrate the statistical characteristics of returns.

The Normal distribution is characterized by the mean and standard deviation.

2. But even with robust datasets, experiences in the tails, particularly the left tail, are infrequent.

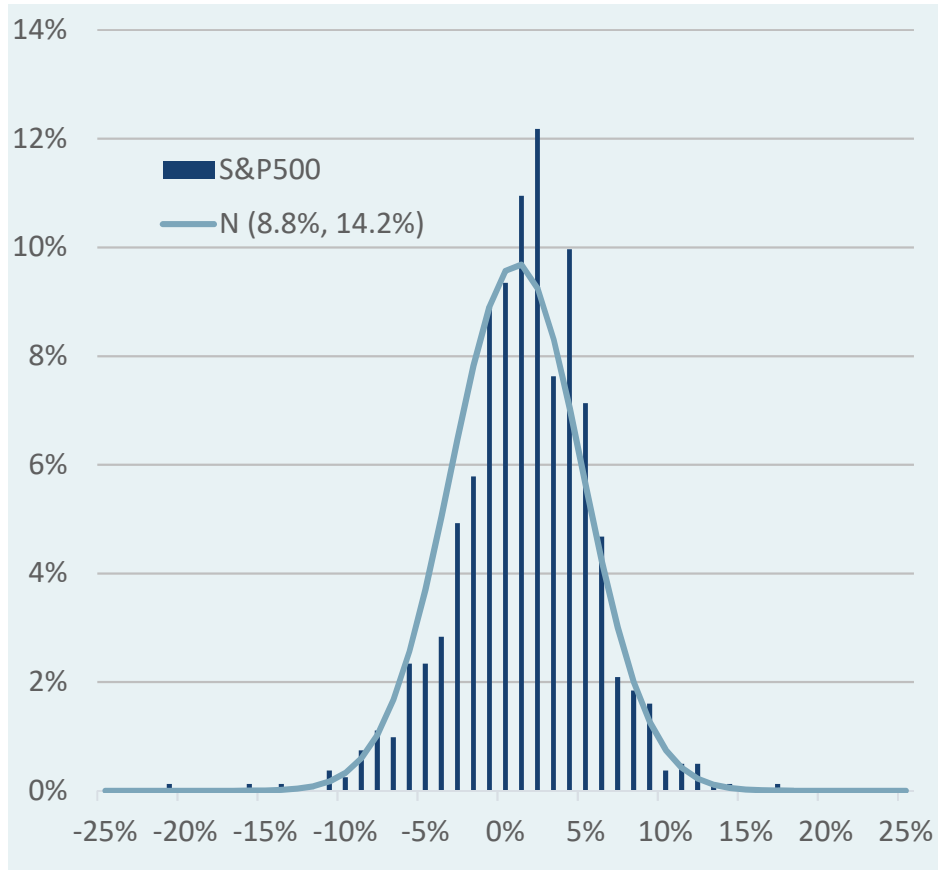
Characterizing behavior in the left tail is difficult without significant samples to analyze.



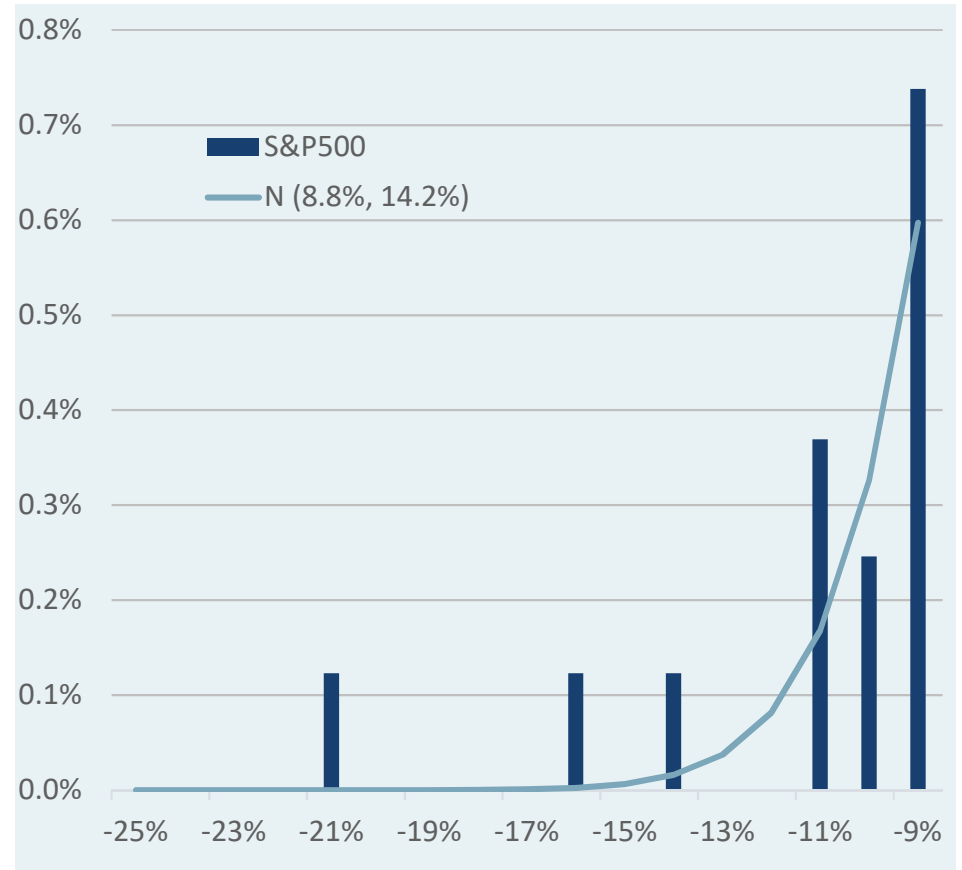
# Returns data

Distribution of S&P500 monthly returns from 1950 to October 1, 2017

FULL DISTRIBUTION OF RETURNS VS. NORMAL



LEFT-TAIL RETURNS VS. NORMAL



Source: Yahoo! Finance



# Liquidity

- Definition:** Liquidity is the ability to buy or sell an asset. It is compromised of both the time required to complete the transaction and the impact that the transaction has on the price of the asset.
- Metrics:** Liquidity is measured in a wide variety of ways across individuals securities, mutual funds, bank holdings, and portfolios. VaR and CVaR are commonly used to measure liquidity in the near term (less than 90 days), while other metrics measure the volume of securities being traded daily, breadth of market participants, relative size of trades versus the total market, and many others.
- Interpretation:** Liquidity metrics are best used to answer specific questions about a portfolio. For a pension plan, the ability to make monthly payments and satisfy capital calls are the primary concerns and must be weighed against expected contributions and investment income.
- Limitations:** Liquidity conditions can and do change rapidly. Conditions are built upon the markets' participants expectations about the other market participants' expectations. During time of duress, participants can grow fearful and expect others to also grow fearful thus creating a liquidity crunch.
- During a liquidity crunch, providers of liquidity can be very helpful to restore normal conditions and generate material returns for doing so.

# Factors & premia

**Definition:** Factors are fundamental drivers of investment returns. Factors can be identified through regression analysis of individual strategy or portfolio-level returns against characteristics in the markets. Factors that demonstrate consistent outperformance relative to others are described as having a premium.

**Metrics:** Thousands of factors have been analyzed with varying levels of efficacy. At the total portfolio level, the most important factors tend to be: equity, currency, credit, rates, and inflation.

Small cap (size), value, and growth investing are common examples.

Within asset classes, investment strategies, and securities, other factors may be more significant.

**Interpretation:** Factor exposures tend to be more stable modeling inputs throughout market cycles than those used in traditional mean-variance analysis (returns, standard deviations, and correlations). This stability provides improved characteristics with which to model portfolios to achieve desired results. Factors are not typically used in optimization models.

Factor exposures break apart asset classes for an improved view of what drives portfolio results. Investment managers bundle factors into their strategies; factor analysis disentangles them.

**Limitations:** Factors and premia are occasionally mis-interpreted to provide forward looking insight into a portfolio. Premia have historically cycled between highs and lows within bands, but this does not allow them to be timed easily. The true benefit of factors and premia is greater diversification in portfolios to address inherent weaknesses of mean-variance analysis.

# Factors & premia: MPT

- Modern Portfolio Theory describes investment returns using a single factor, beta:

$$r_i = \alpha_i + \beta_i(r_m - r_f) + r_f$$

$r_i$  = Return on investment strategy i

$r_f$  = Risk-free rate of return

$r_m$  = Return of the market

$\beta_i$  = Beta of investment strategy i

$\alpha_i$  = Alpha of investment strategy i

- Beta represents the multiplier between the excess returns of the market ( $r_m - r_f$ ) and the returns for the investment after taking into account the risk-free rate.
- When Beta and the risk-free rate do not account for the actual return of the investment, alpha fills the gap.
- Beta can be interpreted as the ratio of the volatility of the strategy over the market times the correlation between the market and the strategy

# Factors & premia: Multi-factor models

- Multi-factor models describe investment returns using multiple betas:

$$r_i = \alpha_i + \beta_{i_1}(F_1) + \beta_{i_2}(F_2) + \dots + \beta_{i_n}(F_n)$$

$r_i$  = Return on investment strategy i

$\beta_{i_n}$  = Betas of investment strategy i

$F_n$  = Factors relevant to describing returns of investment strategy i

$\alpha_i$  = Alpha of investment strategy i

- Betas represents the multipliers between the factors and the returns for the investment.
- When Beta and the factors do not account for the actual return of the investment, alpha fills the gap.

# Factors & premia: Verus factors

- Verus' risk dashboards at the total plan level focus principally on 5 factors:

$$r_P = \alpha_P + X_I(F_{\text{inflation}}) + X_R(F_{\text{Rates}}) + X_C(F_{\text{Credit}}) + X_E(F_{\text{Equity}}) + X_{FX}(F_{\text{Currency}})$$

- The corresponding exposures ( $X_n$ ) are monitored via the risk dashboard and communication report.
- Desired exposure to each factor is dependent on plan circumstances, the market environment, and historical support for premia associated with the factor.

# Factors & premia: From returns to risk

- Portfolio volatility can be determined by the exposure to the factors

$$\sigma_P = \sum_n X_n \sigma(F_n) \rho(F_n, P)$$

$\sigma_p$  = Standard deviation of the portfolio

$X_n$  = Exposure to factor n

$\sigma(F_n)$  = Standard deviation of factor n

$\rho(F_n, R)$  = Correlation between factor n with the portfolio, P

- The 5 factors are use to identify the principal sources of investment risk.
- Because the plan has a limited ability to accept risk, it is important to know the total plan level risk and how much each factor is contributing or detracting from it.

# Investment policy statement

# CCCERA IPS: Investment philosophy

— Sections 4, 5, 6, and 7 of the CCCERA Investment Policy Statement address the Plan’s investment philosophy, investment objectives, investment strategy, and risk philosophy.

— Section 4, the Plan’s Investment Philosophy, covers the following topics explicitly:

- Plan objectives should guide all decision making
- Asset allocation drives portfolio volatility and returns
- Short-term investing
- Long-term investing
- Fees

Each topic in Section 4 contains important elements to manage investment risks.

The focus is primarily at the total plan level and its relationship to the plan sponsor and its participants.



# CCCERA IPS: Investment objectives

— Section 5, Investment Objectives, further addresses:

- Liquidity
- Long-term growth of assets; and
- Protection of capital

— Liquidity is explicitly called out to provide for benefit payments to participants.

— Protection of capital makes note of inflation and market volatility specific risks.

# CCCERA IPS: Investment strategy

— Section 6, Investment Strategy, provides detail around the FFP construct including:

- **Asset Allocation.** This section recognizes the relationship between actuarial liabilities, liquidity needs, risk tolerance and the risk/return characteristics of various asset classes.
- **Liquidity Sub-Portfolio.** This section describes liquidity needs in terms of months of benefit payments (between 24 and 48 months) and notes the importance of preserving capital.
- **Growth Sub-Portfolio.** This section describes the ability to accept higher levels of risk and lower liquidity in order to achieve higher returns.
- **Diversifying Sub-Portfolio.** This section discusses the lower correlation to the Growth Sub-Portfolio, dampening effect on the total Plan's level of risk, and liquidity during market stress.
- **Investment Strategy Attributes.** This section notes that each investment strategy will be considered on its own investment merits as well as its contribution to the overall risk and return characteristics of the Plan.

# CCCERA IPS: Risk philosophy

— Section 7 articulates the Plan’s risk philosophy:

- This section specifically identifies volatility and drawdown risks while noting the myriad of other risks facing the Plan.
- Includes the sentence “The goal in managing investment risk is to ensure that an acceptable level of risk is being taken at the total Plan portfolio level.”
- Discusses the role of each sub-portfolio in mitigating investment risks

# Measuring investment risks

# Introduction

Many of the concepts and metrics discussed are regularly calculated for CCCERA's investment program.

The following pages draw from the reports to show where each can be found.

# Volatility and beta

The quarterly performance report includes a risk analysis page (pg. 9 of the 2Q17 report)

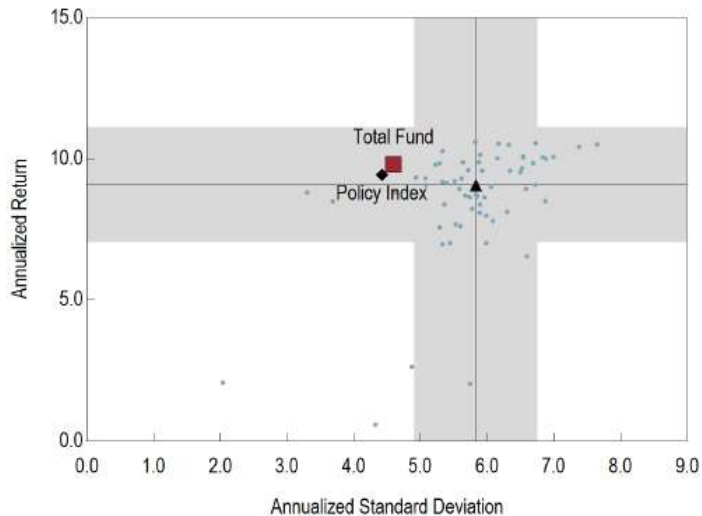
Total Fund  
Risk Analysis - 5 Years (Gross of Fees) Period Ending: June 30, 2017

Realized  
Volatility

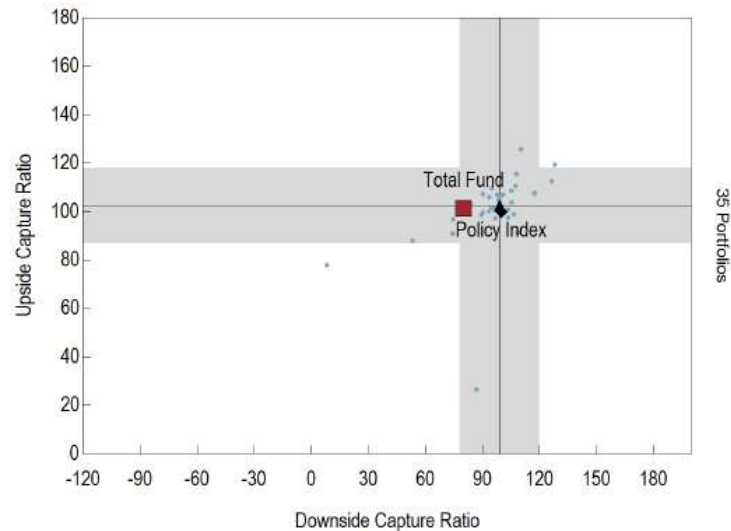
Beta and  
Tracking Error

	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
Total Fund	9.79%	0.37%	4.60%	0.29%	1.01	1.11%	0.94	2.09	0.33	101.55%	80.15%

Risk vs. Return



Up Markets vs. Down Markets



# Liquidity

Liquidity is measured as the market value of the liquidity sub-portfolio, which is also found in the quarterly performance report

Period Ending: June 30, 2017

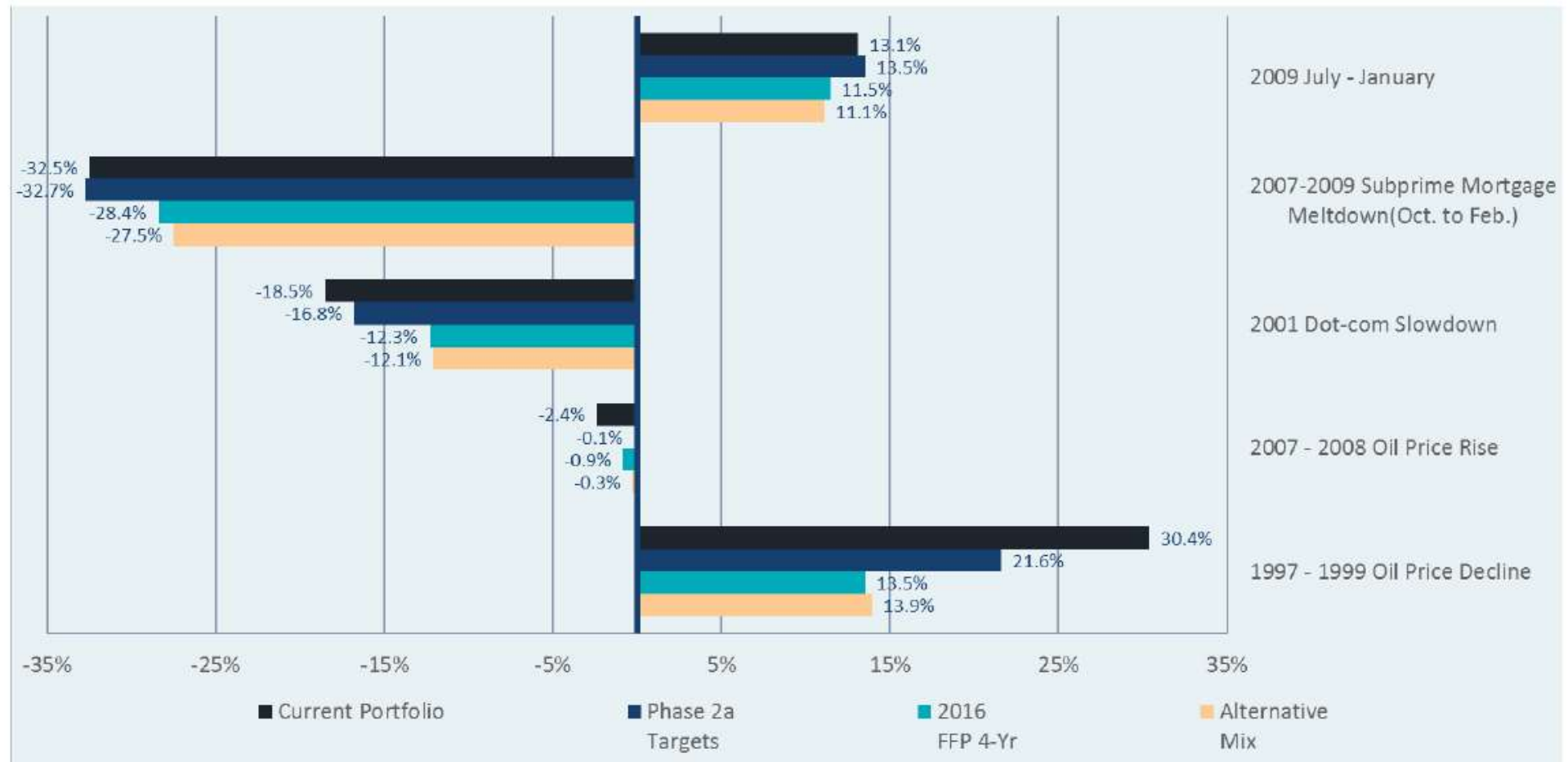
Total Fund Performance Summary (Gross of Fees)														
	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2016	2015	2014	2013	2012	
<b>Liquidity</b>	<b>1,447,152,352</b>	<b>18.4</b>	<b>0.6</b>	<b>1.1</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	
<i>BBgBarc US Govt/Credit 1-3 Yr. TR</i>			0.3	0.7	--	--	--	--	--	--	--	--	--	
<i>eA US Short Duration Fixed Inc Gross Rank</i>			43	51	--	--	--	--	--	--	--	--	--	
<b>DFA Short Credit</b>	<b>331,963,392</b>	<b>4.2</b>	<b>0.8</b>	<b>1.5</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	
<i>BBgBarc US Govt/Credit 1-3 Yr. TR</i>			0.3	0.7	--	--	--	--	--	--	--	--	--	
<i>eA US Short Duration Fixed Inc Gross Rank</i>			13	15	--	--	--	--	--	--	--	--	--	
<b>Insight Short Duration</b>	<b>683,956,060</b>	<b>8.7</b>	<b>0.5</b>	<b>1.0</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	
<i>BBgBarc US Govt/Credit 1-3 Yr. TR</i>			0.3	0.7	--	--	--	--	--	--	--	--	--	
<i>eA US Short Duration Fixed Inc Gross Rank</i>			49	55	--	--	--	--	--	--	--	--	--	
<b>Sit Short Duration</b>	<b>431,232,900</b>	<b>5.5</b>	<b>0.4</b>	<b>0.7</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	
<i>BBgBarc US Govt 1-3 Yr TR</i>			0.2	0.5	--	--	--	--	--	--	--	--	--	
<i>eA US Short Duration Fixed Inc Gross Rank</i>			73	88	--	--	--	--	--	--	--	--	--	
<b>Total Cash</b>	<b>130,051,297</b>	<b>1.7</b>	<b>0.2</b>	<b>0.4</b>	<b>1.1</b>	<b>0.5</b>	<b>2.8</b>	<b>--</b>	<b>0.9</b>	<b>0.1</b>	<b>-3.0</b>	<b>8.8</b>	<b>--</b>	
<i>91 Day T-Bills</i>			0.2	0.4	0.5	0.2	0.2	--	0.3	0.0	0.0	0.0	--	
<b>Cash</b>	<b>130,051,297</b>	<b>1.7</b>	<b>0.2</b>	<b>0.4</b>	<b>1.1</b>	<b>0.5</b>	<b>2.9</b>	<b>3.5</b>	<b>0.9</b>	<b>0.1</b>	<b>1.4</b>	<b>4.5</b>	<b>14.9</b>	

Liquidity

# Drawdown

Historical scenario analysis and stress testing is included in the annual asset allocation review

## TAIL RISK – SCENARIO ANALYSIS





# Correlations

The correlation matrix is also included in the annual asset allocation review

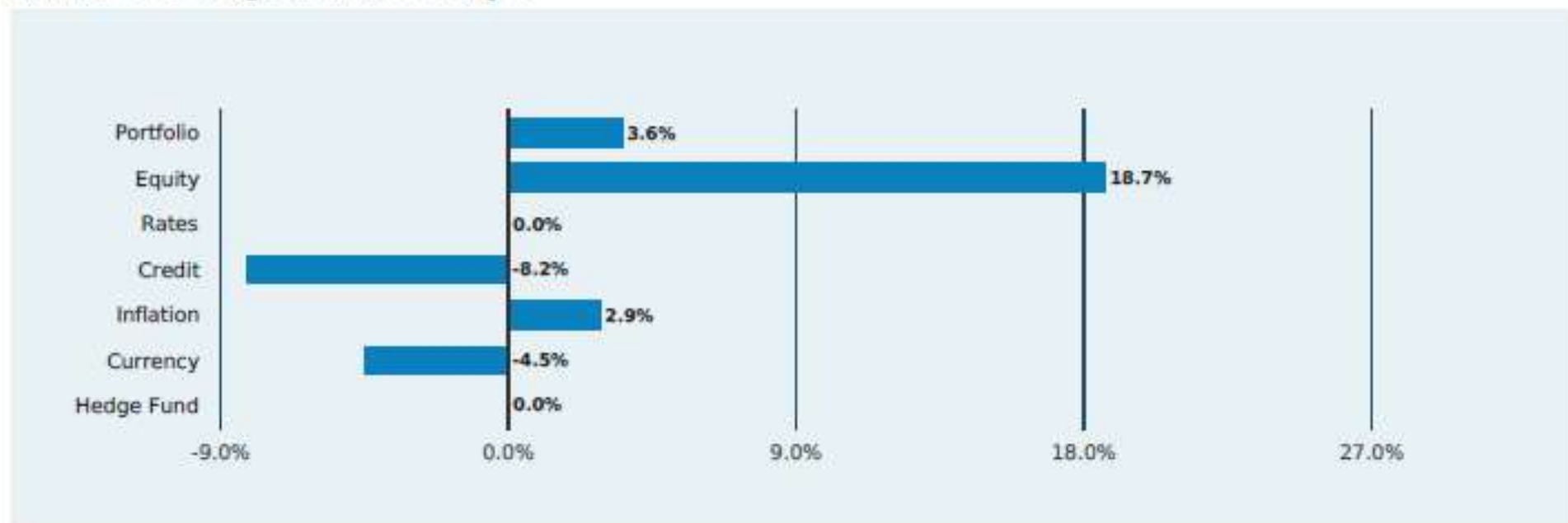
	Cash	US Large	US Small	Developed Large	Developed Small	EM	Global Equity	PE	US TIPS	US Treasury	Global Sovereign ex US	US Core	US Core Plus	Short-Term Govt/Credit	Short-Term Credit	Long-Term Credit	US HY	Bank Loans	Global Credit	EMD USD	EMD Local	Commodities	Hedge Funds	Real Estate	REITs	Risk Parity	Inflation	
Cash	1.0																											
US Large	-0.2	1.0																										
US Small	-0.2	0.9	1.0																									
Developed Large	-0.1	0.9	0.8	1.0																								
Developed Small	-0.2	0.8	0.8	1.0	1.0																							
EM	-0.1	0.8	0.7	0.9	0.9	1.0																						
Global Equity	-0.1	1.0	0.9	1.0	0.9	0.9	1.0																					
PE	-0.2	0.7	0.7	0.6	0.5	0.5	0.7	1.0																				
US TIPS	0.1	0.2	0.1	0.3	0.3	0.4	0.3	0.0	1.0																			
US Treasury	0.1	-0.3	-0.3	-0.2	-0.2	-0.2	-0.3	-0.2	0.6	1.0																		
Global Sovereign ex US	0.1	0.2	0.1	0.4	0.4	0.4	0.3	-0.1	0.6	0.5	1.0																	
US Core	0.1	0.0	-0.1	0.1	0.1	0.2	0.1	-0.1	0.8	0.9	0.6	1.0																
US Core Plus	-0.1	0.3	0.3	0.5	0.5	0.5	0.5	0.0	0.7	0.5	0.5	0.8	1.0															
Short-Term Govt/Credit	0.4	-0.1	-0.1	0.1	0.1	0.1	0.0	-0.2	0.6	0.6	0.6	0.7	0.5	1.0														
Short-Term Credit	0.1	0.3	0.2	0.5	0.5	0.5	0.4	-0.2	0.5	0.2	0.5	0.5	0.8	0.6	1.0													
Long-Term Credit	-0.1	0.3	0.2	0.4	0.4	0.4	0.4	-0.1	0.6	0.5	0.5	0.8	1.0	0.4	0.6	1.0												
US HY	-0.2	0.7	0.7	0.8	0.8	0.8	0.8	0.4	0.4	-0.2	0.3	0.2	0.6	0.1	0.6	0.5	1.0											
Bank Loans	-0.2	0.6	0.6	0.6	0.6	0.6	0.6	0.2	0.2	-0.4	0.0	0.0	0.4	-0.2	0.5	0.3	0.8	1.0										
Global Credit	-0.1	0.6	0.5	0.8	0.8	0.8	0.7	0.2	0.6	0.2	0.7	0.6	0.8	0.5	0.7	0.8	0.8	0.5	1.0									
EMD USD	-0.1	0.6	0.5	0.7	0.7	0.7	0.7	0.3	0.7	0.3	0.5	0.6	0.8	0.4	0.6	0.7	0.8	0.5	0.9	1.0								
EMD Local	0.1	0.6	0.6	0.8	0.7	0.8	0.7	0.3	0.5	0.1	0.7	0.4	0.6	0.4	0.5	0.5	0.7	0.4	0.8	0.8	1.0							
Commodities	0.0	0.5	0.4	0.6	0.6	0.7	0.6	0.2	0.3	-0.2	0.4	0.1	0.3	0.2	0.4	0.2	0.5	0.4	0.6	0.5	0.6	1.0						
Hedge Funds	-0.1	0.7	0.6	0.8	0.8	0.8	0.8	0.6	0.2	-0.3	0.1	0.0	0.4	0.0	0.4	0.3	0.7	0.6	0.6	0.5	0.5	0.6	1.0					
Real Estate	-0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.2	0.2	0.2	0.0	0.2	1.0				
REITs	-0.1	0.7	0.8	0.7	0.6	0.6	0.7	0.5	0.3	0.0	0.3	0.3	0.5	0.1	0.3	0.4	0.7	0.5	0.6	0.6	0.6	0.3	0.4	0.4	1.0			
Risk Parity	0.1	0.5	0.4	0.6	0.6	0.6	0.6	0.0	0.7	0.4	0.6	0.6	0.7	0.5	0.6	0.6	0.5	0.3	0.8	0.7	0.7	0.6	0.5	-0.1	0.4	1.0		
Inflation	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	-0.2	0.0	-0.1	-0.1	0.0	-0.1	-0.2	0.2	0.3	0.1	0.1	0.1	0.3	0.3	0.1	0.1	0.0	1.0	

# Factor exposures

Factor exposures are a component of the risk dashboards previously used

- Holdings-based dashboards provide greater insight into the true factor exposures, but index-based dashboards can still be informative.

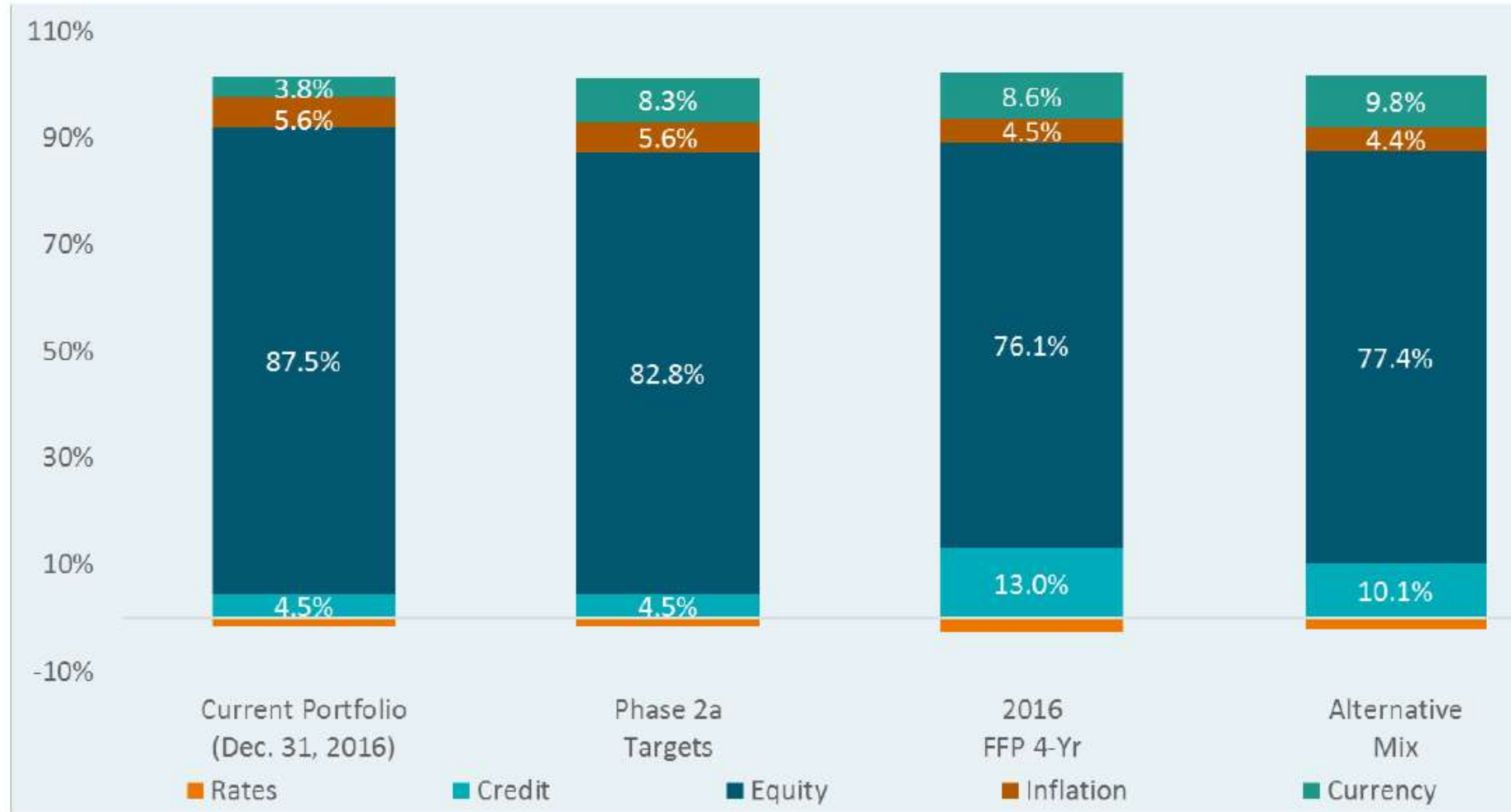
9 Risk factor weight relative to target



# Factor exposures

Factor exposures are also considered in the annual asset allocation analysis

RISK CONTRIBUTION BY RISK FACTOR



# Next steps

# Next steps

— Possible next steps to consider:

- Consider how these risk concepts might improve the governance process in managing the investment program.
- Discuss edits or enhancements to the current investment policy statement to ensure it accurately reflects the Board's view towards investment risks.
- Increase discussion of risk metrics during performance reviews, interactions with investment managers, analysis of asset allocation decisions, and impact on the Plan sponsors.
- Enhance reporting if necessary to meet any proposed changes to the IPS.

# Appendix

# Moody's credit ratings

<b>Aaa</b>	Obligations rated Aaa are judged to be of the highest quality, with minimal credit risk.
<b>Aa</b>	Obligations rated Aa are judged to be of high quality and are subject to very low credit risk.
<b>A</b>	Obligations rated A are considered upper-medium grade and are subject to low credit risk.
<b>Baa</b>	Obligations rated Baa are subject to moderate credit risk. They are considered medium-grade and as such may possess certain speculative characteristics.
<b>Ba</b>	Obligations rated Ba are judged to have speculative elements and are subject to substantial credit risk.
<b>B</b>	Obligations rated B considered speculative and are subject to high credit risk.
<b>Caa</b>	Obligations rated Caa are judged to be of poor standing and are subject to very high credit risk.
<b>Ca</b>	Obligations rated Ca are highly speculative and are likely in, or very near, default, with some prospect of recovery in principal and interest.
<b>C</b>	Obligations rated C are the lowest rated class of bonds and are typically in default, with little prospect for recovery of principal or interest.

**Note:** Moody's appends numerical modifiers 1, 2, and 3 to each generic rating classification from Aa through Caa. The modifier 1 indicates that the obligation ranks in the higher end of its generic rating category; the modifier 2 indicates a mid-range ranking; and the modifier 3 indicates a ranking in the lower end of that generic rating category.

Source: Moody's rating Symbols & Definitions

# S&P credit rating definitions

Long-Term Issuer Credit Ratings*	
Category	Definition
AAA	An obligor rated 'AAA' has extremely strong capacity to meet its financial commitments. 'AAA' is the highest issuer credit rating assigned by Standard & Poor's.
AA	An obligor rated 'AA' has very strong capacity to meet its financial commitments. It differs from the highest-rated obligors only to a small degree.
A	An obligor rated 'A' has strong capacity to meet its financial commitments but is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligors in higher-rated categories.
BBB	An obligor rated 'BBB' has adequate capacity to meet its financial commitments. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitments.
BB; B; CCC; and CC	Obligors rated 'BB', 'B', 'CCC', and 'CC' are regarded as having significant speculative characteristics. 'BB' indicates the least degree of speculation and 'CC' the highest. While such obligors will likely have some quality and protective characteristics, these may be outweighed by large uncertainties or major exposures to adverse conditions.
BB	An obligor rated 'BB' is less vulnerable in the near term than other lower-rated obligors. However, it faces major ongoing uncertainties and exposure to adverse business, financial, or economic conditions which could lead to the obligor's inadequate capacity to meet its financial commitments.
B	An obligor rated 'B' is more vulnerable than the obligors rated 'BB', but the obligor currently has the capacity to meet its financial commitments. Adverse business, financial, or economic conditions will likely impair the obligor's capacity or willingness to meet its financial commitments.
CCC	An obligor rated 'CCC' is currently vulnerable, and is dependent upon favorable business, financial, and economic conditions to meet its financial commitments.
CC	An obligor rated 'CC' is currently highly vulnerable. The 'CC' rating is used when a default has not yet occurred, but Standard & Poor's expects default to be a virtual certainty, regardless of the anticipated time to default.
R	An obligor rated 'R' is under regulatory supervision owing to its financial condition. During the pendency of the regulatory supervision the regulators may have the power to favor one class of obligations over others or pay some obligations and not others.
SD and D	An obligor rated 'SD' (selective default) or 'D' is in default on one or more of its financial obligations including rated and unrated financial obligations but excluding hybrid instruments classified as regulatory capital or in non-payment according to terms. An obligor is considered in default unless Standard & Poor's believes that such payments will be made within five business days of the due date in the absence of a stated grace period, or within the earlier of the stated grace period or 30 calendar days. A 'D' rating is assigned when Standard & Poor's believes that the default will be a general default and that the obligor will fail to pay all or substantially all of its obligations as they come due. An 'SD' rating is assigned when Standard & Poor's believes that the obligor has selectively defaulted on a specific issue or class of obligations but it will continue to meet its payment obligations on other issues or classes of obligations in a timely manner. An obligor's rating is lowered to 'D' or 'SD' if it is conducting a distressed exchange offer.
NR	An issuer designated 'NR' is not rated.

\*The ratings from 'AA' to 'CCC' may be modified by the addition of a plus (+) or minus (-) sign to show relative standing within the major rating categories.

Source: Standard and Poor's Ratings Definitions. [http://www.standardandpoors.com/en\\_US/web/guest/article/-/view/sourceId/504352](http://www.standardandpoors.com/en_US/web/guest/article/-/view/sourceId/504352)



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**PERSPECTIVES  
THAT DRIVE  
ENTERPRISE  
SUCCESS**



**PERIOD ENDING: SEPTEMBER 30, 2017**

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 2017  
Investment Landscape

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

## THE ECONOMIC CLIMATE

- Growth strengthened across developed and emerging economies. Business surveys suggest conditions are improving in both manufacturing and service industries. [p. 17](#)
- The U.S. job market tightened as unemployment dropped from 4.4 to 4.2%, despite disappointing job growth data. Unemployment has not been this low since March of 2001. [p. 9](#)
- An independence movement in Catalonia has received little attention from the financial community, and risk premiums may not reflect the negative possible knock-on effects on the EU. [p. 16](#)

## PORTFOLIO IMPACTS

- Improving economic growth, low inflation, low unemployment, and supportive monetary policy across most markets has created a positive environment for global risk assets, justifying a moderate overweight risk position. [p. 16](#)
- Within risk assets, we believe opportunities exist in emerging markets. [p. 33](#)

## THE INVESTMENT CLIMATE

- Global interest rates are still at historic lows, and very little monetary tightening is priced in across developed markets over the next few years. Even in the U.S., the market is only expecting two rate hikes through the end of next year. [p. 20](#)
- Valuations across global equities and credit are elevated, and have been so for the past few years. Further price appreciation through equity multiple expansion or credit spread contraction is unlikely. [p. 23 & 34](#)

## ASSET ALLOCATION ISSUES

- Equity performance remains strong. Year-to-date returns have been fundamentally driven, supported by earnings growth rather than valuation expansion. [p. 29](#)
- Equity volatility is near historic lows. Stable economic growth and inflation have likely contributed to the muted volatility environment. Investors should monitor leverage in strategies with a specific volatility target. [p. 35](#)

We believe a moderate overweight to risk is warranted

# What drove the market in Q3?

## “Traders keep bets on Fed rate hike in December after jobs report”

### DECEMBER RATE HIKE PROBABILITY BASED ON MARKET PRICING

Apr 30 <sup>th</sup>	May 31 <sup>st</sup>	Jun 30 <sup>th</sup>	Jul 31 <sup>st</sup>	Aug 31 <sup>st</sup>	Oct 6 <sup>th</sup>
47%	43%	52%	42%	34%	80%

Article Source: Bloomberg, September 27<sup>th</sup> 2017

### DECEMBER RATE HIKE PROBABILITY



Source: Bloomberg, as of 10/6/17, based on Fed fund futures prices

## “U.S.-North Korea tensions fuel flight to safety”

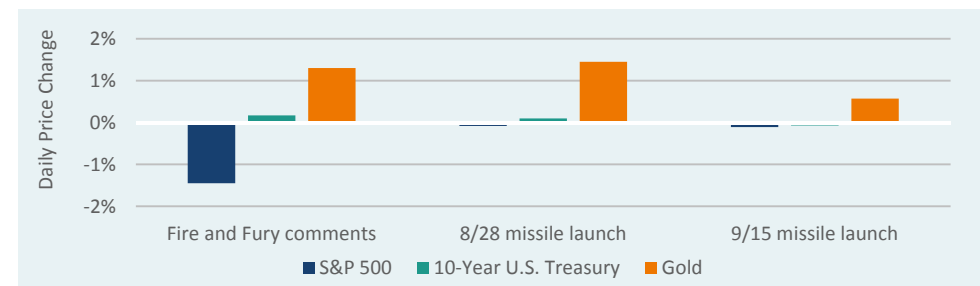
### DAILY PRICE REACTION DURING NORTH KOREA EVENTS

Fire & fury comments 8/28 missile launch 9/15 missile launch

S&P 500	Gold	S&P 500	Gold	S&P 500	Gold
-1.5%	1.3%	-0.1%	1.5%	-0.1%	0.6%

Article Source: Financial Times, August 9<sup>th</sup> 2017

### MARKET REACTION DURING NORTH KOREA EVENTS



Source: Bloomberg

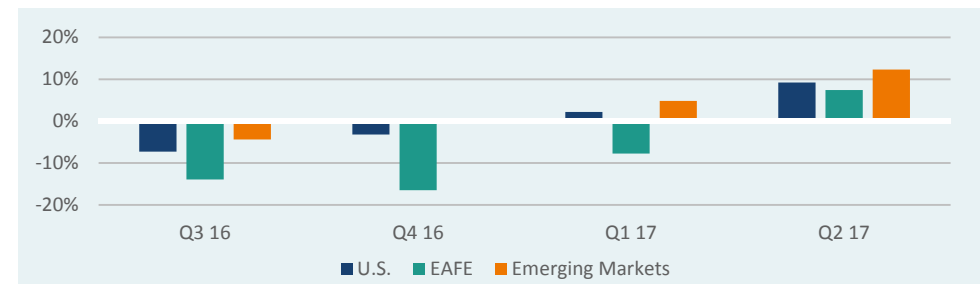
## “Strong earnings lift U.S. stocks”

### MSCI U.S. INDEX EARNINGS GROWTH (YOY)

Q3 16	Q4 16	Q1 17	Q2 17
-7.3%	-3.2%	2.2%	9.2%

Article Source: Wall Street Journal, July 25<sup>th</sup> 2017

### EQUITY EARNINGS GROWTH (YOY)



Source: Bloomberg, MSCI, as of 9/30/17

## “S&P 500 volatility hits 50-year low”

### S&P 500 30-DAY ANNUALIZED TRAILING VOLATILITY

Apr 30 <sup>th</sup>	May 31 <sup>st</sup>	Jun 30 <sup>th</sup>	Jul 31 <sup>st</sup>	Aug 31 <sup>st</sup>	Sep 30 <sup>th</sup>
7.3%	7.8%	6.8%	7.1%	8.1%	5.8%

Article Source: Forbes, August 1<sup>st</sup> 2017

# Economic environment



# U.S. economics summary

- U.S. real GDP grew 2.2% YoY in Q2, consistent with the trend of slow, but steady growth in the current expansion. Consumer spending and business investment were the primary drivers of growth.
- Purchasing manager indexes (PMIs) moved higher to above average levels, indicating a likely acceleration in economic growth over the coming quarters. The ISM Manufacturing and Services PMIs for September were 60.8 and 59.8, respectively.
- The economy added an average of 91,000 jobs per month to payrolls in the third quarter. The September employment data was heavily influenced by hurricanes Harvey and Irma, which resulted in a decline of 33,000 jobs from payrolls, the first drop since 2010. Due to the calculation methodology, a bounce back should be expected in October.
- The U3 unemployment rate (unaffected by the hurricanes) fell 0.2% to a 17-year low of 4.2% over the quarter. The broader U6 unemployment rate also tightened, dropping 0.3% to 8.3%.
- Year-over-year headline CPI accelerated from 1.6% in June to 2.2% in September, while the core inflation rate was unchanged over the quarter at 1.7%. Outside of volatile energy prices inflationary pressures still appear absent, and core inflation remains below the Fed's 2% target.
- The Fed paused from raising interest rates following three consecutive quarters with hikes. Core inflation that has persistently been below the Fed's 2% target was the primary reason given to delay further tightening. The market is expecting the Fed to raise interest rates again in December based on fed fund futures prices.

	Most Recent	12 Months Prior
GDP (YoY)	2.2% 6/30/17	1.2% 6/30/16
Inflation (CPI YoY, Headline)	2.2% 9/30/17	1.5% 9/30/16
Expected Inflation (5yr-5yr forward)	2.0% 9/30/17	1.8% 9/30/16
Fed Funds Rate	1.25% 9/30/17	0.50% 9/30/16
10 Year Rate	2.3% 9/30/17	1.6% 9/30/16
U-3 Unemployment	4.2% 9/30/17	4.9% 9/30/16
U-6 Unemployment	8.3% 9/30/17	9.7% 9/30/16

# U.S. economics – GDP growth

Real GDP grew by 2.2% YoY in Q2 (3.1% quarterly annualized rate), the fastest pace of expansion since Q3 2015. The economic recovery is nearly in its eighth year, but the level of growth remains low relative to history. Despite the length of the expansion, we do not see many of the typical signs that the economy is overheating.

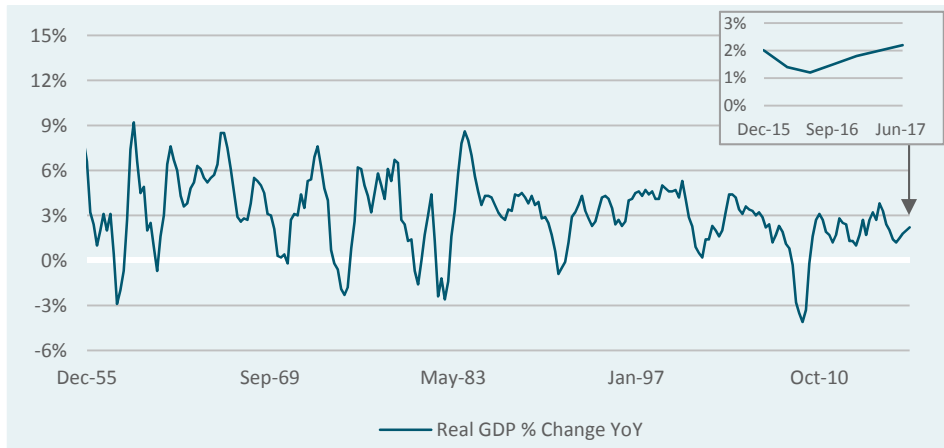
After slowing in the first quarter, consumer spending accelerated to 3.3%, and contributed 2.2% to the overall quarterly growth rate. A tight labor market and moderate wage gains should create a positive environment for consumer spending moving forward.

Business investment has picked up in recent quarters, and was the second largest contributor to GDP in Q2, while residential investment was a slight drag on growth. Trade also had a positive impact on growth, as exports increased at a quicker rate than imports.

Moderate growth is expected throughout the rest of the year – the Atlanta Fed GDP Now forecast for Q3 was 2.5% as of October 6<sup>th</sup>. Hurricanes Harvey and Irma disrupted growth in September, but the economy is likely to see a boost in Q4 once rebuilding begins.

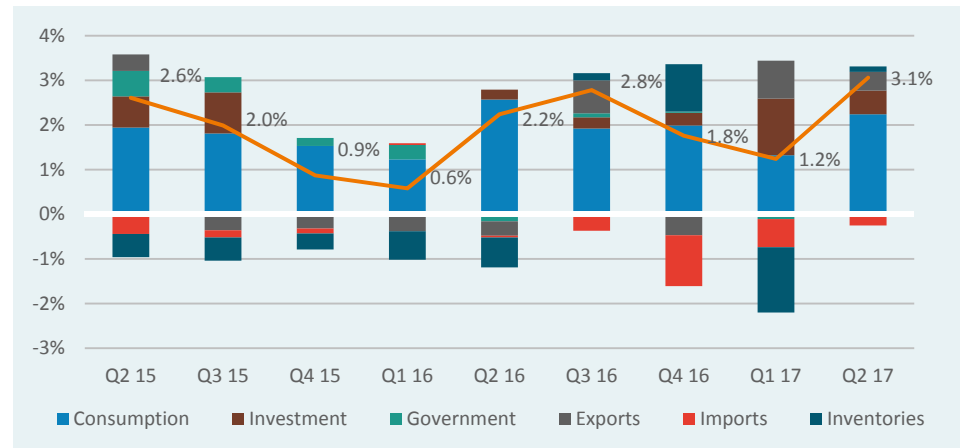
The economy experienced another quarter of moderate growth in Q2 with few signs of overheating

U.S. REAL GDP GROWTH (YOY)



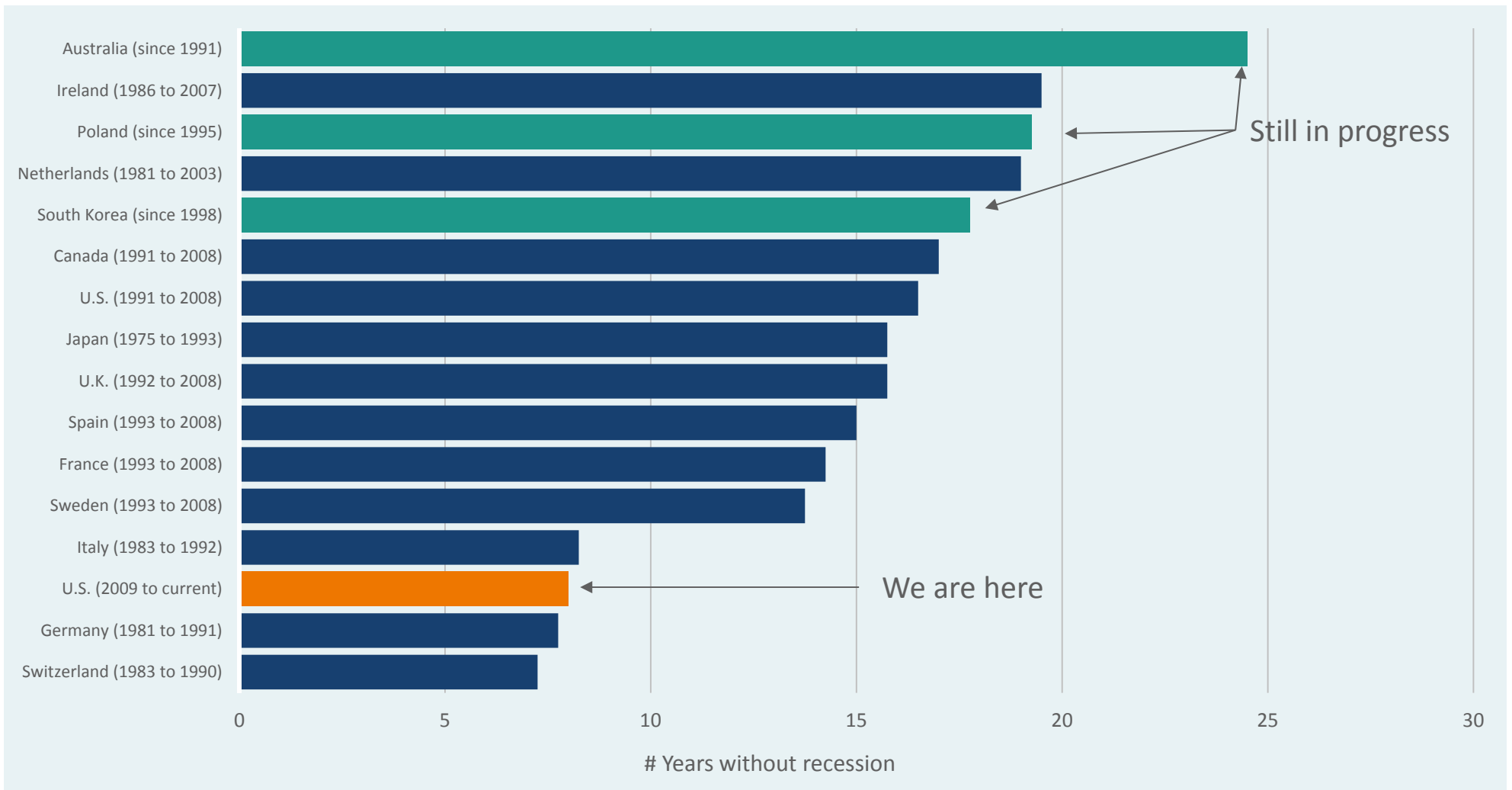
Source: FRED, as of 6/30/17

U.S. GDP COMPONENTS



Source: BEA, annualized quarterly rate, as of 6/30/17

# How long can expansions continue?



Source: Australia Trade and Investment Commission

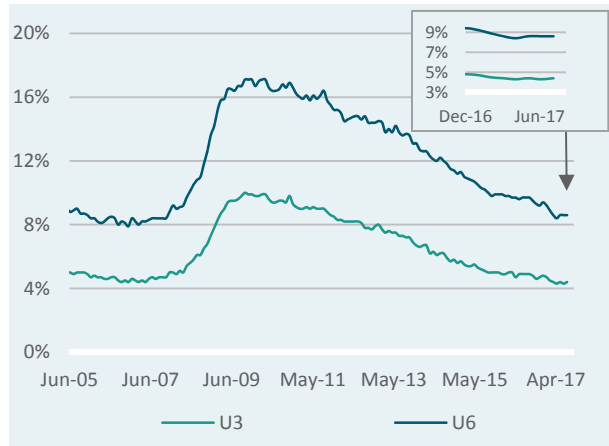
# U.S. economics – Labor market

The U.S. job market tightened as unemployment dropped from 4.4 to 4.2% - the lowest level since March of 2001. Job creation data disappointed in September, though this may largely be attributed to the effects of hurricanes Harvey and Irma.

Labor growth throughout the current U.S. expansion has tended to be tilted towards lower-skill and lower-pay jobs. It is reasonable to ask whether this indicates that the recovery is weak or unbalanced. To arrive at an answer it is

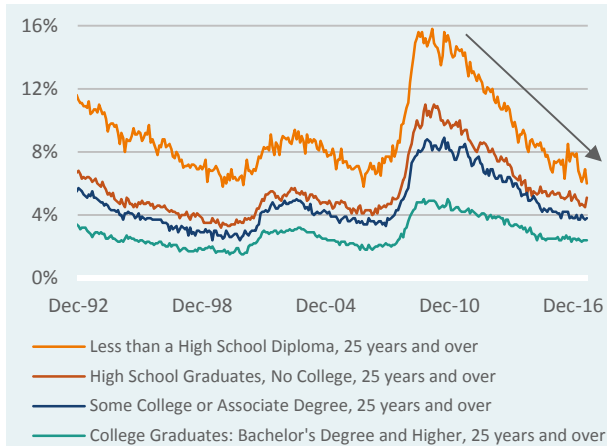
important to note that the types of jobs created during an economic recovery is partly a product of the types of jobs lost during the initial downturn. Examining unemployment by education level and age group suggests that the downturn disproportionately impacted the jobs of younger workers and those with less education. This implies that the job creation seen lately is natural and not necessarily an indication of weakness.

**U.S. UNEMPLOYMENT**



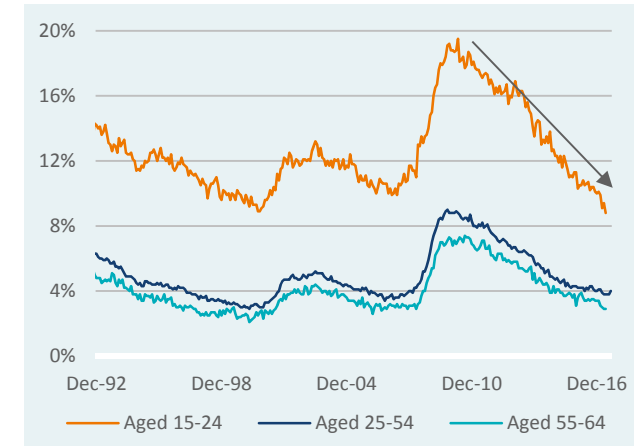
Source: FRED, as of 8/31/17

**UNEMPLOYMENT BY EDUCATION LEVEL**



Source: FRED, as of 8/31/17

**UNEMPLOYMENT BY AGE GROUP**



Source: FRED, as of 8/31/17

# U.S. economics – The consumer

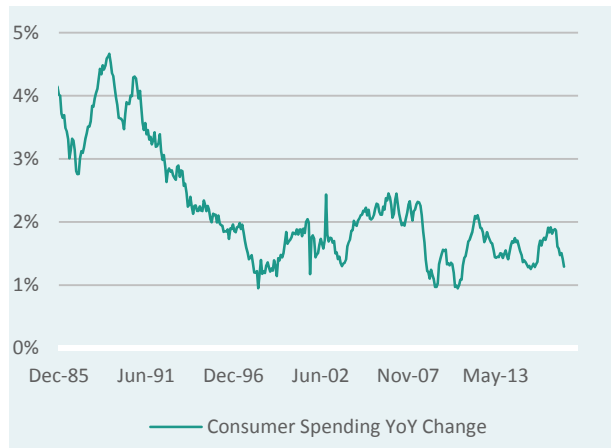
Consumer spending remained within a normal range. Savings rates, in aggregate, have declined over the past year and are now at levels consistent with past economic expansions. The fundamental picture for consumers is still positive. Low inflation, low unemployment, and moderate wage gains should provide a backdrop for further spending growth.

Total consumer debt has surpassed pre-crisis levels, fueled by student loans and auto loans. However, the

burden of debt is lower due to the lower interest rate environment.

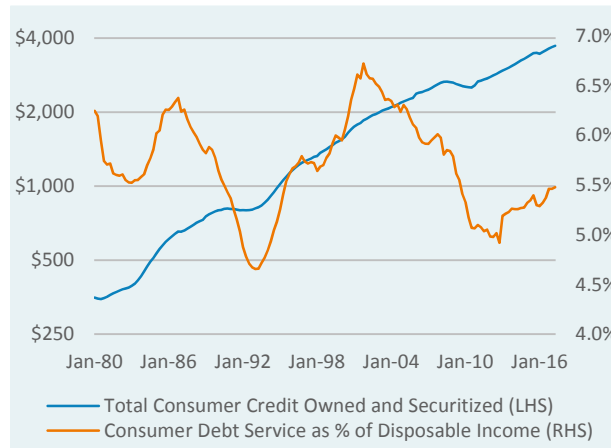
U.S. auto sales spiked in September, reversing a recent trend of weaker purchase activity. Hurricanes Irma and Harvey were estimated to have affected hundreds of thousands of vehicles, which contributed to buying activity throughout the month. However, the spike in sales will likely result in a drag on activity in future years.

**CONSUMER SPENDING (YOY GROWTH)**



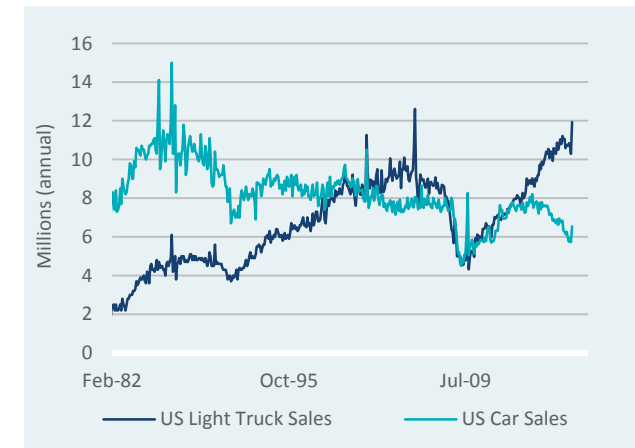
Source: Bloomberg, as of 8/31/17

**CONSUMER DEBT & DEBT BURDEN**



Source: FRED, as of 4/30/17

**U.S. AUTO SALES**



Source: Bloomberg, as of 9/30/17

# U.S. economics – Sentiment

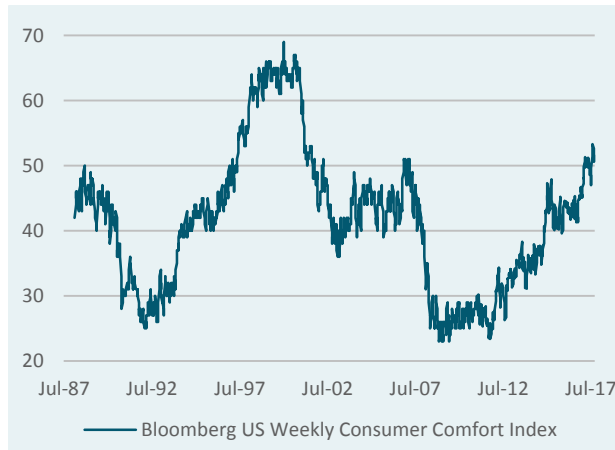
Consumer sentiment measures are above average, reflecting Americans' overall positive view of the economy. In the preliminary reading for October, The University of Michigan Consumer Sentiment Survey unexpectedly increased from 95.1 to 101.1, the highest level since 2004, which placed it in the 91<sup>st</sup> percentile since 1978. According to the survey, the elevated level of confidence is primarily due to consumers anticipating low unemployment, low inflation, small increases in interest rates, and moderate gains in income. Consumer sentiment has been high since the election last

November, but there has yet to be a material increase in consumer spending.

Other measures of sentiment, such as the NFIB Small Business Optimism Index, remain high by historical standards, but have dropped so far this year. Small businesses are still expecting to benefit from tax reform and deregulation, although significant uncertainty remains surrounding the timing and nature of these changes.

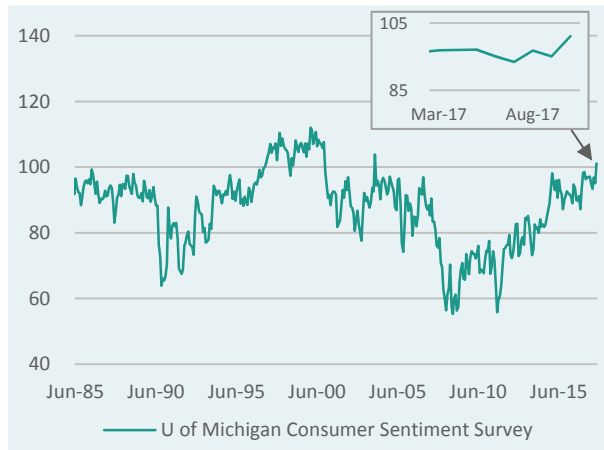
Consumers and small businesses have a positive outlook on the economy

**CONSUMER COMFORT INDEX**



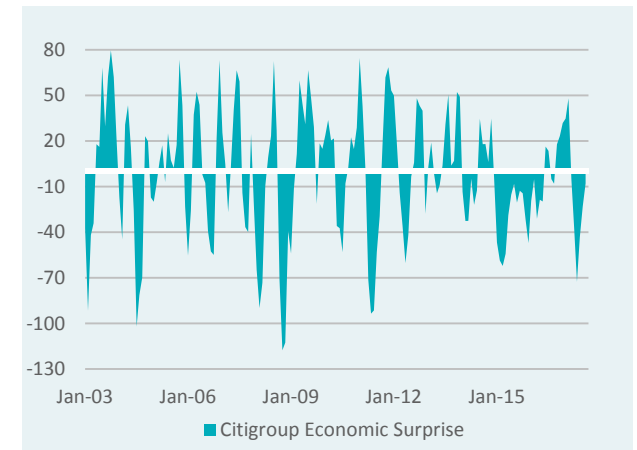
Source: Bloomberg, as of 9/24/17 (see Appendix)

**CONSUMER SENTIMENT**



Source: University of Michigan, as of 9/30/17 (see Appendix)

**U.S. ECONOMIC SURPRISE**



Source: Bloomberg, as of 9/29/17 (see Appendix for details)

# U.S. economics – Housing

U.S. home prices continued to climb higher with 5.9% growth YoY in July according to the S&P/Case-Shiller U.S. National Home Price Index. New and existing home sales have decelerated and are flat year-over-year, though not necessarily worrying given the volatility of sales activity. A surge in housing starts and permit applications is possible as areas of the south and southeast rebuild following hurricane damage.

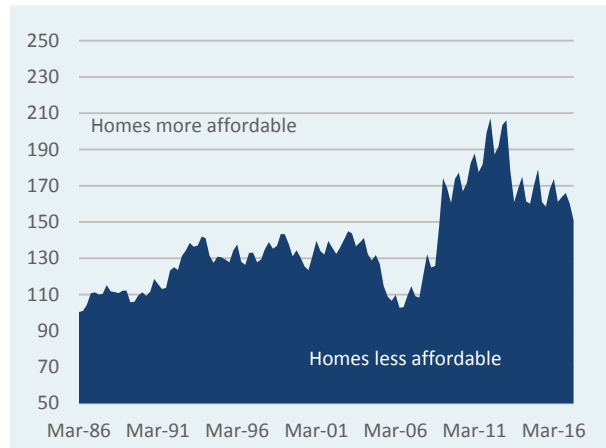
Owning a home remains affordable relative to history. A scenario of higher interest rates and further home price appreciation would result in affordability falling towards the historical average. Materially higher interest rates would make home ownership much more expensive, given the low current level of interest rates. A 1% rise in mortgage interest rates for a \$400,000 loan results in a roughly \$4,000 rise in annual cost for homeowners.

**CASE-SHILLER HOME PRICE INDEX**



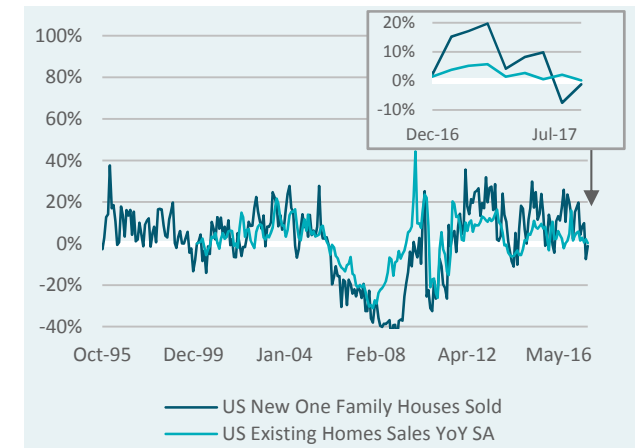
Source: FRED, as of 6/30/17

**HOME AFFORDABILITY**



Source: National Association of Realtors, as of 6/30/17 (see appendix) Source: Bloomberg, as of 8/31/17

**HOUSING SALES**



# U.S. economics – Inflation

Headline CPI inflation was 2.2% from the previous year in September, up from 1.6% in June, driven mainly by increases in gasoline prices following hurricanes Harvey and Irma. Core inflation was unchanged at 1.7%.

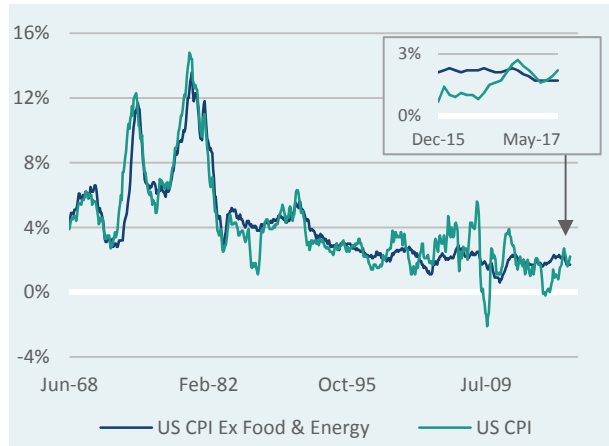
Although the Fed has belabored the “low inflation environment”, inflation measures are not extreme from a historical perspective. The perception of low inflation is likely being impacted by the long duration of the current economic expansion since rising inflation typically occurs in the late cycle. Although several Fed officials have stated they

believe below target inflation is transitory, continued softness in price levels may result in a slower pace of monetary tightening.

Market based inflation expectations increased modestly throughout the quarter with the 10-year TIPS breakeven inflation rate up 10 bps to 1.83%. Expectations are still low, and investors are receiving a low inflation premium on nominal Treasuries.

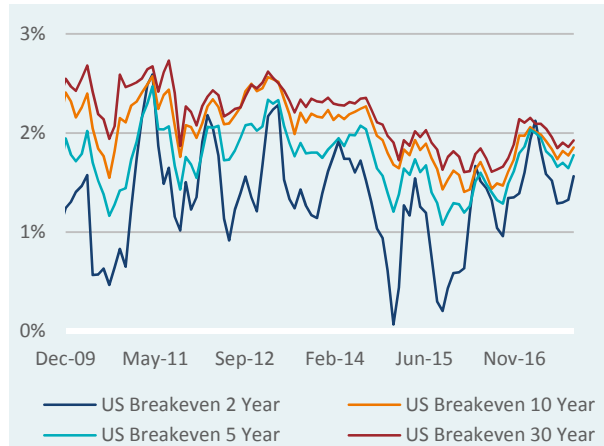
Pressures on core inflation are still low

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



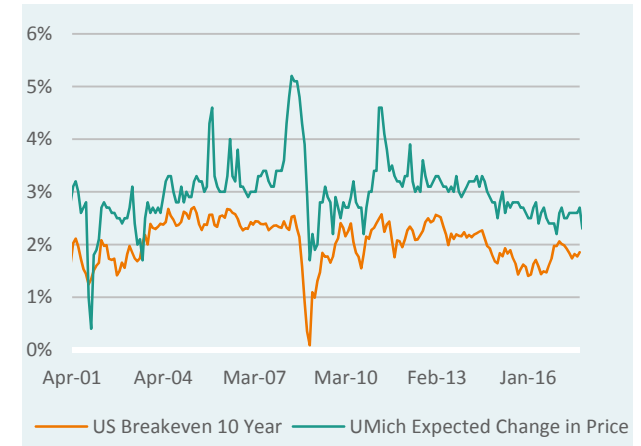
Source: FRED, as of 9/30/17

**U.S. TIPS BREAKEVEN RATES**



Source: FRED, as of 9/30/17

**INFLATION EXPECTATIONS**



Source: Bloomberg, as of 9/30/17



# Is geopolitical risk abnormally high?

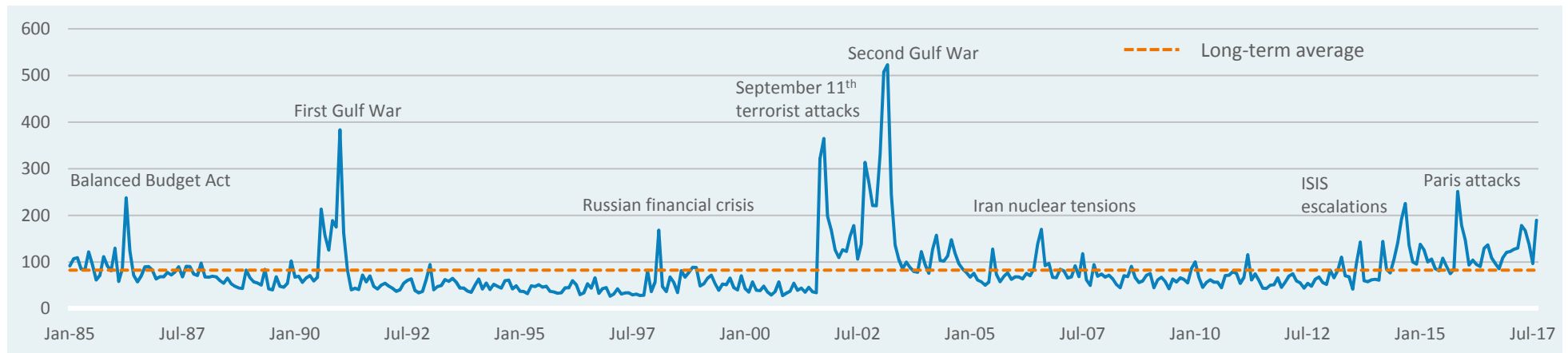
Several events over the quarter, especially increased tensions on the Korean peninsula, have led to heightened concerns over the impact of geopolitical risk on financial markets. The unique nature of each geopolitical event makes it difficult to determine whether the apparent risks are greater than past events.

The Geopolitical Risk Index (GPR) uses automated text-search results of 11 U.S. and international newspapers to give some indication of how the current environment relates to history. While the GPR is above average, it is not abnormally high. Further, given the unpredictability of

geopolitical risk and how it will affect financial markets, we do not recommend making any significant changes to portfolios.

While the concerns over a nuclear attack from North Korea have recently escalated, the threat is not a new one. Many political experts believe the probability of an attack by North Korea against the U.S. or its allies is low because it would jeopardize the existence of the current regime. Additionally, China's support of North Korea has waned in recent months after it agreed to two new rounds of sanctions through the United Nations Security Council.

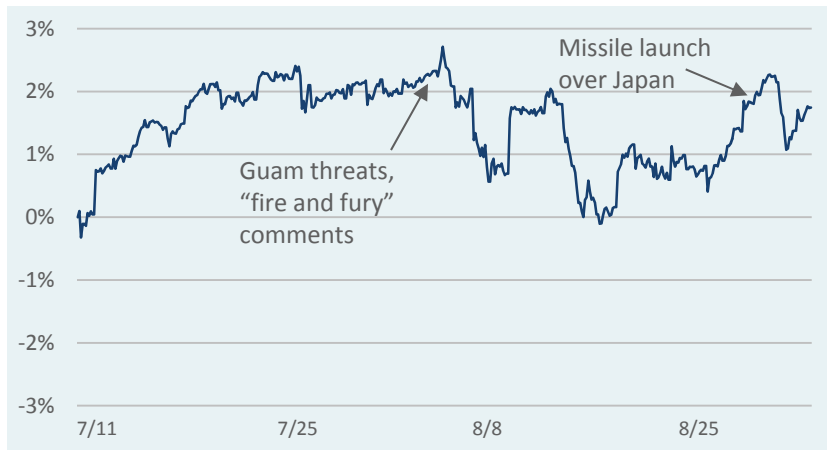
## GEOPOLITICAL RISK INDEX



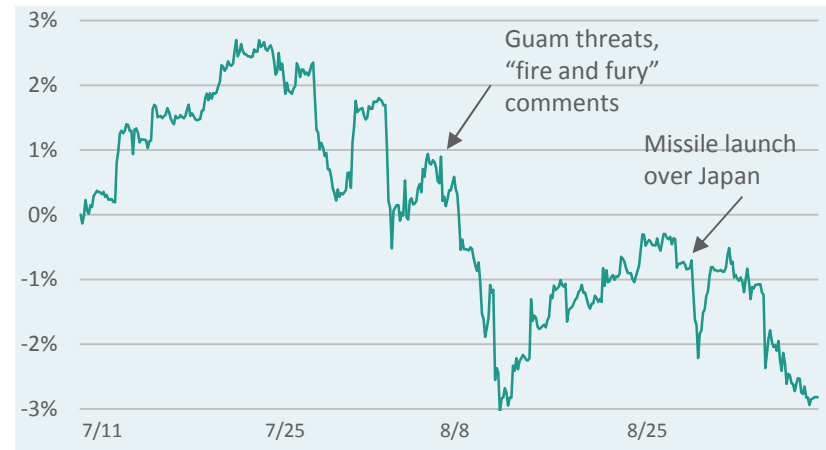
Source: *The Geopolitical Risk Index - Caldarra, Iacoviello, Federal Reserve Board, as of 8/31/17*

# North Korea – Market reactions

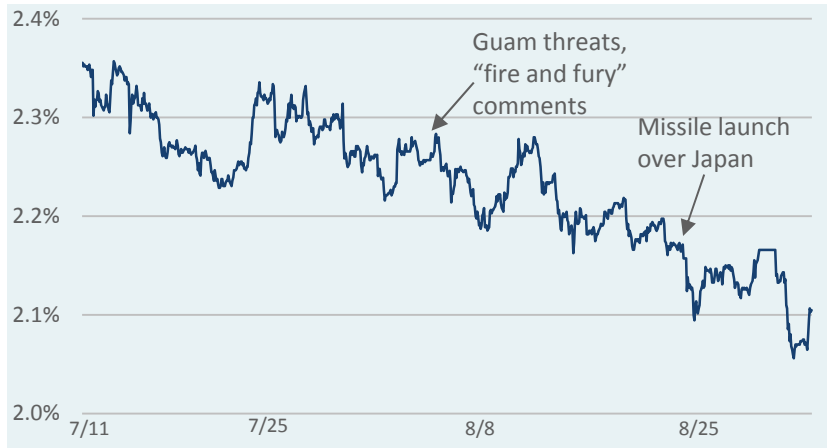
**U.S. EQUITY (CUMULATIVE PRICE MOVEMENT)**



**SOUTH KOREAN EQUITY (CUMULATIVE PRICE MOVEMENT)**



**U.S. 10-YEAR TREASURY YIELD**



**GOLD PRICES**



Source: Bloomberg, S&P 500, KOSPI, 7/11/17-9/6/17

# International economics summary

- International economic growth advanced in the second quarter in both developed and emerging markets. PMIs are above 50 (indicating expansion) in nearly every country across the world, pointing towards a continuation in the recent global growth pickup.
- The IMF raised its projections for global GDP growth 0.1% for both 2017 and 2018 to 3.6% and 3.7%, respectively. For comparison, global GDP growth was 3.2% in 2016.
- Economic conditions in emerging markets have improved. Several countries, such as Brazil and Russia, are still at the beginning stages of a recovery. Lower inflation has allowed emerging central banks to pursue looser monetary policy, which should provide a tailwind to further economic growth.
- Inflation in developed countries has yet to see much pressure outside of the U.K., and remains well below central bank targets.
- Inflation in the U.K. (headline CPI) rose 3.0% YoY in September, driven partly by a weaker pound, while wages only increased by 2.2%. The Bank of England stated that a rate hike may be necessary before the end of the year to slow price increases.
- On October 1<sup>st</sup>, Catalonia passed a referendum to declare independence from Spain, which the Spanish government declared illegal. Although the Catalan prime minister accepted the vote as a mandate to declare independence, he immediately suspended this declaration with the goal of bringing the Spanish government to the negotiating table.

Area	GDP (Real, YoY)	Inflation (CPI, YoY)	Unemployment
United States	2.2% <i>6/30/17</i>	2.2% <i>9/30/17</i>	4.2% <i>9/30/17</i>
Western Europe	2.0% <i>6/30/17</i>	1.5% <i>9/30/17</i>	7.9% <i>6/30/17</i>
Japan	1.4% <i>6/30/17</i>	0.7% <i>8/31/17</i>	2.8% <i>8/31/17</i>
BRICS Nations	5.6% <i>6/30/17</i>	2.0% <i>6/30/17</i>	5.8% <i>6/30/17</i>
Brazil	0.3% <i>6/30/17</i>	2.5% <i>9/30/17</i>	12.7% <i>9/30/17</i>
Russia	2.5% <i>6/30/17</i>	3.0% <i>9/30/17</i>	4.9% <i>8/31/17</i>
India	5.7% <i>6/30/17</i>	3.3% <i>9/30/17</i>	8.4% <i>12/31/16</i>
China	6.9% <i>6/30/17</i>	1.6% <i>9/30/17</i>	4.0% <i>6/30/17</i>

# International economics

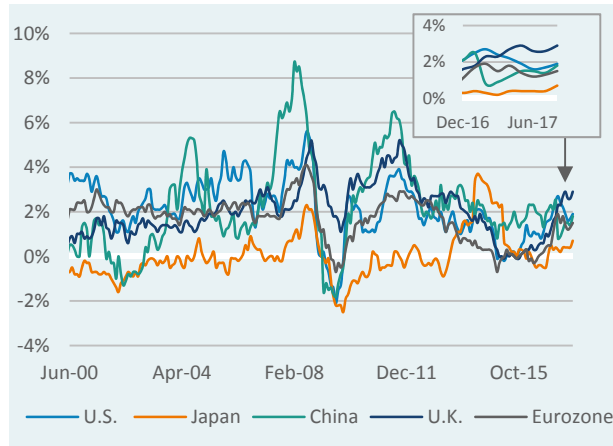
Global surveys indicate a synchronized rise in global growth which may have begun to materialize in Q2. Second quarter GDP growth improved across most countries, especially in Europe and emerging markets.

Real GDP in the Eurozone was 2.3% YoY in Q2, the fastest pace of growth in more than six years. While the ECB has discussed tapering monetary stimulus beginning next year, this will likely be a slow and delicate process. Eurozone financial conditions should continue to be supportive over the next few years. Monetary policy is not expected to change in Japan for the

foreseeable future, and will continue to be a tailwind for the Japanese economy.

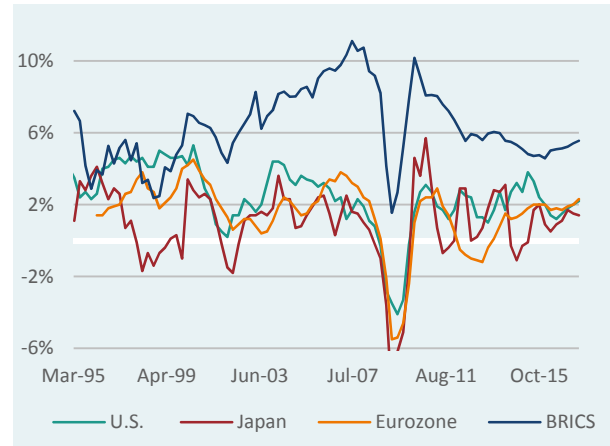
Developed market inflation remains low, with the exception of the U.K. The latest headline CPI reading for the Eurozone and Japan was 1.5% and 0.7%, respectively. Inflation in emerging economies has trended downwards, allowing central banks to cut interest rates to provide monetary stimulus. Many emerging markets are well behind developed markets in the current economic cycle.

## INFLATION (CPI)



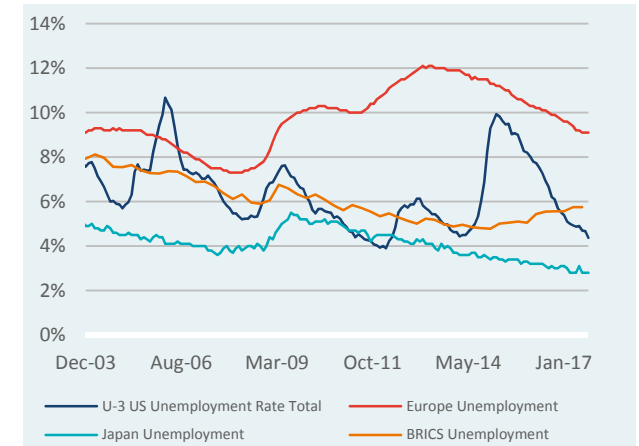
Source: Bloomberg, as of 8/31/17

## REAL GDP GROWTH (YOY)



Source: Bloomberg, as of 6/30/17

## UNEMPLOYMENT



Source: Bloomberg, as of 8/31/17 or most recent release

# Global PMIs

## PMI 1 YEAR (CROSS SECTION) – BLUE HIGH / ORANGE LOW

	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17
<b>Manufacturing</b>												
Global	52	52	53	53	53	53	53	53	53	53	53	53
Developed	53	53	54	54	54	54	54	54	54	54	54	55
US	52	54	55	56	58	57	55	55	58	56	59	61
UK	54	53	56	55	55	54	57	56	54	55	57	56
Eurozone	54	54	55	55	55	56	57	57	57	57	57	58
Germany	55	54	56	56	57	58	58	60	60	58	59	61
Japan	51	51	52	53	53	52	53	53	52	52	52	53
EM	51	51	51	51	51	52	51	51	51	51	52	51
<b>Services</b>												
Global	53	53	53	54	53	54	54	54	54	54	54	54
Developed	54	54	54	55	54	54	54	54	55	55	55	55
US	55	56	57	57	58	55	58	57	57	54	55	60
UK	55	55	56	55	53	55	56	54	53	54	53	54
Eurozone	53	54	54	54	56	56	56	56	55	55	55	56
Germany	54	55	54	53	54	56	55	55	54	53	54	56
Japan	51	52	52	52	51	53	52	53	53	52	52	51
EM	53	54	54	54	56	56	56	56	55	55	55	56

Source: Bloomberg, as of 9/30/17 – PMIs are based on survey data compiled from purchasing and supply managers. Survey questions are asked about several different components of each sector, such as new orders, employment, prices, etc. The final PMI reading is based on the percentage of respondents with a positive view on the sector. A reading above 50 indicates expansion in the sector while a reading below 50 indicates contraction. Historically, PMIs have had a relatively strong positive relationship with actual economic activity.

# Fixed income rates & credit

# Interest rate environment

- After bottoming out to a post-election low of 2.04% on September 7<sup>th</sup> following increased tensions with North Korea, the U.S. 10-year rose to finish the quarter slightly higher at 2.33%.
- The Fed kept interest rates unchanged over the quarter, citing concerns over the lack of inflation. However, Fed officials have communicated that they believe recent low inflation is transitory. An additional rate hike in December appears likely based on market implied probabilities.
- The Fed will begin to reduce its balance sheet in October. The central bank's plan is to runoff \$6 billion of Treasuries and \$4 billion of mortgage-backed securities per month. This will be scaled up commensurately every 3 months to \$50 billion per month. At this pace it will take more than seven years to return the balance sheet to pre-crisis levels.
- U.K. sovereign yields experienced the biggest increase among developed countries after the Bank of England acknowledged that a rate hike may be necessary by the end of the year to slow inflation.
- Very little monetary tightening is priced into short-term developed market interest rates over the next few years. Although we expect central banks to be cautious, faster than expected increases in interest rates represents a potential risk.
- Our underweight position to both U.S. and developed sovereign rates (currency hedged) was unchanged over the quarter, primarily due to the low carry. However, Treasuries still play an important role in portfolios by offering equity risk diversification.

Area	Short Term (3M)	10 Year
United States	1.02%	2.33%
Germany	(0.70%)	0.46%
France	(0.59%)	0.74%
Spain	(0.45%)	1.60%
Italy	(0.39%)	2.11%
Greece	2.02%	5.66%
U.K.	0.28%	1.37%
Japan	(0.17%)	0.07%
Australia	1.71%	2.84%
China	3.04%	3.62%
Brazil	7.46%	9.77%
Russia	7.76%	7.66%

Source: Bloomberg, as of 9/30/17

# Fed monetary tightening

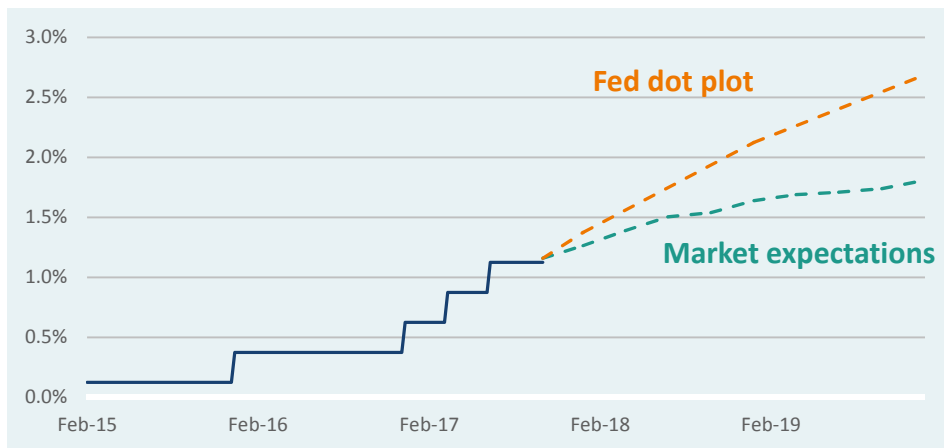
The market's expectation of a rate hike in December increased considerably throughout the quarter to 90%. Although core inflation remained below the official 2% target, several Fed officials have stated they believe the factors dampening inflation are transitory and prices should gradually increase along with wages. According to its own forecast, the Fed is expecting one additional hike this year, three hikes in 2018, and two more in 2019. However, market expectations are much more conservative, pricing in one more hike this year, and only two additional hikes through 2019.

During this tightening cycle the Fed has continually undelivered on projected rate increases. We believe it is reasonable to think this trend will continue since the risk of tightening too quickly outweighs the risk of moving too slowly.

Balance sheet reduction, which began in October also represents a form of gradual tightening. Based on the current plan, the balance sheet will fall by \$1.7 trillion to \$2.8 trillion at the end of 2020. According to the Fed, the runoff will continue as scheduled unless interest rates are brought back down to 0%.

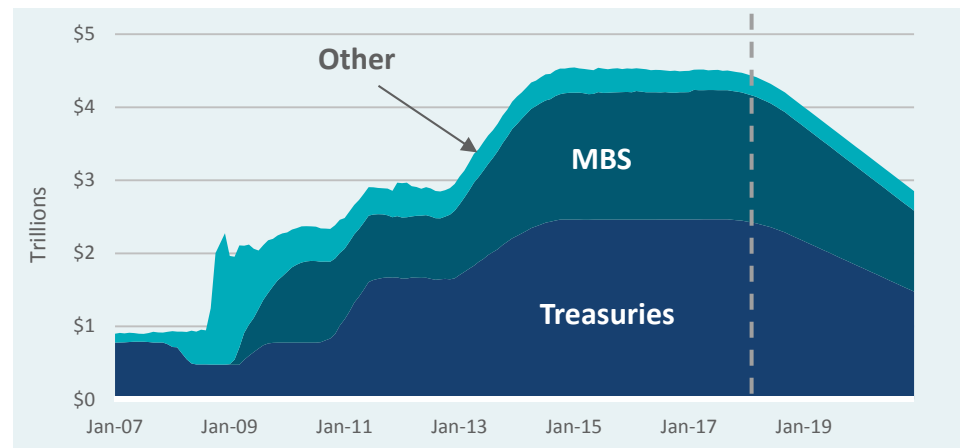
The market is expecting the Fed to move cautiously with further monetary tightening

**FED RATE HIKE EXPECTATIONS**



Source: Bloomberg, as of 10/6/17

**FED BALANCE SHEET REDUCTION EXPECTATIONS**

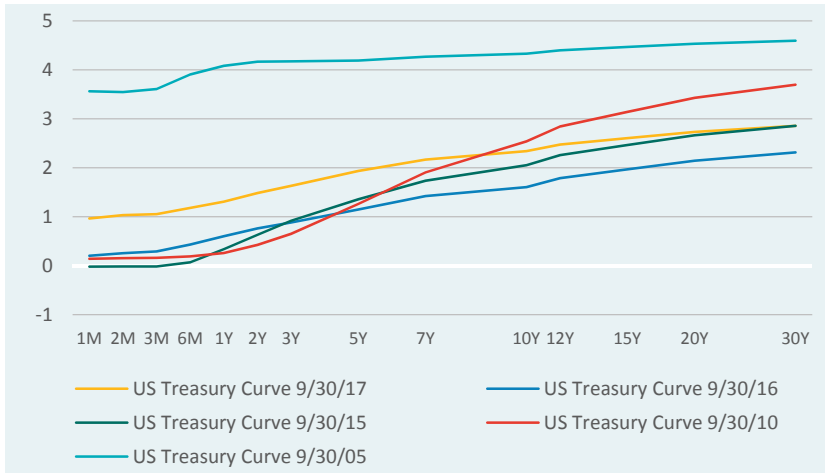


Source: Federal Reserve, as of 9/29/17, projections are based on the Fed's announced reduction plan

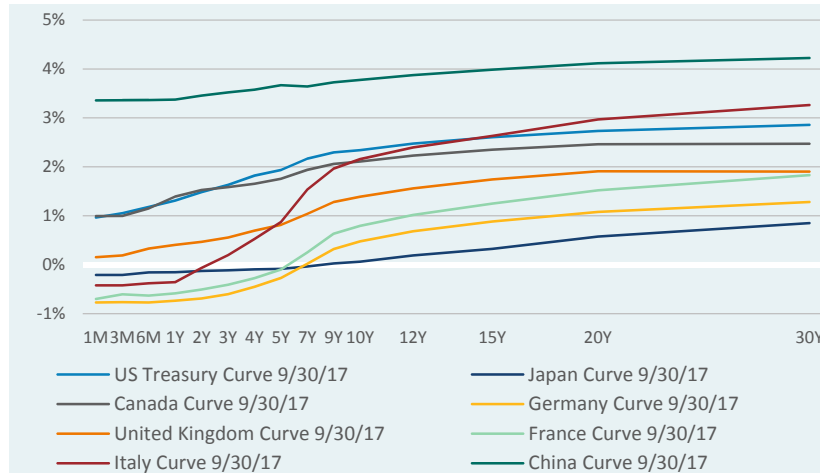


# Yield environment

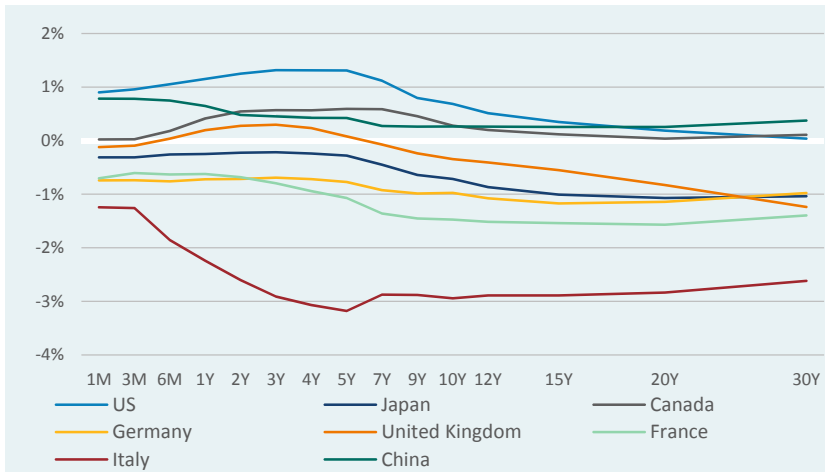
U.S. YIELD CURVE



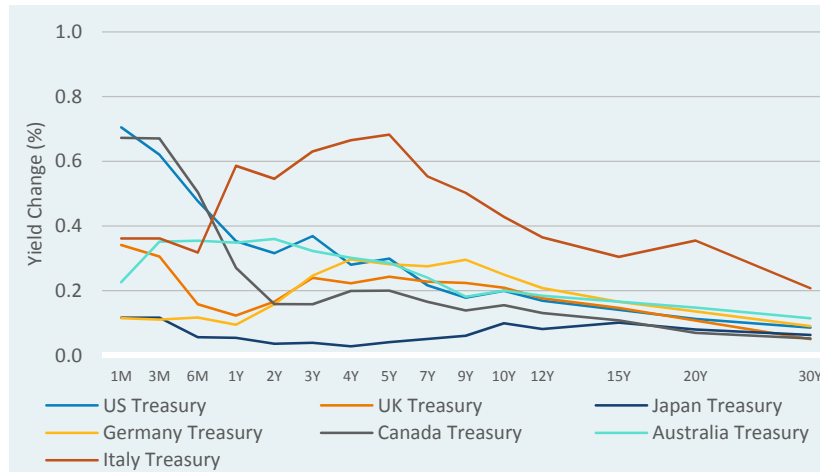
GLOBAL GOVERNMENT YIELD CURVES



YIELD CURVE CHANGES OVER LAST FIVE YEARS



IMPLIED CHANGES OVER NEXT YEAR



Source: Bloomberg, as of 9/30/17

# Credit environment

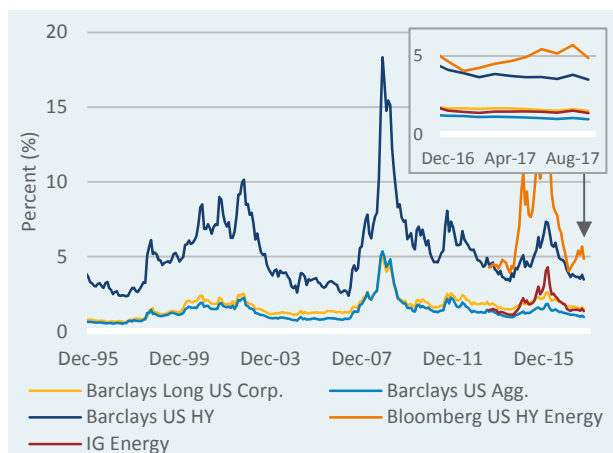
Credit spreads fell slightly over the quarter, remaining at low levels. U.S. high yield option-adjusted spreads compressed in the third quarter to 3.5%, and the asset class generated a 2.0% total return (BBgBarc U.S. Corp. High Yield Index). High yield spreads are tighter than those of bank loans on a duration neutral basis.

Credit spreads have continued to tighten close to multi-year lows, driven by strong corporate fundamentals and general macroeconomic improvement. The combination of tighter credit spreads and additional carry (greater yield) over Treasuries led credit to broadly outperform U.S. Treasuries in

Q3. High yield spreads began the year at 4.0% and have tightened by 51 bps year-to-date. Credit spreads have historically been a good indicator of future performance relative to Treasuries.

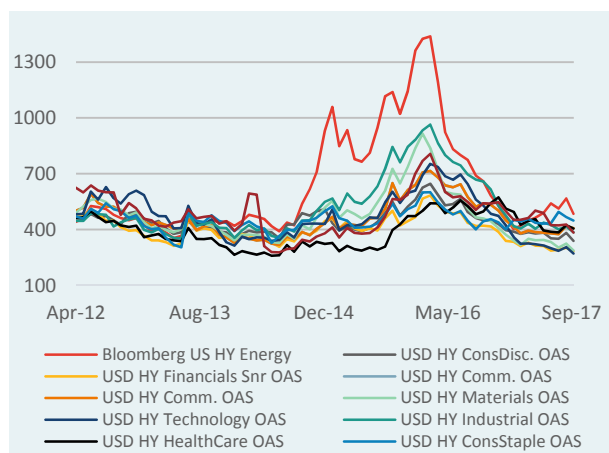
High yield energy spreads compressed over the quarter by 55 bps to 4.8% - a very moderate compression following the 2014 commodity drawdown. Year-to-date, the best performing sectors were financials and utilities. Industrials had weaker performance, most specifically consumer cyclical and the energy sector, which has been recovering from the recent commodity crisis.

## HIGH YIELD SECTOR SPREADS



Source: Barclays, Bloomberg, as of 9/30/17

## SPREADS



Source: Bloomberg, as of 9/30/17

Market	Credit Spread (9/30/17)	Credit Spread (1 Year Ago)
Long US Corporate	1.5%	2.0%
US Aggregate	1.0%	1.4%
US High Yield	3.5%	4.8%
US High Yield Energy	4.4%	6.1%
US Bank Loans	3.6%	3.9%

Source: Barclays, Credit Suisse, Bloomberg, as of 9/30/17

# Issuance and default

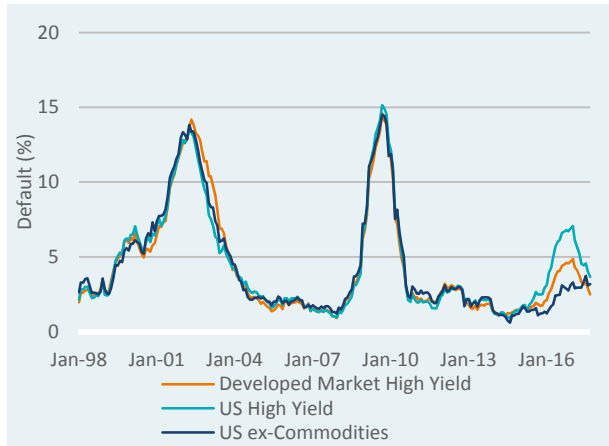
Default activity continued to stabilize in U.S. and international credit markets. Only one U.S. company defaulted in September, the third consecutive month with only one or no defaults, which was the first time this occurred since May 2011. Default volume in the third quarter was the lowest since Q4 2013.

Rolling default rates are currently running below long-term averages. Active management may offer value to investors in the high yield space.

The effects of commodity related defaults are subsiding

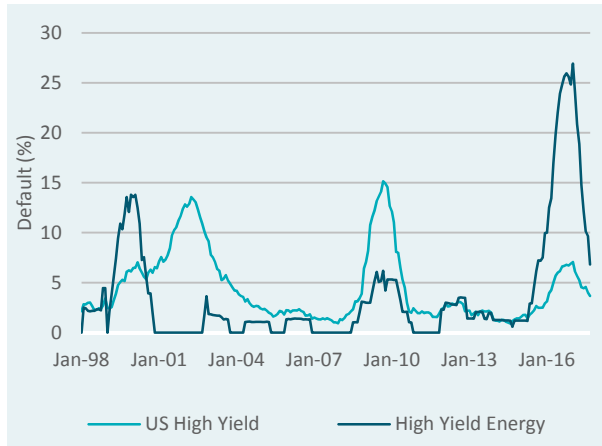
Senior loan and high yield markets stabilized further with the majority of par defaults last year coming from the energy and metals/mining sectors. The retail sector has accounted for the second most defaults.

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



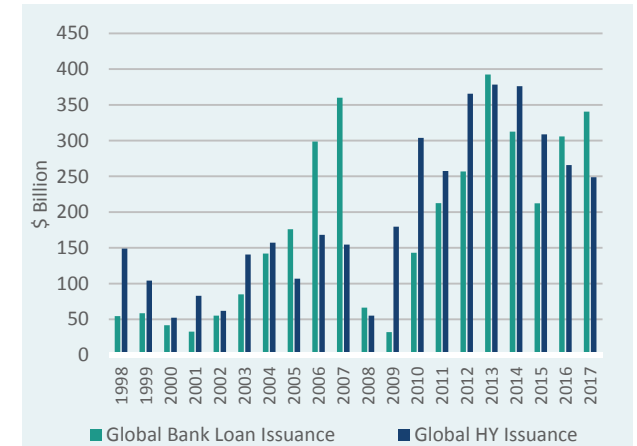
Source: BofA Merrill Lynch, as of 9/30/17

**ENERGY DEFAULT TRENDS**



Source: BofA Merrill Lynch, as of 9/30/17

**GLOBAL ISSUANCE**



Source: Bloomberg, BofA Merrill Lynch, as of 9/30/17

# Equity

# Equity environment

- We maintain a moderate overweight to equities with a preference for emerging markets. Emerging markets have historically delivered outsized economic growth and performance during strong global growth environments. These markets remain attractively valued relative to developed markets, though valuations rose over the quarter.
- U.S. equities moved upward in Q3, setting record highs. Performance has been fueled by earnings growth.
- The possibility of U.S. corporate tax reform has led the market to price in greater expectations for future equity earnings growth. Significant uncertainty remains around the timing and nature of the reform, and the outcome will have a material impact on equity prices in the short-term.
- Equity volatility remains unusually low. Lower volatility has historically indicated less downside risk in equity markets.
- According to FactSet as of October 6th, the estimated Q3 earnings growth rate of the S&P 500 was 2.8% YoY, a materially weaker figure than the 7.5% which was expected as of June 30. Much of the weakness was caused by expected insurance industry losses due to hurricane damage. Excluding the insurance sector, earnings are expected to grow by 4.9% YoY.
- U.S. dollar weakness year-to-date has caused significant earnings differences between companies with greater international sales focus and companies that are more domestically-focused. Overall, U.S. dollar movement has acted as a tailwind to earnings growth.

	QTD TOTAL RETURN		YTD TOTAL RETURN		1 YEAR TOTAL RETURN	
	(unhedged)	(hedged)	(unhedged)	(hedged)	(unhedged)	(hedged)
US Large Cap (Russell 1000)	4.5%		14.2%		18.5%	
US Small Cap (Russell 2000)	5.7%		10.9%		20.7%	
US Large Value (Russell 1000 Value)	3.1%		7.9%		15.1%	
US Large Growth (Russell 1000 Growth)	5.9%		20.7%		21.9%	
International Large (MSCI EAFE)	5.4%	3.7%	20.0%	12.3%	19.1%	20.5%
Eurozone (Euro Stoxx 50)	8.5%	5.2%	25.2%	13.2%	29.2%	24.9%
U.K. (FTSE 100)	4.8%	2.1%	15.7%	7.2%	14.9%	11.9%
Japan (NIKKEI 225)	2.0%	2.7%	12.1%	9.4%	13.4%	27.0%
Emerging Markets (MSCI Emerging Markets)	7.9%	7.2%	27.8%	22.1%	22.5%	19.6%

Source: Russell Investments, MSCI, STOXX, FTSE, Nikkei, as of 9/30/17

# Domestic equity

U.S. equities moved upward over the quarter (S&P 500 +4.5%), reaching record highs, but underperformed international markets (MSCI EAFE +5.4%). Earnings growth remained the primary driver of robust equity performance, though Q3 earnings growth expectations have fallen due to hurricane-related insurance industry losses. The possibility of U.S. tax reform has likely contributed to a positive domestic equity outlook.

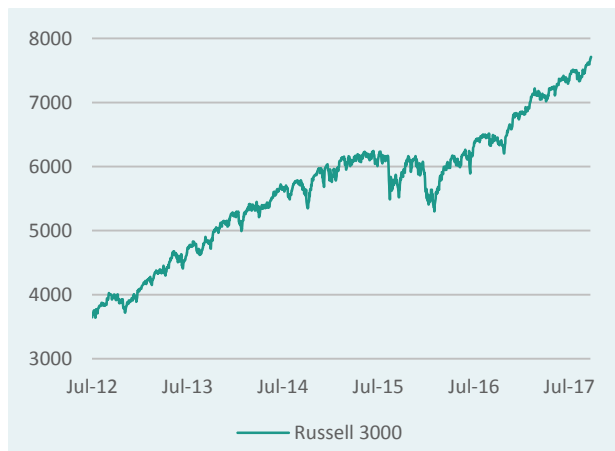
According to FactSet, as of October 6th the estimated Q3 earnings growth rate of the S&P 500 was 2.8% YoY, a

materially weaker figure than the 7.5% which was expected as of June 30. Most of the weakness was caused by insurance industry losses due to hurricane damage. Excluding this sector would result in a current estimate of 4.9% overall growth rather than 2.8%.

U.S. domestically-facing business in aggregate are expected to face flat sales and revenue growth, while externally-facing businesses are expected to produce strong growth. U.S. dollar depreciation and international growth have created a tailwind to the performance of externally-focused U.S. businesses.

We maintain a neutral weight to U.S. equities

## U.S. EQUITIES



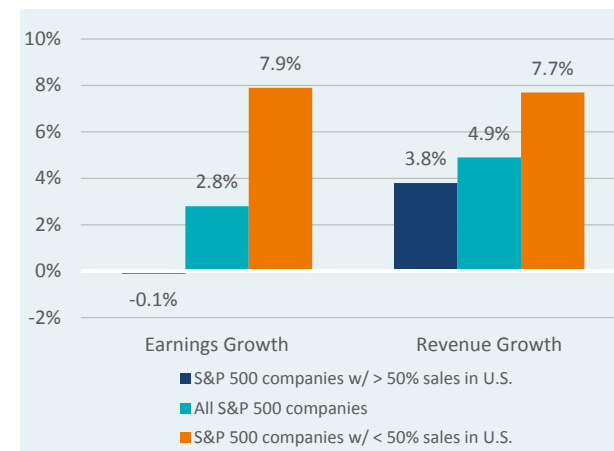
Source: Russell Investments, as of 9/29/17

## S&P 500 EPS GROWTH



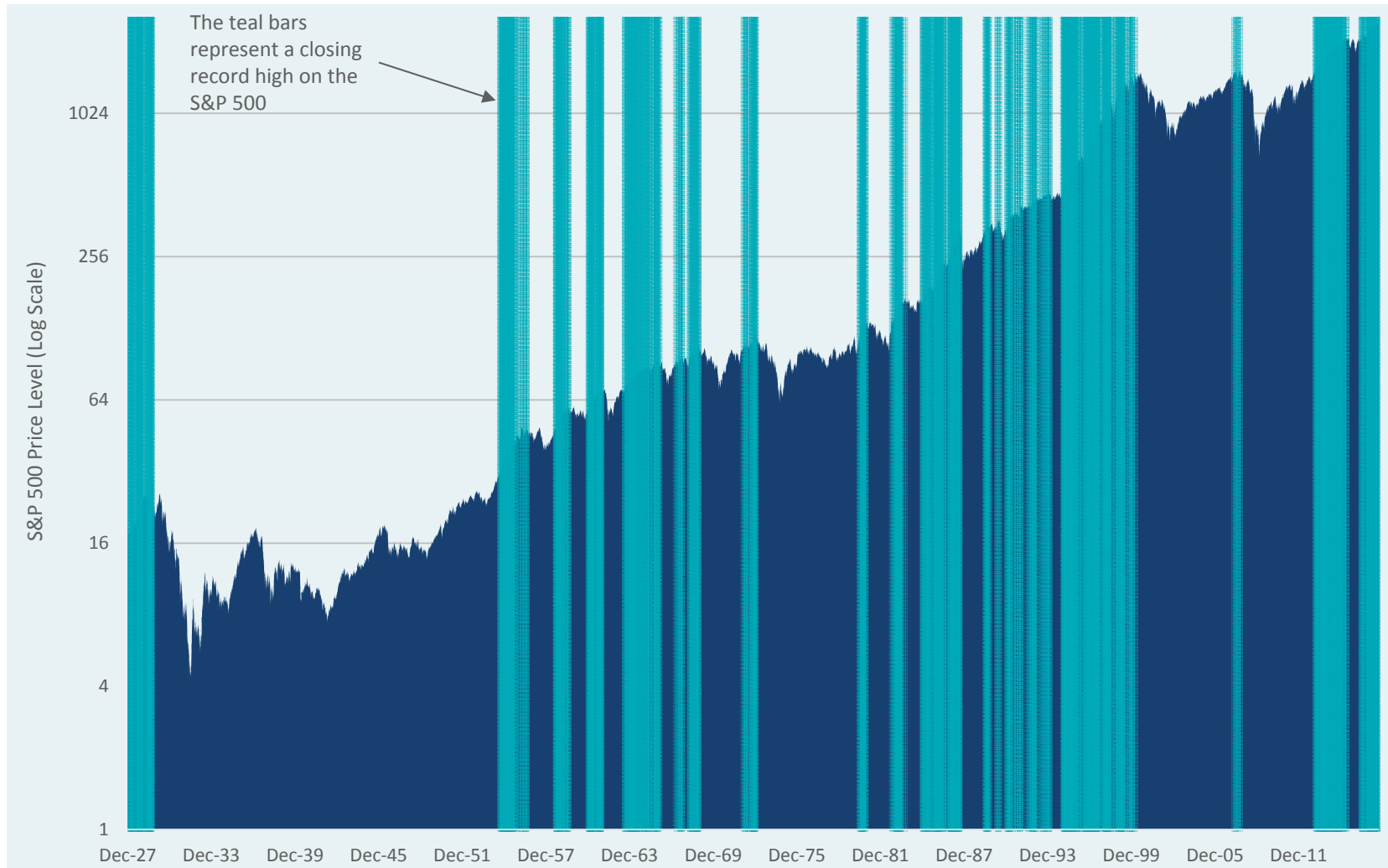
Source: Bloomberg, as of 9/30/17

## Q3 EXPECTATIONS



Source: FactSet, as of 10/6/17

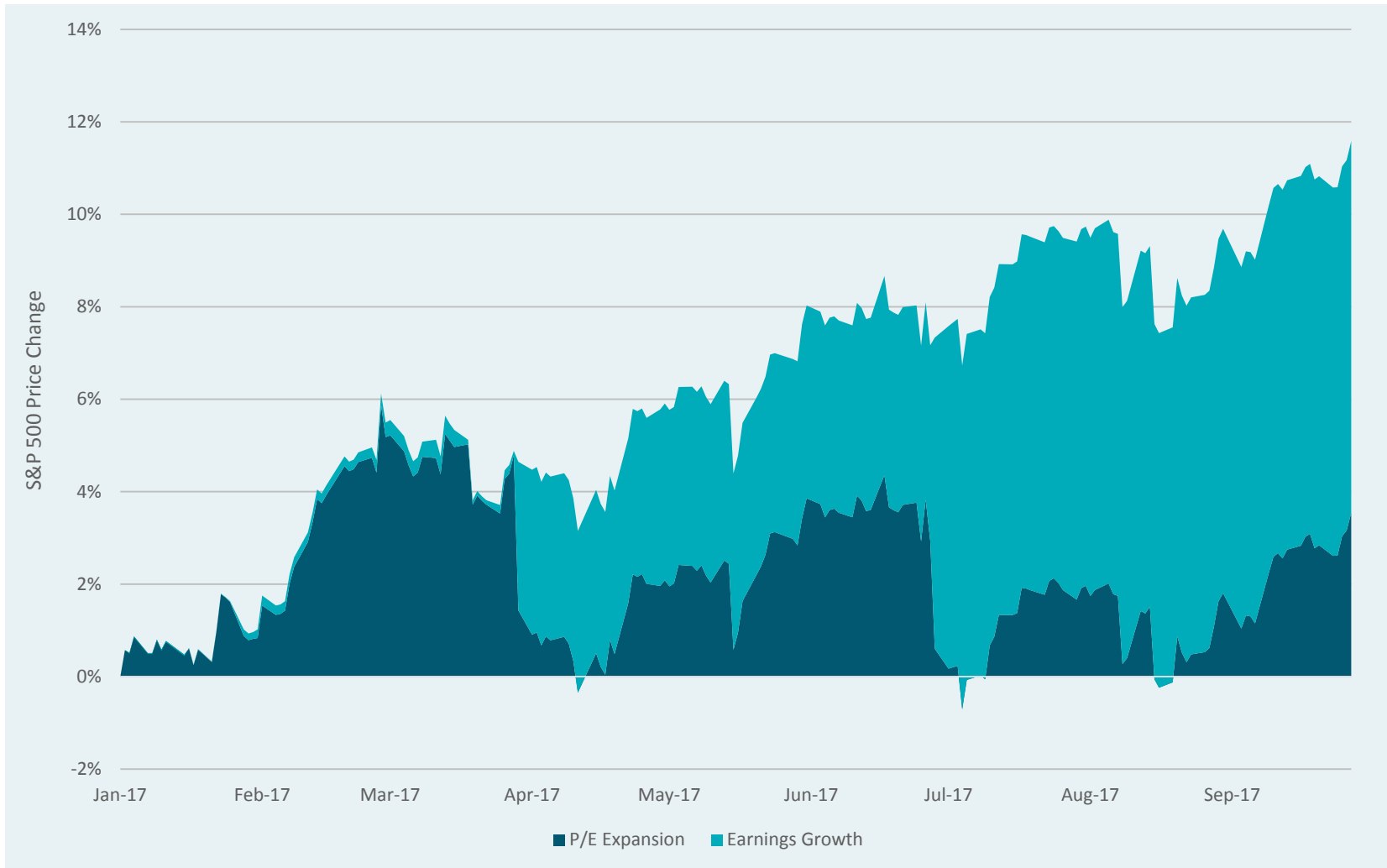
# Record highs



Equity market highs are reached on 5% of market trading days

Source: Verus, Bloomberg, as of 9/29/17, based on the closing price

# What is driving U.S. equities?



S&P 500 price appreciation has been driven by earnings growth so far this year

Source: Verus, Bloomberg, as of 9/29/17



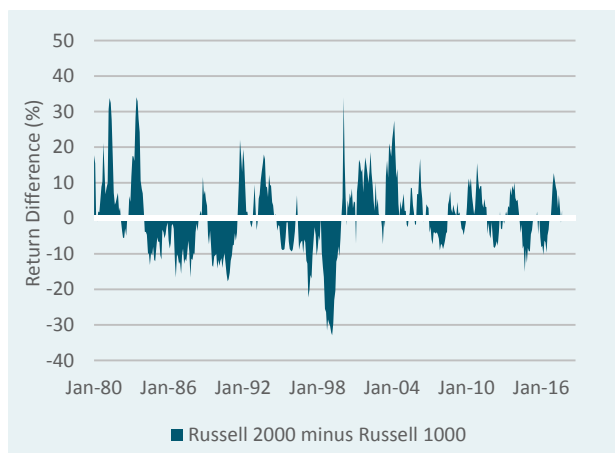
# Domestic equity size and style

Large cap equities led small cap equities through July and August. However, small cap equities rallied in September (+6.2% in the month) and outperformed large cap equities over the quarter. The move in September was partially attributed to an increased focus on U.S. tax reform. If passed, tax cuts will likely provide a greater marginal benefit to smaller companies. Expectations of lower taxes and deregulation have contributed to small cap price appreciation that has outpaced earnings. The relative P/E ratio between large and small companies is at its highest level since the financial crisis.

Large cap equities were led by the technology sector, from which the strongest contributors were semiconductor and internet software companies. The top three individual contributors were Apple, Facebook and Microsoft. Small cap equities were mainly driven by producer durables companies.

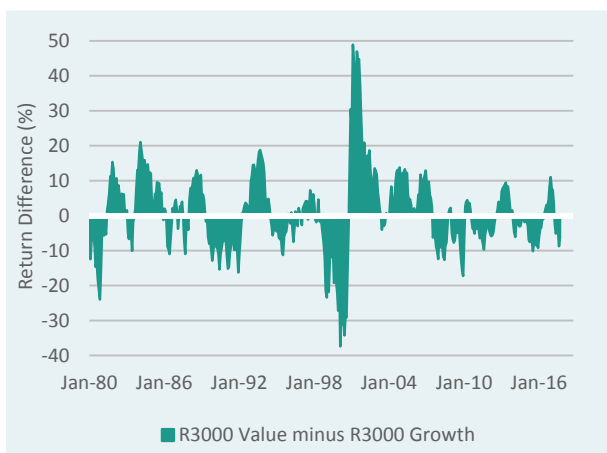
Growth outperformed value in Q3 due to a higher relative weighting to technology companies. Financial services, the most heavily weighted sector in value, returned a positive 5.0%, but still underperformed technology by 3.2%.

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



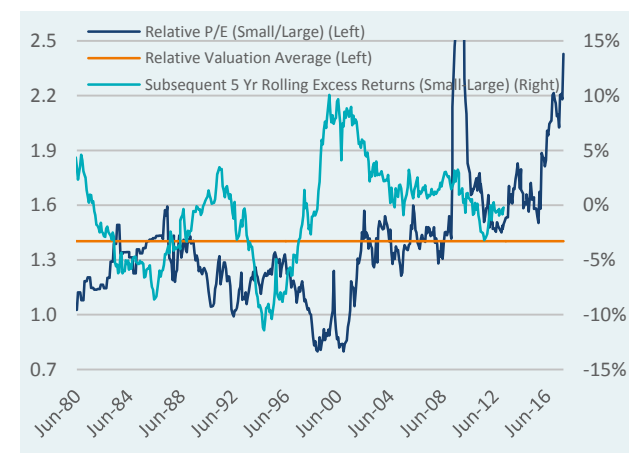
Source: Russell Investments, as of 9/30/17

**VALUE VS GROWTH (YOY)**



Source: Russell Investments, as of 9/30/17

**U.S. LARGE VS. SMALL RELATIVE VALUATIONS**



Source: Russell, Bloomberg, as of 9/30/17

# International equity

International equities outperformed domestic equities during the third quarter. The MSCI ACWI ex U.S. returned 6.2% (+4.6% hedged) while the S&P 500 returned 4.5%. Consistent with the first half of 2017, emerging markets outperformed (MSCI EM +7.9% unhedged) both the EAFE Small Cap Index (+7.5%) and the broad EAFE Index (+5.4%).

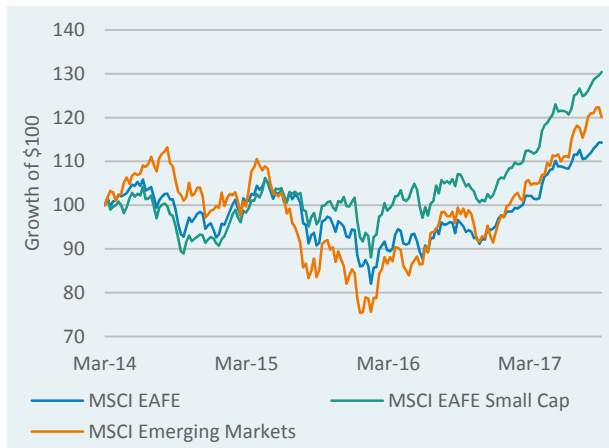
Japanese equities were the largest contributors to the EAFE index in Q3, particularly companies within the industrials and consumer discretionary sectors. Despite the positive moves, Japanese equity valuations based on earnings and

sales remain attractive relative to those in Europe and the United Kingdom.

MSCI EAFE valuations have remained relatively stable in 2017 as earnings and sales growth have kept pace with price appreciation.

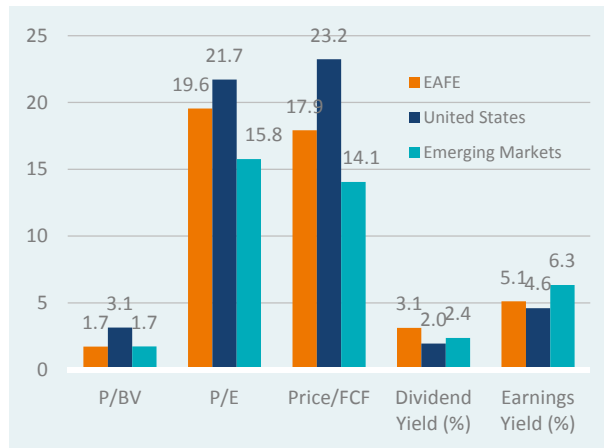
Currency effects added a positive 1.7% to the unhedged MSCI EAFE in Q3 (+7.6% year-to-date), as the U.S. dollar fell for a third consecutive quarter against a trade weighted basket of currencies.

## GLOBAL EQUITY PERFORMANCE



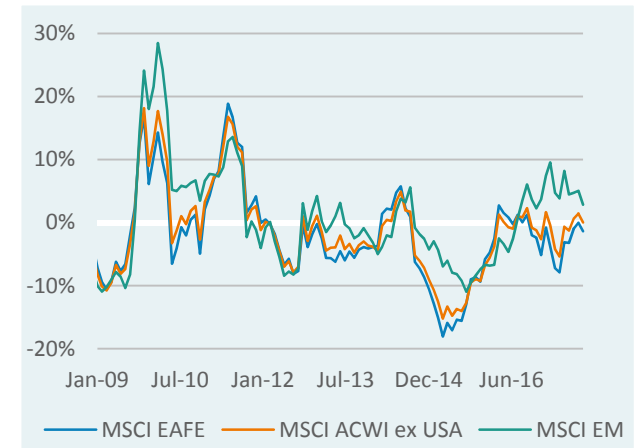
Source: Bloomberg, as of 9/30/17

## VALUATIONS



Source: Bloomberg, as of 9/30/17

## EFFECT OF CURRENCY (1 YEAR ROLLING)



Source: MSCI, as of 9/30/17

# Emerging market equity

We maintain an overweight to emerging market equities, which have historically delivered outsized economic growth and performance during stronger global growth environments.

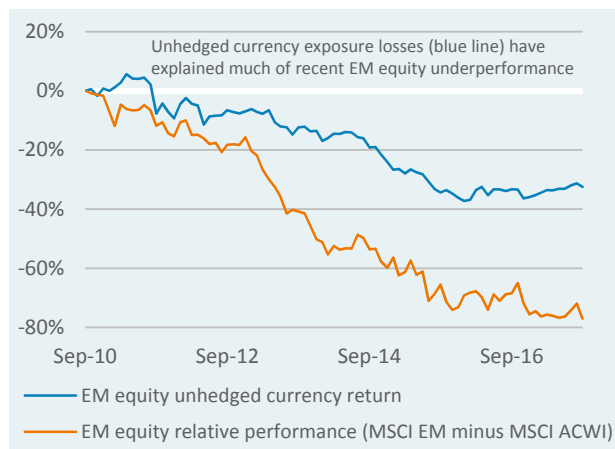
Emerging market equities have outperformed developed markets over the quarter (7.9% vs. 4.8%) and the past year (22.5% vs 18.2%), reversing an extended period of underperformance following the global financial crisis. Currency movement was a significant contributor to

emerging market underperformance during this time, and the recent reversal in currency trends has been additive to the outperformance of these markets.

Valuations have risen off of low levels, bolstering returns. These markets are no longer cheap relative to history though strong earnings growth and mean reversion of currencies could likely fuel further outsized equity gains.

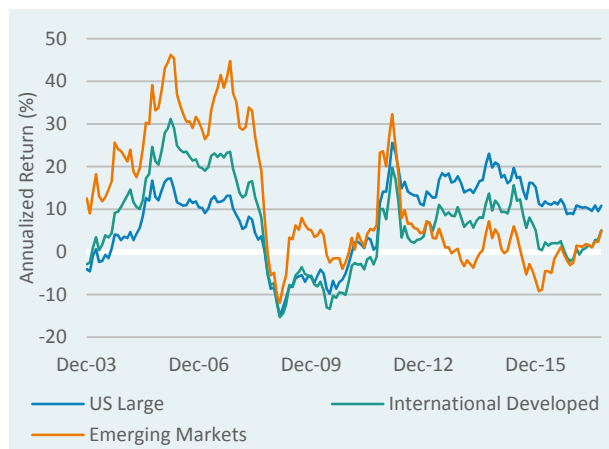
Accelerating global growth should have a positive effect on emerging economies

## EMERGING MARKET FX & RELATIVE PERFORMANCE (7YR CUMULATIVE)



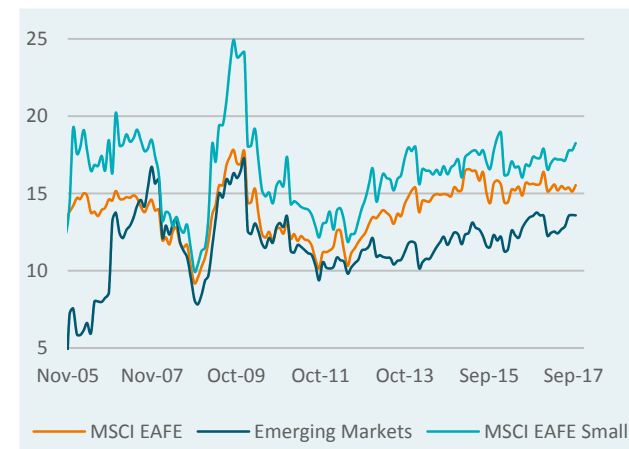
Source: MSCI, JP Morgan EM Currency Index, as of 9/30/17

## EQUITY PERFORMANCE (3YR ROLLING)



Source: Standard & Poor's, MSCI, as of 9/30/17

## FORWARD P/E RATIOS



Source: Bloomberg as of 9/30/17

# Emerging markets – High “growth beta”

During Q3 the trend of coordinated global economic growth continued. Emerging market equities materially outperformed global equities over the quarter (7.9% MSCI EM vs. 5.2% MSCI ACWI) and year-to-date (27.8% vs. 17.3%).

Emerging markets have historically performed well during periods of global growth acceleration, in terms of both equity performance and underlying economic growth.

The relationship between emerging market equities and world economic growth has historically exhibited a beta of 9.6. This suggests that, on average, investors might expect a 1% improvement in global growth to result in emerging market equity outperformance of 9.6%.

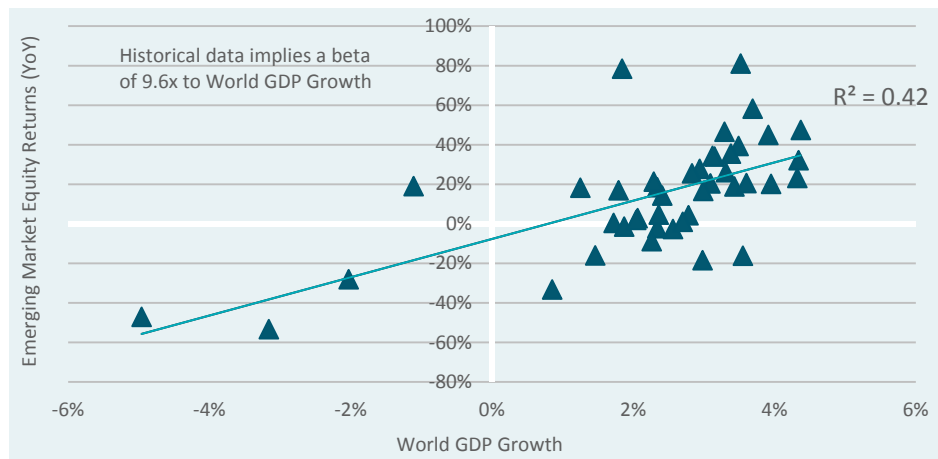
It is important to note that this relationship has also held on the downside, as emerging markets tend to produce poor returns during weak growth environments.

EM GROWTH RELATIONSHIP TO GLOBAL GROWTH



Source: Bloomberg, since 1996 – BRICS used to represent emerging market economic growth

EM EQUITY PERFORMANCE RELATIONSHIP TO GLOBAL GROWTH



Source: Bloomberg, since 1996 - MSCI

# Equity valuations

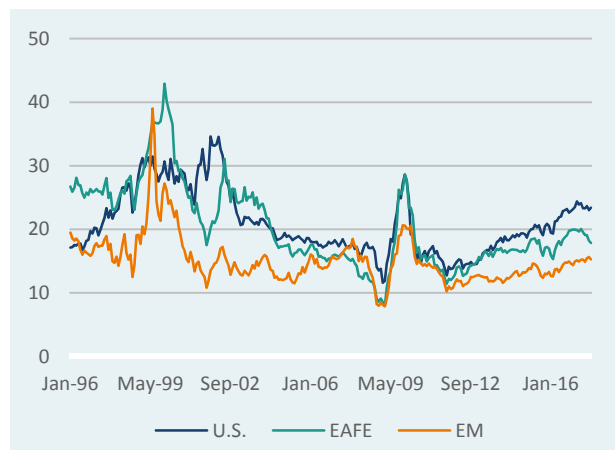
Equity valuations remain elevated compared to history, although recent price appreciation has been driven by earnings growth as opposed to multiple expansion. In international developed markets (EAFE), earnings growth over the past two quarters has outpaced price appreciation, leading to a slight decline in P/E ratios. The opposite has occurred in emerging markets where strong price gains have resulted in higher valuations. Relative to developed countries, emerging equities still appear attractive from a valuation perspective but are no longer considered cheap. Other valuation measures such as price-to-sales (P/S) ratios

also indicate equity prices are rich, especially in the U.S. The P/S ratio at the end of September was 2.1, the highest level since 2000. During this cycle, sales growth has lagged earnings growth (per share), influenced by expanding profit margins and an increase in equity buybacks.

Historically, higher valuations have led to lower future returns over the medium-term, on average. However, valuations can remain elevated for long periods of time and may be partially justified given the current environment of low interest rates and inflation.

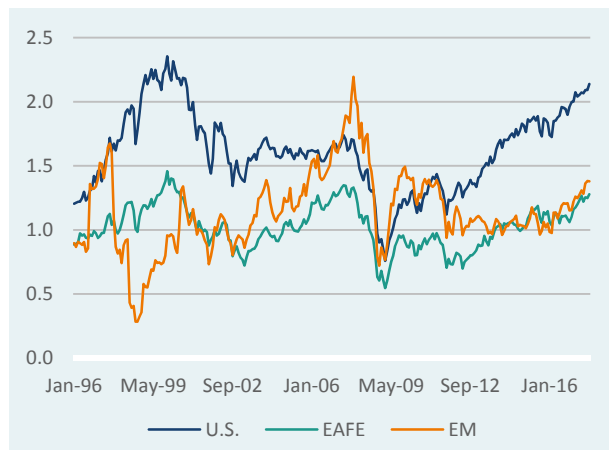
Valuations are elevated, but relative opportunities exist

TRAILING P/E RATIOS



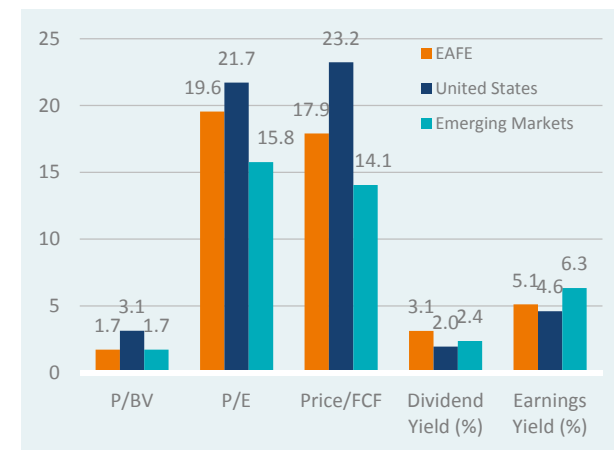
Source: Bloomberg, as of 9/30/17

TRAILING PRICE-TO-SALES RATIOS



Source: Bloomberg, as of 9/30/17

CURRENT VALUATION METRICS



Source: Bloomberg, as of 9/30/17

# Equity volatility

Despite a rise in geopolitical risks, including tensions on the Korean peninsula, realized volatility in equities over the quarter was extremely low, consistent with recent trends. In September, S&P 500 annualized volatility was 5%, the lowest level for a calendar month on record.

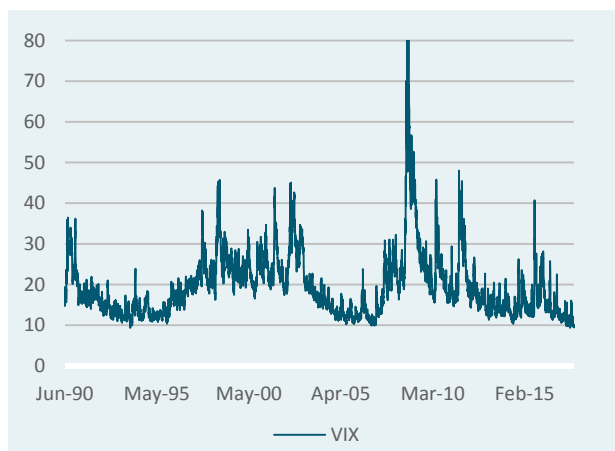
While many market participants have voiced concern over complacency, low volatility generally accompanies bull markets. We continue to watch volatility trends closely, but at this time do not view the current environment as a bearish signal. For investors in strategies with specific

volatility targets, such as risk parity, it is important to be aware of rising equity exposure and leverage. A spike in volatility may lead to forced equity selling during a downturn in order to maintain the risk target.

The CBOE Skew Index, which looks at the steepness of the volatility curve, is above its historical average. This indicates investors are still paying a premium for downside protection.

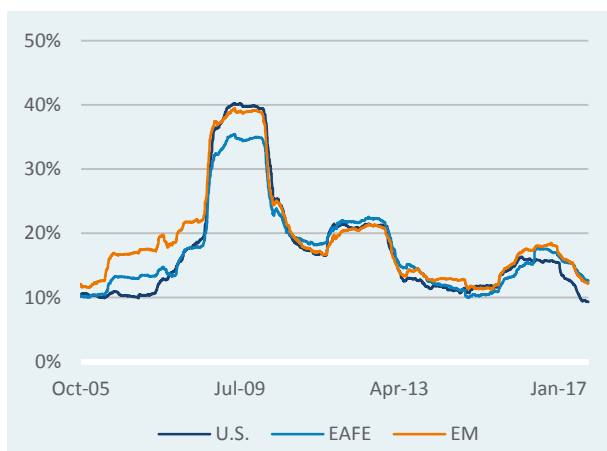
Equity volatility has trended downwards

**U.S. IMPLIED VOLATILITY**



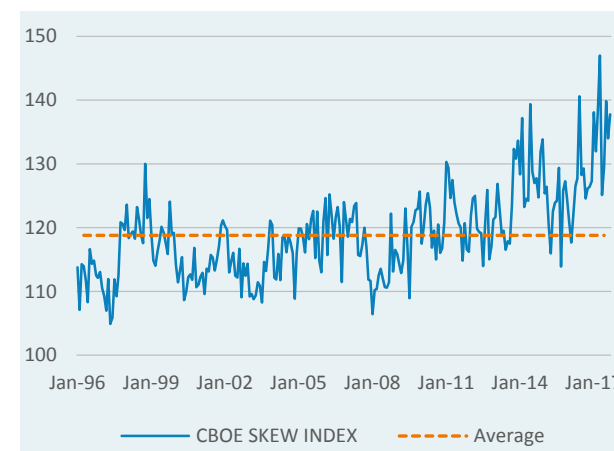
Source: CBOE, as of 9/30/17

**REALIZED 1-YEAR ROLLING VOLATILITY**



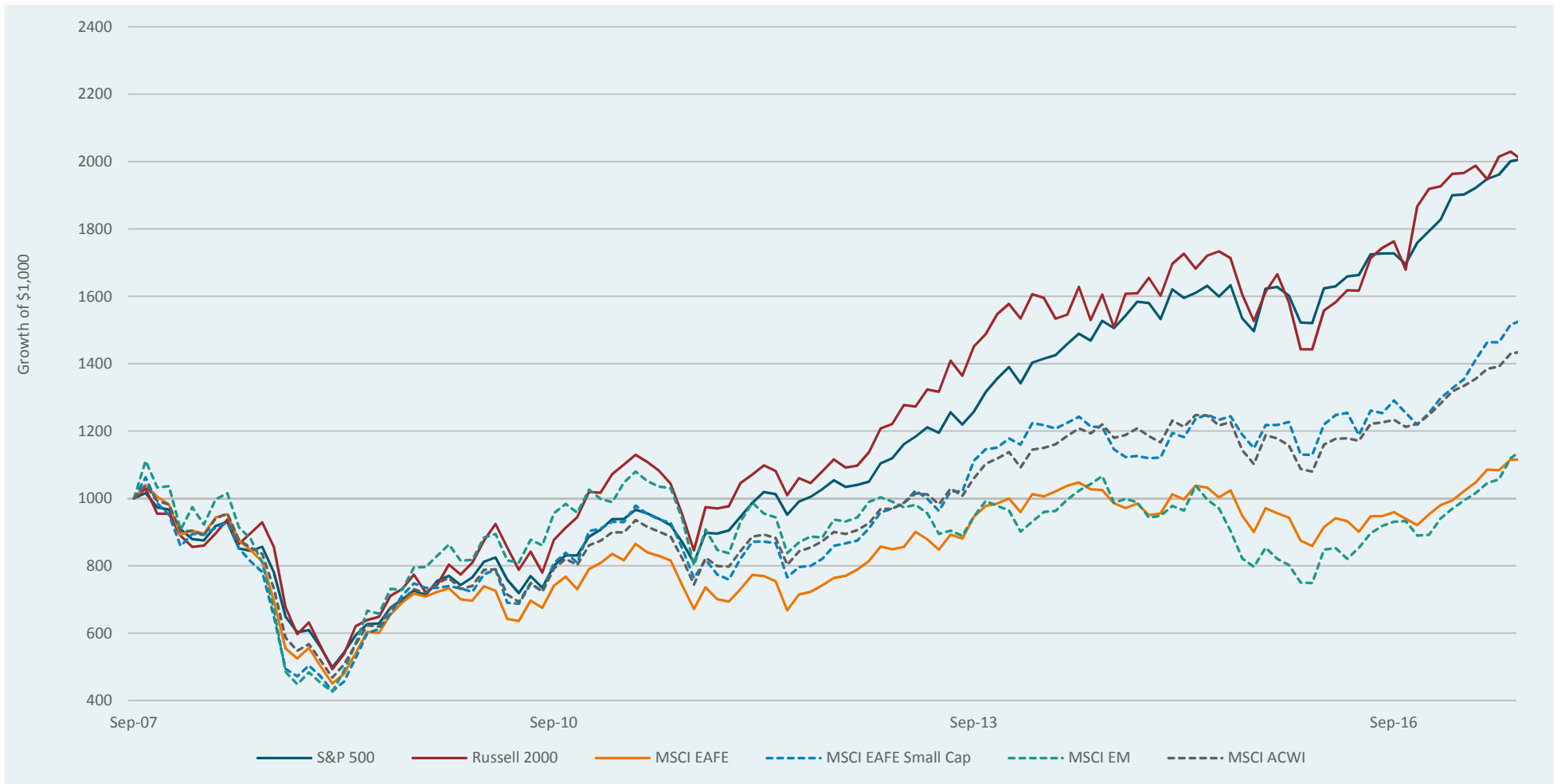
Source: Bloomberg, as of 9/30/17

**U.S. VOLATILITY SKEW**



Source: CBOE, as of 9/30/17

# Long-term equity performance



Source: MPI, as of 9/30/17

# Other assets



# Hedge funds

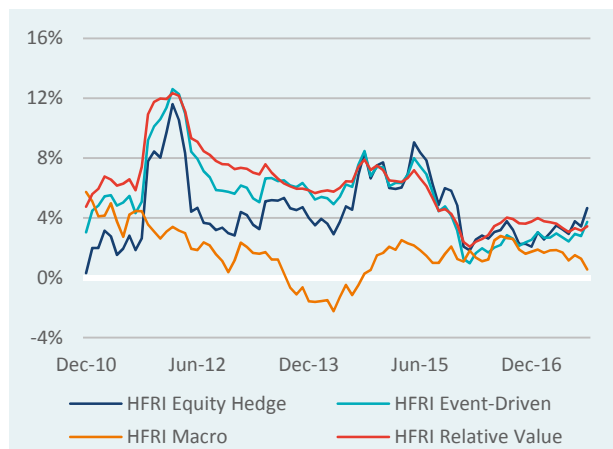
In aggregate, hedge funds returned 2.2% during Q3 and 5.5% year-to-date per HFRI. Equity hedge strategies were the top performer for both periods as they gained 3.5% and 9.6%, respectively. Short biased funds stood out as the only negative sub strategy during Q3, which is typical during equity rallies. Funds with greater net-long market exposure benefited from strong year-to-date equity market returns.

Emerging market hedge funds were notable winners this year as HFRI reported performance of 4.8% for Q3 and 14.7% year-to-date. Funds focused on Latin America (+10.2% for Q3,

16.5% YTD) were particularly strong performers. Those markets rallied due in part to a combination of pro-business politicians retaining power, improving economic growth prospects and stabilizing commodity markets.

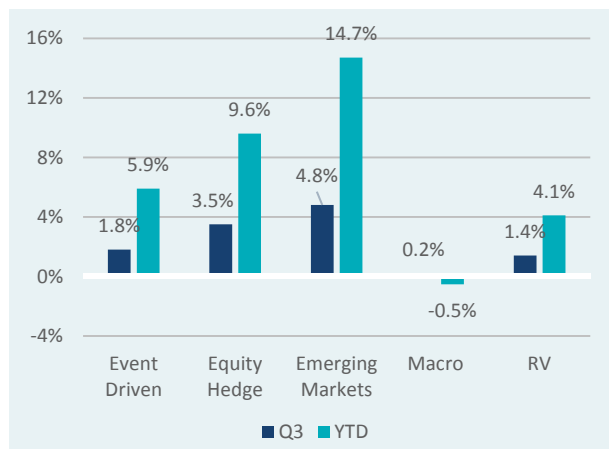
We are closely monitoring volatility levels because we understand that sudden changes in volatility regimes can negatively impact high gross leverage strategies. Our concerns are somewhat balanced due to more normal net leverage levels.

## 3-YEAR ROLLING STYLE PERFORMANCE



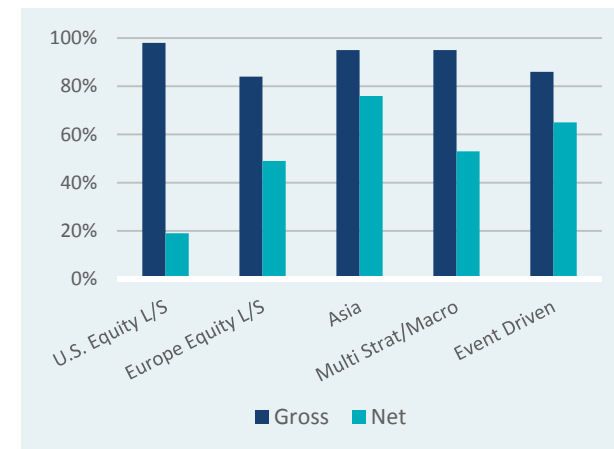
Source: HFRI, as of 9/30/17

## Q3 & YTD STYLE PERFORMANCE



Source: HFRI, as of 9/30/17

## LEVERAGE (PERCENTILE RANK SINCE 2010)



Source: Morgan Stanley, as of 9/30/17

# Currency

The U.S. dollar depreciated an additional 2.7% in Q3 against a trade weighted basket of developed currencies, which brought the year-to-date decline to 8.0%. The downward trend partially reversed in September after prospects of another interest rate hike in December from the Fed helped lead to the first month of dollar appreciation so far this year. The euro appreciated 3.4% against the dollar over the quarter, influenced by improving economic conditions and the possibility of ECB tightening monetary policy.

After several years of depreciation, emerging market

currencies have stabilized. Improved current account balances and economic growth conditions have provided a positive backdrop for these currencies moving forward. However, a quicker than expected rise in U.S. interest rates could represent a headwind to further appreciation.

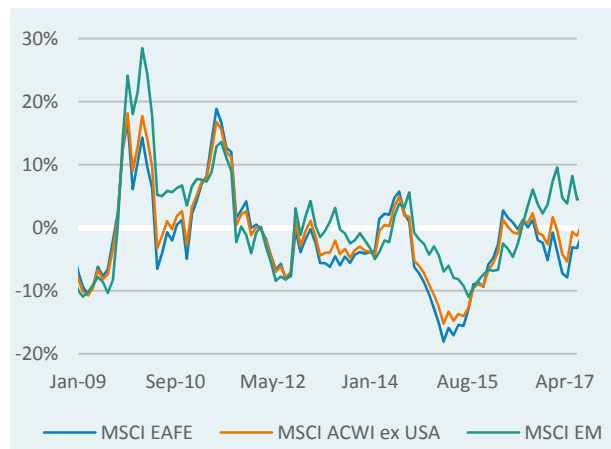
Currency losses from unhedged exposure to developed international equities has begun to reverse due to recent dollar weakness, although currency exposure has still resulted in materially higher volatility.

**U.S. DOLLAR TRADE WEIGHTED INDEX**



Source: Federal Reserve, as of 9/30/17

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



Source: MPI, as of 9/30/17

**JPM EM CURRENCY INDEX**



Source: JPMorgan, as of 9/30/17

# Appendix

# Periodic table of returns

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	YTD	5-Year	10-Year
Emerging Markets Equity	16.6	38.4	23.2	35.2	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	27.8	15.3	9.1
Large Cap Growth	8.1	37.8	23.1	32.9	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	20.7	14.3	8.5
International Equity	6.4	37.2	22.4	31.8	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	20.0	14.3	7.8
Small Cap Growth	4.4	31.0	21.6	30.5	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	16.8	13.8	7.5
Large Cap Equity	3.2	28.5	21.4	22.4	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	14.2	13.3	7.1
60/40 Global Portfolio	2.6	25.7	16.5	16.2	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	12.7	13.2	6.4
Small Cap Equity	0.4	19.6	14.4	13.9	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	10.9	10.5	5.9
Large Cap Value	-1.5	18.5	11.3	12.9	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	7.9	8.4	4.3
Small Cap Value	-1.8	15.2	10.3	10.6	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	5.7	6.3	4.0
Hedge Funds of Funds	-2.0	11.6	9.9	9.7	-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	5.5	4.0	1.3
Real Estate	-2.4	11.1	6.4	5.2	-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	3.3	3.8	1.3
US Bonds	-2.9	7.5	6.0	2.1	-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	3.1	2.1	1.1
Cash	-3.5	5.7	5.1	-3.4	-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	0.6	0.2	0.4
Commodities	-7.3	-5.2	3.6	-11.6	-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	-2.9	-10.5	-6.8

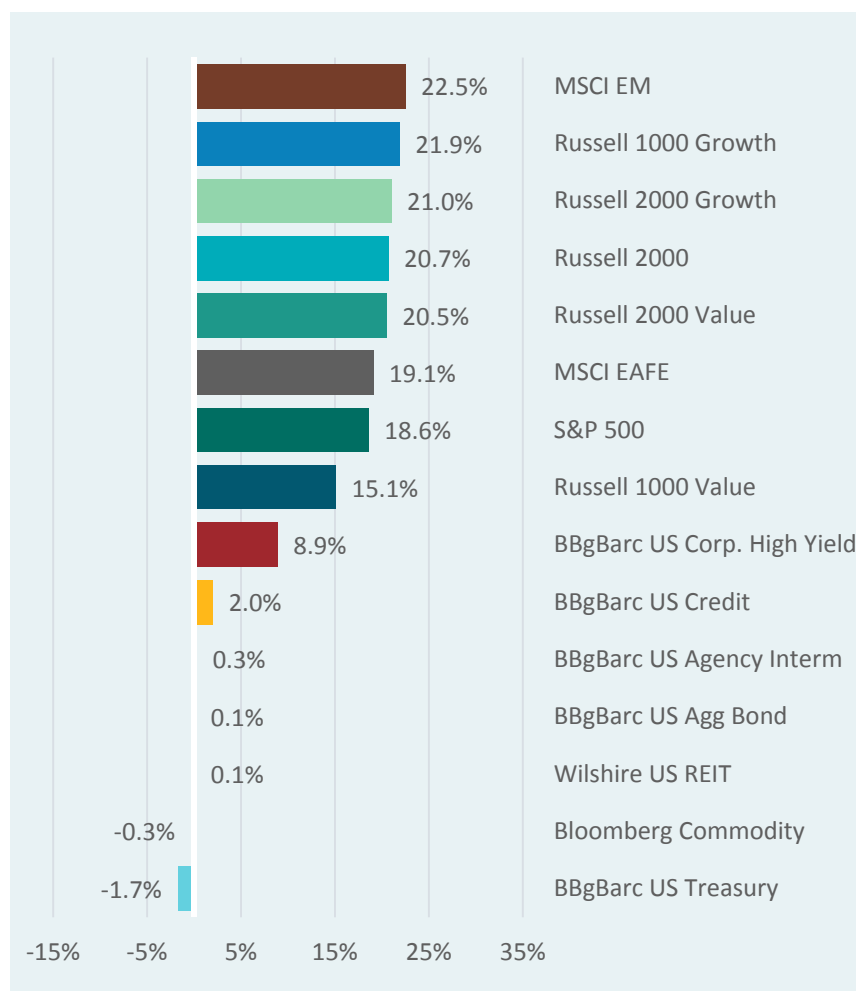
WORST

<span style="display:inline-block; width:15px; height:15px; background-color:#ADD8E6; border:1px solid black;"></span> Large Cap Equity	<span style="display:inline-block; width:15px; height:15px; background-color:#006400; border:1px solid black;"></span> Small Cap Growth	<span style="display:inline-block; width:15px; height:15px; background-color:#8B4513; border:1px solid black;"></span> Commodities
<span style="display:inline-block; width:15px; height:15px; background-color:#00008B; border:1px solid black;"></span> Large Cap Value	<span style="display:inline-block; width:15px; height:15px; background-color:#FFD700; border:1px solid black;"></span> International Equity	<span style="display:inline-block; width:15px; height:15px; background-color:#4682B4; border:1px solid black;"></span> Real Estate
<span style="display:inline-block; width:15px; height:15px; background-color:#00008B; border:1px solid black;"></span> Large Cap Growth	<span style="display:inline-block; width:15px; height:15px; background-color:#FF8C00; border:1px solid black;"></span> Emerging Markets Equity	<span style="display:inline-block; width:15px; height:15px; background-color:#90EE90; border:1px solid black;"></span> Hedge Funds of Funds
<span style="display:inline-block; width:15px; height:15px; background-color:#7FFFD4; border:1px solid black;"></span> Small Cap Equity	<span style="display:inline-block; width:15px; height:15px; background-color:#696969; border:1px solid black;"></span> US Bonds	<span style="display:inline-block; width:15px; height:15px; background-color:#FF0000; border:1px solid black;"></span> 60% MSCI ACWI/40% BBgBarc Global Bond
<span style="display:inline-block; width:15px; height:15px; background-color:#008080; border:1px solid black;"></span> Small Cap Value	<span style="display:inline-block; width:15px; height:15px; background-color:#D3D3D3; border:1px solid black;"></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 6/30/17.

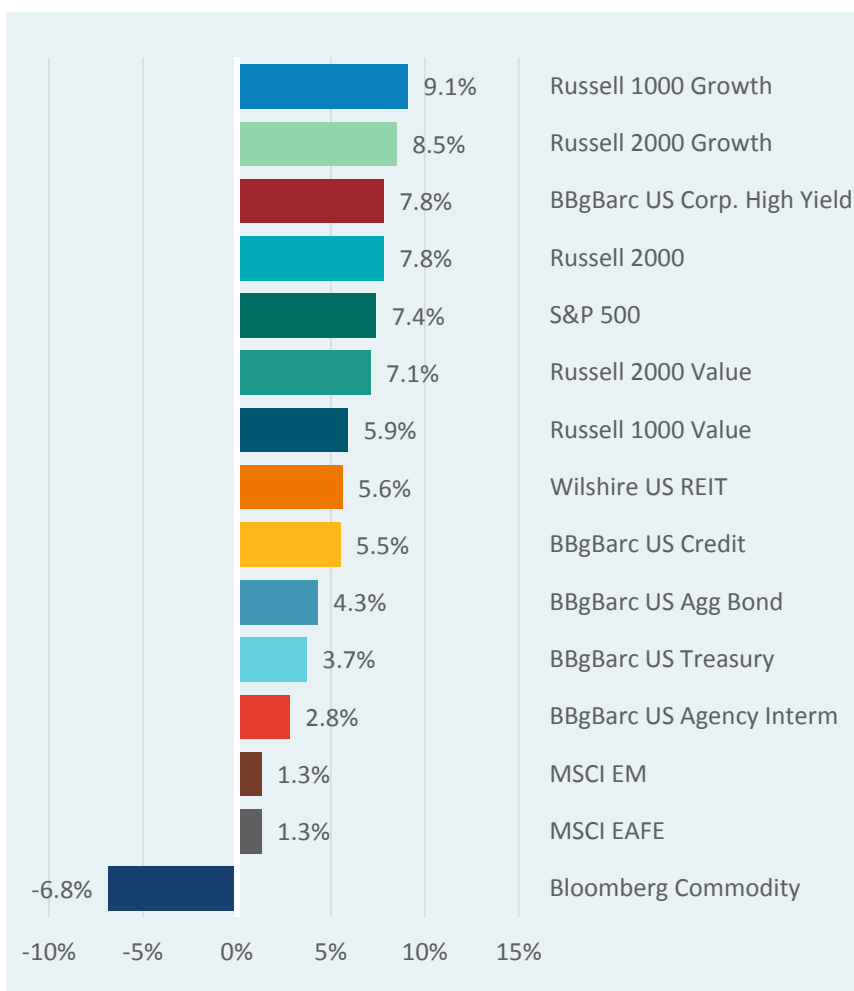
# Major asset class returns

ONE YEAR ENDING SEPTEMBER



Source: Morningstar, as of 9/30/17

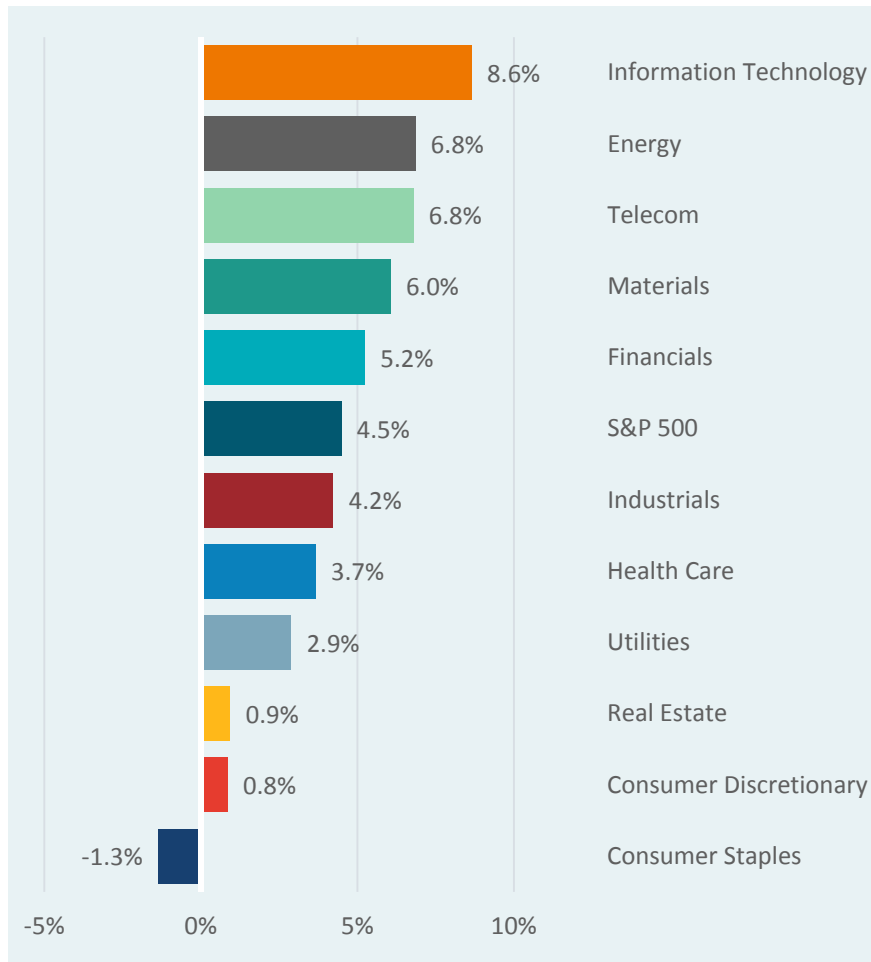
TEN YEARS ENDING SEPTEMBER



Source: Morningstar, as of 9/30/17

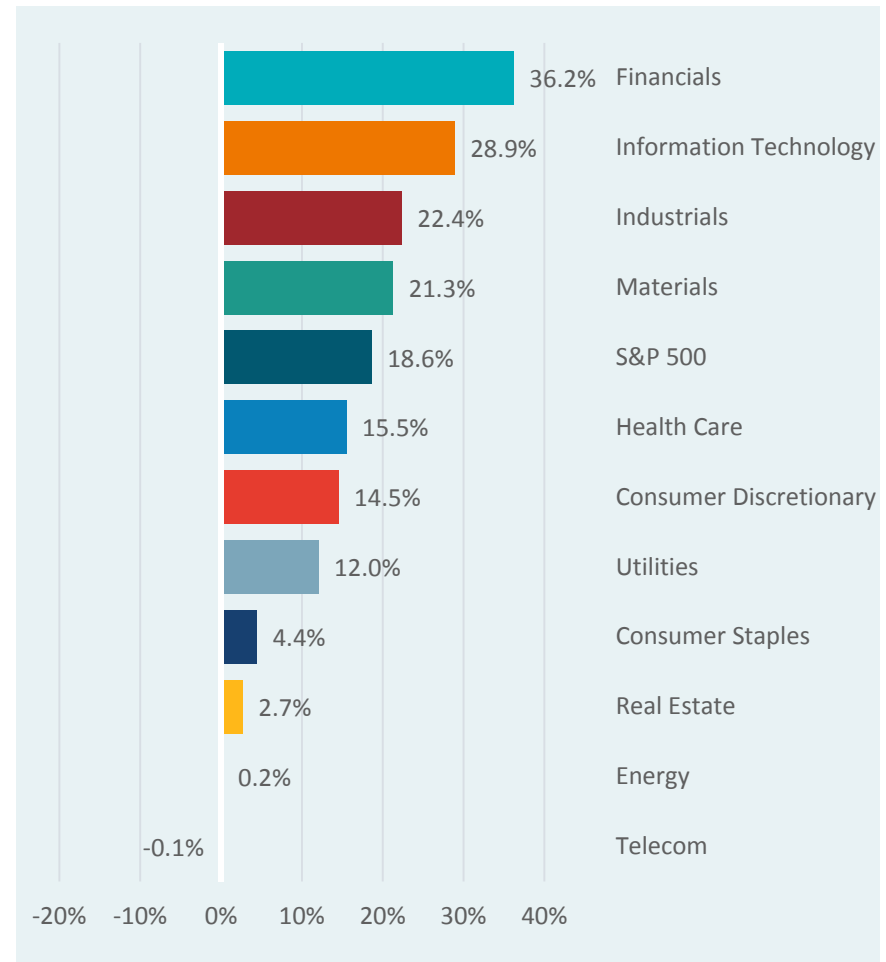
# S&P 500 sector returns

## 3<sup>RD</sup> QUARTER



Source: Morningstar, as of 9/30/17

## ONE YEAR ENDING SEPTEMBER



Source: Morningstar, as of 9/30/17

# Detailed index returns

## DOMESTIC EQUITY

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
<b>Core Index</b>							
S&P 500	2.1	4.5	14.2	18.6	10.8	14.2	7.4
S&P 500 Equal Weighted	2.9	3.6	11.9	16.2	10.1	15.0	8.9
DJ Industrial Average	2.2	5.6	15.5	25.5	12.3	13.6	7.7
Russell Top 200	1.9	4.9	15.1	19.8	11.1	14.3	7.3
Russell 1000	2.1	4.5	14.2	18.5	10.6	14.3	7.5
Russell 2000	6.2	5.7	10.9	20.7	12.2	13.8	7.8
Russell 3000	2.4	4.6	13.9	18.7	10.7	14.2	7.6
Russell Mid Cap	2.8	3.5	11.7	15.3	9.5	14.3	8.1
<b>Style Index</b>							
Russell 1000 Growth	1.3	5.9	20.7	21.9	12.7	15.3	9.1
Russell 1000 Value	3.0	3.1	7.9	15.1	8.5	13.2	5.9
Russell 2000 Growth	5.4	6.2	16.8	21.0	12.2	14.3	8.5
Russell 2000 Value	7.1	5.1	5.7	20.5	12.1	13.3	7.1

## INTERNATIONAL EQUITY

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
<b>Broad Index</b>							
MSCI ACWI	1.9	5.2	17.3	18.6	7.4	10.2	3.9
MSCI ACWI ex US	1.9	6.2	21.1	19.6	4.7	7.0	1.3
MSCI EAFE	2.5	5.4	20.0	19.1	5.0	8.4	1.3
MSCI EM	(0.4)	7.9	27.8	22.5	4.9	4.0	1.3
MSCI EAFE Small Cap	2.9	7.5	25.4	21.8	11.1	12.8	4.6
<b>Style Index</b>							
MSCI EAFE Growth	1.9	4.9	22.4	15.7	6.5	8.9	2.1
MSCI EAFE Value	3.1	5.9	17.6	22.5	3.5	7.8	0.5
<b>Regional Index</b>							
MSCI UK	3.3	5.2	15.7	14.6	0.8	4.9	0.7
MSCI Japan	2.0	4.0	14.3	14.1	7.7	10.6	1.7
MSCI Euro	3.9	8.0	25.9	28.4	5.6	9.9	(0.0)
MSCI EM Asia	(0.0)	7.0	31.8	23.8	8.0	7.4	2.7
MSCI EM Latin American	1.6	15.1	26.7	25.6	(0.3)	(1.9)	(0.8)

Source: Morningstar, as of 9/30/17

## FIXED INCOME

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
<b>Broad Index</b>							
BBgBarc US Treasury US TIPS	(0.6)	0.9	1.7	(0.7)	1.6	0.0	3.9
BBgBarc US Treasury Bills	0.1	0.3	0.6	0.6	0.3	0.2	0.5
BBgBarc US Agg Bond	(0.5)	0.8	3.1	0.1	2.7	2.1	4.3
<b>Duration</b>							
BBgBarc US Treasury 1-3 Yr	(0.2)	0.2	0.7	0.2	0.8	0.6	1.7
BBgBarc US Treasury Long	(2.2)	0.6	6.0	(6.4)	4.9	2.8	6.9
BBgBarc US Treasury	(0.9)	0.4	2.3	(1.7)	2.0	1.2	3.7
<b>Issuer</b>							
BBgBarc US MBS	(0.2)	1.0	2.3	0.3	2.4	2.0	4.1
BBgBarc US Corp. High Yield	0.9	2.0	7.0	8.9	5.8	6.4	7.8
BBgBarc US Agency Interm	(0.3)	0.3	1.4	0.3	1.5	1.1	2.8
BBgBarc US Credit	(0.2)	1.3	5.1	2.0	3.9	3.2	5.5

## OTHER

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
<b>Index</b>							
Bloomberg Commodity	(0.1)	2.5	(2.9)	(0.3)	(10.4)	(10.5)	(6.8)
Wilshire US REIT	(0.1)	0.6	2.4	0.1	9.7	9.5	5.6
CS Leveraged Loans	0.4	1.1	3.0	5.4	4.0	4.4	4.4
<b>Regional Index</b>							
JPM EMBI Global Div	0.0	2.6	9.0	4.6	6.5	4.9	7.5
JPM GBI-EM Global Div	(0.3)	3.6	14.3	7.3	0.3	(0.9)	3.8
<b>Hedge Funds</b>							
HFRI Composite	0.5	2.1	5.7	6.9	3.3	4.7	3.1
HFRI FOF Composite	0.4	2.2	5.5	6.4	2.2	3.8	1.1
<b>Currency (Spot)</b>							
Euro	(0.6)	3.7	12.1	5.2	(2.2)	(1.7)	(1.8)
Pound	4.1	3.3	8.6	3.3	(6.1)	(3.6)	(4.1)
Yen	(2.2)	(0.2)	3.6	(10.0)	(0.9)	(7.1)	0.2

# 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))

**Citi Economic Surprise Index** - objective and quantitative measures of economic news. Defined as weighted historical standard deviations of data surprises (actual releases vs Bloomberg survey median). A positive reading of the Economic Surprise Index suggests that economic releases have on balance been beating consensus. The indices are calculated daily in a rolling three-month window. The weights of economic indicators are derived from relative high-frequency spot FX impacts of 1 standard deviation data surprises. The indices also employ a time decay function to replicate the limited memory of markets. ([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, 2017



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SEATTLE 206-622-3700

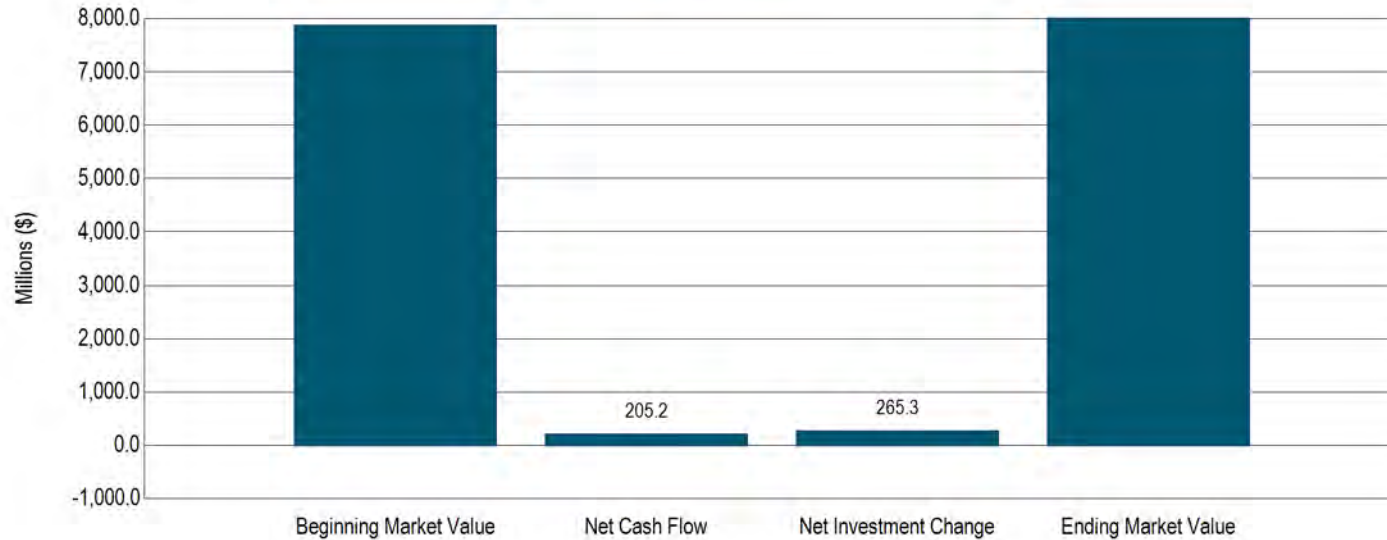
LOS ANGELES 310-297-1777

SAN FRANCISCO 415-362-3484

**Portfolio Reconciliation**

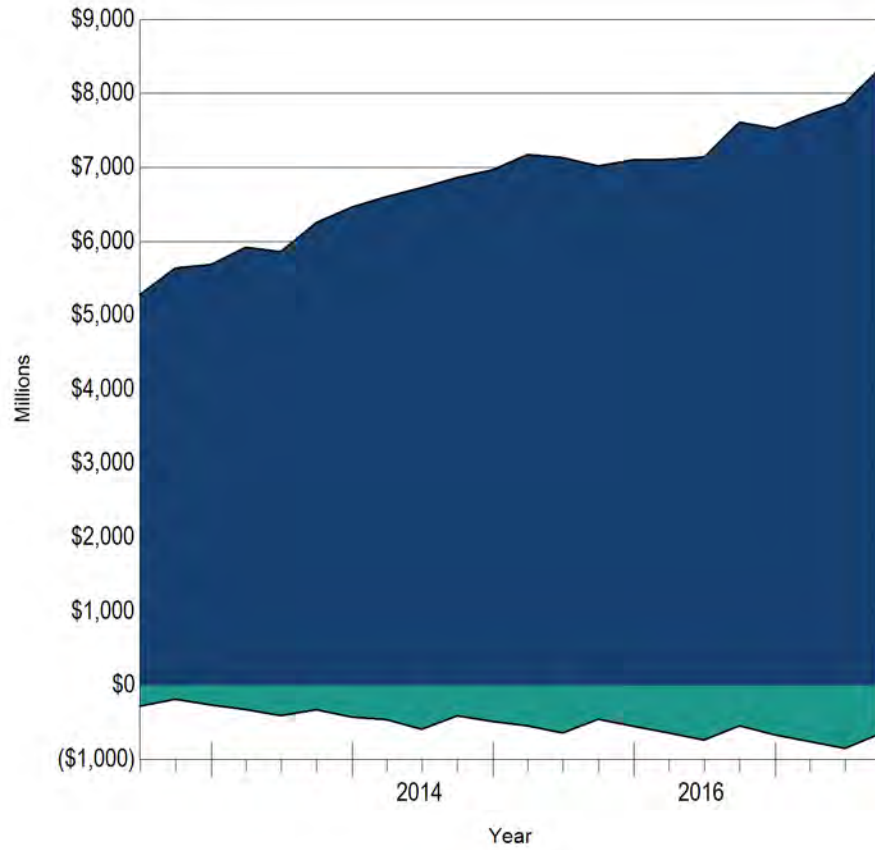
	Last Three Months	Year-To-Date
Beginning Market Value	\$7,872,495,171	\$7,526,951,623
Net Cash Flow	\$205,212,095	\$34,550,883
Net Investment Change	\$265,274,177	\$781,478,937
Ending Market Value	\$8,342,981,443	\$8,342,981,443

**Change in Market Value  
Last Three Months**



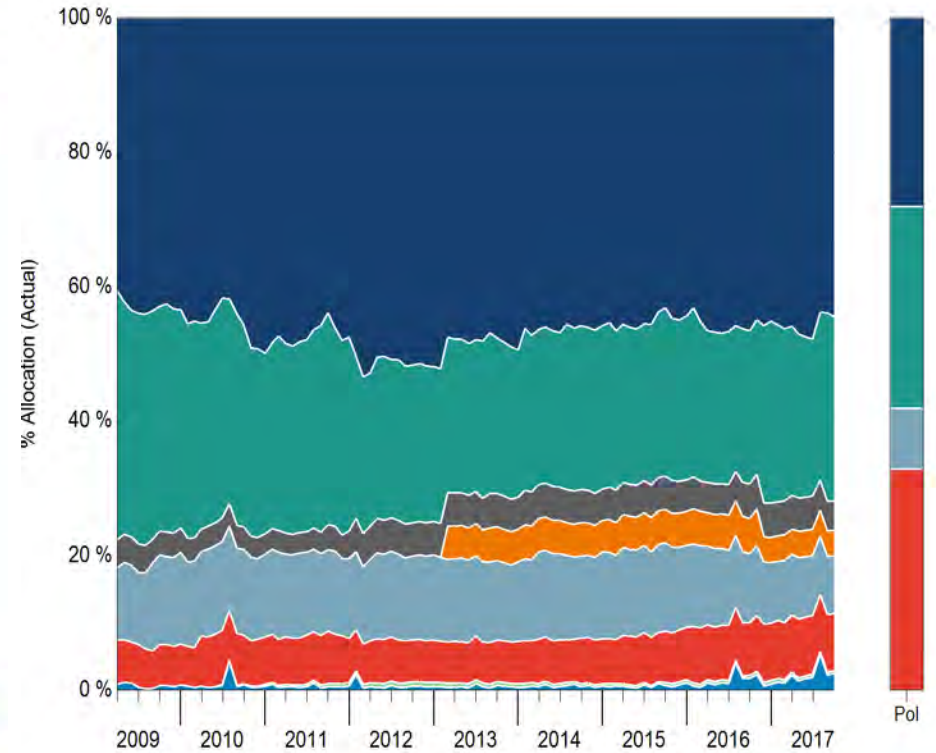
Contributions and withdrawals may include intra-account transfers between managers/funds.

Market Value History  
Cumulative Cash Flows



Market Value Net Cash Flow

Asset Allocation History



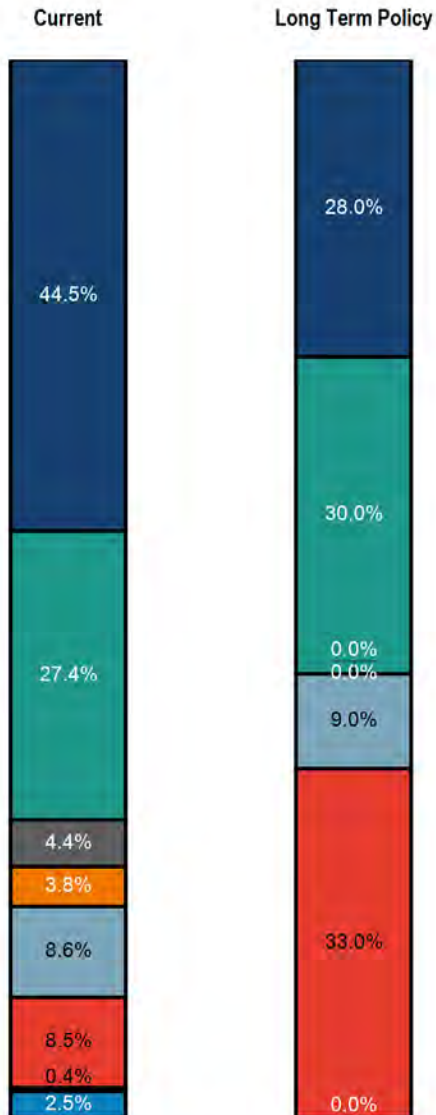
Global Equity Inflation Hedge/Real Assets Opportunistic  
Global Fixed Income Real Estate Cash  
High Yield Fixed Income Alternative Investments

Policy reflects FFP 4-Yr allocations approved in May 2017.

# Total Fund

## Asset Allocation vs. Long Term Target Policy

Period Ending: September 30, 2017



### Allocation vs. Long Term Target

	Current Balance	Current Allocation	Long Term Target	Difference
Global Equity	\$3,711,711,674	44.5%	28.0%	\$1,375,676,870
Global Fixed Income	\$2,283,078,202	27.4%	30.0%	-\$219,816,231
High Yield Fixed Income	\$364,747,075	4.4%	0.0%	\$364,747,075
Inflation Hedge/Real Assets	\$317,401,228	3.8%	0.0%	\$317,401,228
Real Estate	\$713,941,949	8.6%	9.0%	-\$36,926,381
Alternative Investments	\$712,449,633	8.5%	33.0%	-\$2,040,734,243
Opportunistic	\$33,182,759	0.4%	0.0%	\$33,182,759
Cash	\$206,468,923	2.5%	0.0%	\$206,468,923
<b>Total</b>	<b>\$8,342,981,443</b>	<b>100.0%</b>	<b>100.0%</b>	

### Allocation vs. Current Targets

	Current Balance	Current Allocation	Current Target	Difference
Global Equity	\$3,711,711,674	44.5%	44.4%	\$7,427,914
Global Fixed Income	\$2,283,078,202	27.4%	27.4%	-\$2,898,714
High Yield Fixed Income	\$364,747,075	4.4%	5.0%	-\$52,401,997
Inflation Hedge/Real Assets	\$317,401,228	3.8%	3.9%	-\$7,975,048
Real Estate	\$713,941,949	8.6%	9.2%	-\$53,612,344
Alternative Investments	\$712,449,633	8.5%	8.2%	\$28,325,155
Opportunistic	\$33,182,759	0.4%	0.5%	-\$8,532,149
Cash	\$206,468,923	2.5%	1.4%	\$89,667,183
<b>Total</b>	<b>\$8,342,981,443</b>	<b>100.0%</b>	<b>100.0%</b>	

Long Term Targets reflect FFP 4-Yr allocations approved in May 2017.

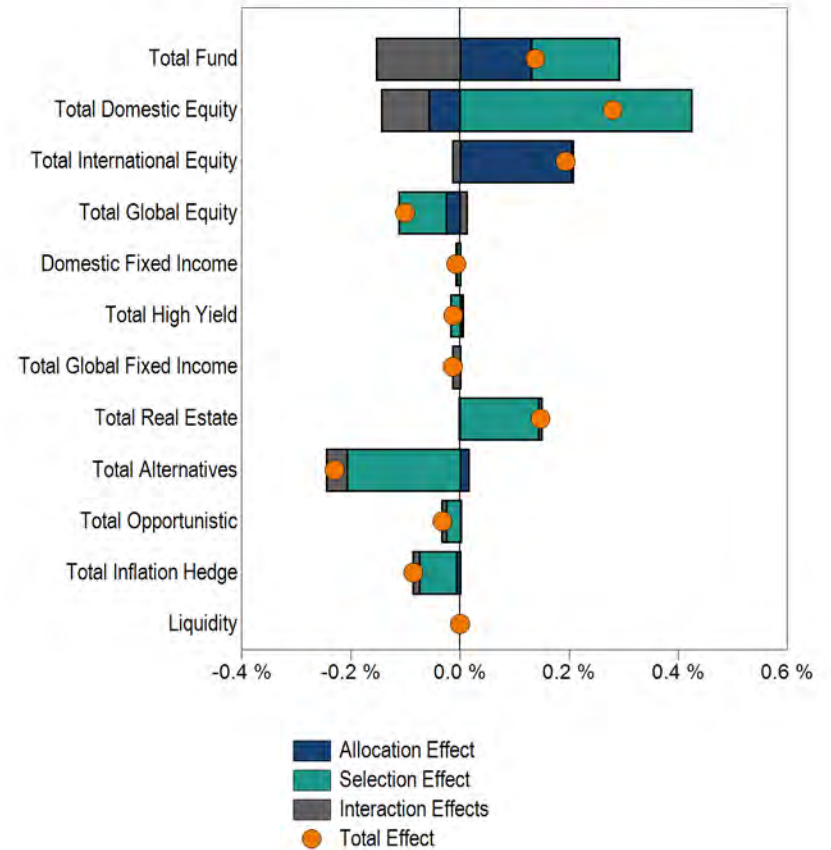
Current Targets reflect Phase 2a Targets approved in March 2017.

# Total Fund Executive Summary (Gross of Fees)

Period Ending: September 30, 2017

	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs
<b>Total Fund</b>	<b>100.0</b>	<b>3.3</b>	<b>10.5</b>	<b>11.0</b>	<b>7.7</b>	<b>9.5</b>	<b>6.2</b>
Policy Index		3.1	10.2	10.6	7.3	9.2	--
InvestorForce Public DB > \$1B Gross Rank		77	78	83	33	32	18
<b>Total Fund ex Overlay &amp; Cash</b>	<b>97.5</b>	<b>3.3</b>	<b>10.5</b>	<b>11.0</b>	<b>7.7</b>	<b>9.5</b>	<b>6.2</b>
Policy Index		3.1	10.2	10.6	7.3	9.2	--
InvestorForce Public DB > \$1B Gross Rank		78	78	83	33	32	18
<b>Growth</b>	<b>68.2</b>	<b>4.4</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
Total Domestic Equity	16.8	6.4	16.7	20.7	12.2	15.0	8.3
Russell 3000		4.6	13.9	18.7	10.7	14.2	7.6
InvestorForce Public DB US Eq Gross Rank		1	4	9	4	6	14
Total International Equity	19.1	6.3	18.3	14.2	5.2	8.3	0.7
MSCI ACWI ex USA Gross		6.3	21.6	20.2	5.2	7.5	1.7
MSCI EAFE Gross		5.5	20.5	19.7	5.5	8.9	1.8
InvestorForce Public DB ex-US Eq Gross Rank		52	96	97	75	59	91
International Equity	11.0	5.7	20.1	15.9	5.8	8.6	0.8
MSCI ACWI ex USA Gross		6.3	21.6	20.2	5.2	7.5	1.7
InvestorForce Public DB ex-US Eq Gross Rank		76	90	95	57	46	87
Emerging Markets Equity	8.1	8.3	--	--	--	--	--
MSCI Emerging Markets		7.9	--	--	--	--	--
InvestorForce Public DB Emg Mkt Eq Gross Rank		16	--	--	--	--	--

Attribution Effects  
3 Months Ending September 30, 2017



Policy Index (12/1/2016 -present): 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% BofA High Yield Master II +2%, 5.1% BofA 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% BofA 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.

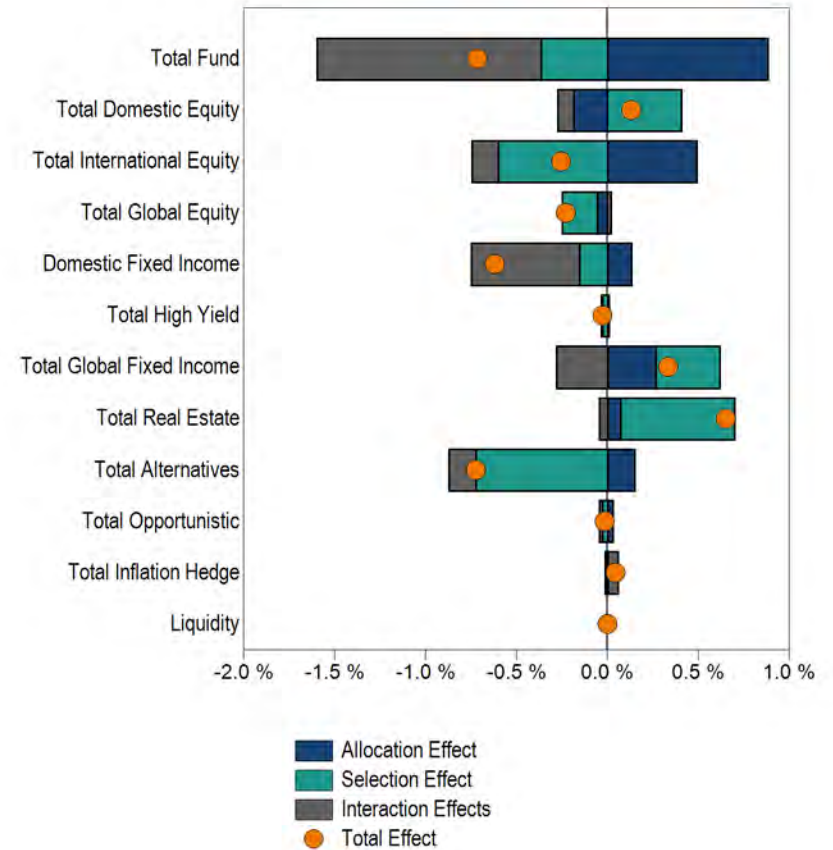
Effective 1/01/2017, only traditional asset class (public equity, public fixed income, REITs) investment management fees will be included in the gross of fee return calculation.

# Total Fund Executive Summary (Gross of Fees)

Period Ending: September 30, 2017

	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs
Total Global Equity	8.6	4.4	18.5	17.1	9.6	11.7	--
<i>MSCI ACWI</i>		5.2	17.3	18.6	7.4	10.2	--
<i>InvestorForce Public DB Total Eq Gross Rank</i>		76	14	95	35	60	--
Domestic Fixed Income	1.8	0.5	4.9	1.0	3.6	4.0	--
<i>BofA ML High Yield Master II +2%</i>		2.5	8.6	11.2	8.0	8.5	--
Total High Yield	4.4	1.7	6.3	8.4	4.9	5.9	7.8
<i>BofA ML High Yield Master II</i>		2.0	7.0	9.1	5.9	6.4	7.7
<i>eA US High Yield Fixed Inc Gross Rank</i>		73	67	51	72	68	43
Total Real Estate	8.6	3.2	8.3	9.1	11.2	12.4	5.2
<i>Real Estate Benchmark</i>		1.7	5.1	3.6	9.4	9.8	6.6
<i>NCREIF-ODCE</i>		1.9	5.4	7.7	10.8	11.6	5.0
<i>NCREIF Property Index</i>		1.7	5.1	6.9	9.8	10.3	6.2
Total Alternatives	8.5	1.4	8.0	12.6	10.6	12.9	10.1
<i>S&amp;P 500 Index +4% (Lagged)</i>		4.1	16.9	22.5	14.0	19.2	11.4
Total Opportunistic	0.4	-2.4	9.1	13.1	0.8	6.5	--
<i>CPI + 4%</i>		1.8	5.3	6.3	5.3	5.3	--
<b>Risk Diversifying</b>	<b>7.1</b>	<b>0.3</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
Risk Diversifying Fixed Income	3.3	0.9	3.3	0.3	3.0	2.4	4.6
<i>eA US Core Fixed Inc Gross Rank</i>		60	69	75	54	64	72
Total Inflation Hedge	3.8	-0.1	5.2	7.3	1.1	--	--
<i>CPI + 4%</i>		1.8	5.3	6.3	5.3	--	--

Attribution Effects  
1 Year Ending September 30, 2017



Policy Index (12/1/2016 -present): 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% BofA High Yield Master II +2%, 5.1% BofA 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% BofA 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.  
 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  
Executive Summary (Gross of Fees)

Period Ending: September 30, 2017

	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs
<b>Liquidity</b>	<b>22.2</b>	<b>0.5</b>	<b>1.6</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
BBgBarc US Govt/Credit 1-3 Yr. TR		0.3	1.1	--	--	--	--
eA US Short Duration Fixed Inc Gross Rank		39	47	--	--	--	--
<b>Total Cash</b>	<b>2.2</b>	<b>0.2</b>	<b>0.6</b>	<b>1.2</b>	<b>0.6</b>	<b>1.6</b>	<b>--</b>
91 Day T-Bills		0.3	0.6	0.7	0.3	0.2	--

Policy Index (12/1/2016 -present): 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% BofA High Yield Master II +2%, 5.1% BofA 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.

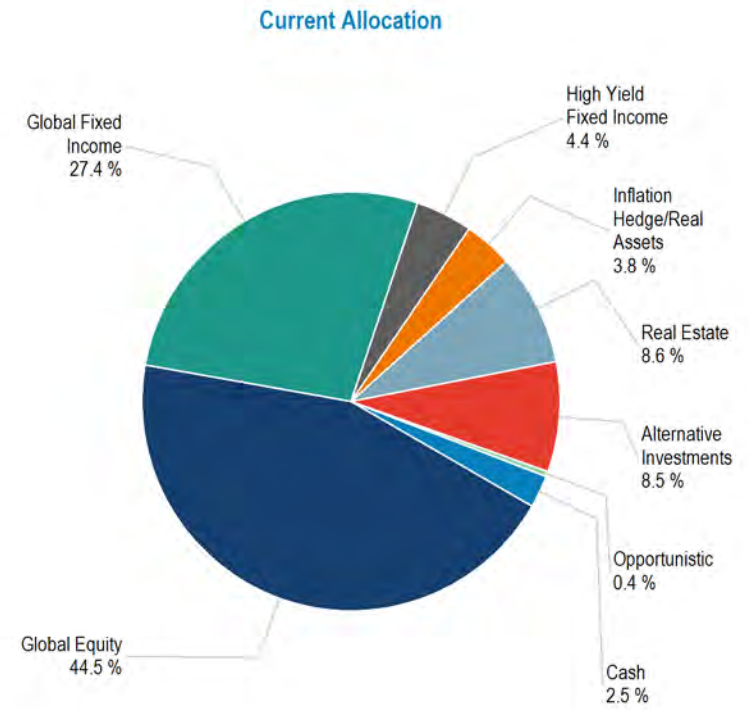
Policy Index (4/1/2012-11/30/16): 27.7% Russell 3000, 10.6% MSCI ACWI ex-US (Gross), 12.3% MSCI ACWI (Net), 19.6% BBgBarc U.S. Aggregate, 5% BofA High Yield Master II, 4% BBgBarc Global Aggregate, 5.4% Wilshire REIT, 6.75% NCREIF Property Index, 1.35% FTSE/EPRA NAREIT Developed exUS, 6.8% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills.

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 Executive Summary (Net of Fees)

Period Ending: September 30, 2017

	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs
<b>Total Fund</b>	<b>100.0</b>	<b>3.2</b>	<b>10.3</b>	<b>10.7</b>	<b>7.2</b>	<b>8.9</b>	<b>5.6</b>
<i>Policy Index</i>		3.1	10.2	10.6	7.3	9.2	--
<b>Total Fund ex Overlay &amp; Cash</b>	<b>97.5</b>	<b>3.2</b>	<b>10.3</b>	<b>10.7</b>	<b>7.2</b>	<b>8.9</b>	<b>5.6</b>
<i>Policy Index</i>		3.1	10.2	10.6	7.3	9.2	--
<b>Growth</b>	<b>68.2</b>	<b>4.3</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
Total Domestic Equity	16.8	6.3	16.3	20.2	11.7	14.5	7.9
<i>Russell 3000</i>		4.6	13.9	18.7	10.7	14.2	7.6
Total International Equity	19.1	6.1	18.0	13.7	4.8	7.9	0.2
<i>MSCI ACWI ex USA Gross</i>		6.3	21.6	20.2	5.2	7.5	1.7
<i>MSCI EAFE Gross</i>		5.5	20.5	19.7	5.5	8.9	1.8
International Equity	11.0	5.6	19.8	15.5	5.3	8.2	0.5
<i>MSCI ACWI ex USA Gross</i>		6.3	21.6	20.2	5.2	7.5	1.7
Emerging Markets Equity	8.1	8.1	--	--	--	--	--
<i>MSCI Emerging Markets</i>		7.9	--	--	--	--	--
Total Global Equity	8.6	4.2	17.9	16.3	8.9	11.0	--
<i>MSCI ACWI</i>		5.2	17.3	18.6	7.4	10.2	--
Domestic Fixed Income	1.8	0.5	4.9	0.9	3.4	3.6	--
<i>BofA ML High Yield Master II +2%</i>		2.5	8.6	11.2	8.0	8.5	--
Total High Yield	4.4	1.6	6.0	8.0	4.5	5.5	7.5
<i>BofA ML High Yield Master II</i>		2.0	7.0	9.1	5.9	6.4	7.7
Total Real Estate	8.6	3.2	8.3	9.0	10.4	11.3	4.2
<i>Real Estate Benchmark</i>		1.7	5.1	3.6	9.4	9.8	6.6
<i>NCREIF-ODCE</i>		1.9	5.4	7.7	10.8	11.6	5.0
<i>NCREIF Property Index</i>		1.7	5.1	6.9	9.8	10.3	6.2



*Policy Index (12/1/2016 -present): 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% BofA High Yield Master II +2%, 5.1% BofA 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% BofA 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.*

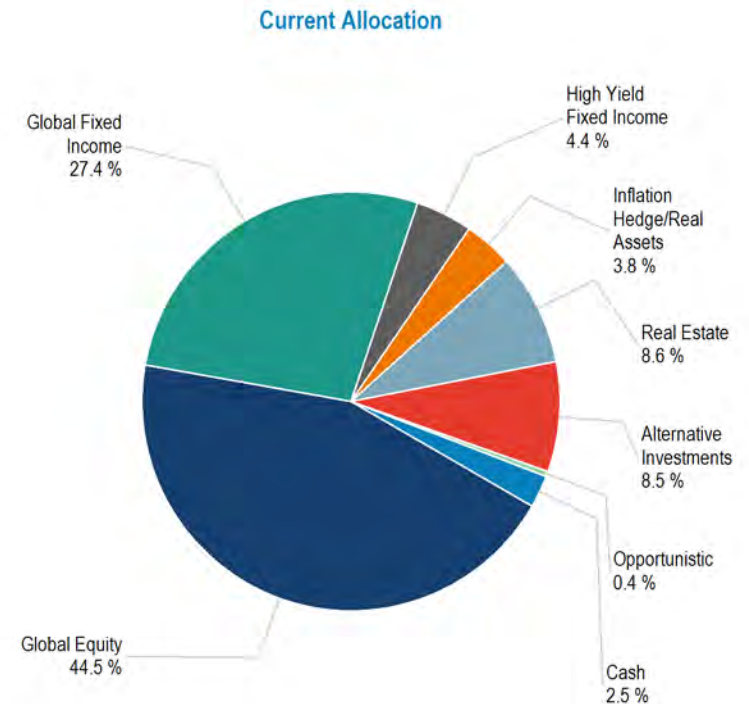
*Effective 1/01/2017, only traditional asset class (public equity, public fixed income, REITs) investment management fees will be included in the gross of fee return calculation.*



# Total Fund Executive Summary (Net of Fees)

Period Ending: September 30, 2017

	% of Portfolio	QTD	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs
Total Alternatives	8.5	1.4	8.0	12.6	9.8	11.5	7.9
S&P 500 Index +4% (Lagged)		4.1	16.9	22.5	14.0	19.2	11.4
Total Opportunistic	0.4	-2.4	9.1	13.1	0.6	6.4	--
CPI + 4%		1.8	5.3	6.3	5.3	5.3	--
<b>Risk Diversifying</b>	<b>7.1</b>	<b>0.3</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
Risk Diversifying Fixed Income	3.3	0.8	2.9	-0.2	2.6	1.9	4.2
Total Inflation Hedge	3.8	-0.1	5.2	7.2	0.4	--	--
CPI + 4%		1.8	5.3	6.3	5.3	--	--
<b>Liquidity</b>	<b>22.2</b>	<b>0.5</b>	<b>1.5</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
BBgBarc US Govt/Credit 1-3 Yr. TR		0.3	1.1	--	--	--	--
<b>Total Cash</b>	<b>2.2</b>	<b>0.2</b>	<b>0.6</b>	<b>1.2</b>	<b>0.6</b>	<b>1.6</b>	<b>--</b>
91 Day T-Bills		0.3	0.6	0.7	0.3	0.2	--



Policy Index (12/1/2016 -present): 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% BofA High Yield Master II +2%, 5.1% BofA 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% BofA 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.

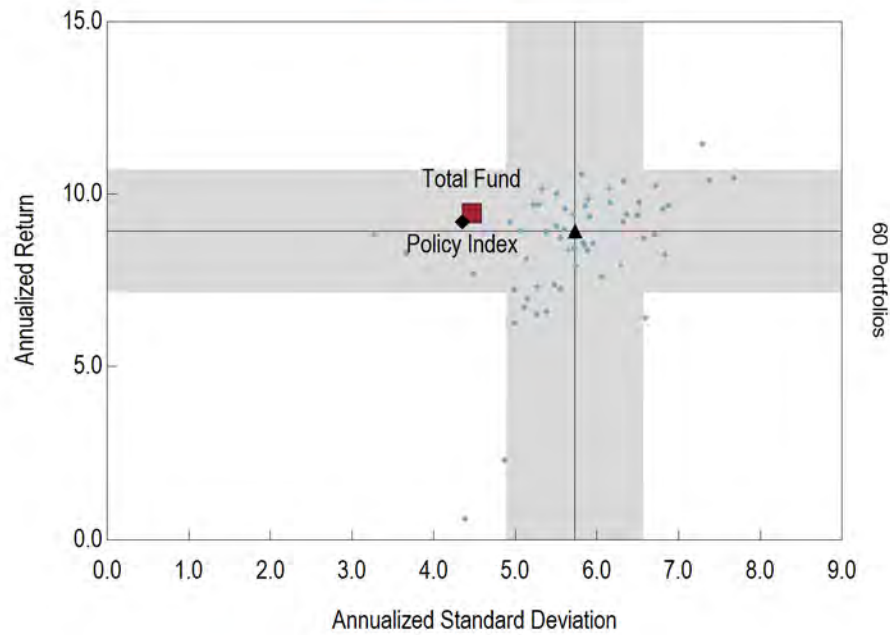
Effective 1/01/2017, only traditional asset class (public equity, public fixed income, REITs) investment management fees will be included in the gross of fee return calculation.

Total Fund  
Risk Analysis - 5 Years (Gross of Fees)

Period Ending: September 30, 2017

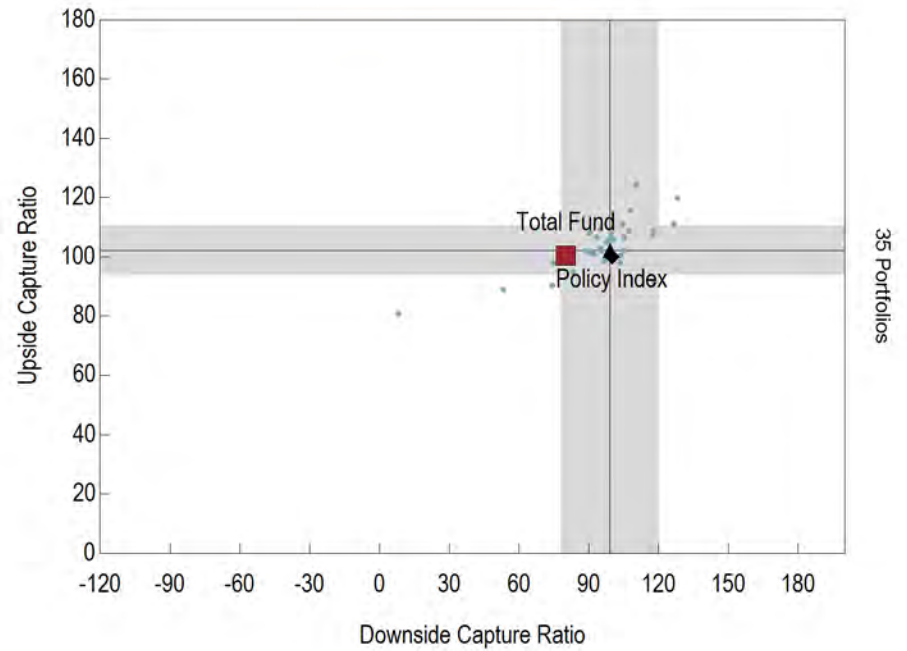
	Anlzd Ret	Ann Excess BM Return	Anlzd Std Dev	Anlzd Alpha	Beta	Tracking Error	R-Squared	Sharpe Ratio	Info Ratio	Up Mkt Cap Ratio	Down Mkt Cap Ratio
Total Fund	9.45%	0.26%	4.47%	0.30%	1.00	1.07%	0.94	2.07	0.24	100.34%	80.15%

Risk vs. Return



- Total Fund
- ◆ Policy Index
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1B Gross

Up Markets vs. Down Markets



- Total Fund
- ◆ Policy Index
- ▲ Universe Median
- 68% Confidence Interval
- InvestorForce Public DB > \$1B Gross

# Total Fund Performance Summary (Gross of Fees)

Period Ending: September 30, 2017

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2016	2015	2014	2013	2012
<b>Total Fund</b>	<b>8,342,981,443</b>	<b>100.0</b>	<b>3.3</b>	<b>10.5</b>	<b>11.0</b>	<b>7.7</b>	<b>9.5</b>	<b>6.2</b>	<b>7.4</b>	<b>2.7</b>	<b>8.4</b>	<b>16.4</b>	<b>14.3</b>
Policy Index			3.1	10.2	10.6	7.3	9.2	--	8.8	0.6	9.0	15.6	14.6
InvestorForce Public DB > \$1B Gross Rank			77	78	83	33	32	18	74	5	6	33	13
<b>Total Fund ex Overlay &amp; Cash</b>	<b>8,136,512,519</b>	<b>97.5</b>	<b>3.3</b>	<b>10.5</b>	<b>11.0</b>	<b>7.7</b>	<b>9.5</b>	<b>6.2</b>	<b>7.4</b>	<b>2.7</b>	<b>8.4</b>	<b>16.4</b>	<b>14.3</b>
Policy Index			3.1	10.2	10.6	7.3	9.2	--	8.8	0.6	9.0	15.6	14.6
InvestorForce Public DB > \$1B Gross Rank			78	78	83	33	32	18	74	5	6	33	13
<b>Growth</b>	<b>5,689,131,854</b>	<b>68.2</b>	<b>4.4</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Total Domestic Equity</b>	<b>1,400,763,516</b>	<b>16.8</b>	<b>6.4</b>	<b>16.7</b>	<b>20.7</b>	<b>12.2</b>	<b>15.0</b>	<b>8.3</b>	<b>11.5</b>	<b>1.1</b>	<b>11.4</b>	<b>36.2</b>	<b>18.2</b>
Russell 3000			4.6	13.9	18.7	10.7	14.2	7.6	12.7	0.5	12.6	33.6	16.4
InvestorForce Public DB US Eq Gross Rank			1	4	9	4	6	14	77	21	50	19	3
BlackRock Russell 1000 Index	112,583,795	1.3	4.5	--	--	--	--	--	--	--	--	--	--
Russell 1000			4.5	--	--	--	--	--	--	--	--	--	--
eA US Large Cap Equity Gross Rank			55	--	--	--	--	--	--	--	--	--	--
Jackson Square Partners	388,754,424	4.7	9.0	25.0	20.0	10.6	14.2	9.0	-4.4	6.1	13.9	35.4	16.9
Russell 1000 Growth			5.9	20.7	21.9	12.7	15.3	9.1	7.1	5.7	13.0	33.5	15.3
eA US Large Cap Growth Equity Gross Rank			2	17	63	71	65	46	98	37	31	40	37
Robeco Boston Partners	379,356,305	4.5	4.8	12.0	21.3	9.4	14.1	8.0	15.1	-3.9	12.0	37.4	21.6
Russell 1000 Value			3.1	7.9	15.1	8.5	13.2	5.9	17.3	-3.8	13.5	32.5	17.5
eA US Large Cap Value Equity Gross Rank			28	30	16	43	37	23	50	65	55	24	5
Emerald Advisers	268,058,074	3.2	6.7	19.4	24.2	15.3	16.9	10.1	10.1	4.1	7.3	50.3	18.5
Russell 2000 Growth			6.2	16.8	21.0	12.2	14.3	8.5	11.3	-1.4	5.6	43.3	14.6
eA US Small Cap Growth Equity Gross Rank			37	44	27	21	22	24	54	19	21	27	22
Ceredex	248,362,054	3.0	4.3	3.8	10.6	12.3	14.0	--	29.8	-4.4	3.3	36.5	19.0
Russell 2000 Value			5.1	5.7	20.5	12.1	13.3	--	31.7	-7.5	4.2	34.5	18.1
eA US Small Cap Value Equity Gross Rank			69	82	98	43	64	--	32	52	74	66	38
<b>Total International Equity</b>	<b>1,591,416,957</b>	<b>19.1</b>	<b>6.3</b>	<b>18.3</b>	<b>14.2</b>	<b>5.2</b>	<b>8.3</b>	<b>0.7</b>	<b>1.2</b>	<b>-1.2</b>	<b>0.3</b>	<b>17.8</b>	<b>18.5</b>
MSCI ACWI ex USA Gross			6.3	21.6	20.2	5.2	7.5	1.7	5.0	-5.3	-3.4	15.8	17.4
MSCI EAFE Gross			5.5	20.5	19.7	5.5	8.9	1.8	1.5	-0.4	-4.5	23.3	17.9
InvestorForce Public DB ex-US Eq Gross Rank			52	96	97	75	59	91	89	28	5	50	49
<b>International Equity</b>	<b>918,125,905</b>	<b>11.0</b>	<b>5.7</b>	<b>20.1</b>	<b>15.9</b>	<b>5.8</b>	<b>8.6</b>	<b>0.8</b>	<b>1.2</b>	<b>-1.2</b>	<b>0.3</b>	<b>17.8</b>	<b>18.5</b>
MSCI ACWI ex USA Gross			6.3	21.6	20.2	5.2	7.5	1.7	5.0	-5.3	-3.4	15.8	17.4
InvestorForce Public DB ex-US Eq Gross Rank			76	90	95	57	46	87	89	28	5	50	49

Individual closed end funds are not shown in performance summary table. PIMCO RAE EM funded 2/28/2017. JPM Global liquidated 2/28/2017. BlackRock Russell 1000 funded 4/20/2017. Goldman Sachs has \$16,946 of residual cash. JPM Global has \$219,748 of residual cash. Lazard has \$6,265 of residual cash. TT Emerging Markets funded 7/27/2017. PIMCO Stock Plus, Intech Large Cap and Global Low Vol liquidated 7/27/2017. Intech Large Cap has -\$6,260 of residual cash. Intech Global Low Vol has \$25,008 of residual cash. PIMCO Stock Plus has \$3,655,124 of residual cash. 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  
Performance Summary (Gross of Fees)

Period Ending: September 30, 2017

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2016	2015	2014	2013	2012
Pyrford	445,746,577	5.3	3.0	15.4	11.9	4.4	--	--	3.4	-2.9	--	--	--
<i>MSCI ACWI ex USA Value</i>			6.0	17.7	21.6	2.9	--	--	8.9	-10.1	--	--	--
<i>eA ACWI ex-US Value Equity Gross Rank</i>			92	87	97	73	--	--	74	59	--	--	--
William Blair	472,379,327	5.7	8.5	24.8	20.0	7.0	9.4	--	-1.4	0.5	-1.2	20.9	24.3
<i>MSCI ACWI ex USA Growth</i>			6.3	24.8	17.7	6.4	7.9	--	0.1	-1.3	-2.6	15.5	16.7
<i>eA ACWI ex-US Growth Equity Gross Rank</i>			44	76	60	74	68	--	55	69	37	44	6
<b>Emerging Markets Equity</b>	<b>673,291,052</b>	<b>8.1</b>	<b>8.3</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<i>MSCI Emerging Markets</i>			7.9	--	--	--	--	--	--	--	--	--	--
<i>InvestorForce Public DB Emg Mkt Eq Gross Rank</i>			16	--	--	--	--	--	--	--	--	--	--
PIMCO RAE Emerging Markets	346,965,219	4.2	8.3	--	--	--	--	--	--	--	--	--	--
<i>MSCI Emerging Markets</i>			7.9	--	--	--	--	--	--	--	--	--	--
<i>eA Emg Mkts Equity Gross Rank</i>			42	--	--	--	--	--	--	--	--	--	--
TT Emerging Markets	326,325,833	3.9	--	--	--	--	--	--	--	--	--	--	--
<i>MSCI Emerging Markets</i>			--	--	--	--	--	--	--	--	--	--	--
<i>eA Emg Mkts Equity Gross Rank</i>			--	--	--	--	--	--	--	--	--	--	--
<b>Total Global Equity</b>	<b>719,531,201</b>	<b>8.6</b>	<b>4.4</b>	<b>18.5</b>	<b>17.1</b>	<b>9.6</b>	<b>11.7</b>	<b>--</b>	<b>7.6</b>	<b>2.2</b>	<b>5.2</b>	<b>23.7</b>	<b>11.1</b>
<i>MSCI ACWI</i>			5.2	17.3	18.6	7.4	10.2	--	7.9	-2.4	4.2	22.8	16.1
<i>InvestorForce Public DB Total Eq Gross Rank</i>			76	14	95	35	60	--	74	3	61	91	99
Artisan Partners	364,485,435	4.4	5.7	26.9	20.0	13.4	14.1	--	5.6	9.2	3.9	26.1	--
<i>MSCI ACWI</i>			5.2	17.3	18.6	7.4	10.2	--	7.9	-2.4	4.2	22.8	--
<i>eA All Global Equity Gross Rank</i>			40	7	39	7	15	--	61	4	56	51	--
First Eagle	354,801,009	4.3	3.1	10.7	10.9	7.6	9.3	--	11.7	0.2	4.5	17.9	13.9
<i>MSCI ACWI</i>			5.2	17.3	18.6	7.4	10.2	--	7.9	-2.4	4.2	22.8	16.1
<i>eA All Global Equity Gross Rank</i>			84	87	86	68	81	--	19	49	51	80	78
<b>Domestic Fixed Income</b>	<b>153,092,499</b>	<b>1.8</b>	<b>0.5</b>	<b>4.9</b>	<b>1.0</b>	<b>3.6</b>	<b>4.0</b>	<b>--</b>	<b>2.6</b>	<b>1.7</b>	<b>7.4</b>	<b>2.0</b>	<b>10.0</b>
<i>BofA ML High Yield Master II +2%</i>			2.5	8.6	11.2	8.0	8.5	--	19.8	-2.7	4.5	9.6	17.9
<b>Total High Yield</b>	<b>364,747,075</b>	<b>4.4</b>	<b>1.7</b>	<b>6.3</b>	<b>8.4</b>	<b>4.9</b>	<b>5.9</b>	<b>7.8</b>	<b>14.3</b>	<b>-3.5</b>	<b>1.2</b>	<b>8.8</b>	<b>14.1</b>
<i>BofA ML High Yield Master II</i>			2.0	7.0	9.1	5.9	6.4	7.7	17.5	-4.6	2.5	7.4	15.6
<i>eA US High Yield Fixed Inc Gross Rank</i>			73	67	51	72	68	43	47	68	83	28	73

Individual closed end funds are not shown in performance summary table. PIMCO RAE EM funded 2/28/2017. JPM Global liquidated 2/28/2017. BlackRock Russell 1000 funded 4/20/2017. Goldman Sachs has \$16,946 of residual cash. JPM Global has \$219,748 of residual cash. Lazard has \$6,265 of residual cash. TT Emerging Markets funded 7/27/2017. PIMCO Stock Plus, Intech Large Cap and Global Low Vol liquidated 7/27/2017. Intech Large Cap has -\$6,260 of residual cash. Intech Global Low Vol has \$25,008 of residual cash. PIMCO Stock Plus has \$3,655,124 of residual cash. 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  
Performance Summary (Gross of Fees)

Period Ending: September 30, 2017

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2016	2015	2014	2013	2012
Allianz Global Investors	364,747,075	4.4	1.7	6.3	8.4	4.9	5.9	7.8	14.3	-3.5	1.2	8.8	14.1
<i>BofA ML High Yield Master II</i>			2.0	7.0	9.1	5.9	6.4	7.7	17.5	-4.6	2.5	7.4	15.6
<i>eA US High Yield Fixed Inc Gross Rank</i>			73	67	51	72	68	43	47	68	83	28	73
<b>Total Real Estate</b>	<b>713,941,949</b>	<b>8.6</b>	<b>3.2</b>	<b>8.3</b>	<b>9.1</b>	<b>11.2</b>	<b>12.4</b>	<b>5.2</b>	<b>5.5</b>	<b>13.5</b>	<b>20.6</b>	<b>10.5</b>	<b>16.7</b>
<i>Real Estate Benchmark</i>			1.7	5.1	3.6	9.4	9.8	6.6	6.7	8.3	18.8	7.1	13.6
<i>NCREIF-ODCE</i>			1.9	5.4	7.7	10.8	11.6	5.0	8.8	15.0	12.5	13.9	10.9
<i>NCREIF Property Index</i>			1.7	5.1	6.9	9.8	10.3	6.2	8.0	13.3	11.8	11.0	10.5
Adelante	67,110,199	0.8	1.6	5.3	2.5	9.8	10.2	5.1	4.1	5.1	33.4	3.6	17.7
<i>Wilshire REIT</i>			0.6	2.4	0.1	9.7	9.5	5.6	7.2	4.2	31.8	1.9	17.6
<b>Total Alternatives</b>	<b>712,449,633</b>	<b>8.5</b>	<b>1.4</b>	<b>8.0</b>	<b>12.6</b>	<b>10.6</b>	<b>12.9</b>	<b>10.1</b>	<b>9.0</b>	<b>13.3</b>	<b>17.3</b>	<b>15.0</b>	<b>10.9</b>
<i>S&amp;P 500 Index +4% (Lagged)</i>			4.1	16.9	22.5	14.0	19.2	11.4	20.0	3.4	24.5	24.0	35.3
<b>Total Opportunistic</b>	<b>33,182,759</b>	<b>0.4</b>	<b>-2.4</b>	<b>9.1</b>	<b>13.1</b>	<b>0.8</b>	<b>6.5</b>	<b>--</b>	<b>10.1</b>	<b>-12.2</b>	<b>8.7</b>	<b>16.8</b>	<b>13.6</b>
<i>CPI + 4%</i>			1.8	5.3	6.3	5.3	5.3	--	6.2	4.8	4.8	5.6	5.8
<b>Risk Diversifying</b>	<b>595,936,946</b>	<b>7.1</b>	<b>0.3</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Risk Diversifying Fixed Income</b>	<b>278,535,718</b>	<b>3.3</b>	<b>0.9</b>	<b>3.3</b>	<b>0.3</b>	<b>3.0</b>	<b>2.4</b>	<b>4.6</b>	<b>2.4</b>	<b>1.6</b>	<b>6.6</b>	<b>-1.9</b>	<b>4.6</b>
<i>eA US Core Fixed Inc Gross Rank</i>			60	69	75	54	64	72	87	15	25	78	82
AFL-CIO	278,535,718	3.3	0.9	3.3	0.3	3.0	2.4	4.7	2.4	1.6	6.6	-1.9	4.7
<i>BBgBarc US Aggregate TR</i>			0.8	3.1	0.1	2.7	2.1	4.3	2.6	0.6	6.0	-2.0	4.2
<i>eA US Core Fixed Inc Gross Rank</i>			60	69	75	54	64	68	87	15	25	78	80
<b>Total Inflation Hedge</b>	<b>317,401,228</b>	<b>3.8</b>	<b>-0.1</b>	<b>5.2</b>	<b>7.3</b>	<b>1.1</b>	<b>--</b>	<b>--</b>	<b>7.4</b>	<b>-4.9</b>	<b>-0.6</b>	<b>1.3</b>	<b>--</b>
<i>CPI + 4%</i>			1.8	5.3	6.3	5.3	--	--	6.2	4.8	4.8	5.6	--
Wellington Real Total Return	189,012,873	2.3	1.8	1.5	1.4	-2.8	--	--	-0.1	-4.9	-2.5	--	--
<i>CPI + 4%</i>			1.8	5.3	6.3	5.3	--	--	6.2	4.8	4.8	--	--
<b>Liquidity</b>	<b>1,851,443,719</b>	<b>22.2</b>	<b>0.5</b>	<b>1.6</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<i>BBgBarc US Govt/Credit 1-3 Yr. TR</i>			0.3	1.1	--	--	--	--	--	--	--	--	--
<i>eA US Short Duration Fixed Inc Gross Rank</i>			39	47	--	--	--	--	--	--	--	--	--
DFA Short Credit	446,571,058	5.4	0.5	2.1	--	--	--	--	--	--	--	--	--
<i>BofA Merrill Lynch US Corp &amp; Gov 1-5 Yrs</i>			0.4	1.6	--	--	--	--	--	--	--	--	--
<i>eA US Short Duration Fixed Inc Gross Rank</i>			34	18	--	--	--	--	--	--	--	--	--

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Total Fund  
Performance Summary (Gross of Fees)

Period Ending: September 30, 2017

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2016	2015	2014	2013	2012
Insight Short Duration	912,652,577	10.9	0.4	1.5	--	--	--	--	--	--	--	--	--
BBgBarc US Govt/Credit 1-3 Yr. TR			0.3	1.1	--	--	--	--	--	--	--	--	--
eA US Short Duration Fixed Inc Gross Rank			59	56	--	--	--	--	--	--	--	--	--
Sit Short Duration	492,220,084	5.9	0.7	1.4	--	--	--	--	--	--	--	--	--
BBgBarc US Govt 1-3 Yr TR			0.2	0.7	--	--	--	--	--	--	--	--	--
eA US Short Duration Fixed Inc Gross Rank			14	61	--	--	--	--	--	--	--	--	--
<b>Total Cash</b>	<b>179,404,730</b>	<b>2.2</b>	<b>0.2</b>	<b>0.6</b>	<b>1.2</b>	<b>0.6</b>	<b>1.6</b>	<b>--</b>	<b>0.9</b>	<b>0.1</b>	<b>-3.0</b>	<b>8.8</b>	<b>--</b>
91 Day T-Bills			0.3	0.6	0.7	0.3	0.2	--	0.3	0.0	0.0	0.0	--
Cash	179,404,730	2.2	0.2	0.6	1.2	0.6	1.7	3.4	0.9	0.1	1.4	4.5	14.9

Individual closed end funds are not shown in performance summary table. PIMCO RAE EM funded 2/28/2017. JPM Global liquidated 2/28/2017. BlackRock Russell 1000 funded 4/20/2017. Goldman Sachs has \$16,946 of residual cash. JPM Global has \$219,748 of residual cash. Lazard has \$6,265 of residual cash. TT Emerging Markets funded 7/27/2017. PIMCO Stock Plus, Intech Large Cap and Global Low Vol liquidated 7/27/2017. Intech Large Cap has -\$6,260 of residual cash. Intech Global Low Vol has \$25,008 of residual cash. PIMCO Stock Plus has \$3,655,124 of residual cash. 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  
Performance Summary (Net of Fees)

Period Ending: September 30, 2017

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2016	2015	2014	2013	2012
<b>Total Fund</b>	<b>8,342,981,443</b>	<b>100.0</b>	<b>3.2</b>	<b>10.3</b>	<b>10.7</b>	<b>7.2</b>	<b>8.9</b>	<b>5.6</b>	<b>6.9</b>	<b>2.1</b>	<b>7.7</b>	<b>15.6</b>	<b>13.6</b>
<i>Policy Index</i>			3.1	10.2	10.6	7.3	9.2	--	8.8	0.6	9.0	15.6	14.6
<b>Total Fund ex Overlay &amp; Cash</b>	<b>8,136,512,519</b>	<b>97.5</b>	<b>3.2</b>	<b>10.3</b>	<b>10.7</b>	<b>7.2</b>	<b>8.9</b>	<b>5.6</b>	<b>6.9</b>	<b>2.1</b>	<b>7.7</b>	<b>15.6</b>	<b>13.6</b>
<i>Policy Index</i>			3.1	10.2	10.6	7.3	9.2	--	8.8	0.6	9.0	15.6	14.6
<b>Growth</b>	<b>5,689,131,854</b>	<b>68.2</b>	<b>4.3</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Total Domestic Equity</b>	<b>1,400,763,516</b>	<b>16.8</b>	<b>6.3</b>	<b>16.3</b>	<b>20.2</b>	<b>11.7</b>	<b>14.5</b>	<b>7.9</b>	<b>11.1</b>	<b>0.6</b>	<b>11.0</b>	<b>35.7</b>	<b>17.8</b>
<i>Russell 3000</i>			4.6	13.9	18.7	10.7	14.2	7.6	12.7	0.5	12.6	33.6	16.4
BlackRock Russell 1000 Index	112,583,795	1.3	4.5	--	--	--	--	--	--	--	--	--	--
<i>Russell 1000</i>			4.5	--	--	--	--	--	--	--	--	--	--
Jackson Square Partners	388,754,424	4.7	8.9	24.7	19.5	10.2	13.8	8.5	-4.8	5.6	13.4	35.0	16.4
<i>Russell 1000 Growth</i>			5.9	20.7	21.9	12.7	15.3	9.1	7.1	5.7	13.0	33.5	15.3
Robeco Boston Partners	379,356,305	4.5	4.7	11.8	20.9	9.0	13.8	7.7	14.7	-4.2	11.6	37.0	21.2
<i>Russell 1000 Value</i>			3.1	7.9	15.1	8.5	13.2	5.9	17.3	-3.8	13.5	32.5	17.5
Emerald Advisers	268,058,074	3.2	6.5	18.9	23.4	14.6	16.1	9.5	9.4	3.5	6.6	49.4	17.8
<i>Russell 2000 Growth</i>			6.2	16.8	21.0	12.2	14.3	8.5	11.3	-1.4	5.6	43.3	14.6
Ceredex	248,362,054	3.0	4.1	3.4	10.0	11.7	13.4	--	29.1	-5.0	2.7	35.8	18.6
<i>Russell 2000 Value</i>			5.1	5.7	20.5	12.1	13.3	--	31.7	-7.5	4.2	34.5	18.1
<b>Total International Equity</b>	<b>1,591,416,957</b>	<b>19.1</b>	<b>6.1</b>	<b>18.0</b>	<b>13.7</b>	<b>4.8</b>	<b>7.9</b>	<b>0.2</b>	<b>0.8</b>	<b>-1.6</b>	<b>0.0</b>	<b>17.4</b>	<b>17.9</b>
<i>MSCI ACWI ex USA Gross</i>			6.3	21.6	20.2	5.2	7.5	1.7	5.0	-5.3	-3.4	15.8	17.4
<i>MSCI EAFE Gross</i>			5.5	20.5	19.7	5.5	8.9	1.8	1.5	-0.4	-4.5	23.3	17.9
<b>International Equity</b>	<b>918,125,905</b>	<b>11.0</b>	<b>5.6</b>	<b>19.8</b>	<b>15.5</b>	<b>5.3</b>	<b>8.2</b>	<b>0.5</b>	<b>0.8</b>	<b>-1.6</b>	<b>0.0</b>	<b>17.4</b>	<b>18.0</b>
<i>MSCI ACWI ex USA Gross</i>			6.3	21.6	20.2	5.2	7.5	1.7	5.0	-5.3	-3.4	15.8	17.4
Pyrford	445,746,577	5.3	2.9	15.1	11.4	3.9	--	--	3.0	-3.3	--	--	--
<i>MSCI ACWI ex USA Value</i>			6.0	17.7	21.6	2.9	--	--	8.9	-10.1	--	--	--
William Blair	472,379,327	5.7	8.4	24.5	19.5	6.6	9.0	--	-1.8	0.0	-1.7	20.4	23.7
<i>MSCI ACWI ex USA Growth</i>			6.3	24.8	17.7	6.4	7.9	--	0.1	-1.3	-2.6	15.5	16.7
<b>Emerging Markets Equity</b>	<b>673,291,052</b>	<b>8.1</b>	<b>8.1</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<i>MSCI Emerging Markets</i>			7.9	--	--	--	--	--	--	--	--	--	--
PIMCO RAE Emerging Markets	346,965,219	4.2	8.2	--	--	--	--	--	--	--	--	--	--
<i>MSCI Emerging Markets</i>			7.9	--	--	--	--	--	--	--	--	--	--
TT Emerging Markets	326,325,833	3.9	--	--	--	--	--	--	--	--	--	--	--
<i>MSCI Emerging Markets</i>			--	--	--	--	--	--	--	--	--	--	--
<b>Total Global Equity</b>	<b>719,531,201</b>	<b>8.6</b>	<b>4.2</b>	<b>17.9</b>	<b>16.3</b>	<b>8.9</b>	<b>11.0</b>	<b>--</b>	<b>6.9</b>	<b>1.6</b>	<b>4.5</b>	<b>22.9</b>	<b>10.6</b>
<i>MSCI ACWI</i>			5.2	17.3	18.6	7.4	10.2	--	7.9	-2.4	4.2	22.8	16.1

Individual closed end funds are not shown in performance summary table. PIMCO RAE EM funded 2/28/2017. JPM Global liquidated 2/28/2017. BlackRock Russell 1000 funded 4/20/2017. Goldman Sachs has \$16,946 of residual cash. JPM Global has \$219,748 of residual cash. Lazard has \$6,265 of residual cash. TT Emerging Markets funded 7/27/2017. PIMCO Stock Plus, Intech Large Cap and Global Low Vol liquidated 7/27/2017. Intech Large Cap has -\$6,260 of residual cash. Intech Global Low Vol has \$25,008 of residual cash. PIMCO Stock Plus has \$3,655,124 of residual cash.

Total Fund  
Performance Summary (Net of Fees)

Period Ending: September 30, 2017

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2016	2015	2014	2013	2012
Artisan Partners	364,485,435	4.4	5.5	26.2	19.1	12.5	13.3	--	4.8	8.4	3.1	25.2	--
<i>MSCI ACWI</i>			5.2	17.3	18.6	7.4	10.2	--	7.9	-2.4	4.2	22.8	--
First Eagle	354,801,009	4.3	2.9	10.1	10.1	6.8	8.5	--	10.9	-0.6	3.7	17.1	13.1
<i>MSCI ACWI</i>			5.2	17.3	18.6	7.4	10.2	--	7.9	-2.4	4.2	22.8	16.1
<b>Domestic Fixed Income</b>	<b>153,092,499</b>	<b>1.8</b>	<b>0.5</b>	<b>4.9</b>	<b>0.9</b>	<b>3.4</b>	<b>3.6</b>	<b>--</b>	<b>2.1</b>	<b>1.4</b>	<b>6.9</b>	<b>1.6</b>	<b>9.6</b>
<i>BofA ML High Yield Master II +2%</i>			2.5	8.6	11.2	8.0	8.5	--	19.8	-2.7	4.5	9.6	17.9
<b>Total High Yield</b>	<b>364,747,075</b>	<b>4.4</b>	<b>1.6</b>	<b>6.0</b>	<b>8.0</b>	<b>4.5</b>	<b>5.5</b>	<b>7.5</b>	<b>13.9</b>	<b>-3.9</b>	<b>0.8</b>	<b>8.4</b>	<b>13.7</b>
<i>BofA ML High Yield Master II</i>			2.0	7.0	9.1	5.9	6.4	7.7	17.5	-4.6	2.5	7.4	15.6
Allianz Global Investors	364,747,075	4.4	1.6	6.0	8.0	4.5	5.5	7.3	13.9	-3.9	0.8	8.4	13.6
<i>BofA ML High Yield Master II</i>			2.0	7.0	9.1	5.9	6.4	7.7	17.5	-4.6	2.5	7.4	15.6
<b>Total Real Estate</b>	<b>713,941,949</b>	<b>8.6</b>	<b>3.2</b>	<b>8.3</b>	<b>9.0</b>	<b>10.4</b>	<b>11.3</b>	<b>4.2</b>	<b>4.8</b>	<b>12.4</b>	<b>19.1</b>	<b>8.9</b>	<b>15.7</b>
<i>Real Estate Benchmark</i>			1.7	5.1	3.6	9.4	9.8	6.6	6.7	8.3	18.8	7.1	13.6
<i>NCREIF-ODCE</i>			1.9	5.4	7.7	10.8	11.6	5.0	8.8	15.0	12.5	13.9	10.9
<i>NCREIF Property Index</i>			1.7	5.1	6.9	9.8	10.3	6.2	8.0	13.3	11.8	11.0	10.5
Adelante	67,110,199	0.8	1.4	4.9	2.0	9.3	9.7	4.6	3.6	4.6	32.7	3.0	17.2
<i>Wilshire REIT</i>			0.6	2.4	0.1	9.7	9.5	5.6	7.2	4.2	31.8	1.9	17.6
<b>Total Alternatives</b>	<b>712,449,633</b>	<b>8.5</b>	<b>1.4</b>	<b>8.0</b>	<b>12.6</b>	<b>9.8</b>	<b>11.5</b>	<b>7.9</b>	<b>8.6</b>	<b>11.7</b>	<b>15.2</b>	<b>12.7</b>	<b>8.5</b>
<i>S&amp;P 500 Index +4% (Lagged)</i>			4.1	16.9	22.5	14.0	19.2	11.4	20.0	3.4	24.5	24.0	35.3
<b>Total Opportunistic</b>	<b>33,182,759</b>	<b>0.4</b>	<b>-2.4</b>	<b>9.1</b>	<b>13.1</b>	<b>0.6</b>	<b>6.4</b>	<b>--</b>	<b>9.5</b>	<b>-12.3</b>	<b>8.7</b>	<b>16.8</b>	<b>13.6</b>
<i>CPI + 4%</i>			1.8	5.3	6.3	5.3	5.3	--	6.2	4.8	4.8	5.6	5.8
<b>Risk Diversifying</b>	<b>595,936,946</b>	<b>7.1</b>	<b>0.3</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Risk Diversifying Fixed Income</b>	<b>278,535,718</b>	<b>3.3</b>	<b>0.8</b>	<b>2.9</b>	<b>-0.2</b>	<b>2.6</b>	<b>1.9</b>	<b>4.2</b>	<b>1.9</b>	<b>1.1</b>	<b>6.1</b>	<b>-2.4</b>	<b>4.3</b>
AFL-CIO	278,535,718	3.3	0.8	2.9	-0.2	2.6	1.9	4.2	1.9	1.1	6.1	-2.4	4.3
<i>BBgBarc US Aggregate TR</i>			0.8	3.1	0.1	2.7	2.1	4.3	2.6	0.6	6.0	-2.0	4.2
<b>Total Inflation Hedge</b>	<b>317,401,228</b>	<b>3.8</b>	<b>-0.1</b>	<b>5.2</b>	<b>7.2</b>	<b>0.4</b>	<b>--</b>	<b>--</b>	<b>6.5</b>	<b>-5.8</b>	<b>-1.5</b>	<b>0.3</b>	<b>--</b>
<i>CPI + 4%</i>			1.8	5.3	6.3	5.3	--	--	6.2	4.8	4.8	5.6	--
Wellington Real Total Return	189,012,873	2.3	1.8	1.5	1.3	-3.2	--	--	-0.6	-5.4	-3.1	--	--
<i>CPI + 4%</i>			1.8	5.3	6.3	5.3	--	--	6.2	4.8	4.8	--	--
<b>Liquidity</b>	<b>1,851,443,719</b>	<b>22.2</b>	<b>0.5</b>	<b>1.5</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<i>BBgBarc US Govt/Credit 1-3 Yr. TR</i>			0.3	1.1	--	--	--	--	--	--	--	--	--
DFA Short Credit	446,571,058	5.4	0.5	2.0	--	--	--	--	--	--	--	--	--
<i>BofA Merrill Lynch US Corp &amp; Gov 1-5 Yrs</i>			0.4	1.6	--	--	--	--	--	--	--	--	--
Insight Short Duration	912,652,577	10.9	0.4	1.4	--	--	--	--	--	--	--	--	--
<i>BBgBarc US Govt/Credit 1-3 Yr. TR</i>			0.3	1.1	--	--	--	--	--	--	--	--	--

Individual closed end funds are not shown in performance summary table. PIMCO RAE EM funded 2/28/2017. JPM Global liquidated 2/28/2017. BlackRock Russell 1000 funded 4/20/2017. Goldman Sachs has \$16,946 of residual cash. JPM Global has \$219,748 of residual cash. Lazard has \$6,265 of residual cash. TT Emerging Markets funded 7/27/2017. PIMCO Stock Plus, Intech Large Cap and Global Low Vol liquidated 7/27/2017. Intech Large Cap has -\$6,260 of residual cash. Intech Global Low Vol has \$25,008 of residual cash. PIMCO Stock Plus has \$3,655,124 of residual cash.



Total Fund  
Performance Summary (Net of Fees)

Period Ending: September 30, 2017

	Market Value	% of Portfolio	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2016	2015	2014	2013	2012
Sit Short Duration	492,220,084	5.9	0.6	1.3	--	--	--	--	--	--	--	--	--
BBgBarc US Govt 1-3 Yr TR			0.2	0.7	--	--	--	--	--	--	--	--	--
<b>Total Cash</b>	<b>179,404,730</b>	<b>2.2</b>	<b>0.2</b>	<b>0.6</b>	<b>1.2</b>	<b>0.6</b>	<b>1.6</b>	<b>--</b>	<b>0.9</b>	<b>0.1</b>	<b>-3.0</b>	<b>8.8</b>	<b>--</b>
91 Day T-Bills			0.3	0.6	0.7	0.3	0.2	--	0.3	0.0	0.0	0.0	--
Cash	179,404,730	2.2	0.2	0.6	1.2	0.6	1.7	3.0	0.9	0.1	1.4	4.5	14.6

Individual closed end funds are not shown in performance summary table. PIMCO RAE EM funded 2/28/2017. JPM Global liquidated 2/28/2017. BlackRock Russell 1000 funded 4/20/2017. Goldman Sachs has \$16,946 of residual cash. JPM Global has \$219,748 of residual cash. Lazard has \$6,265 of residual cash. TT Emerging Markets funded 7/27/2017. PIMCO Stock Plus, Intech Large Cap and Global Low Vol liquidated 7/27/2017. Intech Large Cap has -\$6,260 of residual cash. Intech Global Low Vol has \$25,008 of residual cash. PIMCO Stock Plus has \$3,655,124 of residual cash.

Total Fund  
Closed End Funds - Investment Summary

Period Ending: September 30, 2017

Verus Internal Analysis												
Inception Date	Manager Name/Fund Name	Estimated Market Value as of 9/30/17 <sup>3</sup>	Total Commitment	% Called	Capital Called	Current Qtr. Capital Called	Current Qtr. Distributions	Total Distributions <sup>4</sup>	Remaining Commitment	Distrib./Paid-In (DPI) <sup>1</sup>	Tot. Value/Paid-In (TVPI) <sup>2</sup>	Latest Valuation
<b>Fixed Income</b>												
7/1/2006	Torchlight II	\$44,497,560	\$128,000,000	100%	\$128,000,000	\$0	\$0	\$158,211,379	\$0	1.24	1.58	9/30/2017
12/12/2008	Torchlight III	\$9,014,298	\$75,000,000	100%	\$75,000,000	\$0	\$0	\$101,629,571	\$0	1.36	1.48	9/30/2017
8/1/2012	Torchlight IV	\$52,024,962	\$60,000,000	100%	\$60,000,000	\$0	\$6,511,691	\$54,375,200	\$0	0.91	1.77	9/30/2017
3/12/2015	Torchlight V	\$47,531,295	\$75,000,000	60%	\$44,999,912	\$18,750,000	\$558,819	\$0	\$30,000,088	0.00	1.06	6/30/2017
<b>Total Fixed Income</b>		<b>\$153,068,115</b>										
% of Portfolio (Market Value)		1.8%										
<b>Inflation Hedge</b>												
11/27/2013	Aether Real Assets III	\$20,993,230	\$25,000,000	71%	\$17,659,058	\$1,068,270	\$260,947	\$758,683	\$8,089,813	0.04	1.23	6/30/2017
11/27/2013	Aether Real Assets III Surplus	\$53,856,440	\$50,000,000	83%	\$41,537,022	\$3,134,625	\$0	\$511,975	\$8,926,461	0.01	1.31	6/30/2017
3/16/2016	Aether Real Assets IV	\$14,886,598	\$50,000,000	32%	\$16,106,216	\$8,078,094	\$32,129	\$129,053	\$33,893,784	0.01	0.93	6/30/2017
6/28/2013	Commonfund	\$38,652,087	\$50,000,000	72%	\$36,000,000	\$2,000,000	\$1,564,992	\$0	\$14,000,000	0.00	1.07	6/30/2017
<b>Total Inflation Hedge</b>		<b>\$128,388,355</b>										
% of Portfolio (Market Value)		1.5%										
<b>Opportunistic</b>												
2/18/2010	Oaktree PIF 2009	\$12,610,586	\$40,000,000	87%	\$34,800,000	\$0	\$2,400,000	\$34,638,579	\$6,308,960	1.00	1.36	9/30/2017
9/24/2015	Angelo Gordon Energy Credit Opp.	\$13,818,009	\$28,125,000	67%	\$18,750,000	\$0	\$4,785,000	\$9,424,566	\$9,375,000	0.50	1.24	6/30/2017
12/8/2015	Wastewater Opportunity Fund	\$6,754,164	\$25,000,000	31%	\$7,721,934	\$1,679,183	\$0	\$0	\$17,278,066	0.00	0.87	6/30/2017
<b>Total Opportunistic</b>		<b>\$33,182,759</b>										
% of Portfolio (Market Value)		0.4%										

<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>Total distributions may contain recallable capital

Total Fund  
Closed End Funds - Investment Summary

Period Ending: September 30, 2017

Verus Internal Analysis												
Inception Date	Manager Name/Fund Name	Estimated Market Value as of 9/30/17 <sup>3</sup>	Total Commitment	Total % Called	Capital Called	Current Qtr. Capital Called	Current Qtr. Distributions	Total Distributions <sup>6</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	\$45,739,128	\$80,000,000	94%	\$75,401,855	\$0	\$2,800,000	\$70,552,397	\$12,334,302	0.94	1.54	6/30/2017
12/8/2014	Angelo Gordon Realty Fund IX	\$42,766,417	\$65,000,000	61%	\$39,487,500	\$0	\$0	\$975,000	\$25,844,000	0.02	1.11	6/30/2017
6/23/2005	DLJ RECP III	\$28,372,136	\$75,000,000	95%	\$70,968,662	\$0	\$1,590,319	\$70,841,830	\$4,031,338	1.00	1.40	6/30/2017
2/11/2008	DLJ RECP IV	\$90,463,322	\$100,000,000	91%	\$90,943,569	\$0	\$0	\$56,595,635	\$9,056,431	0.62	1.62	6/30/2017
7/1/2014	DLJ RECP V	\$33,364,528	\$75,000,000	67%	\$50,552,862	\$0	\$0	\$35,722,220	\$43,777,551	0.71	1.37	6/30/2017
6/17/1998	Hearthstone II <sup>4</sup>	-\$15,218	\$25,000,000	80%	\$19,932,386	\$0	\$0	\$19,952,734	\$2,520,348	1.00	1.00	6/30/2017
2/1/2005	Invesco Real Estate I	\$14,095	\$50,000,000	92%	\$46,241,947	\$0	\$77,241	\$50,078,147	\$3,758,053	1.08	1.08	3/31/2017
11/26/2007	Invesco Real Estate II	\$445,630	\$85,000,000	92%	\$78,202,813	\$0	\$0	\$100,620,489	\$6,797,187	1.29	1.29	9/30/2017
6/30/2013	Invesco Real Estate III	\$15,500,919	\$35,000,000	91%	\$32,009,674	\$0	\$0	\$30,621,535	\$2,990,326	0.96	1.44	9/30/2017
6/30/2014	Invesco Real Estate IV	\$23,290,045	\$35,000,000	70%	\$24,520,622	\$0	\$0	\$4,729,246	\$15,208,624	0.19	1.14	9/30/2017
7/16/2013	LaSalle Income & Growth VI	\$39,574,715	\$75,000,000	95%	\$71,428,571	\$0	\$3,933,581	\$63,890,818	\$3,571,429	0.89	1.45	6/30/2017
2/28/2017	LaSalle Income & Growth VII	\$44,873,173	\$75,000,000	56%	\$41,804,354	\$0	\$0	\$0	\$33,195,646	0.00	1.07	6/30/2017
3/30/2007	Long Wharf Fund III	\$1,672,647	\$75,000,000	89%	\$66,940,230	\$0	\$0	\$86,974,484	\$8,059,770	1.30	1.32	9/30/2017
7/3/2013	Long Wharf Fund IV	\$20,060,333	\$25,000,000	100%	\$25,000,000	\$0	\$0	\$13,572,697	\$0	0.54	1.35	9/30/2017
9/30/2016	Long Wharf Fund V	\$20,959,435	\$50,000,000	44%	\$22,032,446	\$5,940,820	\$456,986	\$1,028,219	\$27,967,554	0.05	1.00	9/30/2017
12/31/2011	Oaktree REOF V	\$13,188,617	\$50,000,000	100%	\$50,000,000	\$0	\$2,804,099	\$70,554,099	\$25,750,000	1.41	1.67	9/30/2017
9/30/2013	Oaktree REOF VI <sup>5</sup>	\$68,997,184	\$80,000,000	100%	\$80,000,000	\$0	\$2,450,481	\$37,600,000	\$18,400,000	0.47	1.33	9/30/2017
4/1/2015	Oaktree REOF VII	\$4,570,343	\$65,000,000	10%	\$6,500,000	\$0	\$0	\$2,564,329	\$62,335,000	0.39	1.10	9/30/2017
11/10/2013	Paulson Real Estate Fund II	\$25,286,602	\$20,000,000	85%	\$17,007,123	\$0	\$0	\$0	\$2,992,877	0.00	1.49	6/30/2017
1/25/2012	Siguler Guff DREOF	\$52,948,375	\$75,000,000	93%	\$69,375,000	\$0	\$3,031,933	\$61,818,603	\$5,625,000	0.89	1.65	6/30/2017
8/31/2013	Siguler Guff DREOF II	\$58,637,238	\$70,000,000	75%	\$52,605,000	\$0	\$40,000	\$5,497,512	\$17,395,000	0.10	1.22	6/30/2017
1/27/2016	Siguler Guff DREOF II Co-Inv	\$16,122,086	\$25,000,000	60%	\$15,100,362	\$600,000	\$0	\$0	\$9,899,638	0.00	1.07	6/30/2017
<b>Total Closed End Real Estate</b>		<b>\$646,831,750</b>	<b>\$1,310,000,000</b>	<b>80%</b>	<b>\$1,046,054,977</b>	<b>\$6,540,820</b>	<b>\$17,184,640</b>	<b>\$784,189,994</b>	<b>\$341,510,073</b>	<b>0.33</b>	<b>0.94</b>	
<b>% of Portfolio (Market Value)</b>		<b>7.8%</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>Actual capital called is \$85,600,000 which includes recallable distributions

<sup>6</sup>Total distributions may include recallable distributions

Total Fund  
Closed End Funds - Investment Summary

Period Ending: September 30, 2017

Verus Internal Analysis												
Inception Date	Manager Name/Fund Name	Estimated Market Value as of 9/30/17 <sup>3</sup>	Total Commitment	Total % Called	Capital Called	Current Qtr. Capital Called	Current Qtr. Distributions	Total Distributions	Remaining Commitment	Distrib./Paid-In (DPI) <sup>1</sup>	Tot. Value/Paid-In (TVPI) <sup>2</sup>	Latest Valuation
<b>Private Equity &amp; Venture Capital</b>												
3/18/1996	Adams Street Partners	\$134,091,741	\$210,000,000	81%	\$169,714,125	\$7,450,000	\$7,304,869	\$103,808,805	\$40,285,875	0.61	1.40	6/30/2017
1/16/2009	Adams Street Partners II	\$12,668,989	\$30,000,000	95%	\$28,365,000	\$0	\$1,342,293	\$33,715,530	\$1,635,000	1.19	1.64	6/30/2017
9/21/2012	Adams Street Partners - Fund 5	\$23,856,537	\$40,000,000	75%	\$29,811,900	\$800,000	\$0	\$8,810,703	\$10,188,100	0.30	1.10	6/30/2017
1/18/1996	Adams Street Partners - BPF	\$3,454,265	\$59,565,614	97%	\$57,517,409	\$0	\$573,696	\$100,808,319	\$2,048,205	1.75	1.81	6/30/2017
4/28/2017	Adams Street Venture Innovation	\$2,634,131	\$75,000,000	5%	\$3,412,500	\$0	\$0	\$0	\$71,587,500	0.00	0.77	6/30/2017
6/14/2004	Bay Area Equity Fund	\$2,962,496	\$10,000,000	100%	\$10,000,000	\$0	\$0	\$36,331,243	\$0	3.63	3.93	6/30/2017
12/7/2009	Bay Area Equity Fund II	\$9,042,171	\$10,000,000	100%	\$10,000,000	\$0	\$0	\$2,026,313	\$0	0.20	1.11	6/30/2017
11/26/2003	EIF US Power Fund I	\$754,404	\$30,000,000	100%	\$30,000,000	\$0	\$0	\$64,404,030	\$0	2.15	2.17	6/30/2017
8/16/2005	EIF US Power Fund II <sup>5</sup>	\$33,882,887	\$50,000,000	100%	\$50,000,000	\$0	\$932,437	\$48,553,275	\$0	0.97	1.65	6/30/2017
5/30/2007	EIF US Power Fund III <sup>6</sup>	\$43,920,393	\$65,000,000	100%	\$65,000,000	\$0	\$674,074	\$54,782,083	\$0	0.84	1.52	6/30/2017
11/28/2011	EIF US Power Fund IV <sup>4</sup>	\$51,443,881	\$50,000,000	112%	\$55,770,845	\$0	\$0	\$17,817,527	\$6,308,439	0.32	1.24	6/30/2017
11/28/2016	EIF US Power Fund V	\$10,716,572	\$50,000,000	22%	\$11,078,680	\$0	\$1,779,432	\$3,923,637	\$38,921,320	0.35	1.32	6/30/2017
5/24/2011	Pathway 6	\$34,664,669	\$40,000,000	80%	\$32,029,574	\$812,155	\$1,695,710	\$8,545,396	\$7,970,426	0.27	1.35	6/30/2017
2/7/2013	Pathway 7	\$48,378,975	\$70,000,000	68%	\$47,276,400	\$4,517,701	\$624,147	\$4,623,748	\$22,723,600	0.10	1.12	6/30/2017
11/23/2015	Pathway 8	\$20,033,821	\$50,000,000	37%	\$18,672,401	\$2,576,538	\$163,517	\$866,410	\$31,327,599	0.05	1.12	6/30/2017
11/9/1998	Pathway	\$30,287,917	\$125,000,000	98%	\$122,220,664	\$251,460	\$1,412,250	\$153,156,117	\$2,779,336	1.25	1.50	6/30/2017
12/26/2008	Pathway 2008	\$24,236,154	\$30,000,000	91%	\$27,314,963	\$818,196	\$1,951,189	\$16,183,383	\$2,685,037	0.59	1.48	6/30/2017
1/31/2008	Carpenter Bancfund	\$25,005,297	\$30,000,000	97%	\$29,239,890	\$0	\$0	\$24,414,128	\$979,075	0.83	1.69	6/30/2017
2/15/2004	Nogales	\$45,966	\$15,000,000	99%	\$14,805,103	\$0	\$0	\$12,314,799	\$111,251	0.83	0.83	12/31/2016
11/30/2007	Paladin III	\$26,393,072	\$25,000,000	99%	\$24,799,193	\$141,311	\$19,436	\$15,604,222	\$1,224,568	0.63	1.69	6/30/2017
6/11/2014	Ocean Avenue Fund II	\$19,895,762	\$30,000,000	65%	\$19,500,000	\$0	\$0	\$2,089,938	\$10,500,000	0.11	1.13	6/30/2017
4/15/2016	Ocean Avenue Fund III	\$9,596,509	\$50,000,000	20%	\$10,000,000	\$0	\$0	\$0	\$40,000,000	0.00	0.96	6/30/2017
6/3/2014	Siguler Guff CCCERA Opportunities	\$134,384,629	\$200,000,000	58%	\$115,652,500	\$17,150,000	\$0	\$5,712,984	\$84,347,500	0.05	1.21	6/30/2017
11/30/2016	Siguler Guff Secondary Opportunities	\$10,098,395	\$50,000,000	17%	\$8,250,000	\$0	\$0	\$4,407,569	\$41,750,000	0.53	1.76	6/30/2017
<b>Total Private Equity and Venture Capital</b>		<b>\$712,449,633</b>	<b>\$1,394,565,614</b>	<b>70%</b>	<b>\$982,181,147</b>	<b>\$34,517,362</b>	<b>\$18,473,050</b>	<b>\$722,900,158</b>	<b>\$417,372,831</b>	<b>0.74</b>	<b>1.46</b>	
<b>% of Portfolio (Market Value)</b>		<b>8.5%</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>EIF IV has \$12,677,767 of recallable distributions

<sup>5</sup>EIF II has \$15,029,557 of recallable distributions

<sup>6</sup>EIF III has \$6,125,861 of recallable distributions

Total Fund  
Closed End Funds - IRR Summary

Period Ending: September 30, 2017

Fixed Income	Inception	Fund Level (G)	CCCERA (G)	Fund Level (N)	CCCERA (N)	IRR Date
Torchlight II	07/01/2006	-	-0.0%	-	-1.3%	06/30/2017
Torchlight III	12/12/2008	-	17.9%	-	13.7%	06/30/2017
Torchlight IV	08/01/2012	-	13.7%	-	11.1%	06/30/2017
Torchlight V	03/12/2015	-	27.2%	-	14.3%	03/31/2017
Inflation Hedge	Inception	Fund Level (G)	CCCERA (G)	Fund Level (N)	CCCERA (N)	IRR Date
Aether Real Assets III <sup>4</sup>	11/27/2013	17.9%	-	14.2%	-	06/30/2017
Aether Real Assets III Surplus <sup>4</sup>	11/27/2013	18.6%	-	16.7%	-	06/30/2017
Aether Real Assets IV <sup>1</sup>	01/01/2016	-	-	-	-	-
CommonFund <sup>2</sup>	06/28/2013	-	9.2%	-	6.2%	06/30/2017
Wastewater Opportunity Fund <sup>1</sup>	12/08/2015	-3.1%	-	-35.1%	-	03/31/2017
Opportunistic	Inception	Fund Level (G)	CCCERA (G)	Fund Level (N)	CCCERA (N)	IRR Date
Oaktree PIF 2009	02/18/2010	7.3%	-	7.1%	-	09/30/2017
Angelo Gordon Energy Cred Opp. <sup>1</sup>	09/24/2015	-	-	-	15.9%	06/30/2017
Real Estate	Inception	Fund Level (G)	CCCERA (G)	Fund Level (N)	CCCERA (N)	IRR Date
Angelo Gordon VIII	01/23/2012	-	-	-	16.7%	06/30/2017
Angelo Gordon IX <sup>1</sup>	12/08/2014	-	-	-	12.0%	06/30/2017
DLJ RECP III	06/23/2005	6.0%	-	-	-	03/31/2017
DLJ RECP IV	02/11/2008	6.0%	-	-	32.0%	06/30/2017
DLJ RECP V <sup>1</sup>	07/01/2014	-	-	-	-	-
Hearthstone II	06/17/1998	-	30.1%	-	30.1%	03/31/2017
Invesco Fund I	02/01/2005	3.2%	-	1.6%	-	12/31/2016
Invesco Fund II	11/26/2007	8.2%	-	6.8%	-	12/31/2016
Invesco Fund III	06/30/2013	19.4%	21.9%	-	15.9%	06/30/2017
Invesco Fund IV	06/30/2014	16.6%	22.6%	-	15.9%	06/30/2017
LaSalle Income & Growth VI	07/16/2013	-	13.9%	-	-	09/30/2017
LaSalle Income & Growth VII	02/28/2017	-	-	-	-	-
Long Wharf III	03/30/2007	9.4%	9.3%	7.3%	7.0%	09/30/2017
Long Wharf IV	07/03/2013	18.1%	17.4%	12.9%	12.0%	09/30/2017
Long Wharf V <sup>1</sup>	09/30/2016	8.3%	12.2%	-0.2%	-0.3%	09/30/2017
Oaktree REOF V	12/31/2011	17.5%	-	12.9%	-	09/30/2017
Oaktree REOF VI	09/30/2013	15.9%	-	10.7%	-	09/30/2017
Oaktree REOF VII <sup>1</sup>	04/01/2015	157.6%	-	60.5%	-	09/30/2017
Paulson <sup>1</sup>	11/10/2013	-	-	-	-	-
Siguler Guff I	01/25/2012	-	18.8%	-	13.9%	06/30/2017
Siguler Guff II	08/31/2013	-	13.2%	-	9.2%	06/30/2017
Siguler Guff DREOF II Co-Inv <sup>1</sup>	01/27/2016	-	8.6	-	6.3	06/30/2017

<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>Manager has reported IRR figures, but does not consider them to be meaningful, due to the age of the fund.

Total Fund  
Closed End Funds - IRR Summary

Period Ending: September 30, 2017

Private Equity & Venture Capital	Inception	Fund Level (G)	CCCERA (G)	Fund Level (N)	CCCERA (N)	IRR Date
Adams Street Partners	03/18/1996	-	11.9%	-	9.2%	06/30/2017
Adams Street Partners II	01/16/2009	-	-	18.8%	15.0%	06/30/2017
Adams Street Partners - Fund 5	09/21/2012	-	-	8.2%	5.0%	06/30/2017
Adams Street Partners Venture <sup>1</sup>	04/28/2017	-	-	-	-	-
Adams Street Partners - BPF	01/18/1996	-	14.3%	-	11.6%	06/30/2017
Bay Area Equity Fund I	06/14/2004	26.0%	-	23.4%	-	03/31/2017
Bay Area Equity Fund II	12/07/2009	1.8%	-	1.4%	-	03/31/2017
Energy Investor Fund	11/26/2003	33.6%	34.7%	28.6%	28.4%	06/30/2017
Energy Investor Fund II	08/16/2005	7.3%	6.8%	4.6%	4.1%	06/30/2017
Energy Investor Fund III	05/30/2007	9.3%	9.3%	6.8%	6.8%	06/30/2017
Energy Investor Fund IV	11/28/2011	14.9%	15.2%	9.6%	9.4%	06/30/2017
Energy Investor Fund V	11/26/2016	-	-	-	-	-
Pathway 6	05/24/2011	15.5%	15.5%	12.2%	12.2%	06/30/2017
Benchmark <sup>4</sup>		13.4%	-	-	-	06/30/2017
Pathway 7 <sup>1</sup>	02/07/2013	11.3%	11.3%	7.2%	7.2%	06/30/2017
Pathway 8 <sup>1</sup>	11/06/2015	-	-	-	-	-
Pathway Private Equity Fund	11/09/1998	10.2%	10.2%	8.4%	8.4%	06/30/2017
Benchmark <sup>2</sup>		10.3%	-	-	-	06/30/2017
Pathway Private Equity Fund 2008	12/26/2008	14.9%	14.9%	11.9%	11.9%	06/30/2017
Benchmark <sup>6</sup>		12.7%	-	-	-	06/30/2017
Carpenter Bancfund	01/31/2008	-	-	-	10.7%	06/30/2017
Nogales	02/15/2004	-	-4.5%	-8.6%	-8.8%	03/31/2017
Paladin III	11/30/2007	15.6%	-	-	-	06/30/2017
Ocean Avenue II	06/11/2014	-	-	5.6%	-	06/30/2017
Ocean Avenue III	04/15/2016	-	-	-7.1%	-	06/30/2017
Siguler Guff CCCERA Opportunities	06/03/2014	-	24.6%	-	18.6%	06/30/2017
Siguler Guff Secondary Opportunities	11/30/2016	-	-	-	25+%	06/30/2017

<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 March 31, 2015.

<sup>5</sup>Private iQ global all private equity median pooled return for vintage years 1999-2011, as of March 31, 2015.

<sup>6</sup>Private iQ global all private equity median pooled return for vintage years 2008-2014, as of March 31, 2015.

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

Period Ending: September 30, 2017

	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
Intech Large Cap Core	13.37%	2.56%	8.08%	4.08%	0.86	5.47%	0.56	1.61	0.47	113.23%	58.84%
PIMCO Stocks+ Absolute Return	11.38%	0.57%	9.36%	-2.73%	1.31	2.88%	0.96	1.18	0.20	118.62%	158.51%
Jackson Square Partners	10.17%	-2.52%	11.94%	-7.18%	1.37	6.32%	0.78	0.82	-0.40	86.29%	136.22%
Robeco Boston Partners	9.02%	0.49%	8.68%	0.25%	1.03	2.87%	0.89	1.00	0.17	104.10%	98.30%
Emerald Advisers	14.61%	2.44%	13.38%	2.75%	0.97	5.23%	0.85	1.07	0.47	112.82%	93.68%
Ceredex	11.67%	-0.45%	9.81%	3.98%	0.63	7.37%	0.65	1.16	-0.06	78.58%	45.03%
Pyrford	3.94%	1.02%	8.53%	2.19%	0.60	6.76%	0.68	0.42	0.15	61.32%	40.86%
William Blair	6.57%	0.14%	11.21%	0.65%	0.92	2.86%	0.94	0.56	0.05	96.12%	92.48%
Artisan Partners	12.54%	5.11%	12.30%	3.39%	1.23	6.68%	0.73	0.99	0.76	150.89%	89.62%
First Eagle	6.79%	-0.64%	6.49%	1.65%	0.69	3.75%	0.83	1.00	-0.17	82.97%	71.73%
Intech Global Low Vol	8.11%	0.68%	6.32%	5.86%	0.30	8.29%	0.17	1.23	0.08	80.78%	28.41%
AFL-CIO	2.58%	-0.14%	3.15%	0.08%	0.92	0.49%	0.98	0.72	-0.28	93.99%	93.41%
Allianz Global Investors	4.53%	-1.34%	5.54%	-0.62%	0.88	1.37%	0.96	0.76	-0.98	81.58%	95.31%
Wellington Real Total Return	-3.17%	-8.43%	7.68%	-14.58%	2.17	7.15%	0.19	-0.45	-1.18	-26.43%	1,307.20%
Adelante	9.26%	-0.39%	11.48%	0.29%	0.93	2.15%	0.97	0.78	-0.18	96.08%	98.21%

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, 2017

	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
Intech Large Cap Core	15.39%	1.17%	8.23%	2.20%	0.93	4.30%	0.73	1.84	0.27	104.60%	62.05%
PIMCO Stocks+ Absolute Return	14.35%	0.12%	8.94%	-2.00%	1.15	2.29%	0.95	1.58	0.05	108.55%	151.35%
Jackson Square Partners	13.77%	-1.49%	11.22%	-5.66%	1.27	5.07%	0.83	1.21	-0.29	90.62%	118.35%
Robeco Boston Partners	13.75%	0.55%	8.72%	0.84%	0.98	2.88%	0.89	1.55	0.19	103.44%	93.29%
Emerald Advisers	16.15%	1.86%	14.04%	1.49%	1.03	5.41%	0.85	1.13	0.34	109.36%	90.70%
Ceredex	13.41%	0.14%	11.62%	2.36%	0.83	6.10%	0.76	1.14	0.02	91.98%	77.52%
William Blair	8.97%	1.10%	10.31%	1.57%	0.94	2.64%	0.94	0.85	0.42	102.70%	88.14%
First Eagle	8.52%	-1.68%	6.41%	1.10%	0.73	3.31%	0.85	1.30	-0.51	80.46%	87.20%
Intech Global Low Vol	10.27%	0.08%	7.81%	4.80%	0.54	7.49%	0.31	1.29	0.01	85.79%	45.80%
AFL-CIO	1.93%	-0.13%	2.99%	-0.05%	0.96	0.47%	0.98	0.57	-0.28	93.56%	94.88%
Allianz Global Investors	5.46%	-0.93%	4.92%	-0.26%	0.90	1.19%	0.96	1.06	-0.78	85.81%	94.55%
Adelante	9.72%	0.21%	10.32%	1.13%	0.90	2.17%	0.97	0.92	0.10	92.89%	81.67%

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



# Total Fund Investment Fund Fee Analysis

Period Ending: September 30, 2017

Name	Asset Class	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
BlackRock Russell 1000 Index	Global Equity	0.03% of Assets	\$112,583,795	\$33,775	0.03%
Jackson Square Partners	Global Equity	0.50% of First \$100.0 Mil, 0.40% of Next \$150.0 Mil, 0.35% Thereafter	\$388,754,424	\$1,585,640	0.41%
Robeco Boston Partners	Global Equity	0.50% of First \$25.0 Mil, 0.30% Thereafter	\$379,356,305	\$1,188,069	0.31%
Emerald Advisers	Global Equity	0.75% of First \$10.0 Mil, 0.60% Thereafter	\$268,058,074	\$1,623,348	0.61%
Ceredex	Global Equity	0.85% of First \$10.0 Mil, 0.68% of Next \$40.0 Mil, 0.51% Thereafter	\$248,362,054	\$1,368,646	0.55%
Pyrford	Global Equity	0.70% of First \$50.0 Mil, 0.50% of Next \$50.0 Mil, 0.35% Thereafter	\$445,746,577	\$1,810,113	0.41%
William Blair	Global Equity	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	\$472,379,327	\$1,832,138	0.39%
PIMCO RAE Emerging Markets	Global Equity	0.75% of First \$50.0 Mil, 0.68% of Next \$50.0 Mil, 0.50% of Next \$100.0 Mil, 0.45% Thereafter	\$346,965,219	\$1,873,843	0.54%
TT Emerging Markets	Global Equity	0.70% of First \$100.0 Mil, 0.65% of Next \$100.0 Mil, 0.60% Thereafter	\$326,325,833	\$2,107,955	0.65%
Artisan Partners	Global Equity	0.75% of Assets	\$364,485,435	\$2,733,641	0.75%
First Eagle	Global Equity	0.75% of Assets	\$354,801,009	\$2,661,008	0.75%
Allianz Global Investors	High Yield Fixed Income	0.50% of First \$50.0 Mil, 0.40% of Next \$50.0 Mil, 0.35% Thereafter	\$364,747,075	\$1,376,615	0.38%
AFL-CIO	Global Fixed Income	0.43% of Assets	\$278,535,718	\$1,197,704	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, 2017

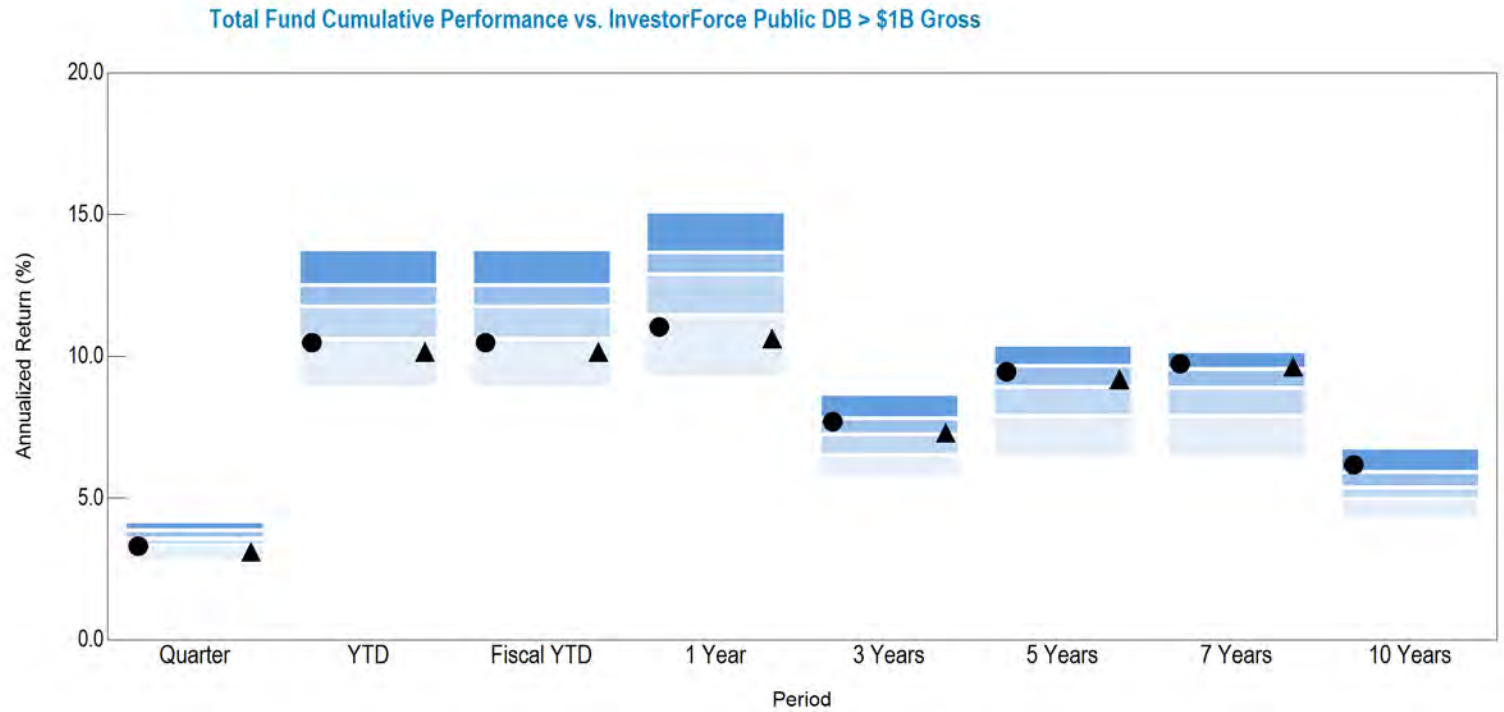
Name	Asset Class	Fee Schedule	Market Value	Estimated Fee Value	Estimated Fee
Wellington Real Total Return	Inflation Hedge/Real Assets	0.55% of Assets	\$189,012,873	\$1,039,571	0.55%
DFA Short Credit	Global Fixed Income	0.20% of First \$25.0 Mil, 0.10% Thereafter	\$446,571,058	\$471,571	0.11%
Insight Short Duration	Global Fixed Income	0.06% of First \$500.0 Mil, 0.05% of Next \$500.0 Mil, 0.04% Thereafter	\$912,652,577	\$506,326	0.06%
Sit Short Duration	Global Fixed Income	0.15% of Assets	\$492,220,084	\$738,330	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, 2017



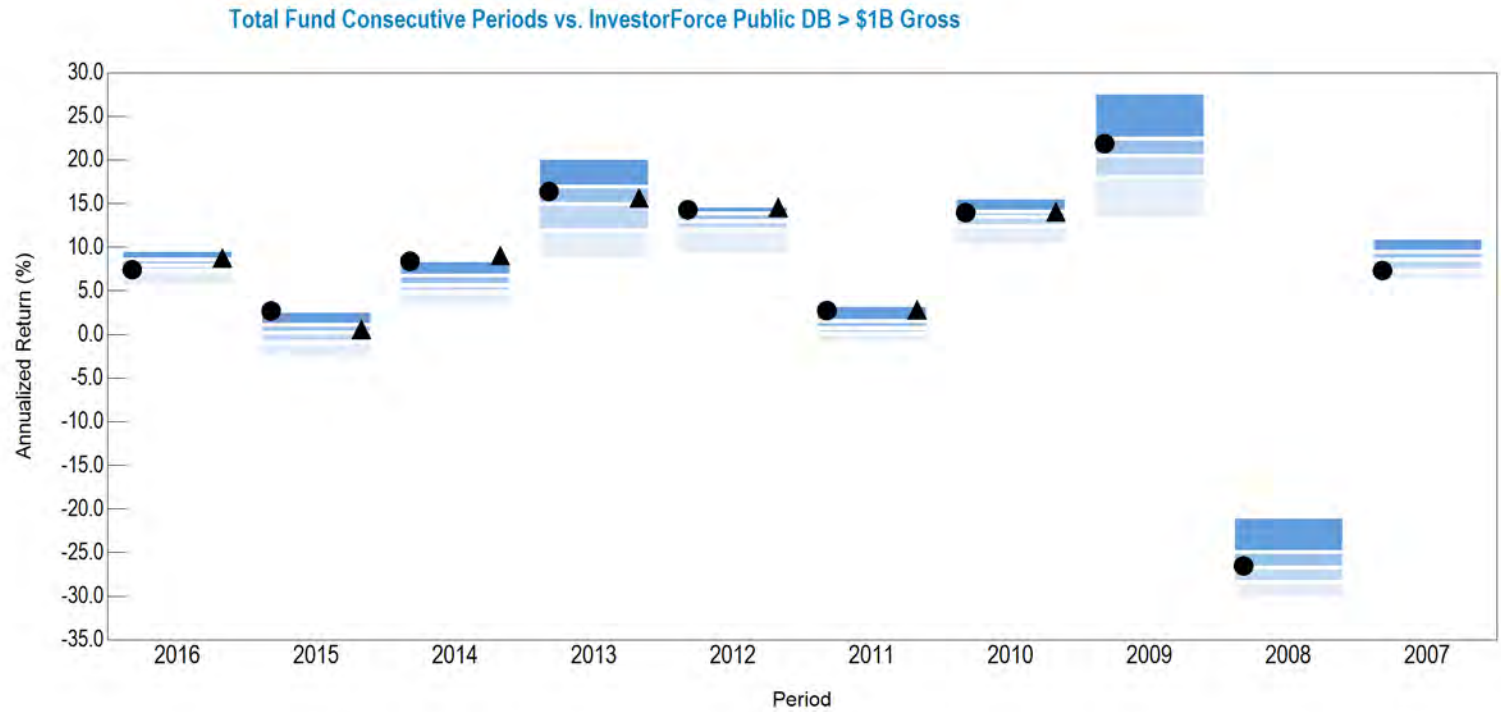
	Return (Rank)													
	Quarter	YTD	Fiscal YTD	1 Year	3 Years	5 Years	7 Years	10 Years						
5th Percentile	4.2	13.8	13.8	15.1	8.7	10.4	10.2	6.8						
25th Percentile	3.9	12.5	12.5	13.7	7.8	9.7	9.6	5.9						
Median	3.6	11.8	11.8	12.9	7.3	8.9	8.9	5.4						
75th Percentile	3.3	10.6	10.6	11.5	6.5	7.9	7.9	5.0						
95th Percentile	2.8	8.9	8.9	9.2	5.7	6.4	6.4	4.3						
# of Portfolios	79	79	79	79	63	60	49	48						
● Total Fund	3.3 (77)	10.5 (78)	10.5 (78)	11.0 (83)	7.7 (33)	9.5 (32)	9.7 (18)	6.2 (18)						
▲ Policy Index	3.1 (82)	10.2 (82)	10.2 (82)	10.6 (89)	7.3 (48)	9.2 (42)	9.6 (22)	-- (-)						

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, 2017



	Return (Rank)									
	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
5th Percentile	9.7	2.7	8.5	20.2	14.7	3.3	15.7	27.7	-21.0	11.0
25th Percentile	8.6	1.1	6.8	17.0	13.9	1.6	14.2	22.5	-24.9	9.5
Median	8.0	0.3	5.7	15.0	13.0	0.8	13.5	20.5	-26.7	8.6
75th Percentile	7.4	-0.7	4.9	12.0	12.1	0.1	12.5	18.1	-28.3	7.4
95th Percentile	5.5	-2.8	3.1	8.7	9.2	-0.9	10.2	13.4	-30.2	6.2
# of Portfolios	92	98	79	67	74	68	66	66	65	64
● Total Fund	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)	7.3 (78)
▲ Policy Index	8.8 (17)	0.6 (40)	9.0 (2)	15.6 (43)	14.6 (8)	2.8 (9)	14.1 (27)	-- (--)	-- (--)	-- (--)

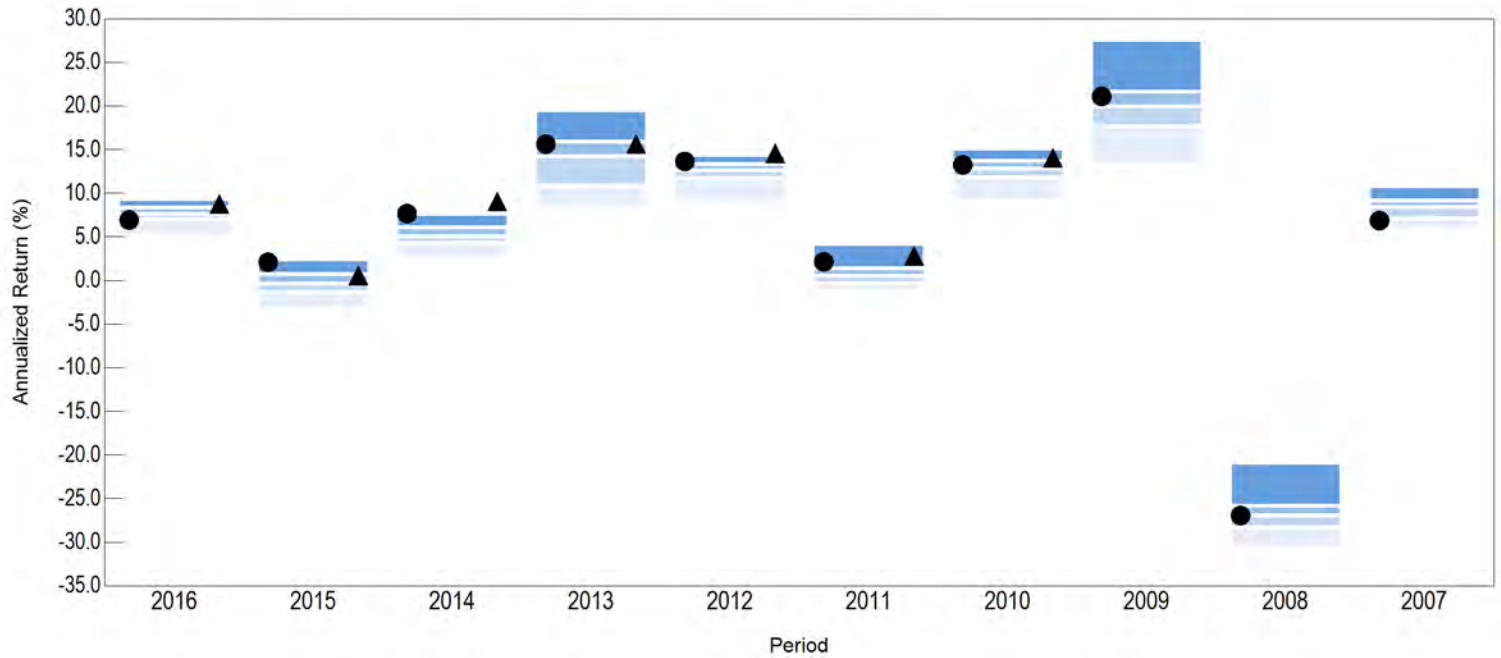
Effective 1/01/2017, only traditional asset class (public equity, public fixed income, REITs) investment management fees will be included in the gross of fee return calculation.

Total Fund

Peer Universe Comparison: Consecutive Periods (Net of Fees)

Period Ending: September 30, 2017

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

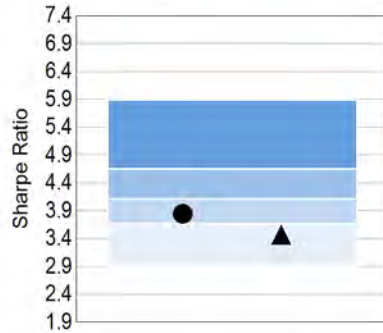


	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
<b>5th Percentile</b>	9.3	2.4	7.6	19.5	14.3	4.2	15.1	27.5	-20.9	10.7
<b>25th Percentile</b>	8.4	0.8	6.1	16.0	13.4	1.5	13.8	21.7	-25.7	9.2
<b>Median</b>	7.7	-0.4	5.1	14.3	12.7	0.6	12.8	20.0	-26.9	8.5
<b>75th Percentile</b>	7.1	-1.3	4.4	11.0	11.8	-0.3	11.8	17.7	-28.3	7.1
<b>95th Percentile</b>	5.3	-3.2	2.6	8.5	9.0	-1.2	9.3	13.4	-30.5	5.9
<b># of Portfolios</b>	62	57	55	48	44	42	41	40	39	39
<b>● Total Fund</b>	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)	6.9 (79)
<b>▲ Policy Index</b>	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)

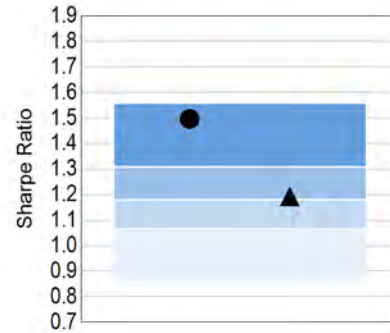
Period Ending: September 30, 2017

Sharpe Ratio  
1 Year



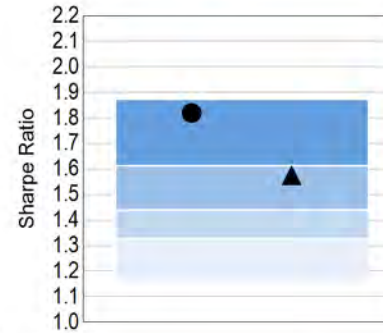
● Total Fund	
Value	3.8
Rank	66
▲ Policy Index	
Value	3.5
Rank	84
Universe	
5th %tile	5.9
25th %tile	4.7
Median	4.1
75th %tile	3.7
95th %tile	2.9

Sharpe Ratio  
3 Year



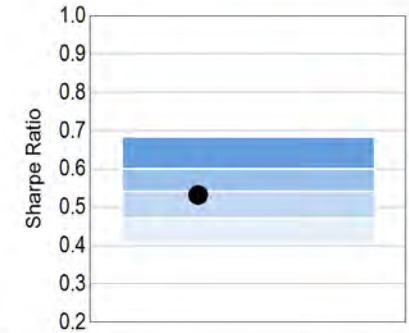
● Total Fund	
Value	1.5
Rank	11
▲ Policy Index	
Value	1.2
Rank	44
Universe	
5th %tile	1.6
25th %tile	1.3
Median	1.2
75th %tile	1.1
95th %tile	0.9

Sharpe Ratio  
5 Year



● Total Fund	
Value	1.8
Rank	7
▲ Policy Index	
Value	1.6
Rank	32
Universe	
5th %tile	1.9
25th %tile	1.6
Median	1.4
75th %tile	1.3
95th %tile	1.2

Sharpe Ratio  
10 Year



● Total Fund	
Value	0.5
Rank	52
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	0.7
25th %tile	0.6
Median	0.5
75th %tile	0.5
95th %tile	0.4

## Domestic Equity Managers

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# Jackson Square Partners Manager Portfolio Overview

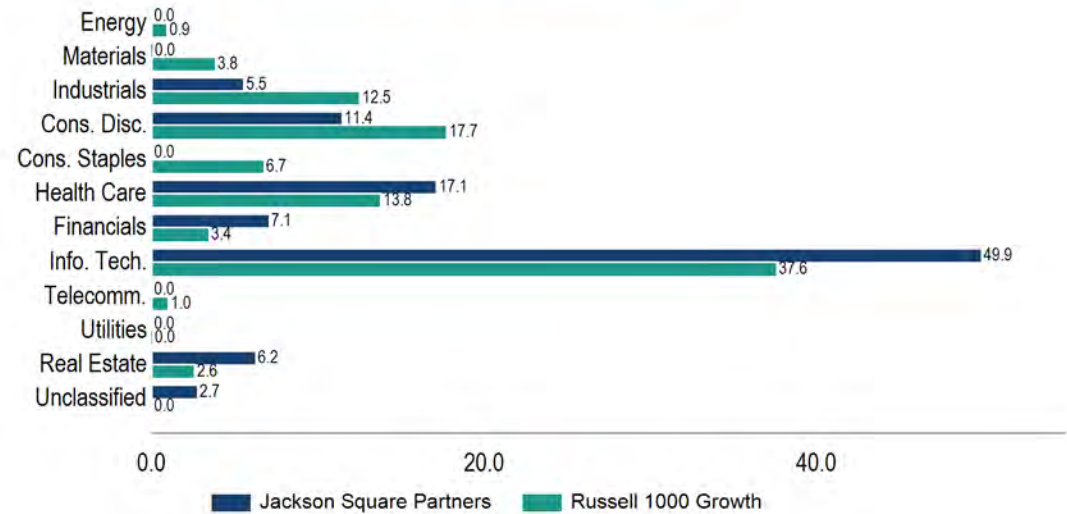
Period Ending: September 30, 2017

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	33	550
Weighted Avg. Market Cap. (\$B)	122.41	181.93
Median Market Cap. (\$B)	44.37	10.82
Price To Earnings	35.90	28.62
Price To Book	7.28	7.91
Price To Sales	5.92	4.39
Return on Equity (%)	23.22	27.51
Yield (%)	0.70	1.37
Beta	1.37	1.00

## Sector Allocation (%) vs Russell 1000 Growth



## Largest Holdings

	End Weight	Return
PAYPAL HOLDINGS	6.96	19.30
VISA 'A'	5.86	12.40
MICROSOFT	5.76	8.64
CELGENE	5.23	12.28
MASTERCARD	4.95	16.47
CROWN CASTLE INTL.	4.12	0.70
BIOGEN	3.89	15.39
EBAY	3.84	10.14
LIBERTY INTACT.QVC GROUP 'A'	3.71	-3.95
ALPHABET 'A'	3.71	4.74

## Top Contributors

	Avg Wgt	Return	Contribution
PAYPAL HOLDINGS	6.74	19.30	1.30
MASTERCARD	4.71	16.47	0.78
VISA 'A'	5.80	12.40	0.72
TAKE TWO INTACT.SFTW.	1.73	39.32	0.68
CELGENE	5.41	12.28	0.66
ASML HLDG.ADR 1:1	1.89	31.38	0.59
BIOGEN	3.65	15.39	0.56
SYMANTEC	3.19	16.45	0.52
MICROSOFT	5.93	8.64	0.51
FACEBOOK CLASS A	3.69	13.17	0.49

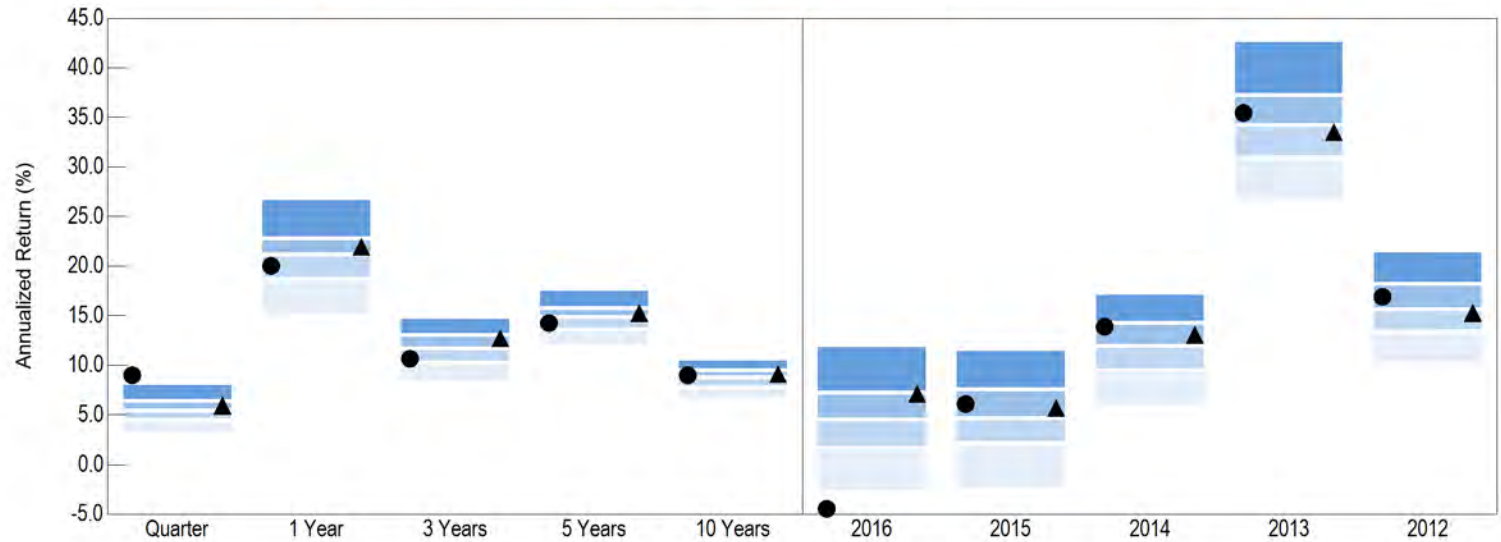
## Bottom Contributors

	Avg Wgt	Return	Contribution
ALLERGAN	2.62	-15.43	-0.40
DENTSPLY SIRONA	2.49	-7.62	-0.19
LIBERTY INTACT.QVC GROUP 'A'	3.92	-3.95	-0.15
SYNGENTA SPN.ADR 5:1	0.00	-0.64	0.00
NOVO NORDISK 'B' ADR 1:1	0.04	13.44	0.01
CROWN CASTLE INTL.	4.39	0.70	0.03
LIBERTY GLOBAL CL.A	0.78	5.57	0.04
CHARLES SCHWAB	2.77	2.01	0.06
EQUINIX	2.32	4.46	0.10
TRIPADVISOR 'A'	2.15	6.10	0.13

Unclassified sector allocation includes cash allocations.

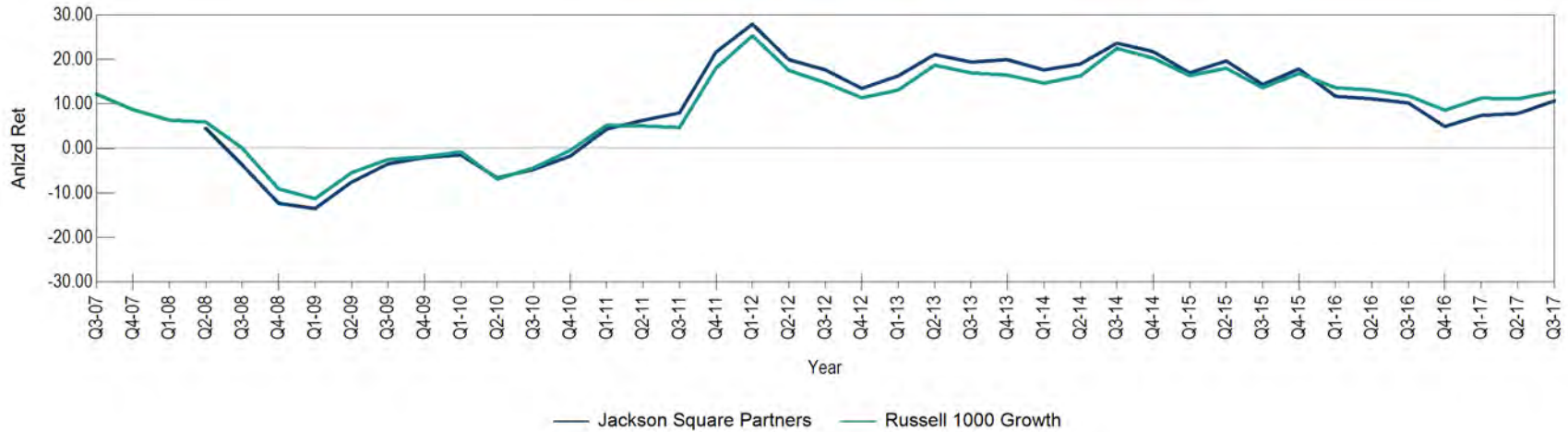


Jackson Square Partners vs. eA US Large Cap Growth Equity Gross Universe

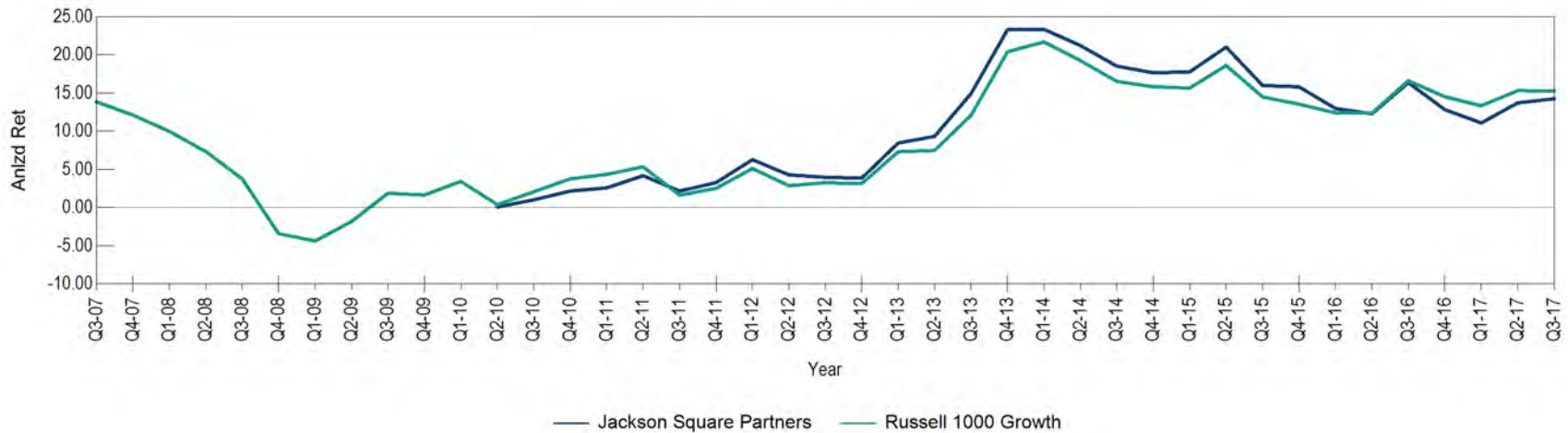


	Quarter	1 Year	3 Years	5 Years	10 Years	2016	2015	2014	2013	2012
<b>Return (Rank)</b>										
5th Percentile	8.2	26.8	14.8	17.7	10.7	12.0	11.6	17.3	42.8	21.6
25th Percentile	6.4	22.9	13.1	15.8	9.5	7.3	7.6	14.3	37.3	18.2
Median	5.4	21.2	11.7	14.9	8.8	4.6	4.7	12.0	34.3	15.7
75th Percentile	4.5	18.7	10.3	13.6	7.8	1.8	2.1	9.5	31.0	13.4
95th Percentile	3.1	15.1	8.3	12.0	6.5	-2.7	-2.4	5.8	26.6	10.2
# of Portfolios	266	266	262	245	219	282	270	291	274	274
● Jackson Square Partners	9.0 (2)	20.0 (63)	10.6 (71)	14.2 (65)	9.0 (46)	-4.4 (98)	6.1 (37)	13.9 (31)	35.4 (40)	16.9 (37)
▲ Russell 1000 Growth	5.9 (38)	21.9 (41)	12.7 (32)	15.3 (41)	9.1 (42)	7.1 (26)	5.7 (42)	13.0 (38)	33.5 (56)	15.3 (55)

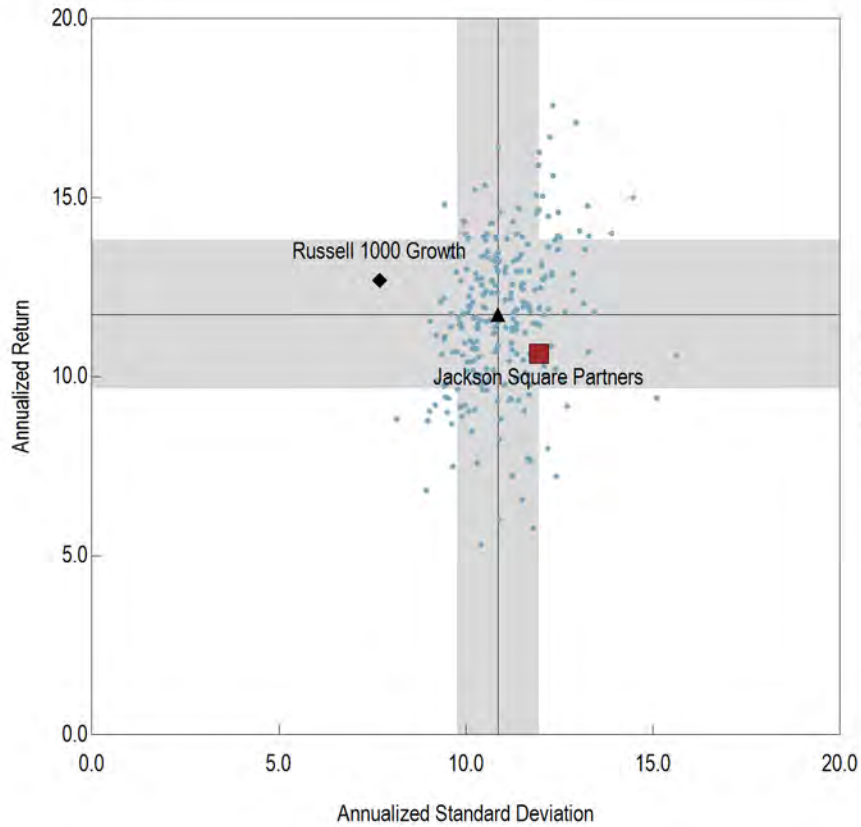
Rolling 3 Year Annualized Return (%)



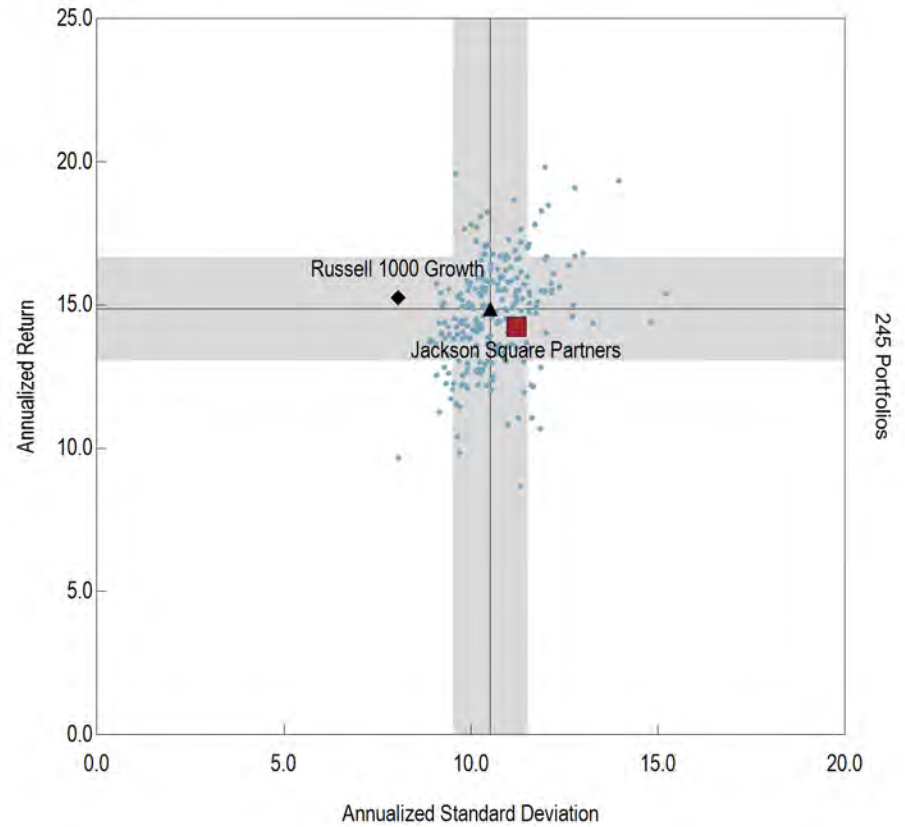
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Jackson Square Partners	10.6%	12.0%	0.9
Russell 1000 Growth	12.7%	7.7%	1.6
eA US Large Cap Growth Equity Gross Median	11.7%	10.9%	1.0

5 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Jackson Square Partners	14.2%	11.2%	1.3
Russell 1000 Growth	15.3%	8.0%	1.9
eA US Large Cap Growth Equity Gross Median	14.9%	10.5%	1.4

# Robeco Boston Partners Manager Portfolio Overview

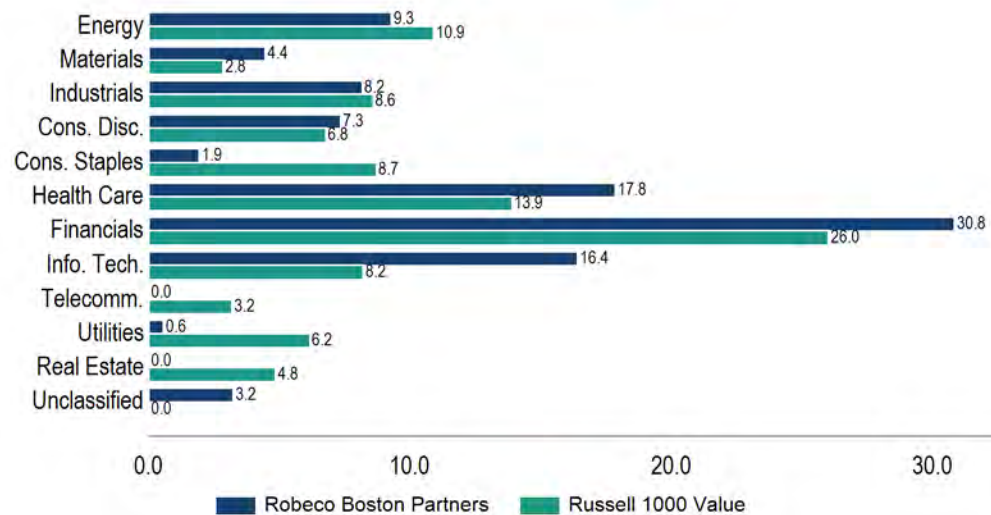
Period Ending: September 30, 2017

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	84	716
Weighted Avg. Market Cap. (\$B)	145.31	112.84
Median Market Cap. (\$B)	37.28	8.54
Price To Earnings	21.53	21.28
Price To Book	2.88	2.61
Price To Sales	2.37	2.85
Return on Equity (%)	16.07	12.04
Yield (%)	2.02	2.42
Beta	1.03	1.00

## Sector Allocation (%) vs Russell 1000 Value



## Largest Holdings

	End Weight	Return
JP MORGAN CHASE & CO.	4.72	5.06
BANK OF AMERICA	4.59	4.98
CITIGROUP	3.80	9.27
BERKSHIRE HATHAWAY 'B'	3.79	8.24
CHEVRON	3.40	13.76
JOHNSON & JOHNSON	2.97	-1.10
WELLS FARGO & CO	2.59	0.25
PFIZER	2.46	7.31
MERCK & COMPANY	2.33	0.62
ORACLE	2.27	-3.21

## Top Contributors

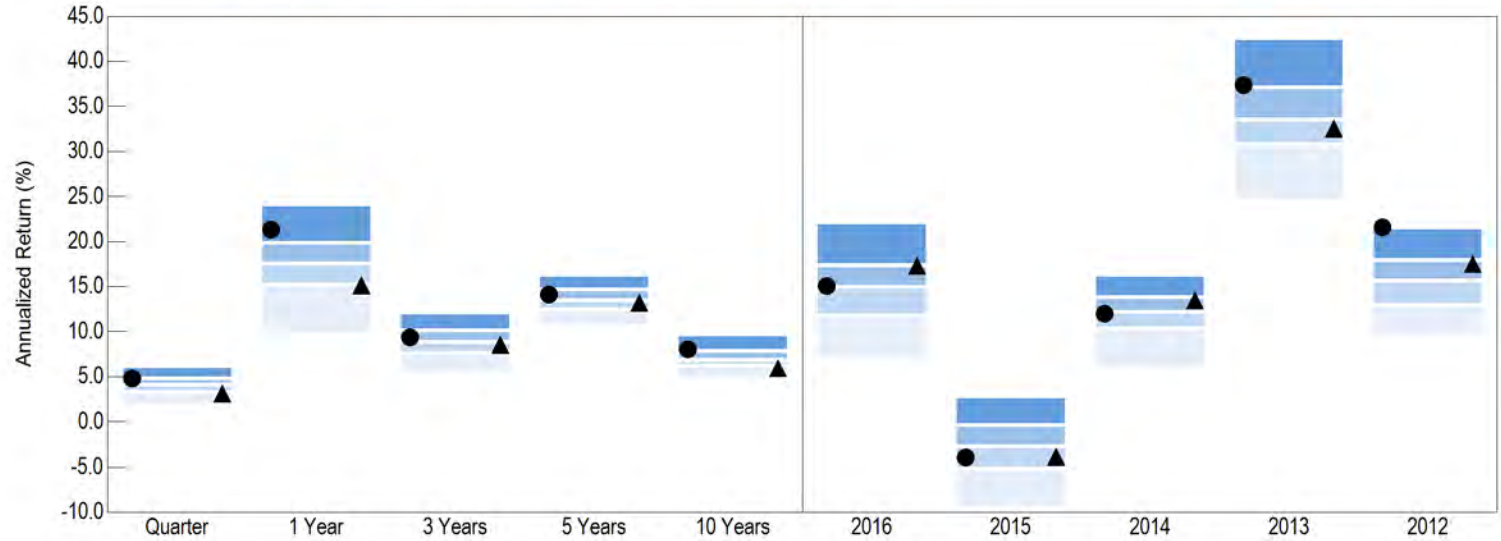
	Avg Wgt	Return	Contribution
CHEVRON	2.78	13.76	0.38
CITIGROUP	3.65	9.27	0.34
BERKSHIRE HATHAWAY 'B'	3.74	8.24	0.31
GILEAD SCIENCES	1.81	15.19	0.28
JP MORGAN CHASE & CO.	4.80	5.06	0.24
KONINKLIJKE PHILIPS ADR 1:1	1.49	15.02	0.22
BANK OF AMERICA	4.50	4.98	0.22
BORGWARNER	1.04	21.32	0.22
CISCO SYSTEMS	2.18	8.45	0.18
DXC TECHNOLOGY	1.33	12.18	0.16

## Bottom Contributors

	Avg Wgt	Return	Contribution
UNITED CONTINENTAL HDG.	0.55	-19.10	-0.10
DELTA AIR LINES	0.95	-9.70	-0.09
INTERPUBLIC GROUP	0.46	-14.72	-0.07
ORACLE	1.97	-3.21	-0.06
UNITED TECHNOLOGIES	1.43	-4.37	-0.06
SOUTHWEST AIRLINES	0.53	-9.70	-0.05
CBS 'B'	0.58	-8.79	-0.05
NAVIENT	0.45	-8.70	-0.04
DAVITA	0.46	-8.29	-0.04
JOHNSON & JOHNSON	3.13	-1.10	-0.03

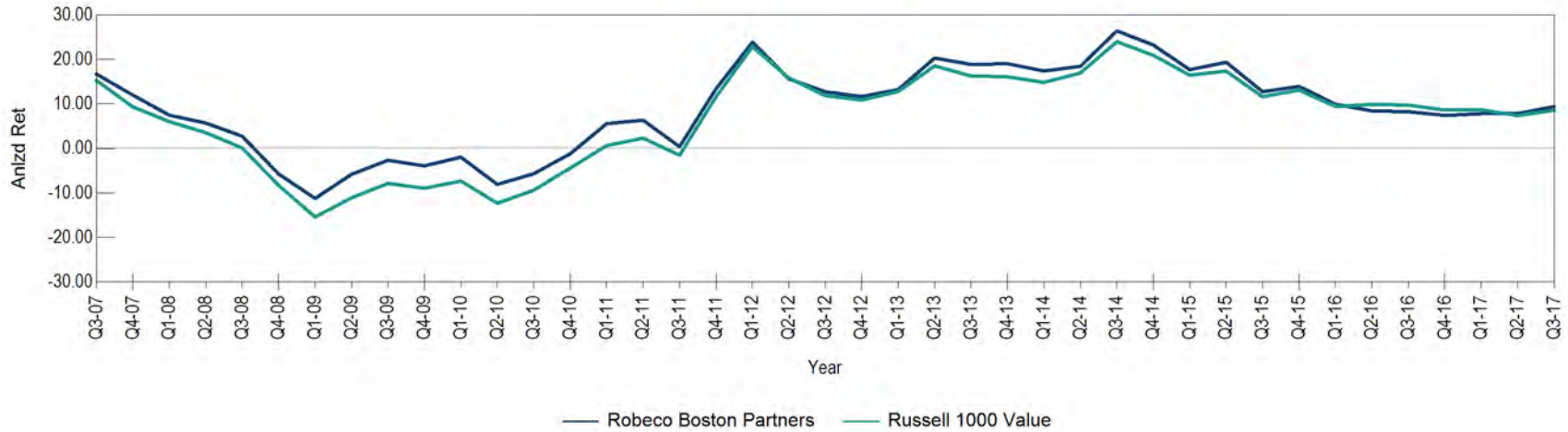
Unclassified sector allocation includes cash allocations.

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

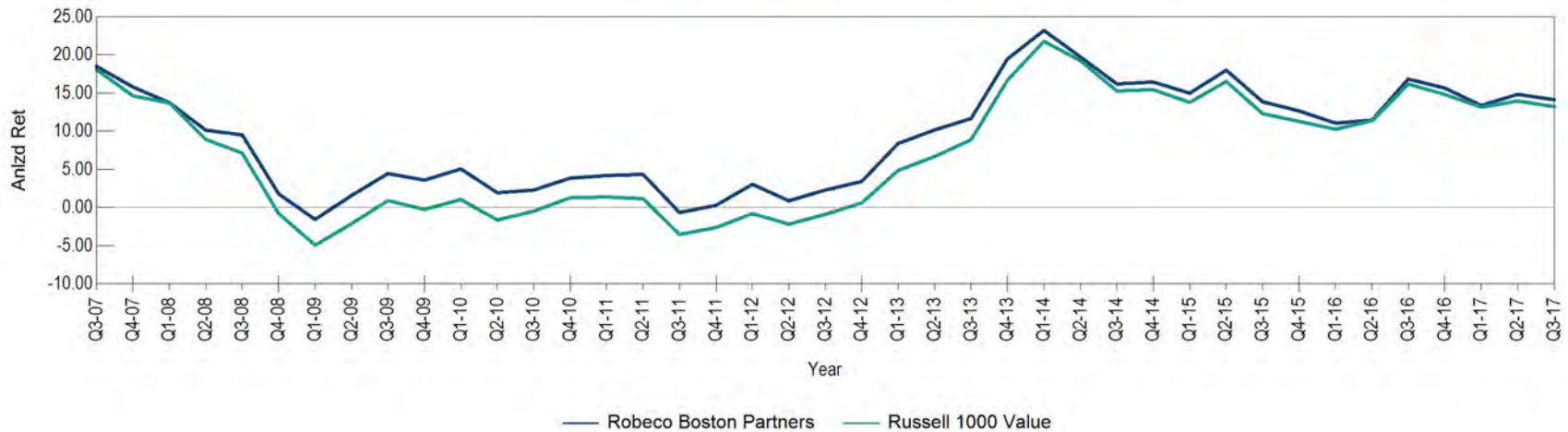


	Return (Rank)										
5th Percentile	6.1	24.1	12.1	16.3	9.7	22.1	2.8	16.3	42.5	21.5	
25th Percentile	4.9	19.9	10.2	14.7	7.9	17.4	-0.4	13.9	37.2	18.0	
Median	4.2	17.6	8.9	13.5	6.9	15.0	-2.6	12.2	33.6	15.7	
75th Percentile	3.4	15.3	7.7	12.5	6.3	11.8	-5.1	10.4	30.8	13.0	
95th Percentile	1.9	9.8	5.4	10.6	4.8	7.0	-9.4	5.9	24.6	9.6	
# of Portfolios	342	342	336	324	263	346	312	307	310	303	
● Robeco Boston Partners	4.8 (28)	21.3 (16)	9.4 (43)	14.1 (37)	8.0 (23)	15.1 (50)	-3.9 (65)	12.0 (55)	37.4 (24)	21.6 (5)	
▲ Russell 1000 Value	3.1 (81)	15.1 (77)	8.5 (61)	13.2 (58)	5.9 (83)	17.3 (26)	-3.8 (64)	13.5 (33)	32.5 (60)	17.5 (30)	

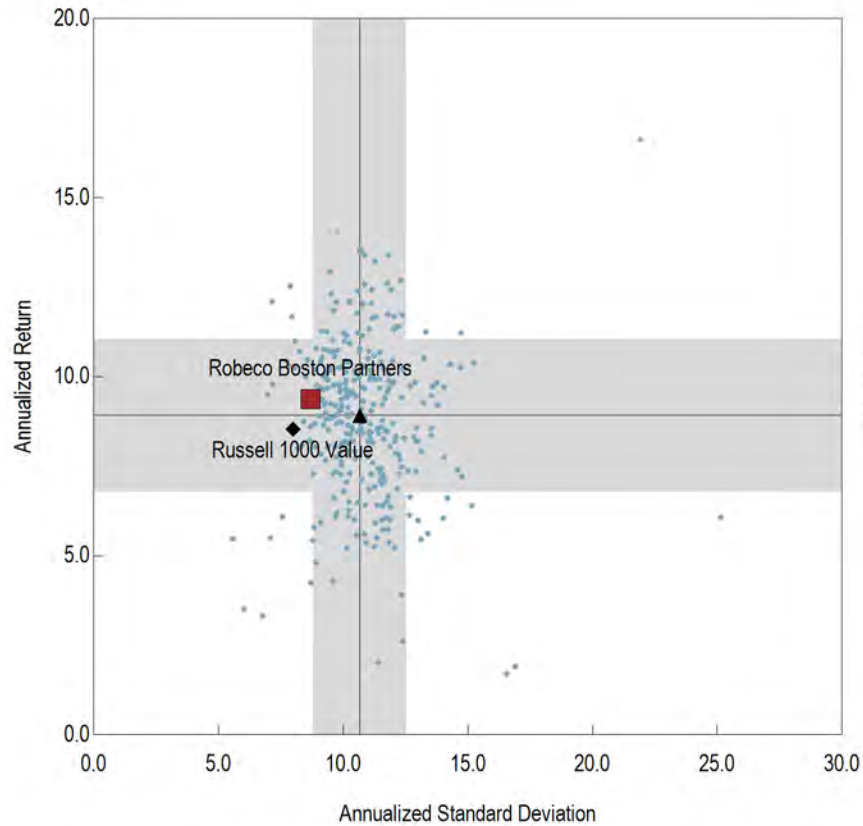
Rolling 3 Year Annualized Return (%)



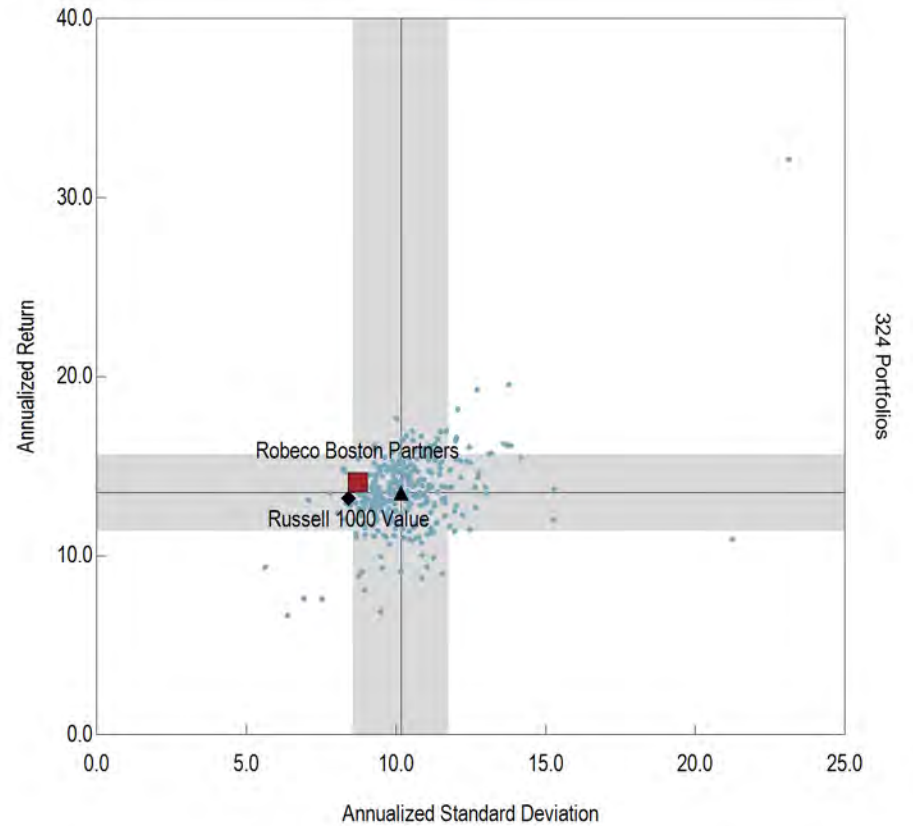
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Robeco Boston Partners	9.4%	8.7%	1.0
Russell 1000 Value	8.5%	8.0%	1.0
eA US Large Cap Value Equity Gross Median	8.9%	10.7%	0.8

5 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Robeco Boston Partners	14.1%	8.7%	1.6
Russell 1000 Value	13.2%	8.4%	1.5
eA US Large Cap Value Equity Gross Median	13.5%	10.2%	1.3

# Emerald Advisers Manager Portfolio Overview

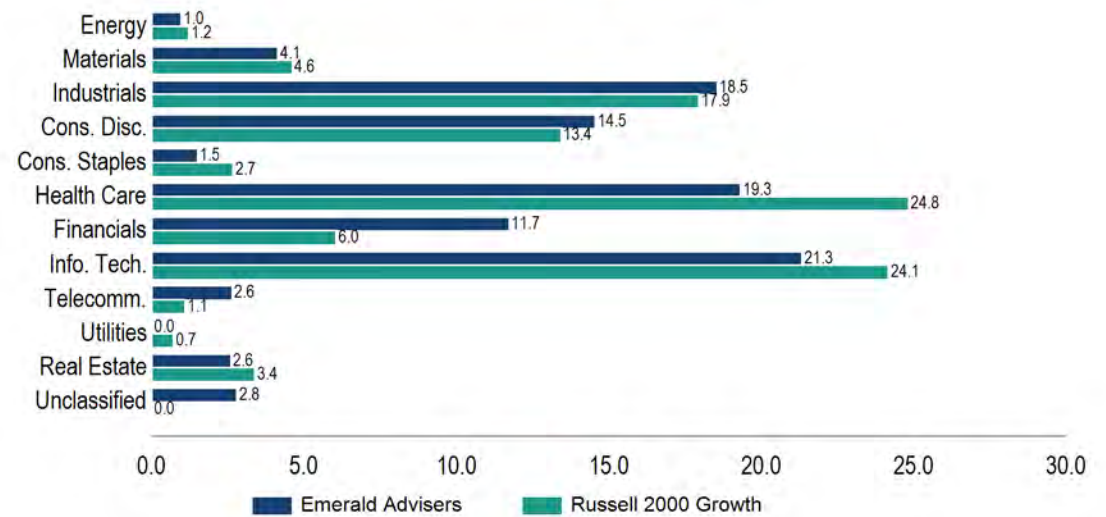
Period Ending: September 30, 2017

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	1,172
Weighted Avg. Market Cap. (\$B)	2.43	2.42
Median Market Cap. (\$B)	1.75	0.97
Price To Earnings	31.69	29.32
Price To Book	5.85	5.43
Price To Sales	3.29	3.34
Return on Equity (%)	15.90	15.74
Yield (%)	0.38	0.55
Beta	0.98	1.00

## Sector Allocation (%) vs Russell 2000 Growth



## Largest Holdings

	End Weight	Return
LENDINGTREE	3.14	41.96
TREX	2.00	33.12
INSTALLED BUILDING PRDS.	1.91	22.38
CHEGG	1.71	20.75
PUMA BIOTECHNOLOGY	1.71	37.01
SAREPTA THERAPEUTICS	1.69	34.56
EPAM SYSTEMS	1.65	4.57
PAC.PREMIER BANC.	1.64	2.30
VONAGE HOLDINGS	1.58	24.46
PROOFPOINT	1.56	0.45

## Top Contributors

	Avg Wgt	Return	Contribution
LENDINGTREE	2.82	41.96	1.18
INSMED	0.72	81.88	0.59
TREX	1.73	33.12	0.57
PUMA BIOTECHNOLOGY	1.36	37.01	0.50
SAREPTA THERAPEUTICS	1.42	34.56	0.49
INSTALLED BUILDING PRDS.	1.74	22.38	0.39
VONAGE HOLDINGS	1.54	24.46	0.38
TAKE TWO INTACT.SFTW.	0.95	39.32	0.37
CHEGG	1.55	20.75	0.32
IPG PHOTONICS	1.16	27.54	0.32

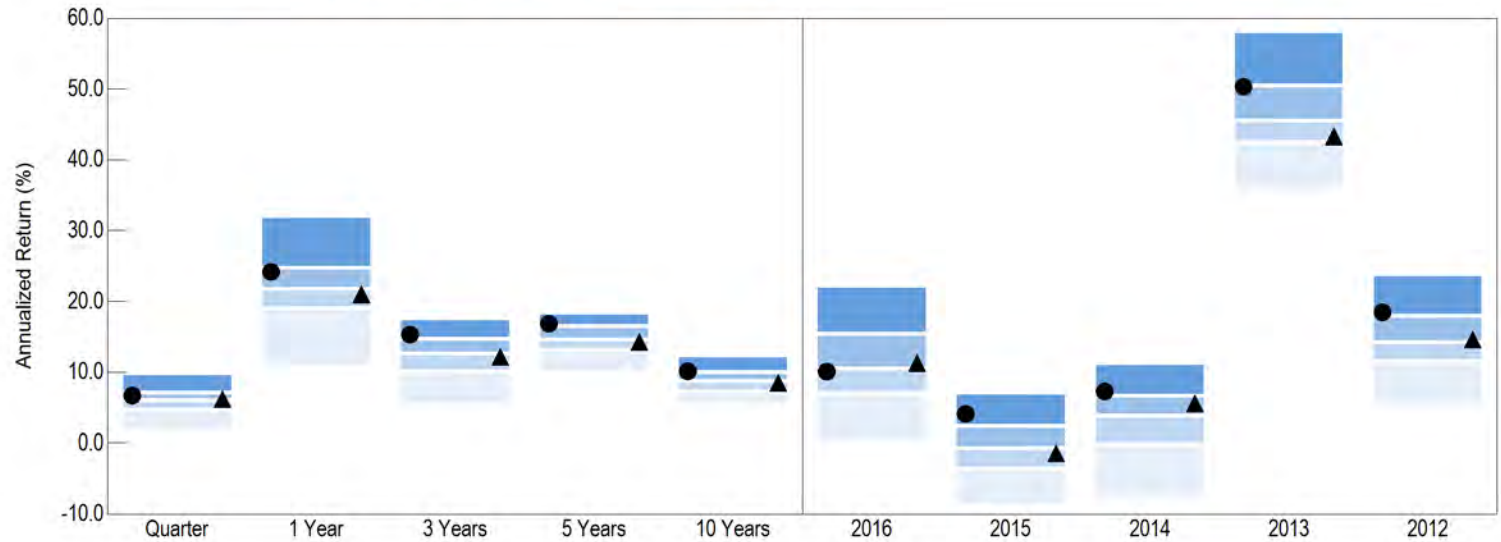
## Bottom Contributors

	Avg Wgt	Return	Contribution
TILE SHOP HOLDINGS	0.83	-38.29	-0.32
SPIRIT AIRLINES	0.74	-35.31	-0.26
MICROSTRATEGY	0.69	-33.37	-0.23
APOGEE ENTERPRISES	1.48	-14.88	-0.22
HOSTESS BRANDS CL.A	1.06	-15.16	-0.16
K2M GROUP HOLDINGS	1.23	-12.93	-0.16
CIENA	1.22	-12.19	-0.15
CLOVIS ONCOLOGY	1.05	-11.99	-0.13
IMPERVA	1.31	-9.30	-0.12
SAGE THERAPEUTICS	0.49	-21.77	-0.11

Unclassified sector allocation includes cash allocations.

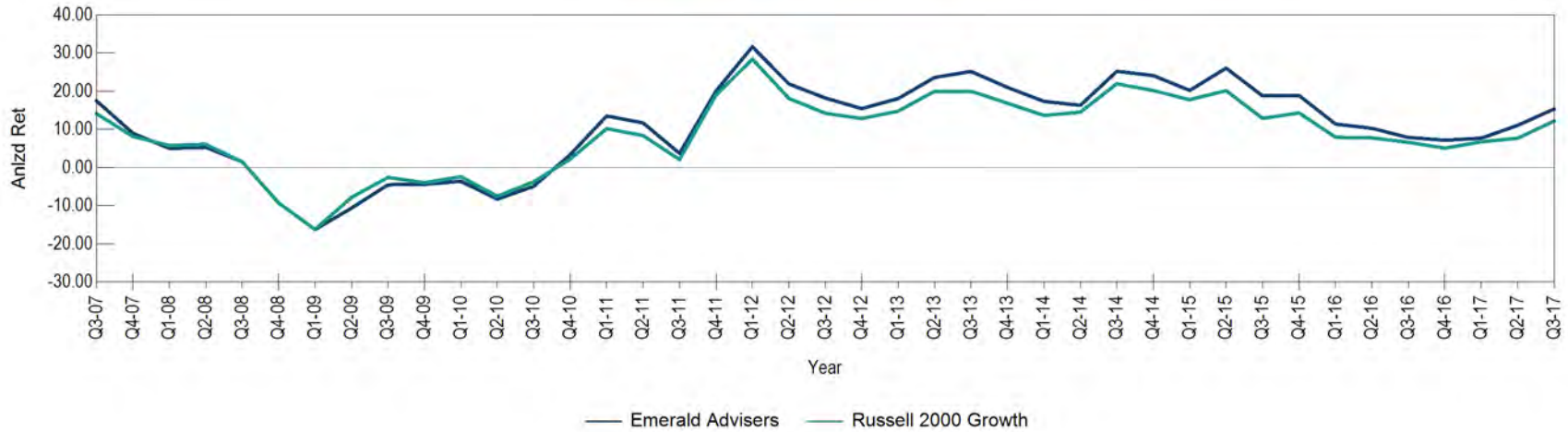


Emerald Advisers vs. eA US Small Cap Growth Equity Gross Universe

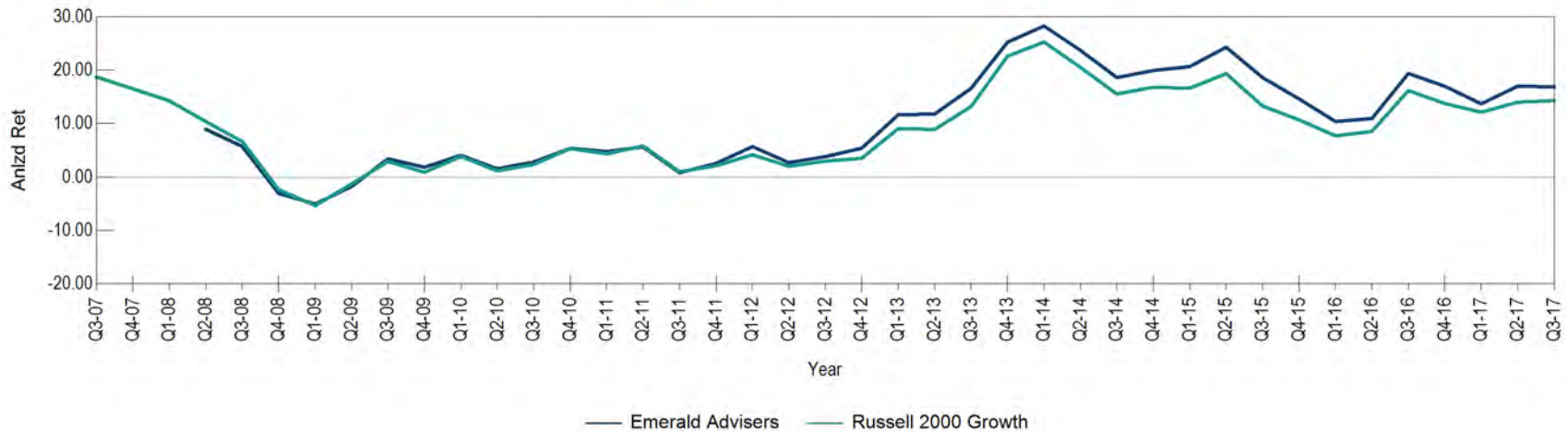


	Return (Rank)									
	Quarter	1 Year	3 Years	5 Years	10 Years	2016	2015	2014	2013	2012
5th Percentile	9.8	32.1	17.5	18.3	12.3	22.2	7.1	11.3	58.2	23.8
25th Percentile	7.2	24.8	14.8	16.6	10.1	15.5	2.5	6.7	50.6	18.0
Median	6.1	21.8	12.7	14.7	8.8	10.6	-0.6	3.9	45.6	14.3
75th Percentile	4.8	19.1	10.1	13.2	7.4	7.1	-3.5	-0.1	42.6	11.6
95th Percentile	1.8	10.9	5.4	10.0	5.3	0.2	-8.7	-7.6	35.6	5.4
# of Portfolios	169	169	163	156	135	170	154	161	160	162
● Emerald Advisers	6.7 (37)	24.2 (27)	15.3 (21)	16.9 (22)	10.1 (24)	10.1 (54)	4.1 (19)	7.3 (21)	50.3 (27)	18.5 (22)
▲ Russell 2000 Growth	6.2 (49)	21.0 (60)	12.2 (55)	14.3 (58)	8.5 (59)	11.3 (49)	-1.4 (59)	5.6 (32)	43.3 (70)	14.6 (48)

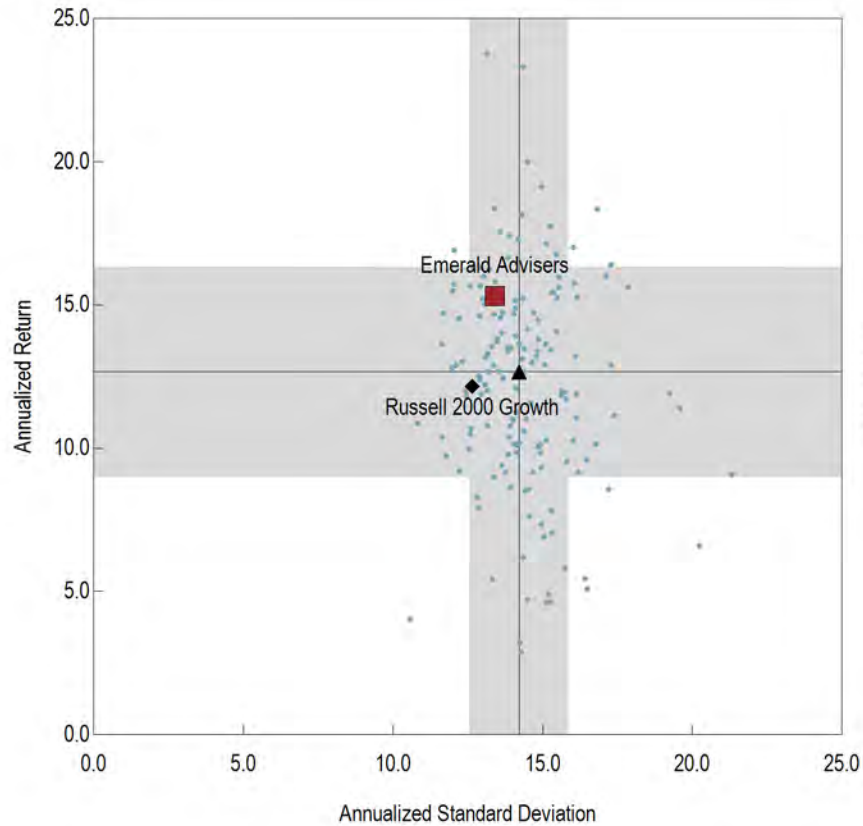
Rolling 3 Year Annualized Return (%)



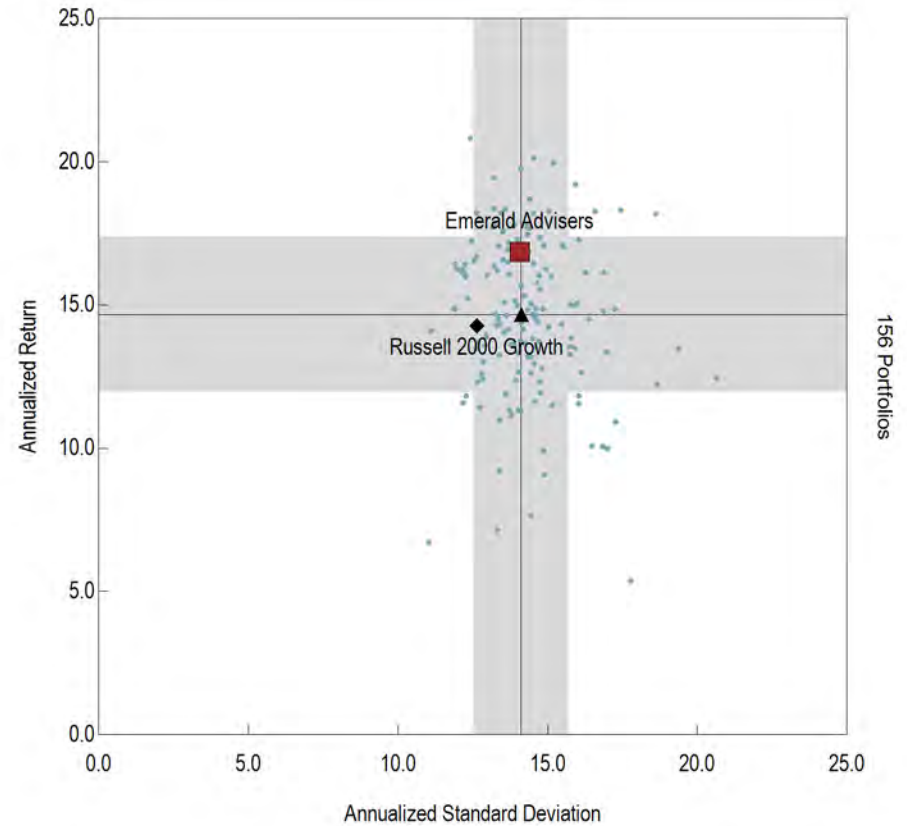
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Emerald Advisers	15.3%	13.4%	1.1
Russell 2000 Growth	12.2%	12.6%	0.9
eA US Small Cap Growth Equity Gross Median	12.7%	14.2%	0.9

5 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Emerald Advisers	16.9%	14.1%	1.2
Russell 2000 Growth	14.3%	12.6%	1.1
eA US Small Cap Growth Equity Gross Median	14.7%	14.1%	1.0

# Ceredex Manager Portfolio Overview

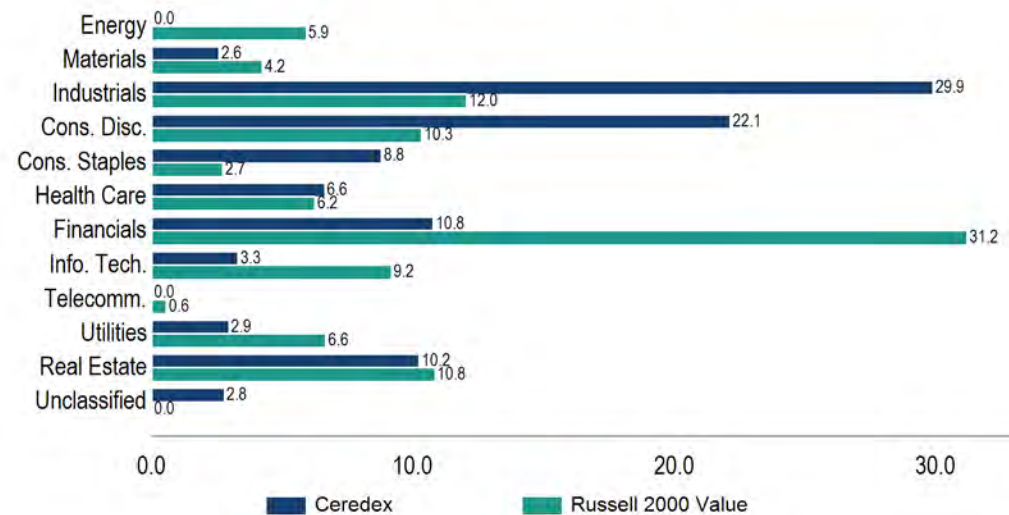
Period Ending: September 30, 2017

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	1,396
Weighted Avg. Market Cap. (\$B)	2.08	1.96
Median Market Cap. (\$B)	1.71	0.70
Price To Earnings	26.20	20.69
Price To Book	3.25	1.79
Price To Sales	2.13	2.72
Return on Equity (%)	15.12	7.49
Yield (%)	2.43	1.60
Beta	0.64	1.00

## Sector Allocation (%) vs Russell 2000 Value



## Largest Holdings

	End Weight	Return
ENERGIZER HOLDINGS	4.11	-3.47
HILL-ROM HOLDINGS	3.37	-6.83
EVERCORE 'A'	2.80	14.35
TANGER FAC.OUTLET CNTRS.	2.78	-4.84
TETRA TECH	2.78	1.99
LITHIA MOTORS 'A'	2.62	28.01
BLOOMIN' BRANDS	2.60	-16.71
COVANTA HOLDING	2.51	14.37
HERMAN MILLER	2.51	18.72
DSW 'A'	2.21	22.56

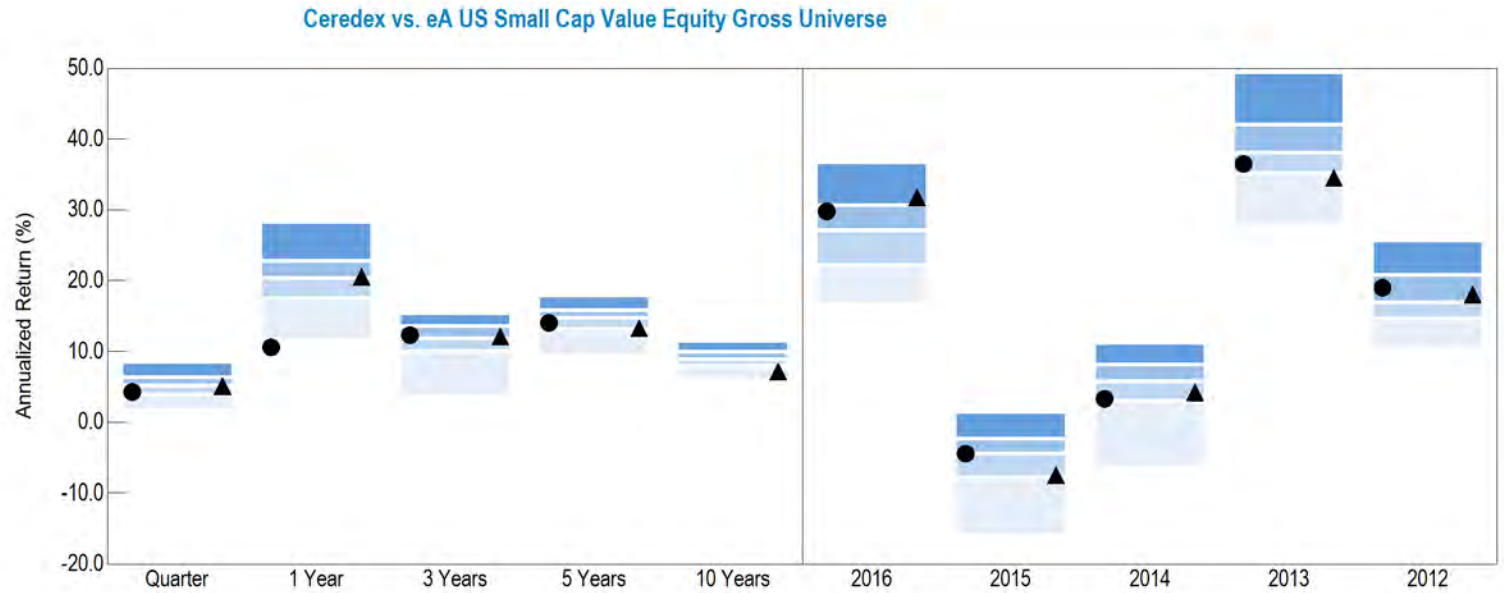
## Top Contributors

	Avg Wgt	Return	Contribution
LITHIA MOTORS 'A'	2.36	28.01	0.66
GUESS	1.72	35.13	0.60
HERMAN MILLER	2.40	18.72	0.45
DSW 'A'	1.96	22.56	0.44
LANDAUER	1.35	29.21	0.40
EVERCORE 'A'	2.73	14.35	0.39
COVANTA HOLDING	2.41	14.37	0.35
AMER.EAG.OUTFITTERS	1.59	19.90	0.32
VIAD	1.03	29.12	0.30
HSN	1.03	23.56	0.24

## Bottom Contributors

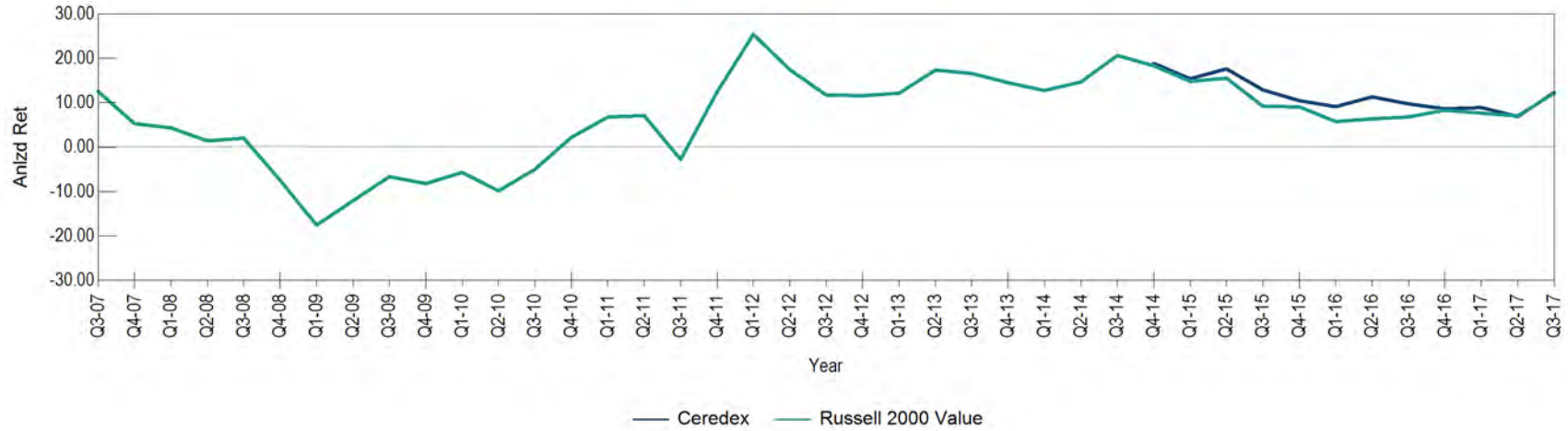
	Avg Wgt	Return	Contribution
AMC ENTERTAINMENT HDG. CL.A	1.88	-34.42	-0.65
BLOOMIN' BRANDS	2.81	-16.71	-0.47
PLANTRONICS	1.81	-15.17	-0.27
REGAL ENTM.GP. 'A'	1.26	-20.63	-0.26
HILL-ROM HOLDINGS	3.68	-6.83	-0.25
APOGEE ENTERPRISES	1.39	-14.88	-0.21
B & G FOODS	2.13	-9.19	-0.20
EDUCATION REAL.TST.	2.36	-6.34	-0.15
TANGER FAC.OUTLET CNTRS.	2.92	-4.84	-0.14
ENERGIZER HOLDINGS	3.51	-3.47	-0.12

Unclassified sector allocation includes cash allocations.

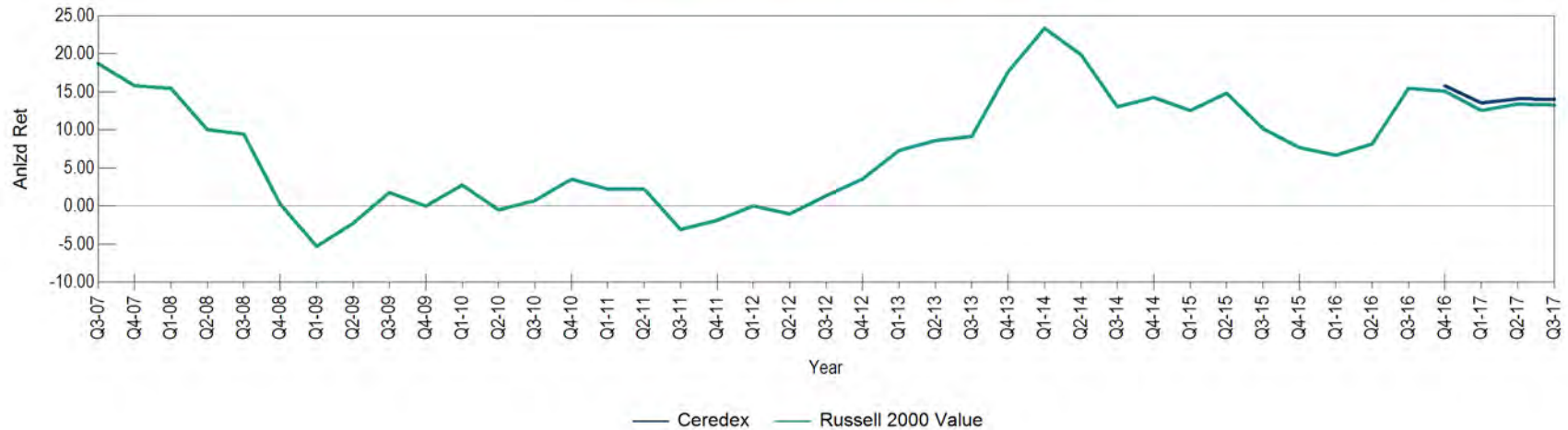


	Return (Rank)									
	Quarter	1 Year	3 Years	5 Years	10 Years	2016	2015	2014	2013	2012
5th Percentile	8.5	28.3	15.3	17.8	11.5	36.7	1.5	11.2	49.4	25.7
25th Percentile	6.4	22.9	13.6	15.9	10.0	30.7	-2.2	8.2	42.1	20.8
Median	5.2	20.4	11.9	14.8	9.0	27.2	-4.3	5.8	38.1	16.9
75th Percentile	3.9	17.6	10.1	13.2	8.0	22.2	-7.7	3.1	35.2	14.7
95th Percentile	1.7	11.6	3.7	9.5	6.0	16.8	-15.8	-6.3	27.8	10.3
# of Portfolios	222	222	212	204	170	222	212	206	199	187
● Ceredex	4.3 (69)	10.6 (98)	12.3 (43)	14.0 (64)	-- (--)	29.8 (32)	-4.4 (52)	3.3 (74)	36.5 (66)	19.0 (38)
▲ Russell 2000 Value	5.1 (54)	20.5 (49)	12.1 (48)	13.3 (75)	7.1 (85)	31.7 (17)	-7.5 (74)	4.2 (68)	34.5 (78)	18.1 (43)

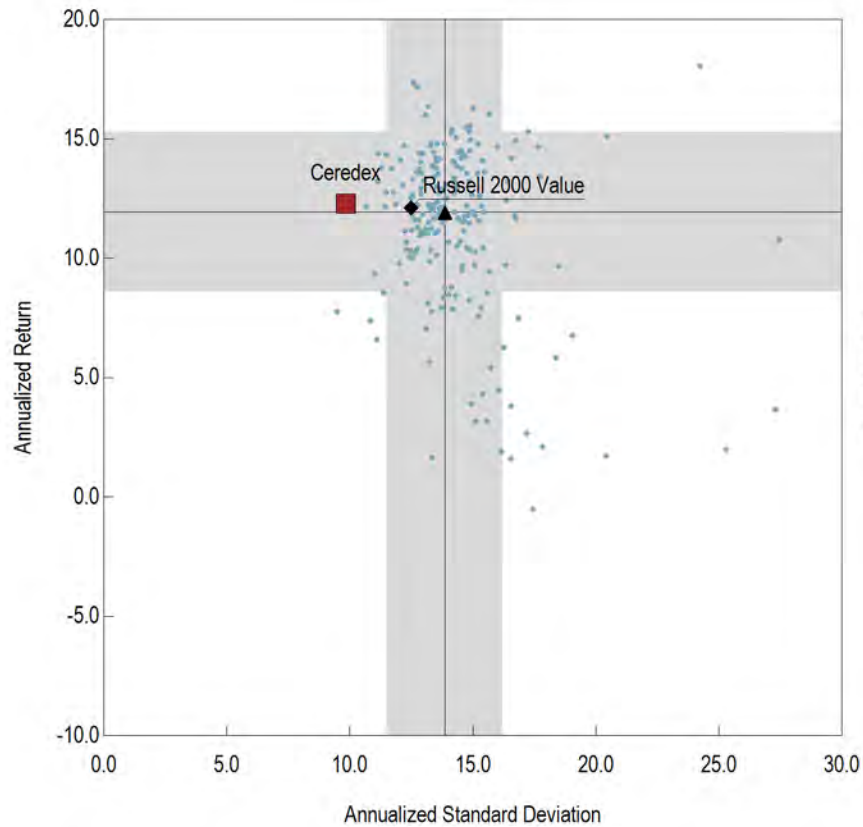
Rolling 3 Year Annualized Return (%)



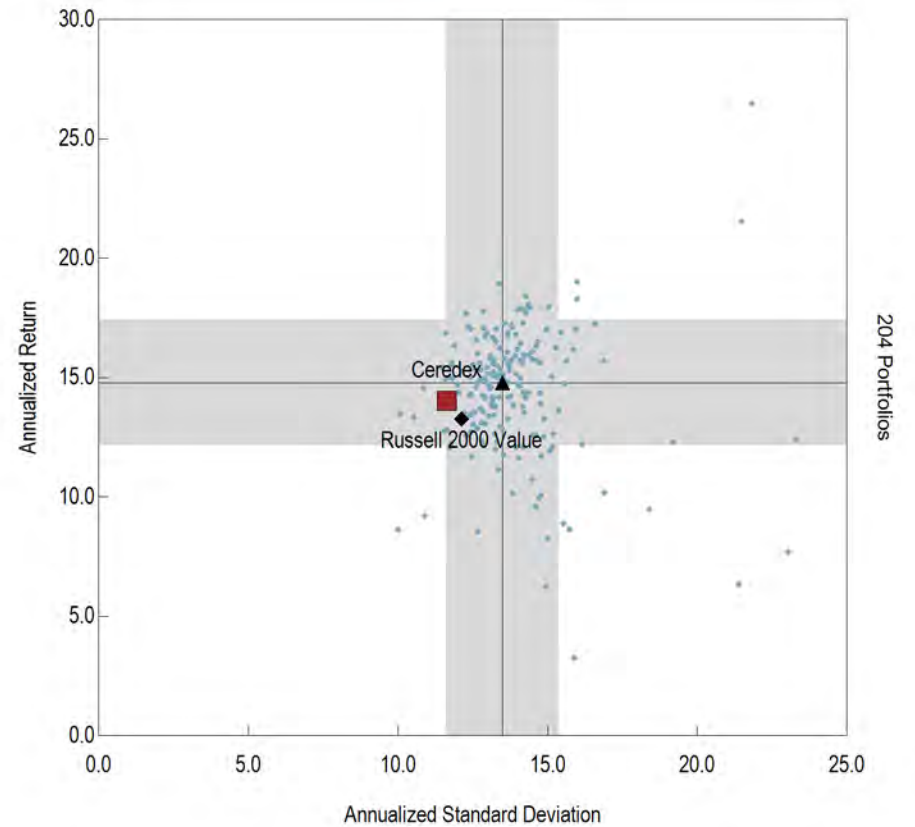
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Ceredex	12.3%	9.8%	1.2
Russell 2000 Value	12.1%	12.5%	0.9
eA US Small Cap Value Equity Gross Median	11.9%	13.9%	0.8

5 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Ceredex	14.0%	11.6%	1.2
Russell 2000 Value	13.3%	12.1%	1.1
eA US Small Cap Value Equity Gross Median	14.8%	13.5%	1.1

# International Equity Managers

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# Pyrford Manager Portfolio Overview

Period Ending: September 30, 2017

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.

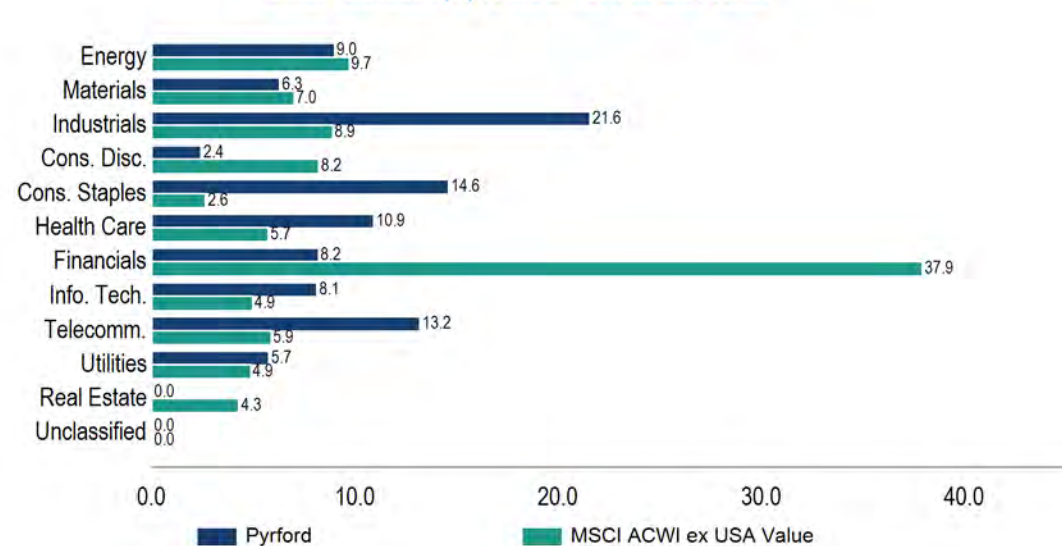
## Characteristics

	MSCI ACWI Portfolio	MSCI ACWI ex USA Value
Number of Holdings	71	1,053
Weighted Avg. Market Cap. (\$B)	62.84	59.13
Median Market Cap. (\$B)	21.65	7.54
Price To Earnings	23.17	15.20
Price To Book	3.74	1.60
Price To Sales	2.37	1.60
Return on Equity (%)	19.75	11.12
Yield (%)	3.60	3.72
Beta	0.60	1.00

## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	93.1%	77.0%
Emerging*	6.9%	23.0%
<b>Top 10 Largest Countries</b>		
United Kingdom	15.2%	13.9%
Switzerland	14.6%	5.3%
Australia	10.6%	4.7%
Japan	8.5%	15.9%
France	7.6%	7.7%
Germany	7.2%	6.4%
Hong Kong	6.9%	2.3%
Netherlands	6.1%	1.3%
Singapore	4.9%	0.9%
Sweden	4.8%	1.9%
<b>Total-Top 10 Largest Countries</b>	<b>86.3%</b>	<b>60.5%</b>

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



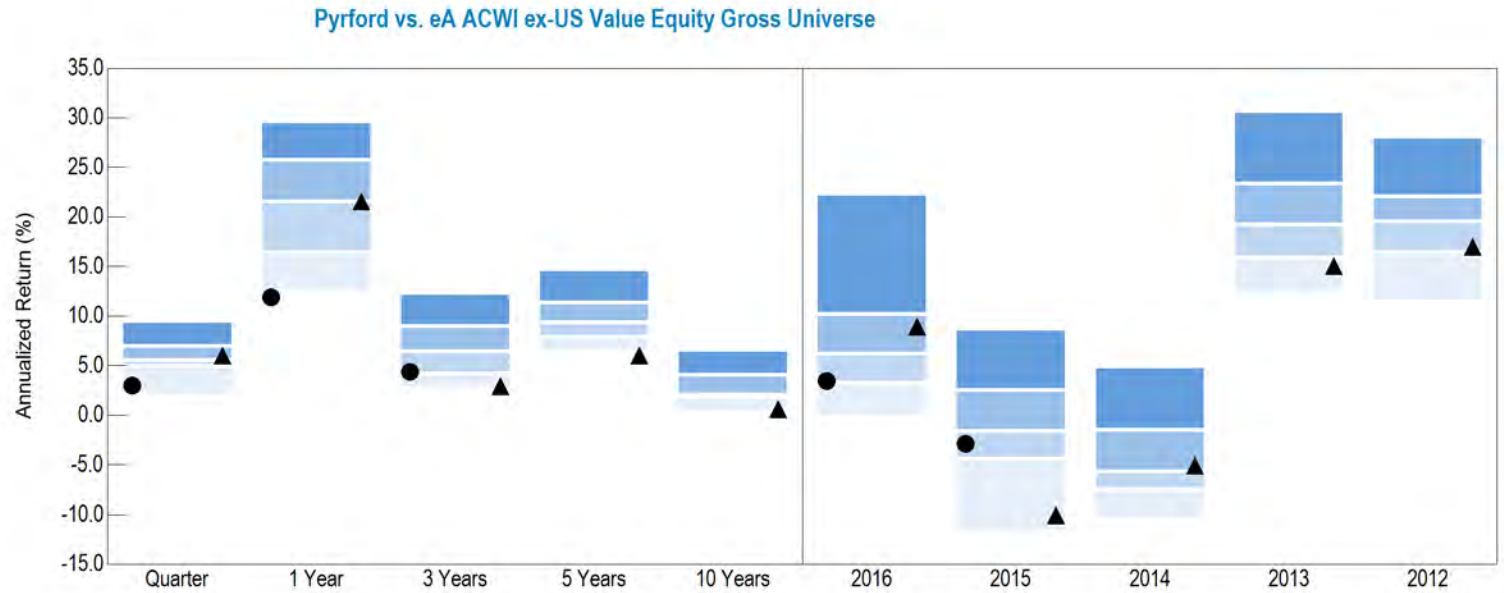
## Top Contributors

	Avg Wgt	Return	Contribution
TELENOR	1.89	27.95	0.53
DEUTSCHE POST	1.26	19.16	0.24
CNOOC	1.14	20.38	0.23
ROYAL DUTCH SHELL A	1.36	15.97	0.22
ATLAS COPCO 'A'	2.01	10.34	0.21
BUREAU VERITAS INTL.	1.08	16.81	0.18
ROYAL DUTCH SHELL B	1.07	16.79	0.18
UNILEVER DR	1.97	8.91	0.18
FUCHS PETROLUB PREF.	1.96	7.72	0.15
AXIATA GROUP	1.43	10.29	0.15

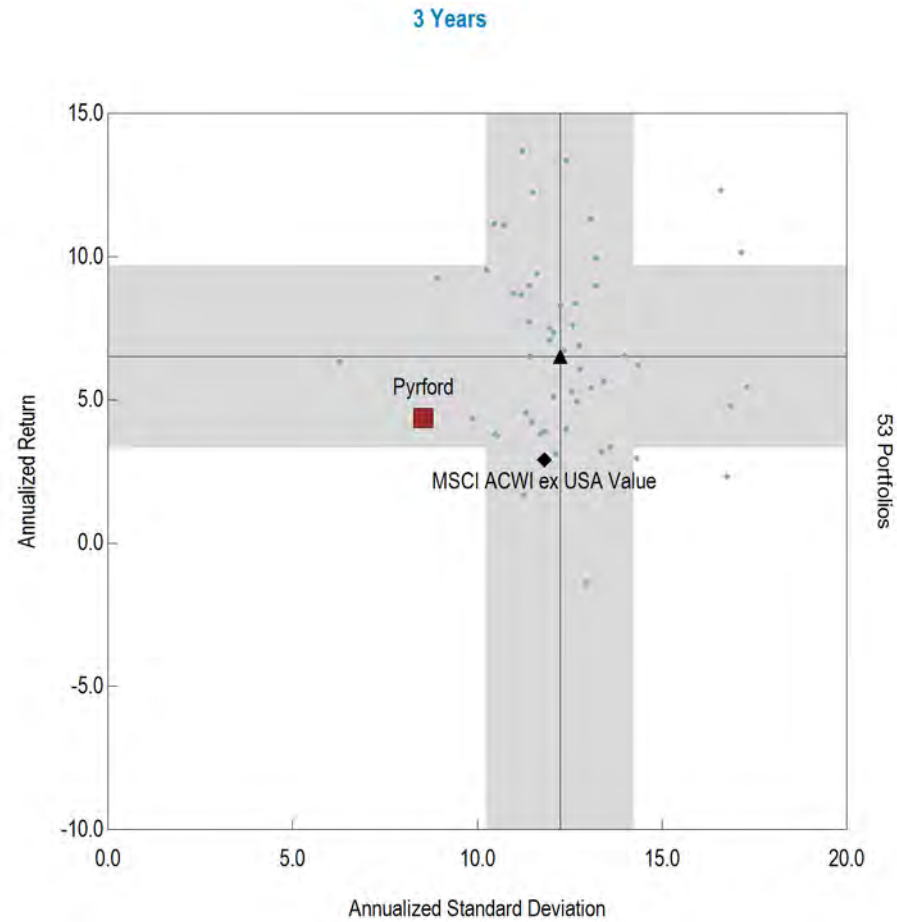
## Bottom Contributors

	Avg Wgt	Return	Contribution
BEZEQ THE ISRAELI TELECOM CORP.LTD.	1.39	-15.55	-0.22
NESTLE 'R'	3.87	-3.81	-0.15
BRITISH AMERICAN TOBACCO	2.12	-6.73	-0.14
QBE INSURANCE GROUP	1.05	-11.52	-0.12
JAPAN TOBACCO	1.72	-6.73	-0.12
COMFORTDELGRO	1.46	-6.47	-0.09
GLAXOSMITHKLINE	1.66	-4.79	-0.08
MERIDA INDUSTRY	0.47	-16.55	-0.08
VOPAK	1.46	-5.27	-0.08
BRAMBLES	1.99	-3.84	-0.08

Unclassified sector allocation includes cash allocations.



	Return (Rank)															
5th Percentile	9.4	29.6	12.3	14.7	6.6	22.3	8.7	4.9	30.7	28.1						
25th Percentile	7.0	25.8	9.0	11.4	4.1	10.2	2.5	-1.4	23.4	22.1						
Median	5.6	21.6	6.5	9.4	2.1	6.2	-1.6	-5.7	19.3	19.6						
75th Percentile	5.0	16.5	4.2	7.9	1.9	3.3	-4.3	-7.4	15.9	16.5						
95th Percentile	2.1	12.5	2.7	6.4	0.3	-0.1	-11.6	-10.4	12.4	11.7						
# of Portfolios	56	56	53	46	30	55	45	37	34	32						
● Pyrford	3.0 (92)	11.9 (97)	4.4 (73)	-- (--)	-- (--)	3.4 (74)	-2.9 (59)	-- (--)	-- (--)	-- (--)						
▲ MSCI ACWI ex USA Value	6.0 (40)	21.6 (52)	2.9 (95)	6.0 (98)	0.6 (93)	8.9 (35)	-10.1 (93)	-5.1 (49)	15.0 (83)	17.0 (74)						



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Pyrford	4.4%	8.5%	0.5
MSCI ACWI ex USA Value	2.9%	11.8%	0.2
eA ACWI ex-US Value Equity Gross Median	6.5%	12.2%	0.5

# William Blair Manager Portfolio Overview

Period Ending: September 30, 2017

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.

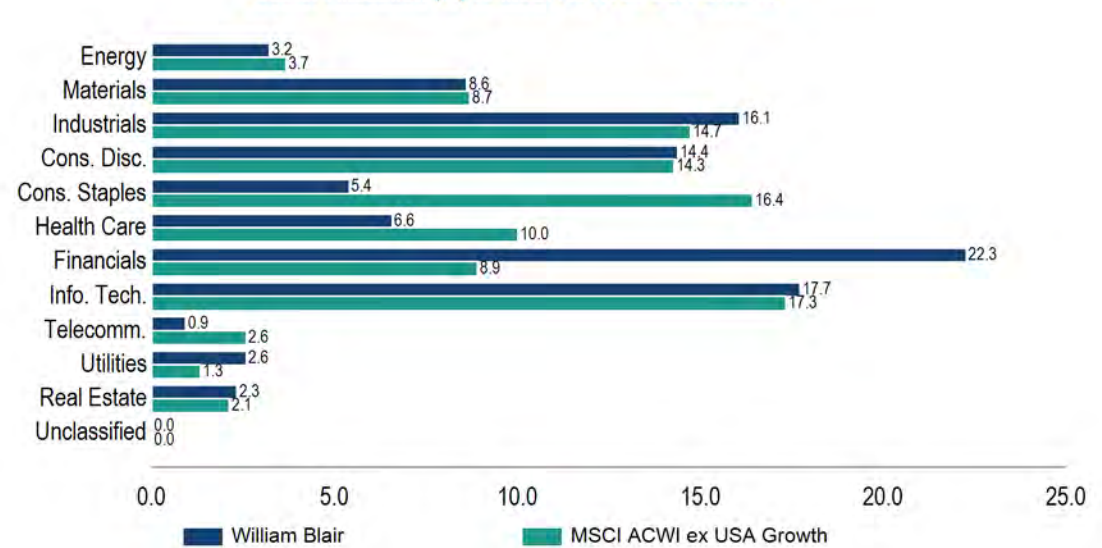
## Characteristics

	MSCI ACWI Portfolio	MSCI ACWI ex USA Growth
Number of Holdings	214	1,060
Weighted Avg. Market Cap. (\$B)	49.75	66.62
Median Market Cap. (\$B)	9.29	8.37
Price To Earnings	23.43	26.40
Price To Book	4.69	4.05
Price To Sales	3.28	2.96
Return on Equity (%)	21.34	18.20
Yield (%)	1.99	1.89
Beta	0.92	1.00

## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	78.0%	75.0%
Emerging*	21.9%	25.0%
Frontier**	0.1%	0.0%
<b>Top 10 Largest Countries</b>		
Japan	16.1%	16.1%
France	12.1%	7.2%
United Kingdom	12.0%	10.8%
Germany	7.4%	7.0%
China*	5.1%	7.9%
Canada	5.1%	6.6%
Hong Kong	4.8%	2.5%
India*	4.6%	2.0%
Switzerland	3.3%	6.1%
Italy	3.1%	0.9%
<b>Total-Top 10 Largest Countries</b>	<b>73.7%</b>	<b>67.1%</b>

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



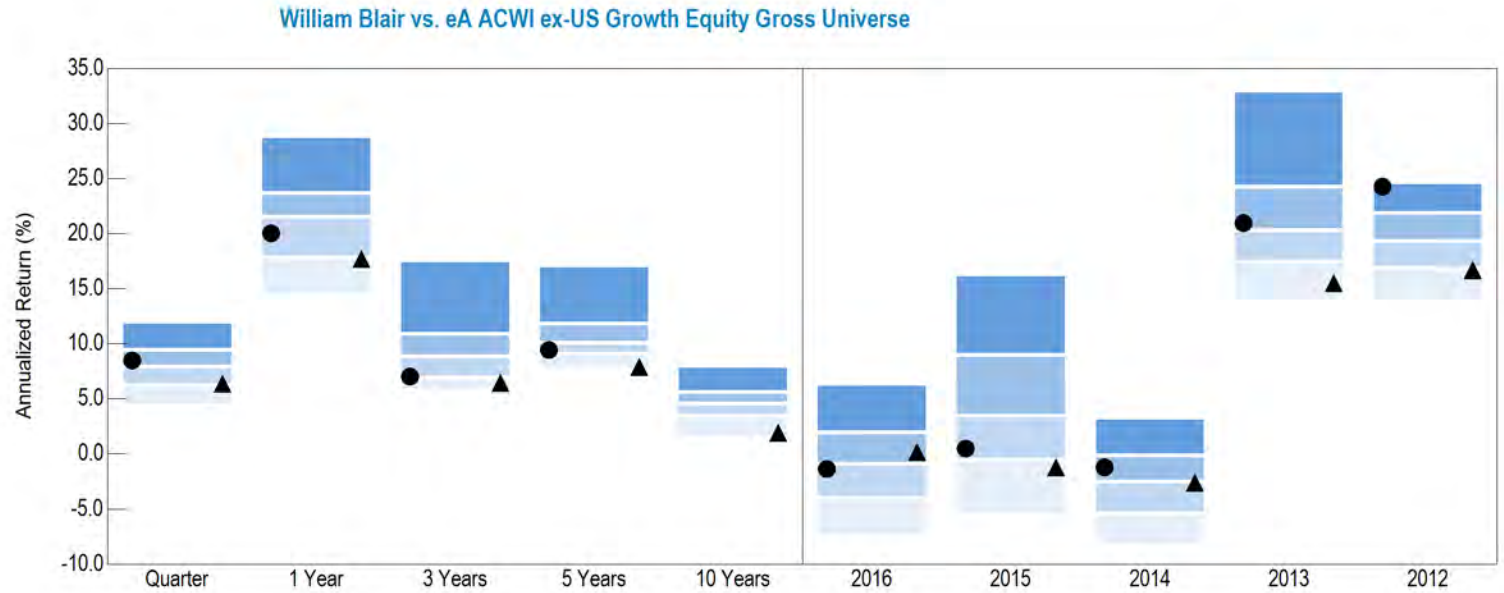
## Top Contributors

	Avg Wgt	Return	Contribution
ALIBABA GROUP HLDG.SPN. ADR 1:1	1.77	22.58	0.40
PING AN INSURANCE 'H'	1.95	18.94	0.37
TENCENT HOLDINGS	1.51	20.35	0.31
ITAU UNIBANCO HOLDING PN	1.17	24.94	0.29
GLENCORE	1.03	23.89	0.25
LONZA GROUP	1.15	21.28	0.24
SUNCOR ENERGY	1.10	20.83	0.23
KEYENCE	0.97	20.98	0.20
INDL.& COML.BK.OF CHINA 'H'	1.25	15.89	0.20
BNP PARIBAS	1.53	12.18	0.19

## Bottom Contributors

	Avg Wgt	Return	Contribution
PROVIDENT FINANCIAL	0.23	-64.74	-0.15
BRITISH AMERICAN TOBACCO	1.57	-6.73	-0.11
GLAXOSMITHKLINE	1.43	-4.79	-0.07
WPP	0.41	-11.37	-0.05
AENA SME	0.63	-7.33	-0.05
GREENCORE GROUP	0.23	-17.62	-0.04
LENZING	0.18	-18.94	-0.03
MITSUBISHI UFJ FINL.GP.	1.54	-2.16	-0.03
TOKIO MARINE HOLDINGS	0.83	-3.80	-0.03
ARCA CONTINENTAL	0.34	-9.03	-0.03

Unclassified sector allocation includes cash allocations.

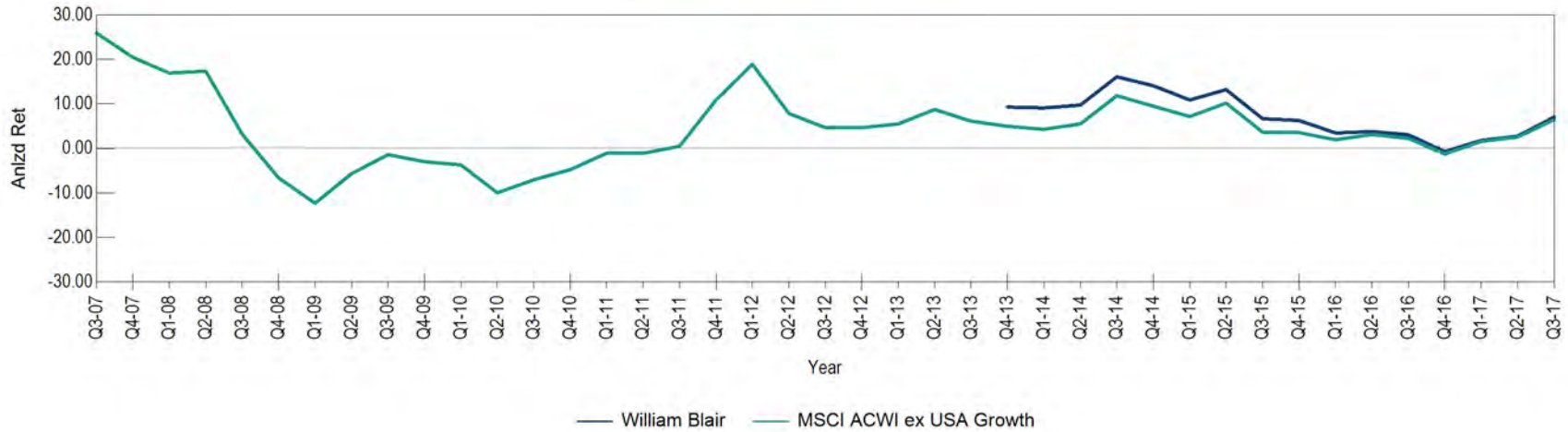


	Quarter	1 Year	3 Years	5 Years	10 Years	2016	2015	2014	2013	2012
<b>5th Percentile</b>	12.0	28.8	17.6	17.1	8.0	6.3	16.3	3.2	33.0	24.6
<b>25th Percentile</b>	9.5	23.7	10.9	11.9	5.6	2.0	9.0	-0.1	24.3	21.9
<b>Median</b>	8.0	21.5	8.9	10.1	4.6	-0.9	3.5	-2.5	20.3	19.3
<b>75th Percentile</b>	6.3	17.9	7.0	9.1	3.5	-3.9	-0.5	-5.3	17.5	16.9
<b>95th Percentile</b>	4.4	14.4	5.8	7.7	1.5	-7.4	-5.4	-8.2	14.0	13.7
<b># of Portfolios</b>	98	98	89	81	58	90	70	50	46	51
● William Blair	8.5 (44)	20.0 (60)	7.0 (74)	9.4 (68)	-- (--)	-1.4 (55)	0.5 (69)	-1.2 (37)	20.9 (44)	24.3 (6)
▲ MSCI ACWI ex USA Growth	6.3 (73)	17.7 (76)	6.4 (86)	7.9 (95)	1.9 (94)	0.1 (45)	-1.3 (83)	-2.6 (53)	15.5 (87)	16.7 (78)

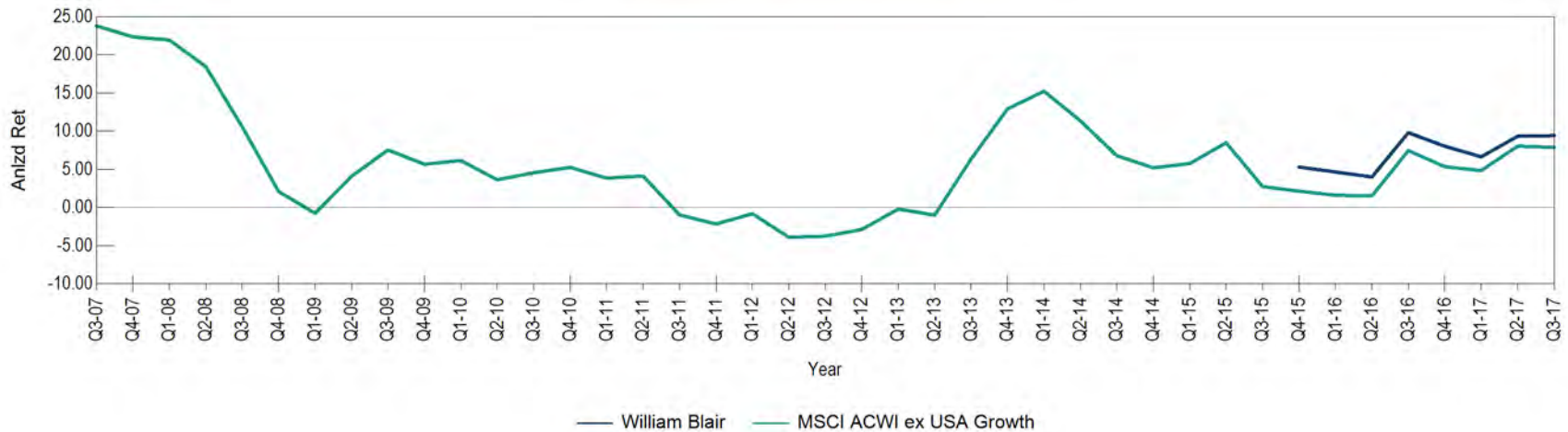
William Blair  
 Manager Performance - Rolling 3 & 5 Year (Gross of Fees)

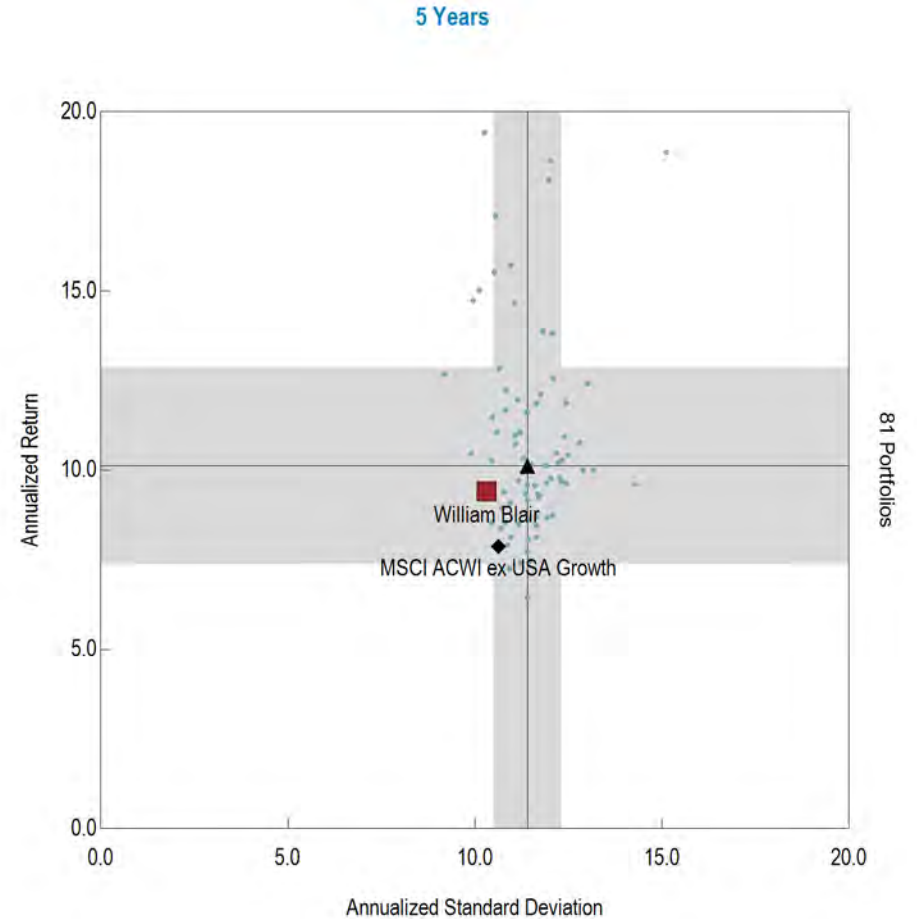
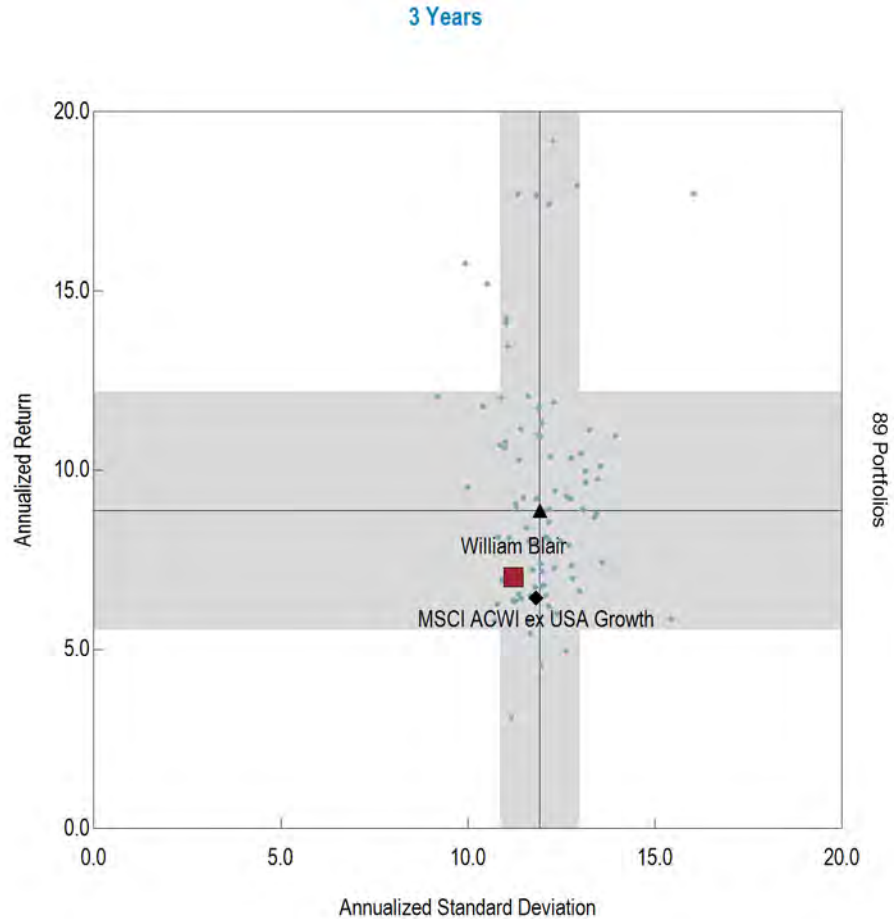
Period Ending: September 30, 2017

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
William Blair	7.0%	11.2%	0.6	William Blair	9.4%	10.3%	0.9
MSCI ACWI ex USA Growth	6.4%	11.8%	0.5	MSCI ACWI ex USA Growth	7.9%	10.6%	0.7
eA ACWI ex-US Growth Equity Gross Median	8.9%	11.9%	0.7	eA ACWI ex-US Growth Equity Gross Median	10.1%	11.4%	0.8

# PIMCO RAE Emerging Markets Manager Portfolio Overview

Period Ending: September 30, 2017

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.

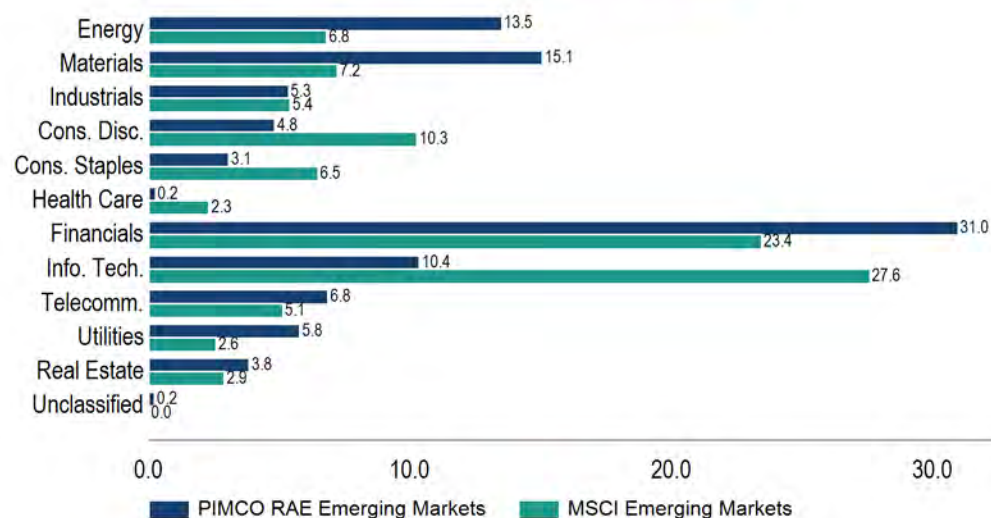
## Characteristics

	Portfolio	MSCI Emerging Markets
Number of Holdings	568	839
Weighted Avg. Market Cap. (\$B)	35.76	80.55
Median Market Cap. (\$B)	3.78	5.53
Price To Earnings	13.12	21.53
Price To Book	1.44	2.75
Price To Sales	1.06	2.21
Return on Equity (%)	11.65	17.35
Yield (%)	3.23	2.29
Beta		1.00

## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	9.5%	0.0%
Emerging*	90.5%	100.0%
<b>Top 10 Largest Countries</b>		
Korea*	17.5%	14.9%
China*	16.1%	29.6%
Brazil*	14.8%	7.5%
Russia*	9.8%	3.4%
Hong Kong	8.7%	0.0%
Taiwan*	7.9%	11.5%
India*	5.7%	8.4%
South Africa*	5.4%	6.3%
Poland*	2.8%	1.3%
Thailand*	2.5%	2.2%
<b>Total-Top 10 Largest Countries</b>	<b>91.2%</b>	<b>85.3%</b>

## Sector Allocation (%) vs MSCI Emerging Markets



## Top Contributors

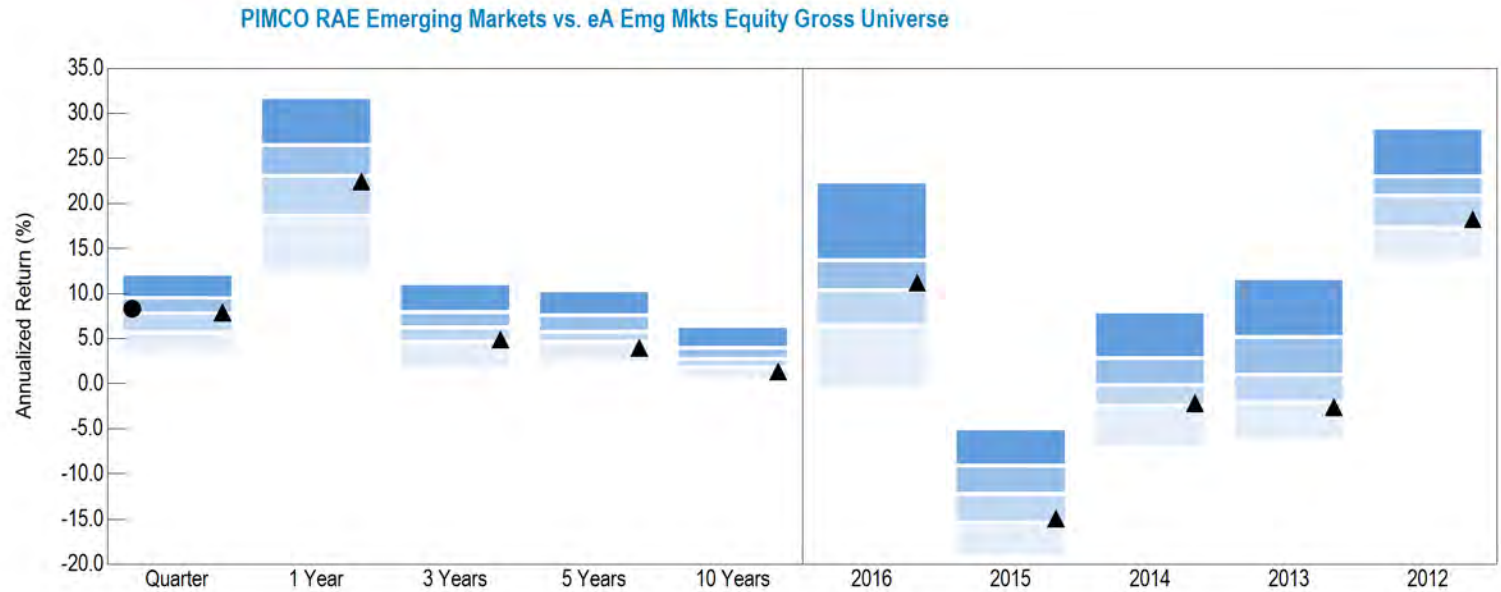
	End Weight	Return	Contribution
CHINA EVERGRANDE	0.59	94.26	0.56
BANCO DO BRASIL ON	1.48	37.59	0.56
VIA VAREJO UNITS	0.39	122.49	0.47
PETROLEO BRASILEIRO ADR 1:2	1.55	25.66	0.40
INDL. & COML.BK.OF CHINA 'H'	2.38	15.89	0.38
VALE PN	2.46	14.98	0.37
BNC.BRADESCO PF.SPN.ADR 1:1	1.06	31.38	0.33
ITAU UNIBANCO BANCO HLDG.ADR 1:1	1.30	25.38	0.33
SAMSUNG ELECTRONICS	3.94	7.75	0.31
SURGUTNEFTEGAZ SPN.ADR. 1:10	1.28	20.99	0.27

## Bottom Contributors

	End Weight	Return	Contribution
THAI AIRWAYS INTL.FB	0.26	-62.29	-0.16
KT ADR 2:1	0.67	-16.65	-0.11
ALPHA BANK	0.34	-19.86	-0.07
JAIPRAKASH ASSOCIATES	0.36	-18.52	-0.07
HYUNDAI MOTOR	1.07	-5.74	-0.06
KIA MOTORS	0.31	-17.23	-0.05
LG DISPLAY	0.29	-17.74	-0.05
LOTTE SHOPPING	0.27	-18.87	-0.05
KOREAN AIR LINES	0.24	-20.50	-0.05
LG UPLUS	0.33	-14.51	-0.05

Unclassified sector allocation includes cash allocations.





	Return (Rank)																	
5th Percentile	12.2	31.7	11.1	10.3	6.4	22.4	-5.0	8.0	11.7	28.4								
25th Percentile	9.5	26.5	8.0	7.6	4.0	13.7	-9.0	2.9	5.2	23.0								
Median	7.8	23.1	6.3	5.8	2.8	10.4	-12.2	-0.1	1.0	20.9								
75th Percentile	5.7	18.7	4.7	4.7	1.8	6.6	-15.3	-2.4	-2.0	17.3								
95th Percentile	3.3	12.5	1.6	2.4	0.5	-0.6	-19.2	-7.0	-6.3	13.7								
# of Portfolios	338	338	315	258	127	337	273	251	198	155								
● PIMCO RAE Emerging Markets	8.3 (42)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)	-- (--)								
▲ MSCI Emerging Markets	7.9 (49)	22.5 (58)	4.9 (72)	4.0 (87)	1.3 (87)	11.2 (45)	-14.9 (70)	-2.2 (74)	-2.6 (80)	18.2 (68)								

# TT Emerging Markets Manager Portfolio Overview

Period Ending: September 30, 2017

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

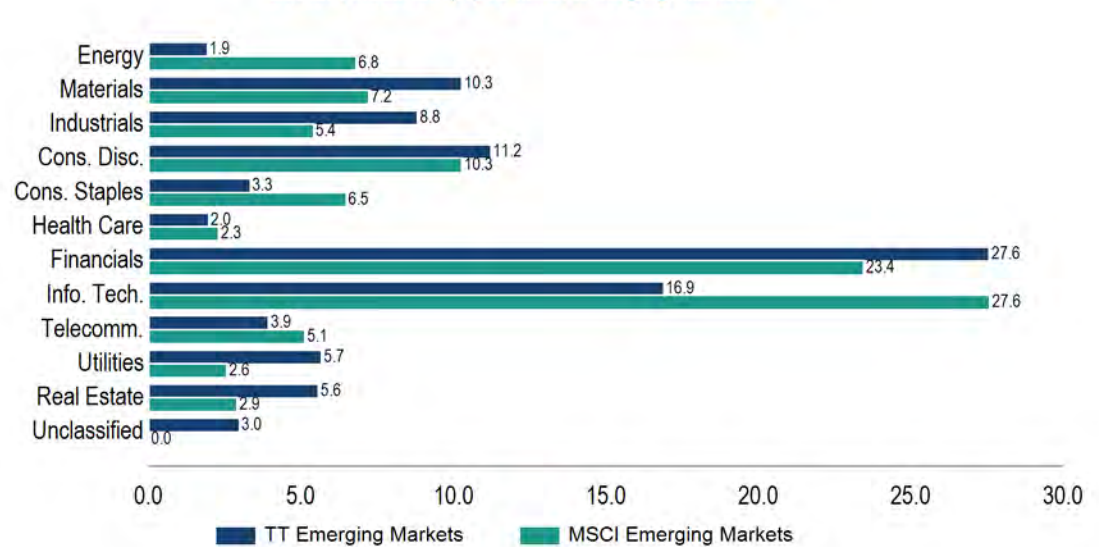
	Portfolio	MSCI Emerging Markets
Number of Holdings	42	839
Weighted Avg. Market Cap. (\$B)	45.36	80.55
Median Market Cap. (\$B)	2.61	5.53
Price To Earnings	24.37	21.53
Price To Book	2.89	2.75
Price To Sales	3.85	2.21
Return on Equity (%)	15.91	17.35
Yield (%)	1.33	2.29
Beta		1.00

## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	16.0%	0.0%
Emerging*	76.6%	100.0%
Frontier**	7.5%	0.0%
<b>Top 10 Largest Countries</b>		
China*	15.8%	29.6%
India*	11.7%	8.4%
Korea*	10.3%	14.9%
Argentina**	7.5%	0.0%
Brazil*	7.4%	7.5%
Russia*	7.0%	3.4%
South Africa*	5.7%	6.3%
United States	4.2%	0.0%
Hong Kong	3.8%	0.0%
Turkey*	3.7%	1.1%
<b>Total-Top 10 Largest Countries</b>	<b>77.0%</b>	<b>71.3%</b>

Unclassified sector allocation includes cash allocations.

## Sector Allocation (%) vs MSCI Emerging Markets



## Top Contributors

	End Weight	Return	Contribution
ALIBABA GROUP HLDG.SPN. ADR 1:1	6.04	22.58	1.36
GRUPO SUPERVIELLE B	2.59	37.06	0.96
SBERBANK OF RUSSIA	2.28	36.03	0.82
SINA	2.21	34.93	0.77
SAMSUNG ELTN.PREF.	7.22	10.63	0.77
CHINA BLUE CHEMICAL 'H'	1.81	37.22	0.68
NASPERS	5.71	11.63	0.66
POLYUS	3.29	18.10	0.60
PETROLEO BRASILEIRO ON	1.91	25.46	0.49
BANCO MACRO BANSUD 'B'	1.75	27.06	0.47

## Bottom Contributors

	End Weight	Return	Contribution
PP (PERSERO)	2.25	-27.21	-0.61
UNITED BANK	1.78	-18.42	-0.33
MAPLE LEAF	1.10	-22.55	-0.25
CMT.FACTORY	2.61	-8.77	-0.23
SREI INFRASTRUCTURE FIN.	1.46	-12.14	-0.18
TONGDA GROUP HOLDINGS	1.42	-9.74	-0.14
DISH TV INDIA	1.60	-7.53	-0.12
CHOLAMANDALAM INV.& FIN.	2.28	-3.69	-0.08
BIO-RAD LABORATORIES 'A'	1.96	-1.81	-0.04
IIFL HOLDINGS	2.01	-1.11	-0.02

## Global Equity Managers

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# Artisan Partners Manager Portfolio Overview

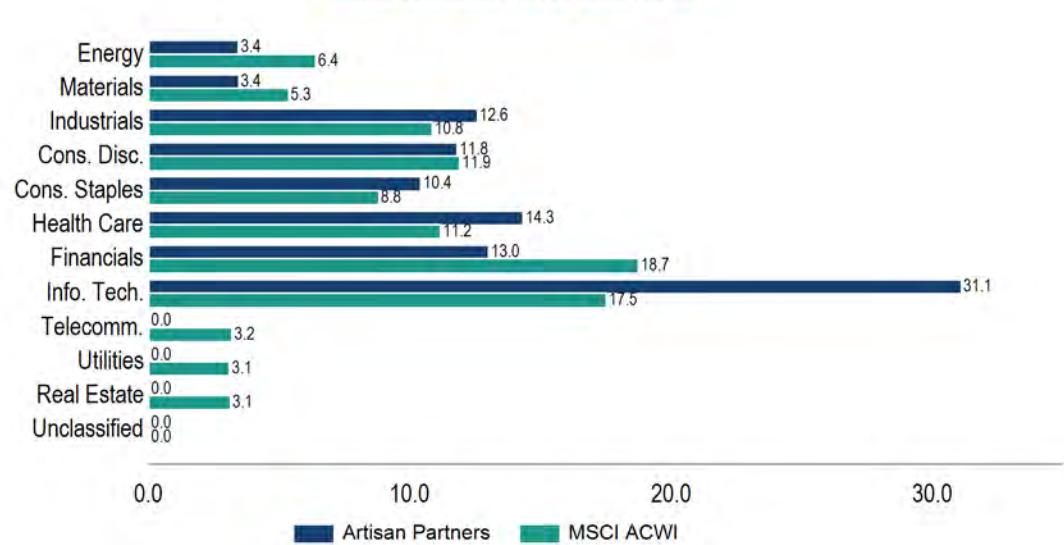
Period Ending: September 30, 2017

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	2,491
Weighted Avg. Market Cap. (\$B)	80.67	111.18
Median Market Cap. (\$B)	27.39	10.03
Price To Earnings	35.04	22.98
Price To Book	6.24	3.66
Price To Sales	6.40	2.87
Return on Equity (%)	18.47	16.34
Yield (%)	0.86	2.35
Beta	1.23	1.00

## Sector Allocation (%) vs MSCI ACWI



## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	94.9%	88.5%
Emerging*	5.1%	11.5%
<b>Top 10 Largest Countries</b>		
United States	52.4%	52.1%
Japan	9.8%	7.7%
United Kingdom	5.1%	5.9%
Hong Kong	5.0%	1.1%
Netherlands	5.0%	1.2%
Germany	5.0%	3.2%
Australia	4.8%	2.3%
Denmark	3.3%	0.6%
Switzerland	2.2%	2.7%
South Africa*	2.1%	0.7%
<b>Total-Top 10 Largest Countries</b>	<b>94.7%</b>	<b>77.6%</b>

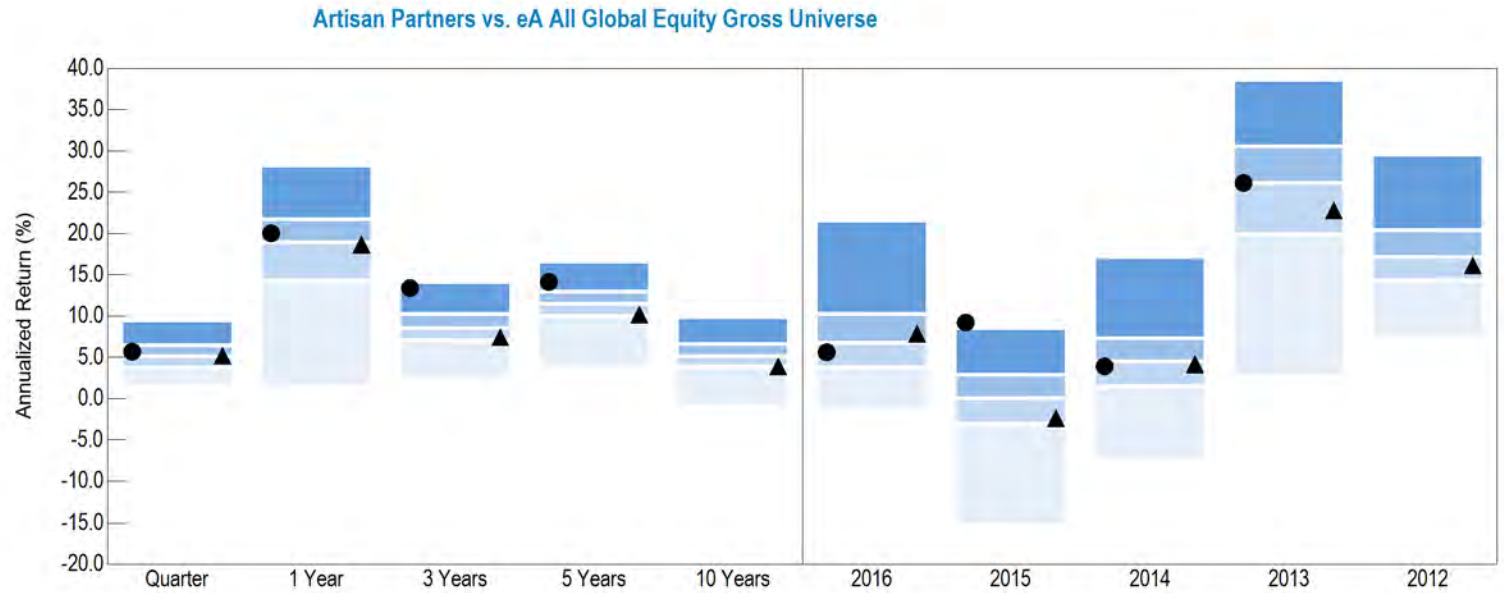
## Top Contributors

	Avg Wgt	Return	Contribution
ASML HLDG.ADR 1:1	2.85	31.38	0.90
VISA 'A'	6.92	12.40	0.86
FACEBOOK CLASS A	4.36	13.17	0.57
ENERPLUS (NYS)	1.89	21.87	0.41
LKQ	3.56	9.23	0.33
BOSTON SCIENTIFIC	5.14	5.23	0.27
ALPHABET 'A'	5.36	4.74	0.25
HDFC BANK ADR 1:3	1.99	10.81	0.21
STATE STREET	2.73	6.94	0.19
BANK OF AMERICA	3.37	4.98	0.17

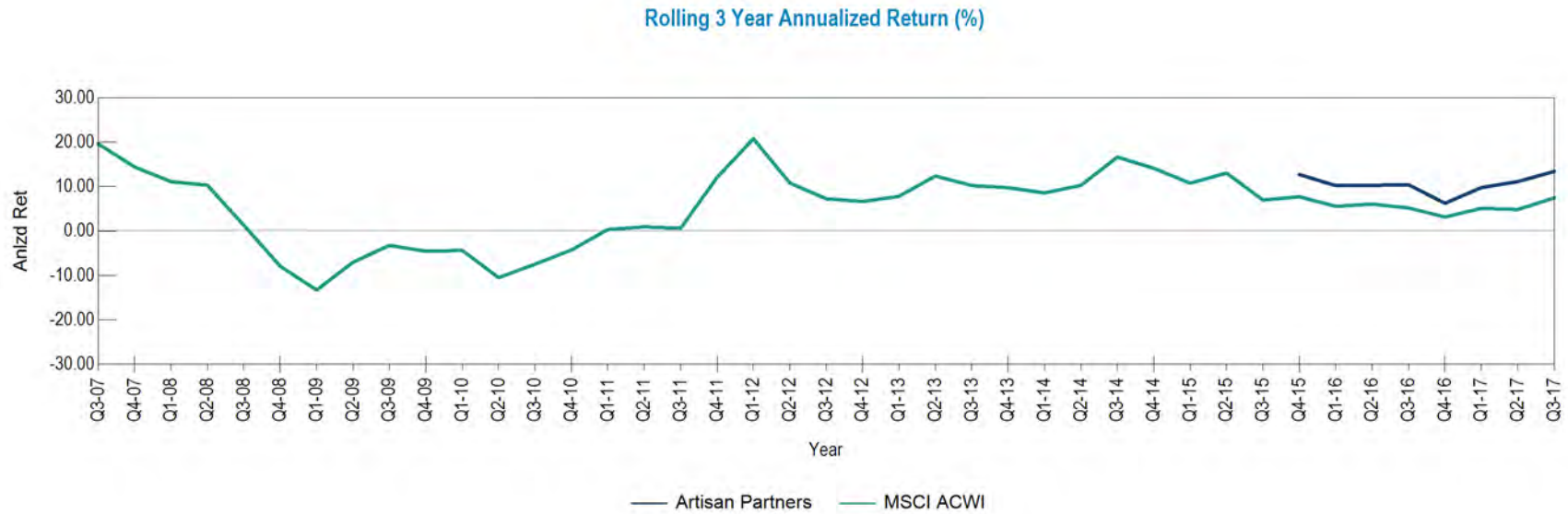
## Bottom Contributors

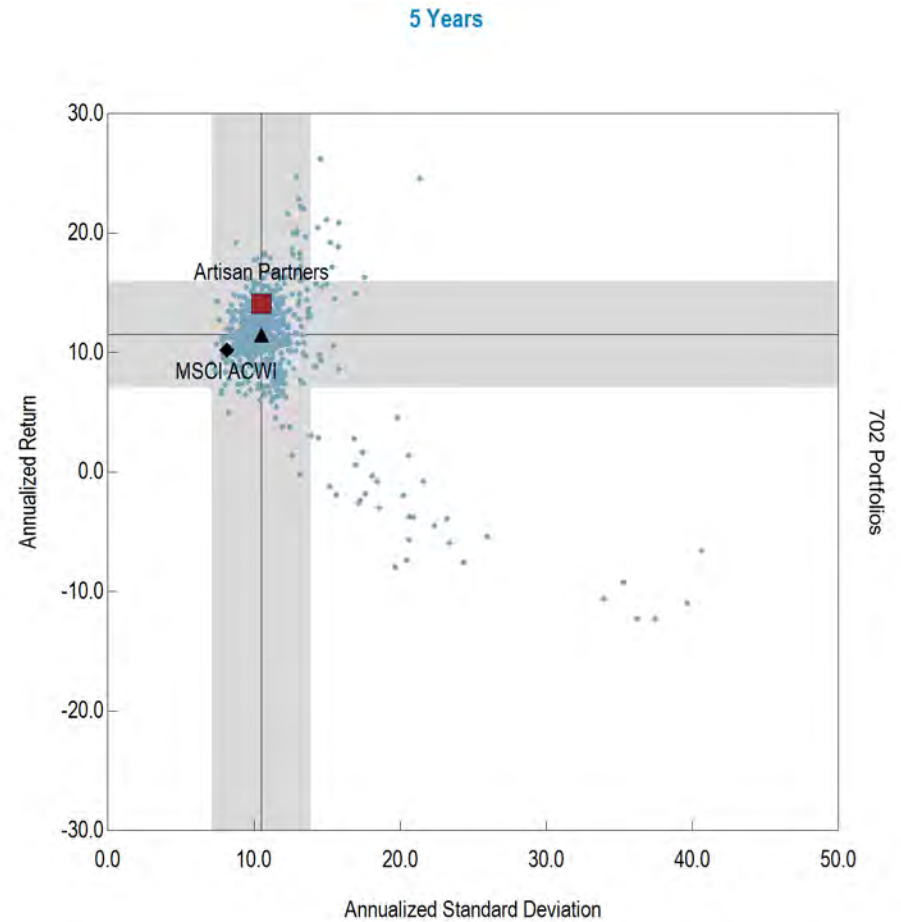
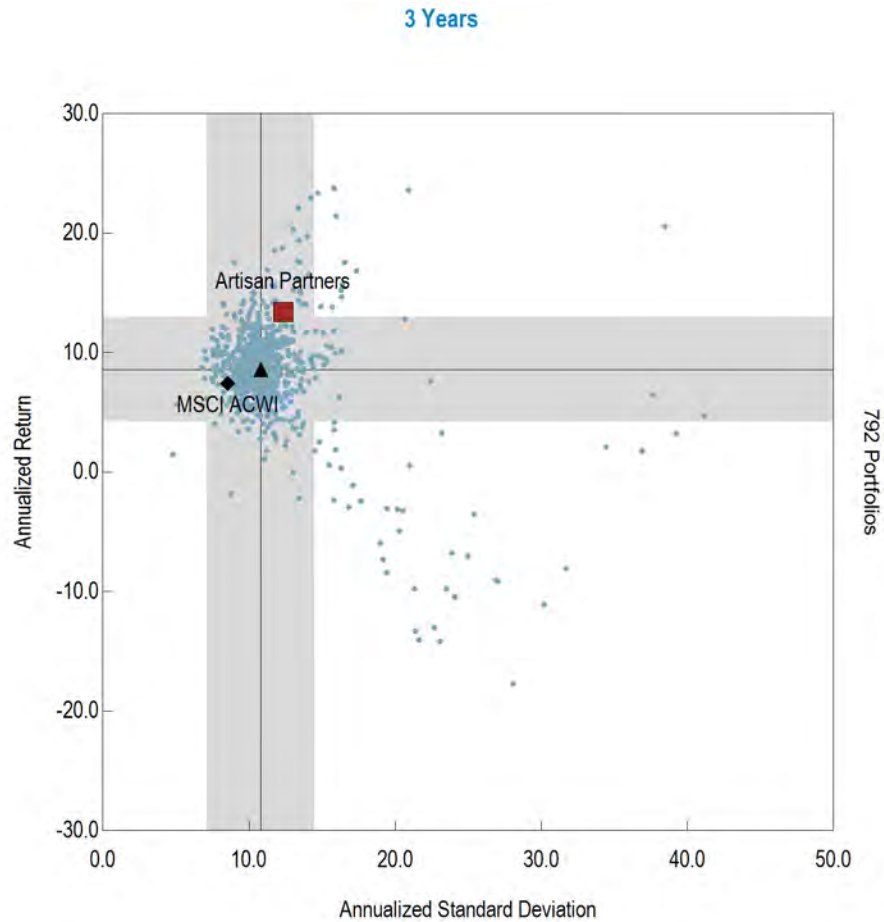
	Avg Wgt	Return	Contribution
GENESIS HEALTHCARE 'A'	4.35	-33.33	-1.45
DEXCOM	1.52	-33.12	-0.50
REGENERON PHARMS.	4.73	-8.96	-0.42
SOTHEBY'S	2.74	-14.09	-0.39
JAMES HARDIE INDS.ADR 1:1	2.53	-10.84	-0.27
PIONEER NTRL.RES.	2.84	-7.52	-0.21
ECOLAB	2.39	-2.84	-0.07
PRICELINE GROUP	2.70	-2.12	-0.06
ALLIANCE DATA SYSTEMS	0.41	-13.49	-0.06
FOM.ECO.MEXNO.SAB DE CV SPN.ADR 1:10	1.43	-2.86	-0.04

Unclassified sector allocation includes cash allocations.



	Return (Rank)									
5th Percentile	9.4	28.2	14.1	16.5	9.8	21.5	8.5	17.1	38.6	29.5
25th Percentile	6.5	21.7	10.3	13.0	6.6	10.3	3.0	7.4	30.6	20.4
Median	5.2	18.9	8.6	11.5	5.2	6.8	0.1	4.6	26.2	17.2
75th Percentile	3.8	14.4	7.1	10.0	4.0	3.9	-2.9	1.5	20.0	14.4
95th Percentile	1.7	1.5	2.4	3.8	-0.8	-1.4	-15.1	-7.4	2.7	7.4
# of Portfolios	863	863	792	702	413	842	692	609	552	475
● Artisan Partners	5.7 (40)	20.0 (39)	13.4 (7)	14.1 (15)	-- (--)	5.6 (61)	9.2 (4)	3.9 (56)	26.1 (51)	-- (--)
▲ MSCI ACWI	5.2 (51)	18.6 (53)	7.4 (70)	10.2 (73)	3.9 (77)	7.9 (42)	-2.4 (73)	4.2 (54)	22.8 (66)	16.1 (61)





	3 Years			5 Years		
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio		Anlzd Standard Deviation	Sharpe Ratio
Artisan Partners	13.4%	12.3%	1.1	Artisan Partners	10.5%	1.3
MSCI ACWI	7.4%	8.5%	0.8	MSCI ACWI	8.1%	1.2
eA All Global Equity Gross Median	8.6%	10.8%	0.8	eA All Global Equity Gross Median	10.5%	1.1

# First Eagle Manager Portfolio Overview

Period Ending: September 30, 2017

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

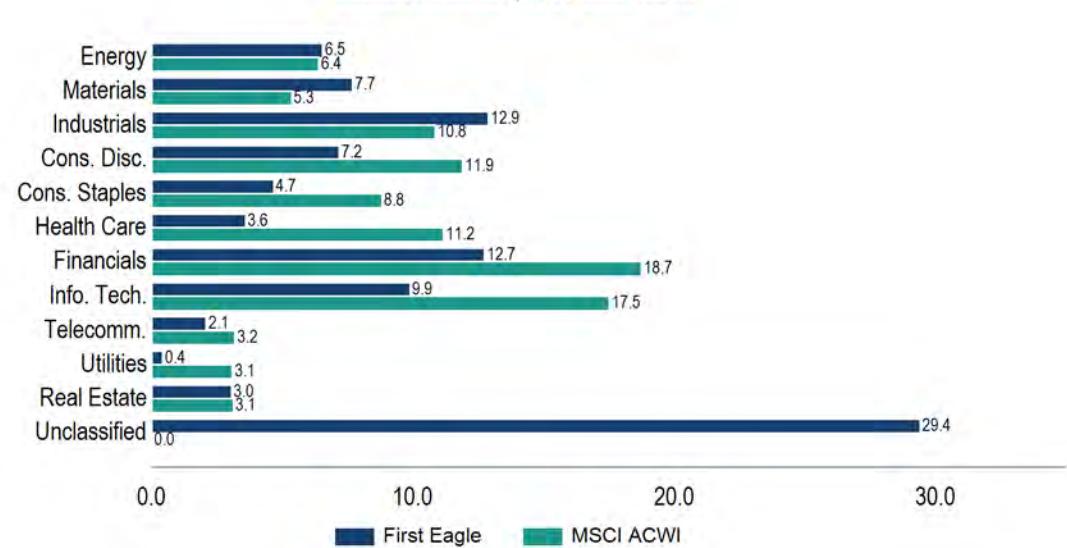
## Characteristics

	Portfolio	MSCI ACWI
Number of Holdings	175	2,491
Weighted Avg. Market Cap. (\$B)	70.87	111.18
Median Market Cap. (\$B)	18.81	10.03
Price To Earnings	23.68	22.98
Price To Book	3.42	3.66
Price To Sales	3.26	2.87
Return on Equity (%)	16.91	16.34
Yield (%)	2.01	2.35
Beta	0.69	1.00

## Country Allocation

	Manager Ending Allocation (USD)	Index Ending Allocation (USD)
<b>Totals</b>		
Developed	77.8%	88.5%
Emerging*	4.0%	11.5%
Cash	18.2%	
<b>Top 10 Largest Countries</b>		
United States	44.7%	52.1%
Cash	18.2%	0.0%
Japan	12.4%	7.7%
France	5.9%	3.6%
Canada	4.0%	3.2%
United Kingdom	3.1%	5.9%
Germany	1.5%	3.2%
Mexico*	1.4%	0.4%
Switzerland	1.4%	2.7%
Korea*	1.3%	1.7%
<b>Total-Top 10 Largest Countries</b>	<b>93.9%</b>	<b>80.5%</b>

## Sector Allocation (%) vs MSCI ACWI



## Top Contributors

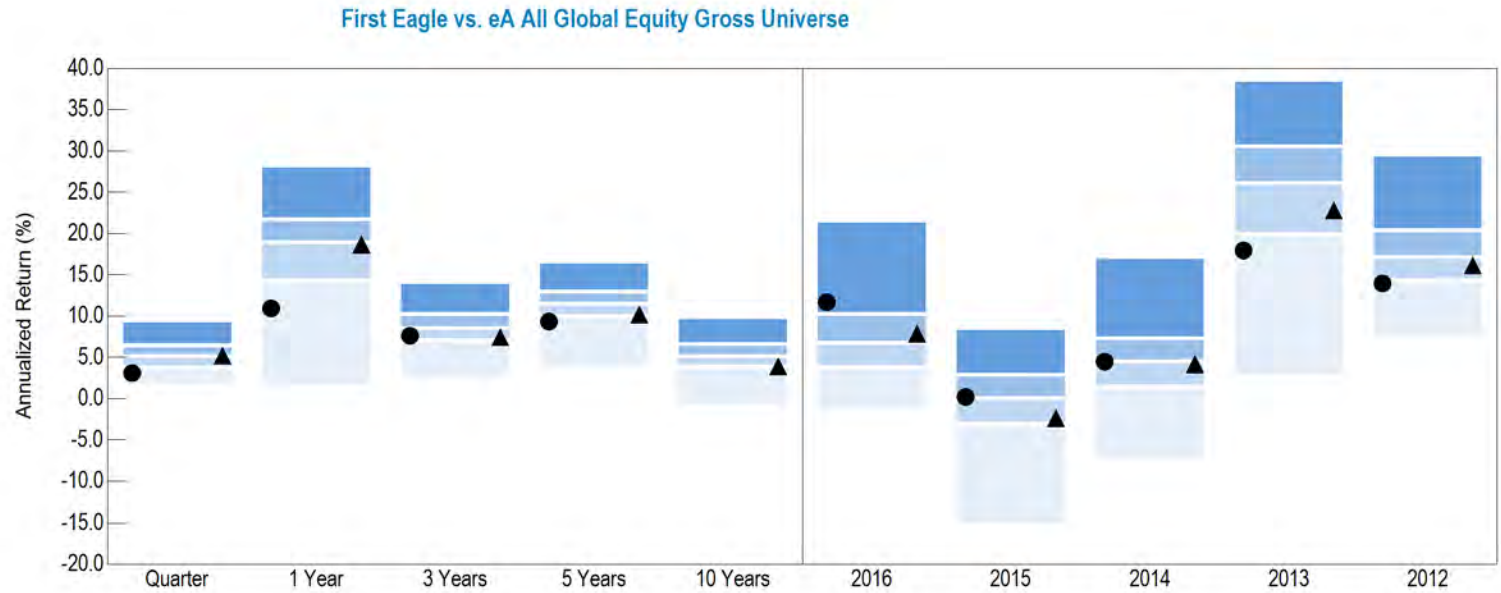
	Avg Wgt	Return	Contribution
ORBITAL ATK	0.69	35.77	0.25
KEYENCE	1.00	20.98	0.21
SMC	1.21	16.60	0.20
MICROSOFT	1.99	8.64	0.17
AMERICAN EXPRESS	1.61	7.79	0.13
BERKELEY GROUP HDG.(THE)	0.59	20.64	0.12
POTASH CORPORATION (NYS) OF SASKATCHEWAN	0.62	18.65	0.12
TERADATA	0.69	14.58	0.10
GBL NEW	0.99	9.44	0.09
CINTAS	0.64	14.47	0.09

## Bottom Contributors

	Avg Wgt	Return	Contribution
OMNICOM GROUP	1.31	-9.99	-0.13
CARREFOUR	0.48	-20.00	-0.10
KIA MOTORS	0.49	-17.23	-0.08
ORACLE	2.47	-3.21	-0.08
SHIMANO	0.46	-15.85	-0.07
KT & G	0.67	-9.92	-0.07
MITSUBISHI ESTATE	1.01	-6.24	-0.06
FLOWSERVE	0.62	-7.86	-0.05
SECOM	1.26	-3.09	-0.04
BRITISH AMERICAN TOBACCO	0.54	-6.73	-0.04

Unclassified sector allocation includes cash allocations and Gold allocations (6.8% as of 9/30/2017).



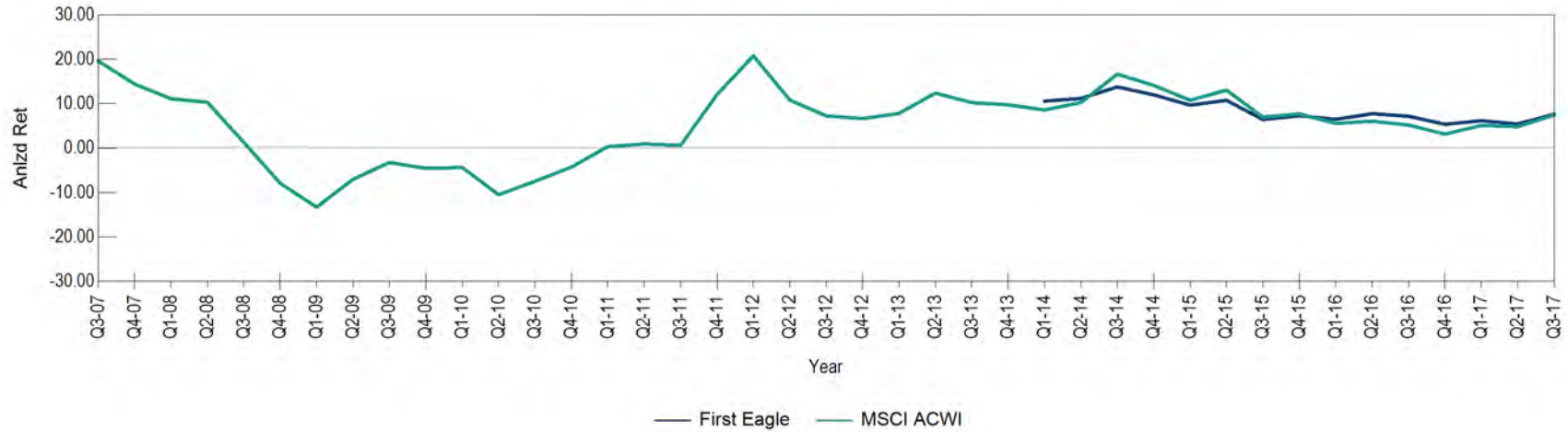


	Quarter	1 Year	3 Years	5 Years	10 Years	2016	2015	2014	2013	2012
<b>Return (Rank)</b>										
5th Percentile	9.4	28.2	14.1	16.5	9.8	21.5	8.5	17.1	38.6	29.5
25th Percentile	6.5	21.7	10.3	13.0	6.6	10.3	3.0	7.4	30.6	20.4
Median	5.2	18.9	8.6	11.5	5.2	6.8	0.1	4.6	26.2	17.2
75th Percentile	3.8	14.4	7.1	10.0	4.0	3.9	-2.9	1.5	20.0	14.4
95th Percentile	1.7	1.5	2.4	3.8	-0.8	-1.4	-15.1	-7.4	2.7	7.4
# of Portfolios	863	863	792	702	413	842	692	609	552	475
● First Eagle	3.1 (84)	10.9 (86)	7.6 (68)	9.3 (81)	-- (--)	11.7 (19)	0.2 (49)	4.5 (51)	17.9 (80)	13.9 (78)
▲ MSCI ACWI	5.2 (51)	18.6 (53)	7.4 (70)	10.2 (73)	3.9 (77)	7.9 (42)	-2.4 (73)	4.2 (54)	22.8 (66)	16.1 (61)

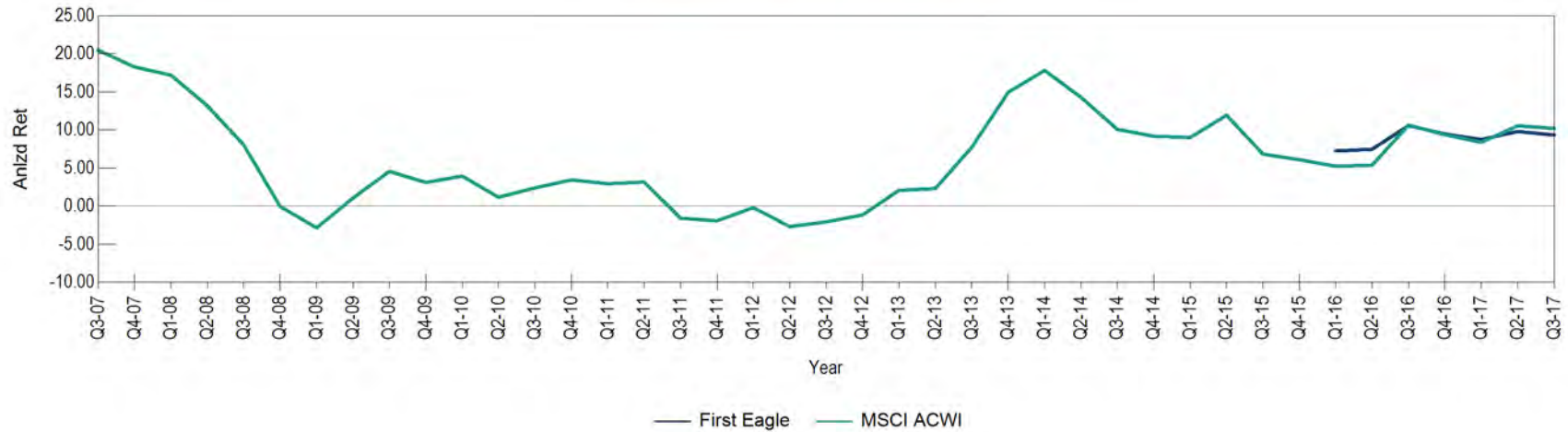
First Eagle  
 Manager Performance - Rolling 3 & 5 Year (Gross of Fees)

Period Ending: September 30, 2017

Rolling 3 Year Annualized Return (%)



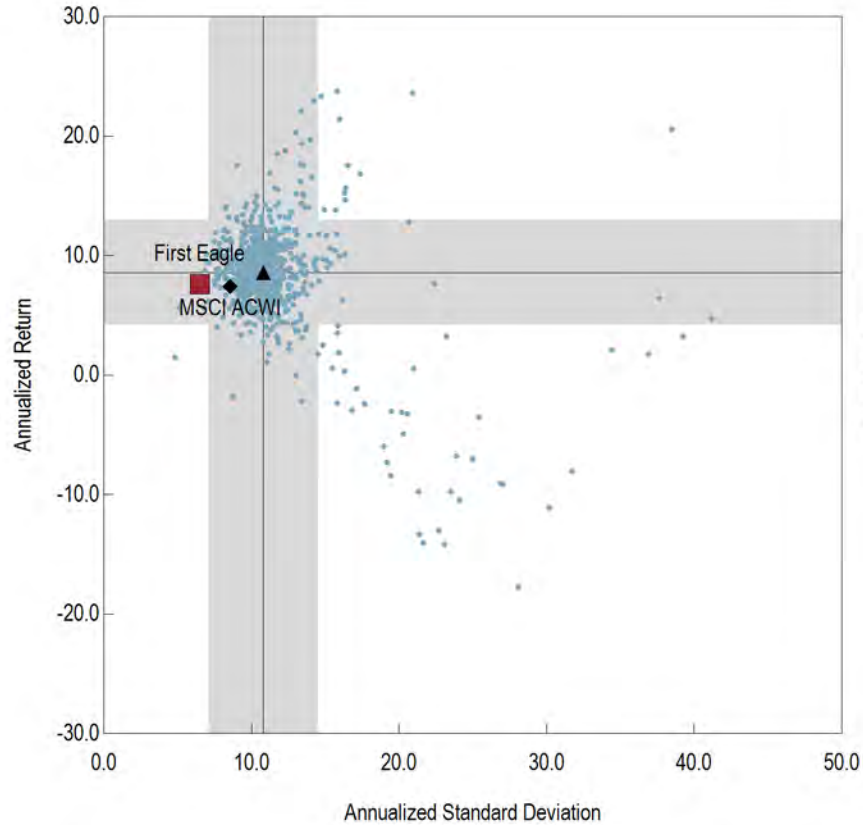
Rolling 5 Year Annualized Return (%)



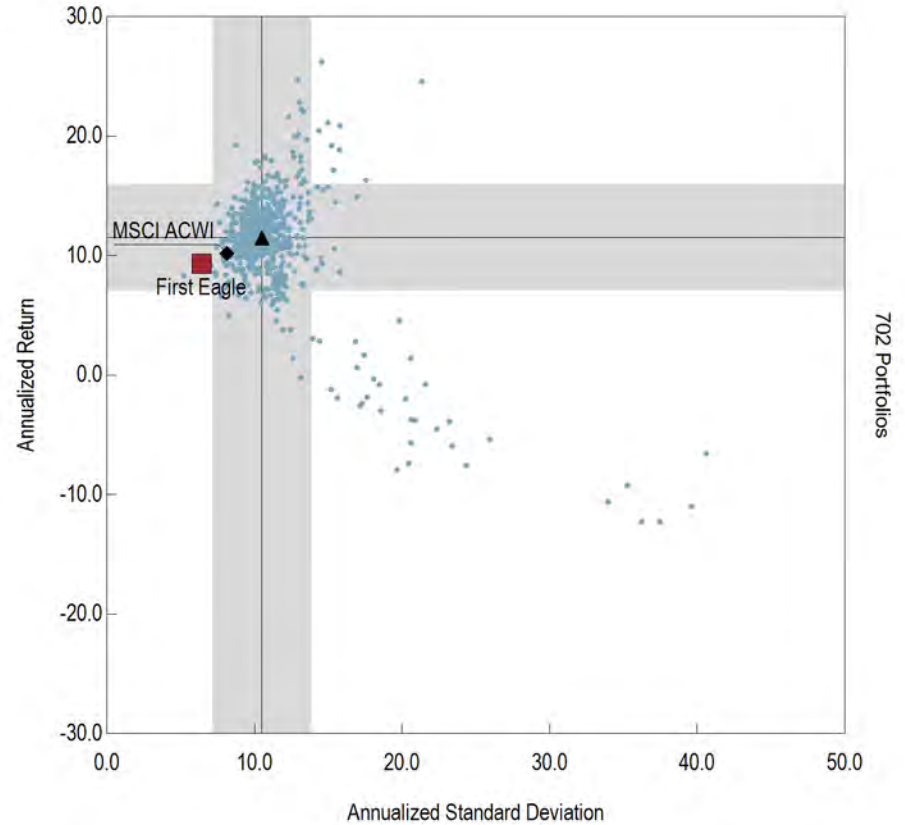
First Eagle  
Risk vs. Return 3 & 5 Year (Gross of Fees)

Period Ending: September 30, 2017

3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
First Eagle	7.6%	6.5%	1.1
MSCI ACWI	7.4%	8.5%	0.8
eA All Global Equity Gross Median	8.6%	10.8%	0.8

5 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
First Eagle	9.3%	6.4%	1.4
MSCI ACWI	10.2%	8.1%	1.2
eA All Global Equity Gross Median	11.5%	10.5%	1.1

## **Domestic Fixed Income Managers**

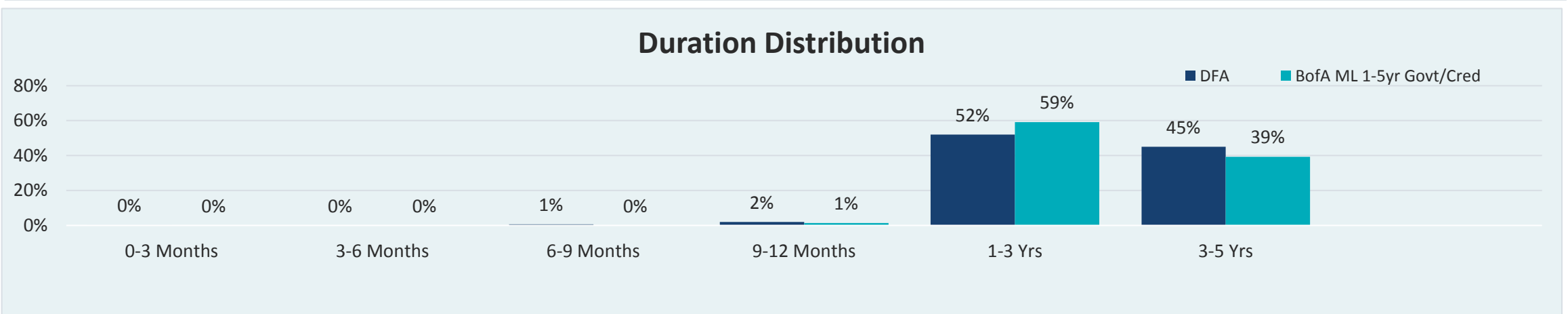
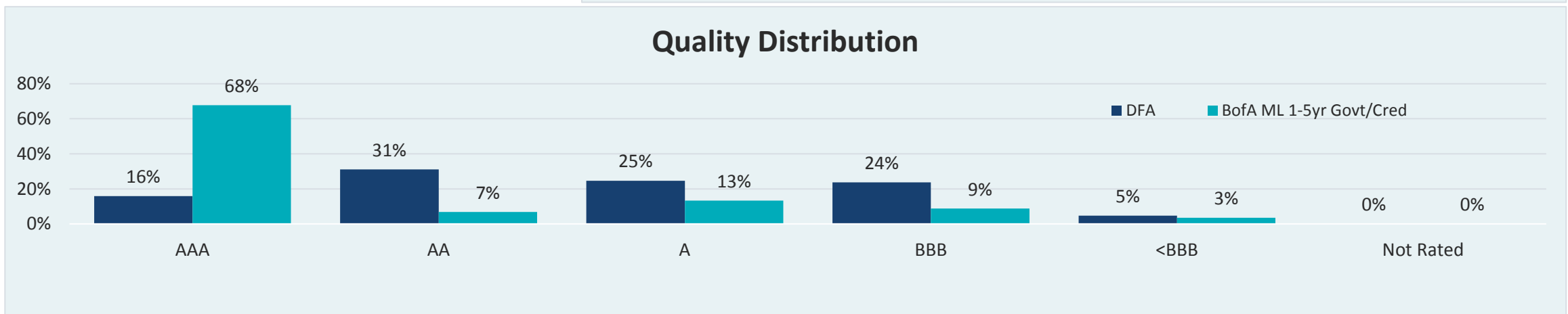
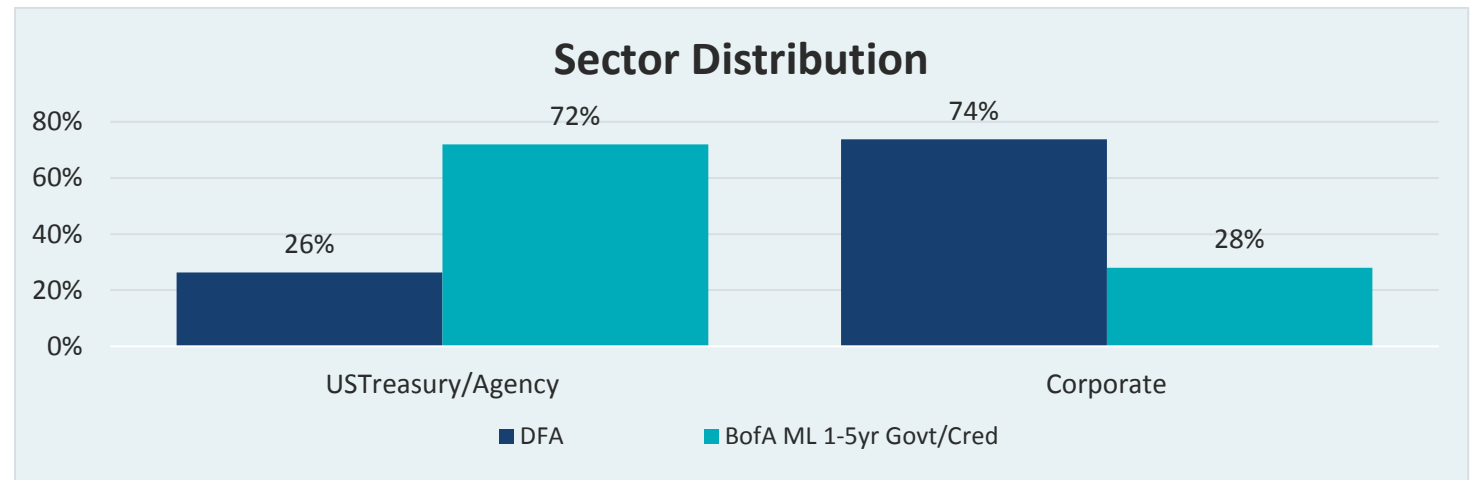
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# DFA Short Credit Manager Portfolio Overview

Period Ending: September 30, 2017

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	BofA ML 1-5yr Gov/Credit
Effective Duration	2.72	2.72
Yield to Maturity	2.19	1.85
Average Quality	A+	Aa1
Average Coupon	2.78%	2.44%

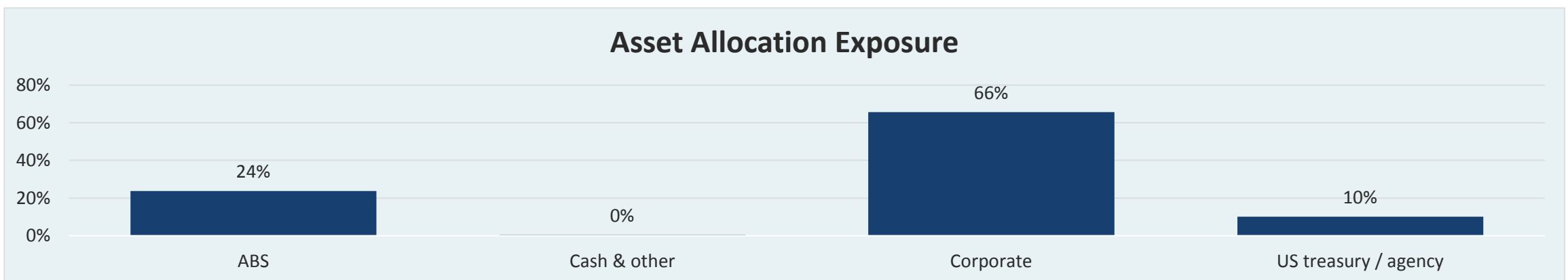
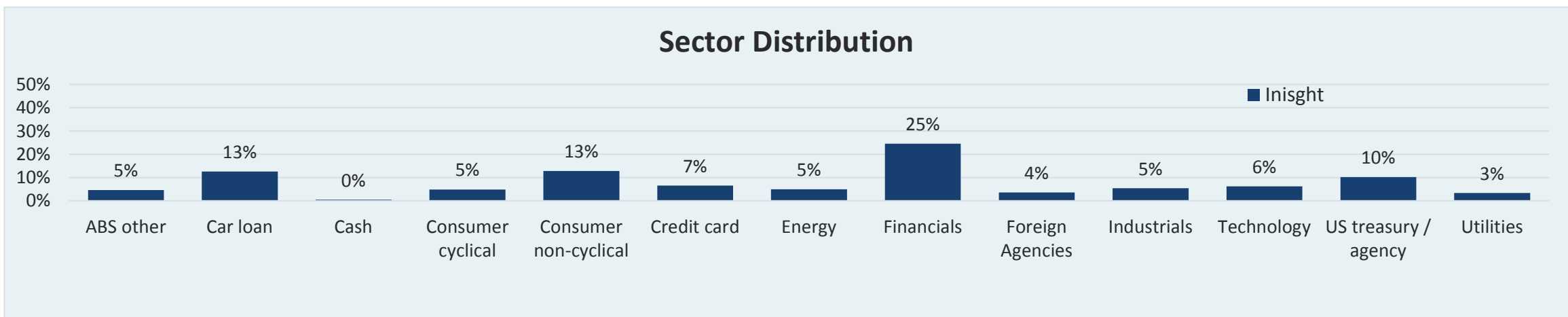
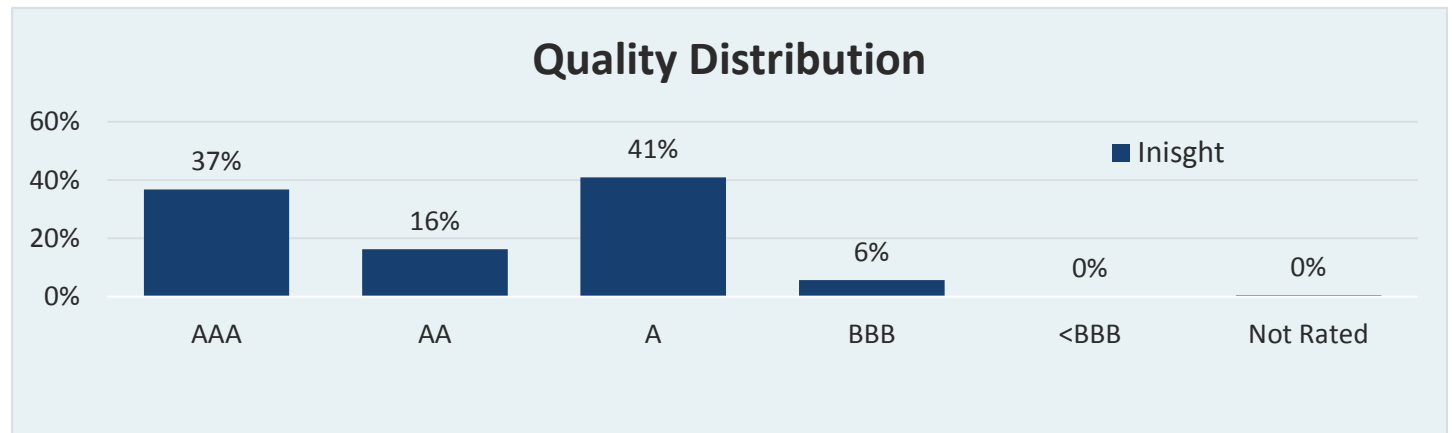


# Insight Short Duration Manager Portfolio Overview

Period Ending: September 30, 2017

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

	Inisight	BBgBarc 1-3yr Govt
Effective Duration	1.51	1.9
Yield to Maturity	1.78	AAA
Average Quality	AA-	1.6%

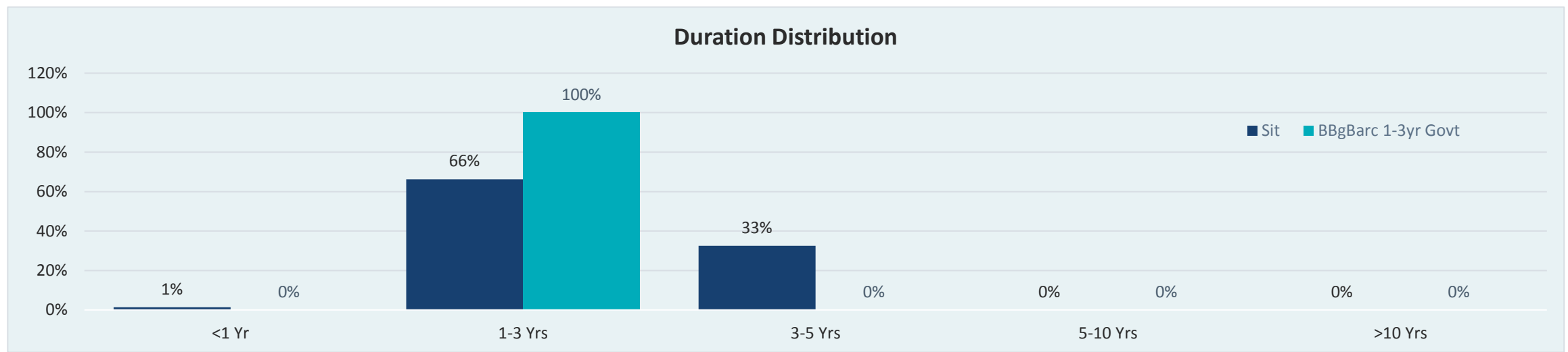
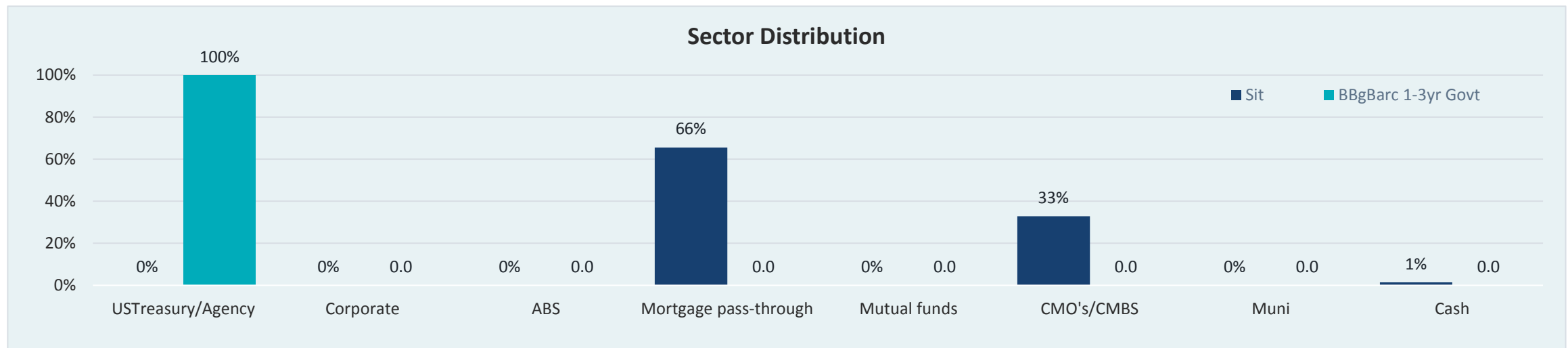


# Sit Short Duration Manager Portfolio Overview

Period Ending: September 30, 2017

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	2.5	1.9
Average Quality	AAA	AAA
Average Coupon	6.5%	1.6%



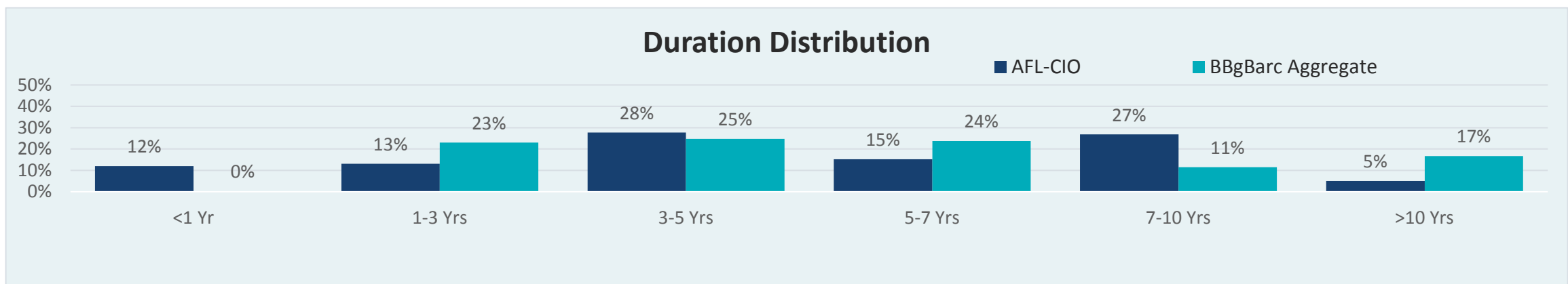
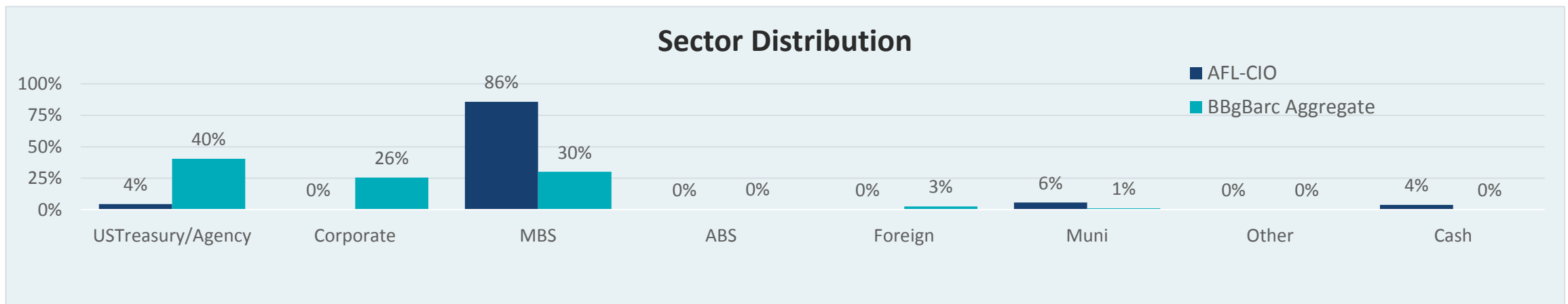
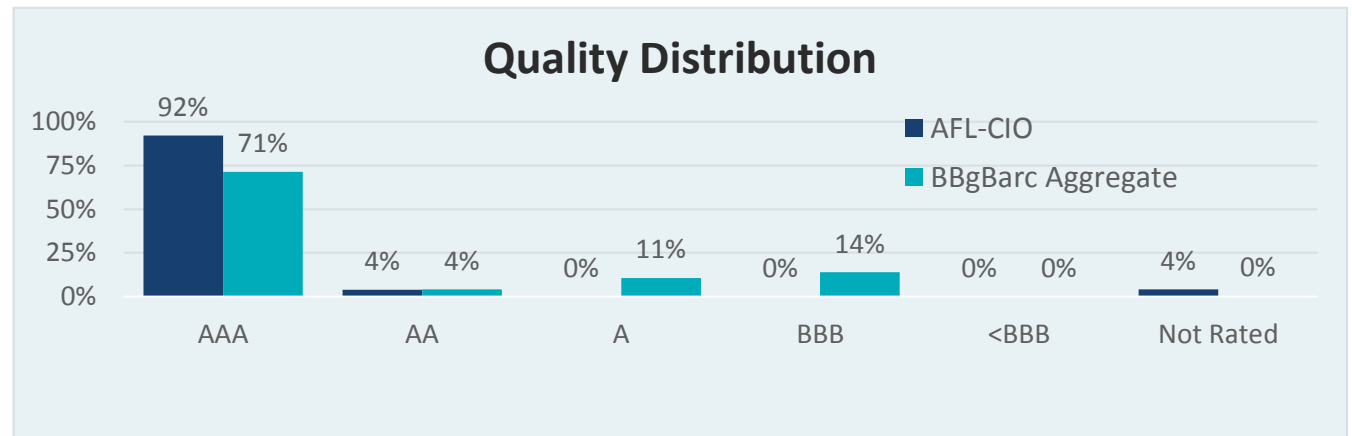
# AFL-CIO

## Manager Portfolio Overview

Period Ending: September 30, 2017

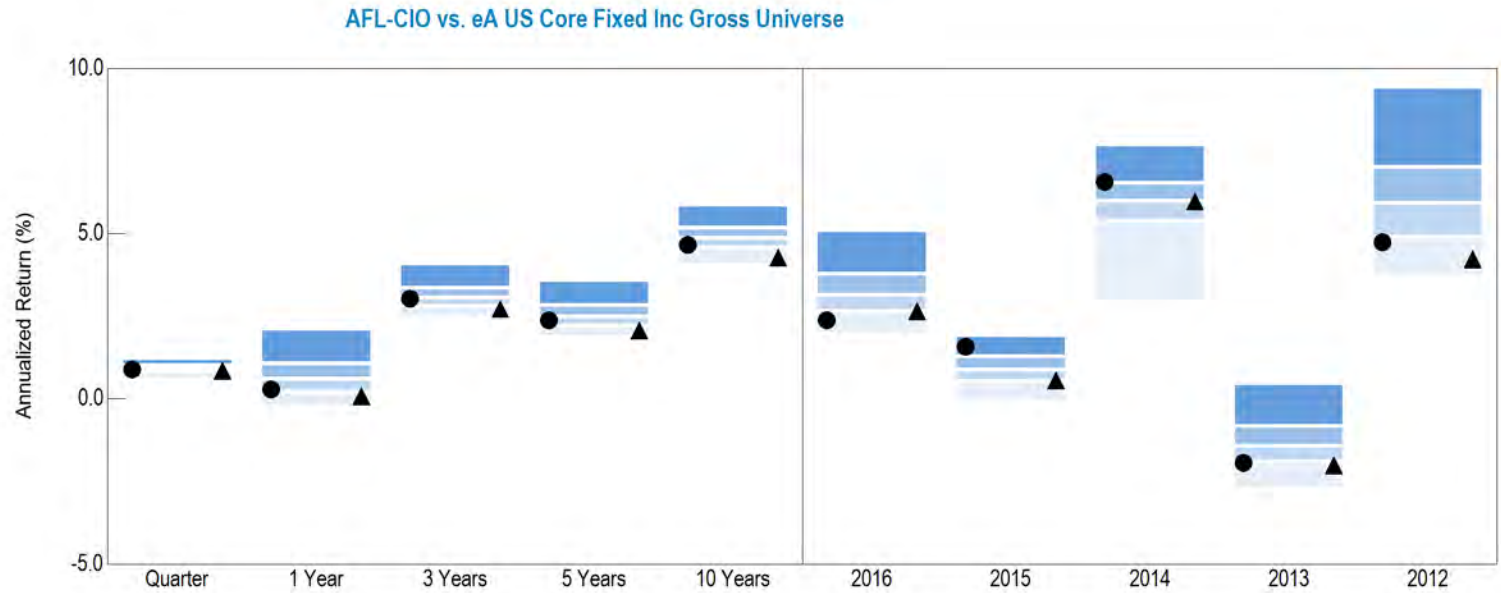
Domestic core fixed income portfolio with an exclusive focus on mortgage-related securities. Primary personnel include Stephen Coyle and Chang Su.

	AFL-CIO	BBgBarc Aggregate
Effective Duration	5.51	6.09
Yield to Maturity	3.23	2.50
Average Quality	AAA	AA
Average Coupon	3.22%	3.14%



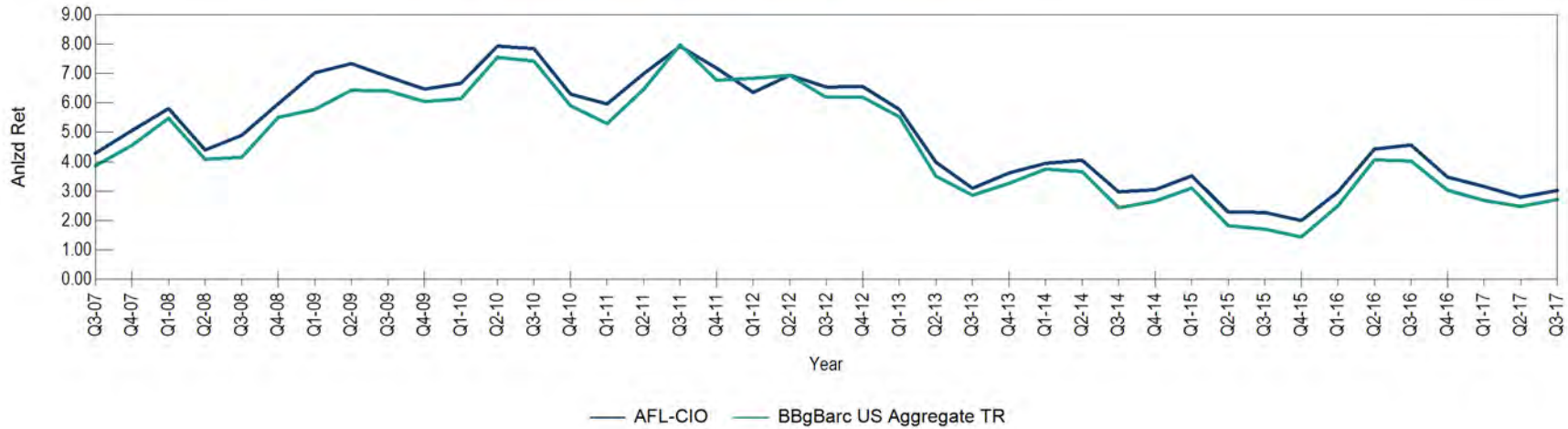
Duration and Quality distributions exclude cash.



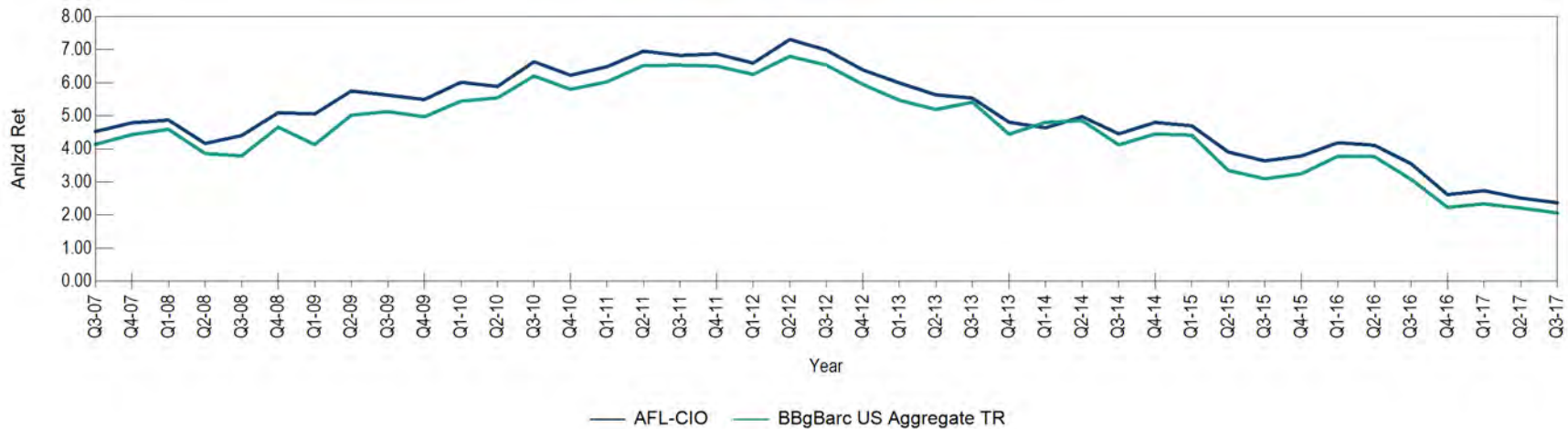


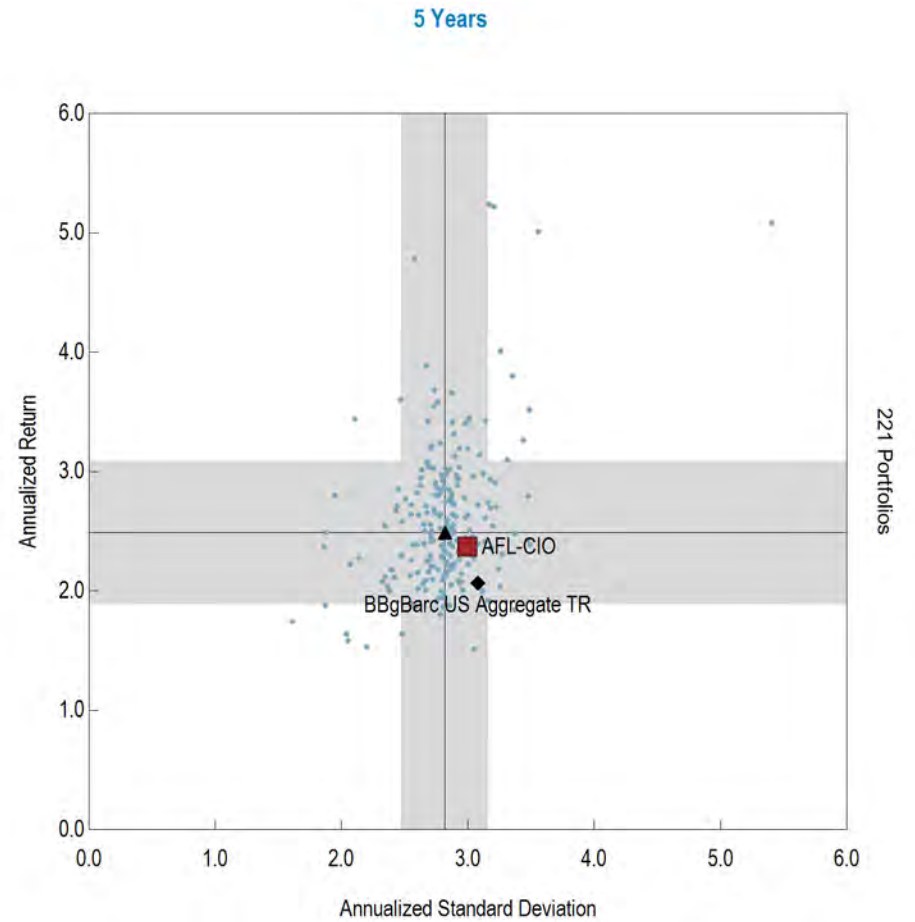
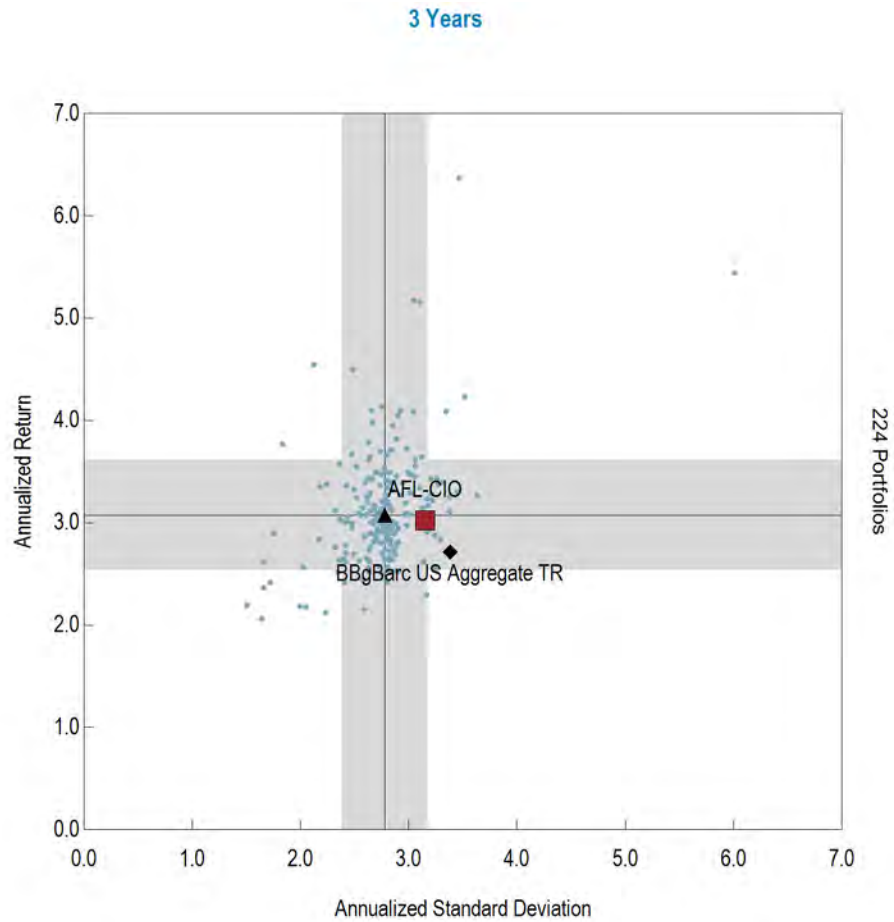
	Quarter	1 Year	3 Years	5 Years	10 Years	2016	2015	2014	2013	2012
<b>5th Percentile</b>	1.2	2.1	4.1	3.6	5.9	5.1	1.9	7.7	0.5	9.4
<b>25th Percentile</b>	1.0	1.1	3.4	2.9	5.2	3.8	1.3	6.5	-0.8	7.0
<b>Median</b>	0.9	0.6	3.1	2.5	4.9	3.2	0.9	6.0	-1.4	5.9
<b>75th Percentile</b>	0.8	0.2	2.8	2.2	4.6	2.7	0.5	5.4	-1.9	4.9
<b>95th Percentile</b>	0.6	-0.2	2.5	1.9	4.1	2.0	-0.1	2.9	-2.7	3.7
<b># of Portfolios</b>	226	226	224	221	202	223	196	213	209	228
● <b>AFL-CIO</b>	0.9 (60)	0.3 (75)	3.0 (54)	2.4 (64)	4.7 (68)	2.4 (87)	1.6 (15)	6.6 (25)	-1.9 (78)	4.7 (80)
▲ <b>BBgBarc US Aggregate TR</b>	0.8 (69)	0.1 (86)	2.7 (82)	2.1 (87)	4.3 (91)	2.6 (77)	0.6 (75)	6.0 (52)	-2.0 (82)	4.2 (90)

Rolling 3 Year Annualized Return (%)



Rolling 5 Year Annualized Return (%)





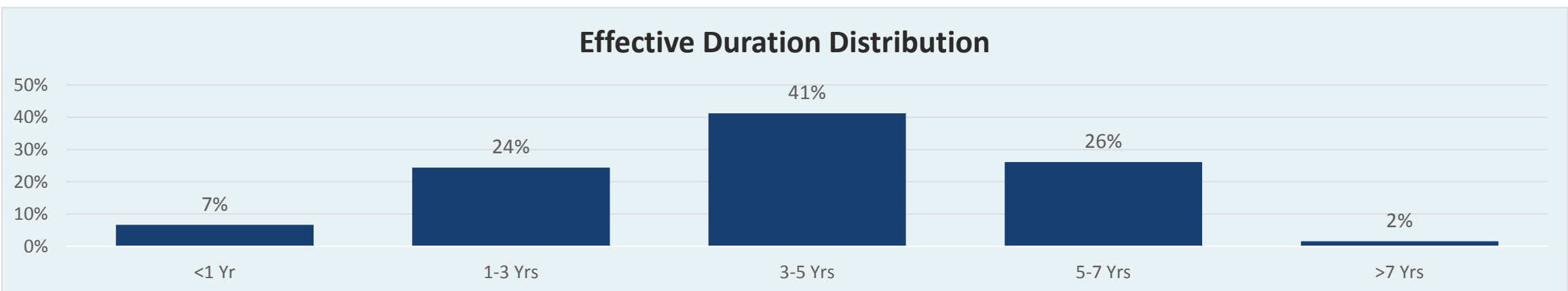
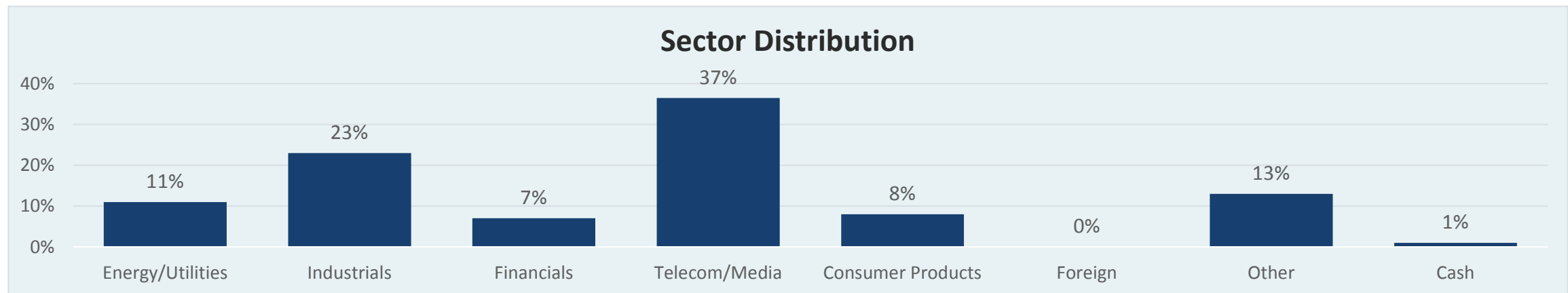
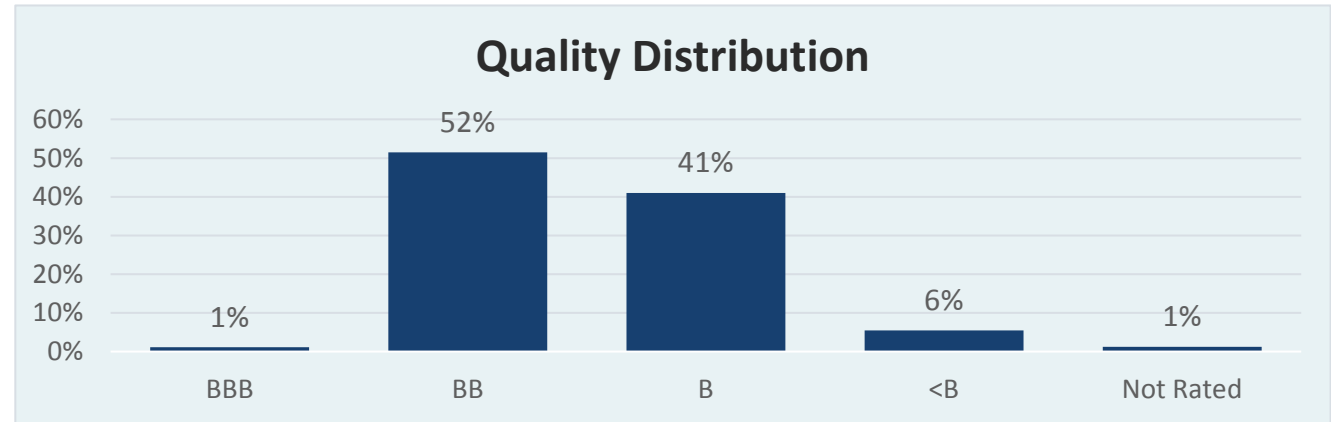
	3 Years			5 Years			
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	
AFL-CIO	3.0%	3.1%	0.9	AFL-CIO	2.4%	3.0%	0.7
BBgBarc US Aggregate TR	2.7%	3.4%	0.7	BBgBarc US Aggregate TR	2.1%	3.1%	0.6
eA US Core Fixed Inc Gross Median	3.1%	2.8%	1.0	eA US Core Fixed Inc Gross Median	2.5%	2.8%	0.8

## High Yield Managers

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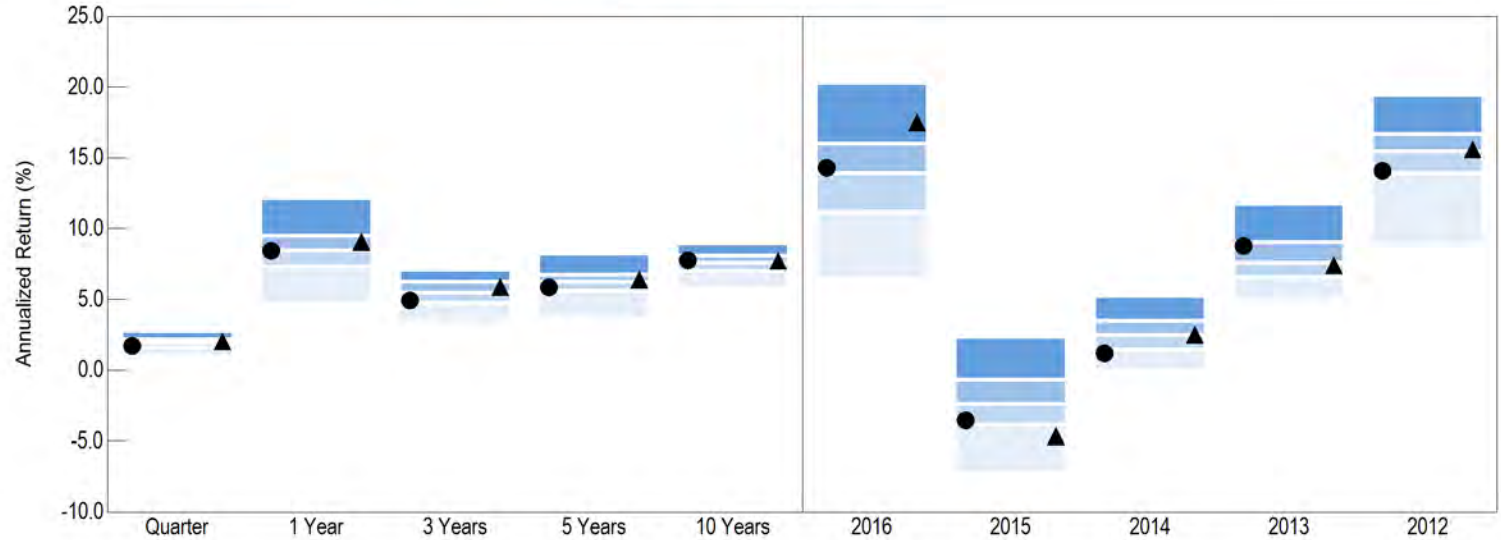
Domestic high yield fixed income portfolio with a focus on security selection. Primary personnel include Douglas Forsyth, Justin Kass, William Stickney, and Michael Yee.

	Allianz	BofA ML HY Master II
Effective Duration	3.8	3.9
Yield to Maturity	5.7	6.0
Average Quality	B1	B1
Average Coupon	6.5%	6.4%



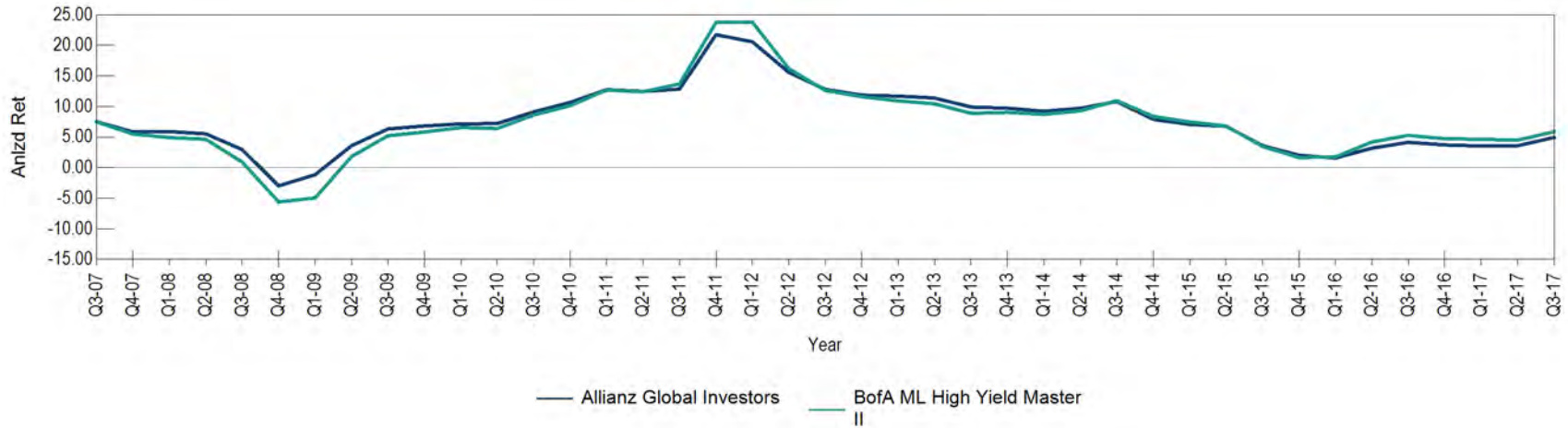
Quality distribution excludes cash.

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

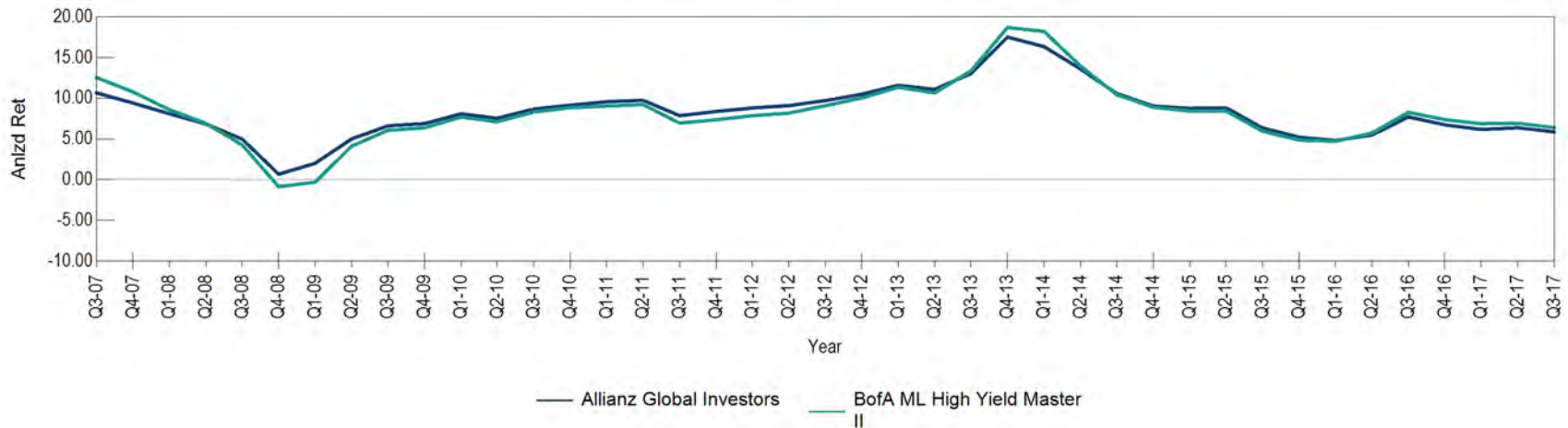


	Return (Rank)									
5th Percentile	2.8	12.1	7.1	8.2	9.0	20.3	2.3	5.2	11.7	19.4
25th Percentile	2.2	9.5	6.3	6.8	8.1	16.0	-0.7	3.5	9.1	16.7
Median	2.0	8.5	5.5	6.3	7.6	14.0	-2.4	2.5	7.6	15.5
75th Percentile	1.7	7.4	4.8	5.6	7.0	11.3	-3.8	1.5	6.6	14.0
95th Percentile	1.0	4.7	3.4	3.7	5.9	6.6	-7.2	0.0	5.0	8.9
# of Portfolios	194	194	187	168	118	183	155	141	130	129
● Allianz Global Investors	1.7 (73)	8.4 (51)	4.9 (72)	5.9 (68)	7.8 (43)	14.3 (47)	-3.5 (68)	1.2 (83)	8.8 (28)	14.1 (73)
▲ BofA ML High Yield Master II	2.0 (42)	9.1 (37)	5.9 (35)	6.4 (45)	7.7 (46)	17.5 (14)	-4.6 (83)	2.5 (50)	7.4 (55)	15.6 (47)

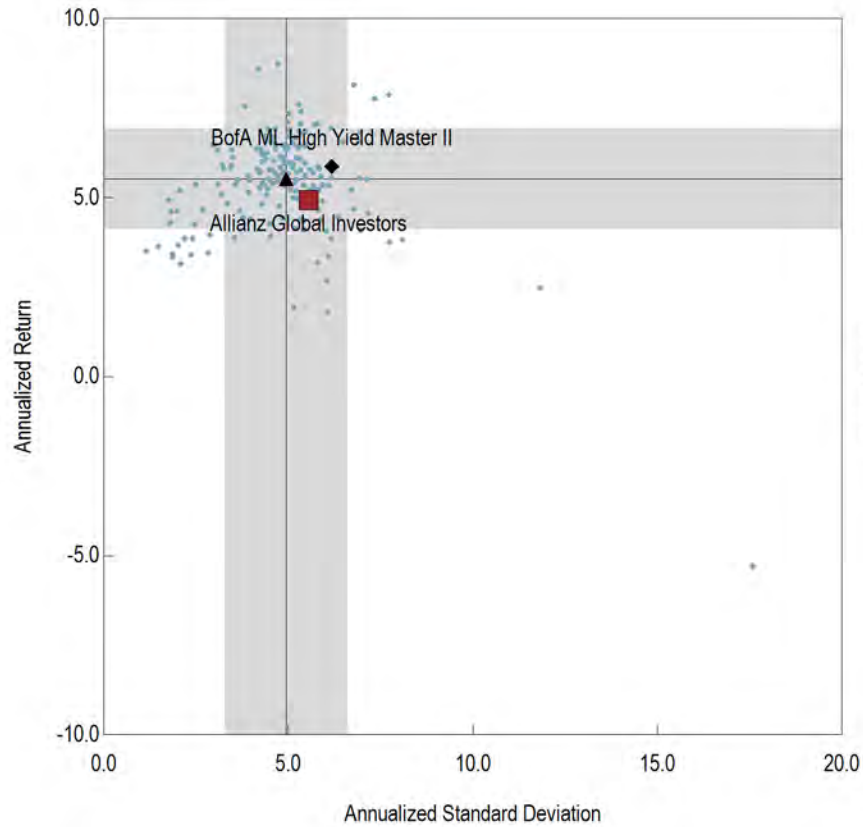
Rolling 3 Year Annualized Return (%)



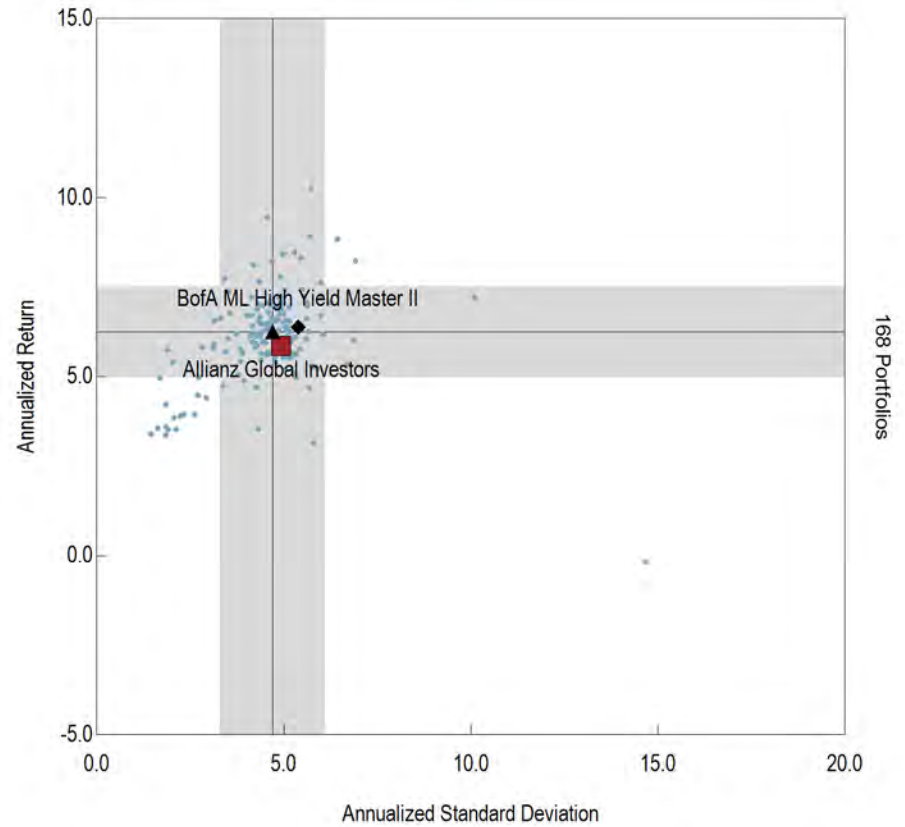
Rolling 5 Year Annualized Return (%)



3 Years



5 Years



3 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Allianz Global Investors	4.9%	5.5%	0.8
BofA ML High Yield Master II	5.9%	6.2%	0.9
eA US High Yield Fixed Inc Gross Median	5.5%	4.9%	1.1

5 Years

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio
Allianz Global Investors	5.9%	4.9%	1.1
BofA ML High Yield Master II	6.4%	5.4%	1.1
eA US High Yield Fixed Inc Gross Median	6.3%	4.7%	1.3



## Inflation Hedge Managers

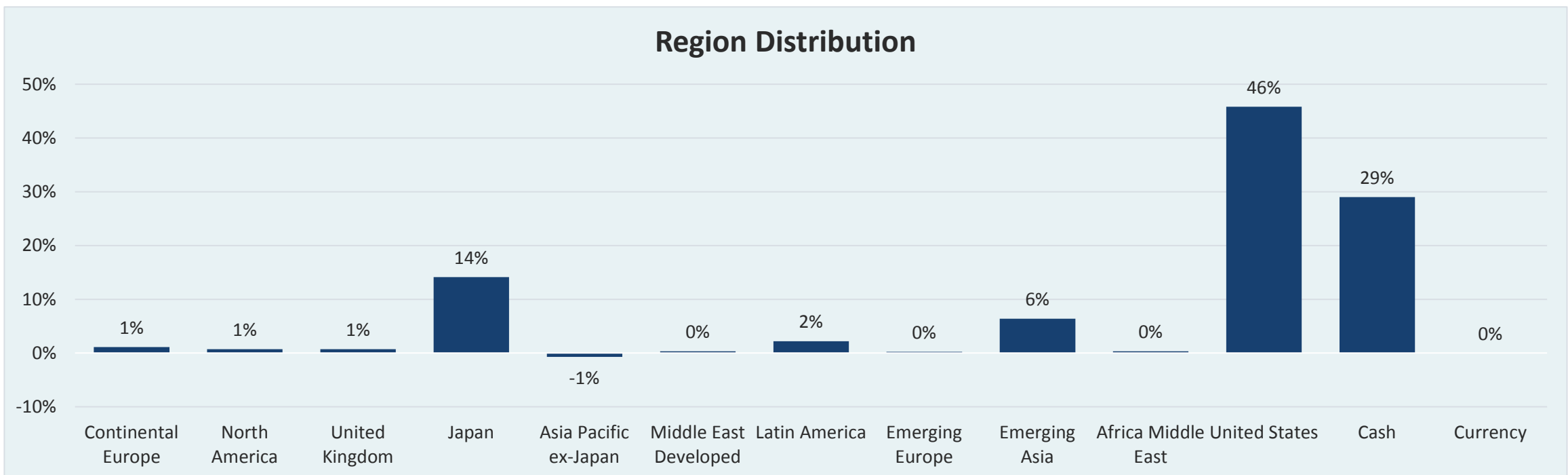
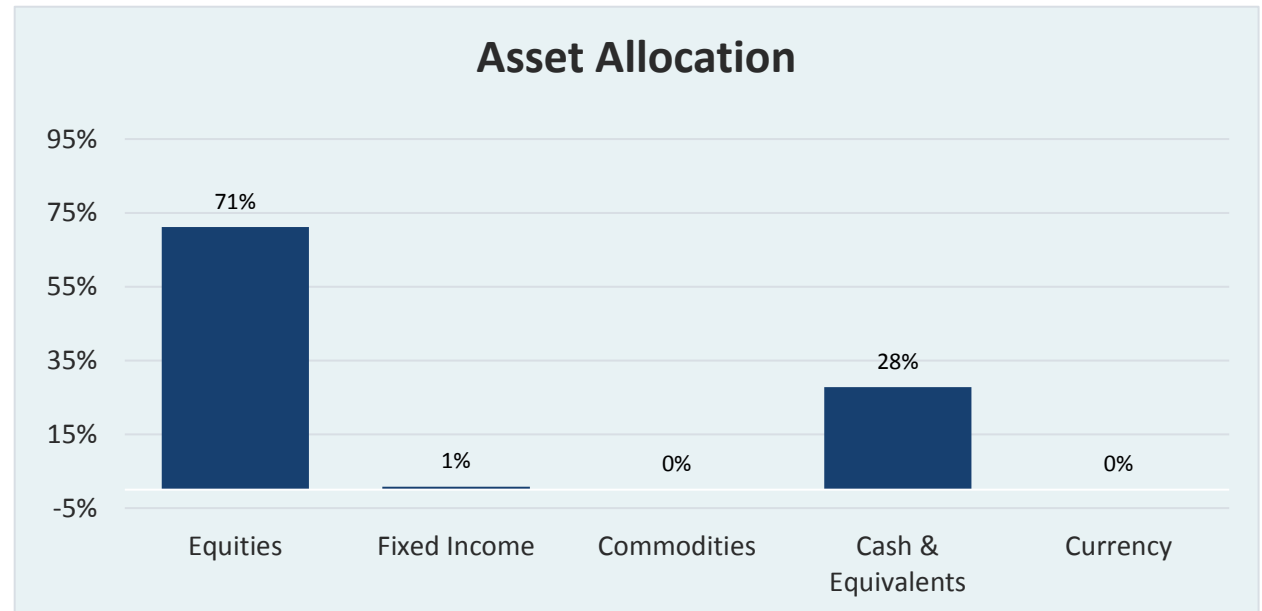
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# Wellington Total Return Manager Portfolio Overview

Period Ending: September 30, 2017

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	942
Number of Commodity Holdings	144
Effective Duration (Years)	4.30
Average Quality	D



# Real Estate Managers

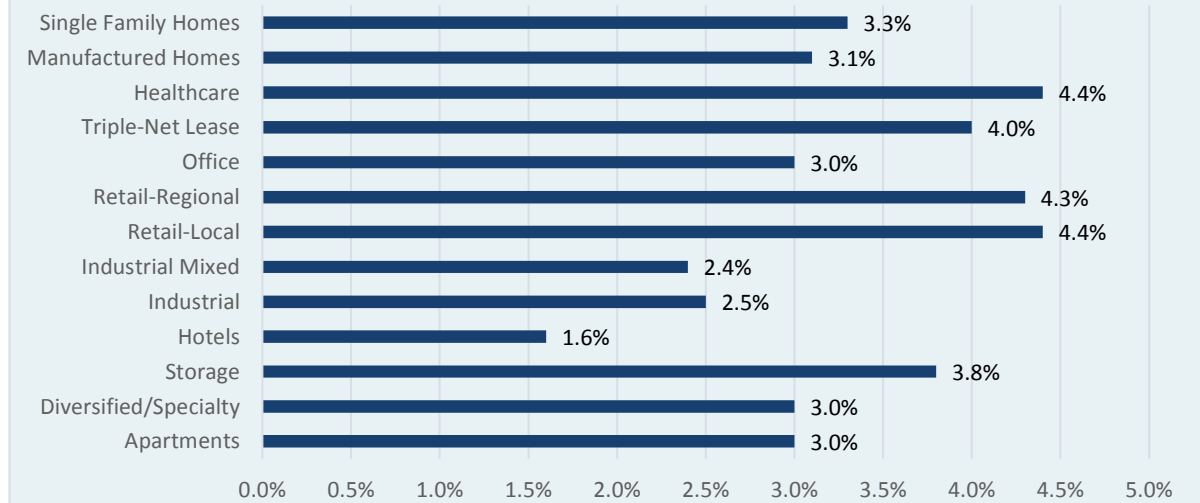
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Diversified portfolio of U.S. REITs with a focus on the underlying real estate assets

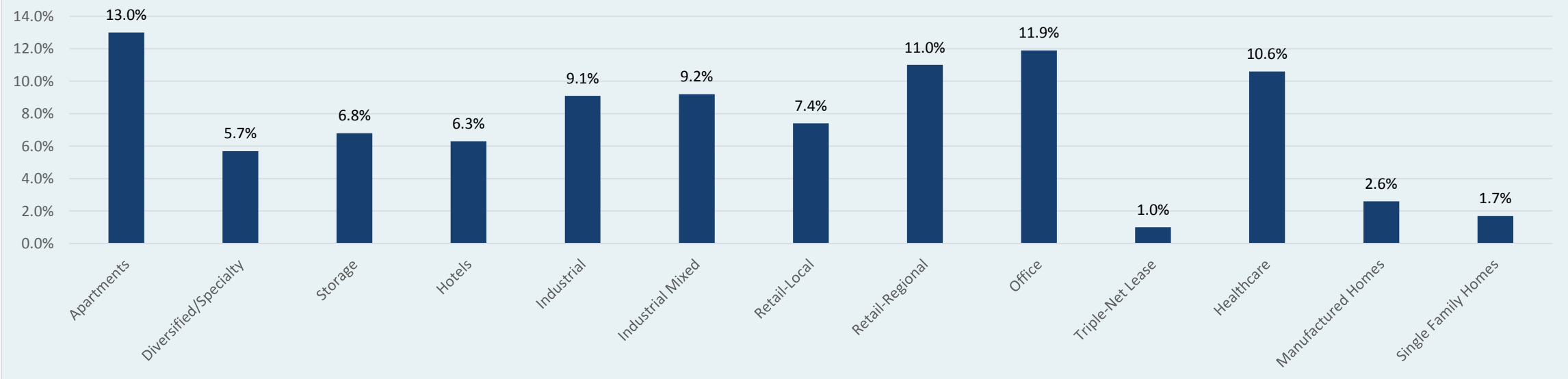
**Top Five Holdings**

Company	Property Type	Allocation
Simon Property Group	Retail-Regional	9.5%
Welltower Inc.	Healthcare	6.9%
Equity Residential	Apartments	5.7%
Vornado Realty Trust	Specialty	5.1%
Regency Centers Corp.	Retail-Local	4.8%

**Dividend Yield by Property Type**



**Property Type Allocation**



3.7% is allocated to Cash and Cash Equivalents.

**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 III	3/30/2007	Long Wharf
Jackson Square Partners	5/1/2005	State Street	Long Wharf Fund IV	7/3/2013	Long Wharf
Robeco Boston Partners	6/1/1995	State Street	Long Wharf Fund V	9/30/2016	Long Wharf
Emerald Advisors	4/7/2003	State Street	Invesco Real Estate I	2/1/2005	Invesco
Ceredex	11/6/2011	State Street	Invesco Real Estate II	11/26/2007	Invesco
Pyrford	4/25/2014	State Street	Invesco Real Estate III	6/30/2013	Invesco
William Blair	10/29/2010	William Blair	Invesco Real Estate IV	6/30/2014	Invesco
Artisan Partners	10/1/2012	SEI Trust	Oaktree REOF V	12/31/2011	Oaktree
First Eagle	1/18/2011	State Street	Oaktree REOF VI	9/30/2013	Oaktree
PIMCO RAE Emerging Markets	2/28/2017	State Street	Oaktree REOF VII	4/1/2015	Oaktree
TT Emerging Markets	7/27/2017	TT	Siguler Guff DREOF	1/25/2012	Siguler Guff
AFL-CIO	6/30/1991	AFL-CIO	Siguler Guff DREOF II	8/31/2013	Siguler Guff
Sit Short Duration	11/2/2016	State Street	Siguler Guff DREOF II Co-Inv	1/27/2016	Siguler Guff
DFA Short Credit	11/21/2016	State Street	Paulson Real Estate Fund II	11/10/2013	State Street
Insight Short Duration	11/18/2016	State Street	Adams Street Partners	3/18/1996	Adams Street
BlackRock	4/20/2017	BlackRock	Adams Street Partners II	1/16/2009	Adams Street
Torchlight II	9/30/2006	Torchlight	Adams Street Partners Venture	4/28/2017	Adams Street
Torchlight III	12/31/2008	Torchlight	Adams Street Partners - BFP	1/18/1996	Adams Street
Torchlight IV	7/1/2012	Torchlight	Adams Street Partners - Fund 5	9/21/2012	Adams Street
Torchlight V	7/1/2012	Torchlight	Bay Area Equity Fund	6/14/2004	DBL Investors
Allianz Global Investors	4/25/2000	State Street	Bay Area Equity Fund II	12/7/2009	DBL Investors
BlackRock Transition	11/1/2016	State Street	Carpenter Bancfund	1/31/2008	Carpenter Bancfund
Wellington Real Total Return	2/26/2013	State Street	EIF US Power Fund I	11/26/2003	Ares Management
Aether Real Assets III	11/27/2013	Aether	EIF US Power Fund II	8/16/2005	Ares Management
Commonfund	6/28/2013	Commonfund	EIF US Power Fund III	5/30/2007	Ares Management
Adelante	9/30/2001	State Street	EIF US Power Fund IV	11/28/2011	Ares Management
Cash	-	State Street	EIF US Power Fund V	11/28/2016	Ares Management
Angelo Gordon Realty Fund VIII	1/23/2012	Angelo Gordon	Nogales	2/15/2004	Nogales
Angelo Gordon Realty Fund IX	12/8/2014	Angelo Gordon	Paladin III	11/30/2007	Paladin
Angelo Gordon Energy Credit Opp	9/24/2015	Angelo Gordon	Ocean Avenue Fund II	6/11/2014	Ocean Avenue
DLJ RECP II	9/24/1999	DLJ	Ocean Avenue Fund III	4/15/2016	Ocean Avenue
DLJ RECP III	6/23/2005	DLJ	Pathway	11/9/1998	Pathway

DLJ RECP IV	2/11/2008	DLJ	Pathway 2008	12/26/2008	Pathway
DLJ RECP V	7/1/2014	DLJ	Pathway 6	5/24/2011	Pathway
Wastewater Opp. Fund	12/8/2015	Wastewater	Pathway 7	2/7/2013	Pathway
LaSalle Income & Growth VI	7/16/2013	LaSalle	Siguler Guff CCCERA Opps	6/3/2014	Siguler Guff
LaSalle Income & Growth VII	2/28/2017	LaSalle	Siguler Guff Secondary Opps	11/30/2016	Siguler Guff
Hearthstone II	6/17/1998	Hearthstone	Aether Real Assets IV	3/16/2016	Aether
Parametric Overlay	3/29/2017	State Street			

**Policy & Custom Index Composition**

Policy Index (12/1/2016 - present) 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% BofA High Yield Master II +2%, 5.1% BofA 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% BofA 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.

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.

# 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: Portfolio Return - [Risk-free Rate + Portfolio Beta x (Market Return - Risk-free Rate)].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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